# Environmental Report: Non-Technical Summary

## Introduction

The Environment Agency, working with East Lindsey District Council and Lincolnshire County Council, is proposing a draft strategy to guide how future coastal flood risk and investment is managed along the low-lying coastline between Saltfleet and Gibraltar Point in Lincolnshire. Our objective is to develop an affordable and sustainable strategy that addresses current and future flood risk to people and the environment over the next 100 years.

The strategy area extends up to 15 kilometres (km) inland and over 37 km along the coast, from Saltfleet in the north to Gibraltar Point in the south, as shown on Figure 1. To help develop the strategy, we have divided the coast into three zones (A, B and C) based on the actions taken to manage flood risk along the coast in recent decades.

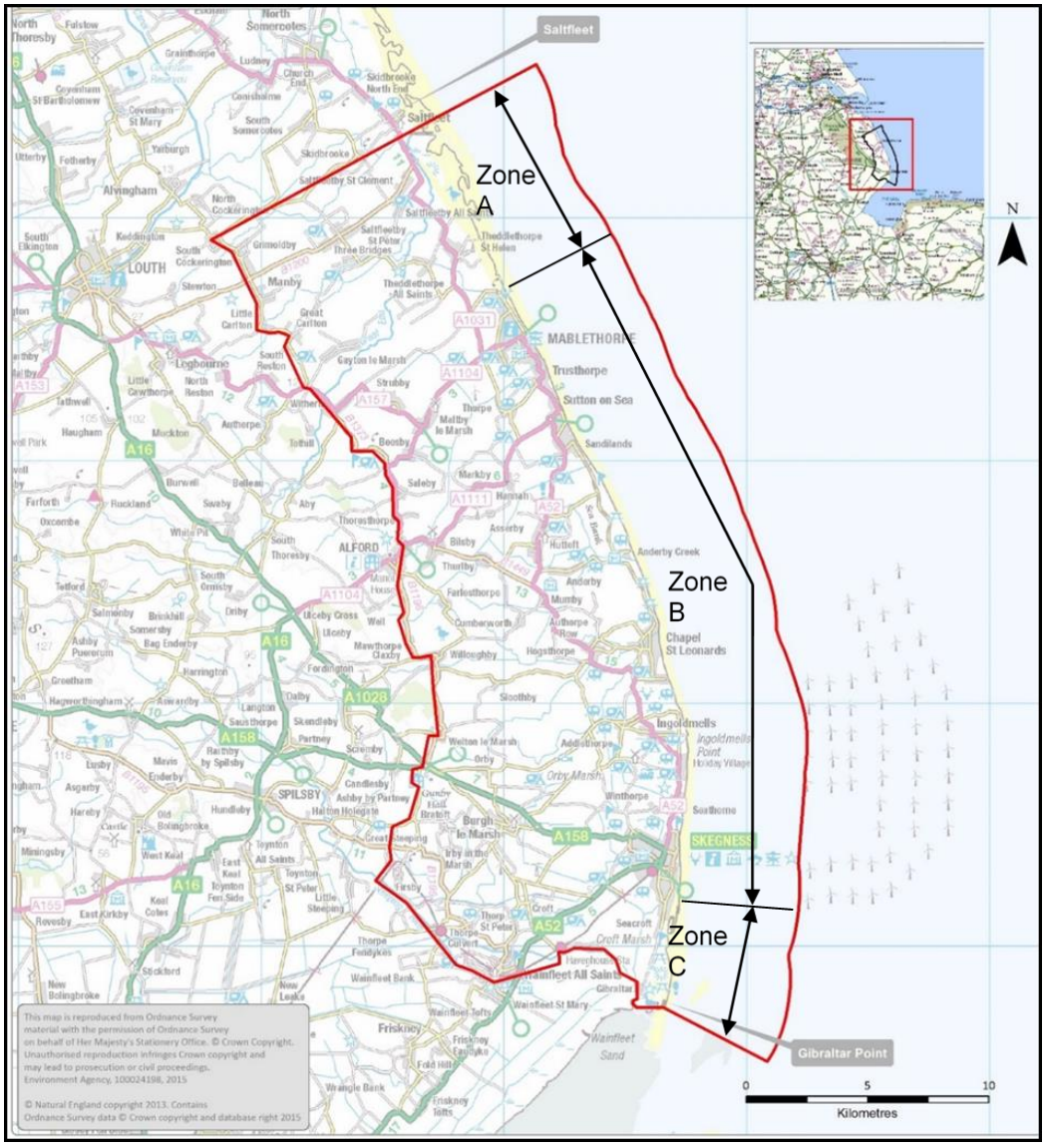


**Figure 1: The strategy area**

This Non-Technical Summary explains our approach to the Strategic Environmental Assessment of the draft Saltfleet to Gibraltar Point Strategy and presents the main results. Strategic Environmental Assessment is a process used to assess the likely significant environmental effects of a proposed plan and identify ways to avoid or reduce any negative environmental effects. The findings of the Strategic Environmental Assessment are presented in an Environmental Report.

Both the Environmental Report and this summary have been prepared in accordance with the Environmental Assessment of Plans and Programmes Regulations 2004[1], as best practice, and the Environment Agency's commitment to sustainable development.

## Need for the strategy

The strategy is needed to manage the risk of flooding from the sea in the strategy area now and into the future. The risk of flooding is currently managed by a system of seawalls, sand dunes and beaches. For more than 20 years the beaches have been managed through an annual beach nourishment scheme (i.e. the *Lincolnshire Beach Management project*, previously *Lincshore*). This dredges significant volumes of sand from offshore sites to add to the beaches. Flood risk is predicted to significantly increase in the future as a result of climate change and sea level rise.

The existing seawalls, sand dunes and annual beach nourishment maintain the existing standard of protection to approximately 22,000 residential and commercial properties and approximately 24,500 caravans, as well as key roads, utilities, tourist and recreational assets and agricultural land along the coastline. If nothing was done to manage flood risk, these would regularly be at significant risk from flooding, with potential catastrophic consequences, similar to those experienced during the 1953 floods. These risks are set to increase over time in response to predicted climate changes.

The strategy considers these risks in relation to the condition of the existing seawalls, the sand dunes, and the current beach management scheme (which will continue to be carried out prior to the strategy beginning in 2021). It identifies the best way forward to manage coastal flood risk along this coastline for the next 100 years, taking into account future climate change predictions, by considering a range of factors including technical performance, cost and social and environmental impacts.

## Environmental considerations

The strategy area is significant in terms of its biodiversity, cultural, social, archaeological and landscape value (refer to Photographs 1 to 3). The coastline also provides a range of services including fisheries, areas for wildlife, industry and amenity. Consideration of the sensitivity and value of these features, and any associated legal requirements, has informed the development of the draft strategy through the Strategic Environmental Assessment process, and through consultation with key stakeholders and the general public. Statutory designated sites within the strategy area are shown on Figure 2.

The Strategic Environmental Assessment considers how people and the environment will be affected by flooding from the sea with, and without, the strategy. The implications of the draft strategy and various alternatives have been assessed in terms of the environmental aspects in Table 1.

Our understanding of the existing environment was used to identify the key issues, constraints and opportunities, both now and in the future, to inform the development of the draft strategy. A range of plans and strategies, which are relevant to the future planning of the strategy area, were also reviewed to understand the links between the draft strategy and the objectives of others.

The understanding of these issues enabled the development of an assessment framework within which the likely environmental effects of the draft strategy were assessed. Consultation on this assessment was undertaken through the issue of a Scoping Consultation Document, in August 2016, to statutory bodies and key stakeholders. All feedback received informed the future stages of the Strategic Environmental Assessment.

[1] Statutory Instrument 2004 No. 1633. Available on: http://www.legislation.gov.uk/uksi/2004/1633/pdfs/uksi_20041633_en.pdf, accessed 12/05/18.

Photograph 1: Saltfleetby – Theddlethorpe Dunes (Zone A)

Photograph 2: Skegness – North Bracing beach, promenade and flood wall (Zone B)

Photograph 3: Gibraltar Point (Zone C)

| **Table 1: Environmental aspects considered during the development of the strategy** | |
|---|---|
| *Population, health and economy* | • Population and properties at risk – including areas of social deprivation and vulnerable communities<br>• Importance of the amenity beach<br>• Tourist facilities, attractions and recreational and amenity resources<br>• Significant industry, commercial and economic activities – notably agriculture, tourism and commercial fisheries/shellfisheries<br>• Potential opportunities for economic investment |
| *Material assets* | • Key transport routes and critical infrastructure – roads, emergency services, power/water infrastructure, windfarm landfalls<br>• Long term sustainability and available supply of materials (e.g. sand dredged from offshore) |
| *Wildlife and biodiversity* | • Designated nature conservation sites (e.g. Special Areas of Conservation, Special Protection Areas, Sites of Special Scientific Interest, National Nature Reserves)<br>• Local nature conservation sites (e.g. Local Wildlife Sites)<br>• Valuable marine, coastal and terrestrial habitats<br>• Species with legal protection/of conservation concern<br>• Fish and shellfish<br>• Opportunities for habitat improvements |
| *Soils, geology and geomorphology* | • Designated earth heritage sites (e.g. Sites of Special Scientific Interest) and local geological sites<br>• Coastline and marine processes and sediment systems, including downdrift into The Wash<br>• Areas of known contaminated land or licensed landfill sites |
| *Land uses* | • Principal land uses at risk – agricultural land |
| *Water* | • Surface water and groundwater resources and quality, including Bathing Waters |
| *Climate* | • Contribution to, vulnerability and adaptability to climate change |
| *Historic environment* | • Coastal heritage of seaside towns and historic townscape/seascape<br>• Designated heritage assets (e.g. listed buildings)<br>• Known non-designated assets/clusters and their setting (i.e. those on the Lincolnshire Historic Environment Record) |
| *Landscape and views* | • Landscape, seascape and historic character<br>• Significant changes in views along the coastal frontage |
| *Cumulative effects* | • Effects of the strategy in combination with other plans or proposals (e.g. offshore windfarms) |

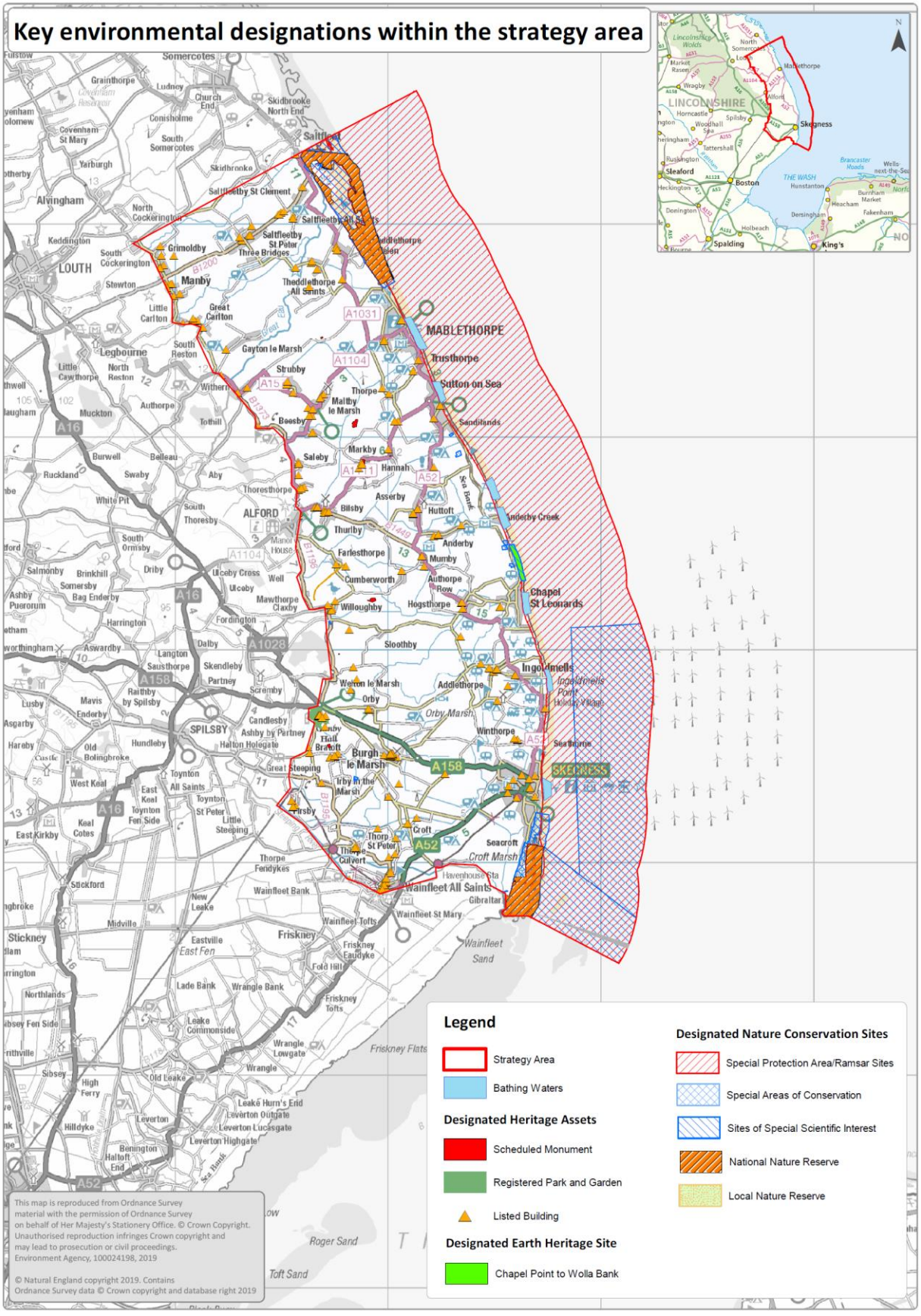


**Figure 2: Statutory designated sites within the strategy area**

## Options considered and the development of the strategy

In developing the strategy, flood risk management policies for the area between Flamborough Head and Gibraltar Point (including the outer Humber Estuary) identified in the Humber Estuary Coastal Authorities Group Shoreline Management Plan 2 (2010) (the SMP2), were considered. The SMP2 sets out policies for addressing flood risk in this area over a 100-year timescale.

The draft strategy adds greater detail to the SMP2, identifying the flood risk management actions needed in the short-term (up to 2025), medium-term (up to 2055) and long-term (decades into the future with timescales triggered by events or changing circumstances), setting out what needs to be done in the three zones shown on Figure 1.

A range of approaches were considered, taking into account factors such as climate change, increasing demands on funding, the continued availability of beach nourishment material, and the improved knowledge of the coastline gained from the past 20 plus years. The management approaches considered were:

- *Approach 1*: take no action in the future (i.e. do nothing to defend land from flooding by the sea) where existing defences are allowed to fail and flood risk increases. This is the base case against which other approaches can be assessed.
- *Approach 2*: do the minimum amount of action needed to maintain the standard of the existing flood defences. This could include patch and repair works and would only be undertaken, as needed, if a problem with the defences arises. This approach may have a limited life, for example due to climate change. It also provides an alternative base case.
- *Approach 3*: 'hold the line' with a beach, including nourishment and recycling (movement of sand around the beach by mechanical means), seawall repairs and the potential use of new structures to control the movement of sand (e.g. groynes or offshore breakwaters). This could include:
    - Maintaining the existing practice (i.e. annual beach nourishment) or varying the existing practice, for example, change the frequency of nourishment, material grading, alternative placement of material, more intensive recycling of material.
    - Introducing control structures along the beaches to reduce the volume of nourishment material required over time.
- *Approach 4*: 'hold the line' without beach nourishment and recycling. Beach levels would significantly drop and the existing coastal defence structures would need to be significantly increased in size and extent.
- *Approach 5*: dividing the coast into individual sections of coastline, stabilised with major control structures. This could result in a combination of options in different areas along the coastline. For example, creating stable bays along the existing coastline or, in some places, setting defences further inland to create larger bays and dunes.

Initial analysis and stakeholder engagement discounted approach 4, given the value of the beach to the local economy. A long list of 27 potential options was then identified based on the remaining approaches. More detailed environmental, social and economic assessment of these options was then undertaken to identify a short-list. This list was then consulted on, seeking the views of the general public and a range of stakeholder organisations. Feedback from this consultation was then used to identify the preferred options and the proposals in the short, medium and long term set out in the draft strategy.

## The draft strategy

The draft strategy comprises a combination of short, medium and long-term proposals to manage coastal flood risks along the low-lying coastline between Saltfleet and Gibraltar Point, through an adaptive approach over the next 100 years. The strategy is needed to manage the risk of tidal flooding, particularly as climate change and sea level rise are predicted to increase these risks in

the future. An overview of the strategy proposals in the short, medium and long-term in the three coastal zones (A, B and C) is provided in Table 2.

Although the proposed strategy sets out a clear direction and proposed change in approach in the medium to long term, there remains inherent uncertainty regarding the type and timing of actions that will be taken to implement the strategy depending on the availability of funding, future climate change and other triggers. To address this, the Strategic Environmental Assessment of the strategy proposals considers two reasonable scenarios in the medium and long term to ensure that both potential solutions are assessed.

**Table 2: Draft strategy proposals in each zone in the short, medium and long term**

| Zone | Short term (to 2025) | Medium term (2026 to 2055) | Long term (2056 to 2120) |
|---|---|---|---|
| A: Northern area: Saltfleet to Theddlethorpe (Meers Bank) (8 km length) | No active intervention (i.e. do nothing in terms of defending against flooding).<br>This option will involve continuing to record and review beach levels each year. | No active intervention (i.e. do nothing in terms of defending against flooding).<br>Some minor works e.g. embankment raising, may be required if the effects of climate change occur earlier than predicted.<br>This option will involve monitoring of the beach, coastal marsh and dune systems. | Some works will be required to continue maintaining the flood defences in response to the effects of climate change. The proposed works might include extending Zone B proposals northwards from Mablethorpe. |
| B Central area: Mablethorpe (Meers Bank) to Skegness (Lifeboat Avenue) (25 km length) | Maintaining the existing beach (with present management) through beach nourishment each year. | Two possible scenarios ('options') for coastal management are<br>• Scenario 1 maintaining the existing beach (with present management) through beach nourishment each year, with increasing volumes of sand/sediment required over time due to sea level rise; or<br>• Scenario 2 constructing new structures (e.g. seawalls) with smaller volumes of beach nourishment and movement of sand to reduce losses from the beach.<br>Both scenarios will require the raising of existing sea defences in the long term due to sea level rise. | |
| C Southern area: Skegness (Lifeboat Avenue) to Gibraltar Point (5 km length) | No active intervention (i.e. do nothing in terms of defending against flooding).<br>This option will involve continuing to record and review beach levels each year. | No active intervention (i.e. do nothing in terms of defending against flooding).<br>Some minor works e.g. embankment raising, may be required if the effects of climate change occur earlier than predicted. | Some works will be required to continue maintaining the flood defence in response to the effects of climate change.<br>The works might include extending Zone B proposals southwards from Skegness. |

In the short-term, the present management will continue in Zone B; with no actions planned in Zones A and C. Beach nourishment works in Zone B will also include the additional measures that form part of the present Lincolnshire Beach Management scheme: visual inspections of structures and dune systems; removal of any remaining damaged timber groynes; potential sand recycling; monitoring of beach levels; and annual environmental monitoring.

In the medium to long term, implementing Scenario 1 in Zone B would require little change to the present management (in terms of funding or licensing), although future approvals and consents will be needed. Implementing Scenario 2 would require affordability and funding sources to be considered and a 10 to 15 year procurement plan produced. Implementing Scenario 2 and the introduction of control structures (e.g. rock groynes) would also be phased over time to enable monitoring and assessment of performance and refine the designs for subsequent phases. The first phase of structures would likely occur early in the medium term (2026 onwards). Maintenance of the beach, through annual beach nourishment, would continue before any control structures would be built. In addition, initial and periodic (5 to 10 year frequency) beach nourishment would also be required with the control structures in place.

It is proposed to hold the existing flood defences in their current position in Zones A and C in the medium term. Therefore, there would be no active intervention, although with a potential increase in monitoring activity until climate change triggers dictate that some intervention will be required. In the long term, it is likely that new actions will be required in Zones A and C, subject to long term climate change triggers (i.e. measurable changes in sea level or storm damage to the marsh and dune systems).

## Stakeholder and public involvement

The involvement of stakeholders is important in producing an effective and inclusive strategy. Throughout the development of the draft strategy, it was important to both meet regulatory requirements for consultation, and to ensure that the knowledge, experience and views of stakeholders and the general public were taken into account. This was achieved through formal consultation activities, including social media, newsletters, press releases, a phased series of stakeholder workshops, environmental stakeholder meetings and one-to-one meetings with conservation organisations, e-consultation, public drop-in sessions and the publication of reports.

Information relating to the Strategic Environmental Assessment is being made available to stakeholders and the general public throughout the development of the draft strategy, through a project webpage https://consult.environment-agency.gov.uk/flood-and-coastal-risk-management/sgp enabling direct communication with the project team.

## Predicted environmental effects of the draft strategy

The environmental assessment of the proposals in the draft strategy in the short, medium and long term are presented in the Environmental Report. The identified **significant or uncertain effects** of the draft strategy (i.e. those key issues that would have a major influence on the development of the strategy) have been identified as either:

- Beneficial (**++**) – effects that resolve an existing environmental issue and/or maximise improvements to the environment.
- Negative (**XX**) – effects that contribute to an environmental problem and/or undermine environmental improvements.
- Uncertain (**?**) – there is insufficient detail available to accurately assess how the environment would be affected by the proposal.

The draft strategy, which will provide an adaptive approach that can be adjusted to respond to changing conditions, is predicted to have the significant effects (resulting from both scenarios, except where stated otherwise) described in Table 3. Many other neutral (**N**), minor positive (**+**) and negative (**-**) effects have been identified, as documented within the Environmental Report.

Mitigation measures are proposed within the Environmental Report for all adverse effects identified, whether significant or minor.

**Table 3: Summary of identified potential significant or uncertain effects**

| | |
|---|---|
| *Population, health and economy* | |
| • Present level of flood protection will be sustained, in line with predicted climate change, to people, up to 22,000 houses and commercial properties, 24,500 seasonally occupied static caravans and areas of employment in all coastal zones. This will have associated benefits to health and well-being in the short to long-term. These impacts will benefit disconnected and isolated populated areas and vulnerable members of the community. | **++** |
| • Increased confidence, that flood protection provided in the medium to long-term will be effective, will help attract economic investment in the floodplain (scenario 2 only). | **++** |
| • Protection of the beaches, beachside facilities, holiday accommodation and continued unrestricted access along the coast in the short to long-term (except the beach in the medium to long-term under scenario 2). | **++** |
| • Continued attractiveness of the coastline to visitors and tourists with associated benefits to the economy at the seaside resorts of Mablethorpe, Trusthorpe, Sutton-on-Sea, Sandilands, Chapel St Leonards, Ingoldmells and Skegness in the short to long-term. | **++** |
| • Potential disruption in short, medium and long-term to fisheries (e.g. brown shrimp in The Wash) by limiting access to beach launching sites and nearshore fishing grounds during works. Potential changes to fish yields due to the loss of nourishment material from the frontage. The introduction of new structures in the medium to long-term (scenario 2) could present a new hazard to navigation for fishing boats. Further assessment and liaison will be required. | **X/?** |
| *Material assets* | |
| • The present level of flood protection will be sustained, in line with predicted climate change, to all strategic A-roads and local roads within the floodplain in the short to long-term. | **++** |
| • The present level of flood protection will be sustained, in line with predicted climate change, to critical infrastructure and services (power, water, wastewater) in the short to long-term. | **++** |
| • Reliance on annual sourcing, use and redistribution of large volumes of sand for beach nourishment and replenishment of losses in the medium to long term (under scenario 1). The design and development of the beach nourishment programme will need to be carefully considered to minimise the volume of materials required. | **XX** |
| *Wildlife and biodiversity* | |
| • The present level of flood protection will be sustained, in line with predicted climate change, to terrestrial and freshwater wildlife including those within the conservation sites within tidal floodplain (e.g. Sea Bank Clay Pits) in the short to long-term. | **++** |
| • Potential for some uncertain effects on European or internationally designated wildlife. Further scheme-level assessment will be required. | **X/?** |
| • Potential accumulation of nourishment sand to the south of the strategy area e.g. in The Wash. This will require continued monitoring to better understand future change. This may affect fisheries in the short to long-term under scenario 1. The installation of new structures (scenario 2) has potential for indirect effects on fisheries/shellfisheries further south in medium to long-term. Further assessment and liaison will be required. | **X/?** |
| *Soils, geology and geomorphology* | |

| | |
|---|---|
| • Continued protection through increased sand or sediment cover of geological deposits (though degree of coverage will vary) in short to long-term (under scenario 1). | ++ |
| • The present level of flood protection will be sustained, in line with predicted climate change, to soils and potential polluting sites (e.g. landfills) within wider floodplain in short to long-term. | ++ |
| *Land use* | |
| • The present level of flood protection will be sustained, in line with predicted climate change, to 21,000 ha of moderate to high quality agricultural land and all land uses in the tidal floodplain, enabling people to continue living and using urban areas, in the short to long-term. | ++ |
| *Climate* | |
| • The proposals will enable adaptation to future changes in climate and sea level rise in the short to medium term. | ++ |
| • Continued beach nourishment in the medium-term will result in increasing carbon generation to sustain the present level flood protection. Measures to reduce the amount of carbon dioxide released into the atmosphere resulting from on-going maintenance, material sourcing and defence raising, and the construction of new structures (scenario 2) will be required. | XX |
| *Historic environment* | |
| • Continued protection of heritage assets and the historic landscape behind defences in the short to long-term. | ++ |
| • Non-designated archaeological features present on the foreshore would continue to be buried under sandy beaches. | ++ |
| *Landscape and views* | |
| • Beach nourishment would protect the coastal landscape and views of beaches in the medium to long term (under scenario 1) and maintain the landscape behind the defences (both scenario 1 and 2). | ++ |
| • New and increasing numbers of large rock structures in the medium to long-term (scenario 2) will cross the open beach and change landscape. Dependent on their location, the new structures may negatively alter the rural nature of the coastline between Donna Nock and Gibraltar Point. These impacts will be managed through designing defences, where possible, that complement the geometry of the coast and that consider the interface with the natural beach with a gradual change in rock size. | XX |

The proposed mitigation measures will be reviewed and assessed as the strategy is implemented over time, and design details (e.g. visual appearance, siting and footprint of structures etc.), as well as an improved understanding of coastal processes, become available. Additional monitoring will also be required to ensure that mitigation measures are appropriate and effective.

## Potential in-combination effects

An assessment was undertaken of the potential effects of the draft strategy in combination with other key plans and strategies, either already in place or in development. These included, but were not limited to, the emerging East Lindsey Local Plan, the 2015 Anglian River Basin Management Plan and Flood Risk Management Plan, the Greater Lincolnshire and Wild Coast Visions and developments such as the Triton Knoll offshore windfarm and the Viking Link Interconnector Project. The Environmental Report sets out the relationships between relevant plans and the draft strategy and identifies where there is potential for in-combination effects

(positive and negative) that should be considered as the strategy is taken forward and proposals developed.

This brief assessment identifies that the draft strategy is generally compatible with the plans and strategies considered, taking into account their requirements. Further studies will be required at scheme design stage, which may include modelling of impacts, to ensure that no adverse in-combination effects result from the proposed works to implement the strategy. The key recommendation from this assessment is to continue liaison with the statutory bodies and organisations responsible for the other plans and developments to ensure that any potential interfaces and conflicts can be managed and opportunities for efficiencies and additional benefits can be delivered.

## Implementation and monitoring

A key recommendation for the implementation of the draft strategy is that future actions in the medium and long-term need to be influenced by continued monitoring and review of likely environmental effects. Therefore, the Environmental Report provides a monitoring plan to consider the significant effects of the strategy, compare predictions with reality, and identify required actions.

The key principles of this are to:

- Ensure that measures to avoid or reduce negative effects are implemented and effective.
- Monitor the significant environmental effects identified during assessment and documented in the Environmental Report. This includes all significant positive, negative, foreseen and unforeseen environmental effects.
- Identify any unexpected environmental effects.
- Avoid duplication by using existing/ongoing monitoring data from other projects and programmes.

Key aspects of the proposed monitoring include:

- Monitoring of beach levels and windblown sand - to adjust the level of the beach if windblown sand restricts access along the promenade walkway/cycleway; and to review the depth of protection provided to geological exposures to enable action, if needed.
- Monitoring of changes in the form and shape of the coast and offshore processes to improve our understanding, and consider the implications of any changes on population, wildlife, fisheries and flood and erosion risks, and to take action if needed.
- Review of water quality data to ensure no negative effects on bathing waters or fisheries.
- Review levels of carbon emissions during implementation of the strategy and identify ways to reduce carbon outputs.
- Ongoing discussion with:
    - infrastructure providers – to avoid in-combination impacts on the environment associated with cable landings/drainage outfalls and the proposed nourishment activities.
    - Natural England and other wildlife organisations – to obtain existing and ongoing monitoring data carried out by them to improve our understanding of any changes to wildlife.

## Next steps

Comments are invited on the content of the Environmental Report as part of the public consultation on the proposed strategy. Submissions regarding the draft strategy are being invited until 25th August 2019.

These documents have been made available at local libraries, council premises and other publicly accessible venues across the strategy area. You can also find the documents at the Environment

Agency's office at Kingfisher House, Goldhay Way, Orton Goldhay, Peterborough, PE2 5ZR, or request them by emailing lincscoastline@environment-agency.gov.uk or calling 07840 639326. The documents are also available online on www.consult.environment-agency.gov.uk/sgp.

Comments on the Environmental Report should be returned by email to lincscoastline@environment-agency.gov.uk or by post, addressed to 'Josh Ystenes, Saltfleet to Gibraltar Point Strategy' at the address above.

Following the completion of this consultation period on 25th August, the draft strategy will be finalised, taking account of submissions received. An assessment of the implications of these changes will also be undertaken to identify the effects of these changes and complete the Strategic Environmental Assessment process. A Strategic Environmental Assessment post-adoption statement will be produced to document this process which will be published with the final strategy.

Once the final strategy has been published, the proposed monitoring set out within the Environmental Report will be used to assess the impacts of the implementation of the strategy. This will also be used to inform future revisions of the strategy as and when the need to review it arises.