Appendix B

2002 Scoping Report

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Bathside Bay Compensatory Habitat:
Managed Realignment in Hamford Water

Environmental Scoping

Hutchison Ports (UK) Ltd

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Environmental scoping report in relation to the proposed Managed Realignment at Little Oakley, produced by Posford Haskoning Environmental

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ENVIRONMENT

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1 BACKGROUND

1.1 Bathside Bay tidal works and approach channel deepening EIA

In October 2001, Hutchison Ports (UK) Ltd (HPUKL) submitted an application to the Department for Transport (DfT) (formerly the DTLR) (Ports Division) to undertake tidal works within Bathside Bay, Stour Estuary, Essex. In conjunction with this application, the Harwich Haven Authority (HHA) submitted an application to the DTLR to deepen and widen the approach channel to Bathside Bay and to dispose of the dredged arisings. Posford Haskoning were commissioned to undertake an Environmental Impact Assessment (EIA) and to produce an Environmental Statement (ES) to accompany the applications. Although the various components of the proposed scheme are subject to different consent routes, it was considered that a single ES should be prepared for the scheme as a whole given the highly inter-dependant nature of the various components.

In summary, the proposed tidal works comprise the reclamation of approximately 65ha of intertidal area (above CD) and the dredging of approximately 4ha of intertidal in the Gas House Creek area to accommodate small craft moorings. The channel would be dredged to a depth of -14.5m CD, from a depth of -9.0m CD, with a depth of -15m CD in the berthing area adjacent to the quay face. It is proposed to dispose of the silt and clay at an offshore disposal site and to utilise all of the dredged gravel for reclamation purposes. Further details of the proposed works and a full assessment of the associated environmental effects are provided in the ES (Posford Haskoning and HR Wallingford, 2001).

1.2 Effect on integrity of the Stour and Orwell Estuaries SPA

The DfT (then DTLR), following advice from English Nature, determined that the proposed scheme would be likely to have a significant effect on the Stour and Orwell Estuaries Special Protection Area (SPA). Therefore, 'appropriate assessment' was required in accordance with the Conservation (Natural Habitats &c.) Regulations 1994. The information to inform an appropriate assessment was provided within the ES (Posford Haskoning and HR Wallingford, 2001).

One of the key findings of the ES was that the proposed scheme would be likely to have an adverse affect on the integrity of the Stour and Orwell Estuaries SPA. This effect arises due to the loss of habitat within Bathside Bay that is considered to play an important contributory role to the designated status of the SPA. Assuming that the lead competent authority (in this case the DfT) agrees with this conclusion, Regulation 49(1) of the Conservation (Natural Habitats &c.) Regulations 1994 would apply. Regulation 49(1) states that:

"If..., there being no alternative solutions, the plan or project must be carried out for imperative reasons of overriding public interest..., the competent authority may agree to the plan or project notwithstanding a negative assessment of the implications for the site"

Following consideration of the overriding public interest (OPI) case, the project may be consented despite the findings of the appropriate assessment. Should this be the case, Regulation 53 would apply, which states that:

*"...the Secretary of State shall secure that any necessary **compensatory measures** are taken to ensure that the overall coherence of Natura 2000 is protected" [emphasis added].*

1.3 Compensatory habitat

Given the conclusion of the ES, Hutchison Ports (UK) Ltd began to seek land that had the potential to provide the necessary compensation should it be concluded by the Secretary of State that Regulation 49(1) and Regulation 53 apply.

Due to the nature of the habitat that would be lost at Bathside Bay, and the magnitude of this loss, the only feasible method of creating compensatory habitat is considered to be managed realignment of coastal flood defences. Details of the broad habitat characteristics that would be required to compensate for the loss of Bathside Bay, and that were therefore considered in the selection of an appropriate site, are provided in Section 2.1.

1.4 Requirement for EIA

At this early stage in the assessment of the suitability of managed realignment at Hamford Water, it was considered to be sensible to begin the process with a scoping exercise and environmental appraisal of the proposals. It is apparent, however, that the managed realignment of flood defences to create compensatory habitat is likely to require planning permission and Environmental Impact Assessment (EIA) in accordance with the Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 1999 which implements the EIA Directive in England and Wales.

1.5 Aim and structure of the scoping report

A scoping report is often prepared at an early stage in the environmental assessment process in order to identify the potential impacts of the proposed works on all relevant parameters. The scoping study can also be useful in assessing a number of alternative options and informing the selection of a preferred option.

The habitat characteristics that were considered in the selection of a suitable compensation site and a description of the options considered for undertaking managed realignment are described in **Section 2.** For each of the environmental parameters considered, **Section 3** contains a brief background section that provides an outline of the nature of the existing environment. Following this, **Section 4** of the scoping report identifies the potential impacts that could arise during the construction and operational phases of the works for each of the alternative managed realignment options. **Section 5** identifies a preferred option for undertaking managed realignment based on the information presented in Section 4 and provides further information on the design of the breach. **Section 6** sets out the further work that will be undertaken to provide sufficient data for an assessment of environmental effects to be made. The proposed scope of the Environmental Appraisal, in the form of a contents list, is provided in **Section 7.**

1.6 Definition of the study area

The study area is defined by considering the area that would be directly affected by the tidal inundation resulting from managed realignment of the coastal defences and the area that may be indirectly affected due to changes in the hydrodynamic regime. Broadly, therefore, the study area comprises Hamford Water, the coastline adjacent to it and an area of low-lying land located on the northern shore of Hamford Water. The location of Hamford Water and the study area is shown on Figure 1.1.

2 COMPENSATORY HABITATS

2.1 Identification of land for creation of compensatory habitat

In order to focus the selection of areas where managed realignment could successfully compensate for the loss of Bathside Bay, a range of key parameters for the habitat replacement were identified as being important. These parameters were as follows:

- **Geographic location**

The potential site should be located as close as possible to Bathside Bay so that (ideally) functionality can be maintained or links established between the Stour and Orwell estuaries and the compensatory habitat. The closer the compensatory habitat is to that which is lost, the more likely the coherence of Natura 2000 would be maintained;

- **Type of habitat**

Compensatory measures are intended to provide replacements for the key habitats and species affected by the proposals. Therefore, any compensatory habitats need to be of a similar habitat type to those lost as a result of the works. The compensatory habitat should be able to be designed is such a way as to support the suite of designated waterfowl species that were supported by the habitats that have been lost (in this case a mixture of mudflat (primarily) and saltmarsh);

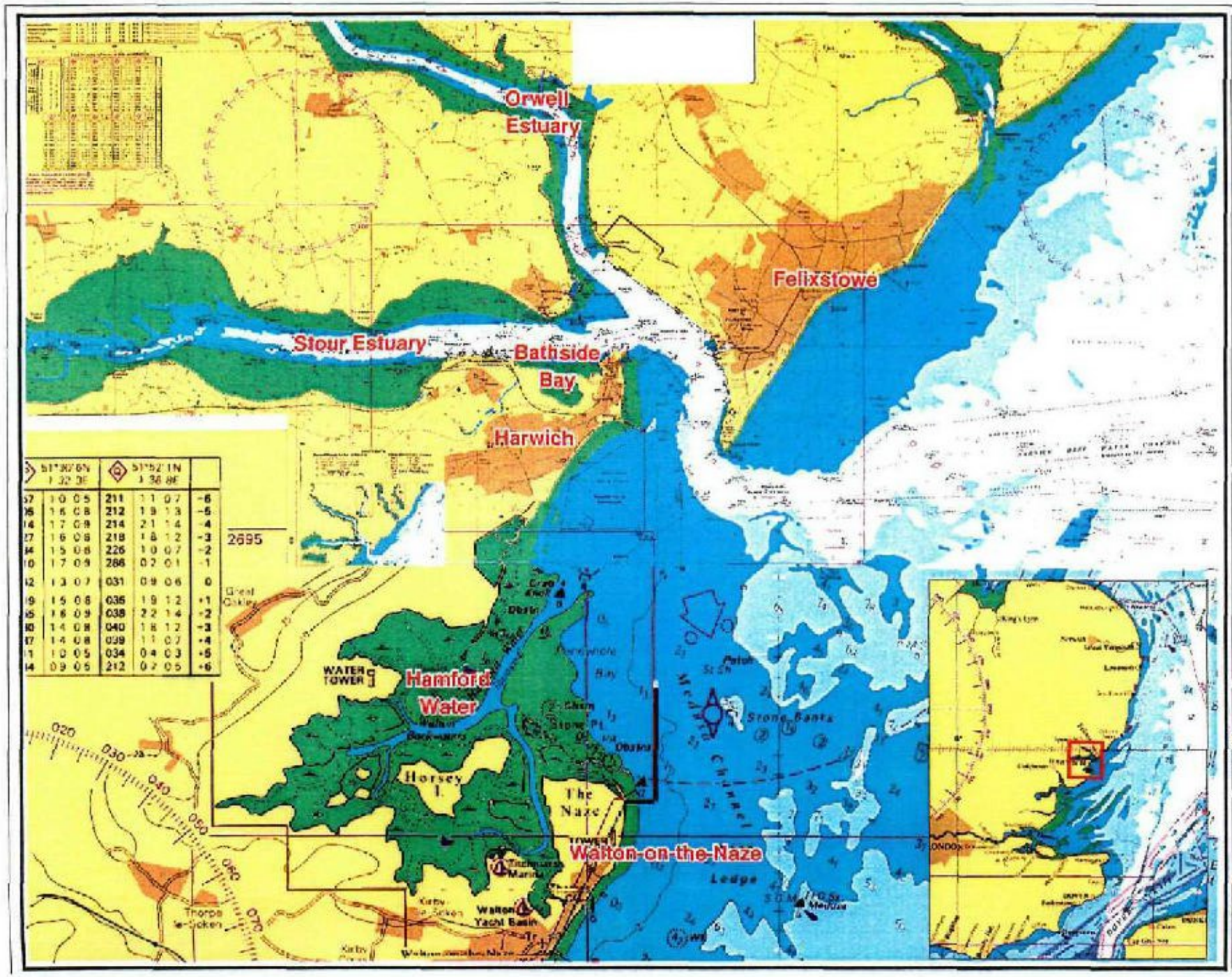
- **Sustainability**

Any replacement habitat needs to have an assured life in excess of the habitat that would be lost and the design should seek to secure the most sustainable ecosystem possible; and,

- **Timing and uncertainty**

Ideally, the compensation should be in place before the loss of habitat due to development takes place. Where this is not possible, the compensation package should be scaled to take account of the additional impact (i.e. the temporary intermediate loss of habitat). In addition, there is likely to be some uncertainty in the confidence with which the compensatory habitat would be able to support the affected qualifying features.

A number of other factors are also important considerations that were taken into account when selecting a suitable site for compensation. In summary, the main factors were the:



Source:
ARCS Charts under license from UK Hydrographic Office.

Title:
LOCATION OF HAMFORD WATER

Project:
HAMFORD WATER MANAGED REALIGNMENT

Client:
HUTCHISON PORTS (UK) LTD

Date:
JULY 2002

Scale:
NTS

Figure:
1.1

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- Level of disturbance experienced by the site - a site that experiences limited disturbance was sought;
- Physical characteristics (e.g. position within estuary system, adjacent sediment type and topography of site);
- Likelihood of the site to freeze during cold weather - a site at the mouth of an estuary, that is less likely to freeze, was sought (Bathside Bay tends not to freeze when the intertidals of the mid and upper Stour freeze over);
- Likely nature of biological communities that would colonise the area;
- Existing land uses and infrastructure; and,
- Amount of engineering that would be needed to create a functioning site (e.g. length of counter wall construction required).

Based on the above considerations, a 138ha site was identified on the northern shore of Hamford Water, Essex. Hamford Water is located to the south of the Stour and Orwell estuaries and to the north of Walton on the Naze (see Figure 1.1); approximately 2.6km from Bathside Bay.

Three potential options have been identified for undertaking the realignment of the sea defences at the site.

2.2 Description of options for undertaking managed realignment

Following a series of site visits and a study to determine the potential hydrodynamic and sedimentary effects of breaching the seawall (HR Wallingford, 2002), it is considered that there are three feasible options for undertaking managed realignment of the flood defences. These options are described below:

- *Breach A* — *Breaching within Hamford Water (see Figure 2.1) (referred to as the 'Hamford Water Breach')*

  Under this option, the managed realignment area would be flooded through the existing creeks that pass through an extensive saltmarsh area on the northern shore of Hamford Water.

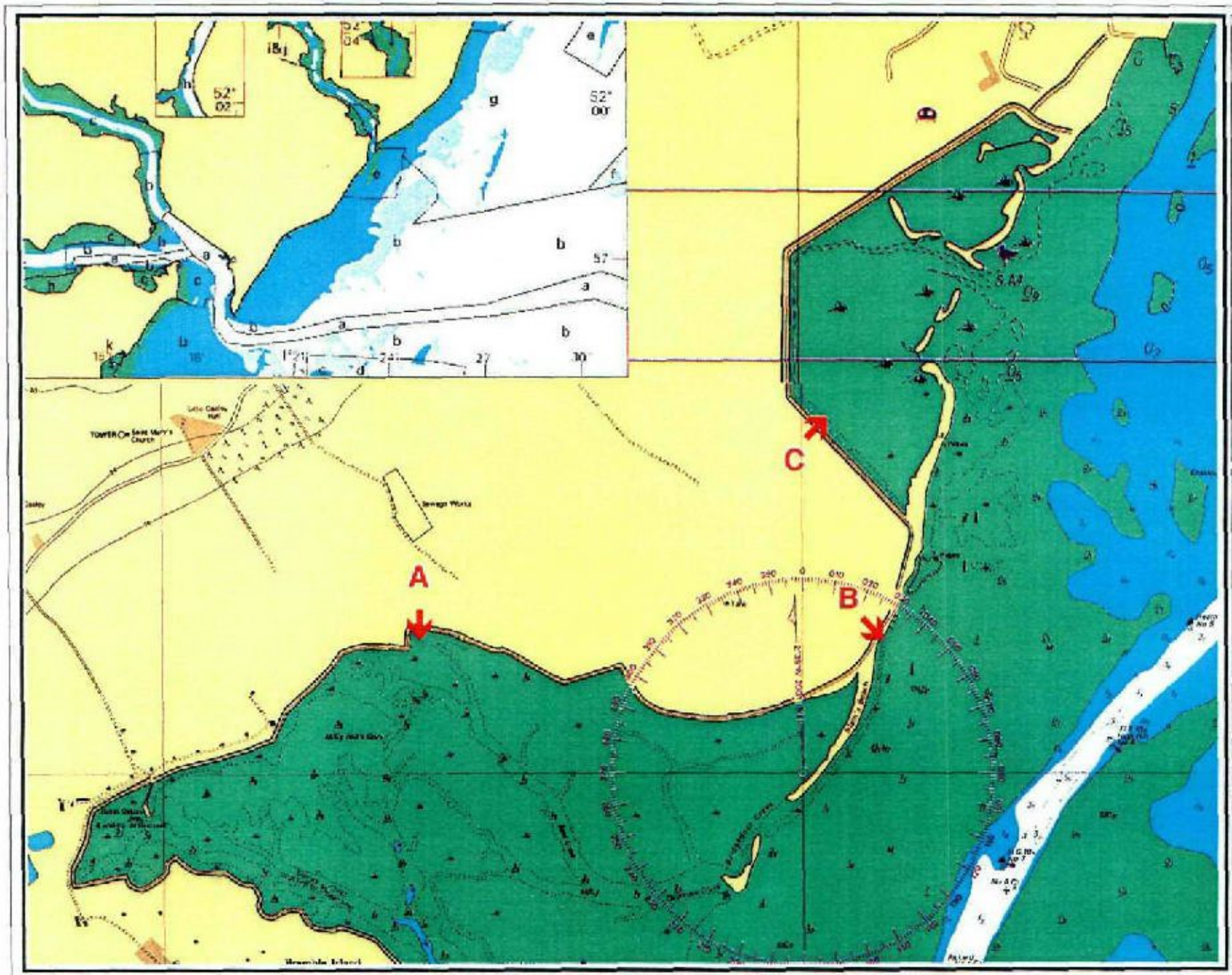
- *Breach B* — *Breaching directly to the open coast (see Figure 2.1) (referred to as the 'Coastal Breach')*

  This option involves breaching the seawall along the open coast, at the mouth of an old creek system (located to landward of the current seawall).

- *Breach C* — *Breaching adjacent to saltmarsh on the open coast (see Figure 2.1) (referred to as the 'Coastal Marsh Breach')*

  This breach would be on the coast to the north of Breach B, adjacent to an area of saltmarsh. A single main creek (South Hall Creek) dissects this marsh.

Under each of the above options, the tidal volume of the managed realignment area would be approximately 1 million m^3 on spring tides and 0.4 million m^3 on neap tides.



Key:

Source:
ARCS Charts under license from UK Hydrographic Office.

Title:
LOCATION OF ALTERNATIVE BREACH OPTIONS

Project:
HAMFORD WATER MANAGED REALIGNMENT

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For each of the options, it is proposed that maintenance dredged material (from the berths of and approach channels to the Haven Ports) would be pumped into the managed realignment area to raise its levels and achieve intertidal mudflat over most of the area, backed by saltmarsh. This will also enable the benthic community to recolonise and develop more rapidly than if sediment were allowed to accrete naturally within the realignment area.

The seawall would be reinstated to the required level of defence at the back of the site.

Further description of the preferred option for breaching is given in Section 5.

3 DESCRIPTION OF THE BASELINE ENVIRONMENT

3.1 DESIGNATED STATUS

Hamford Water is covered by a number of designations, largely for its nature conservation interest (see Figure 3.1). These are:

- Special Protection Area (SPA)[1];
- Ramsar site[2];
- Site of Special Scientific Interest (SSSI)[3]; and,
- National Nature Reserve (NNR)[4].

Hamford Water was designated an SPA and Ramsar site in 1993 and covers an area of 2,179ha. The land that lies behind the seawall within the study area is largely arable land and not designated under any legislation for nature conservation.

In addition, Hamford Water lies within an Environmentally Sensitive Area (ESA). ESAs are statutory areas in which the Government seeks to encourage environmentally sensitive farming practices, prevent damage that might result form certain types of agricultural intensification, and restore traditional landscapes.

There are three Geological Conservation Review (GCR) sites in the vicinity of Hamford Water. GCR sites are non-statutory designations and are of national or international importance for earth science. All of these sites are located to the south of Hamford Water at Walton on the Naze.

Hamford Water is also designated a Special Landscape Area (SLA).

3.2 MARINE AND ESTUARINE ECOLOGY

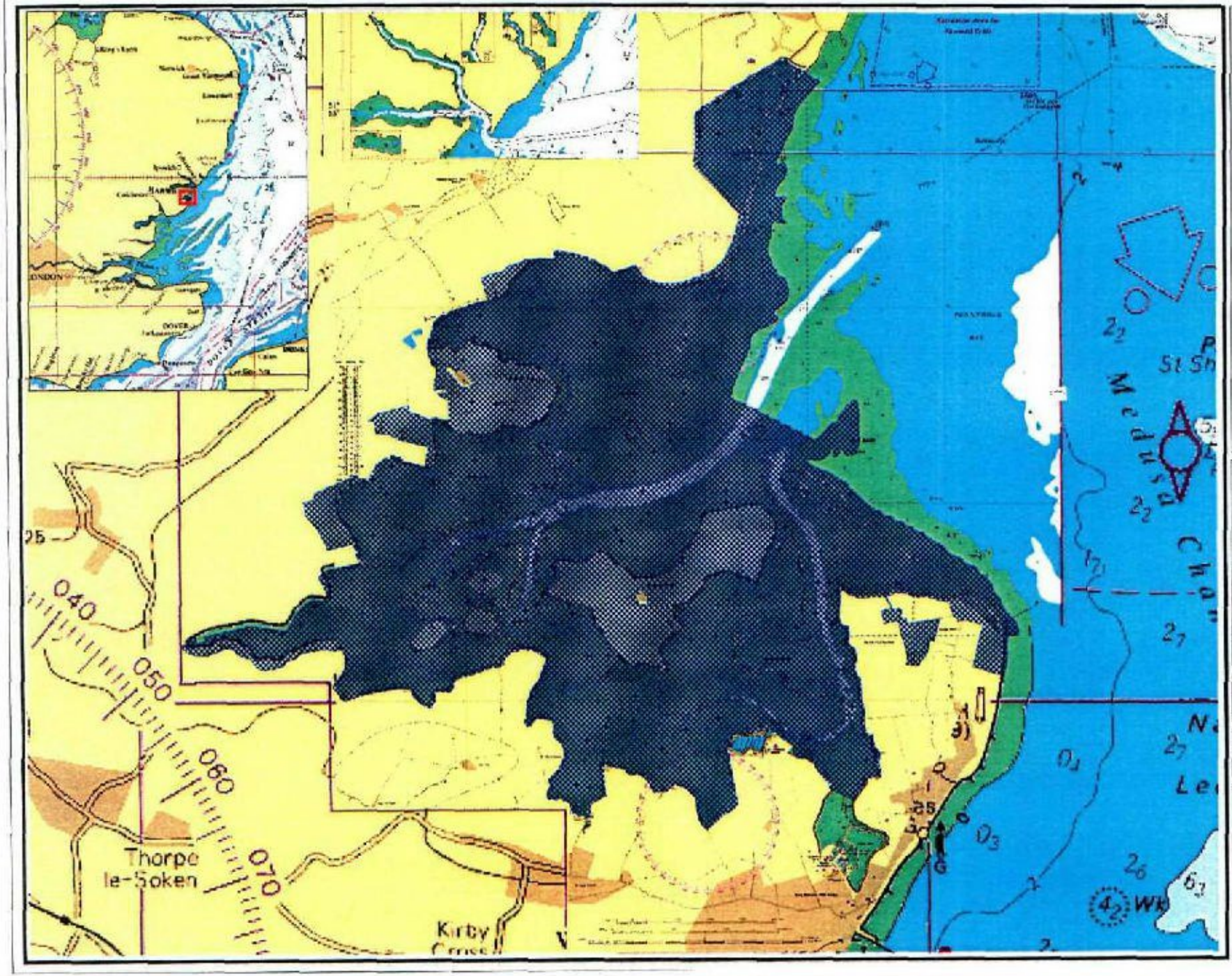
This section describes the main features of the marine and estuarine ecology of the area in the vicinity of the alternative locations for the breach. Within Hamford Water itself, to the north-east of Bramble Island, there is an extensive area of saltmarsh (Figure 1.1) that is dissected by a complex network of channels of varying sizes. These channels

[1] Designated under Council Directive 79/409/EEC on the conservation of wild birds

[2] Designated under the Convention on Wetlands of International Importance, held at Ramsar, Iran

[3] Designated under Section 28 of the Wildlife and Countryside Act 1981

[4] Declared under the National Parks and Access to the Countryside Act 1949 or the Wildlife and Countryside Act 1981



Legend

Hamford Water SPA, Ramsar site and SSSI

Source:
ARCS Charts under license from UK Hydrographic Office.

SPA boundary from EN website

Title:
EXTENT OF HAMFORD WATER SPA

Project:
HAMFORD WATER MANAGED REALIGNMENT

Client:
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Date:	Scale:
JULY 2002	NTS

Figure:
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The invertebrate communities that are supported by these areas have not been specifically surveyed to date. However, given the physical conditions that prevail in the area, it is likely that the assemblage would be typically estuarine. Therefore, it would be expected that the community comprises a variety of Polychaeta, Oligochaeta, Mollusca and Crustacea. The invertebrate communities from other intertidal areas within Hamford Water are known to be productive and diverse; embayment flats constitute the most biologically productive system in Britain, producing a greater tonnage of biomass per unit area than intensive agriculture (English Nature, 2000). For example, the ragworm *Hediste diversicolor* can occur at densities of up to 10,000 per m^2 and the laver spire shell *Hydrobia ulvae* can reach densities of up to 50,000 per m^2 (English Nature, 2000). The invertebrate communities of the intertidal areas of Hamford Water are a vital food resource for many species of waterfowl.

Further east, towards the mouth of Hamford Water, parts of the foreshore comprise sand and gravel; this material is artificial and has moved to this location as a result of a placement of material made by the Harwich Haven Authority for sea defence purposes in 1999 (Plate 3.1). These sand and shingle structures have become vegetated. (Plate 3.2).

Plate 3.1 **Sand and gravel on the upper shore at the mouth of Hamford Water resulting from placements of material by the Harwich Haven Authority (looking north-east)**

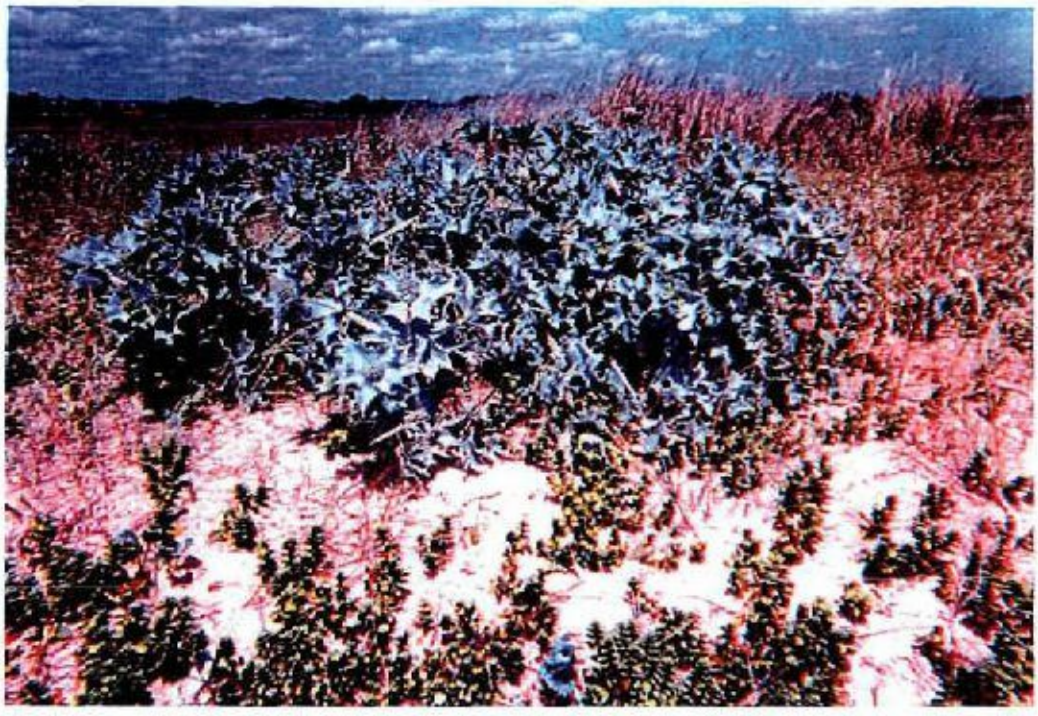


Plate 3.2 **An example of vegetation of sand and shingle structures (sea holly *Eryngium maritimum*)**

Immediately to the north of the entrance to Hamford Water there is an area of saltmarsh on the upper shore (Plate 3.3). Below this level there is a strip of sand and gravel shore and lower down the shore the substratum is defined as intertidal mudflats and sandflats.

Plate 3.3 **Area of saltmarsh to the north of the entrance to Hamford Water**

The subtidal zone around the entrance to Hamford Water is sandy, with a spit on each side of the channel. This sandy substratum supports the polychaete *Nephtys cirrosa,* and the amphipods *Bathyporeia tenuipes* and *B. sarsi*. To the north of Horsey Island, there is a series of sunken barges that are used as part of a coast protection and saltmarsh replenishment scheme. These barges provide an interesting area of hard substratum in an otherwise sedimentary environment. The flooded holds within the barges provide a point of attachment for the peacock worm *Sabella pavonina* and the stalked sea squirt *Styela clava*. The subtidal zone throughout much of the remainder of Hamford Water is dominated by the polychaetes *Nephtys hombergii, Streblospio shrubsolii, Tharyx marioni, Tubificoides* spp., the Baltic tellin *Macoma balthica* and the horseshoe worm *Pharonis muelleri*.

3.3 TERRESTRIAL AND FRESHWATER ECOLOGY

This section describes the ecological interest of the seawalls and the area to landward, including areas of wet grassland and brackish and freshwater ditches.

3.3.1 Wet grassland

Wet grassland includes coastal grazing marsh subject to maritime influence and lowland wet grassland adjacent to tidal reaches of estuaries. Coastal grazing marsh is a distinctive habitat consisting of lowland wet pasture drained by a series of ditches that may be either brackish or freshwater. An important resource in Essex are the 'foldings' or the grassland between the seawalls and the 'borrow dyke' (the ditch to landward of the seawall). The foldings are grazed and comprise unimproved or semi-improved grassland. These areas are comparatively herb-rich and, therefore, are of high conservation importance.

Wet grasslands and foldings can support nationally scarce and rare plant species. It is known, for example, that hog's fennel *Peucedanum officinale* is present within the study area. Improved grassland on Horsey Island is a feeding and roosting site for internationally important wintering populations of brent geese and black-tailed godwit.

The site that is proposed for managed realignment is mostly comprised of agricultural land and there are no areas that could be described as being extensive areas of wet grassland. However, there is likely to be some interest in the area between the seawall and the main ditch that runs parallel to the seawall on the landward side.

3.3.2 Freshwater and brackish ditches

The wet grasslands of Essex have some of the most floristically diverse ditch systems in Britain, largely due to ditch management such as casting and vegetation cutting which allows the growth of smaller emergent, floating and submerged plants. A number of nationally scarce plants are found in the freshwater ditches in Essex.

Brackish ditches have a characteristic but less species-rich flora than the freshwater ditches. The most botanically diverse ditches have a range of salinities. The initial results of ecological survey work within the area proposed for retreat suggest that all of the ditches present are brackish water (Plate 3.4).

Plate 3.4 ***Brackish water ditch to landward of the seawall within the proposed managed realignment site***

A rich assemblage of invertebrate species can be present in ditches and the ditches of Essex support nationally scarce invertebrate species. For example, Hamford Water is the only site in Britain that supports Fisher's estuarine moth *Gortyna borelii*.

3.3.3 Seawall vegetation

Seawalls can support a range of characteristic floral species. The seawall vegetation of the study area is not known.

3.4 ORNITHOLOGY

Hamford Water is designated under national and international legislation as an important site for its ornithological interest (see Section 3.3).

3.4.1 Waders and wildfowl

Hamford Water Special Protection Area (SPA)

Hamford Water qualifies as an SPA under Article 4.1 of Council Directive 79/409/EEC on the conservation of wild birds by supporting internationally important populations of regularly occurring Annex 1 species. Species within Annex 1 of the Directive are the subject of special conservation measures concerning their habitat in order to ensure their survival and reproduction in their area of distribution. Hamford Water is of importance for a nationally important population of little tern (*Sterna albifrons*) and a

nationally important population of wintering avocet (*Recurvirostra avosetta*) (Table 3.1). The seaward boundary of the SPA is the mean low water mark.

Table 3.1 Nationally important populations of regularly occurring Annex 1 species

Little tern *Sterna albifrons*	35 pairs (5 year mean 1986-1990)
Avocet *Recurvirostra avosetta*	99 birds (7% of the British wintering population)

Little terns feed primarily within shallow coastal waters and nest on areas of bare and sparsely vegetated shingle. Avocets feed in intertidal areas and shallow water at low tide and nest on freshwater grazing marsh around Hamford Water.

Hamford Water further qualifies under Article 4.2 of the Directive by supporting internationally important populations of regularly occurring migratory species. Several bird species occur in internationally (and nationally) important numbers (Table 3.2).

Table 3.2 Internationally and nationally important populations of regularly occurring migratory species

Dark-bellied brent geese *Branta bernicla bernicla*	5650 birds (2% of the Western European, 4% of the British wintering population)
Black-tailed godwit *Limosa limosa*	1580 birds (2% East Atlantic Flyway, 33% British population)
Redshank *Tringa totanus*	1240 birds (1% North West, 3% British population)
Ringed plover *Charadrius hiaticula*	620 birds (1% East Atlantic Flyway, 3% British population)
Shelduck *Tadorna tadorna*	840 birds (1% British population)
Teal *Anas crecca*	3630 birds (2% British population)
Grey plover *Pluvialis squatarola*	1080 birds (2% British population)

Hamford Water Ramsar site

A wetland is considered internationally important under the terms of the Ramsar Convention if:

- it regularly supports 20,000 waterfowl;
- it regularly supports substantial numbers of individuals from particular groups of waterfowl, indicative of a wetlands' value, productivity or diversity; and,

- it regularly supports 1% of the individuals in a population of one species or subspecies of waterfowl.

Hamford Water qualifies under criterion 3c of the Ramsar Convention by regularly supporting internationally important wintering populations of dark-bellied brent geese (*Branta bernicla bernicla*), black-tailed godwit (*Limosa limosa*), redshank (*Tringa totanus*) and ringed plover (*Charadrius hiaticula*).

Also notable is a nationally important breeding colony of little terns and nationally important wintering populations of shelduck (*Tadorna tadorna*), teal (*Anas crecca*), avocet and grey plover (*Pluvialis squatorola*).

During severe winter weather elsewhere, Hamford Water can assume even greater national and international importance as wildfowl and waders from many other areas arrive, attracted by the relatively mild climate, compared with continental European areas, and the abundant food resources available.

The usage of the retreat site roosting and feeding waders and wildfowl is currently unknown.

3.4.2 Terrestrial birds

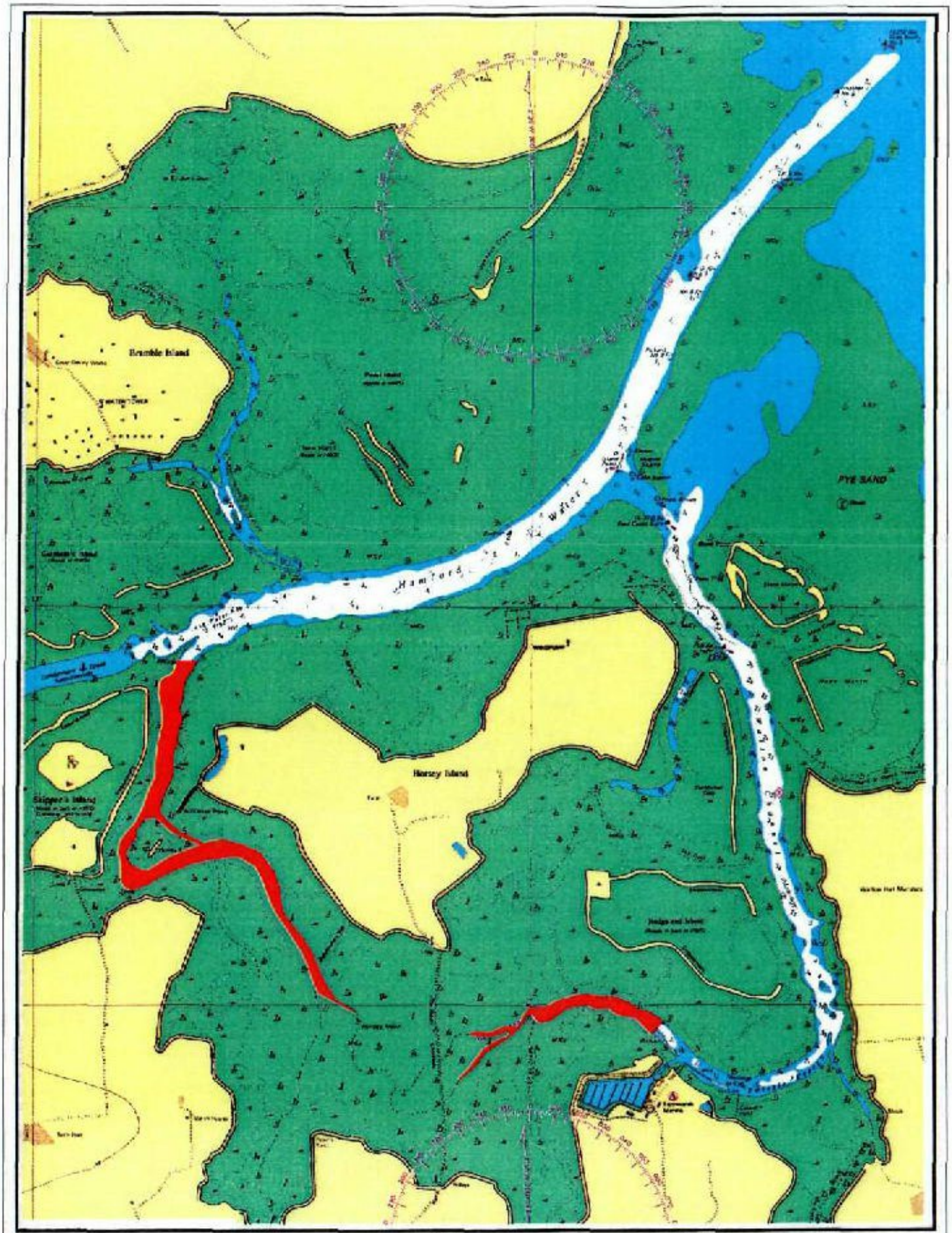
The use of the area landward of the seawall by other birds is currently unknown, although the main interest is likely to be confined to the nesting birds within the vegetation of the ditches present within the study area. The majority of the area behind the seawall is agricultural land that is unlikely to be a significant habitat for birds due to the relative lack of cover.

3.5 MARICULTURE, FISHERIES AND FISHING ACTIVITY

Commercial fishing activity within Hamford Water is dominated by the cultivation of native oysters *Ostrea edulis* and Pacific oysters *Crassostrea gigas*. There is occasional netting for grey mullet and, in summer, the area may be trawled infrequently for bass *Dicentrarchus labrax*.

There are a number of areas around Horsey Island that are subject to a Several Order for the cultivation of oysters (see Figure 3.2). Several Orders are granted under section 1 of the Sea Fisheries (Shellfish) Act 1967 and are granted to enable cultivation on the seabed within a designated area of water and to conserve and develop named molluscan species of shellfish. The right of several or exclusive oyster fishery granted in this order covers the bed below the low water mark of mean spring tides in Kirby Creek and The Twizzle, to the west and south of Horsey Island.

Ostrea edulis is brought in and laid on the bed in March, allowed to grow during the summer, and harvested between September and April (approximately 500,000 oysters per season). Having suffered from *Bonamia* (a parasitic shellfish wasting disease), oysters are no longer reared from seed or kept on the beds for over 12 months, for fear of recurrence. The operation produces approximately 30 tonnes of oysters each year. The oysters are graded and packaged on the premises, and despatched for both local and distant markets. The activity does not utilise artificial structures, although the substrate is manually prepared prior to the initial laying of oysters.



Legend

Several Order (oyster beds)

Source: ARCS charts under license from the UK Hydrographic Office, license number 11636A

Title:
LOCATION OF THE SEVERAL ORDER IN HAMFORD WATER

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HAMFORD WATER MANAGED REALIGNMENT

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Figure:
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JULY 2002

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3.6 WATER AND SEDIMENT QUALITY

3.6.1 Bathing water quality

Marine water quality is monitored by the Environment Agency in compliance with the EC Bathing Water Directive (76/160/EEC). Nineteen quality requirement parameters must be met in order to comply with the Directive requirements.

The nearest bathing waters, designated under the EC Bathing Waters Directive, are located at Walton-on-the-Naze and Dovercourt. The bathing water at Walton-on-the-Naze has been classified as 'Good' in every year from 1988 to 2001. The water at Dovercourt was classified as 'Excellent' from 1998 to 2001, 'Good' from 1989 to 1997 and 'Poor' in 1988.

3.6.2 Estuarine water quality

The Environment Agency routinely monitors the state of water quality on all inland river systems and estuaries. Tidal rivers data given in the Local Environment Agency Action Plan (LEAP) for North Essex (Environment Agency, 1998) is categorised according to the Classification of Estuaries Working Party (CEWP) scheme. Under the CEWP scheme, stretches of estuary are allocated points depending on their biological, aesthetic and chemical quality. There are four classes ranging from A to D which classify each stretch of the estuary as good, fair, poor and bad respectively.

Hamford Water was classified under CEWP as Class A following the Chemical River Quality Survey 1996 (Environment Agency, 1998).

3.6.3 Shellfish waters

The classification of shellfish waters in England and Wales is compiled by CEFAS and is required by EC Directive 91/492/EEC on health conditions for the production and placing on the market of live bivalve molluscs. Production areas are classified according to the extent to which shellfish sampled from the area are contaminated with *Escherischia coli* (a bacterium) (Table 3.3).

Table 3.3 Classification of shellfish harvesting areas

A	Molluscs can be harvested for direct human consumption
B	Molluscs can go for human consumption after purification in an approved plant or after relaying in an approved class A area of after an EC approved heat treatment process
C	Molluscs can go for human consumption only after relaying for at least two months in an approved relaying area followed, where necessary, by treatment in a purification centre, or after an EC approved heat treatment process

The classification of shellfish harvesting areas is revised annually. The latest revision, produced in September 2001, classifies the production areas in Hamford Water as class B.

3.6.4 *Sediment quality*

The quality of the sediment within the study area is not known but is likely to be good given the low number of significant possible sources of contamination (there is a chemical works at Bramble Island; see Section 3.9.3). Hamford Water has no major tributaries and there are no towns on its perimeter. The only recreational boating centre is situated at Titchmarsh Marina in the south of Hamford Water (see Section 3.9.2).

3.7 ARCHAEOLOGY AND CULTURAL HERITAGE

In the coastal marshland of Essex many mounds can be found that rise up to approximately 1m above the surrounding land. These mounds have a red-brown colour and are, therefore, known as Red Hills. Archaeological evidence suggests that these are the remains of ancient salt works (Colchester Archaeological Group, 1990). It is known that there are a number of Red Hills within the vicinity of the study area.

Intertidal areas within Essex are amongst the most archaeologically rich in the country. This is largely due to the effect of rising sea levels following the retreat of the glacial ice sheet at the end of the last Ice Age, which caused many terrestrial areas to become submerged. These areas, therefore, can often reveal evidence of past human activity that took place within the coastal zone. Known sites range in date from early prehistoric times to the recent past. Remains include subsurface deposits, landscape features, crop and soil marks, standing buildings, and historic environments.

An archaeological assessment of Hamford Water which was carried out in 1992 revealed a total of 33 sites of archaeological interest. These ranged from examples such as flint, coins and pottery finds, to salt working sites and human skeletons. There are also two Scheduled Ancient Monuments located near Hamford Water (Essex County Council, 1992).

3.8 LANDSCAPE AND VISUAL

The land surrounding Hamford Water is low-lying open countryside and the landscape character can be described as coastal/estuarine. The main land use is agricultural with a few residential buildings (Plate 3.5). A chemical works is situated on Bramble Island in Hamford Water, and this is the only major industrial development in the area. Hamford Water is designated a Special Landscape Area.

Plate 3.5 Agricultural land within the proposed realignment site

3.9 LOCAL COMMUNITY

3.9.1 Noise and air quality

The Hamford Water area is rural in nature and, therefore, has low ambient noise levels. The air quality is also likely to be good for the same reasons.

3.9.2 Recreation and access

The Walton on Naze and District Wildfowlers' Association have freehold ownership of Hedge End Island and all of the adjacent saltmarsh. In addition, wildfowling licenses and agreements exist with all landowners on the Walton (south) side of the estuary.

The Little Oakley and District Wildfowlers Association owns all of the saltmarsh known as New Island, Pewit Island and Bulls Ooze (i.e. all of the saltmarsh to the east of Bramble Island to Foulton Hall Point and the saltmarsh to just east of South Hall Creek). Furthermore, Garnhams Island is leased, thereby giving the club total control of the northern side of Hamford Water.

Hamford Water is used extensively for recreational navigation, with 350 moored and stored dinghies and some 650 larger craft situated in the Walton Channel, The Twizzle, Foundary Creek and at Titchmarsh Marina and the Walton-on-the-Naze Yacht Basin.

Other recreational activities in the area include walking, bird watching and angling. There are footpaths along the coastline to the south of Horsey Island and footpaths and bridleways to the north.

3.9.3 *Industry*

The only significant industrial development within Hamford Water is Exchem Industries plc which carry out acid processes, inorganic chemical processes and manufacture and use organic chemicals.

3.10 COMMERCIAL NAVIGATION

The only significant commercial navigation within Hamford Water is related to Exchem Industries plc which operate a private dock (Great Oakley Jetty) at the head of Oakley Creek. This dock is used by 400 to 600 tonne coasters, with about 1 movement every 2 weeks. Recreational navigation is addressed in Section 3.9.

3.11 LAND DRAINAGE AND COASTAL DEFENCE

Hamford Water only has limited freshwater inflows from streams and drains and is a mosaic of low-lying island, mudflats, creeks and saltmarsh. Many of the islands are former saltmarshes that have been embanked and converted to wet grassland; however, breaching of seawalls has resulted in the conversion of some of these areas back to saltmarsh.

It is understood that the area receives significant surface water discharge from Dovercourt. The Environment Agency have indicated that a gravity surface water drainage system discharges into the area of the proposed managed realignment and this outfall may require modification.

The proposed site for managed realignment is protected from tidal inundation by embankments (Plate 3.6). At the mouth of Hamford Water on the northern shore there is a stretch of concrete seawall (Plate 3.7).

3.12 PLANNING POLICIES

The key policy documents influencing development within the proposed managed realignment area are the Essex and Southend-on-Sea Replacement Structure Plan (Adopted Replacement Structure Plan, April 2001) and the Colchester Borough Local Plan (2nd Deposit Draft, September 2000), both of which will be in existence until 2011. Summaries of the most relevant policies are given below for each plan.

Plate 3.6 **Embankment between the proposed realignment site (left) and an area of saltmarsh (right) (looking north-west)**

Plate 3.7 **Stretch of concrete seawall at the mouth of Hamford Water (looking north-east)**

3.12.1 *The Essex and Southend-on-Sea Replacement Structure Plan*

The Essex and Southend-on-Sea Replacement Structure Plan covers a number of sectors, ranging from nature conservation to transport and waste management. Specific policies that are particularly relevant to the proposed managed realignment scheme are listed below according to the sector within which they fall.

Core strategy

Policy CS2 The quality of the natural and built environment will be maintained and conserved by:

- Sustaining and enhancing the rural environment, including conserving the countryside character and the protection of the countryside for its own sake;
- Protecting and enhancing the landscape, wildlife and heritage qualities of the coastline.

Countryside

Policy C5 Within the rural areas outside the Metropolitan Green Belt the countryside will be protected particularly for the importance of its landscapes, natural resources and areas of ecological, historic, archaeological, agricultural and recreational value. Development should be related to existing patterns of development and of a scale, siting and design sympathetic to the rural landscape character.

Natural resources

Policy NR1 The natural beauty, amenity and traditional character of the landscape will be protected, conserved and enhanced. Development must respect its landscape setting and will not be permitted if it would cause permanent destruction or damage to the character of the landscape.

Policy NR7 Local authorities will work in partnership with statutory and voluntary conservation groups and landowners to increase the number, size, quality and diversity of natural habitats to be safeguarded and managed for their nature conservation importance, having regard for the Essex Biodiversity Action Plan.

Policy NR8 Development which would result in the permanent loss or degradation of agricultural land classified as Grades 1, 2 or 3A will not be permitted unless it can be shown that there is an overriding need for the development and no suitable alternative site of lower agricultural quality is available.

Policy NR9 The landscape will be enhanced by increasing the coverage of woodland and hedgerows using locally native species in ways which are in keeping with the character of the landscape. Where appropriate, existing woods,

trees and hedgerows will be protected for their wildlife and historic importance.

Policy NR12 Development will only be permitted where there would be no materially adverse effect upon fisheries, nature conservation, archaeological remains, landscape and recreation in river and canal corridors, coastal margins and other waterside areas.

Leisure, recreation and tourism

Policy LRT7 Development will not be permitted which would result in the loss of suitable existing or potential inland water areas for water recreation.

3.12.2 *Tendring District Local Plan*

The countryside

Policy TCR1 The Countryside outside existing defined settlements will be protected from inappropriate forms of development. Permission will not normally be given for development in the rural areas unless the proposals are related to agriculture, forestry or appropriate outdoor recreational uses or similar uses of an open character compatible with their setting.

Agriculture

Policy TCR5 The district planning authority will seek to conserve the best and most versatile agricultural land and protect it from non agricultural development.

Landscape conservation

Policy TCR8 Where appropriate, development proposals will be judged in relation to their impact on the surrounding landscape and whether or not such proposals detract from views across open countryside.

Special Landscape Areas

Policy TCR10 Within special landscape areas, proposals for development will normally not be permitted unless their location, siting, design, materials and landscaping accord with the character of the area. Proposed development which is outside of, but likely to be prominent from within a special landscape area will also be judged in relation to this policy.

Nature conservation

Policy TCR15 Any development that may destroy or adversely affect a designated or proposed site of special scientific interest, national nature reserve or local nature reserve either directly or indirectly will not be permitted. With respect to sites of special scientific interest designated as "Ramsar Sites" or "Special Protection Areas", the district planning authority will have regard to the United Kingdom's International Obligations.

Policy TCR16 Development which is prejudicial to the retention and management of important wildlife habitats will not be permitted. The retention and enhancement of important wildlife habitats will be sought through conditions or legal agreements.

Policy TCR16A When considering development proposals the district planning authority will not normally grant planning permission where there is a threat to a site supporting rare or vulnerable species protected by law.

The coast

Policy TCR17 There shall be the most stringent restrictions on development on the rural and undeveloped coastline outside built-up areas and any development which is exceptionally permitted shall not adversely affect the open and rural character or wildlife.

4 IDENTIFICATION OF POTENTIAL ENVIRONMENTAL IMPACTS

Tables 4.1 and 4.2 broadly identify the potential effects of each of the options for the location of the proposed breach on various parameters during the construction and operational phases respectively. The tables are not intended to provide a comprehensive list of predicted impacts, but serve to highlight areas where a full assessment of impacts will be undertaken and where survey work will be carried out to provide data to allow a rigorous assessment of potential impacts.

For the purposes of the following tables, the construction phase is defined as the period from the commencement of the creation of the breach to when the realignment site has been inundated by one tide; the operational phase is the period subsequent to this.

5 SELECTION OF A PREFERRED OPTION

Based on the information presented in Tables 4.1 and 4.2, it is considered that there are two viable options for undertaking managed realignment. The preferred option for undertaking managed realignment is at **Breach B *(Coastal Breach)***. This conclusion has been reached based on the type and area of habitat that would be created under each of the different breaching scenarios and a comparison of the predicted impacts during both the construction and operational phases. A second option preferred is Breach C *(Coastal Marsh Breach)*; the reasons why these options are preferred over Breach A *(Hamford Water Breach)* are provided below.

During the construction phase, each of the proposed breach locations would have a similar impact on the various environmental parameters considered. In this respect, therefore, none of the potential options is preferred.

During the operational phase, Breach B *(Coastal Breach)* would have a smaller overall effect on the hydrodynamic and sedimentary regime. Furthermore, the direct and indirect effects of the breach on the marine and estuarine ecological interest of Hamford Water would be less than for the other two options. This is due to the absence of saltmarsh adjacent to the breach and the nature of the benthic communities on the

foreshore in the vicinity of the breach. There is, however, the potential for an indirect effect on the sediment feed to Hamford Water, which would require management.

The implications of all three of the options for breaching on the terrestrial and brackish water ecological interest of the managed realignment area are similar.

Breach C *(Coastal Marsh Breach)* is preferred over Breach A *(Hamford Water Breach)* as a second option. This selection is made based on its implications for the hydrodynamic and sedimentary regime and, therefore, the intertidal and subtidal habitats of Hamford Water. Breach A *(Hamford Water Breach)* is located within Hamford Water and it is predicted that the indirect effects of this breach on the designated habitats within Hamford Water would be extensive. This option is not, therefore, considered to be a viable option for creating compensatory habitat.

Breach C *(Coastal Marsh Breach)* is predicted to cause some erosion of saltmarsh due to water flowing through the channels within the marsh. However, given that the breach is not located within Hamford Water, the hydrodynamic and sedimentary effects on Hamford Water are predicted to be minor.

5.1 Further details of the configuration of the proposed Breach B *(Coastal Breach)*

The seawall in the vicinity of the proposed Breach B is of substantial scale and construction, and has been re-enforced over the last decade in order to provide greater stability against the exposed wave and tidal climate. It would not be prudent to breach through this concrete seawall, as this would leave two sections to maintain, and would be a difficult operation to perform. Instead, it is proposed that the seawall to the north of the concrete armouring is breached, at approximately 623900E, 227900N (subject to confirmation), allowing at least 50m from the end of the existing concrete seawall.

Most of the realignment site is above 0mOD, and will, therefore, fill on the upper half of the tidal cycle. The tidal volume under spring tide conditions is of the order of $1Mm^3$, which will enter the realignment site over the three hours from mean water level to high tide. The breach should be made to a level of 0mOD in order to avoid ponding, so that during mid-flood conditions at the breach, the depth of water will be approximately 1m (spring tide level being 2mODN). Under these conditions the current through the breach will be approximately 100/W (m/s) where W is the width of the breach. It is recommended that the breach width be of order 70m, in order to maintain currents below 1.5m/s and thereby reduce the potential for scour at the breach. Experience from the managed realignment schemes at Tollesbury and Orplands have, however, indicated that the foundations of the seawall are strong and unlikely to erode significantly. This width of breach is comparable with the apparent width of the historical creek within the retreat site.

Table 4.1 Identification of the potential impacts associated with the three breach options: construction phase

Breach A *(Hamford Water Breach)*	Breach B *(Coastal Breach)*	Breach C *(Coastal Marsh Breach)*
• No effects are predicted	• No effects are predicted	• No effects are predicted
• Loss of seawall communities (approximately 75m)	• The impact identified for Breach A would also apply here	• The impact identified for Breach A would also apply here
• Loss of ecological interest of brackish water ditches within realignment site	• The impact identified for Breach A would also apply here	• The impact identified for Breach A would also apply here
• Loss of ecological interest within realignment site	• The impact identified for Breach A would also apply here	• The impact identified for Breach A would also apply here
• Loss of nesting and feeding sites within ditches	• The impact identified for Breach A would also apply here	• The impact identified for Breach A would also apply here
• No impacts are anticipated	• No impacts are anticipated	• No impacts are anticipated
• Very localised increase in suspended sediment following removal of the seawall	• The impact identified for Breach A would also apply here	• The impact identified for Breach A would also apply here
• Inundation of features of archaeological interest • Effect on the setting of archaeological features	• The impact identified for Breach A would also apply here	• The impact identified for Breach A would also apply here
• A small localised visual effect due to the presence of construction plant (present on the landward side of the seawall)	• The impact identified for Breach A would also apply here	• The impact identified for Breach A would also apply here

Table 4.1 (continued)

Breach A *(Hamford Water Breach)*	Breach B *(Coastal Breach)*	Breach C *(Coastal Marsh Breach)*
• No impacts are anticipated	• No impacts are anticipated	• No impacts are anticipated
• Loss of access along the seawall • Noise impact on recreational users (no residential properties would be affected)	• The impact identified for Breach A would also apply here	• The impact identified for Breach A would also apply here
• No impacts are anticipated	• No impacts are anticipated	• No impacts are anticipated
• Reinstatement of the seawall	• Reinstatement of the seawall	• Reinstatement of the seawall
• No apparent conflicts with planning policies	• No apparent conflicts with planning policies	• No apparent conflicts with planning policies

Table 4.2 Identification of the potential impacts associated with the three breach options: operational phase

Breach A *(Hamford Water Breach)*	Breach B *(Coastal Breach)*	Breach C *(Coastal Marsh Breach)*
• Erosion of creek system and meandering causing saltmarsh loss within SPA, Ramsar site, SSSI and NNR • Scour of bed material and deposition elsewhere • Poor drainage leading to 'ponding' effect within realignment area • Potential effect on the hydrodynamic and sedimentary regime throughout Hamford Water	• No predicted effect on saltmarsh or creek systems within SPA, Ramsar site, SSSI and NNR • Small conversion of intertidal to subtidal due to scouring of a channel on the foreshore • Possible interruption of sediment drift to Irlam's Beach to the south, with the consequential risk of damaging integrity of saltmarsh in the north of Hamford Water • Sacrificial wave bund would be required within the realignment site	• Erosion of creek system and meandering causing saltmarsh loss • Scour of bed material and deposition elsewhere • Poor drainage leading to 'ponding' effect within realignment area

Table 4.2 (continued)

Breach A *(Hamford Water Breach)*	Breach B *(Coastal Breach)*	Breach C *(Coastal Marsh Breach)*
• Creation of approximately 138ha of intertidal habitat within the realignment site • Potential for creation of saltmarsh (the area of which would depend on the topography of the site and engineering of levels) • Significant erosion of ecologically valuable soft mud substratum and associated communities within estuarine system • Elevation in suspended sediments due to bed erosion • Deposition (accretion) of sediment, possibly causing smothering of sensitive species	• Creation of approximately 138ha of intertidal habitat within the realignment site • Potential for creation of saltmarsh (the area would depend on the topography of the site and engineering of levels) • Minimal erosion of sandy/clay foreshore of relatively low ecological value • Potential for indirect effect on saltmarsh due to interruption of sediment movement	• Creation of approximately 138ha of intertidal habitat within the realignment site • Potential for creation of saltmarsh (the area of which would depend on the topography of the site and engineering of levels) • Some erosion of invertebrate communities of the creek system • Elevation in suspended sediments due to bed erosion
• Potential for recreation/enhancement (through engineering) of brackish interest within site	• The impact identified for Breach A would also apply here	• The impact identified for Breach A would also apply here
• No impacts are anticipated	• No impacts are anticipated	• No impacts are anticipated
• Creation of feeding and roosting areas for waders and wildfowl • Potential erosion of high quality feeding and roosting habitat (mudflat and saltmarsh) due to hydrodynamic change within SPA, Ramsar site, SSSI and NNR	• Creation of feeding and roosting areas for waders and wildfowl • Potential erosion of relatively low quality feeding and roosting habitat due to hydrodynamic change within SPA, Ramsar site, SSSI and NNR	• Creation of feeding and roosting areas for waders and wildfowl • Potential erosion of high quality feeding and roosting habitat (mudflat and saltmarsh) due to hydrodynamic change within SPA, Ramsar site, SSSI and NNR

Table 4.2 (continued)

Breach A *(Hamford Water Breach)*	Breach B *(Coastal Breach)*	Breach C *(Coastal Marsh Breach)*
• Potential for adverse effect on oyster laying areas due to elevated suspended sediment concentration and localised sediment accretion	• No impacts are anticipated	• No impacts are anticipated
• Potential for elevated suspended sediment concentration (and increased turbidity) due to predicted bed erosion within Hamford Water • Potential for affect on estuarine water quality due to interference with surface water drainage	• Potential for affect on estuarine water quality due to interference with surface water drainage	• Potential for elevated suspended sediment concentrations, but to a lesser degree than for Breach A • Potential for affect on estuarine water quality due to interference with surface water drainage
• Erosion of buried features due to scouring of the bed (i.e. creek formation) • Burial of features due to pumping of dredged material and natural sediment accretion	• The impact identified for Breach A would also apply here	• The impact identified for Breach A would also apply here
• Change in the landscape character of the realignment site, but in keeping with the character of Hamford Water	• The impact identified for Breach A would also apply here	• The impact identified for Breach A would also apply here
• Change in land use from mainly agricultural to estuarine habitat	• The impact identified for Breach A would also apply here	• The impact identified for Breach A would also apply here

Table 4.2 (continued)

Breach A *(Hamford Water Breach)*	Breach B *(Coastal Breach)*	Breach C *(Coastal Marsh Breach)*
• Potential increase in ornithological interest • Potential adverse effect on wildfowling due to erosion of saltmarsh and intertidal habitat, but potential for benefit due to development of saltmarsh and intertidal area within the site • Loss of access along the seawall	• Potential increase in ornithological interest • Potential benefit to wildfowling due to development of saltmarsh habitat and creation of intertidal feeding area • Potential adverse effect on wildfowling interests if sediment transport was affected with adverse effect on saltmarsh • Loss of access along the seawall	• The impact identified for Breach A would also apply here
• Changes to bed levels (i.e. localised accretion) may affect and commercial navigation	• No impacts are anticipated	• No impacts are anticipated
• Potential for enhancing the rate of degradation of seawalls due to wave activity on both sides • Interference with surface water drainage, particularly form the Dovercourt area	• The impacts identified for Breach A would also apply here	• The impacts identified for Breach A would also apply here
• No apparent conflicts with planning policies	• No apparent conflicts with planning policies	• No apparent conflicts with planning policies

A small channel of order 2 to 5m wide and at a level of -0.5mOD (i.e. 0.5m below the main level of the breach) should also be made to aid drainage. No action is recommended seaward of the breach as the discharge into and out of the realignment site should rapidly form a channel.

The breach should be trapezoidal in section with an average width of 70m and slopes of 1:3 or flatter. Given the exposed aspect of this site it should be anticipated that the ends of the seawall at the breach will erode, and protection should be added to minimise the rapid erosion that could occur.

The breach may cause an interruption of along-shore sediment movement which feeds the sand and shingle structures that are present to the east and west of the site of the proposed breach.

6 PROPOSALS FOR FURTHER DATA COLLECTION, MODELLING AND ASSESSMENT

It is recognised that for many environmental parameters there is little or no existing data that can be used to describe the baseline environment for the site. Where data does exist, it is either several years old or it is too general to describe the baseline environment of the area that may be affected by the proposed managed realignment in sufficient detail. Therefore, a number of specialist surveys have been commissioned and are currently being undertaken, namely:

- Intertidal and subtidal benthic invertebrate communities;
- Saltmarsh communities;
- Aquatic invertebrates (brackish water);
- Protected/BAP species (e.g. great-crested newts, water voles, brown hares, badgers and bats);
- Vegetation of sand and shingle structures,
- Seawall vegetation; and,
- Breeding birds.

In order to assess the effects of the proposed breach, it is proposed that detailed numerical modelling will be undertaken by HR Wallingford, namely:

- Hydrodynamic modelling - simulation of tidal currents and wave-driven currents for the existing scenario and including the breached scenario; and,
- Sediment transport modelling - will consider sand transport on the open coast due to spring and neap tides and the five wave conditions under spring tides. Simulation of the existing conditions and including the breach will enable an assessment of the impact of the breach on the littoral drift to be determined.

Depending on the outcome of the modelling, it may be necessary to develop a mitigation and management strategy for the coastline.

Furthermore, it is recognised that detailed consideration will need to be given to the potential impact of the proposals on land drainage issues. Given that surface water drainage in the area appears to be problematic at the moment, there may be the potential for a solution to be designed into the overall scheme.

The information that is gathered as a result of the above survey work and modelling will be used in the Environmental Appraisal to describe the existing environment of the proposed managed realignment site and the area that may be directly affected in more detail. The environmental implications of undertaking managed realignment will then be determined.

7 PROPOSED SCOPE OF THE ENVIRONMENTAL APPRAISAL

The Environmental Appraisal will consider the potential effects of the proposed managed realignment scheme on the hydrodynamic and sedimentary regime and various environmental parameters. A proposed contents list for the Environmental Appraisal is presented below.

1. INTRODUCTION
- 1.1 Statement of need
- 1.2 Brief description of the proposed scheme
- 1.3 Definition of the study area
- 1.4 Consideration of alternatives
- 1.5 Legislative context
- 1.6 The impact assessment process
- 1.7 Consultation

2. DESCRIPTION OF THE PROPOSED SCHEME
- 2.1 Construction phase
- 2.2 Operational phase

3. EXISTING ENVIRONMENT
- 3.1 Introduction
- 3.2 Hydrodynamic and sedimentary regime
- 3.3 Marine and estuarine ecology
- 3.4 Brackish and freshwater ecology
- 3.5 Terrestrial ecology
- 3.6 Ornithology
- 3.7 Mariculture, fisheries and fishing activity
- 3.8 Water and sediment quality
- 3.9 Archaeology and cultural heritage
- 3.10 Landscape and visual
- 3.11 Land use
- 3.12 Local community
- 3.13 Commercial navigation
- 3.14 Land drainage and coastal defence
- 3.15 Planning policies

4. ASSESSMENT OF EFFECTS ON THE HYDRODYNAMIC AND SEDIMENTARY REGIME

5. ASSESSMENT OF ENVIRONMENTAL EFFECTS AND MITIGATION
- 4.1 Marine and estuarine ecology
  - 4.1.1 Construction phase
  - 4.1.2 Operational phase

[The same structure follows for those parameters identified as sections 3.4 to 3.15 above]

6. SUMMARY OF POTENTIAL ENVIRONMENTAL EFFECTS AND MITIGATION

7. IN-COMBINATION EFFECTS

8. IMPLICATIONS FOR THE DESIGNATED STATUS OF HAMFORD WATER

9. MONITORING PROPOSALS

10. REFERENCES

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