



Able Marine Energy Park
Environmental Statement
Non-Technical Summary

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Able UK Ltd, ERM & Black & Veatch

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1.1 INTRODUCTION

1.1.1 Able Humber Ports Ltd (Able) proposes to develop a Marine Energy Park (or MEP) on the south bank of the Humber Estuary, to be known as Able Marine Energy Park (AMEP). An artistic impression of the development is reproduced in *Figure N1.1* (overleaf).

1.1.2 The site is located in North Lincolnshire; it is approximately 1 km downstream of the Humber Sea Terminal (HST) and immediately upstream of the South Killingholme Oil Jetty. A location plan is reproduced in *Figure N1.2*.

Figure N1.2 Site Location Plan



1.1.3 The development will serve the needs of the marine energy sector; this is a sector that is currently dominated by the offshore wind industry. A new quay will be built that is suitable for specialised offshore installation vessels. Onshore facilities will provide for the manufacture, assembly and storage of the principal components of offshore energy installations including wind turbines and related items.

Figure N1.1 Able Marine Energy Park - Artist's Impression



- 1.1.4 As part of the creation of the new quay, the development will include the reclamation of 45 ha of land that lies within the Humber Estuary. The estuary is designated under European law as an important site for nature conservation and forms part of the Natura 2000 network of sites across Europe. These sites include Special Areas of Conservation (SACs) and Special Protection Areas (SPAs). The loss of protected habitat that results from the reclamation will have an adverse effect on the integrity of the Humber Estuary SAC and SPA. The Humber Estuary is also a Ramsar site and a Site of Special Scientific Interest.
- 1.1.5 The boundaries of the designated sites are shown on *Figure N1.3*.
- 1.1.6 In order to ensure the coherence of the Natura 2000 network, new intertidal habitat will be created on the north bank of the Humber Estuary. This habitat will be created by realigning the existing flood defences at Cherry Cobb Sands, an area of arable land directly opposite the AMEP site and adjacent to the estuary. The habitat thus created will replace the habitat to be lost from the estuary by the construction of AMEP and will also provide land of equivalent functional value to that lost. This managed realignment site is located in an area known as Sunk Island, some 4 km to the south-west of Keyingham.
- 1.1.7 At another site close to Cherry Cobb Sands, Old Little Humber Farm, ground levels will be re-contoured to produce wet grassland for the benefit of feeding and roosting estuary birds. These works will be created within a 38.5 ha plot of land currently in arable use. Together, these two areas are referred to as “the Compensation Site”.
- 1.1.8 AMEP and the Compensation Site are together referred to as “the Project”. An application for the grant of a Development Consent Order for the Project is being submitted to the Infrastructure Planning Commission (IPC) in accordance with the requirements of the Planning Act 2008; the IPC will conduct the examination of the application, and the decision-maker will ultimately be the Secretary of State for Transport.
- 1.1.9 This document is the non-technical summary (NTS) of the Environmental Statement (ES) for the Project. It provides a broad overview of the content and conclusions of the environmental impact assessment conducted for the Project. This part of the ES has been structured to reflect the chapters which comprise the main document.

1.2 THE ENVIRONMENTAL ASSESSMENT PROCESS

- 1.2.1 The Infrastructure Planning (Environmental Impact Assessment) Regulations 2009 (“the 2009 EIA Regulations”) require an Environmental Impact Assessment (EIA) of the Project to be undertaken, implementing the requirements of European Directive 85/337/EEC, as amended. The principal purpose of an EIA is to ensure that all likely significant environmental effects are considered for the construction, operation and (where relevant) decommissioning of a scheme.
- 1.2.2 As a first step in the EIA for the Project, Able issued a Scoping Report to the IPC in September 2010. This described the proposed approach to the assessment, including the technical topics that would be covered. The IPC responded to this with a Scoping Opinion (dated 27th October 2010), setting out its detailed requirements. This informed the initial scope of the EIA.
- 1.2.3 Following this, a Preliminary Environmental Information Report (PEIR) was prepared and made available to statutory consultees and key stakeholders between 31 January and 19 March 2011 for the purposes of consultation. The PEIR included information gathered and assessments made up to that point. The PEIR and the subsequent consultation also informed the EIA process.
- 1.2.4 The ES was subsequently prepared to record the EIA process and describes the likely significant environmental impacts resulting from the Project and, where appropriate, the measures intended to mitigate any adverse impacts. The ES is divided into two volumes: *Volume 1* reports on the EIA undertaken for AMEP, *Volume 2* reports on the EIA undertaken for the Compensation Site. Where environmental effects act in-combination, or the two parts of the Project (or other forthcoming developments) act together to produce a cumulative effect, these are also considered in the ES.
- 1.2.5 The 2009 EIA Regulations require an ES to provide a description of the location, design and size of the scheme to enable the likely significant environmental effects to be assessed and to enable the IPC, statutory consultees and the public to make a properly informed response. Flexibility to respond to commercial opportunities and emerging economic circumstances is, however, essential if the Project is to proceed and be successful. To ensure a robust approach the environmental assessment has been based on an Indicative Masterplan that represents the maximum development that is proposed to be built.

- 1.2.6 As shown in *Figure N1.4* parts of AMEP have been divided into separate “land parcels”. Within these parcels, parameters are fixed as to appropriate levels of development with respect to height, massing and density. These parameters provide an “envelope” for assessing the impacts of the development. These parameters are detailed on the Indicative Masterplan, *Figure N1.5*.
- 1.2.7 The EIA takes account of all the reasonable variations in the form of the development that would be permissible within the parameters stated in the application, and the ES records the likely significant effects of these where appropriate. If the actual development were varied in any substantial way, such that its impacts could be materially worse than predicted, then a further application would need to be submitted prior to construction or implementation of any divergent elements.
- 1.2.8 The spatial, or geographical, scope of the EIA takes into account the following factors:
- the physical extent of the proposed works, as defined by the scheme design;
 - the nature of the baseline environment and the manner in which the impacts are likely to be propagated; and
 - the pattern of governmental administrative boundaries, which provide the planning and policy context for the Project.
- 1.2.9 In most cases the impact is likely to affect interests for a limited area around the Project. However, for some issues (such as socio-economics) the impact may affect regional level interests, or even be an impact of national or international significance.
- 1.2.10 The temporal scope of the assessment refers to the time periods over which impacts may be experienced. This has been established for each topic individually, and where appropriate through discussion with the relevant statutory consultees. In general, the following terms are used regarding temporal effects:
- *Short-Term* – the impact is temporary and lasts for up to 12 months;
 - *Medium-Term* – the impact occurs for up to 5 years; and
 - *Long-Term* – the impact remains for a substantial time, perhaps permanently.

- 1.2.11 There is potential for other projects that have been consented but not built and for projects that are still within the planning system to act cumulatively with AMEP to produce a more adverse impact than AMEP alone. Such projects have been identified throughout the EIA process, and a cumulative impact assessment has been undertaken where relevant.
- 1.2.12 The EIA for AMEP was led by Environmental Resources Management Ltd (ERM), working closely with Able and various other specialist consultants. Black and Veatch (B&V) led the EIA for the Compensation Site.
- 1.2.13 The final scope of the EIA examined the potential for significant impacts on the environment arising from construction and operation of the proposals with regard to the following issues:
- Geology and hydrogeology
 - Hydrodynamic and Sedimentary Regime
 - Water Quality and Sediment Quality
 - Aquatic Ecology
 - Terrestrial Ecology and Birds
 - Commercial Fisheries
 - Drainage and Flood Risk
 - Commercial and Recreational Navigation
 - Traffic and Transport
 - Noise
 - Air Quality
 - Historic Environment
 - Light
 - Landscape and Visual Impact
 - Socio-Economics
 - Aviation
 - Waste
 - Health
 - Cumulative and In-Combination Impacts
- 1.2.14 The broad conclusions of the assessment are summarised below with the detail included in *Volumes 1 and 2* of the ES.
- 1.3** *PLANNING POLICY AND CONTEXT*
- 1.3.1 AMEP has been defined as a Nationally Significant Infrastructure Project (NSIP) and is governed by the Planning Act 2008. A series of

National Policy Statements (NPSs) has been promulgated by the Government (or are currently being consulted upon) for NSIPs in England and Wales.

1.3.2 NPSs have been designated for port developments, as well as energy (including renewable energy). Between them, these set out Government policy on the need for renewable energy infrastructure at port locations. Taken together the designated NPSs recognise that there is an urgent need for renewable energy infrastructure to be developed, that offshore wind should provide a significant proportion of the renewable energy mix and that new port capacity is needed to support the offshore renewable sector.

1.3.3 In addition to the NPSs, Planning Policy Statements and Planning Policy Guidance set out the Government's national policies on different aspects of spatial planning. Planning authorities are required to have regard to these when determining planning applications. Planning circulars are also issued by the Government to provide guidance on material planning issues and are generally afforded weight in any planning decision.

1.3.4 Local planning in North Lincolnshire operates within a Local Development Framework (LDF). In June 2011, North Lincolnshire Council (NLC) adopted a new Core Strategy which sets out the long term spatial vision for the area and contains broad local planning objectives. Policy CS12 of NLC's Core Strategy strongly supports the development of a port at the application site, explaining that the role and function of the site is to:

'(m)aintain, increase and enhance the role of Immingham Port as part of the busiest port complex in the UK, by extending port related development northwards from Immingham Port to East Halton Skitter in harmony with the environmental and ecological assets of the Humber Estuary. This will include safeguarding the site frontage to the deep water channel of the River Humber for the development of new port facilities and the development of new pipe routes needing access to the frontage. The deep water channel offers the opportunity of developing a new port along the River Humber frontage between Immingham Port and the Humber Sea Terminal. The role of the South Humber Ports should be strengthened by providing an increased number of jobs particularly giving employment opportunities for North Lincolnshire and North East Lincolnshire residents'.

1.3.5 Part of the land within the AMEP application boundary already holds planning permissions for use as port related storage. The majority of

the remainder of the terrestrial areas of the site is in agricultural use, with several small light industrial plots and three residences within the boundary.

- 1.3.6 On the north bank, East Riding of Yorkshire Council's (ERYC) local planning policies are set out in The Holderness District Wide Local Plan which was adopted in April 1999. This is due to be replaced by an LDF, the Core Strategy of which is, at the time of application, under consultation and has not yet been published. The ERYC Local Plan does not preclude the development of managed realignment sites adjacent to the estuary and two have already been built: one at Welwick by Associated British Ports to compensate for works at the Port of Immingham and the Port of Hull, and one at Paull Holme Strays by the Environment Agency to compensate for their coastal defence works. There are no existing planning consents within the Compensation Site.

1.4 *DESCRIPTION OF THE PROJECT*

The Quay

- 1.4.1 Alternative quay configurations for the site were initially studied in 2009 by Mott MacDonald, on behalf of Yorkshire Forward and were informed by discussions with potential investors. Initially suspended finger piers and jetties were considered. These narrow structures are not, however, fit for the purposes of the offshore sector, as they provide very limited space for the transport, manoeuvring, handling and pre-assembly of offshore wind turbines (OWT), and for the laydown of large and heavy products being imported and exported. For these practical reasons, reclaiming land from within the estuary is considered the only viable means of providing a facility suitable for the offshore energy sector.
- 1.4.2 A number of alternative quay alignments were considered in detail with a view to balancing the following considerations:
- capital dredging works;
 - maintenance dredging works at the new quay;
 - minimising adverse changes to sedimentation patterns at nearby berths; and
 - changes to accretion patterns in the vicinity of the existing outfalls and intakes.

- 1.4.3 The alternative alignments that have been considered are illustrated in *Figure N1.6*.
- 1.4.4 Briefly, the quay frontage proposed in the application is 1 279 m in length and will be located close to the western edge of the existing dredged channel that provides access into the Humber Sea Terminal (HST).
- 1.4.5 The quay is proposed to be a solid berth structure for 1 200 m of its length with a front wall that comprises a combination of large diameter tubular steel piles alternating with steel sheet piles. This arrangement is commonly referred to as a combi-pile wall. This front wall will return at the southern end of the quay and form part of a specialist berth for emerging offshore wind turbine installation vessels. At the northern end, the quay returns at an angle that is square to the existing flood defence.
- 1.4.6 The berthing pocket in front of the quay will be over-dredged to the top of the natural bedrock and then backfilled to -11 m Chart Datum (mCD) with stone aggregate to enable repeated loading by 'jack-up' barges.
- 1.4.7 The existing intertidal area between the existing flood defence and the new quay will be filled with sea or estuary dredged material to bring the levels up to the proposed finished level of the quay. The upper sections of fill, approximately 1 m, will comprise imported stone that will provide a drained heavy duty pavement suitable for operational plant which will include tracked cranes and self propelled mobile transporters.
- 1.4.8 To enable the quay to operate twenty-four hours a day, sufficient lighting will be provided to enable personnel to access, egress and carry out their work safely and to identify any hazards or obstacles in the workplace. Accordingly, external lighting over the quay frontage will comprise 50 m towers that will be fitted with directional luminaires to limit spill outside the working areas.
- 1.4.9 Navigational lighting will be provided on the quay as required to enable safe berthing and manoeuvring of vessels.

Dredging

- 1.4.10 To enable vessel access to the operational quay and allow berthing alongside its length over a commercially viable tidal range, capital dredging will be required. *Table N1.1* details the approximate quantities of capital dredging works that will be required.

Table N1.1 Approximate Capital Dredge Quantities

Area	Dredge
Reclamation Area	294 500 m ³
Berthing Pocket	827 000 m ³
Approach Channel	682 000 m ³
Turning Area	132 000 m ³
TOTAL	1 935 500 m³

Industrial Areas

General

1.4.11 As noted above, AMEP will provide a base for the manufacture of marine energy generators and related items. The particular mix of manufacturing facilities that will locate to the site cannot be fixed prior to the application. The manufacturing site is based on the following indicative development proposal for the offshore wind sector:

- three nacelle factories producing a total of 600 units per year;
- two tower factories producing a total of 400 units per year;
- two blade factories producing a total of 1 200 units per year;
- two foundation factory producing a total of 50 units per year; and
- a Supply Chain Park.

1.4.12 As the manufactured goods are bulky and, other than blades, cannot be stacked, the factory units require substantial external areas for storage of their finished product. These laydown areas are designed to be sufficient to ensure that manufacturing is never interrupted by the absence of available storage space.

Buildings

1.4.13 Factory units will be of steel framed construction with powder coated metal cladding. Office space is incorporated into, or annexed to, each building, up to three storeys in height. Each building will have a bituminous car parking area with safe pedestrian access from the car park into the buildings. The car parks will be illuminated with 30 m high columns. External illuminated unit identification signs may be provided on one side of each building

External Storage Areas

1.4.14 External storage areas within each plot will be provided with a stone pavement suitable for tracking by heavy duty plant. To suppress dust

the surface will be finished with a skim of tarmac chippings or similar. As with the quay, the external storage areas around the manufacturing plants will need to operate twenty-four hours a day. Accordingly, external lighting for these areas will also comprise 50 m towers.

Surface Water Drainage

- 1.4.15 The site will be provided with an improved ditch system that will carry surface water to a new pumping station. The new ditches will comprise a main channel and a flood berm that will store water in extreme events and minimise, as far as reasonably practicable, the pumping requirement.

Foul Water Drainage

- 1.4.16 Foul water drainage from buildings will fall by gravity into pumping stations distributed throughout the site. These will pump the foul effluent through rising mains into the adopted foul water drainage system operated and maintained by Anglian Water.

Ground Levelling

- 1.4.17 Existing ground levels within the manufacturing site will be graded to provide adequate falls into the new surface water drainage system. Along the eastern edge of the manufacturing area ground levels will be raised by around 3.5 m to tie into the quay.

Highways Access

- 1.4.18 The site is currently provided with two accesses on Rosper Road. One access is currently a private road but will be improved and the junction reconfigured to a standard that is suitable for its increased level of use. Access for existing users will be maintained.
- 1.4.19 One additional access is proposed onto Rosper Road to facilitate access and egress. This new junction is located between Station Road and the existing access into Able Humber Port Facility. Rosper Road will need to be widened at this location to provide a right turn for traffic approaching the site from the south.

Rail Access

- 1.4.20 The existing rail line that runs through the site is the remnant of the Killingholme Branch Line and has been largely disused since 2005. The existing Network Rail infrastructure terminates just beyond the HST,

the track beyond having been taken up in the 1960s. The existing line will become a privately operated siding. A barrier will be erected to demarcate the siding from the Network Rail line and control access. New level crossings will be constructed to enable access for manufactured goods to the quay.

Soft Landscaping

1.4.21 A soft landscaping scheme is proposed to mitigate for the impacts of the development on the existing ecology and to soften and screen the development insofar as it is possible to do so, given its scale. Landscaping proposals include:

- shrub and tree planting at the entrance to each plot and around car parking areas;
- shrub and tree planting along Rosper Road to supplement existing features; and
- a green corridor running along the side of the main north south ditch running through the site.

1.4.22 Species of generally local provenance will be used that are known to suit the particular microclimate adjacent to the estuary.

Ecological Mitigation Area

1.4.23 To the south of the industrial development lies a 48 ha plot that will be landscaped and managed in the future for the benefit of ecological interests that would otherwise be adversely affected by the development. The majority of the plot will be managed as wet grassland to provide feeding and roosting habitat for over-wintering birds.

1.4.24 A 0.7 ha plot of land to the south of Chase Hill Wood will also be managed for the benefit of fauna. This will include the creation of new ponds for the translocation of great crested newts from the main development site.

Diversion of Public Rights of Way

1.4.25 A public right of way exists along the top of the existing flood defence wall within the AMEP site. This right of way will be diverted around the perimeter of the site. The route is shown on *Figure N1.7*.

Construction Methodology – AMEP Site

Working Hours

- 1.4.26 Construction is proposed to be undertaken at the times detailed in *Table N1.2*:

Table N1.2 *Schedule of Working Hours*

Location	Day	Working Hours
Marine Works	Monday to Friday	Piling Works: 06:00 – 22:00
	Saturday	
	Sundays and Bank	All other Works: At all times
	Holidays	
MEP Site, existing terrestrial areas	Monday to Friday	07:00 to 19:00
	Saturday	07:00 to 17:00
	Sundays and Bank	Occasional working as required
	Holidays	

Marine Works

- 1.4.27 Marine works, other than piling works, are proposed to be undertaken twenty fours a day. Vessel lighting will be required including localised task lighting after dark. Lighting will be kept to a minimum with light spill controlled by the use of appropriate lighting units.
- 1.4.28 Once the pile wall has been installed, land reclamation will commence. A system of pipelines will transport either imported marine dredged material or material from the capital dredge, from the supply vessel or dredger respectively, into the cells.
- 1.4.29 A minimum 2 year construction programme is anticipated for the marine works although this is dependent on other constraints established during the consultation process, in particular any restrictions imposed on working during the winter period.

The Manufacturing Areas

- 1.4.30 It is expected that approximately 2 million m³ of fill will need to be imported onto the site over a period of around two years. Ground raising will be undertaken in parallel with construction of the factory units.

Mitigation of Construction Impacts

- 1.4.31 Mitigation of any potential effects would be delivered through a Code of Construction Practice (CoCP) to be approved by the local authority.

Operational Details

The Quay

- 1.4.32 The application includes for the creation of a new harbour authority to manage the operation of the facility. On completion, the quay will be used for the export of goods and for the import of materials and components that are procured from overseas or from other coastal locations within the UK.
- 1.4.33 Loading of the installation vessels will be undertaken using a combination of heavy duty mobile dock cranes and the vessels' own cranes. Loading of each vessel will be undertaken on a 24/7 basis with a typical total turnaround time for each vessel of between 24 and 48 hours. However, loading is a weather critical operation with crane lifts being subject to limiting wind speeds for safety reasons.
- 1.4.34 Vessels alongside will also replenish their consumables and may undertake some routine maintenance.

The Manufacturing Park

- 1.4.35 Given the current policy and market focus on offshore wind (set out in further detail in *Section 1.5* of this NTS), the indicative masterplan is based upon a development that serves that sector. Nevertheless, alternative technologies may emerge that will also be served by the facility.
- 1.4.36 A range of products will be manufactured on the site using a variety of processes and will generate some waste materials that will be disposed of in an environmentally responsible manner.

Decommissioning

- 1.4.37 The quay, once constructed will form a significant part of the nation's port infrastructure. Accordingly, there will be an overriding requirement to maintain the quay rather than decommission it.
- 1.4.38 Whilst the industrial buildings will be constructed with a nominal 60-year design life, it is possible that in the future they will be dismantled

and replaced with other bespoke buildings. A large proportion of the buildings will be recyclable at the end of their commercial life.

- 1.4.39 The Health and Safety File, produced in accordance with the Construction (Design and Management) Regulations 2007 will record all materials incorporated into the works to enable safe demolition in the future if it is ever required.

1.5 *THE NEED FOR THE DEVELOPMENT*

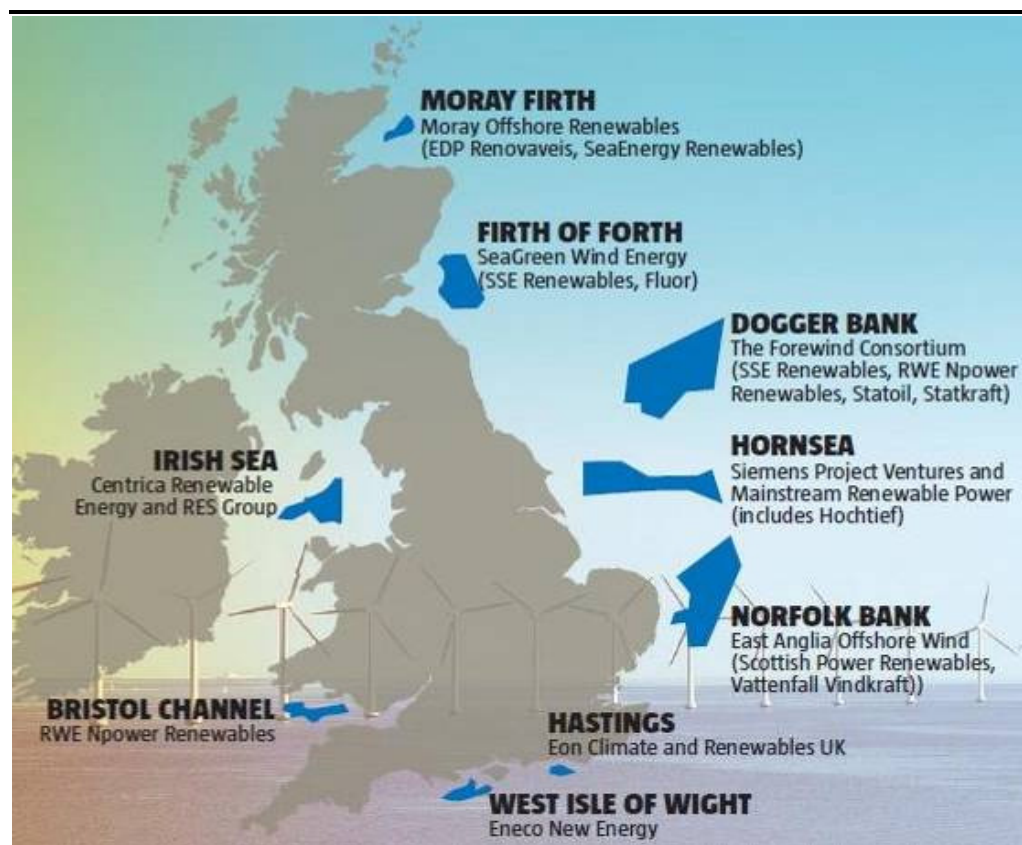
- 1.5.1 The global environmental threat to the Earth from the potential effects of climate change is, beyond any reasonable scientific doubt, significant and will inevitably result from a continued increase in the levels of greenhouse gases in the atmosphere.

- 1.5.2 In response to this, the international Kyoto Protocol required that subscribing states seek to reduce their greenhouse gas emissions. A more recent objective is implemented in the EU by the Renewable Energy Directive (RED), which has passed into UK law and led to the development of a new UK energy policy that is substantially reliant on offshore wind energy. The EU is committed to near zero carbon energy production by 2050.

- 1.5.3 As required by the RED each Member State has submitted a national action plan for renewable energy to the EC. These show a targeted and significant increase in both onshore and offshore wind turbine developments. In the UK, The Crown Estate has licensed two rounds of offshore development in the past, but with a planned total capacity of 32.2 Gigawatt (GW), a third tranche, Round 3, represents a step-change in the scale of development. Development zones for the first two rounds were generally near shore, whereas Round 3 zones are much further offshore and are concentrated off the east coast of the UK, as illustrated in *Figure N1.8*

- 1.5.4 The future rate of development of offshore wind cannot be predicted with complete certainty, but for the UK a sustainable production capacity of around 3.5 GW per annum by 2020 is a reasonable goal. For the remainder of Europe, the annual demand is likely to be around a further 4 GW of manufacturing by 2020 and increasing thereafter.

Figure N1.8 Round 3 Development Zones



Source: New Civil Engineer

- 1.5.5 Current manufacturing facilities are scaled to produce sub-4 Megawatt (MW) turbines that are transportable by road for the onshore market, but research and development is focusing on new turbines with double the generating capacity specifically for the offshore sector. These turbines will be larger and heavier than before. New manufacturing facilities for offshore wind will therefore need to be located at port facilities with significant storage space and with direct access to quays that are able to withstand heavy plant.
- 1.5.6 The Department for Energy and Climate Change (DECC) have long recognised this need for port facilities to service Round 3 sites and in 2009 published 'UK Ports for the Offshore Wind industry: Time to Act'. The report identified a need for between 2-3 000 m of quay space for the offshore energy sector
- 1.5.7 Two potential alternative solutions to meet the needs of the offshore wind sector are possible:
- **Ad-hoc approach:** Discrete development of individual manufacturing facilities within the footprints of existing ports with ad-hoc use of existing port facilities for construction. In the long term this will give rise to a distributed supply chain with significant

logistical demands and simply accelerate the need for further port development as the nation's buffer for other international trading activities is eroded. In the worst case, an ad-hoc approach to development is likely to act as a deterrent private sector investment.

- **A strategic approach:** The development of bespoke MEPs that combine manufacturing sites, construction ports and an import/export quay. Such an approach allows the development of industrial clusters capable of meeting a significant proportion of the offshore wind market demand in an efficient and commercially advantageous manner, necessary in a market led approach. The scale of a MEP will be determined by the optimisation of the facilities onsite but will require a substantial quay and associated large areas of storage space.

1.5.8 To meet the identified need established in the national renewable energy action plans; to address longer term national and European policy for a zero carbon energy industry, and to promote growth in its manufacturing sector, the UK needs to establish one or more MEPs. Such facilities, if sufficiently large and located in a commercially advantageous position, have the capacity to attract significant private sector investment. The urgency and scale of the need justifies the development of a significant site at this time. This by itself will not, however, preclude the need for further significant development at other ports in the future.

1.6 CHOICE OF SITE

1.6.1 The choice of site is a material planning consideration for this project because, if it were to be carried out, the possibility of an adverse effect on the integrity of a Natura 2000 site cannot be excluded.

1.6.2 The principal criteria in relation to the choice of site for AMEP are:

- proximity to the Round 3 Windfarm sites;
- vessel access for 10m draft vessels with no air draft restrictions;
- berthing facilities for jack-up barges; and
- at least 150 ha of flat land

1.6.3 A number of potential port sites were identified in the DECC publication, 'UK Offshore Wind Ports Prospectus'. The report contains details of 26 potential ports, 15 of them on the southern and eastern shoreline of the UK, which could be developed to serve the offshore wind industry in some capacity, though not necessarily as a MEP.

These ports are Nigg, Peterhead, Dundee, Methil, Leith, Blyth, Tyneside, Able Middlesbrough, Hartlepool, Able Seaton, ABP Humber, Able Humber, Great Yarmouth, Isle of Grain and Sheerness.

- 1.6.4 Whilst seven alternative sites have been considered, the application site is unique in its size and optimal location. Two alternative sites – Bathside Bay and Southampton - have sufficient land available for a MEP development but both are also located within Natura 2000 sites and any development would necessitate land reclamation within those sites. A third site – Sheerness – can support some manufacturing and construction activity but is much smaller than the application site and, if developed, would be needed as well as other manufacturing sites.
- 1.6.5 The application site is in the optimal location to serve the three largest offshore wind development zones licensed by the Crown Estate. The land is appropriately allocated for port development by the local authority, North Lincolnshire Council. It is also adjacent to a maintained deep water channel that has the benefit of having no air restriction to the open sea. The development would also give rise to significant socio-economic benefits in a relatively deprived area of the UK.
- 1.6.6 The loss of Natura 2000 habitat that would result from the development can be compensated for in close proximity on the opposite bank of the estuary.
- 1.6.7 In the absence of any single site that could be brought forward as a feasible alternative to AMEP then an equivalent grouping of sites along the east coast of Britain, possibly including sites on continental Europe, might provide an equivalent manufacturing and construction capacity. However, such a distributed supply chain is not likely to result in a reduced environmental impact but would have a greater carbon footprint.
- 1.6.8 AMEP provides a singular opportunity for the significant expansion of the low carbon offshore energy sector in the UK.

1.7 *GEOLOGY, HYDROGEOLOGY AND GROUND CONDITIONS*

Terrestrial Geology

- 1.7.1 The geological maps for the application site indicate that the area is underlain by marine and estuarine alluvium in the east and glacial till in the west with a small outcrop of glacial sand and gravel in the south-

east. These estuarine and glacial deposits are overlain either by topsoil, in the areas still used as arable farmland or made ground in the developed areas in the north of the application site and along the railway line. The application site is underlain by Burnham Chalk in the west and Flamborough Chalk in the east.

Estuarine Geology

- 1.7.2 Within the footprint of the proposed quay the mudflats are composed of Tidal Flat mud with outcrops of Tidal Flat sand and Gravel and Glacial Till. The channel bed comprises sands of Seabed & Tidal River Bed Deposits.
- 1.7.3 Several previous site investigations have been undertaken at AMEP to develop an understanding of the site's baseline geology. Ground conditions encountered in the investigations all show consistency with alluvial deposits covering the eastern areas of the site, overlying cohesive glacial deposits underlain by chalk bedrock.

Impacts - General

- 1.7.4 The terrestrial geology is considered unlikely to be adversely impacted by AMEP. The site has been partly developed in recent years and the remaining undeveloped areas are currently used as farmland. As such extensive made ground is unlikely to be encountered through the construction works.
- 1.7.5 Imported material for ground raising will be tested for contaminants prior to incorporation into the AMEP works. Contaminated material will not be used.
- 1.7.6 A hydrogeological risk assessment has concluded that the proposed piling and dredging works at AMEP are unlikely to have a negative impact on the principal aquifer which underlies the entire site.

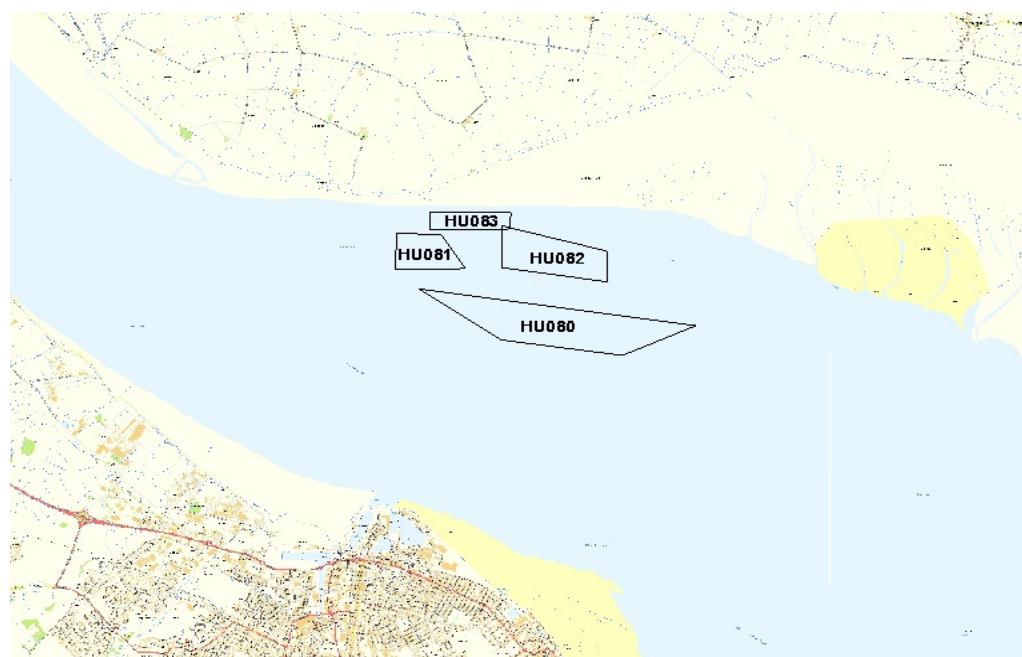
Impacts - Dredging

- 1.7.7 A dredging strategy has been prepared for the all phases of the dredging works. The strategy outlines the methodology of dredging and the anticipated disposal locations.
- 1.7.8 In the absence of any other beneficial use, the default option is to dispose of all material within the estuary and thereby maintain the sediment supply. A number of disposal sites are open in the estuary and are divided between those that receive erodible deposits, such as

the alluvium and sands and gravels, and those that receive non-erodible deposits such as the glacial till.

- 1.7.9 It is proposed that all erodible material will be deposited at Middle Shoal (HU080), since the character of that material will be similar to that normally deposited at the site. Unerodible deposits will be deposited at the 'window' sites to the north of Sunk Dredge Channel (HU081, 082 and 083). These sites are shown in *Figure N1.9*

Figure N1.9 Proposed disposal sites in the Humber Estuary (©OS OpenData™),)



1.8 *HYDRODYNAMIC AND SEDIMENTARY REGIME*

- 1.8.1 The Humber Estuary is a macro-tidal estuary with a spring tidal range of 6.0 - 7.0m at AMEP. High water levels increase further upstream as tidal flows are constricted by the narrowing estuary.
- 1.8.2 An assessment of the effects of AMEP on hydrodynamic and sedimentary processes has been carried out using appropriate numerical modelling tools. The modelling has been used to simulate the baseline conditions of hydrodynamic and sedimentary processes in the Humber Estuary, and subsequently to determine and quantify the predicted effects of AMEP on these baseline conditions.
- 1.8.3 Two and three dimensional hydrodynamic numerical models were constructed, calibrated and validated in order to simulate baseline

flows within the estuary. The model grid extends from Spurn Head to Trent Falls.

Dredging

- 1.8.4 The construction of AMEP requires a significant capital dredging operation. In total, and including the reclamation area, berths, approach channel, and turning area 1 935 500 m³ will be extracted from the estuary bed and some material may be released back into the water column during the process. Dredged material will comprise clays, sand, gravels and silts. The dredging programme will lead to a temporary increase in sediment in the water column, which may travel from the dredging site and from the disposal site to other areas of the estuary.

Flows

- 1.8.5 Currents within the estuary are dominated by the tide. Upstream, the monthly average freshwater flow rate at Trent Falls of 250 m³/s has been estimated from Environment Agency data, with a variability of ± 110 m³/s. Observations of currents near to Killingholme used to calibrate the hydrodynamic model show that magnitudes can reach approximately 1.5 m/s offshore and 1.1 m/s in the near shore zone during a modest spring tide.
- 1.8.6 Flow speeds are reduced upstream and downstream of AMEP during flood and ebb tides and over a distance of 0.6 km to 1 km from AMEP. Flow speeds are initially increased seawards of the quay. This scale of changes remained the same when tested in combination with other developments proposed on the Humber.

Bed Shear Stress

- 1.8.7 The shear stresses experienced on the bed of the Humber Estuary determine the evolution of the morphology. Significant reductions in bed shear stress are predicted upstream and downstream of AMEP, with increases seawards of AMEP. The changes to bed shear stresses give an indication of changes to sedimentation and erosion that have been assessed using sand and mud transport models.

Waves

- 1.8.8 Immediately in front of the AMEP quay, increases in wave height of up to 0.4 m are predicted. 750 m offshore the predicted increase reduces to 0.2 m. In terms of wave impacts on the shoreline, slight increases in the wave height corresponding to 200 year event are predicted along the

adjacent shoreline, with the largest increase predicted immediately adjacent to AMEP and to the north though this has been mitigated through use of rock armour.

Sediments and Maintenance Dredging Requirements

- 1.8.9 Predicted increases in sedimentation into AMEP dredged areas and to the north of the quay indicate a need for maintenance dredging. No increases to maintenance dredging requirements are predicted for Humber Sea Terminal, South Killingholme Jetty, Immingham Oil Terminal, Humber International Terminal, or Immingham Bulk Terminal.
- 1.8.10 In the absence of sediment management activities to the north of the quay, bed levels across approximately 12 ha of intertidal would rise to form a similar response to that which is seen north of the Humber International Terminal reclamation. To the south of AMEP less change is predicted on the upper intertidal areas as a result of the intertidal levels already being higher in response to the HIT development.
- 1.8.11 An estimated 1 ha of intertidal to the south of AMEP is likely to be affected by construction, maintenance, and evolution of a drainage channel from a proposed drainage outfall through which all surface water runoff from the development will be discharged.

1.9 WATER QUALITY AND SEDIMENT QUALITY

- 1.9.1 The construction and operation of AMEP has the potential to impact on the quality of water and sediment in the Humber Estuary, both through the effects of dredging and the effects of the presence of the quay on the behaviour of water and sediment in the estuary system.

Water Quality

- 1.9.2 The disposal of dredge arisings will cause a sediment plume, resulting in an increase of suspended sediment concentrations (SSCs) of 80-100 mg/l by the end of the disposal programme with short lived peaks of around 250 mg/l during disposal. Similar increases in sediment concentrations will occur around the AMEP site. The configuration of the new quay will result in a marginal increase of the water temperature at the intake of the E.On and Centrica power stations to the north of the quay of up to 0.25 °C. The increases in ambient water temperature and SSCs will not result in any significant impacts to water quality as the increases will not result in exceedance of any

environmental quality standards (EQS) or Water Framework Directive (WFD) status thresholds.

Sediment Quality

- 1.9.3 An investigation has been carried out to determine the levels of contamination in the sediment that will be disturbed by the construction works. CEFAS (Centre for Environment, Fisheries and Aquaculture Science) has defined two action levels that govern how material is to be managed.
- 1.9.4 Any contaminant below Action Level 1 threshold is classified as not a risk and any over the Action Level 2 threshold is considered a risk. Any contaminant that falls between the two thresholds is considered a potential risk. Professional judgement is required to determine whether any further actions are required.
- 1.9.5 A number of metal contaminants, including copper, within the intertidal and subtidal surface sediments exceed the UK CEFAS Action Level 1 Guidelines. However, they do not exceed CEFAS Action Level 2.
- 1.9.6 AMEP associated capital dredging activities will cause sediment bound contaminants to become widely redistributed within the Estuary with a minor portion permanently removed from the estuary with the outgoing tides to coastal waters. The dredging activities will not result in any significant impacts on sediment quality. The impacts of maintenance dredging will be of a similar order of magnitude as capital dredging and will therefore also be insignificant.

1.10 AQUATIC ECOLOGY

- 1.10.1 There are a number of habitats and species of conservation interest in the vicinity AMEP. This impact assessment was undertaken to assess potential impacts to aquatic ecology with a focus on the habitats and species of conservation interest and wider ecosystem structure and functioning.
- 1.10.2 In summary, significant impacts to aquatic ecology from construction of AMEP only occur as a result of the necessary reclamation of subtidal and intertidal area. These significant ecological impacts are to be compensated by the creation of the Compensation Site at Cherry Cobb Sands. A full assessment of the compensation measures will be

assessed as part of a Habitats Regulation Assessment that is submitted as part of the AMEP application, though separately to the ES.

- 1.10.3 On the grounds of the area of influence of piling noise, it is concluded that there is a potentially significant impact on local resident fish. Migratory fish species of conservation interest are unlikely to be affected by prolonged exposure to piling unless piling noise would act as an acoustic barrier; though there is no evidence of such an effect.
- 1.10.4 No other significant impacts to aquatic ecology construction or operation of AMEP are predicted when mitigation measures inherent to the Project design are taken into account.

1.11 *TERRESTRIAL ECOLOGY AND BIRDS*

- 1.11.1 The Humber Estuary is one of the largest estuaries in the UK comprising extensive wetland and coastal habitats. Its input of freshwater into the North Sea is the largest in Britain draining a catchment of some 24 240 km², and it has the second-highest tidal range in Britain (7.2 m). At low tide approximately one-third of the estuary is exposed as mud or sand-flats. There are extensive areas of reedbed with areas of mature and developing saltmarsh in the inner estuary, with grazing marsh in the middle and outer estuary. Behind the saltmarsh, there are low sand dunes with marshy slacks and brackish pools. The estuary supports important numbers of waterbirds (especially geese, ducks and waders) during the migration periods and in winter, and important breeding populations of terns and raptors over the summer months. The estuary's assemblage of over-wintering and passage birds are attracted by the wide expanse of mudflat that is exposed within the estuary at low tide and which provide feeding grounds rich in invertebrates. At high tide the assemblage is forced to roost outside of the SPA. Some flocks roost in adjacent fields whilst others fly several kilometres inland. Other protected species present in the estuary include grey seals, river and sea lamprey

Principal Impacts

- 1.11.2 AMEP has the potential to cause significant adverse impacts both in terms of habitats and species. In terms of habitats, the new quay will reclaim 45 ha of estuary habitat, both intertidal and subtidal; the intertidal habitat is an important resource for eight species of the resident bird assemblage, including:

- bar-tailed godwit (maximum of 2.1 percent of Humber population);
- black-tailed godwit (66 percent);
- curlew (3.6 percent);
- dunlin (4.8 percent);
- lapwing (1.7 percent);
- redshank (9.9 percent);
- shelduck (2 percent); and
- ringed plover (9.7 percent).

1.11.3 The development of AMEP will also result in the removal of fields currently in arable use which provide feeding and roosting habitat for estuary birds which may also use the intertidal habitat, including redshank, curlew, dunlin and lapwing throughout the winter period, shelduck intermittently throughout the autumn and winter, black-tailed godwit in autumn and over the winter, and bar-tailed godwits in spring.

1.11.4 During the construction of AMEP, noise generated by piling has the potential to disturb birds that would otherwise use the Killingholme Marshes foreshore.

1.11.5 Several ponds are present within AMEP, two of which support populations of Great Crested Newts, a European protected species. These ponds will require to be developed so the habitat will be lost. Water voles are also present in ditches throughout the site, some of which will require realignment and creation of flood berms.

1.11.6 Some use of AMEP is made by foraging bats and badgers, though neither of these species permanently inhabits any part of AMEP. No reptiles make use of the site.

Mitigation and Compensation for Potential Adverse Effects

1.11.7 National and local planning policy is aimed at conserving, enhancing and restoring the diversity of the country's wildlife. The project seeks to achieve this by incorporating a number of features within the development to mitigate for its effects. Where this is not possible, for example because it results in the loss of protected habitat, compensatory measures are proposed outside of the main project area.

Compensation

- 1.11.8 To compensate for the loss of estuarine habitat a Compensation Site will be developed on the north bank of the Humber. A new managed realignment site is proposed at Cherry Cobb Sands which will be designed to provide mudflat that will also provide a new feeding resource for the bird assemblage displaced by the reclamation on the south bank.
- 1.11.9 As compensation schemes should, ideally, be in place and functioning prior to any permanent adverse effects occurring, an additional area will be developed at Old Little Humber Farm. This will be developed to provide wet grassland of functional value as feeding and roosting habitat for estuary birds in advance of the managed realignment site reaching its full functional value over a period of years.

Mitigation

- 1.11.10 Because the terrestrial areas of AMEP will result in the loss of fields currently used by estuary birds and farmland birds, and of ponds occupied by Great Crested Newts, two mitigation areas will be developed to provide enhanced habitat for the species affected.
- 1.11.11 Mitigation Area A (*Figure N1.5*) is a plot of 47.8 ha adjacent to the southern edge of AMEP, which will be developed to provide wet grassland habitat for the use of feeding and roosting birds, and also farmland birds. Mitigation Area B is a plot of 0.7 ha adjacent to the Chase Hill Wood local wildlife site, which will be developed for the use of Great Crested Newts, including the provision of new ponds. This area will be developed to complement the local wildlife site.
- 1.11.12 Mitigation for water voles will be created within AMEP with the development of a network of ditches which will take account of the requirements of water voles in their management.
- 1.11.13 Badgers and bats will also benefit from the proposed mitigation measures incorporated into the development.

1.12 *COMMERCIAL FISHERIES*

- 1.12.1 Commercial fish species, or those with recreational angling relevance, that are recorded in the Humber include whiting, sprat, common (or Dover) sole, flounder, cod, saithe, pollack, dab, plaice and eel. Shellfish of commercial interest are large decapod crustaceans (brown shrimp, lobster and brown crab), bivalve molluscs (cockles and mussels) and

whelk. Some of these species (e.g. common sole and whiting) have important nursery grounds in the intertidal and shallow subtidal estuarine habitats, hence an impact on these habitat might affect the local fishery and, due to connectivity across a wider area, exploited stocks (hence fisheries) elsewhere.

1.12.2 AMEP's construction and operation may impact on fisheries activities either directly, by affecting the access to fishing grounds and operation of fishing gear, or indirectly, by affecting the fisheries resources.

1.12.3 Besides the possible medium sensitivity of certain receptors, the impacts on commercial fishing or angling activities in the Humber Estuary have been assessed as of negligible to minor significance primarily due to the low fishing effort in the immediate area around the development. Possible impacts on the local ecology (e.g. nursery functioning of intertidal and shallow subtidal habitats) might have indirect effects on fish stocks elsewhere, hence on the fisheries exploiting them. This is mediated by ecological processes such as the successful recruitment of individuals to adult stocks.

1.12.4 No or minor significant implications to fisheries have been identified for the projects considered cumulatively with AMEP and the Compensation Site, mainly due to the current low fishing activity in the Humber.

1.13 DRAINAGE AND FLOOD RISK

1.13.1 Extensive consultations about flood risk and drainage matters have been undertaken with the Environment Agency (EA), North East Lindsey Drainage Board (NELDB) and Anglian Water.

1.13.2 The site and surrounding area is protected from tidal flooding by continuous coastal defences along the south bank of the Humber. The construction of the quay will replace a length of existing tidal defences, raising the finished ground levels in the location of the former defence embankment. The quay will be a very substantial installation and it will be virtually impossible for it to be breached or significantly overtopped; the quay will thus provide a localised improvement in the tidal flood defences. The standard of protection provided by the existing adjacent tidal defences will be maintained.

1.13.3 Tidal breach modelling confirms that the raised site levels will tend to obstruct the route of floodwaters, thus increasing flood risk on land near a breach (outside the site flood depths are predicted to increase by

a maximum of 0.35 m adjacent to a breach). However, flood depths in the affected areas would be over 2.0 m without the development. It is therefore considered that the predicted increases in flood depths do not present a significant impact and there would be no appreciable detriment.

- 1.13.4 The proposals include the construction of a new pumping station to allow surface water drainage from Killingholme Marshes drainage system to discharge into the Humber Estuary at all tidal states. The pumping station will cater for storm events of a 1:100 year probability.
- 1.13.5 Foul drainage will discharge direct to the adjacent South Killingholme Waste Water Treatment Works (WWTW). Anglian Water will upgrade the WWTW separately.
- 1.13.6 Control measures will be implemented to mitigate the potential and residual impacts of pollution incidents during the construction and operation phases. There will be no adverse cumulative impacts in combination with other adjacent developments.

1.14 *COMMERCIAL AND RECREATIONAL NAVIGATION*

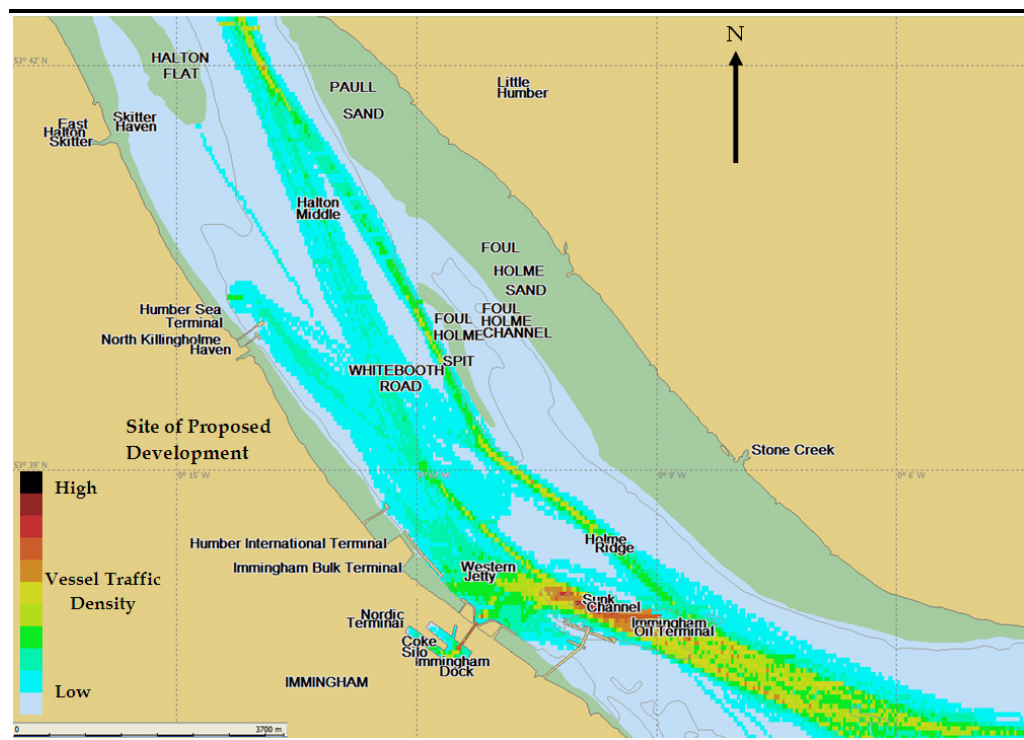
- 1.14.1 High levels of shipping activity are present within the Humber Estuary; statistics produced by the Department for Transport (DfT) show that 15 percent of total UK port freight handling took place within the Humber Estuary area in 2009. In addition to freight vessels, a number of ferries operate on the Humber Estuary, primarily on the Hull-Rotterdam and Hull-Zeebrugge routes.
- 1.14.2 The Department for Transport produces statistics for vessel arrivals at Humber ports. The number of vessel arrivals can be doubled to give an estimated number of vessel movements. *Table N1.3* summarises the estimated number of vessel movements for the last five years.

Table N1.3 *Estimated Number of Vessel Movements in the Humber Estuary 2005-09.*

Reporting Area	2005	2006	2007	2008	2009
Hull	7,264	6,540	6,054	5,718	4,598
Goole	2,564	2,290	2,068	2,010	1,658
Rivers Hull and Humber	992	866	868	990	1,056
Grimsby & Immingham	17,440	16,912	16,520	15,940	14,638
River Trent	2,200	2,380	2,522	2,146	1,308
River Ouse	294	358	376	262	286
Humber Total	30,754	29,346	28,408	27,066	23,554

1.14.3 Analysis of Automatic Identification System (AIS) data for the Humber Estuary area has been used to identify the baseline of vessel routes used by Humber shipping traffic and is illustrated in *Figure N1.10* below.

Figure N1.10 Vessel Traffic Density Grid in the Vicinity of the Proposed Development.



1.14.4 When compared to the average number of vessel movements on the Humber Estuary from 2005 to 2009, the construction traffic will represent an increase of approximately 10 percent over a two year period. The estimated additional operational vessel movements per year represent an increase of approximately 1.9 percent over the average number of vessel movements from 2005 to 2009.

1.14.5 A navigational risk assessment for the development has been undertaken and is reported in full in the ES. A number of Hazard Management Actions (HMAs) are already in place on the Humber Estuary and additional HMAs have been identified to further reduce the navigational risk of the proposed AMEP development. When the recommended HMAs have been implemented, and provided that the risks are regularly reviewed, it is anticipated that the risks to navigational safety associated with AMEP will be at a level that can be considered as low as reasonably practicable.

1.15 TRAFFIC AND TRANSPORT

- 1.15.1 An assessment of the impact of AMEP has been undertaken in terms of changes to traffic conditions on the local highway network and their potential for delays and congestion, and accidents and road safety.
- 1.15.2 The predicted number of vehicle arrivals and departures for AMEP has been identified using predicted employment figures and a number of reasoned assumptions and has been developed through consultation with North Lincolnshire Council (NLC) and the Highways Agency (HA).
- 1.15.3 The accident and road safety records from NLC and North East Lincolnshire Council (NELC) from the previous five years have been analysed and no significant trends have been identified.
- 1.15.4 The base traffic flows on the local and strategic highway network have been derived using traffic surveys undertaken on behalf of the HA for the A160/A180 highway improvement work. An additional traffic survey was commissioned at the A180 / Europarc Great Coates Interchange.
- 1.15.5 It has been agreed that since traffic flows from a large number of developments with existing (or close to receiving) planning approval are included in the assessment, no traffic growth has been applied or future year assessment been undertaken. Traffic growth will be restricted by the implementation of a Travel Plan that will limit the number of single occupier car journeys to and from the development.
- 1.15.6 Assessments of traffic capacity have been undertaken at junctions with more than 30 two-way AMEP trips, and highway improvement schemes have been proposed where the AMEP traffic has an impact on junction capacity. The junction improvement proposals mitigate AMEP traffic only, as agreed by all parties.
- 1.15.7 Improvement options are proposed at the following junctions:
- Rosper Road / Humber Road (traffic signals);
 - Humber Road / A160 / A1173 (additional lane on one approach);
and
 - A1173 / North Moss Lane / Kiln Lane (additional lane on each approach).

1.15.8 Through the above assessment, and through consultation with the relevant stakeholders, it has been determined that there are no highway reasons why permission for the proposed development should not be granted, subject to agreement on and implementation of the identified mitigation measures.

1.16 *NOISE AND VIBRATION*

1.16.1 A noise and vibration impact assessment has been undertaken for the construction and operational phases of AMEP, addressing the following aspects:

- potential airborne noise and ground vibration impacts as a result of construction of AMEP;
- potential noise impacts as a result of operation of AMEP; and
- potential noise impact as a result of any traffic flow increases as a result of the construction and operation of AMEP.

Construction Noise

1.16.2 For daytime construction work there is potential for minor noise impacts from construction activities (predominantly from piling, but inclusive of other activities such as earthmoving and general construction, fabrication and erection of buildings and site infrastructure) at Hazel Dene, which is the nearest non project related receptor to the AMEP site. Implementation of piling shrouds and soft starts reduces the noise level further and changes the impact rating to less than significant at all sensitive receptors on the south bank of the estuary. Minor residual impacts will be experienced at five locations on the north bank of the estuary, principally because of the very low baseline levels of noise in that locality. Night time impacts from construction noise are assessed as negligible for all receptors on both banks of the estuary.

1.16.3 There is potential for vibration impacts from construction activities, particularly from piling. Ground vibration from pile driving is likely to be perceptible at North Low Lighthouse and Station House (the nearest vibration sensitive receptors to the works) when piling activities approach within a distance of 150 m to 200 m. These properties will, however, be unoccupied during the construction period, so no nuisance impact will result from vibration. A series of mitigation measures have

been recommended to monitor vibration levels and reduce levels if necessary so that no building damage arises.

- 1.16.4 There are no significant road traffic noise impacts identified during the construction phase of the Project.

Operational Noise

- 1.16.5 Noise levels from AMEP are predicted to meet the project-specific noise criteria for the daytime and night time periods at all residential receivers with the exception of those on the south bank that will be subject to CPO procedures.

- 1.16.6 Hourly road traffic noise levels from the operational phase have been calculated and compared to the existing road traffic noise levels along the identified routes around the project site. On many of these roads there are no noise sensitive receptors, and hence there are no adverse impacts on these roads. On those roads where there are noise sensitive receptors, moderate impacts are to be expected in the peak times in the morning, afternoon and evening during the shift changes on the development site. The three locations where residential properties would be affected are those bordering roads in Ulceby, South Killingholme and Immingham. Mitigation measures have been developed to address these, but are limited because they would arise on the public highway. Residual impacts are expected, in the peak hours only.

- 1.16.7 There are no significant vibration generating sources from the operation and hence impacts from vibration are not expected to occur.

1.17 AIR QUALITY

- 1.17.1 The construction and operation of AMEP has the potential to result in impacts on air quality. These impacts may be to sensitive human receptors or sensitive ecological receptors and arise from a number of sources. The key issues of interest are:

- construction phase:
 - emissions associated with the additional road vehicles accessing the site;
 - emissions associated with the additional shipping accessing the site; and
 - construction dust raised during construction activities.

- operational phase
 - emissions associated with the additional road vehicles accessing the site;
 - emissions associated with the additional shipping accessing the site; and
 - spray painting emissions arising from the from paint spraying of products; and
 - supply chain manufacturing activities resulting in emissions to air from metal works.

1.17.2 The air quality impact assessment primarily focuses on: whether AMEP is likely to result in exceedance of any air quality standards for the protection of humans; whether there is a significant risk of dust nuisance occurring, and whether there are likely to be any significant impacts on sensitive habitats.

1.17.3 The results of the assessment concluded that:

- There are, overall, potentially significant impacts associated with emissions from the road traffic, ships, the main site and Supply Chain Park; however, the emissions from the Supply Chain Park are the most important.
- With regard to the operation of the site, and in particular the Supply Chain Park, the design will comply with Best Available Techniques and will also be designed in such a manner as to minimise impacts.
- There are also some impacts associated with road traffic. As would be expected, these are most important at locations close to the roadside. However, road traffic emissions are not associated with air quality standards being exceeded and are therefore acceptable.

1.17.4 There is the potential for nuisance associated with construction dust, and therefore there is a need for mitigation to be implemented on site to make sure that nuisance doesn't occur. There are generic best practice measures that can be put into place for the control of dust emissions. These will be implemented and will therefore minimise as far as practicable the risk of substantiated nuisance issues arising during construction.

1.18 *MARINE AND TERRESTRIAL ARCHAEOLOGY*

- 1.18.1 The Humber Estuary, between Killingholme and Cherry Cobb Sands, has been a focus of human activity for perhaps as much as 10 000 years. Exploitation of the river valley as a resource for food, transport, invasion, defence, trade and industry has been a recurring theme throughout this time.
- 1.18.2 Preserved beneath the mudflats and reclaimed former marsh on the southern shore are deposits containing evidence of the earliest prehistoric settlers, their tools and other artefacts and fragmentary remains of the environment they inhabited preserved in buried pollen and other organic remains.
- 1.18.3 Rising sea level in the later prehistoric period submerged these early land surfaces and new exploitation saw extensive Iron Age and Romano-British villages develop along the shoreline, often located around tidal inlets to maximise the use of the river valley. Shifts in the course of the river will have removed some of these, and later, remains.
- 1.18.4 While much evidence of the later history of the area is apparent in the form of medieval churches, moated sites, modern settlements, lighthouses, railways, port facilities, and 20th century industrial development, more subtle and vulnerable remains in the form of shipwrecks, military aircraft, remains of Iron Age and Roman round houses, kilns and furnaces, and occasionally their human remains, lie buried. Together these provide the physical evidence of an area rich in resources that have been exploited by human endeavour for centuries.
- 1.18.5 The development of AMEP may cause damage to these archaeological remains; by compression and compaction through infilling the land site, or by removal during the excavation of foundations for new structures, including the new quay and berthing pocket. There has been a comprehensive assessment of archaeological evidence to identify such impacts; including studies of previous records of archaeological discoveries in the area, as well as new surveys using modern scientific techniques – magnetometers and coring of deep sediments. Further surveys will be undertaken, to high professional and scientific standards and where important archaeological remains are located, as the development of the site proceeds, they will be recorded in detail and results analysed to provide a detailed account of the area's long historical development. There will be some loss of significance of a small number of heritage assets, but in a landscape already dominated by industrial and port facilities.

1.19 LIGHT

- 1.19.1 AMEP has the potential to cause light impacts on sensitive receptors within the surrounding area. These impacts will be largely limited in the long term to the period of operation
- 1.19.2 There are very few sensitive amenity receptors such as residential properties that are sensitive to light impacts and are close to AMEP; the main ones are Station House, North Low Lighthouse and The Lookout, all of which will be unoccupied during the construction and operation of AMEP, and Hazel Dene on Marsh Lane. Sensitive ecological receptors include the North Killingholme Haven Pits, the Humber intertidal mudflats and various fields in proximity to AMEP used as a feeding resource by estuary birds.
- 1.19.3 During the construction phase, light impacts will arise from the use of mobile task lighting which means that impacts will be mainly local. Nearby ecological receptors such as the mudflats will have had their ecological interest displaced due to the overall construction works rather than the construction lighting component – these impacts will be addressed by the creation of the Compensation Site. No significant light impacts are predicted to arise from the construction phase.
- 1.19.4 During the operational phase, AMEP includes proposed lighting in the form of a combination of 30 m and 50 m towers fitted with directional light fittings to limit spill outside the working areas. Although there are a number of these towers as shown on *Figure N1.5*, the extent of increased illumination is fairly restricted and confined to short distances from the site boundary. This is due to the fact that light levels drop off dramatically over distance. However, even though lux levels may reduce over distance, the apparent glow and possible glare may be observed at some distance by sensitive receptors. Assessment of night time photomontages has illustrated that there are no significant impacts from the three viewpoints selected as representative of sensitive visual receptors. This is mainly due to the existence of artificial lighting in the vicinity of the site and along this developed and industrial part of the south Humber bank.
- 1.19.5 The assessment of light impacts shows that there will be no long term residual significant impacts on sensitive ecological receptors. Due to the removal of a number of nearby residential receptors subject to compulsory purchase orders, there are no significant impacts except for the property at Hazel Dene where a moderate significant impact is predicted.

1.19.6 Mitigation measures or measures to reduce any impacts include using lighting fixtures which can be directed towards the working area and can include shields which direct light away from adjacent sensitive receptors. Light fixtures will also be chosen which prevent light spillage into the sky. This will assist with aviation safety and keep the night skies dark.

1.20 *LANDSCAPE AND VISUAL*

1.20.1 AMEP will have an impact on landscape elements, landscape character and visual amenity. The main sources of landscape and visual impact comprise the main site, the new quay and the presence of a number of completed wind turbines and wind turbine components which will stand upright on the quayside.

1.20.2 The landscape and visual impact assessment covers a 30 km radius area from the centre of the site. This study area is selected for assessment to capture all significant effects arising from a proposal of this scale. The assessment considered the worst or maximum case scenario, that is, the maximum size of wind turbines and the maximum size and scale of buildings for the manufacturing facility.

Landscape

1.20.3 Impacts will arise to the landscape of the site during construction and these include the loss of hedgerow vegetation and grassland over part of the site together with the presence of construction activities, construction plant and machinery and construction lighting.

1.20.4 During the operational phase, direct physical changes to the landscape of the site will arise as a result of the introduction of new structures including buildings and warehouses, a new quayside and the presence of wind turbines awaiting despatch to offshore locations.

1.20.5 During operation, impacts on the character of the receiving landscape will arise as a result of the visibility of the proposed buildings and structures. The impact significance assumes that measures will be put in place to provide some visual screening and thereby reduce these impacts. In addition, the colour rendering of buildings and structures will be goosewing grey in order to minimise visual impact. A landscape masterplan with boundary and internal planting is proposed to assist integration of the proposal into the receiving landscape and to minimise impacts on landscape character and visual amenity – this is included as *Figure N1.11*

- 1.20.6 The site for the proposal is located in North Lincolnshire, specifically in the Humber Estuary for which a moderate impact on landscape character is predicted. This moderate impact significance reflects the fact that there are many industrial land uses in the vicinity of the site for the proposal. Also in North Lincolnshire a moderate impact will arise on the Lincolnshire Drift landscape character area. In North East Lincolnshire, a minor impact will arise to the character of the Lincolnshire Coast and Marshes and a not significant to minor impact will arise to the character of the Humber Estuary landscape character areas. In the West Lindsey area, a not significant impact will arise to the character of the Wolds Estates landscape character area. In the East Riding of Yorkshire, impacts on landscape character will be either minor or not significant for all the landscape character areas that fall within the defined study area except for Sunk Island for which a moderate impact will arise.
- 1.20.7 Impacts on National Landscape Character are predicted to be of minor significance for Humber Estuary and Lincolnshire Wolds. For the remaining national landscape character areas, a not significant impact is predicted to arise.
- 1.20.8 Impacts on the setting of landscapes designated in county development plans for their special value were also considered. In the case of the Lincolnshire Wolds Area of Outstanding Natural Beauty (AONB), a not significant - minor impact is predicted to arise. A moderate impact is predicted to arise on the setting of the Sunk Island landscape conservation Area. A minor impact is also predicted for the Spurn Heritage Coast.
- 1.20.9 Impacts of a not significant level are predicted for most of the registered parks and gardens in the study area. A minor impact is predicted to arise to the setting of Brocklesby Park and Humber Bridge Country Park.

Visual Impact

- 1.20.10 Visual impacts will be experienced by a range of viewer types at different distances and directions from the proposal. Visual impacts were assessed at 18 viewpoint locations representing residents of dwellings, recreational users and those engaged in travel or work.
- 1.20.11 Visual impacts of major significance will arise at viewpoint 2 - North Killingholme Haven Pits and viewpoint 8 - residents at Marsh Lane (as set out in *Figure N1.12*). These viewpoints are located very near to the site. A moderate to major visual impact will arise at viewpoint 1-

public footpath on the South Humber Bank. Visual impacts of a moderate significance will arise at three viewpoint locations: these are viewpoint 3 – Coastal Footpath, North Humber Bank, Viewpoint 9 – Homestead Lake Public Park and viewpoint 13 – Residents of East Halton. Visual impacts of a minor to moderate significance will arise at four viewpoint locations: these are Viewpoint 5 – Humber Bridge, Viewpoint 14 – South End, Viewpoint 15 – Brocklesby and Viewpoint 16 – Sunk Island.

- 1.20.12 In the case of many of the viewpoints, AMEP will be seen along with other industrial developments in the area. Viewers located south of the Humber in Lincolnshire will often see the proposal along with existing industrial infrastructure such as the Lindsey Oil Refinery whilst viewers in the north, in the East Riding of Yorkshire will see the proposal along with other existing industrial and built up areas that line the south bank of the River Humber. Visual impacts at the remaining viewpoint locations will be in the range of minor to not significant.
- 1.20.13 The cumulative assessment considers the additional contribution made by the proposal to existing and proposed industrial development in terms of impact on landscape character and visual amenity.
- 1.20.14 In North Lincolnshire, AMEP will cause a minor cumulative impact on the character of the Humber Estuary Landscape Character Area. At some locations within this landscape, the viewers, for example at viewpoint 1, will experience a minor to moderate cumulative visual impact. In the case of the Lincolnshire drift landscape character area, a minor cumulative impact is predicted to arise. This cumulative visual effect will be experienced by viewers in the settlements of North and South Killingholme (viewpoints 11 and 12).
- 1.20.15 In the East Riding of Yorkshire, minor cumulative impacts will arise in the two landscape character areas of the Low Lying Drained Farmland of the Humber Estuary. These are namely the South Patrington, Ottringham and Keyingham Farmland and Paull Farmland. A minor to moderate cumulative impact is predicted to arise in the Low Lying Drained Farmland of the Humber Estuary – Sunk Island landscape character area. The cumulative impact on Open Farmland of Holderness – Burstwick to Withernsea Farmland is predicted to be not significant to minor. The cumulative impact on the remainder of the landscape character areas at county level are predicted to be not significant.

1.21 SOCIO-ECONOMICS

- 1.21.1 The socio-economic impact of the Project on the local area and the wider Hull and Humber sub-region has been assessed.
- 1.21.2 An approximate construction cost for the Project is £400 million. The construction investment results in estimated 2 637 worker-years or 264 full time equivalent (FTE) jobs.
- 1.21.3 There is an inherent uncertainty in estimating the number of FTE jobs that are likely to be created by the development of the scale proposed by this Project once it is fully operational. However, it is estimated that the completed Project will create around 4 100 direct FTE jobs on the site related to manufacturing of marine energy components and 5 000 direct FTE jobs in the Yorkshire and Humber region and elsewhere in the UK; this totals 9 100 direct FTE jobs related to the manufacturing facilities. In addition there will be up to 3 200 direct FTE jobs in total (i.e. locally, in the rest of the region, and the rest of the UK) related to the installation of the wind turbines.
- 1.21.4 Indirect jobs will include a variety of suppliers to businesses located at AMEP. The 200 FTE supplier jobs in the wider local area will be those providing a number of goods and services required to run premises, equip the workforce, and run the business (e.g. professional services such as accounting and legal). More of such supplier jobs - 880 FTEs - will be created in the rest of the region bringing the total in Yorkshire and the Humber to 1 080 FTE jobs.
- 1.21.5 Further jobs will be created through the spending of workers employed in direct and indirect jobs. Their salaries will be spent in the local economy supporting existing businesses and creating an estimated 920 FTE jobs in the wider local area (North and North East Lincolnshire) and 720 FTE jobs in the rest of the region. These jobs, in a variety of sectors, from retail to leisure, will boost local business growth.
- 1.21.6 AMEP activities will contribute to the economy in terms of Gross Value Added (GVA). The direct on-site GVA is estimated at £264.5 million annually. The total net additional GVA arising from AMEP in the Yorkshire and Humber region is estimated at £378 million, whereas the net additional annual impact in the UK is £602.5 million.
- 1.21.7 Wider economic impacts include additional inward investment that will potentially be attracted regionally, for example in Research and Development (R&D). AMEP can potentially influence education and skills development in Yorkshire and Humber because the majority of

the offshore wind jobs require higher qualified employees with strong skills in STEM (Science, Technology, Engineering and Mathematics) subjects.

1.21.8 The Project has the potential to encourage certain types of firms to locate in the sub-region. The presence of several major Original Equipment Manufacturers is required to enable clustering in offshore wind and AMEP would provide such opportunity.

1.21.9 Both North and North East Lincolnshire Councils have taken into account the potential development of the South Humber Bank when setting their housing completion targets. Given the combined housing target of the Councils at the start of AMEP operations and additional supply from East Lindsey, it can be expected that projected housing completions will satisfy the demand driven by AMEP employees.

1.21.10 Both North and North East Lincolnshire are currently refurbishing some of their schools through the Building Schools for the Future programme. This will in particular allow the schools to meet projected demand in 2015.

1.22 *AVIATION*

1.22.1 Structures, and particularly tall structures, present a hazard to aircraft and aviation activities since there is judged to be a potential for aircraft striking such structures and this judgement is reflected in the relevant legislation. There is a greater risk presented to aircraft in the hours of darkness and in conditions of poor visibility (e.g. fog) and, therefore, the legislation sets out measures for warning aircraft of the presence of structures – typically, these measures include lighting.

1.22.2 The construction phase of AMEP may lead to changes in bird activity in the area. However as the new intertidal habitat is being established further away from Humberside Airport, approximately 4.5 km away, there will not be an increased bird strike hazard to aviation activities at the airport, since birds will likely be displaced to a location further away from the runway extended centreline.

1.22.3 Humberside Airport's outer horizontal surface (the safeguarding zone around the airport) will not be breached during either the construction or operational phases. The hazard to aviation presented by tall structures will be mitigated by provision of aviation obstacle warning lighting. For structures on AMEP less than 45 m above ground level, aviation obstacle warning lighting is not specifically required. For

structures on AMEP between 45-150 m above ground level, deemed to present a hazard to aviation, medium intensity red steady obstacle warning lighting will be provided. It is judged unlikely that structures <80 m above mean sea level would be deemed hazards to aviation and on this basis the tallest proposed permanent structures (up to 50 m above ground level) on AMEP would not require aviation warning lights. For structures 150 m or more above ground level, such as completed offshore wind turbines, medium intensity steady red obstacle lights will be provided, positioned as close as possible to the top of the obstacle and at intermediate levels spaced so far as practicable equally between the top lights and ground level with an interval of not more than 52 m.

1.22.4 Based on the fact that there are several existing tall structures in the vicinity of AMEP, the cumulative impact of the tall structures within AMEP is judged to be relatively low.

1.23 WASTE

1.23.1 Wastes will arise both during the construction and operation of AMEP. These have the potential to cause nuisance and have environmental and public health impacts if managed inappropriately. They also represent a loss of resource, and therefore all wastes will be managed in a hierarchy which emphasises prevention and reuse as a priority and landfill disposal being the option of last resort.

1.23.2 The potential impacts of waste arisings will be mitigated by strict adherence to the waste hierarchy and the adoption of best practice such that any residual impacts in the construction phase or operation phase of the site are of no significance.

1.23.3 The development will place demand on the local waste recycling, incineration and landfill infrastructure. This is not considered significant as much of the site won material during the construction phase will be used on site (thereby reducing the need for imported aggregate), and some 70 percent of the wastes arising from site operations will be separated at source as recyclables, for which there is local and regional demand. The impact of residual wastes on demand for landfill is small and potentially insignificant if alternatives to landfill are maximised.

1.23.4 Transport impacts from the management of wastes are assessed to be not significant. However, these will be minimised by ensuring that skips and containers are optimally sized and that only complete loads

are transported from the site. On-site compaction and pre-treatment of specific wastes will be considered (e.g. for cardboard and plastic sheeting) where this can further optimise payloads or reduce potential impacts in downstream handling.

1.24 HEALTH

1.24.1 In terms of assessing the potential health impacts associated with the Project, any significant impacts have been identified from the outcomes of the EIA in conjunction with evidence from published literature to determine their potential implications on health.

1.24.2 There will be 264 full time equivalent (FTE) jobs during the construction period, although it is not known what percentage will go to local people. Health benefits will accrue from these employment opportunities though they will be transient and limited to the individuals who find employment. Procurement of goods and services may have the potential to create additional employment opportunities, which in turn may potentially increase people's incomes and have a positive impact on their health.

1.24.3 During operation there will be 4 100 FTE jobs on site, which will have health benefits at the population level. In addition, the presence of this workforce is unlikely to place additional demands on local services such as health care facilities and schools.

1.24.4 The existing local landscape character at the site is industrial. Construction activities and operation will result in visual disturbances to nearby residential receptors and impacts upon the quality of views experienced by people which may impact on their quality of life and cause anxiety and concern as well as decreased wellbeing. The extent of these impacts is set out in the Landscape and Visual Impact assessment.

1.24.5 During construction and operation there will be an increase in the number of vehicle movements on roads, which will cause increased journey times which may cause annoyance and stress amongst local residents and road users, there may be potentially an increased risk of road traffic accidents due to the increased number of HGV movements which has the potential to cause injuries. There will be an increase in vessels movements which may marginally increase the risk of accidents at sea. The extent of these impacts is set out in the Transport Impact assessment

1.24.6 During construction there is potential for minor noise impacts during the day at the nearest receptors, therefore, the potential for any health impacts is minimal. During night time construction, no sensitive human receptors will be subject to major noise impacts, so there will be no associated health impacts. During operation it is not thought there will be any adverse health impacts associated with noise.

1.24.7 There will be no significant increase in pollutant concentrations as a result of increased road traffic during construction, therefore there should not be any adverse effects on the health of nearby residents. There will, however, be dust producing activities on-site during construction. Correct implementation of dust mitigation measures is predicted to render residual impacts not significant, therefore there are unlikely to be any associated health impacts.

2 *THE COMPENSATION SCHEME*

2.1 *INTRODUCTION*

2.1.1 If AMEP is approved, Natural England has confirmed that habitat compensation will need to be secured prior to consent being granted. As a result, Able has designed a Compensation Site that is located on the north bank of the Humber Estuary, opposite AMEP in Paull Civil Parish within the East Riding of Yorkshire Council administrative area.

2.1.2 The Compensation Site comprises two distinct parts; an intertidal part and a separate part comprising wet grassland:

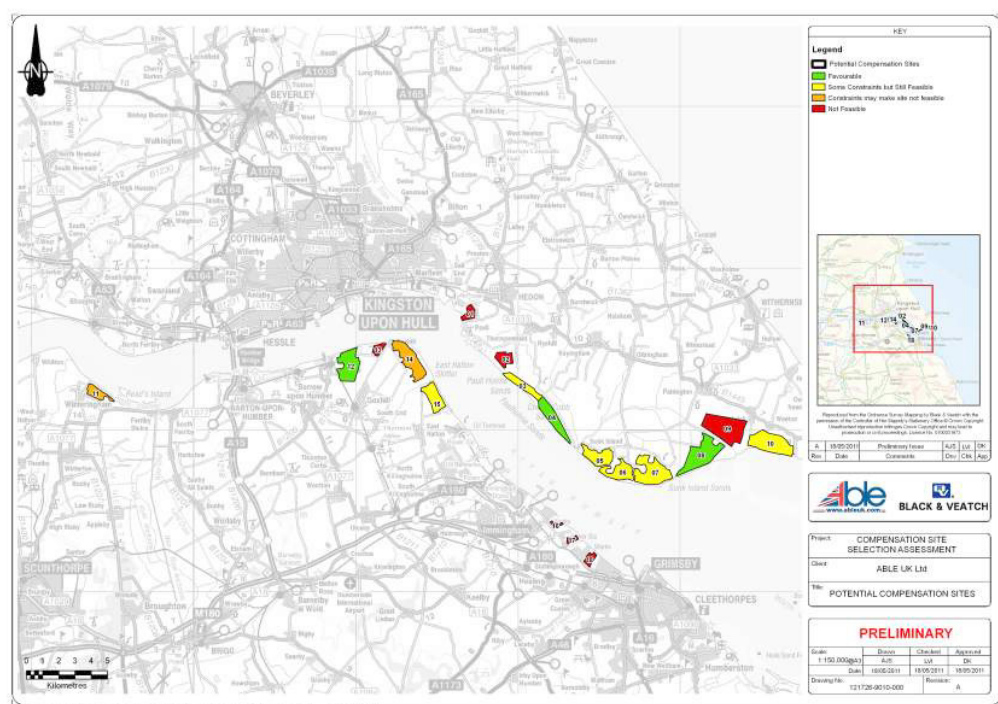
- The intertidal area is located some 4 km to the south-west of Keyingham and north of Stone Creek between the existing flood defences and Cherry Cobb Sands Road. The location of this site for the purposes of this project is known as 'Cherry Cobb Sands', and is roughly triangular in shape; it currently comprises arable fields defined at their boundaries by drainage ditches and a flood defence embankment.
- The managed wet grassland part will be developed on four existing arable fields between Newlands Lane and the South Ends and Thorney Crofts Drain approximately 2 km south of Thorngumbald. For the purposes of this project, this land is known as 'Old Little Humber Farm'.

- 2.1.3 The locations of Cherry Cobb Sands and Old Little Humber Farm are shown in *Figure N2.1*.
- 2.1.4 At Cherry Cobb Sands the existing flood embankment will be breached following the construction of new embankments around the perimeter of the proposed intertidal site to provide protection to the surrounding area. The ground levels within the site will be re-contoured to provide the new embankment and new habitat of functional value to wildfowl and wading birds as well as other flora and fauna. This intertidal Compensation Site will be developed within a 115 ha plot.
- 2.1.5 At Old Little Humber Farm, wet grassland will be created; an indicative design has been developed which includes for the stopping up of existing land drainage, re-contouring arable farmland and sowing to permanent pasture to provide new habitat of functional value to wildfowl and wading birds as well as other flora and fauna. The existing ditches and hedges crossing and bordering this land are not proposed to be disturbed.

2.2 CHOICE OF SITE

- 2.2.1 A total of 18 sites were identified in a high level assessment that could potentially be suitable for intertidal and estuarine habitat compensation. These sites are shown on *Figure N2.2*.

Figure N2.2 The 18 Potential Locations for Compensatory Habitat Identified in High Level Assessment



2.2.2 The high level assessment identified three sites as being most favourable, namely Cherry Cobb Sands and Outstray Farm on the north bank of the Humber and New Holland on the south bank. These sites were likely to comply with most selection criteria and pose the least environmental constraints. Of the three sites, Cherry Cobb Sands is the closest in distance to the proposed AMEP site.

2.2.3 Natural England advised the need for some form of compensatory habitat to be in place before the proposed intertidal compensatory habitat could be fully effective, if construction of AMEP would be taking place at the same time. To meet this need Able will develop wet grassland to provide a temporary alternative habitat that would be of particular value to black tailed godwit and other bird species that might be displaced by construction of AMEP.

2.3 *GEOLOGY, HYDROLOGY AND GROUND CONDITIONS*

2.3.1 There will be no significant impacts on the solid geology or on the hydrogeology of the area through construction and operation of the Compensation Site. The excavation of approximately 300 000 m³ of soil could however disturb any pollutants present within Cherry Cobb Sands.

2.3.2 There is a medium risk of encountering unexploded ordnance during construction of the managed realignment scheme as the local area was used as a decoy site during World War II. Actions to mitigate this risk are proposed and these include non intrusive specialist geophysical surveys prior to the commencement of the earthworks and visual inspections of open excavations by a suitably qualified engineer.

2.3.3 The Cherry Cobb Sands site has been designed to avoid an historic landfill site to the north west of the site. Further intrusive Site Investigations will be completed prior to the commencement of construction works to determine the location of any additional historic landfills within the Cherry Cobb Sands site boundary.

2.4 *HYDRODYNAMIC AND SEDIMENTARY REGIME*

2.4.1 The impacts of AMEP and the Compensation Site are discussed separately because the impacts of the two parts of the Project are largely independent. Nevertheless, model tests including both components of the Project have been carried out.

2.4.2 Changes in the foreshore drainage pattern as a result of the Cherry Cobb Sands managed realignment are likely to lead to an increase in

flow in Cherry Cobb Sands Creek south of the breach site, which will lead to its enlargement especially between the site of the breach and the Stone Creek confluence.

- 2.4.3 The increased flows in Cherry Cobb Sands Creek will initially lead to a small (0.1 m) increase in low water level and a small reduction (30 minutes) in the low water period at Stone Creek which is currently more than six hours long. There is also a risk that there will be increased sedimentation within Stone Creek while Cherry Cobb Sands Creek enlarges. Once this is complete, which is expected within five years, the duration of low water and the low water levels are predicted to return to baseline conditions.
- 2.4.4 There is a risk that a low-way or drainage creek might form across Foul Holme Sand following the breaching of the Cherry Cobb Sands site. Because of the low baseline velocities over the top of Foul Holme Sand and the small velocity increase, this risk is considered low. If it materialised it would be within the natural variability of conditions experienced on Foul Holme Sands.
- 2.4.5 These changes to the landforms of the foreshore and creek are expected to remain of only local importance for estuary geomorphology.
- 2.4.6 Sedimentation conditions within Cherry Cobb Sands will vary. The presented design is expected to result in the development of more than 50 ha of mudflat over a period of approximately five years. Further detailed modelling studies are planned to refine the initial ground levels within the managed realignment. This will maximise the area of mudflat that develops over the long term considering the potential evolution of the site over a time period of up to ten years.

2.5 *WATER QUALITY AND SEDIMENT QUALITY*

Water Quality

- 2.5.1 During construction there is likely to be a temporary increase in suspended sediment concentration in estuarine waters adjacent to the Cherry Cobb Sands part of the Compensation Site especially in Cherry Cobb Sands Creek. The impacts will be localised and as the Humber Estuary has naturally very high concentrations of suspended sediment and a large tidal range, this will result in a temporary minor negative significant effect. During operation suspended sediment concentrations in the vicinity of the Cherry Cobb Sands site are likely to be higher than

current levels although this impact will reduce over time as the site moves towards equilibrium.

- 2.5.2 A Site Investigation to determine potential contaminants present within the Cherry Cobb Sands site concluded that the majority of the soils at the site do not contain visual or olfactory evidence of contamination and do not contain contaminants in elevated concentrations. Prior to construction there will be an additional Site Investigation which will further inform the understanding of the chemicals which may be present and if disturbed discharged into the Humber during the first few tidal floods of the Compensation Site.
- 2.5.3 The soke dyke at Cherry Cobb Sands and the drain alongside Old Little Humber Farm are both designated as part of the same artificial water body under the Water Framework Directive. The section of water body adjacent to Cherry Cobb Sands will be recreated in a similar manner to the existing soke dyke to prevent deterioration in the status of this water body, while the section at Old Little Humber Farm is expected to be unaffected.
- 2.5.4 There are chalk and secondary aquifers in proximity to the Compensation Site however given the depth and location of these, neither aquifer is considered to be at risk from construction of the Compensation Site.
- 2.5.5 The increase in suspended sediment concentration will not have an effect on any of the protected areas in proximity to the Compensation Site.

Sediment Quality

- 2.5.6 The managed realignment scheme will act as a sink for contaminated sediments from the Humber which will have a positive benefit for removal of metals and other contaminants from the estuary water column.

2.6 AQUATIC ECOLOGY AND NATURE CONSERVATION

- 2.6.1 Removal of saltmarsh in front of the breach at Cherry Cobb Sands will allow water to enter the site. This loss of saltmarsh will be compensated for within the managed realignment site once new saltmarsh habitat forms within the site following inundation.

2.6.2 Following inundation of the site there will be new opportunities for benthic (marine floor-dwelling) invertebrate communities to colonise new intertidal habitats. Intertidal habitats within the Cherry Cobb Sands will become established fairly quickly following tidal inundation with fine marine sediments being imported into the site which provide the ideal environment for flora and fauna.

2.6.3 Prior to construction a monitoring programme will be developed in consultation with regulators to monitor and assess the development and function of Cherry Cobb Sands.

2.7 *TERRESTRIAL ECOLOGY*

2.7.1 Terrestrial habitats at Cherry Cobb Sands largely comprise agricultural land with associated soke dykes, hedgerows, occasional trees and small patches of improved grassland. The terrestrial habitats are known to be utilised by protected species including badgers, water vole, breeding birds and nine species of designated waterbirds.

2.7.2 The foreshore area at Cherry Cobb Sands is heavily used by waterbirds from September to March, including 21 designated waterbird species, and is also utilised to a lesser extent during spring and summer months. Construction of the managed realignment will be undertaken between April and October with the majority of earthworks being undertaken in the first year. This will minimise impact upon designated bird species that utilise the foreshore or fields behind the existing foreshore for feeding and roosting overwinter or on passage.

2.7.3 The construction of the Compensation Site will cause the conversion of approximately 100 ha of terrestrial habitat (mostly arable farmland) to subtidal, intertidal mudflat and saltmarsh, and 38 ha of terrestrial agricultural habitat to wet grassland. The creation of a large area of intertidal habitat adjacent to the Humber Estuary European Site as well as the wet grassland will add substantial estuarine ecological value and (subject to the results of future monitoring) the residual impact is therefore assessed as being of major positive significance for both intertidal habitats and waterbirds.

2.7.4 The loss of roosting and feeding habitat for waterbirds in fields behind the existing embankment is of minor negative significance, and will be partly mitigated through the creation of the wet grassland site.

2.7.5 The primary reason for implementing the Compensation Site is to compensate for likely significant effects on Natura 2000 designated

habitats and bird species resulting from AMEP. Therefore the likely significant positive impacts upon these features identified through the creation of the Compensation Site adjacent to the Natura 2000 designated habitats need to be balanced against the significant negative impacts resulting from AMEP. It is therefore assessed that the cumulative impacts of the two aspects of the Project will, at least, balance out to have negligible impacts and will maintain the favourable conservation status of habitats and species on the Humber Estuary European Site.

2.8 *DRAINAGE AND FLOOD RISK*

- 2.8.1 Construction activities will be managed to ensure drainage of surrounding land through Cherry Cobb Sands Drain is not compromised at any time. The existing soke dyke will be diverted around the Cherry Cobb Sands flood embankment. This is unlikely to affect drainage of the surrounding land.
- 2.8.2 The new tidal defences which will be constructed as part of the Cherry Cobb Sands managed realignment have been designed to ensure that they will provide better protection against flooding than the tidal embankment that they will replace. This improvement alone will not lead to a significant overall reduction in flood risk to local residents as this would require works on adjacent flood defences. It will, however, make future additional works to local flood defences more economically feasible and therefore the overall impact is assessed as being of minor positive significance.
- 2.8.3 Residential properties to the north side of Cherry Cobb Sands Road will be closer to the realigned flood defence than at present. Although closer to the new flood defence and thus at greater flooding hazard if there is a failure of the defence, the risk to people is assessed as reduced overall as the standard of protection provided will be higher and the probability of failure will be reduced. The long term effect upon flood protection is therefore assessed as being of minor positive significance.
- 2.8.4 The long term effect of the Cherry Cobb Sands managed realignment on siltation at Stone Creek is likely to be neutral or possibly beneficial, though in the short term there may be greater accretion within Stone Creek. An agreed monitoring and maintenance plan will be implemented to determine any impacts of the managed realignment on land drainage through Stone Creek. This plan will identify the circumstances in which mitigation works will be undertaken. The resulting impact is therefore determined to be negligible.

2.8.5 The works to develop wet grassland at Old Little Humber Farm will remain 10 m from adjacent watercourses to ensure that the function of the surrounding drains is not affected during construction or operation.

2.9 *TRAFFIC AND TRANSPORT*

2.9.1 Delivery of plant and materials to the intertidal site at Cherry Cobb Sands will be via the A63 to the A1033 and then south on March Lane, Corn Market and Marsh Road which then joins Cherry Cobb Sands Road. This route and all major and local roads used by construction related traffic will remain open and unobstructed throughout the construction period. The effect is assessed as being of temporary minor negative significance.

2.9.2 Local residents and farmers in proximity to the intertidal site at Cherry Cobb Sands are likely to experience an increase in traffic along local roads as a result of an average of six deliveries a day for a six month period. Early consultation will inform residents of when the works will be carried out and what increase in traffic they can expect to experience. This will help people to plan their journeys to take account of the small increase in traffic on local roads.

2.9.3 Delivery of plant to Old Little Humber Farm will be from Newlands Lane, which runs north-west to south-east along the western boundary of the site. Access between Newlands Lane and the A1033 is likely to be via Darks Lane and Hook Lane to the south of Thorngumbald, although it is anticipated that some construction vehicles will also use the route from the intertidal site via Cherry Cobb Sands Lane. There will be limited construction vehicles travelling to and from site, and the effect is assessed as being of temporary minor negative significance.

2.9.4 Damage to the fabric of the local roads from Heavy Goods Vehicles is considered unlikely. Prior to construction a photographic baseline survey will record the quality of the road infrastructure and any damage to roads from delivery of construction plant and materials will be repaired.

2.9.5 A Construction Traffic Management Plan will be developed prior to construction.

2.10 *NOISE*

- 2.10.1 A noise assessment has been undertaken for the construction phase of the Compensation Site and includes an assessment of the impacts of construction activities as well as the impacts from road traffic noise from deliveries of plant, lime and erosion protection to Cherry Cobb Sands. It is not anticipated that there will be any elevated noise levels during the operational phase of the scheme.
- 2.10.2 The temporary minor effect on three residential receptors from construction activities at Cherry Cobb Sands is assessed as being of minor negative temporary significance. Noise on site will result predominantly from earthworks and general construction of new flood embankments and mitigation will be employed to reduce noise impacts during construction. Construction will only take place during set daytime hours: no working is anticipated on Sundays and bank holidays.
- 2.10.3 No significant impacts upon noise are anticipated from site works at Old Little Humber Farm.
- 2.10.4 Road traffic noise from deliveries of plant, lime and erosion protection to Cherry Cobb Sands is assessed as having a temporary minor negative significant effect. Deliveries will be restricted to daytime hours to minimise disturbance to residential receptors. Mitigation will be employed to reduce noise impacts including implementation of appropriate speed limits on local roads.

2.11 *AIR QUALITY*

- 2.11.1 There is a temporary negative effect on local residents at Cherry Cobb Sands and Old Little Humber Farm and users of the public right of way at Cherry Cobb Sands from changes in air quality as a result of vehicle emissions.
- 2.11.2 Given the high moisture content of the soils at Cherry Cobb Sands there is a low potential for dust generation, although there is still the potential for impacts on receptors during periods of warm, dry weather, particularly when the lime is being used.
- 2.11.3 Best practice measures will be employed during construction of the Compensation Site to minimise the impacts of dust on sensitive receptors. Providing mitigation measures are put in place the temporary impact of localised reduction in air quality during

construction and material transportation will be reduced to negligible significance.

2.12 *ARCHAEOLOGY*

- 2.12.1 The Compensation Site at Cherry Cobb Sands will affect land that has been reclaimed from the seas within the past few hundred years and which comprises a thick alluvial deposit. While there is some potential for the survival of buried prehistoric land surfaces at considerable depth below the existing surfaces, the new works are considered to be too shallow to impact on these horizons. There is, however, some potential for features of marine interest both seaward and landward of the existing sea wall and a programme of archaeological investigation will be implemented to record any significant remains that are exposed.
- 2.12.2 At Old Little Humber Farm, there is evidence for Medieval cultivation remains across the site, now ploughed away. The use of the land for the Compensation Site is unlikely to affect any buried archaeological remains.

2.13 *LANDSCAPE AND VISUAL*

- 2.13.1 The works at Cherry Cobb Sands and Old Little Humber Farm have the potential to cause impacts on the landscape of the surrounding area. These impacts will be greatest during the short construction period but may continue to a smaller degree for a while afterwards.

Construction

- 2.13.2 During the construction period the work of heavy machinery, and the presence of silos and a construction compound (at Cherry Cobb Sands only) will cause a moderate level of temporary impacts on the surrounding landscape and those who live or work in it and move through it. The significance of the impacts will be reduced with increasing distance from the works.
- 2.13.3 As part of the construction there will be some tree removal at Cherry Cobb Sands. The trees cannot remain as they would either not survive within the saline intertidal habitat area or would provide ideal lookout points for predators that prey on the birds it is aimed to attract.
- 2.13.4 Following construction, grass seeding and natural regeneration of the landscape will take time to establish and relatively bare earth will be

visible for at least one growing season after construction is complete. Within three years grass seeding will have covered all bare earth areas. The intertidal habitat area will establish itself naturally.

Operation

- 2.13.5 The presence of a new flood embankment along Cherry Cobb Sands Road will shorten views to the south from the road and from houses in close proximity to the proposed embankment. The creation of a minimum offset of approximately 300 m from Stone Creek House and 220 m from Fair View will lessen the magnitude of impact, although significant adverse landscape effects upon residences are still likely to occur.
- 2.13.6 The construction of the proposed embankment at Cherry Cobb Sands will allow the existing embankment to be breached to allow sea water into the site. This breach means that a public footpath (Paull Footpath 6) will need to be diverted to a new location beside the new embankment. Users of this new path will be able to see the Humber Estuary and the new habitat area from new bird hides to avoid disturbance to the birdlife being encouraged at this site. Three bird watching hides at separate locations on the embankment crest are proposed to be included along the realigned length of the footpath to afford sheltered views for pedestrians across the intertidal site towards the estuary. The location of a hide opposite the proposed breach location will retain views across the Humber for footpath users.
- 2.13.7 Following mitigation, the landscape impacts, with the exception of those on the footpath, are predicted to create only minor or insignificant permanent impacts on the character of the landscape and the panoramic views for people within it. The significance of the impacts for users of the footpath is mitigated for by the inclusion of bird hides which will present opportunities for people to view the area and its wildlife.
- 2.13.8 A further landscape impact will arise because the land at Cherry Cobb Sands would become a wetland habitat similar to that at Paull Holme Strays. This is a big change from its existing crop growing land use but it is intended to make the site look much like the coastal habitat that currently fringes the northern banks of the Humber Estuary. These impacts are generally predicted to be minor or not significant on the landscape.
- 2.13.9 No mitigation is required for the change in land use from arable to pasture (wet grassland) farmland at Old Little Humber Farm. The

change in habitat type will not make a discernable detrimental impact upon the landscape character and visual amenity of the area.

2.14 *SOCIO-ECONOMICS*

2.14.1 The study area falls into Paull Civil Parish which includes the settlement of Paull. The area is predominantly agricultural and is listed as Grade 2 agricultural land.

2.14.2 Creation of the Compensation Site will result in the loss of approximately 115 ha of Grade 2 agricultural land at Cherry Cobb Sands and 38 ha of Grade 2 agricultural land at Old Little Humber Farm. This loss equates to 0.009 percent of the total agricultural land available in the Yorkshire and Humber region. The land does not currently support specialist crops and loss of this land will have a negligible effect on food security. The residual impact is assessed as being of permanent minor negative significance.

2.14.3 There is a permanent moderate significant effect on the local economy from the loss of land and the potential for one farm to reduce its output significantly. The overall impact upon the local economy is determined to be of permanent moderate negative significance.

2.14.4 Paull Footpath No. 6 joins the suburbs of Kingston upon Hull to the drainage sluices at Stone Creek and forms an attractive route approximately 11 km along the Humber Estuary shoreline. A section of this public right of way will be permanently diverted during construction and operation of the intertidal site at Cherry Cobb Sands. The new footpath will rejoin the existing footpath to the south of the intertidal site. Three bird hides will be installed with 1:20 access ramps to enable bird watching and views across the site. A small car park with six parking spaces will be provided adjacent to Cherry Cobb Sands Road which will facilitate access for informal recreation. The overall impact upon tourism and recreation is determined to be of negligible significance.

2.15 *WASTE*

2.15.1 Approximately 300 000 m³ of material will be excavated during construction of the Cherry Cobb Sands site. All material will be re-used on site for the construction of the new embankment and therefore it is anticipated that no surplus material will be created.

- 2.15.2 Any waste that is generated will be re-used on site wherever appropriate. Materials that are not suited to re-use on site will be made available for re-use elsewhere or recycled where possible.
- 2.15.3 The small quantity of remaining wastes that are not readily recycled will be disposed of to normal municipal waste streams and therefore may be processed by incineration, landfill or other locally preferred method.

- 3.1.1 In-combination impacts have been considered throughout the EIA process and in the preparation of the individual impact chapters so that it can take into account the broader picture of how the Project (both AMEP and the Compensation Site) may affect the various environmental media.
- 3.1.2 All environmental topics are interlinked to a degree such that interrelationships exist on numerous levels. A summary matrix (*Table N2.1*) has been developed to identify key interactions that exist with respect to the Project. A “✓” symbol has been used to indicate that an interaction exists.

Table N2.1 Impacts Interaction and Interrelationship Matrix

	Geology, Hydrogeology and Ground Conditions	Hydrodynamic and Sedimentary Regime	Water and Sediment Quality	Aquatic Ecology	Terrestrial Ecology and Birds / Ecology and Nature Conservation	Commercial Fisheries	Drainage and Flood Risk	Commercial and Recreational Navigation	Traffic and Transport	Noise and Vibration	Air Quality	Marine and Terrestrial Archaeology / Historic Environment	Light	Landscape and Visual	Socio-Economics	Aviation	Waste	Health
Geology, Hydrogeology and Ground Conditions	✓	✓	✓	✓	✓	✓	✓					✓						✓
Hydrodynamic and Sedimentary Regime	✓		✓	✓	✓	✓	✓	✓				✓						
Water and Sediment Quality	✓	✓		✓	✓	✓	✓	✓							✓		✓	✓
Aquatic Ecology	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓		✓			
Terrestrial Ecology and Birds / Ecology and Nature Conservation	✓	✓	✓	✓		✓	✓		✓	✓	✓		✓		✓	✓		
Commercial Fisheries	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓		✓			
Drainage and Flood Risk	✓	✓	✓	✓	✓	✓		✓				✓						
Commercial and Recreational Navigation		✓	✓	✓		✓	✓		✓	✓	✓				✓			✓
Traffic and Transport			✓	✓	✓	✓	✓	✓		✓	✓		✓	✓				✓

	Geology, Hydrogeology and Ground Conditions	Hydrodynamic and Sedimentary Regime	Water and Sediment Quality	Aquatic Ecology	Terrestrial Ecology and Birds / Ecology and Nature Conservation	Commercial Fisheries	Drainage and Flood Risk	Commercial and Recreational Navigation	Traffic and Transport	Noise and Vibration	Air Quality	Marine and Terrestrial Archaeology / Historic Environment	Light	Landscape and Visual	Socio-Economics	Aviation	Waste	Health
Noise and Vibration				✓	✓	✓		✓	✓						✓			✓
Air Quality				✓	✓	✓		✓	✓						✓			✓
Marine and Terrestrial Archaeology / Historic Environment	✓	✓		✓		✓	✓								✓			
Light				✓	✓	✓			✓					✓	✓	✓		✓
Landscape and Visual													✓		✓			✓
Socio-Economics			✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓			✓	✓
Aviation					✓								✓					✓
Waste			✓												✓			✓
Health	✓		✓					✓	✓	✓	✓		✓	✓	✓	✓	✓	

3.1.3 The consideration of in-combination impacts has been addressed during the preparation of the EIA in each of the individual topic chapters. A very diverse range of interactions has been considered as part of this EIA. The key in-combination impacts are discussed further in *Table N2.2*.

Table N2.2 Key In-combination Impacts

Key Interaction	Description
Hydrodynamic and Sedimentary Regime, Water and Sediment Quality, Aquatic Ecology and Commercial Fisheries	Impacts resulting from changes to the hydrodynamic and sedimentary regime associated with the construction and operational phases have been considered in terms of its impact on water and sediment quality, aquatic ecology and commercial fisheries.
Noise and Vibration, Aquatic Ecology, Terrestrial Ecology and Birds, and Health	The potential for impacts resulting from noise or vibration during the construction and operational phases was considered, particularly when carrying out the assessment of potential impacts on ecological and human receptors and defining the relevant mitigation measures.

Key Interaction	Description
Air Quality, Terrestrial Ecology and Birds, Aquatic Ecology, and Health	Impacts on human and ecological receptors may occur as a result of emissions of dust, changes in traffic levels and exhaust emissions. The potential for impacts was considered when carrying out the assessment of potential impacts and defining the relevant mitigation measures.
Noise and Vibration and Marine and Terrestrial Archaeology	The potential for vibration impacts on features of architectural, archaeological or cultural importance has been considered and appropriate measures have been defined where necessary.
Traffic and Transport, Commercial and Recreational Navigation, Health and Socio-Economics	Traffic and transport, and commercial and recreational navigation impacts have the potential to impact on health and socio-economics. Interactions between these topics was considered to ensure that both direct and indirect impacts were considered and appropriate mitigation measures put in place where necessary.
Light, Terrestrial Ecology and Birds and Aviation	The impacts from light have been considered in the assessment of the impacts terrestrial ecology and birds, as well as on aviation.

4 SUMMARY

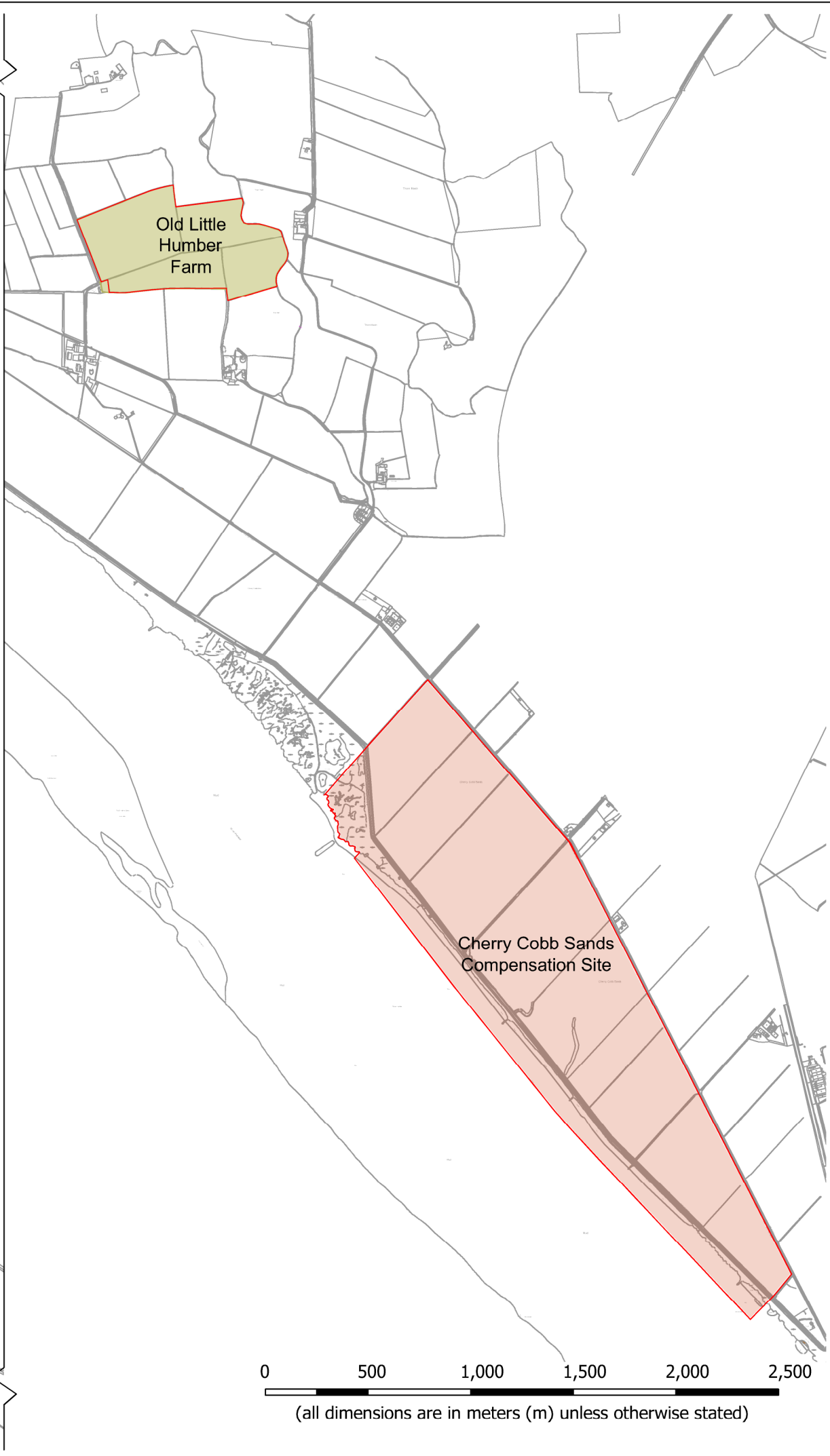
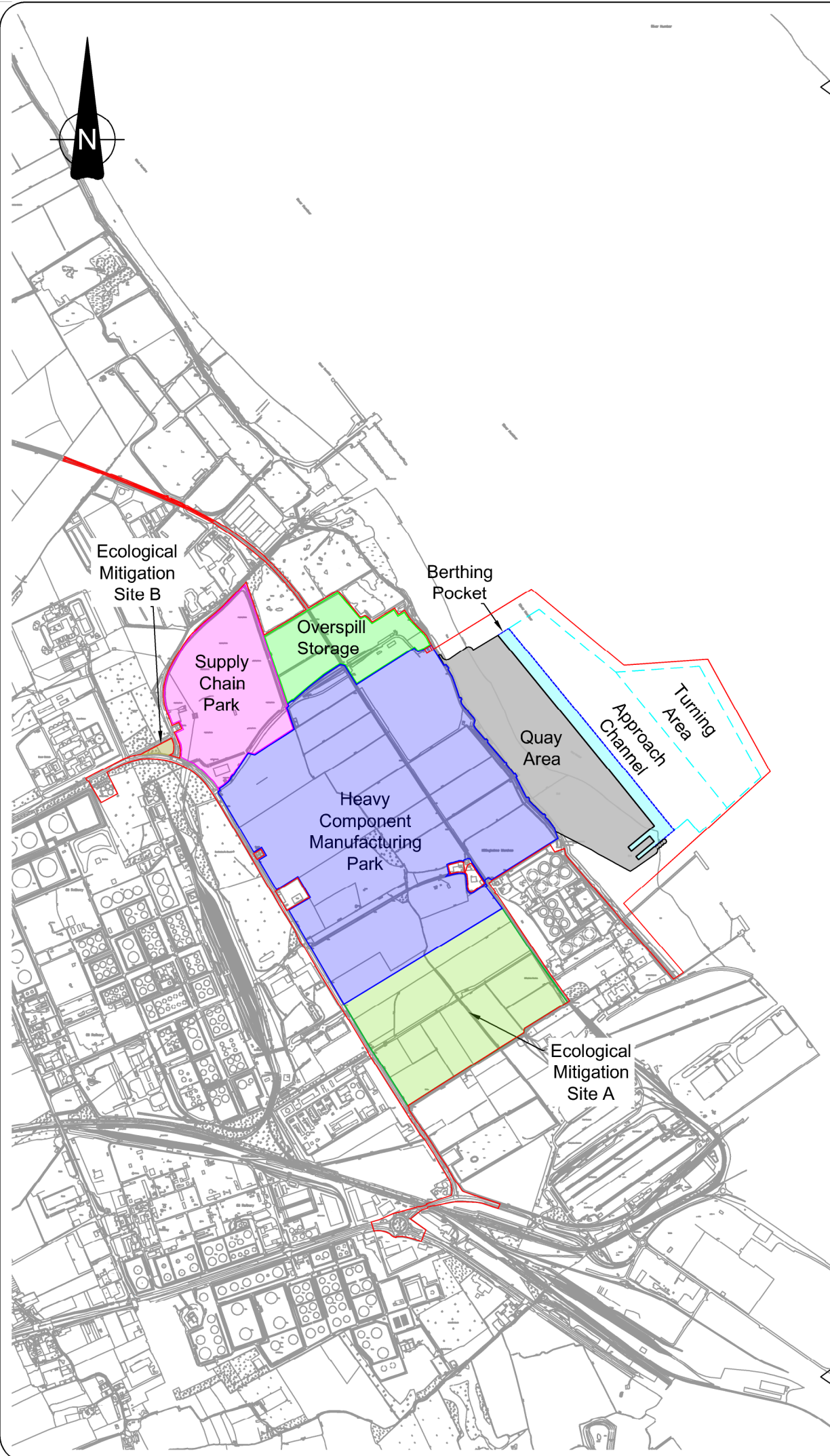
- 4.1.1 Able Humber Ports Ltd proposes to develop a Marine Energy Park (or MEP) on the south bank of the Humber Estuary, to be known as Able Marine Energy Park . The site is located in North Lincolnshire; it is approximately 1 km downstream of the Humber Sea Terminal and immediately upstream of the South Killingholme Oil Jetty. The site will be developed to serve the needs of the emerging marine energy sector.
- 4.1.2 The development of the site will include the creation of a new quay projecting into the Humber Estuary, with associated dredging works, together with the re-contouring of ground levels on the terrestrial part of the site. The terrestrial area will then be developed with manufacturing facilities, external storage areas and site infrastructure, geared towards the manufacture, storage and export of large-scale, heavy marine energy components.
- 4.1.3 Because the creation of AMEP will lead to the loss of European protected habitat in the estuary, the Compensation Site will also be developed to provide compensatory habitat to ensure the coherence of the Natura 2000 network. The Compensation Site will comprise a managed realignment of the existing flood defence at Cherry Cobb Sands to provide intertidal habitat, and the creation of temporary managed wet grassland at Old Little Humber Farm.

4.1.4 The impacts of the Project on the environment, which are summarised in this Non-Technical Summary document, and reported in full in the Environmental Statement (ES) for the Project, have been assessed in terms of:

- Geology and hydrogeology
- Hydrodynamic and Sedimentary Regime
- Water Quality and Sediment Quality
- Aquatic Ecology
- Terrestrial Ecology and Birds
- Commercial Fisheries
- Drainage and Flood Risk
- Commercial and Recreational Navigation
- Traffic and Transport
- Noise
- Air Quality
- Historic Environment
- Light
- Landscape and Visual Impact
- Socio-Economics
- Aviation
- Waste
- Health
- Cumulative and In-Combination Impacts.

4.1.5 Where the Environmental Impact Assessment has identified significant negative impacts, mitigation measures have been proposed to reduce those impacts as far as possible. Any residual impacts remaining after the implementation of these mitigation measures are summarised above and reported in full in the ES.

4.1.6 The ES, of which this document forms a part, is submitted as part of an application for development consent to the Infrastructure Planning Commission.



KEY

— Development Consent Order Boundary

Rev	Date	Comments	Drw	Chk	App
A	12/12/11	Preliminary Issue	RK	RC	RC



ABLE UK Ltd
ABLE House
Billingham,
Teesside,
TS23 1PX

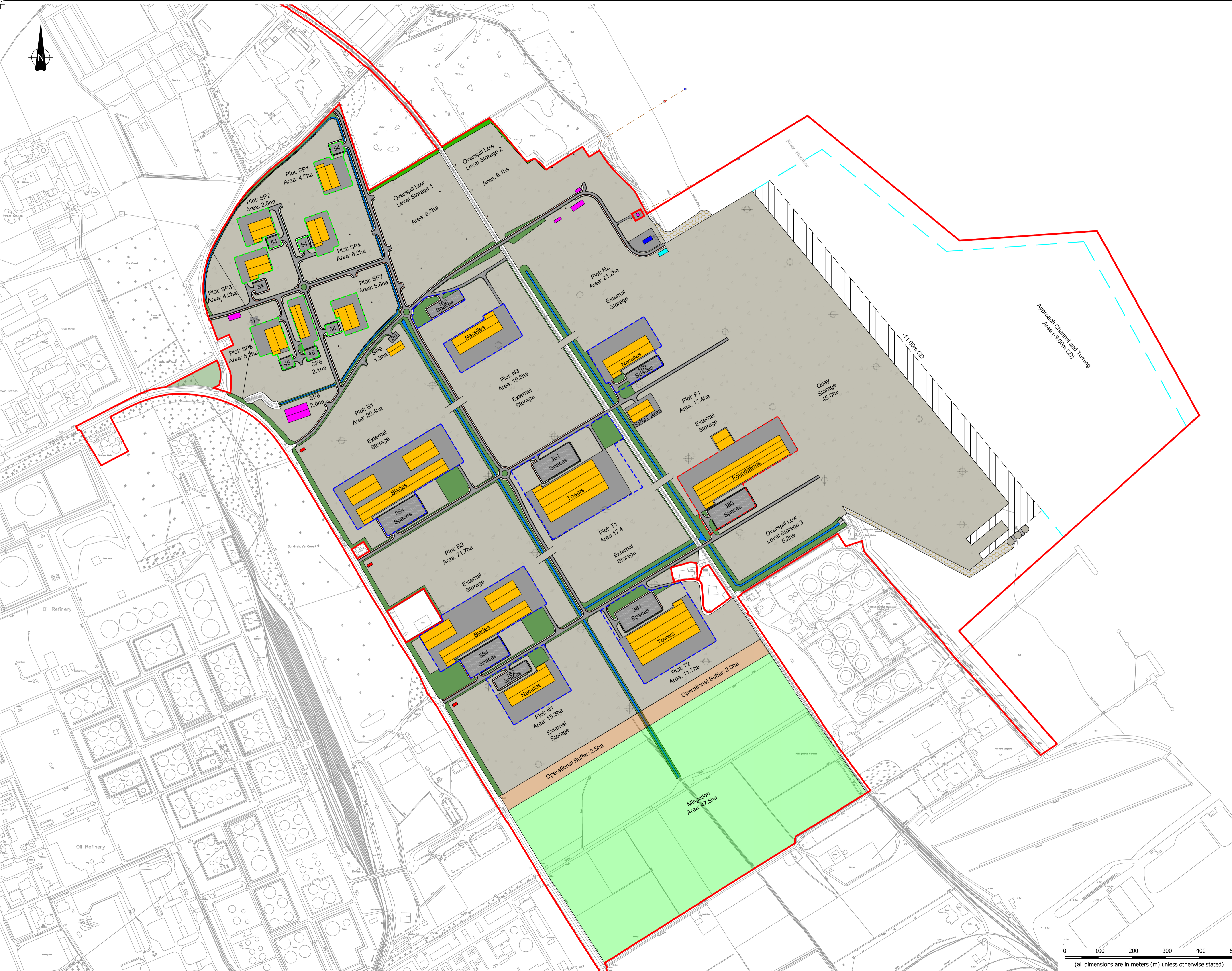
Tel: +44(0)1642 806080
Fax: +44(0)1642 655655
email: info@ableuk.com
www.ableuk.com

Project:	ABLE Marine Energy Park
Client:	ABLE UK Ltd
Title:	Core Development Areas

PRELIMINARY

Scale:	1:25,000@A3	Drawn:	R Keirl	Checked:	R Cram	Approved:	R Cram	
Date:	12/12/2011	Date:	12/12/2011	Date:	12/12/2011			
Drawing No.:	N1.4	Revision:	A					

0 500 1,000 1,500 2,000 2,500
(all dimensions are in meters (m) unless otherwise stated)



- KEY**
- - - Limit of deviation for siting of building up to 45m high.
 - - - Limit of deviation for siting of building up to 25m high.
 - - - Limit of deviation for siting of building up to 15m high.
 - 48 Space Car Park
 - Stone Surfacing
 - Landscaping
 - Rock Revetment
 - Existing Lighting Column (21-30m High)
 - Proposed Lighting Column (50m High)
 - Existing Cooling Water Intake
 - Existing Cooling Water Outfall
 - Existing Building
 - Proposed Building
 - Electric Substation
 - HMRC Office
 - Berthing Pocket
 - Waste Recycling & Transfer Facility
 - - - Able Approach Channel & Turning Area
 - Proposed Pumping Station

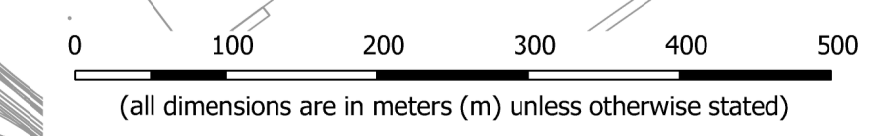
Rev	Date	Comments	Drw	Chk	App
A	12/12/11	Preliminary Issue	RK	RC	RC

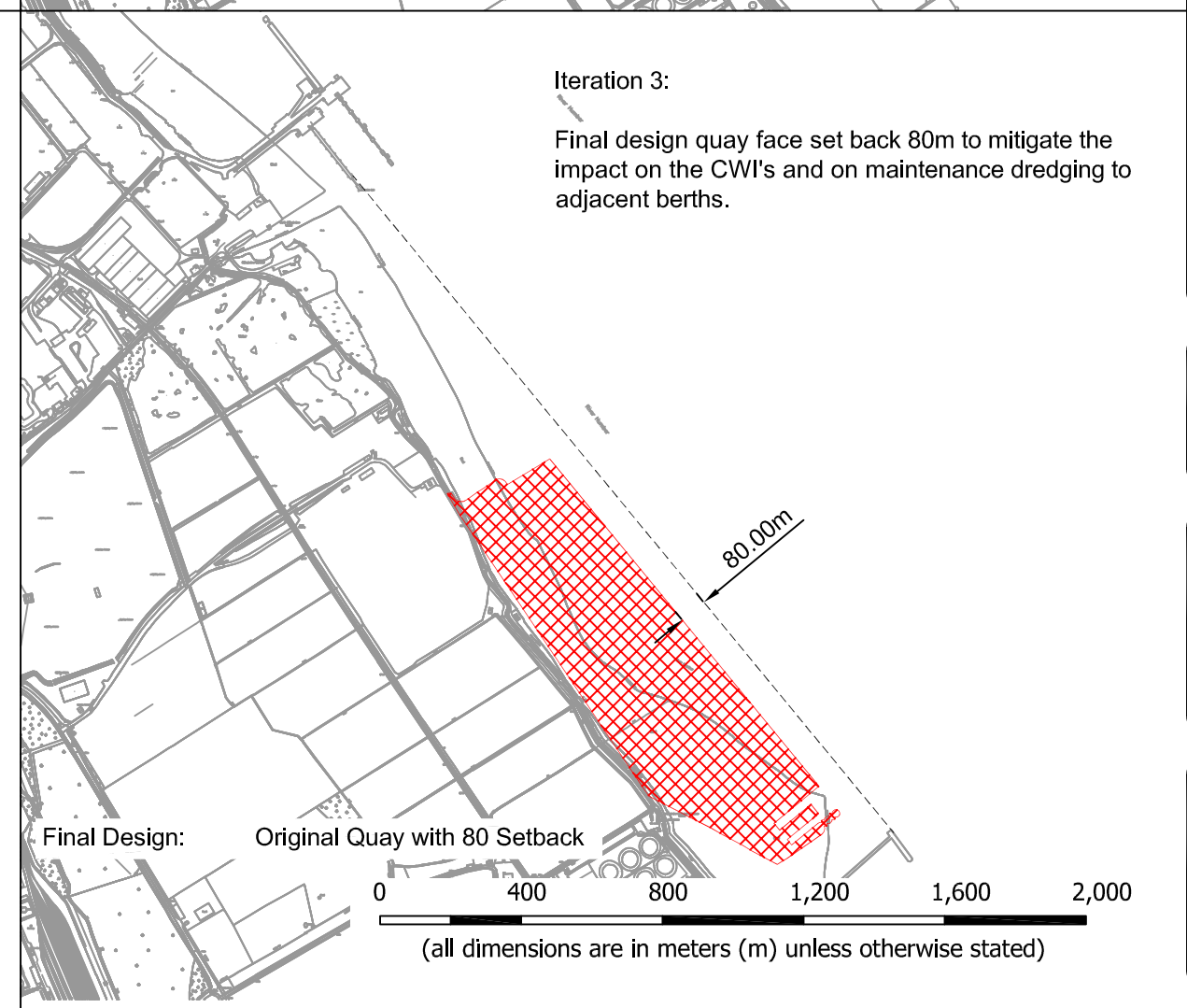
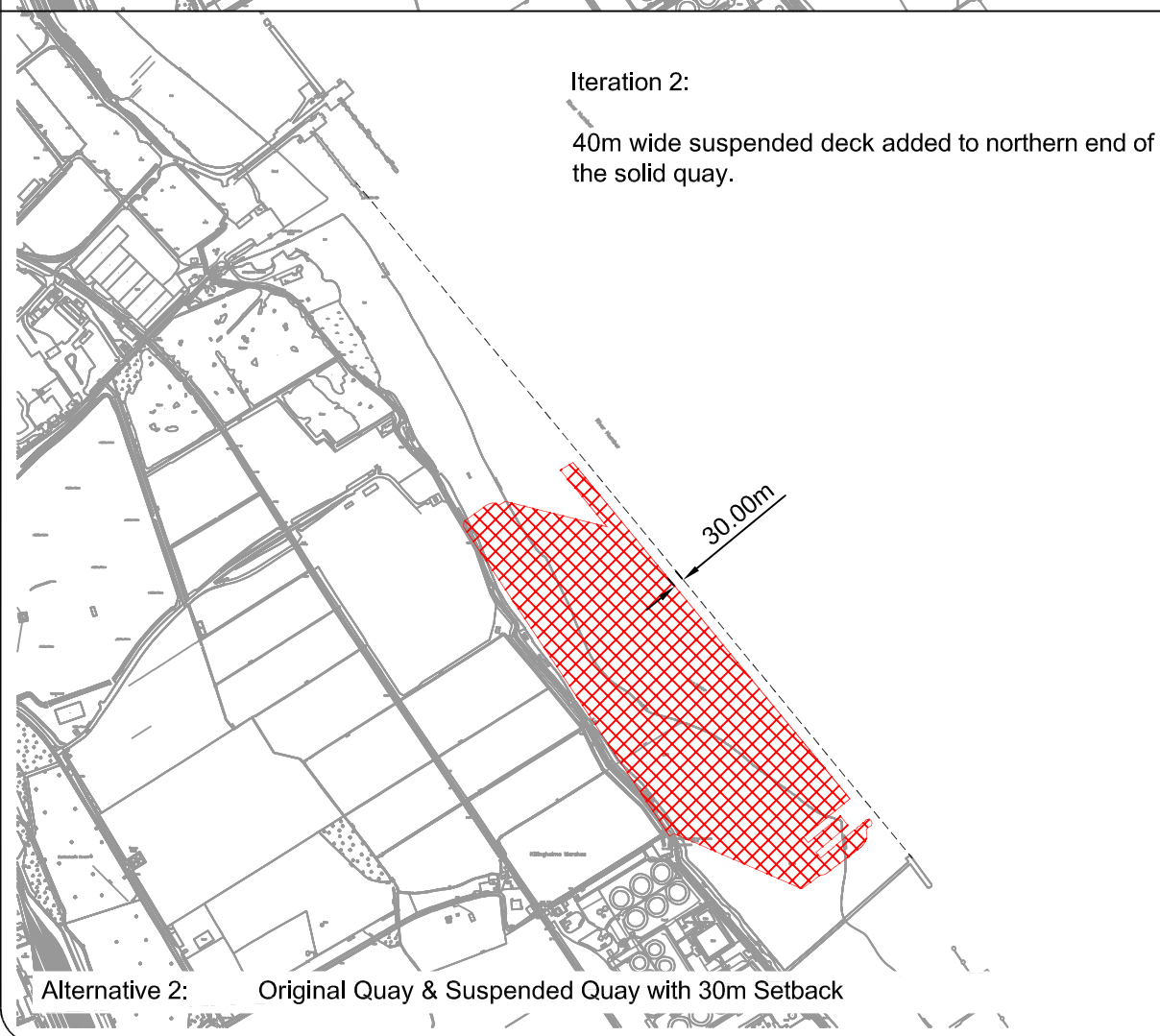
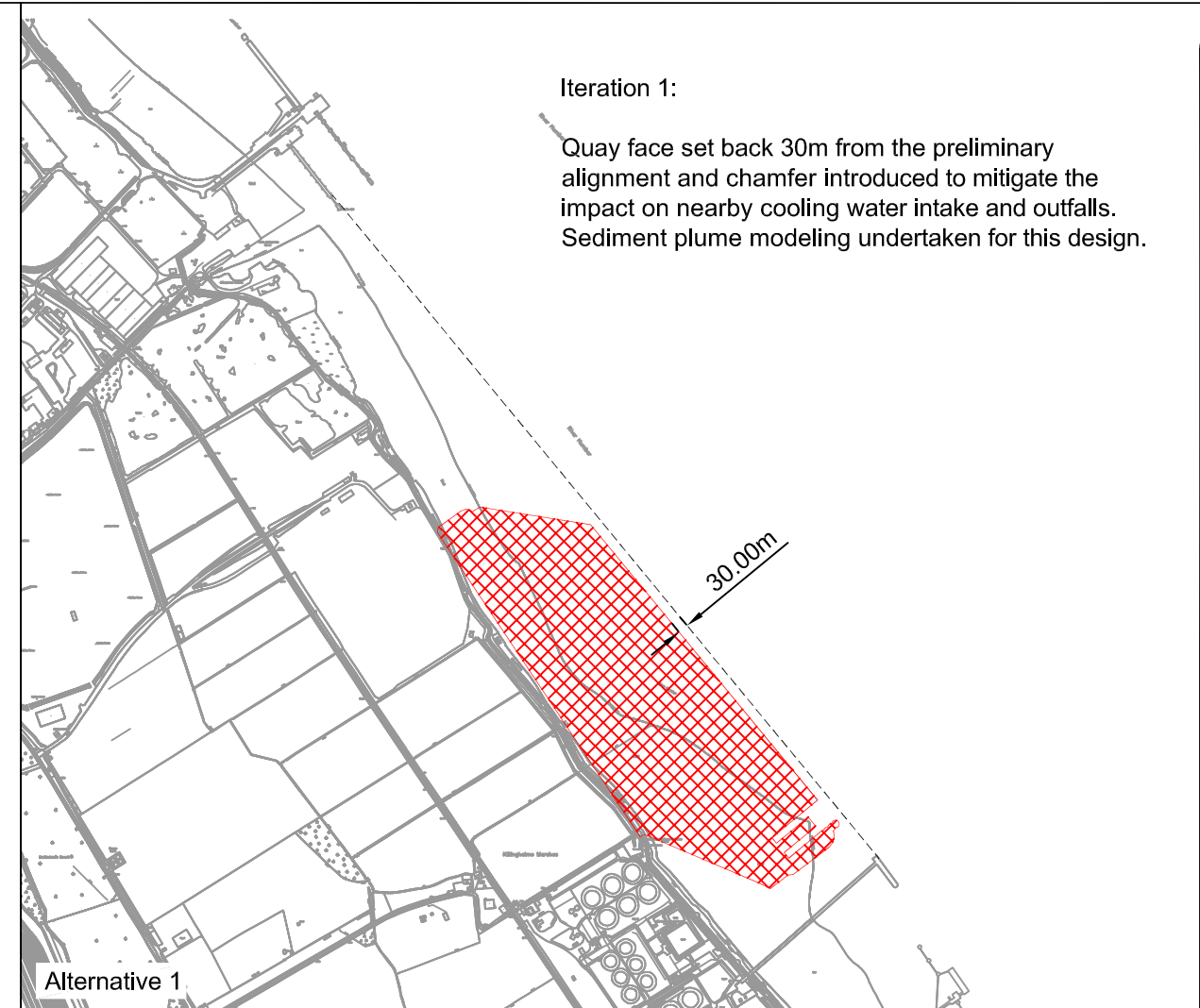
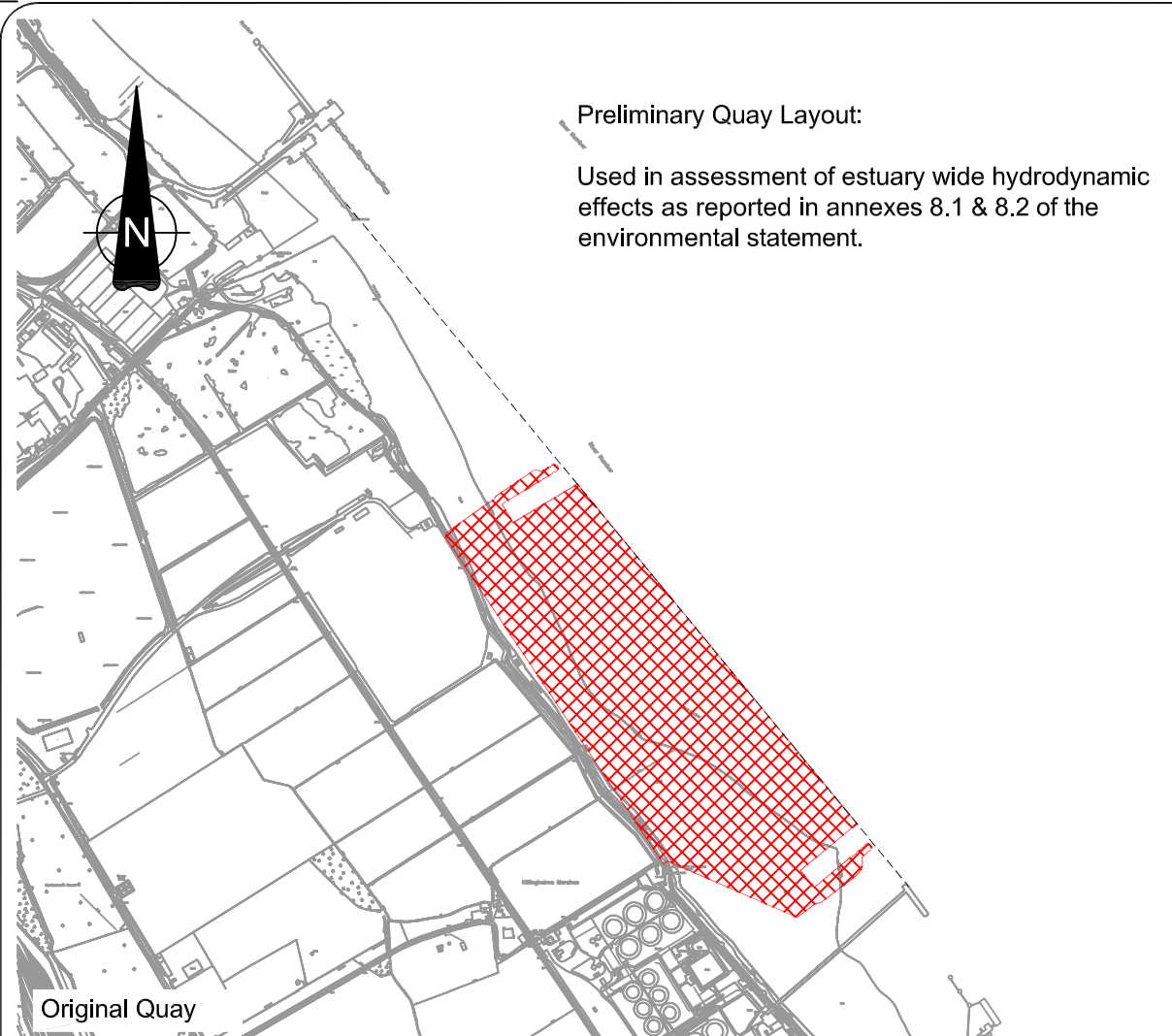
abe ABLE UK Ltd Tel: +44(0)1642 856000
 ABLE House Fax: +44(0)1642 856555
 Birmmham, email: info@ableuk.com
 TESSA, email: info@ableuk.com
 www.ableuk.com

Project:	ABLE Marine Energy Park
Client:	ABLE UK Ltd
Title:	Indicative Masterplan

PRELIMINARY

Scale	Drawn	Checked	Approved
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1:5,000@A1			
Drawing No.	N1.5	Revision:	A





KEY

Notes:

1. This drawing shows the evolution of the design as the environmental impacts were assessed and mitigation introduced.

Rev	Date	Comments	Drw	Chk	App
A	14/09/11	Preliminary Issue	JH	RC	RC

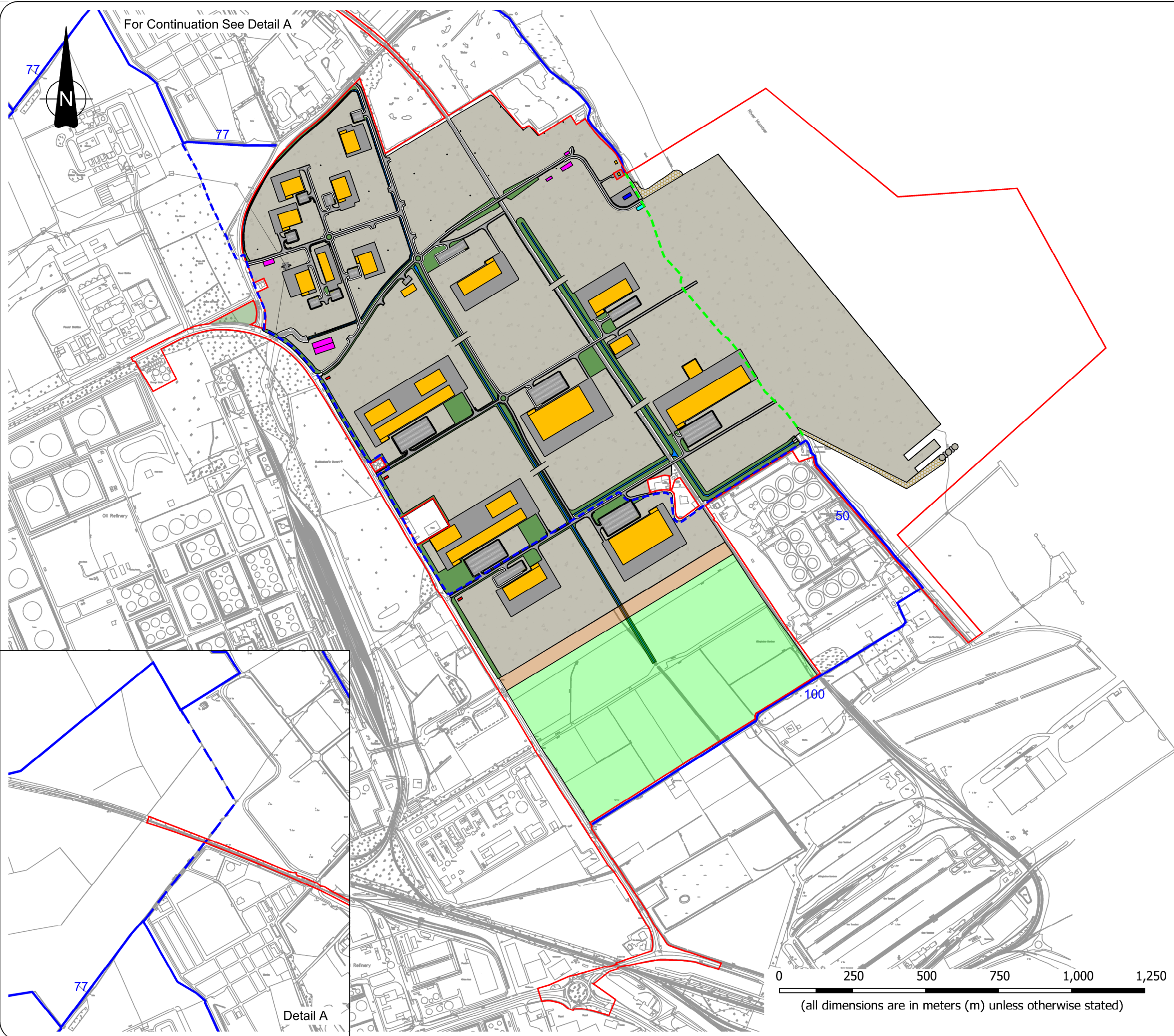
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Project:	ABLE Marine Energy Park
Client:	ABLE UK Ltd
Title:	Quay Design Iterations

PRELIMINARY

Scale:	1:20,000@A3	Drawn:	J Harris	Checked:	R Cram	Approved:	R Cram
Date:	14/12/2011	Date:	14/12/2011	Date:	14/12/2011		
Drawing No.:	N1.6	Revision:	A				



For Continuation See Detail A

KEY

- Development consent Order Boundary
- Existing Footpaths
- - - Footpath to be Diverted
- - - Proposed Footpath No. 50/77/100 Diversions

Rev	Date	Comments	Drw	Chk	App
A	12/12/11	Preliminary Issue	RK	RC	RC



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Project:	ABLE Marine Energy Park
Client:	ABLE UK Ltd
Title:	Footpath No. 50 Diversion Diversion Route

PRELIMINARY

Scale:	Drawn	Checked	Approved
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Date	12/12/2011	12/12/2011	12/12/2011
Drawing No.	N1.7		Revision: A

0 250 500 750 1,000 1,250
(all dimensions are in meters (m) unless otherwise stated)

Detail A

- Semi Mature Avenue Tree Planting.
- Standard Tree Planting mainly native tree species.
- Native woodland and/or scrub planting.
- Grass areas: maintenance regime dependent on location i.e low frequency of cut adjacent water courses, higher frequency adjacent to paths, parking areas and at entrances.

Central drainage feature includes areas of hedgerows and scrub with grass areas next to ditch to provide wildlife corridor. Planting kept 3 to 5m back from ditch with infrequently cut grassland.

Mitigation Area B – Erect nest boxes for tree sparrows in adjacent trees.
Habitat Creation, restoration and enhancement measures.

- Amphibian-proof fence
- Log piles
- Creation of six new ponds for GCN translocation
- Turf covered GCN hibernaculum
- Grassland bund
- Infrequently cut grassland providing year round cover for GCN
- Section of tarmac to be removed and grass seeded
- Arable field converted to species rich grassland

Amenity planting areas providing shelter and outdoor facilities for staff and workers in adjacent buildings. Grass areas more frequently maintained.

Landscape Treatment along Rosper Road to consist of semi mature trees in avenue groups as shown with native woodland/scrub belt to rear. Trees are positioned at key locations to encourage bats to fly high and over towards adjacent existing woodland.

Main site access roads with formal avenue tree planting using semi mature stock. This will introduce a formal parkland appearance to the development and will tie in with the amenity planting associated with the car parks and the various buildings.

An additional formal tree lined avenue is proposed along the western access road. Trees will be berry bearing varieties.

Trees also provide bat flight corridors linking in with trees along Rosper Road which then tie in with adjacent woodlands.

Due to the widening of Station Road, existing trees to the north will be replaced by new tree planting. Every effort will be made to retain the existing trees to the south of Station Road. However, due to their condition they will gradually be replaced by new tree planting.

Mitigation Area A

Area A will provide habitat for mitigation for wintering waders, eg curlew, the loss of Station Road Local Wildlife Site, bats and breeding birds.

The primary focus of Area A will be the creation and enhancement of wet grassland habitat for wintering waders however measures to enhance the habitat for other species will also be taken.

- Habitat creation, enhancement and restoration measures:
- arable fields converted to grassland;
 - water scrapes that are shallow and variable depth, at least 100 m from field boundaries;
 - selected existing hedgerows will be removed to create an open aspect for wintering birds;
 - foraging habitat for bats, low shrub/scrub will be located mainly around the margins;
 - 1.7 ha (at least) of neutral grassland to mitigate for loss of Station Roads Local Wildlife Site;
 - tussocky swards will be encouraged which provide habitat for nesting skylarks and meadow pipit; and
 - clearance of surrounding vegetation where it is resulting in overshadowing, vegetation surrounding the water which provides cover from predators (eg rough grassland) and food for water vles will be encouraged.

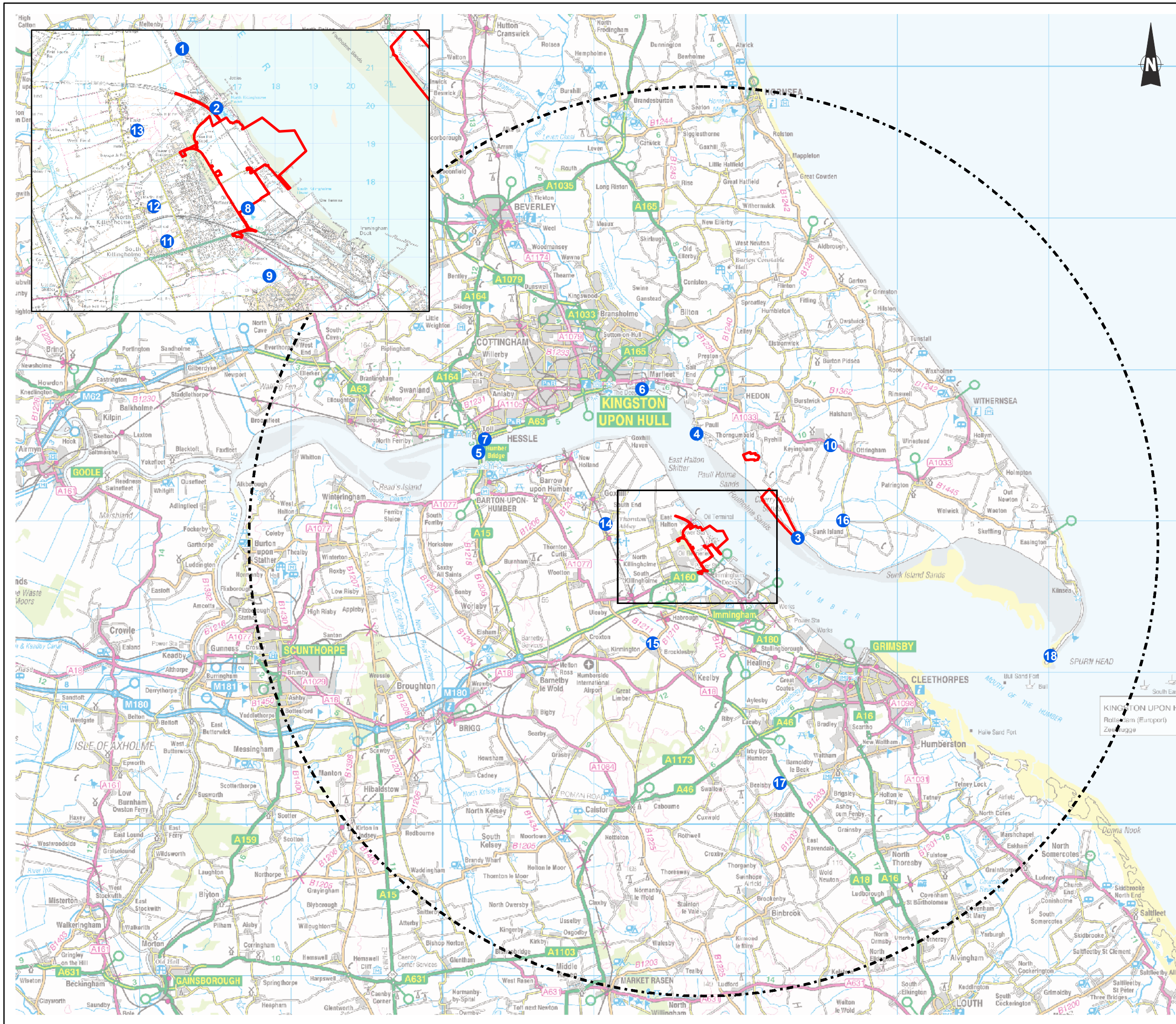
Rev	Date	Comments	Dw	Chk	App
A	12/12/11	Preliminary Issue		RK	RC



Project:	ABLE Marine Energy Park
Client:	ABLE UK Ltd
Title:	Indicative Landscape Masterplan

PRELIMINARY			
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Date:	12/12/2011	12/12/2011	12/12/2011
Drawing No.:	N1.11	Revision:	A

0 100 200 300 400 500
(all dimensions are in meters (m) unless otherwise stated)



Key

- Application Boundaries
- 30km Buffer
- 1 Viewpoint Locations

SOURCE: Reproduced from Ordnance Survey digital map data. © Crown copyright. All rights reserved. 2011 License number 0100031673.
 PROJECTION: British National Grid

Rev	Date	Comments	Drw	Chk	App
A	01/12/2011	General Amendments	MTC	EO'C	SP



Project:	ABLE Marine Energy Park			
Client:	ABLE UK Ltd			
Title:	Figure N1.12 Viewpoint Locations			

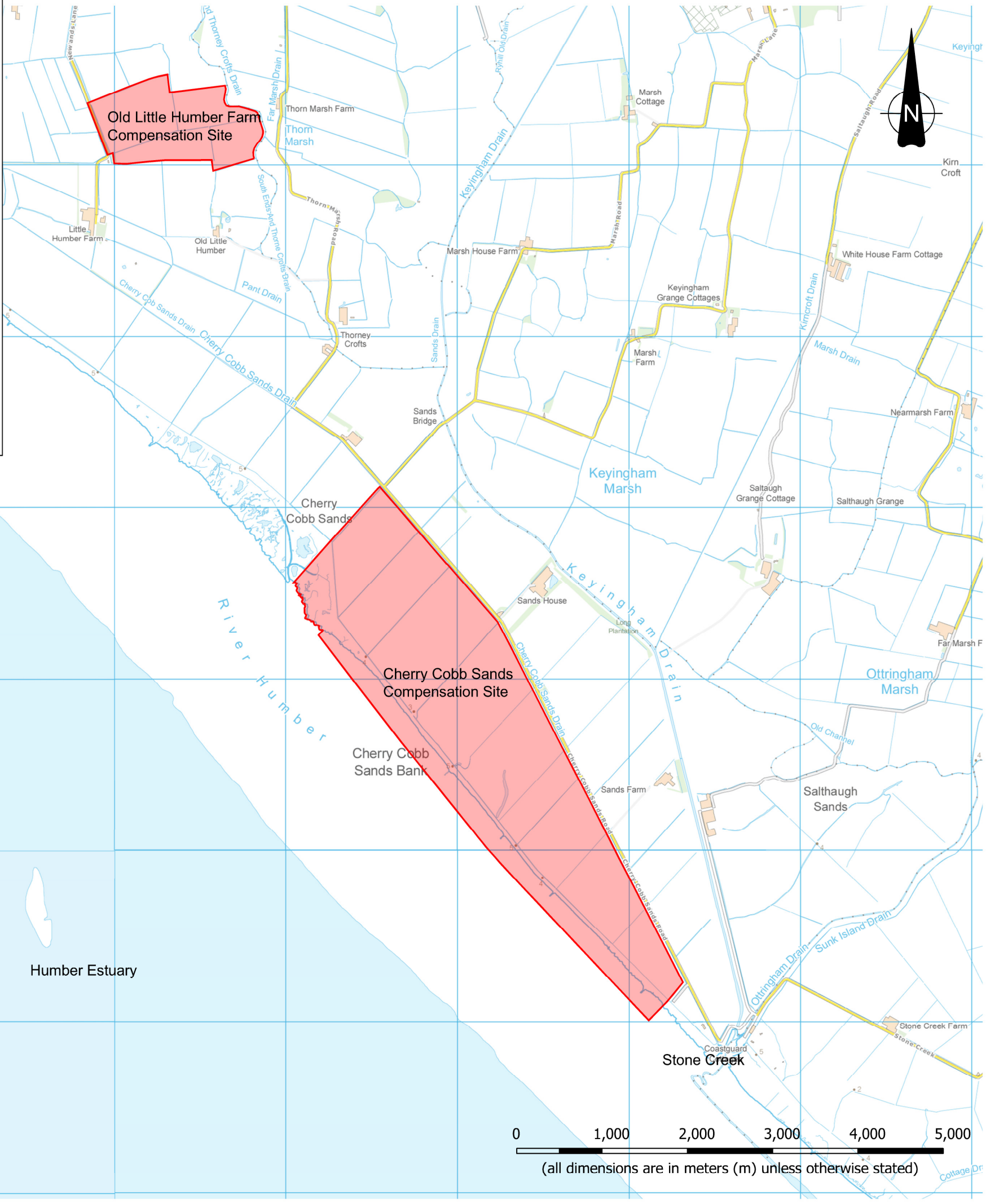
PRELIMINARY

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Date	01/12/2011	01/12/2011	01/12/2011
Drawing No.	ABLE_ViewPoints.mxd		Revision: A

File: 0108172-ABLE_MarineEnergyParkGIS_MTC_MKMAPSABLE_Template Maps/ABLE_ViewPoints.mxd



UK Location



KEY

Development Consent Order Boundary

A	12/12/11	Preliminary Issue	RK	RC	RC
Rev	Date	Comments	Drw	Chk	App

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Fax: +44(0)1642 655655
email: info@ableuk.com
www.ableuk.com

Project: ABLE Marine Energy Park

Client: ABLE UK Ltd

Title: Cherry Cobb Sands & Old Little Humber Farm : Location Plan

PRELIMINARY

Scale: 1:50,000@A3	Drawn R Keirl	Checked R Cram	Approved R Cram
Date	12/12/2011	14/12/2011	14/12/2011
Drawing No.	N2.1		Revision: A

