

# NOTICE OF MEETING

<b>Meeting:</b>	<b>PLACE AND SUSTAINABILITY OVERVIEW AND SCRUTINY PANEL</b>
<b>Date and Time:</b>	<b>THURSDAY, 18 JULY 2024, AT 6.00 PM</b>
<b>Place:</b>	<b>COUNCIL CHAMBER - APPLETREE COURT, BEAULIEU ROAD, LYN DHURST, SO43 7PA</b>
<b>Enquiries to:</b>	<b>Email: <a href="mailto:joe.tyler@nfdc.gov.uk">joe.tyler@nfdc.gov.uk</a> Joe Tyler Tel: 023 8028 5982</b>

## **PUBLIC INFORMATION:**

This agenda can be viewed online (<https://democracy.newforest.gov.uk>). It can also be made available on audio tape, in Braille and large print.

Members of the public are welcome to attend this meeting. The seating capacity of our Council Chamber public gallery is limited under fire regulations to 22.

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## **PUBLIC PARTICIPATION:**

Members of the public may speak in accordance with the Council's [public participation scheme](#):

- (a) on items within the Place and Sustainability Overview and Scrutiny Panel's terms of reference which are not on the public agenda; and/or
- (b) on individual items on the public agenda, when the Chairman calls that item. Speeches may not exceed three minutes.

Anyone wishing to attend the meeting, or speak in accordance with the Council's public participation scheme, should contact the name and number shown above no later than **12.00 noon on Monday, 15 July 2024.**

**Kate Ryan**  
Chief Executive

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# AGENDA

## Apologies

### 1. MINUTES

To confirm the minutes of the meetings held on 7 March and 13 May 2024 as correct records.

### 2. DECLARATIONS OF INTEREST

To note any declarations of interest made by members in connection with an agenda item. The nature of the interest must also be specified.

Members are asked to discuss any possible interests with Democratic Services prior to the meeting.

### 3. PUBLIC PARTICIPATION

To receive any public participation in accordance with the Council's public participation scheme.

### 4. CHRISTCHURCH BAY AND HARBOUR FLOOD AND COASTAL EROSION RISK MANAGEMENT (FCERM) STRATEGY (Pages 3 - 488)

To consider the Christchurch Bay Flood and Coastal Erosion Risk Management Strategy.

### 5. PORTFOLIO HOLDER'S UPDATE (Pages 489 - 494)

An opportunity for the Portfolio Holder's to provide an update to the Panel on developments within their portfolio.

### 6. WORK PROGRAMME (Pages 495 - 496)

To agree the work programme to guide the Panel's activities over the coming months.

To: **Councillors**

Steve Rippon-Swaine (Chairman)  
Alvin Reid (Vice-Chairman)  
Peter Armstrong  
Keith Craze  
Allan Glass

**Councillors**

Matthew Hartmann  
Stephanie Osborne  
Adam Parker  
Malcolm Wade

## **CHRISTCHURCH BAY & HARBOUR FLOOD & COASTAL EROSION RISK MANAGEMENT (FCERM) STRATEGY**

### **1. RECOMMENDATIONS**

- 1.1 That the Panel provides comments to the Cabinet on the content of this report and supports the intended Cabinet recommendations, as follows.
- i. Cabinet approve and adopt the recommended leading options identified in the Christchurch Bay & Harbour Flood & Coastal Erosion Risk Management (FCERM) Strategy for the New Forest District Council area, subject to securing the necessary funding contributions.
  - ii. In approving and adopting the strategy, that NFDC commits to developing a Funding Strategy that will seek to identify and aim to secure the necessary funding contributions to enable the national or local leading options to be implemented via future capital schemes and maintenance of existing/new schemes, noting that the exact amount of contributions will need to be confirmed as schemes are developed.
  - iii. Cabinet notes that there is no statutory duty upon NFDC as the Coast Protection Authority to undertake coast protection works, nor does the adoption of the strategy bind NFDC to commit to the provision of any funding for the delivery of the identified options.
  - iv. Cabinet notes that throughout the development of the strategy extensive engagement and consultation has been undertaken with:
    1. Residents & wider communities (including landowners, community groups, organisations and individuals)
    2. Key stakeholders,
    3. Officers & members

### **2. INTRODUCTION**

- 2.1 Bournemouth, Christchurch and Poole Council (BCP), New Forest District Council (NFDC), and the Environment Agency have been working to develop a new FCERM Strategy for Christchurch Bay and Harbour (hereafter referred to as The Strategy) since the Spring of 2021. There has been extensive engagement with local communities and statutory stakeholders alike to identify and now recommend an adaptive approach to how the risks of coastal flooding, erosion and land-sliding in this area can be managed sustainably over the next 100 years in a changing climate.
- 2.2 The strategy identifies where, when and what type of works are needed to manage the risks of coastal flooding and erosion over the next century and what they may cost.
- 2.3 As Coast Protection Authorities, BCP and NFDC do not have any statutory duty to undertake coast protection work but can use permissive powers to protect the coastline and work with communities to help them adapt to future coastal change.

### **3. BACKGROUND**

#### **Why A Strategy Is Required**

- 3.1 Coastal strategies sit at the second tier in the hierarchy of coastal management in England, sitting below the high-level Shoreline Management Plan policies (see table 2.1 of StAR). It is the role of the Strategy to consider how coastal flood and erosion risk is likely to change in the future, in response to climate change and to develop sustainable and robust options to manage the risks associated with coastal flooding and erosion. Developing a Strategy ensures that technically feasible, environmentally acceptable and economically viable options are recommended to reduce the risks from coastal flooding and erosion to people their properties and the environment.
- 3.2 For NFDC, this area of our coastline will experience significant risk to property and asset losses, through exposure to the greatest storm impacts from the southwest, along with a series of complex cliffs that are significantly affected by groundwater issues. Current coastal defence assets throughout the bay are at the end of their lifespan, with failures already being experienced, such as at Westover in 2020.
- 3.3 Without a strategic approach, it is likely that current management approaches would continue in the short term and future coastal defence works would be managed on an 'ad-hoc' or reactive basis which would lead to poor cost efficiency and a general increase in the coastal flood and erosion risk over time. A Strategy is also important to deliver an integrated approach to the management of our coastline. Holistic wider-level thinking behind Strategy decisions ensures that the management options implemented in one area do not increase the coastal flood and erosion risk in adjacent areas, and that opportunities to deliver wider benefits are not missed.
- 3.4 Importantly the Strategy is required to help gain approval for future schemes and obtaining public funding from central government for coastal defences known as flood and coastal erosion risk management grant in aid (FCERM-GiA).
- 3.5 However, it is important to note that there is no guarantee that any of the options recommended in the Strategy will be progressed. Implementation of options will be subject to funding availability and to gaining required consents. Public funds for coastal management are not widely available, so significant funding from a variety of sources will be needed to progress any options in this Strategy.

### **4. STRATEGY DEVELOPMENT**

#### **The Strategy Area**

- 4.1 Since the Spring of 2021, supported by £525,000 Flood and Coastal Erosion Risk Management (FCERM) Grant-in-Aid from central Government, BCP Council, NFDC and the Environment Agency have worked collaboratively with the Engineering and Environmental Consultancy AECOM, to develop a new FCERM Strategy for Christchurch Bay and Harbour.
- 4.2 Due to the connectivity of the physical processes across Christchurch Bay and Harbour the Strategy area extends from Hengistbury Head Long Groyne to the western end of Hurst Spit at Milford-on-Sea on the open coast, and to Tuckton Bridge and Knapp Mill on the lower Rivers Stour and Avon within Christchurch Harbour respectively.
- 4.3 The coastline is complex with various risks including tidal flood risk around Christchurch Harbour and coastal erosion/ landslide risk along parts of the open coast. The population of the strategy area, including the towns of Christchurch,

Highcliffe, Barton-on-Sea, Milford-on-Sea and New Milton is estimated to be over one hundred thousand.

- 4.4 The area contains a mix of residential and commercial properties. There are large areas of open space and sites of significant environmental importance around much of the frontage, including environmental designations and historical landmarks. This diverse and interesting coastal environment provides extensive access and recreation opportunities and is widely used for leisure by many visitors each year. Christchurch Bay beaches are popular with swimmers, surfers, sailors and walkers alike.

### Current Defences

- 4.5 Many parts of the Strategy frontage are already defended; however, the condition, standard of protection (SoP) against coastal flooding and erosion and the expected life of these defences is highly variable.
- 4.6 Coastal defences are owned and maintained by both councils (BCP and NFDC), the Environment Agency and by private landowners. Many of the defences are in poor condition and are close to the end of their residual life. These assets require significant investment to withstand the impacts of climate change now and into the future.

### Present And Future Coastal Flood & Erosion Risk

- 4.7 Significant areas of land around Christchurch Harbour are at risk of flooding from large storm events. Parts of the open coast are at threat from coastal erosion.
- 4.8 In the future, with the increased storminess and rising sea levels that are predicted because of climate change, the risk of coastal flooding and erosion is likely to increase significantly.
- 4.9 Without actively implementing measures to manage coastal flood and erosion risks, over 1,600 properties are likely to be at risk of erosion and over 2,200 properties at risk from coastal flooding by 2124, in the strategy area. The table below identifies the properties within the New Forest District at risk. In addition to the property losses there will be losses of amenity / recreation land, along with other assets, such as beach huts, car parks and public conveniences.

Strategic Management Zone (SMZ)*	Properties at risk of coastal erosion by 2124**	Properties at risk of coastal flooding by 2124	Economic damages over the next 100 years (£k - cash)
4 (Naish Cliff & Barton-on-Sea)	597	0	184,139
5 (Taddiford)	1	0	707
6 (Milford-on-Sea)	661	139	208,216
	<b>1,259</b>	<b>139</b>	<b>393,062</b>

\* See section 4 for explanation of SMZs

\*\*Properties at risk from table 3.2 StAR & damage costs table 3.8 Economic Appraisal Report

- 4.10 In economic terms, the estimated damage from the risk of coastal flooding and erosion along the strategy frontage over the next century if we do nothing is £1.21 billion (cash) or £186 million (when discounted following HM Treasury guidance to allow for a comparison of future values in terms of their value in the present day).

### **The Strategy Development Approach**

- 4.11 The Strategy has been developed in a staged approach. The first stages were focused on understanding the key features, issues and opportunities that exist within the Strategy area. To achieve this, several studies and activities were undertaken during the early stages of developing the Strategy. These included:
- i) Site walkovers and visual asset inspections to determine the location, type and condition of coastal defences and assets;
  - ii) A study of coastal processes to understand waves, tides, sediment movements and to look at the longer-term coastal flood and erosion risk to both the open and harbour coastlines;
  - iii) Identification of important environmental and heritage features along the frontage – so that key environmental objectives and legal requirements to protect the environment can be accounted for in the Strategy;
  - iv) Baseline economic assessment, including wider benefit assessment such as Gross Value Added assessment;
  - v) Identifying potential broader outcomes and opportunities – to capture ideas as to how the Strategy can be funded as well as deliver wider benefits to communities.
- 4.12 Having developed the above understanding, the latter stages of the Strategy development focused on identification and evaluation of a range of strategic approaches to managing coastal flood and erosion risks from long-list to short-list and then to leading preferred options (further details are provided below and in Appendix A).
- 4.13 Stakeholder engagement and consultation have been key to the Strategy's development. Since July 2021, four phases of engagement with key stakeholders, residents, and the wider community (including landowners, community groups, organisations and individuals) had sought to understand their aspirations and concerns, and to help shape the Strategy as it developed. The fifth phase of stakeholder communication was a formal 3-month public consultation on the draft leading options to manage the risk of coastal flooding and erosion and which closed in August 2023.
- 4.14 Engagement and consultation included face-to-face drop-in events, public online presentations with Q&A sessions, stakeholder workshops and surveys with a combination of traditional and online promotion. In total, over 12,000 people have viewed our website information, approximately 9,000 have engaged with our social media posts, around 730 people have attended our face-to-face and online events and 345 people have completed a survey. Further details are provided in Appendix E. The table below outlines the engagement events undertaken throughout the strategy development.

	2021	2022		2023	
Event	Round 1	Round 2	Round 3	Round 4	Round 5
Public engagement (inc. online briefings & exhibitions)	July to August	May to June	July	Nov to Jan	June to Aug
Online Councillor briefings	8 <sup>th</sup> July 2021	18 <sup>th</sup> May 2022		21 <sup>st</sup> Nov	27 <sup>th</sup> June*
Councillor & officer drop in event (ATC)					23 <sup>rd</sup> Nov

\* Link to youtube recoding of 27th June Councillor briefing:

<https://www.youtube.com/watch?v=kNTisSoJ4bs+&feature=youtu.be>

- 4.15 In spring 2025 we intend to undertake a sixth round of communications to inform stakeholders about the final approved Strategy, explain what it means, and what the next steps are to begin to implement the Strategy in the areas identified as being those needing to be prioritised due to the immediacy of risk and/or condition of existing defences.
- 4.16 Alongside the 3-month public consultation, the draft Strategic Environmental Assessment, and Habitat Regulations Assessment, Water Framework Directive Assessment and Marine Conservation Zone Assessment have been consulted on with Statutory Consultees (i.e. Natural England, Historic England and the Environment Agency).
- 4.17 The feedback from this statutory consultation has been analysed and used to inform the selection of final leading preferred options that this paper is seeking approval of.

## 5. OPTIONS APPRAISAL APPROACH

- 5.1 The options appraisal process to identify and evaluate the range of strategic options involved identifying with stakeholders a wide-range of potential long-list options, appraising those against a multi-criteria appraisal matrix (also informed by stakeholder feedback) to identify a short-list of options, and then more detailed appraisal of that short-list to determine leading preferred options.
- 5.2 The options appraisal for the Strategy has been undertaken across a spatial framework consisting of six high level Strategic Management Zones (SMZs) shown in Figure 1. These have been further sub-divided into a total of eighteen smaller Option Development Units (ODUs) shown in the table below and in Figures 2 to 4 (NFDC area only). By dividing the Strategy frontage into these distinct areas, it has allowed the appraisal to develop options that are strategic in nature, but also consider local risks and opportunities at the ODU level. It also ensures that the Strategy considers the impact of options on nearby and adjacent locations.



Figure 1 The Strategy Management Zones defined across the Christchurch Bay & Harbour area.

SMZ	Authority	ODUs
1 – Mundeford Sandbank	BCP	1 & 2
2 - Christchurch Harbour	BCP	3, 4, 5, 6, 7, 8, 9, 10 & 11
3 – Christchurch Beaches & Cliffs	BCP	12 & 13
4 – Naish Cliff & BoS	NFDC	14
5 - Taddiford	NFDC	15
6 - MoS	NFDC	16, 17 & 18



Figure 2 The ODUs defined in SMZ4 of the strategy area.



Figure 3 The ODUs defined in SMZ5 of the strategy area

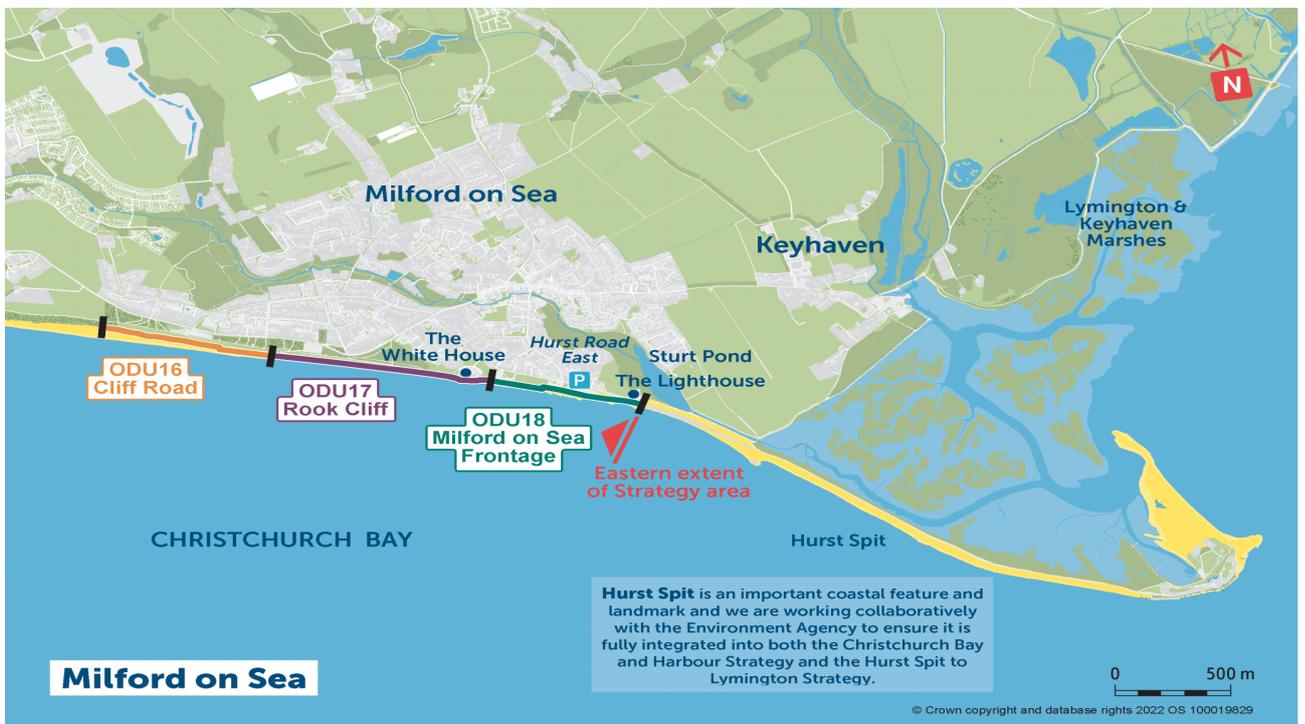


Figure 4 The ODUs defined in SMZ6 of the strategy area.

5.3 The options developed for the Strategy outline what the strategic intent of the option is (Do Nothing, Do Minimum, Maintain, Managed Realignment, Sustain or Improve the standard of protection) and the timings of the defence measures that are required to achieve this. The timings of defence measures were developed based on three-time epochs in the Strategy:

- Epoch 1 (short term): between 2024-2044
- Epoch 2 (medium term): between 2044-2074

- Epoch 3 (long term): between 2074-2124
- 5.4 In each ODU, up to three types of proposed leading options have been identified. These include:
- the National Economic leading option, which is identified by following the Environment Agency's FCERM Appraisal Guidance. This option has been identified in each ODU and forms the basis of the appraisal;
  - the Local Aspirational leading option has been identified in some ODUs and considers local opportunities, wants and needs to deliver wider benefits (informed by stakeholder engagement during development of the Strategy). This option typically costs more than the National Economic leading option and/or would be delivered sooner; and
  - the Back-up option has been identified in some ODUs when there is a large funding shortfall. It is typically a lower cost option that will be more easily delivered if funding is limited and may not reduce risks in the longer-term.
- 5.5 Each type of option outlines the planned coastal defence interventions during the different epochs, in the form of an adaptive pathway for each ODU.
- 5.6 Given that funding is a key constraint that has been identified, alongside other factors, including uncertainty such as the onset of coastal flooding and erosion risks and the rate of change that may occur in these risks due to climate change, identifying these adaptive pathways provides a flexible approach that will enable the ability to adjust course depending on the risks / funding availability. For example, if more funding becomes available than expected, the delivery team could switch from delivering the National Economic Leading Option to the Local Aspirational Option.
- 5.7 Further details on the options appraisal process are provided in Appendix A.

## **6. THE RECOMMENDED PREFERRED OPTIONS FOR THE NFDC AREA**

**(Refer also to Appendix A and Appendix B)**

- 6.1 SMZ 4 – Naish Cliff and Barton on Sea
- SMZ 4 (Naish Cliff and Barton on Sea) includes the settlement of Barton on Sea and the currently undefended stretch of coastline at Naish Cliff. There is only one ODU in this zone, ODU 14, and the main risk facing this area is from erosion. ODU 14 is characterised by steep topography and an active cliff face that is environmentally designated as a Site of Special Scientific Interest (SSSI). The cliff in this area is a complex cliff and when undefended it erodes from the combined influence of sea erosion of the cliff toe and groundwater induced instability. Considering affordability constraints, and environmental designations along the cliff, it is unlikely to be possible to completely stop cliff erosion in this location.

- The recommended preferred options in this SMZ are summarized in the following table:

ODU		National Economic Leading Option	Local Aspirational Leading Option	Backup Option
14 – Naish Cliff and Barton on Sea	<b>Option</b>	Managed Realignment A	-	Managed Realignment B; or Managed Realignment D; or Maintain
	<b>Details</b>	Improved toe defences and cliff stabilisation / drainage in the area between Marine Drive West and the eastern end of Barton on Sea during the first part of epoch 1. This would help to slow rates of cliff top recession but not stop it entirely.	-	Managed Realignment B: As per Managed Realignment A, except defence improvements would be undertaken during epoch 2.  Managed Realignment D: As per Managed Realignment B, except no new cliff drainage and toe protection at Marine Drive West.  Maintain: Maintain existing defences and functioning drainage but no new defences constructed.
	<b>Option cost present value<sup>1</sup> (PV £k)</b>	22,211	-	Managed Realignment B: 19,718  Managed Realignment D: 14,218  Maintain: 5,927
	<b>Option benefits (PV £k)</b>	23,489	-	Managed Realignment B: 20,077  Managed Realignment D: 14,391  Maintain: 5,959
	<b>ABCR (Average Benefit Cost Ratio)</b>	1.06	-	Managed Realignment B: 1.02  Managed Realignment D: 1.01  Maintain: 1.01
	<b>Estimated partnership funding (PF) score for initial intervention</b>	12%	-	-
	<b>Estimated GiA availability for initial intervention (cash £k)</b>	3,215	-	-

- The leading options in ODU 14 are likely to obtain central government funding for only a small proportion of the scheme costs (around 12%). Therefore, the majority of the cost will need to be funded from alternative sources, totaling cash value over 100 years estimated to be around £41.5m.

<sup>1</sup> When comparing costs and benefits across different time periods we discount the future. Discounting gives Present Value (PV), which is a way of representing the current value of future cash flows, based on the principle that money in the present is worth more than money in the future. More details on discounting can be found in the [Green Book](#).

## 6.2 SMZ 5 – Taddiford

- SMZ 5 (Taddiford) includes ODU15 and covers the area between Barton on Sea and Hordle Cliff. The area is currently undefended with no defences in front of the cliff. The beach provides the only protection to the cliff toe from erosion and also holds a recreational / amenity benefit. A permissive path exists along the cliff top (part of European long-distance path, route E9). There is no risk from tidal flooding in this location and the main source of risk is from erosion. However, relative to other parts of the frontage the erosion risk to properties is very low with minimal properties at risk (there are therefore no economic damages in this unit). This zone's full length is fronted by a marine Special Protection Area designation, and the cliffs are part of the Site of Special Scientific Interest (SSSI).
  - The option for this SMZ is do nothing, no defence maintenance (there are no defences) or beach management undertaken. If appropriate undertake health and safety activities following cliff erosion events to make safe public spaces.
- The Do-Nothing option is in line with SMP policy and due to there being minimal properties at risk there is no justification to construct new defences. There is potential to place additional beach material in this unit as part of a wider beach nourishment scheme and due to the longshore transport direction being from west to east, this would provide benefit to SMZ 6 to the east. Options for material placement may be explored after the Strategy during the outline design of future schemes in SMZ 6.

## 6.3 SMZ 6 – Milford – on – Sea

- SMZ 6 (Milford on Sea) includes ODUs 16, 17 and 18 and covers the frontage between Hordle Cliff and the western end of Hurst Spit. The cliff elevation reduces from west to east in this zone. There is a risk of coastal erosion in this location and there is also localised flood risk at the eastern end of ODU 18 where the cliff elevation is reduced. Here wave overtopping can occur from the open coast, and there is also a risk of tidal inundation and fluvial flooding from the Sturt Pond and Danes Stream area. A key issue for this frontage is the management of beach levels. There has been a recent trend of beach erosion that has increased the pressure on the defences at the back of the beach. Here a beach is required to protect the toe of the existing seawall and in the past low beach levels have contributed to seawall failures. The leading options focus on managing the beach levels in this location through periodic nourishment and larger scale beach nourishment schemes.
- The appraisal of options for Hurst Spit itself is being led by the adjacent Hurst Spit to Lymington Strategy. Both project teams have collaborated to ensure a joined-up approach is taken. The leading options in ODUs 16-18 will ensure that the options for managing Hurst Spit can also be undertaken (and vice-versa).

- The recommended preferred options in this SMZ are summarized in the following table:

ODU		National Economic Leading Option	Local Aspirational Leading Option	Backup Option
16 – Cliff Road	<b>Option</b>	Managed Realignment C	Managed Realignment A or B	Maintain
	<b>Details</b>	From second half of epoch 2 undertake beach nourishment and construct local strong point to control rate of cliff erosion. Cliff top recession would still occur but intent would be to prevent it reaching Cliff Road.	As per Managed Realignment C, except beach nourishment and strong point would be constructed much sooner, in either epoch 1 (Managed Realignment A) or start of epoch 2 (Managed Realignment B)	Maintain existing defences and undertake beach recycling to control beach levels. In the long term this is likely to lead to more erosion than the Managed Realignment options.
	<b>Option cost (PV £k)</b>	4,405	5,069 – 5,612	1,791
	<b>Option benefits (PV £k)</b>	7,400	7,400	3,017
	<b>ABCR</b>	1.68	1.32 – 1.46	1.68
	<b>Estimated PF score for initial intervention</b>	19%	21% – 29%	-
	<b>Estimated GiA availability for initial intervention (cash £k)</b>	1,932	1,301 – 1,564	-
17 – Rook Cliff	<b>Option</b>	Improve C	Improve A or B	Maintain:
	<b>Details</b>	Refurbish existing cliff toe defences in epoch 1. From second half of epoch 2 upgrade defences at cliff toe.	As per Improve C, except toe defence improvements would be constructed much sooner, in either epoch 1 (Managed Realignment A) or start of epoch 2 (Managed Realignment B)	Maintain existing defences at the toe of the cliff. Long term sustainability of this approach is uncertain given lowering beach levels in this location and this option is therefore likely to lead to more erosion than the Improve options.
	<b>Option cost (PV £k)</b>	9,055	9,376 – 11,471	4,110
	<b>Option benefits (PV £k)</b>	11,516	11,516	4,222
	<b>ABCR</b>	1.27	1.00 – 1.23	1.03
	<b>Estimated PF score for initial intervention</b>	20%	15% - 18%	-
	<b>Estimated GiA availability for initial intervention (cash £k)</b>	3,457	2,400 – 2,676	-
18 – Milford on Sea	<b>Option</b>	Improve A / Improve B	-	Maintain
	<b>Details</b>	Upgrade seawall, construct new groynes and undertake major beach nourishment from epoch 1. Construct setback tidal flood defences at eastern end of Milford on Sea to reduce risk of flooding from Sturt Pond	-	Maintain: Maintain existing defences and undertake beach recycling. Long term effectiveness is uncertain.

ODU		National Economic Leading Option	Local Aspirational Leading Option	Backup Option
		direction in epoch 2.  Improve B: As per Improve A, except upgrade coastal defences and beach nourishment in epoch 2. Refurbish existing defences in epoch 1 to extend service life until upgrade.		
	<b>Option cost (PV £k)</b>	11,060 (Improve A) / 11,035 (Improve B)	-	Maintain: 8,872
	<b>Option benefits (PV £k)</b>	11,155 (Improve A or Improve B)	-	Maintain: 8,933
	<b>ABCR</b>	1.01 (Improve A or Improve B)	-	Maintain: 1.01
	<b>Estimated PF score for initial intervention</b>	12%	-	-
	<b>Estimated GiA availability for initial intervention (cash £k)</b>	1,355	-	-

- The leading options in this SMZ are likely to obtain central government funding for only a small proportion of the scheme costs (around 12-29%). Therefore, the majority of the cost will need to be funded from alternative sources, totaling cash value over 100 years estimated to be in excess of £57m.

## **7. CONCLUSIONS**

- 7.1 The Strategy's recommended leading options identify where and when potential defence schemes can be implemented along the frontage but identifies a significant funding challenge in order to deliver the national and/or local options.
- 7.2 In some cases, any intervention – even if funding can be secured – is unlikely to mitigate the long-term risks posed by climate change in terms of increasing risk of coastal flooding, erosion and landsliding. Therefore, the measures set-out in this Strategy need to be considered as buying time and reflected in wider-Local Planning policy with a view to the potential need for land-use adaptation longer-term (up to and beyond the 100-year horizon adopted in developing this Strategy).

## **8. FINANCIAL IMPLICATIONS**

- 8.1 As identified above, following the current central government partnership funding rules means that the recommended leading strategic options do not qualify for full central government FCERM grant in aid (GiA) funding and will therefore need contributions from alternative sources to be delivered.
- 8.2 The current partnership funding mechanism encourages those benefiting from schemes to contribute to their cost to supplement government grants. By working together, schemes which are still viable but have less economic benefits would still be able to unlock national funding to boost and prioritise schemes to implement the Strategy. Raising sufficient funding will:
- Allow development and delivery of the recommended coastal defence schemes
  - Increase the standard of protection of defences
  - Improve the quality of materials used (e.g. to better fit the character of a location)
  - Increase certainty and accelerate the delivery of schemes
  - Deliver wider benefits to communities associated with schemes, such as improved landscaping, access and public realm
  - Deliver environmental enhancements to increase biodiversity.
- 8.3 Under these current funding rules, the scale of the funding contributions required over the next 100 years in cash terms across the NFDC area ranges from £88m - £99m, depending on which combination of recommended strategic options (national, local or backup) are eventually taken forward.
- 8.4 Over the next 20 years, the contributions required in cash terms are estimated to be between £39m - £50m; or £2.0m - £2.5m per year if annualized. Within the NFDC area, capital investments that comprise a significant proportion of the required contributions are needed as follows:

8.5

ODU	Likely timing of capital intervention to replace aged defences from year 0 (2024)	
	National Economic Leading Option	Local Aspirational Leading Option
14	5 -9 years	N/A – no local option defined
15	N/A – no capital intervention expected	N/A – no local option defined
16	35-39 years	5-9 years
17	35-39 years (refurbishment in year 5-9 years)	5-9 years
18	5-9 years	N/A – no local option defined

- 8.6 The balance of contributions required reflect the need for ongoing revenue expenditure by the asset owners to undertake maintenance works to ensure estimated defence life is provided to reach the anticipated replacement capital investment timing indicated above, as well as implementing property level protection in some ODUs for which other non-GiA funding sources may be available.
- 8.7 It should be noted that the level of funding contributions required are indicative and may change (up or down) as more work is undertaken to develop schemes and refinement of required works, costs, etc are developed; as such these values act as a guide to the likely level of contributions that will need to be secured in the coming years to enable FCERM investments to occur in line with the leading options identified in this Strategy.
- 8.8 If these funding contributions are not achieved, then the Strategy in some areas identifies a back-up option that will provide a minimum amount of intervention to manage risks for a period of time, but that will eventually cease and the do-nothing scenario will become more likely, leading eventually to the scale of damages and loss described above.
- 8.9 In some cases, any intervention – even if funding can be secured – is unlikely to mitigate the long-term risks posed by climate change in terms of increasing risk of coastal flooding, erosion, and land sliding. Therefore, the measures set-out in this Strategy need to be considered as buying time and reflected in wider local planning policy with a view to the potential need for land-use adaptation longer-term (up to and beyond the 100-year horizon adopted in developing this Strategy).
- 8.10 The following tables illustrate the estimated timing of funding contributions required over the 100-year period in order to deliver the Strategy in the NFDC area as a whole, along with requirements for each Option Development Unit:

Leading Option	Option Overview (Epoch 1)	Epoch 1 Costs (£K)	Indicative GiA (£K & % amount)	Partnership Funding Required (£K)
<b>Naish Cliff and Barton – on - Sea</b>				
ODU 14 - National	Improve toe defences, cliff stabilization & drainage	27,165	3,215 (12%)	23,680
ODU 14 – Backup B	Maintenance works only in epoch 1	1,020	N/A	1,020
ODU 14 – Backup D	Maintenance works only in epoch 1	1,020	N/A	N/A
ODU 14 – Backup Maintain	Maintenance with some refurb	6,126	N/A	N/A
<b>Cliff Road</b>				
ODU 16 - National	Maintenance works only in epoch 1	392	N/A	N/A
ODU 16 – Local	Beach recharge & rock structure construction	5,032	1,301 (26%)	3,731
ODU 16 - Backup	Maintain existing defences and undertake beach recycling (reliant on recharge in other units). In the long term this is likely to lead to more erosion than the Managed Realignment options.	785	N/A	N/A
<b>Rook Cliff</b>				
ODU 17 - National	Refurbishment of existing defences	3,986	N/A	3,986
ODU 17 – Local	Improve defences	13,825	2,400 (17%)	11,425
ODU 17 - Backup	Maintain toe defences	3,985	N/A	3,985
<b>Milford – on- Sea</b>				
ODU 18 - National	Seawall repairs, control structures & small scale recharge	11,964	1,355 (11%)	10,609
ODU 18 – Backup B	Refurb existing defences & beach recharge. Major works in epoch 2	5,301	N/A	5,301
ODU 18 - Maintain	Ongoing beach management, refurb of defences & beach recharge	6,752	N/A	6,752

Leading Option	Description	Indicative non-GiA funding contribution required (£k) – cash*														Total	
		Epoch 1 (years)				Epoch 2 (years)						Epoch 3 (years)					
		0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-59	60-69	70-79	80-89		90-99
National		1,206	7,180	30,044	507	870	786	4,493	22,961	659	659	3,584	15,413	1,568	7,193	1,550	98,673
Local**	(With National where no Local)	1,206	17,880	30,083	546	659	659	6,040	659	659	659	7,986	13,739	1,568	4,465	1,553	88,361

\*Indicative funding for major capital scheme in option (if multiple capital schemes, not all have been assessed).

\*\*Local option funding does not include GiA for ODUs 14 and 18 even though some could be available. This is because the BCR for the local option in these ODUs is <1, and it is uncertain if it will be viable to proceed with these if funding contributions are not forthcoming.

## **9. LEGAL IMPLICATION**

- 9.1 The works required to implement the Strategy recommended leading options are undertaken under permissive powers granted to BCP and NFDC under the Coast Protection Act 1949 and Land Drainage Act 1991, and the Environment Agency under the Water Resources Act 1991. However, there is no statutory legal duty on these authorities to undertake these schemes if there is no justification and/or insufficient funding to do so.

## **10. CRIME & DISORDER IMPLICATIONS**

- 10.1 There are no crime & disorder implications arising from the Strategy.

## **11. ENVIRONMENTAL IMPLICATIONS**

- 11.1 As part of developing the Strategy, a Strategic Environmental Assessment (SEA) has been undertaken. This has considered the implications of the range of technical options considered against a range of topics, objectives, and assessment questions, known as the SEA framework, to determine the sustainability of options in relation to: biodiversity and geodiversity; climate change; landscape; historic environment; land, soil and water resources; population and communities; and transport and movement.
- 11.2 In undertaking the SEA assessment, consideration has included whether options offer the potential for biodiversity net gain or other environmental enhancements. The full SEA environmental report is provided in Appendix C, and the findings of the SEA have informed the selection of the leading preferred options.
- 11.3 The SEA has been consulted on with statutory consultees including Natural England and Historic England, who have also provided letters of support (see Appendix D).
- 11.4 A key outcome of the SEA, alongside informing selection of more sustainable leading options, is to identify monitoring requirements to implement in the near future in order that improved data is provided to inform decision making as schemes to implement the Strategy are developed in future years.
- 11.5 Alongside the SEA, a Habitat Regulations Assessment (HRA), Marine Conservation Zone (MCZ) Assessment and Water Framework Directive (WFD) Assessment have also been completed and agreed with the respective statutory consultees.
- 11.6 The HRA Stage 1 (Screening) identified potential for significant impacts on qualifying designated features associated with SAC and SPAs in the Strategy area. The HRA Stage 2 (Appropriate Assessment) considered these aspects in greater detail and concluded that mitigation will in the main be possible by only undertaking future works at specific times of year / states of water level – aspects that will need to be taken into account as and when detailed scheme designs are developed in future years to implement the Strategy. The HRA did not identify any requirement to provide compensatory habitat to mitigate any potential coastal squeeze impacts by continuing to defend areas against coastal flood and erosion risk.
- 11.7 The MCZ and WFD Assessments concluded that there are some potential limited, temporary impacts of construction works in relation to increased sediment turbidity but no longer-term impacts of the proposed strategic options. These potential impacts will need to be considered further when detailed scheme designs are developed in future years to implement the Strategy.

## **12. EQUALITY & DIVERSITY IMPLICATIONS**

12.1 NFDC Equality Impact Assessment completed 25th April 2024. No impacts were identified as a result of the assessment.

## **13. DATA PROTECTION IMPLICATIONS**

13.1 There are no data protection implications arising from the Strategy.

## **14. PORTFOLIO HOLDER COMMENTS**

(Required for reports to the Cabinet)

### **For further information contact:**

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Service Manager Coastal  
023 8028 5311  
steve.cook@nfdc.gov.uk

### **Background Papers:**

Appendix A – Strategy Appraisal Report (StAR)

Appendix B – Implementation / Action Plan

Appendix C – Strategic Environmental Assessment (SEA)

Appendix D – SEA Letters of Support from Statutory Consultees

Appendix E – Consultation Report

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# Strategy Appraisal Report

Authority scheme reference	WXC500E/001A/675A
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Defra/WAG LDW number	LDW 42765
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Promoting authority	Bournemouth, Christchurch and Poole Council / New Forest District Council
---------------------	---

Strategy name	Christchurch Bay & Harbour FCERM Strategy
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Aerial photograph of flooding in Christchurch Harbour and the lower River Avon (BCP Council, January 2023)

Date	25/05/2024
------	------------

Version	V1
---------	----



## StAR for *Christchurch Bay & Harbour FCERM Strategy*

<b>Version</b>	<b>Status</b>	<b>Signed off by:</b>	<b>Date signed</b>	<b>Date issued</b>
1	Version issued to BCP / NFDC for approval			

Template version – April 2011

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<b>No.</b>	Version 1	<b>Status:</b>	BCP / NFDC issue	<b>Issue Date:</b>	May 2024
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**For technical approval of the business case**  
**Environment Agency Region:**

**Project name:**

**Approval Value:**       **£**

**Sponsoring Director: David Jordan                      Director of Operations**

**Non-financial scheme of delegation**

Part 11 of the Non-financial scheme of delegation states that approval of FCERM Strategies/Complex Change Projects, following recommendation for approval from the Large Projects Review Group, is required from the Regional Director or Director, Wales and Director of Operations.

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# Approval history sheet

APPROVAL HISTORY SHEET (AHS)			
<b>1. Submission for review (to be completed by team)</b>			
Project Title: Christchurch Bay and Harbour FCERM Strategy		Project Code: WXC500E/001A/675A	
Project Manager: Alan Frampton		Date of Submission: 01/05/24	
Lead Authority: Bournemouth, Christchurch and Poole Council (BCP)		Version No: v1	
Consultant Project Manager: Ben Taylor		Consultant: AECOM	
<i>The following confirm that the documentation is ready for submission to PAB or LPRG. The Project Executive has ensured that relevant parties have been consulted in the production of this submission.</i>			
Position	Name	Signature	Date
Project Executive			
	Job Title:		
<b>2. Review by: Large Projects Review Group (LPRG)</b>			
Date of Meeting(s):		Chairman:	
Recommended for approval: In the sum of £:		Date:	Version No:
<b>3. Environment Agency NFSoD approval</b> <i>Officers in accordance with the NFSoD.</i>			
Version No:		Date:	
Project Approval	By: In the sum of: £	Date:	
<b>4. Defra or WAG approval</b> <i>(Delete as appropriate)</i>			
Submitted to Defra / WAG or Not Applicable (as appropriate)		Date:	
Version No. (if different):			
Defra/ WAG Approval: or Not applicable (as appropriate)		Date:	
Comments:			

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**NON FINANCIAL SCHEME OF DELEGATION (NFSoD) COVERSHEET FOR A FCRM  
COMPLEX CHANGE PROJECT / STRATEGIC PLAN**

1. Project name				Start date	
				End date	
Business unit			Programme		
Project ref.		Regional SoD ref.		Head Office SoD ref.	-

2. Role	Name	Post Title
Project Sponsor		
Project Executive		
Project Manager		

3. Risk Potential Assessment (RPA) Category	Low	<input type="checkbox"/>	Medium	<input type="checkbox"/>	High	<input type="checkbox"/>
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4. NFSoD value	£k
Whole Life Costs (WLC) of Complex Change Project / Strategic Plan	

5. Required level of Environmental Impact Assessment (EIA)	N/A	Low	Medium	High
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

6. NFSoD approver name	Post title	Signature	Date
	Regional Director/Director Wales		
	Director of Operations		
NFSoD consultee name	Post title	Signature	Date
	LPRG Chair		

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# 1 Executive summary

## 1.1 Purpose of this Report

- 1.1.1 This report is the Strategy Appraisal Report (StAR) for the Christchurch Bay and Harbour Flood and Coastal Erosion Risk Management (FCERM) Strategy.
- 1.1.2 The Strategy sets out the leading options, adaptive pathways and timings to sustainably address coastal flood and erosion risk over the next 100 years for the 13km coastal frontage between Hengistbury Head Long Groyne and the landward end of Hurst Spit, and 14km of shoreline within Christchurch Harbour, extending to Tuckton Bridge on the River Stour and Knapp Mill on the River Avon.

## 1.2 Background

- 1.2.1 The Strategy frontage is highly varied and ranges from a sheltered environment within Christchurch Harbour and an exposed open coast environment with beaches and steep cliffs within Christchurch Bay. It contains a mix of developed residential and commercial areas with the coastal towns of Christchurch, Barton on Sea and Milford on Sea. There are also areas of open space and sites of environmental significance across much of the frontage.
- 1.2.2 Much of the Strategy frontage is fronted by coastal defence structures that help to manage coastal flooding and erosion risks. The defences are typically owned and maintained by the Environment Agency, Bournemouth, Christchurch and Poole Council (BCP) and/or New Forest District Council (NFDC) but there are also sections of privately owned and maintained defences. Many of the defences are ageing and have a limited residual life before needing to be replaced or improved.
- 1.2.3 Beach management is also a key method in which the coastal flooding and erosion risks are managed within the bay. This occurs on a frequent basis (annually in some locations such as at Milford on Sea) and takes the form of either beach recycling or small-scale beach renourishment.
- 1.2.4 There are significant coastal flooding and erosion risks facing the Strategy frontage over the next 100 years which are projected to increase in severity due to climate change and sea level rise. Higher sea levels and increased storminess will reduce the performance and standard of protection provided by existing coastal defences.
- 1.2.5 In the Strategy area there are estimated to be 120 properties (total residential and non-residential) currently at risk from coastal flooding from a 1 in 200 return period event (0.5% Annual Exceedance Probability - AEP). Due to climate change and sea level rise, this number is projected to increase to 2,227 properties for the 1 in 200 (0.5% AEP) return period in 100 years' time.
- 1.2.6 There are estimated to be 1,365 properties (total residential and non-residential) at risk of coastal erosion over the next 100 years if nothing is done to manage the risk. Several historic landfill sites are also at risk of erosion in the future.
- 1.2.7 The 'Do Nothing' economic damages from the flooding and erosion risk have been calculated for the Strategy frontage for the next 100 years. Damages to the national economy are estimated to be over £186million in present value (PV) terms and

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£1,213million in undiscounted cash terms, with the damages concentrated in Christchurch Harbour, Christchurch Beaches and Cliffs, Barton on Sea and Milford on Sea.

- 1.2.8 Under the Do Nothing scenario there are also expected to be wider damages to the local economy from the flooding and erosion risks, such as the Gross Value Added damages, potential damages to tourism, health and wellbeing and council revenue. These local economic damages far exceed the national damages over the duration of the appraisal period.
- 1.2.9 There is currently no existing strategy in place to provide a framework for the long term management of the coastline and to deliver the higher level management policies of the Poole and Christchurch Bay Shoreline Management Plan 2 (2011). Currently defence maintenance and improvements are undertaken on a reactive basis governed largely by the availability of Local Authority revenue budgets or through applications for emergency FCERM Grant in Aid following asset failures.
- 1.2.10 A Strategy is required to set out a plan for managing the flooding and erosion risks facing the Strategy frontage in a cohesive and joined-up way. The Strategy sets out the leading options, adaptive pathways and trigger thresholds and the estimated investment that is required. If approved by the Environment Agency, the Strategy will demonstrate that strategic planning has been undertaken which will improve the case for attracting funding for future schemes from FCERM Grant in Aid and also from non-Grant in Aid contributions.

### 1.3 Options Considered

- 1.3.1 In order to manage the risks posed by coastal flooding and erosion over the next century, a range of Strategic Options were considered across 18 Option Development Units (ODUs). Each ODU covers a different part of the Strategy frontage and the strategic links between areas were considered. See Figure 4-1 for a map of the ODU locations.
- 1.3.2 The Strategic Options were developed and appraised in line with the updated Defra’s Flood and Coastal Erosion Risk Management Appraisal Technical Guidance (FCERM-ATG, 2022), originally published in 2010 (FCERM-AG, 2010) and then updated in 2022.
- 1.3.3 The Strategic Options outline the intent of the interventions over the next 100 years, such as doing nothing, maintaining the defences, sustaining the defences, improving the defences or undertaking managed realignment.
- 1.3.4 The Strategic Options are made up of a ‘package’ of FCERM measures. The measures refer to the local level defences that would be constructed or maintained (e.g. a seawall, setback floodwall, beach recycling etc.). Often it is necessary to combine a variety of these measures into a ‘package’ and therefore strategic options generally include a combination of FCERM measures that would be implemented over time to deliver the option.

### 1.4 Leading Options and Adaptive Pathways

- 1.4.1 Within each ODU up to three types of leading option have been identified, as follows:
  - National Leading Option – the leading option identified by following FCERM-AG decision rules;

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- Local Aspirational Option – an option that takes into account local opportunities, wants, and needs to deliver greater or wider benefits. The Local Aspirational Option is typically a higher cost than the National Leading Option.
- Backup Option – an option that is more deliverable from a funding perspective than either the National Leading Option or the Local Aspirational Option. Backup Options typically have lower present value costs and smaller capital funding requirements but deliver less benefits.

1.4.2 With multiple leading options identified, the Strategy has the required flexibility to move between the leading options as it is being implemented over the next 100 years. The different routes that can be followed between implementing the options are known as ‘adaptive pathways’. This approach increases the adaptive capacity of the Strategy and provides the required flexibility that is required to account for uncertainties such as rates of climate change, funding availability, project costs, potentially contaminated land, land ownership, consenting and future development.

1.4.3 A summary of the leading options is provided below:

- In ODUs 1 and 2 (Hengistbury Head and Mudeford Sandbank) it is important to sustain the FCERM function of the Mudeford Sandbank as uncontrolled erosion / movement of Mudeford Sandbank could have uncertain impacts on the wider morphology of the area, potentially impacting flood risk, navigation, sediment transport and buried services in the vicinity. The Local Aspirational Options for this location are focussed on maintaining the existing FCERM function of the Sandbank over the course of the appraisal period. On a national basis there is not a strong economic case to deliver the Local Aspirational Options in ODUs 1-2, but it is important for these to be delivered to ensure the leading options in ODUs 3-10 are successful.
- In ODUs 3-10 (Christchurch Harbour) the main risk is from tidal flooding to properties and other assets. Where there is an economic case, the leading options are generally focussed on upgrading the SoP provided by defences in these locations. This could be achieved by raising existing defences or constructing new defences as required. Different timings are recommended for defence upgrades based on a range of factors such as the onset of risk and the residual life of existing defences. Another risk in ODUs 3-10 is historic landfill sites and the potentially contaminated materials that could be exposed should these locations be undefended and erode. The different approaches to managing this risk (with respect to timings and cost) have been explored in the appraisal and are picked up in the leading options.
- In ODU 11 (Mudeford Quay) it is important to sustain the FCERM function of the existing quay walls as erosion / damage to the quay could lead to more widespread morphological changes and impact flood risk elsewhere in the area. The Local Aspirational Option in this location aims to prevent the quay from eroding and provides property level protection to the properties on the quay at risk from flooding. Similar to ODUs 1 and 2, on a national basis there is not a strong economic case to sustain the function of the quay walls in ODU 11, but it is important for the function of these assets to be continued to ensure the leading options in ODUs 3-10 and ODU 12 can be delivered successfully.
- In ODUs 12-18 (Christchurch Bay open coast), the leading options are underpinned by a series of strategically placed beach nourishment interventions over time. The placement locations have been identified to provide an immediate benefit to the placement location but also to provide a long term benefit to areas downdrift over the Strategy period, including Hurst Spit. The leading options recommend beach

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nourishment is undertaken in ODU 12, ODU 13, ODU 16 and ODU 18 at various points over the next 100 years. There is an opportunity to explore a joined-up approach to scheme delivery in these locations which could deliver efficiencies. The beach nourishment will ensure that the beach can continue to provide an integral part of the overall defence system along the open coast. However, in some locations it would need to be supplemented with additional hard defence structures and cliff slope stabilisation. For example at Barton on Sea (ODU 14) new cliff toe defences and cliff slope drainage is recommended and new hard defences at Milford on Sea (ODUs 16-18) are also recommended.

## 1.5 Economic and Funding Case

- 1.5.1 It is estimated that the total whole life present value cost of delivering the Strategy is approximately £140million over the next 100 years. This value is in present value terms and therefore includes a discount for the cost of future interventions that are required over the next 100 years. In undiscounted cash terms, the total whole life cost of the delivering the Strategy is estimated to be approximately £313million.
- 1.5.2 On a national basis, the total whole life present value benefits of delivering the Strategy are estimated to be approximately £168million. These are the benefits that would occur due to a reduction in flood and erosion risk compared to the baseline 'Do Nothing' scenario.
- 1.5.3 Across the Strategy frontage as a whole, the whole life present value economic benefits (£168million) exceed the estimated whole life present value costs (£140million). However, in some individual ODUs the average benefit cost ratio of the leading option is less than unity. But this is only the case when considered on a national basis (i.e. only considering nationally eligible benefits as per the FCERM-AG). As part of the Strategy, the wider local impacts of flooding and erosion in each ODU have also been calculated and when these damages (and potential benefits) are considered, this results in a much stronger economic case of the options on a local economic basis for each ODU.
- 1.5.4 For each of the leading options (National / Local Aspirational options), Partnership Funding calculations have been undertaken for the initial schemes of these options using the Environment Agency's Partnership Funding calculator. The score for the initial schemes is typically less than 50%. This indicates that significant funding contributions from non FCERM-Grant in Aid sources will need to be found to deliver the Strategy.
- 1.5.5 Typically the initial schemes are not recommended to occur for several years at least (with many recommended to occur even later during epoch 2 / 3). This provides the BCP / NFDC FCERM teams with time to source funding contributions and one of the recommendations following the Strategy is to develop a funding action plan to plan, identify and secure contributions before schemes are required.
- 1.5.6 A Strategy Action and Implementation Plan has been developed. This plan includes details of the triggers and thresholds to inform key FCERM decisions and movement through the adaptive pathways in each ODU. This includes decision tree illustrations for the adaptive pathways.

## 1.6 Strategic Factors

### Future uncertainty

- 1.6.1 There is uncertainty around the magnitude of future climate change and sea level rise and the availability of funding for FCERM projects in the future. It has therefore been

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imperative that the Strategy does not set a rigid intervention approach that cannot be changed in the future.

- 1.6.2 Following the adaptive pathway approach the Strategy leading options have been developed with sufficient flexibility to move between leading options as required when the Strategy is delivered, subject to the evolution of the key uncertainties over time. Switching pathways between the leading options will not compromise the approach in adjacent areas.

**Beach sediment transport**

- 1.6.3 The role of coastal processes and beach sediment transport within Christchurch Bay is a critical strategic issue because the beach volume is a key influence on rates of coastal erosion. The dominant longshore transport direction within the Bay is from west to east. Some parts of the Strategy frontage have sufficient beach material (e.g. Highcliffe which has effective beach control structures), whereas other parts of the frontage do not have enough material (e.g. Milford on Sea).

- 1.6.4 In developing the Strategy the knock-on impact on longshore sediment transport from the proposed options has been fully considered and a series of beach nourishment interventions within the bay are proposed as part of the leading options. The joined up strategic planning undertaken as part of the option appraisal is essential for the long term sustainable management of the erosion risk facing the bay and this strategic planning is not always prevalent when FCERM interventions are developed on a scheme by scheme basis without a Strategy in place.

**Historic landfill**

- 1.6.5 A key strategic concern for the Strategy is the erosion risk to historic landfill sites of which there are several around Christchurch Harbour, including at Stanpit, Wick, the Quomps and Mudeford Quay. Erosion could release potentially contaminated materials into the environment. The contamination status of the historic landfill sites is unknown so more work is needed after the Strategy to investigate this risk further. In the option development and appraisal the Strategy has taken a conservative stance and recommended defending historic landfill sites as part of the leading options and adaptive pathways.

- 1.6.6 There is a recognition that on a national basis protecting historic landfill sites does not typically attract sufficient FCERM-GiA and therefore additional sources of funding will need to be sought and investigated to facilitate the delivery of these works.

**Hurst Spit**

- 1.6.7 Hurst Spit is located at the eastern end of the Strategy frontage and forms a vital controlling feature for the morphological evolution of Christchurch Bay. In developing the Strategy the project team has collaborated with the Hurst Spit to Lympington FCERM Strategy team. It is understood that various options for managing Hurst Spit in the future are being considered by the Hurst Spit to Lympington Strategy, including controlled rollback.

- 1.6.8 The role of beach management within Christchurch Bay has an influence on the future of the spit, as FCERM actions in the bay will influence how much material the Spit will naturally receive. Many of the leading options for the Christchurch Bay and Harbour Strategy involve beach nourishment / management and depending on the level of nourishment and the extent of recycling activities, it would be expected to increase the feed of material to Hurst Spit over time, relative to this situation today. The leading options for the Strategy have been discussed with the Hurst Spit to Lympington team and more details of the interaction between the leading options and Hurst Spit are provided in section 6.7.

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- 1.6.9 The potential coastal process impacts of the rollback of the spit are uncertain and potentially wide ranging across Christchurch Bay and also the Solent area. The existing coastal processes allow the formation of offshore banks (such as Shingles Bank and Dolphin Sands) and influence the sediment distribution patterns observed within the bay.
- 1.6.10 A working assumption from both projects is that the large rock revetment at the base of Hurst Spit (landward end) will be held in place over the duration of the Strategies. This will provide an anchor point for both the Spit and also for Milford on Sea and the options have been developed in this Strategy on this basis. However, if managed rollback of the spit is the leading option that is identified in the Hurst Spit to Lymington Strategy, it will be important to fully understand the coastal processes implications of the rollback and to manage the rollback accordingly so that it does not threaten the rock revetment transition point or have significant negative impacts on wider coastal processes within the area.

### **Environmental considerations**

- 1.6.11 The majority of the frontage is environmentally sensitive and is internationally and nationally designated.
- 1.6.12 The Strategy has taken account of the potential impacts on the environment, and the potential environmental opportunities through the development of a Strategic Environmental Assessment, Habitats Regulations Assessment, Water Framework Directive Assessment and Marine Conservation Zone Assessment.
- 1.6.13 Where potential environmental impacts have been identified, the environmental assessments have identified appropriate mitigation measures and recommendations for scheme level appraisal (such as identifying appropriate alignments for new defences during design). Areas where there could be opportunities to create new habitats or improve existing habitats have also been identified around Christchurch Harbour.
- 1.6.14 Historic England and Natural England have reviewed the relevant environmental assessments (Historic England reviewed the SEA, Natural England reviewed the SEA, HRA and MCZ assessment) and have provided letters of support for the Strategy and the recommendations.

## **1.7 Implementation**

- 1.7.1 The Strategy promotes and supports long term, sustainable adaptive management of the coastal flooding and erosion risks in Christchurch Bay and Harbour over the next 100 years. The Strategy has set out the leading options for each ODU and in order to implement these options a series of phased capital interventions and scheduled maintenance is required. This work needs to be planned ahead of time through the development of business cases. Ongoing engagement with stakeholders and communities will be required to manage the risks and consequences of flooding and erosion and to build support for FCERM interventions.
- 1.7.2 Table 1-1 below outlines the indicative programme and key dates for all defence upgrades outlined in the Strategy leading options over the first 20 years of the Strategy. Delivery of these upgrades will be subject to acquiring the required funding and reaching the trigger thresholds set out in the Action and Implementation Plan.

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**Table 1-1: Indicative key dates for defence upgrades over the next 20 years, subject to acquiring suitable funding and adaptive pathways / trigger thresholds**

Activity	Date
<b>ODU 3 (verge / slope armouring to historic landfill)</b> Historic landfill / contaminated land investigations Commence detailed appraisal Approval Construction start Construction completion	2026 2028 2030 2031 2032
<b>ODU 4 (lengthening / raising defence embankment)</b> Commence detailed appraisal Approval Construction start Construction completion	2030 2032 2033 2035
<b>ODU 5 (frontline / setback defence improvements)</b> Commence detailed appraisal Approval Construction start Construction completion	2026 2029 2030 2032
<b>ODU 12 (beach nourishment, groyne / seawall improvement)</b> Commence detailed appraisal Approval Construction start Construction completion	2033 2035 2036 2038
<b>ODU 13 (outflanking defence)</b> Commence detailed appraisal Approval Construction start Construction completion	2033 2035 2036 2038
<b>ODU 14</b> Drainage trial and analysis Commence detailed appraisal Approval Construction start Construction completion	2025 2028 2032 2033 2035
<b>ODU 16</b> Commence detailed appraisal Approval Construction start Construction completion	2026 2029 2030 2032
<b>ODU 17</b> Commence detailed appraisal Approval Construction start Construction completion	2026 2029 2030 2032
<b>ODU 18</b> Commence detailed appraisal Approval Construction start Construction completion	2026 2029 2030 2032

## 1.8 Strategy Plan

1.8.1 Figure 1-1 presents a plan of the Strategy frontage showing the intent of the leading options in each location. The intent of the leading options are determined from the Local Aspirational Option and/or National Option where a Local Aspirational Option does not exist.

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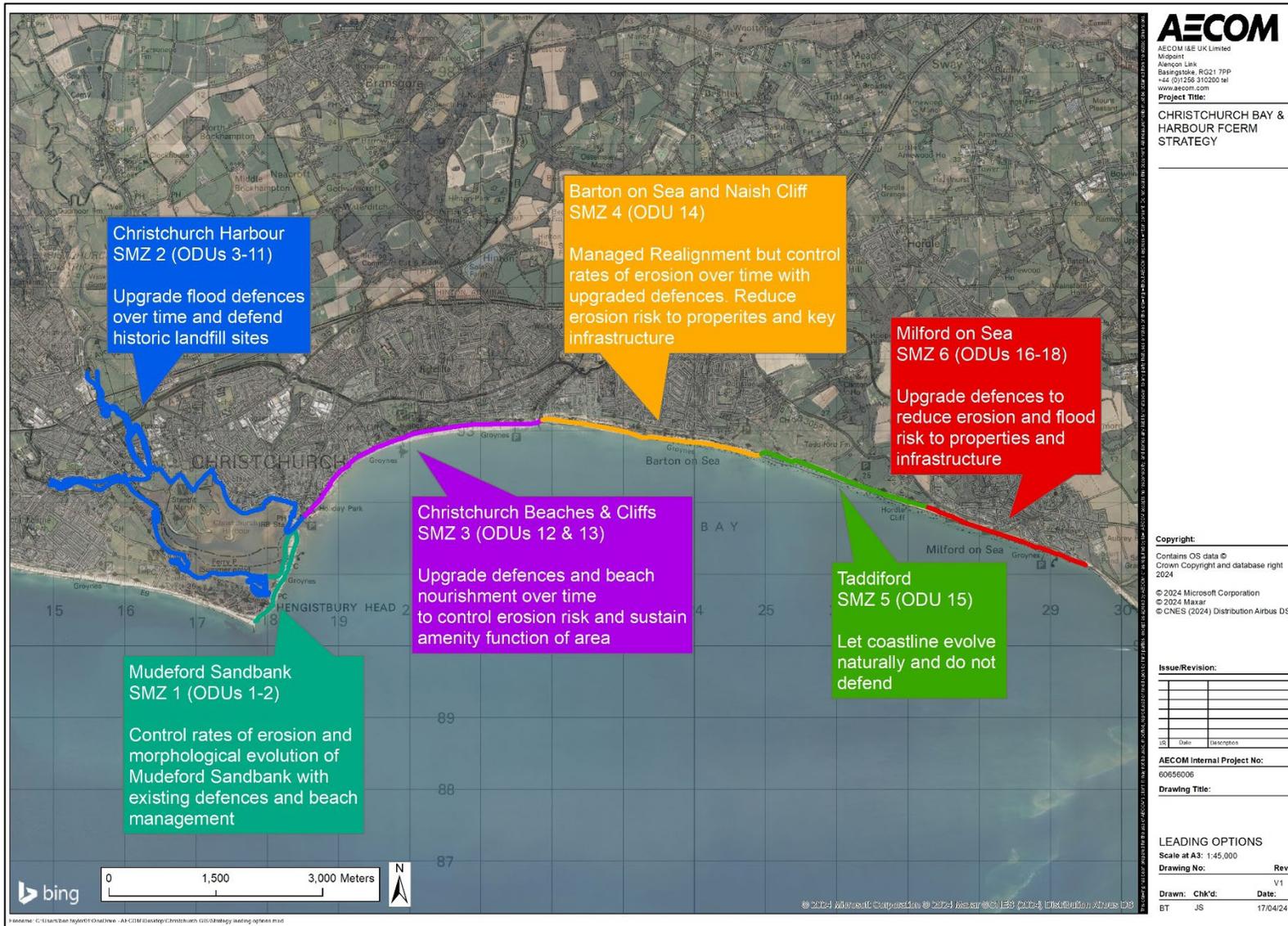


Figure 1-1: Strategy plan showing leading options in each location

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## 2 Introduction and background

### 2.1 Purpose of this report

- 2.1.1 This report is the Strategy Appraisal Report (StAR) for the Christchurch Bay and Harbour Flood and Coastal Erosion Risk Management (FCERM) Strategy, herein referred to as ‘the Strategy’. The Strategy area is within the jurisdiction of Bournemouth, Christchurch and Poole Council (BCP) and New Forest District Council (NFDC) and has been collaboratively developed with both councils, with support from the Environment Agency (EA) and other key stakeholders. Technical support has also been provided from engineering consultant AECOM.
- 2.1.2 The Strategy sets out the leading options, adaptive pathways and timings for FCERM within the Strategy area over the next 100 years. The leading strategic approaches have been developed to sustainably manage the coastal flood and erosion risk between Hengistbury Head (immediately to the east of Hengistbury Head long groyne) and the landward (western) end of Hurst Spit, and encompassing the predominantly tidal flood risk area within Christchurch Harbour.
- 2.1.3 The Strategy has been developed in accordance with the updated Defra’s Flood and Coastal Erosion Risk Management Appraisal Technical Guidance (FCERM-ATG, 2022), originally published in 2010 (FCERM-AG, 2010) and then updated in 2022, supplementary documents and associated EA policies and procedures.
- 2.1.4 The purpose of this report is to seek approval of the Strategy by the Environment Agency, but no financial contributions are being sought at this time.

### 2.2 Background

#### Strategic and legislative framework

- 2.2.1 The Strategy coastline is within the area covered by the Poole and Christchurch Bay Shoreline Management Plan 2 (SMP2) (2011). The SMP provides a large-scale assessment of the coastal flooding and erosion risks between Durlston Head and Hurst Spit, including the areas of Bournemouth, Poole and Christchurch Bay. The SMP presents a policy framework to address the risks to people, the developed, historic, and natural environment.
- 2.2.2 The SMP2 policies vary along the Strategy frontage, with the most frequent policies being ‘Hold the Line’ and ‘Managed Realignment’. Table 2-1 below presents the SMP2 policies along the Strategy frontage. To facilitate the development of the Strategy, the frontage has been divided into six ‘Strategy Management Zones’ (SMZs) and then further sub-divided into eighteen ‘Option Development Units’ (ODUs). The SMP2 policies for each of the ODUs are provided in the table.

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**Table 2-1: Overview of SMP2 policies along the Strategy frontage**

Location	Summary of SMP2 policies
SMZ 1: Mudeford Sandbank	ODU 1 (Hengistbury Head east): Managed Realignment ODU 2 (Mudeford Sandbank): Hold the Line into Managed Realignment
SMZ 2: Christchurch Harbour	ODU 3 (Christchurch Harbour South): No Active Intervention ODUs 4-6 (Wick, Willow Drive / Quomps, River Avon West Bank): Hold the Line ODUs 7-8 (Rossiters Quay / River Avon East Bank): No SMP policy* ODU 9 (Stanpit): Hold the Line into Managed Realignment ODU 10 (Mudeford): Hold the Line, Managed Realignment then Hold the Line ODU 11 (Mudeford Quay): Hold the Line
SMZ 3: Christchurch Beaches and Cliffs	ODUs 12-13 (Avon Beach, Highcliffe): Hold the Line
SMZ 4: Naish Cliff and Barton on Sea	ODU 14 (Naish Cliff and Barton on Sea): Managed Realignment
SMZ 5: Taddiford	ODU 15 (Barton on Sea to Hordle Cliff): No Active Intervention
SMZ 6: Milford on Sea	ODU 16 (Cliff Road): Managed Realignment ODU 17 (Rook Cliff): Hold the Line ODU 18 (Milford on Sea): Hold the Line into Managed Realignment

*\*No SMP policy in ODUs 7-8 as area is upstream along the River Avon and outside of SMP extent*

2.2.3 The Strategy frontage includes, or is adjacent to, a variety of sensitive environmental receptors and designations. Therefore the Strategy has taken into consideration the requirements of the Environment Act (1995, 2021) and undertaken several environmental assessments, including:

- Strategic Environmental Assessment (SEA);
- Habitats Regulations Assessment (HRA);
- Water Framework Directive (WFD) Assessment; and
- Marine Conservation Zone (MCZ) Assessment.

2.2.4 The various environmental assessments carried out during the development of the Strategy have formed an integral part of the option development and appraisal process. The various environmental assessments can be found in Appendices K to N, and are summarised in Section 5.2.

2.2.5 In developing the Strategy, the project team has liaised with teams from adjacent plans and strategies that are also currently in development. This has ensured that the Strategy does not contradict or hinder the delivery of other or future FCERM plans for the wider area. Liaison and alignment with the following adjacent projects / teams has occurred;

- Hurst Spit to Lymington FCERM Strategy (led by the Environment Agency);
- Hengistbury Head Long Groyne Refurbishment project (led by BCP);
- Barton on Sea Cliff Drainage Trial Scheme (led by NFDC);
- The Durlston to Hurst Sediment Resource Management Programme; and
- The Lower Stour Strategy and the Lower Avon and Harbour Modelling project (led by the Environment Agency Partnership Strategic Overview team).

2.2.6 Given the importance of Hurst Spit on the morphology of Christchurch Bay and the wider Solent area, frequent liaison, and communication with the Hurst Spit to Lymington FCERM Strategy project team was particularly important to develop a cohesive solution. Both project teams met monthly during the development of the Strategy and discussed the interaction and alignment between the two Strategies during option development. For

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the public consultation phase of engagement, the two projects delivered a joined-up engagement event for the public.

## Previous studies

2.2.7 In addition to the SMP2, there have been a number of key supporting technical studies previously undertaken within the Strategy frontage and the adjacent areas that have been referred to in development of the Strategy, as summarised below.

### **Christchurch Bay and Harbour FCERM Study (2012)**

2.2.8 This Study developed a coastal flood and erosion risk management strategy for the Strategy frontage in 2012, however, this was not formally adopted by BCP / NFDC or approved by the Environment Agency.

### **Hurst Spit to Hengistbury Head Annual Survey Report (Southeast Regional Coastal Monitoring, 2021-2023)**

2.2.9 The Southeast Regional Coastal Monitoring Programme collects beach profile and volume data along the Strategy coastline at regular intervals. This information has fed into the option development and appraisal and helped determine areas where beach nourishment is likely to be required / effective.

### **Poole Bay Beach Management Scheme 2015-2032**

2.2.10 Poole Bay stretches from the Sandbanks in the west to Hengistbury Head in the east and is adjacent to the Strategy area. The beach management in Poole Bay has the potential to impact sediment transport into Christchurch Bay and therefore this scheme has been considered when developing the baseline and options for the Strategy.

### **Mudford Sandbank Beach Management Plan (HR Wallingford, 2001)**

2.2.11 The Mudford Sandbank Beach Management Plan outlines monitoring requirements and suggested interventions for beach renourishment and regrading.

## Social and political background

2.2.12 The Strategy frontage extends across two local authority jurisdictions; BCP in the west and NFDC in the east. The boundary between the two local authority areas is at Chewton Bunny, just to the east of the Highcliffe coastal defences (see Figure 2-1). It was important for the Strategy to be developed in unison across both political areas to ensure a cohesive and joined-up approach to managing the coastal processes within Christchurch Bay.

2.2.13 The Strategy has been developed in close collaboration with key personnel, officers and political representatives from both BCP and NFDC Councils which was achieved via a robust project Governance Structure. Regular briefings with members of the Councils, including the elected members, were held at key stages of the Strategy development to minimise political risks and build support.

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## Location and designations

### Geographical location

- 2.2.14 As shown in Figure 2-1, the Strategy area encompasses the 13km coastal frontage between Hengistbury Head Long Groyne and the landward end of Hurst Spit. The frontage also includes approximately 14km of shoreline within Christchurch Harbour, extending to Tuckton Bridge on the River Stour and Knapp Mill on the River Avon.
- 2.2.15 At the western end of the Strategy frontage at Hengistbury Head, the long groyne acts as a man-made barrier to sediment transport into Christchurch Bay (although there is some bypassing of material). The beach to the west of Hengistbury Head is managed through the Poole Bay Beach Management Scheme (2015-2032) and aims (in part) to reduce coastal erosion and prevent a breach forming from Poole Bay into Christchurch Harbour.
- 2.2.16 The eastern end of the Strategy frontage is the rock revetment at the landward end of Hurst Spit. The management of the Spit is key to the overall morphology of Christchurch Bay (and the wider Solent area) and a long-term Strategy for managing the Spit is being developed by the adjacent Hurst Spit to Lymington FCERM Strategy (being led by the Environment Agency). Due to the importance of this Strategy for the future of Hurst Spit (and vice versa), there has been close collaboration between the two project teams throughout the development of both Strategies.
- 2.2.17 Along the River Avon and River Stour within Christchurch Harbour, the dominant source of flood risk within the Strategy boundary (downstream of Knapp Mill and Tuckton Bridge respectively) is from tidal flooding. Upstream of these locations the fluvial flood risk becomes more dominant.

### Landscape and physical characteristics

- 2.2.18 The character of the frontage is highly varied from exposed open coast within the Bay to more sheltered areas within Christchurch Harbour. Natural geomorphological features within Christchurch Bay include Hurst Spit, Mudeford Sandbank and Hengistbury Head, each of which provides a controlling influence on the shape and planform of the coastline.
- 2.2.19 Christchurch Harbour is a naturally formed Harbour, sheltered to the south by Hengistbury Head and Mudeford Sandbank, with parts of the Harbour being reclaimed. The landscape throughout the harbour is comprised of marshes, heath and woodland. The historic town of Christchurch is located on the banks of the harbour and includes many cultural heritage designations and scheduled monuments. There are also areas of historic landfill / potentially contaminated land adjacent to the harbour.
- 2.2.20 Mudeford Sandbank is a low-lying sandy spit adjacent to Hengistbury Head. It provides shelter to Christchurch Harbour from wave activity and is a key area for visitors and tourism, with beach huts and a small number of businesses. The FCERM assets on the Sandbank include rock groynes and a rock revetment and regular beach recycling is undertaken. The entrance to Christchurch Harbour is at the end of the Sandbank and this is known as 'the Run'. It is highly dynamic from a sediment transport perspective and has fast tidal flows in what is a narrow channel.
- 2.2.21 The open coast part of the frontage between Mudeford Quay and Highcliffe is comprised of a mixed beach in front of low-lying vegetated cliffs. This area is also popular for tourism and amenity. The FCERM assets include groynes and seawalls.

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2.2.22 Between Highcliffe and Hordle the coast is comprised of a mixed beach in front of higher cliffs, reducing in elevation from west to east. The cliffs are actively eroding in places. Due to the sloping geological beds in the bay, the geology of the exposed cliffs changes along the frontage, with the cliffs at Barton on Sea particularly susceptible to erosion and land sliding. There are a variety of FCERM assets along this part of the frontage including rock groynes, a rock revetment and cliff drainage at Highcliffe and then rock groynes, a rock revetment and cliff drainage (in various states of repair) at Barton on Sea. These defences provide some protection to the urban areas located on the cliff top. Between Barton on Sea and Hordle Cliff the coastline is undefended.

2.2.23 At Milford on Sea, the land is lower lying and there is a risk of both flooding and coastal erosion. There are extensive FCERM assets in this area including groynes, a rock revetment, and a seawall / revetment. A key risk in this location is lowering beach levels that can lead to undermining of the defences and frequent small scale beach nourishments are undertaken here annually to top-up beach levels. Flooding can occur in this area from wave overtopping along the open coast as well as from tidal inundation / fluvial risk from Danes Stream. Milford on Sea is popular for tourism and amenity and includes disabled access.

### Environmental Designations

2.2.24 There are local, national, and international environmental designations within or in proximity to the Strategy frontage. The key designations include;

- Four Special Areas of Conservation (SAC); the Solent Maritime, Dorset Heaths, Avon River and South Wight Maritime SACs;
- Four Special Protection Areas (SPA); Solent and Southampton Water, Dorset Heathlands, Avon Valley and the Solent and Dorset Coast SPAs;
- Two Ramsar sites; Avon Valley, and Solent and Southampton Water;
- Four Sites of Special Scientific Interest (SSSIs); Hurst Castle and Lymington River, Highcliffe to Milford Cliffs, Christchurch Harbour and the Avon River;
- Two Marine Conservation Zones; the Needles MCZ and Southbourne Rough MCZ;
- Five Local Nature Reserves; Stanpit Marsh, Hengistbury Head, Steamer Point, Milford-on-Sea and Sturt Pond;
- Eight scheduled monuments including the Multiperiod Landscape on Hengistbury Head and Christchurch Priory / Monastery;
- Numerous listed buildings including Christchurch Priory, Constable’s House, Town Bridge and Highcliffe Castle that are Grade I listed.

### Social characteristics

2.2.25 The Strategy area encompasses four parishes; Christchurch, Highcliffe and Walkford, Milford on Sea and New Milton. The 2021 Census indicated that the population in these four parishes was approximately 75,000. The towns and villages to the east of Christchurch are mainly residential, with tourism and service industries providing the main form of employment. The settlements within the Strategy area typically have an older average population and are popular retirement destinations. The Index of Multiple Deprivation for England ranked the BCP and NFDC areas as 14,821 and 10,782 respectively out of a possible 32,884 (with 1 being most deprived and 32,884 being least deprived).

## History of Flooding and Coastal Erosion

### History of coastal flooding

2.2.26 The history of coastal flooding within the Strategy area is concentrated around the low-lying areas of Christchurch Harbour. Flooding has also occurred at Milford on Sea from

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wave overtopping. Coastal flooding caused significant damage in the Strategy area in the winters of 2000/2001 and in 2013/2014 due to a high frequency of storms.

- 2.2.27 Within Christchurch Harbour the coastal flood risk is generally from tidal still water levels, added to by limited amounts of wind driven wave action under certain conditions. The exception is at Mudeford Quay which is adjacent to the Run (entrance to the harbour) and is more exposed to wave action. Here flooding occurs on a regular basis with waves overtopping the quay wall annually. The Rivers Avon and Stour also contribute to the flood risk within the harbour but the tidal component is the dominant source of risk in the Strategy area.
- 2.2.28 Coastal flooding has also recently occurred at the eastern end of Milford-on-Sea near the Hurst Road East Car Park. Here there are two sources of risk; from wave overtopping along the open coast and from tidal still water level flooding from the Sturt Pond direction where the land levels and defences are lower. The eastern end of Milford on Sea most recently flooded in 2014 when a high volume of wave overtopping the seawall caused seawater to flow onto Hurst Road, and the car park, causing internal flooding (up to 1m deep) in The Lighthouse
- 2.2.29 Outside of Christchurch Harbour and Milford on Sea, the rest of the open coast frontage within Christchurch Bay is characterised by steep topography and cliffs. Historically, coastal flooding to properties has therefore not been an issue (erosion is more of a concern). However, storms have led to damage to beach huts and services along the beach front; the February 2014 storms damaged beach huts at Avon Beach, washed away 80 timber beach huts at Hordle and destroyed 119 beach huts at Milford on Sea. Recently storms during 2024 have also led to beach hut damage at Hordle.

### History of coastal erosion

- 2.2.30 Historically erosion has been a significant risk along much of the open coast frontage. The cliffs within Christchurch Bay are comprised of tertiary sands and clays (i.e. soft rock cliffs). The dip of the beds, their orientation and underlying geology has a significant bearing on the stability of the cliffs. Erosion of the soft rock cliffs is controlled by a range of factors, but exposure of the cliff toe to marine erosion is often the key process. In some parts of the frontage, for example, at Barton on Sea, the role of groundwater / rainfall in inducing cliff instability is also a key factor.
- 2.2.31 The cliff line is actively eroding in several locations within the Strategy frontage, including at Naish Cliff, Barton on Sea, Hordle Cliff & Rook Cliff. At Barton on Sea extensive cliff drainage and toe defences have been constructed in the past which have slowed the rate of erosion. However, due to the complex cliff geology in this location the erosion has not stopped entirely and has continued even with these defences in place. Other parts of the Strategy frontage, such as at Highcliffe, have successful cliff drainage and toe defences that have stabilised the cliff line. However, if these defences were to fail in the future, then erosion of the cliffs would be expected to continue.
- 2.2.32 Historically the cliff stabilisation schemes within the bay have been funded by BCP / NFDC. It is recognised that moving forward, land stabilisation measures are not typically eligible for FCERM Grant in aid funding and will therefore need to be funded through different sources.
- 2.2.33 Erosion and loss of beach material is also a concern along the open coast. Lowering beach levels can be linked with rates of erosion for soft cliffs and there is also a link between low beach levels and failure of sea defences due to undermining / toe exposure. Loss of beach material is a critical issue at Milford on Sea, with significant erosion of the

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beach since monitoring began in the year 2000. In 2020, a failure of the seawall occurred to the west of the White House and amongst the contributing factors was significant beach drawdown that led to the toe becoming exposed. Full analysis of beach levels in the Strategy area is provided in the Strategy Coastal Processes Report (Appendix Q).

## 2.3 Current Approach to Coastal Flood and Erosion Risk Management

### Measures to manage the probability of coastal flooding and erosion risk

- 2.3.1 Much of the Strategy frontage is fronted by coastal defence structures. The structures vary in type and include both formal and informal defences. The defences are typically owned and maintained by the Environment Agency, BCP and/or NFDC. There are also sections of privately owned and maintained defences.
- 2.3.2 Beach management is also a key method in which the coastal flooding and erosion risks are managed within the bay. This occurs on a frequent basis (annually in some locations such as at Milford on Sea) and takes the form of either beach recycling or small-scale beach renourishment.
- 2.3.3 Some parts of the frontage are currently undefended and have a 'No Active Intervention' policy in the SMP2 so nothing is done to manage the risks.
- 2.3.4 Table 2-3 outlines the key types of defences and beach management activities within the Strategy area.

**Table 2-2: Existing coastal defences and beach management**

Location	Coastal defences	Beach management	Defence Owner / Maintainer
SMZ 1: Mundeford Sandbank	- Rock revetment, rock groynes, gabions and seawall	- Beach recycling, typically moving 1,000m <sup>3</sup> of material from the end of the Sandbank back to the groyne bays (undertaken on 8 occasions between 2002-2017)	BCP
SMZ 2: Christchurch Harbour	- Quay walls, setback, embankment, setback floodwall, seawall and rock armour.  - Typically undefended in low population areas around the harbour, such as along the south side of the harbour	- No beach management within the harbour	BCP, Environment Agency, Private

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Location	Coastal defences	Beach management	Defence Owner / Maintainer
SMZ 3: Christchurch Beaches and Cliffs	- Timber groynes, rock groynes, seawall, rock revetment and cliff drainage	- Beach recycling between 2011-2018 moving 57,000m <sup>3</sup> from harbour entrance onto upper beach between Avon Beach and Highcliffe.  - In 2021 beach recycling to Avon Beach, Friars Cliff and Highcliffe Beach, using material from the 4 easternmost groyne bays at Highcliffe.  - Beach nourishment between 1985-1991 at Highcliffe of 73,000m <sup>3</sup> of material that has largely been retained.	BCP, Private
SMZ 4: Naish Cliff and Barton on Sea	- Barton on Sea: Rock revetment, rock groynes and cliff drainage  - undefended at Naish Cliff	- No beach management in this location	NFDC
SMZ 5: Taddiford	- undefended	- No beach management in this location	NA
SMZ 6: Milford on Sea	- Seawall, timber groynes, rock groynes and rock revetment	- Small scale beach nourishment in 2004, 2006 and then annually since 2008. Total volume of approximately 45,000m <sup>3</sup> with an average of 2,500m <sup>3</sup> per nourishment.	NFDC

## Measures to manage the consequences of coastal flooding and erosion risk

2.3.5 To manage the consequences of coastal flooding, the Local Authorities have a number of measures in place. Both BCP and NFDC have details on their website about how to prepare properties for flooding (i.e. setting up an emergency plan, insurance, emergency box etc.) and offer advice for during flood events such as how to stay safe, when, and how to travel etc. Both councils also provide details of the Environment Agency flood warning system through social and traditional media channels and recommend that residents sign up to the flood warning service. In the event of flooding, BCP / NFDC's emergency planning officer co-ordinates the dissemination of advice and liaises with relevant organisations to advise people on what to do during a flooding emergency.

2.3.6 To manage the consequences of coastal erosion, following an erosion event, BCP and NFDC undertake an immediate inspection of the damage and risks posed. A recommendation for remedial works is then put forward to the Local Authority for funding approval from limited maintenance budgets. However, often the costs associated with failing defences is high and there is no guarantee that there would be sufficient funding available to make a repair and applications to the Environment Agency for emergency works may be required.

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## 3 Problem definition and objectives

### 3.1 Outline of the problem

- 3.1.1 There is currently no existing approved FCERM Strategy in place that provides the framework for the long-term management of the coastline within Christchurch Bay and Harbour and to facilitate the delivery of the SMP2 policies. Currently defence maintenance and improvements are undertaken on a piecemeal basis by BCP and NFDC. Without a Strategy in place it is difficult for these authorities to access FCERM-Grant in Aid (GiA) funding or develop robust partnership funding strategies.
- 3.1.2 There are significant coastal flooding and erosion risks facing the Strategy frontage over the next 100 years which are projected to increase in severity due to climate change and sea level rise. Higher sea levels and increased storminess will reduce the performance and standard of protection provided by existing coastal defences.
- 3.1.3 Table 3-1 shows the return period of extreme water levels within Christchurch Harbour for the present day and indicates how this is anticipated to change in the future (return periods rounded to nearest 0.1m water level for illustration purposes). These water levels have been determined using the Coastal Design Sea Levels – Coastal Flood Boundary Dataset (Environment Agency, 2018), and have been adjusted with the UKCP18 RCP 8.5 70<sup>th</sup> percentile sea level rise projections.

**Table 3-1: Tidal extreme water levels and return period in Christchurch Harbour.**

Extreme water level (mODN)	Return period			
	2024	2044	2074	2124
1.5	1 in 2 (50% AEP)			
1.6				
1.7	1 in 10 (10% AEP)	1 in 2 (50% AEP)		
1.8	1 in 20 (5% AEP)	1 in 10 (10% AEP)		
1.9	1 in 50 (2% AEP)	1 in 20 (5% AEP)	1 in 2 (50% AEP)	
2.0	1 in 200 (0.5% AEP)	1 in 50 (2% AEP)		
2.1		1 in 200 (0.5% AEP)	1 in 10 (10% AEP)	
2.2			1 in 20 (5% AEP)	
2.3			1 in 50 (2% AEP)	
2.4			1 in 200 (0.5% AEP)	
2.5				
2.6				1 in 2 (50% AEP)
2.7				1 in 10 (10% AEP)
2.8				1 in 20 (5% AEP)
2.9				1 in 50 (2% AEP)
3.0				1 in 200 (0.5% AEP)

- 3.1.4 With respect to the flood risk, in the Strategy area there are estimated to be 120 properties currently at risk from coastal flooding from a 1 in 200 (0.5% AEP) return period event. Due to climate change and sea level rise, this number is projected to increase to 2,227 properties for the 1 in 200 (0.5% AEP) return period in 100 years' time. With respect to the erosion risk, there are estimated to be 1,365 properties at risk of coastal erosion over the next 100 years if nothing is done to manage the risk.
- 3.1.5 Many of the existing coastal defences in the Strategy area are approaching the end of their effective service life. For the full Strategy frontage, approximately 8% of the defences by defence length are in a poor condition, 32% in a fair condition, 23% in a good

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condition, 1% in a very good condition and 36% in an unknown condition (private / inaccessible). If no maintenance is undertaken, the defences in the Strategy area would be expected to fail within the next 20 years, with many much sooner than this. Defence failure would exacerbate the risks of flooding and erosion to properties, infrastructure and environmental features. This includes the risk of flooding and erosion of several historic landfill sites primarily with Christchurch Harbour, which poses a threat to the coastal environment through the release of potentially contaminated materials and/or leachates.

3.1.6 Given the risks and strategic considerations faced, without robust and holistic management and suitable investment, the flooding and erosion risk has the potential to cause significant and unacceptable detrimental impacts to a range of important receptors, including people and the developed, historic and natural environment. Flooding and erosion would create significant economic damages on a national and local basis.

## 3.2 Consequences of doing nothing

3.2.1 A sound representation and understanding of the baseline flood and erosion risk under the 'Do Nothing' scenario was established to inform the Strategy development. Table 3-2 presents a summary of the properties at risk from flooding and erosion under the 'Do Nothing' scenario. Figure 3-1 presents a map of the Strategy frontage showing the 1 in 200 year (0.5% AEP) flooding extent for the present day and in 2120 and the Do Nothing erosion zones for the short term (0-20 years), medium term (20-50 years) and long term (50-100 years.)

### Flood risk

3.2.2 The present day and future flood risk was identified using numerical model outputs and GIS analysis. Results from two numerical models were used:

- For Christchurch Harbour the present day flood risk was established from the numerical modelling results of the Lower River Avon and Christchurch Harbour Study. This project is ongoing and the modelling results were provided to the project team by the Environment Agency who are leading on the modelling project. The model considers tidal input and fluvial inputs from the River Avon and River Stour.
- For the future flood risk within the harbour, a GIS based approach was used that compared extreme tidal water levels to land levels. A range of checks were undertaken to check the consistency of the GIS approach against the Surface Water Management Plan outputs and emerging model results from the Lower River Avon and Christchurch Harbour Study for future return periods. The approach was endorsed by the Environment Agency members of the project team and more details can be found in the Economic Appraisal Report (Appendix F).
- For Milford on Sea the preset day and future flood risk was established from the numerical modelling results from the Hurst Spit to Lymington FCERM Strategy. This project is ongoing and the modelling results were provided to the project team by the Environment Agency who are leading on the project.

3.2.3 Sea level rise will have a significant impact on the flood risk. Extreme water levels for future return periods were projected using the UKCP18 RCP 8.5 70<sup>th</sup> percentile sea level rise projections, as per Environment Agency guidance.

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3.2.4 Within Christchurch Harbour the present-day coastal flood risk is generally focused on the banks of the harbour and low-lying areas such as Mudeford Quay, Wick Meadows, Elkins Boatyard and Stanpit Marshes. Currently there are setback flood defences at the Quomps, Rossiters Quay and Wick which prevent ingress of flood water further inland in these locations. In the future, with projected sea level rise combined with the failure / outflanking of existing defences, the flood risk in Christchurch harbour will become more extensive and extend further inland into areas such as Mudeford, Stanpit, Willow Drive and Wick. These are areas with a high concentration of properties and infrastructure which leads to significant economic damages from flooding. It is projected that 2,131 properties will be at risk from coastal flooding at Christchurch Harbour from a 1 in 200 year (0.5% AEP) event in 2124. This would include flooding to a significant number of listed buildings and parts of scheduled monuments.

3.2.5 At Milford on Sea the present day flood risk is concentrated either side of Hurst Road that runs parallel to the sea defences. This flood risk originates from wave overtopping of the sea defences from the open coast direction. In the future, with projected sea level rise, the flood risk at Milford on Sea will become more extensive and extend inland into the Sea Road area. The flood risk in the future comes from a combination of wave overtopping along the open coast and still water level flooding from the Sturt Pond direction (behind Hurst Spit, to the east of Milford on Sea). It is projected that 78 properties will be at risk from coastal flooding at Milford on Sea from a 1 in 200 year (0.5% AEP) event in 2124.

**Erosion risk**

3.2.6 The erosion risk was identified using the No Active Intervention erosion zones produced in the SMP2. The properties at risk from erosion are primarily located in three areas; Christchurch Beaches and Cliffs (primarily Highcliffe), Barton on Sea and Milford on Sea (including at Hordle Cliff). These areas generally have coastal defences at the toe of the cliffs or shoreline but there are localised exceptions.

3.2.7 At Christchurch Beaches and Cliffs there are extensive toe defences at Highcliffe that consist of a rock revetment and rock groynes. These support a successful drainage scheme installed at Highcliffe in the 1980's which has proven to be effective in stabilising the cliffs in this location in recent years. To the west of Highcliffe there is a wide mixed beach which provides protection to the cliff toe. Under a Do Nothing scenario the existing defence system would fail in the short-medium term, likely leading to an increased movement of beach material and a restart in cliff erosive processes. In addition, the defence system at Highcliffe is currently at risk of outflanking in the future because the coastline to the east at Naish Cliff is undefended and is rapidly eroding. It is estimated that 313 properties are at risk of erosion over the next 100 years under the Do Nothing scenario.

3.2.8 Barton on Sea has a history of coastal erosion, landslides and cliff instability. There are extensive rock defences at the cliff toe along the central and eastern parts of Barton on Sea, but the western part of the frontage is undefended. Cliff drainage is currently in place in the east part of Barton on Sea but has failed along the central sections of the frontage. The existing defences do not stop erosion from occurring due to the complex geology and the cliffs continue to erode at a slow rate. To the west of Barton on Sea is Naish Cliff which is undefended and eroding rapidly. Under the Do Nothing scenario erosion would be expected to continue at a fast pace at Naish Cliff and accelerate at Barton on Sea when existing defences fail. It is estimated that 477 properties are at risk of erosion over the next 100 years under the Do Nothing scenario.

3.2.9 The west part of Milford on Sea comprises Hordle and Rook Cliffs. The elevation of the coastline gradually reduces moving to the east and the eastern part of Milford on Sea is low lying. There are extensive coastal defences at Milford on Sea but they are ageing and

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vulnerable to failure. The risk is increased by the trend of falling beach levels at this location, particularly at the eastern end of the frontage. A significant failure of the seawall occurred in 2020 which required emergency intervention to repair. If nothing is done to manage the risks over the next 100 years, existing defences will fail leading to erosion of 574 properties, key infrastructure such as Hurst Road (access point to Hurst Spit), numerous coastal car parks and listed buildings such as the White House.

3.2.10 The SMP2 erosion zones do not cover Mudeford Sandbank and the areas within Christchurch Harbour. However, there is still likely to be coastal change in these areas in the future under a Do Nothing scenario, as discussed in Section 3.3.

### **Economic damages**

3.2.11 The Do Nothing economic damages from the flooding and erosion risk have been calculated for the Strategy frontage for the next 100 years. The damages have been calculated in accordance with the Multicoloured Manual (MCM) and FCERM-AG methodologies and include direct property related damages and indirect damages.

3.2.12 The damages calculated using the MCM and FCERM-AG methodologies (as shown in Table 3-2) represent damages to the national economy and are eligible to be included the Strategy option economic appraisal and future FCERM-GiA funding applications. It is estimated that the total FCERM damages for the Strategy frontage are over £186million in present value (PV) terms and £1,213million in undiscounted cash terms, with the damages concentrated in SMZ 2 (Christchurch Harbour), SMZ 3 (Christchurch Beaches and Cliffs), SMZ 4 (Naish Cliff and Barton on Sea) and SMZ 6 (Milford on Sea).

3.2.13 In addition to these national economic damages, in developing the Strategy the project team has also estimated wider damages to the local economy from the flooding and erosion risks, such as the Gross Value Added damages, potential damages to tourism, health and wellbeing and council revenue. These local economic damages far exceed the national damages over the duration of the appraisal period, but have not been considered when selecting the Strategy National Leading Options and will not be used in FCERM-GiA funding applications in the future. They are useful to inform local decision making and to provide a broader evidence base for FCERM and attracting non-GiA funding sources.

3.2.14 More information on the economic assessment and appraisal for the Strategy can be found in the Economics Appraisal Report (Appendix F).

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**Table 3-2: Properties at risk from coastal flooding and erosion (1 in 200 year event, 0.5% AEP) and Do Nothing Damages over the next 100 years**

SMZ	Zone Characteristics	Total properties at risk of coastal flooding (residential and non-residential)				Total properties at risk of coastal erosion (residential and non-residential)			Total Do Nothing Damages (PV, £k)
		2024	2044	2074	2124	2044	2074	2124	
1 – Mudeford Sandbank	Sandbank, exposed to wave energy. Mainly beach huts with a few businesses. Area popular for recreation and tourism and buried services buried beneath the Sandbank.	4	5	6	6	0	0	0	153
2 – Christchurch Harbour	Town of Christchurch located within sheltered harbour environment. Interaction of Rivers Avon and Stour with the harbour. High density of properties leads to significant flood risk. Risk of erosion to historic landfill sites. Environmental designations.	110	527	1,132	2,131	0	0	0	111,297
3 – Christchurch Beaches and Cliffs	Open coast frontage that is important for recreation and tourism. Mixed beach exposed to wave energy. Topography increases in elevation moving east.	1	2	3	12	9	41	313	15,935
4 – Naish Cliff and Barton on Sea	Open coast frontage characterised by high cliffs that are eroding. SSSI designation of cliffs due to geological importance. Naish Cliff undefended whereas extensive cliff toe defences and drainage (some of which has failed) at Barton on Sea.	0	0	0	0	10	120	477	28,364
5 – Taddiford	Undefended open coast frontage with very few properties along the cliff top. Actively eroding cliffs and mixed beach.	0	0	0	0	0	0	1	73
6 – Milford on Sea	Open cost frontage with extensive sea defences that are threatened by lowering beach levels. Properties at risk from flooding (wave overtopping and still water level) and erosion. Beach huts at base of Hordle Cliff.	5	18	38	78	6	81	574	30,415
<b>Total</b>		<b>120</b>	<b>552</b>	<b>1,179</b>	<b>2,227</b>	<b>25</b>	<b>242</b>	<b>1,365</b>	<b>186,237</b>

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## 3.3 Strategic issues

- 3.3.1 There are a number of strategic issues facing the frontage that span geographical areas and time periods and require a joined-up and cohesive FCERM Strategy to manage effectively. These include;
- the impact of future uncertainty due to climate change and funding availability;
  - beach sediment transport processes and the influence that this has on coastal erosion;
  - lowering beach levels at Milford on Sea;
  - the evolution of Mudeford Sandbank and its influence on Christchurch Harbour;
  - the erosion risk to historic landfill sites; and
  - the interaction of the Strategy with Hurst Spit.
- 3.3.2 The SMP2 explored some of these issues and set policy accordingly. However, the work undertaken to develop and appraise options in the Strategy has not been rigidly confined to the SMP policies and has revisited assumptions, in light of new evidence, to develop leading options and a range of adaptive pathways for future FCERM within the Strategy area.
- 3.3.3 The leading options in the Strategy do not align with the intent of the SMP policy in ODUs 2, 3 and 9. This could also be the case in ODUs 1, 4 and 11 if the Local Options are not delivered. Where differences between the Strategy leading options and the SMP policy occur, the changes are often in line with the findings of the SMP refresh.

### Future uncertainty

- 3.3.4 There is uncertainty around the magnitude of future climate change and sea level rise and the availability of funding for FCERM projects in the future. Climate science is an ever evolving area of research and future climate scenarios are heavily influenced by human greenhouse gas emissions which will be shaped by future government policies and technological advances (both of which are highly uncertain and difficult to predict). The Strategy has applied the climate change projections recommended by the Environment Agency (UKCP18, RCP 8.5, 70th percentile) and has sensitivity tested the option appraisal to higher rates of sea level rise. However, there is still uncertainty and therefore it is imperative that the long term plan for FCERM in the Strategy area does not set a rigid intervention approach that cannot be changed in the future.
- 3.3.5 Likewise, there is uncertainty around future funding availability and funding rules from central Government. There is currently a partnership funding system in place to obtain central government funding (FCERM-GiA) but it is unlikely that this system will remain unchanged for the duration of the Strategy appraisal period (i.e. the next 100 years). Likewise, funding from non-GiA sources will be influenced by local policy, politics and development opportunities which is also uncertain.
- 3.3.6 With this uncertainty in mind, it is essential that a Strategy to manage the risks to people, property and the natural environment from flooding and erosion is flexible. Therefore, the Strategy has developed adaptive pathways that provide the required flexibility for FCERM decision making in the future to act and change course accordingly as the evidence base develops.

### Beach sediment transport

- 3.3.7 The role of coastal processes and beach sediment transport within Christchurch Bay is a critical strategic issue because the beach volume is a key influence on rates of coastal erosion. The dominant longshore transport direction within the Bay is from west to east.

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Currently there are areas that are undefended and where longshore transport is unconstrained (i.e. Naish Cliffs, Becton to Hordle Cliff), and other areas where beach control structures such as groynes influence the rate of longshore sediment transport (i.e. Christchurch beaches, Highcliffe, Milford on Sea). Some parts of the Strategy frontage have sufficient beach material (i.e. Highcliffe) whereas other parts of the frontage do not have enough (i.e. Milford on Sea).

- 3.3.8 In developing the Strategy it has been important to fully consider the knock-on impact on longshore sediment transport from the proposed options. This has required strategic level thinking that is not always prevalent when FCERM interventions are developed on a scheme by scheme basis without a Strategy in place, including considering how the influence of the Strategy proposed options on longshore transport will also impact Hurst Spit to the east.

**Lowering beach levels – Milford on Sea**

- 3.3.9 Related to the above, there is a trend of lowering beach levels at Milford on Sea at the eastern end of the frontage. This trend is increasing the vulnerability of the existing defences in the location and is increasing the undermining risk and risk of defence failure.

- 3.3.10 In developing the Strategy the role that beach nourishment could have in managing the beach lowering at Milford on Sea has been considered, not just by directly placing material at this location but also more broadly in other strategic locations within the Bay. In some locations it may be feasible to overfill the beach with material, increasing the supply of sediment towards Milford on Sea over time. Overall a more cohesive approach to managing beach material in the bay is required and the Strategy has suggested leading options that will help facilitate this. After the Strategy it is recommended that a bay wide Beach Management Plan is produced that aligns with the Durlston to Hurst Sediment Resource Management Programme (which aims to better manage beach sediment within the Poole and Christchurch Bays sediment sub-cell).

**Muddeford Sandbank**

- 3.3.11 Without further FCERM intervention, Muddeford Sandbank would likely rollback over time in response to storm events that would move material from the seaward side / crest of the Sandbank to the lee side. If the rollback process is not managed, it would likely cause severe disruption to the Sandbank (which is an important tourism area), lead to loss of beach huts, expose and damage buried services and would increase uncertainty around the morphology of the area.

- 3.3.12 Currently the Sandbank provides shelter to Christchurch Harbour and any significant changes to the morphology of the Sandbank (such as rollback / flattening) could reduce this effect. As part of the Strategy development, sediment transport and wave modelling was undertaken to investigate the potential impacts of a breach of the Sandbank (a breach 90m wide). This modelling concluded that a breach of this size would likely increase wave heights in the harbour. However, on the north side of the harbour where the majority of properties are located, the increase in wave height would only be expected to be between 0.1-0.15m.

- 3.3.13 The future of the Sandbank will impact the FCERM within Christchurch Harbour and therefore it has been important for the Strategy to propose options accordingly, both for the Sandbank itself, and for adjacent areas. This has also been done considering the interaction with management approach in Poole Bay which aims to prevent erosion leading to a breach from Poole Bay into the harbour which would also have significant impact on FCERM in the harbour.

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### Historic landfill

- 3.3.14 Christchurch Harbour is currently sheltered by Mudeford Sandbank and Hengistbury Head and therefore wave activity and erosion risk is more limited compared to the open coast. However, there is still some potential for erosion within the harbour in undefended areas or if existing defences fail.
- 3.3.15 A key strategic concern for the Strategy is the erosion risk to historic landfill sites of which there are several around the harbour, including at Stanpit, Wick, the Quomps and Mudeford Quay. Erosion could release potentially contaminated materials into the environment. The contamination status of the historic landfill sites is unknown so more work is needed after the Strategy to investigate this risk further. In the option development and appraisal the Strategy has taken a conservative stance and recommended defending historic landfill sites as part of the leading options and adaptive pathways.
- 3.3.16 There is a recognition that on a national basis protecting historic landfill sites does not typically attract sufficient FCERM-GiA and therefore additional sources of funding will need to be sought and investigated to facilitate the delivery of these works.

### Hurst Spit

- 3.3.17 Hurst Spit is located at the eastern end of the Strategy frontage and forms a vital controlling feature for the morphological evolution of Christchurch Bay. In developing the Strategy the project team has collaborated with the Hurst Spit to Lymington FCERM Strategy team. It is understood that various options for managing Hurst Spit in the future are being considered by the Hurst Spit to Lymington Strategy, including controlled rollback.
- 3.3.18 The role of beach management within Christchurch Bay has an influence on the future of the spit, as FCERM actions in the bay will influence how much material the Spit will naturally receive. Many of the leading options for the Christchurch Bay and Harbour Strategy involve beach nourishment / management and depending on the level of nourishment and the extent of recycling activities, it would be expected to increase the feed of material to Hurst Spit over time, relative to this situation today. The leading options for the Strategy have been discussed with the Hurst Spit to Lymington team and more details of the interaction between the leading options and Hurst Spit are provided in section 6.7.
- 3.3.19 The potential coastal process impacts of the rollback of the spit are uncertain and potentially wide ranging across Christchurch Bay and also the Solent area. The existing coastal processes allow the formation of offshore banks (such as Shingles Bank and Dolphin Sands) and influence the sediment distribution patterns observed within the bay.
- 3.3.20 A working assumption from both projects is that the large rock revetment at the base of Hurst Spit (landward end) will be held in place over the duration of the Strategies. This will provide an anchor point for both the Spit and also for Milford on Sea and the options have been developed in this Strategy on this basis. However, if managed rollback of the spit is the leading option that is identified in the Hurst Spit to Lymington Strategy, it will be important to fully understand the coastal processes implications of the rollback and to manage the rollback accordingly so that it does not threaten the rock revetment transition point or have significant negative impacts on wider coastal processes within the area.

## 3.4 Key constraints

- 3.4.1 The key constraints for the development of the Strategy relate to environmental requirements such as the Habitats Regulations. The majority of the Strategy frontage is

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within or adjacent to environmentally sensitive receptors (see Section 2.2) and the development of the Strategy has considered how the options can limit or mitigate any impacts and enhance these receptors.

- 3.4.2 The Strategy has undertaken a range of environmental assessments including an SEA to support option development and appraisal, a Habitats Regulations Assessment to assess compliance of the leading options, a Marine Conservation Zone Assessment to determine the potential impacts of beach nourishment on the nearby designations, and a Water Framework Directive Assessment.
- 3.4.3 In some locations, particularly within Christchurch Harbour, the construction of new defences or improvements to existing defences may be technically challenging due to a lack of space and varied land ownership. An appropriate level of risk contingency and optimism bias has been incorporated into the option costs to account for these uncertainties. Site walkovers with the project team were also undertaken to assess the technical feasibility of the Strategy options.
- 3.4.4 Parts of the frontage, particularly around Christchurch Old Town have historic and listed buildings and monuments and therefore the design of new structures at scheme level should be in keeping with the historic and built environment and should incorporate mitigation measures as required.

## 3.5 Objectives

### Objectives

- 3.5.1 The project objectives were defined at the outset in collaboration with the Project Board. The objectives of the Strategy have focussed the project on what is needed to address the identified problems and strategic issues. To ensure that the Strategy has delivered upon these objectives they were continually considered throughout the project development. The Strategy objectives are:
  - To build on the work of the Poole and Christchurch Bays Shoreline Management Plan (SMP2);
  - Acknowledge overlaps, dovetail, and support other adjacent / overlapping FCERM strategies, studies and projects that have been produced or are currently being developed;
  - To define, articulate and raise awareness of coastal flooding and erosion risks to people and the developed, historic and natural environments and the role of the Strategy in the management of these risks;
  - To identify the preferred technically, economically, and environmentally sustainable strategic options for managing those risks over a 100 year appraisal period, and define an implementation plan (taking into account climate change and predicted sea level rise);
  - To balance the needs of people and the environment;
  - To comply with environmental legislation and identify opportunities for environmental benefits, allowing where possible the natural evolution of the shoreline;

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- To identify opportunities for broader outcomes. Broader outcomes will be linked to partner initiatives such as regeneration and economic growth, tourism, recreation, and amenity;
- To integrate and align with the Local Plans covering the Strategy frontage (including the Bournemouth Local Plan, the Christchurch and East Dorset Local Plan and the New Forest Local Plan);
- To identify opportunities for potential contributions to future management and maintenance through developing partnerships with beneficiaries, key stakeholders, communities and supporting plans and programmes;
- To develop an action plan and forward programme of studies/projects needed to implement the strategy over the next 5, 10 and 20 years. This will set out adaptation pathways for the long-term strategic approach, including triggers and thresholds for key management decision points to guide future monitoring efforts; and
- To ensure the Strategy obtains Statutory and Key Stakeholder support, Adoption by the Local Authorities and Environment Agency LPRG assurance.

### **Critical success factors**

3.5.2 To guide the option development and appraisal process for the Strategy, a set of critical success factors were also identified:

- Strategic fit and business needs – develop and identify leading options that are consistent with the ambitions of BCP and NFDC and also the Environment Agency’s National FCERM Strategy;
- Potential value for money – the whole life benefits of the leading options should exceed the whole life costs or provide good value for money when compared to alternative options and other FCERM interventions;
- Supplier capacity and capability – potential suppliers should have the capacity and capability of carrying out the leading options;
- Potential affordability – identify leading options that have a realistic possibility of being funded and implemented with support and/or contributions from partners; and
- Potential achievability – the leading options should be able to obtain necessary approvals and consents and it must be physically possible to construct and maintain the leading options over their intended life.

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# 4 Options for managing coastal flood and erosion risk

## 4.1 Framework for option appraisal

### Strategic Options and FCERM Measures

- 4.1.1 For each area of the Strategy frontage, a series of 'strategic options' were developed and appraised. These outline the FCERM intent of the interventions over the next 100 years, such as doing nothing, maintaining the defences, sustaining the defences, improving the defences or undertaking managed realignment.
- 4.1.2 The strategic options are made up of a 'package' of FCERM measures. The measures refer to the local level defences that would be constructed or maintained (e.g. a seawall, setback floodwall, beach recycling etc.). Often it is necessary to combine a variety of these measures into a 'package' and therefore strategic options generally include a combination of FCERM measures that would be implemented over time to deliver the option.

### Spatial and temporal Framework

- 4.1.3 The option development and appraisal for the Strategy has been undertaken across a spatial framework comprising six Strategy Management Zones (SMZs) and eighteen smaller Option Development Units (ODUs). ODU are small local areas of the frontage with consistent themes and risks. SMZs are larger areas of the Strategy frontage that comprise multiple ODUs with similar characteristics or strategic considerations. Figure 4-1 shows a map of the SMZs and ODU locations. *Note that after agreement with the Environment Agency Partnership Strategic Overview team, no appraisal was undertaken for ODU 8 as the risk in this location is fluvially dominated. It was agreed that it would be more appropriate for this area to be appraised during future work on the River Avon.*
- 4.1.4 Strategic options and packages of measures have been developed and appraised for each ODU. In addition, the appraisal has also considered how the options in each unit align with the options in adjacent areas to ensure that the plan is cohesive across the broader Strategy area. Using this spatial framework has allowed the Strategy options to be developed on an area by area basis, ensuring that local needs and opportunities are considered whilst also confirming that there are appropriate strategic links with adjacent areas of the frontage.
- 4.1.5 The appraisal period for the Strategy is the next 100 years, from 2024 to 2124. The flooding and erosion risks change over time and therefore to facilitate the option development and appraisal the appraisal period was broken down into three epochs:
- Epoch 1 (short term, 2024-2044);
  - Epoch 2 (medium term, 2044-2074); and
  - Epoch 3 (long term, 2074-2144).

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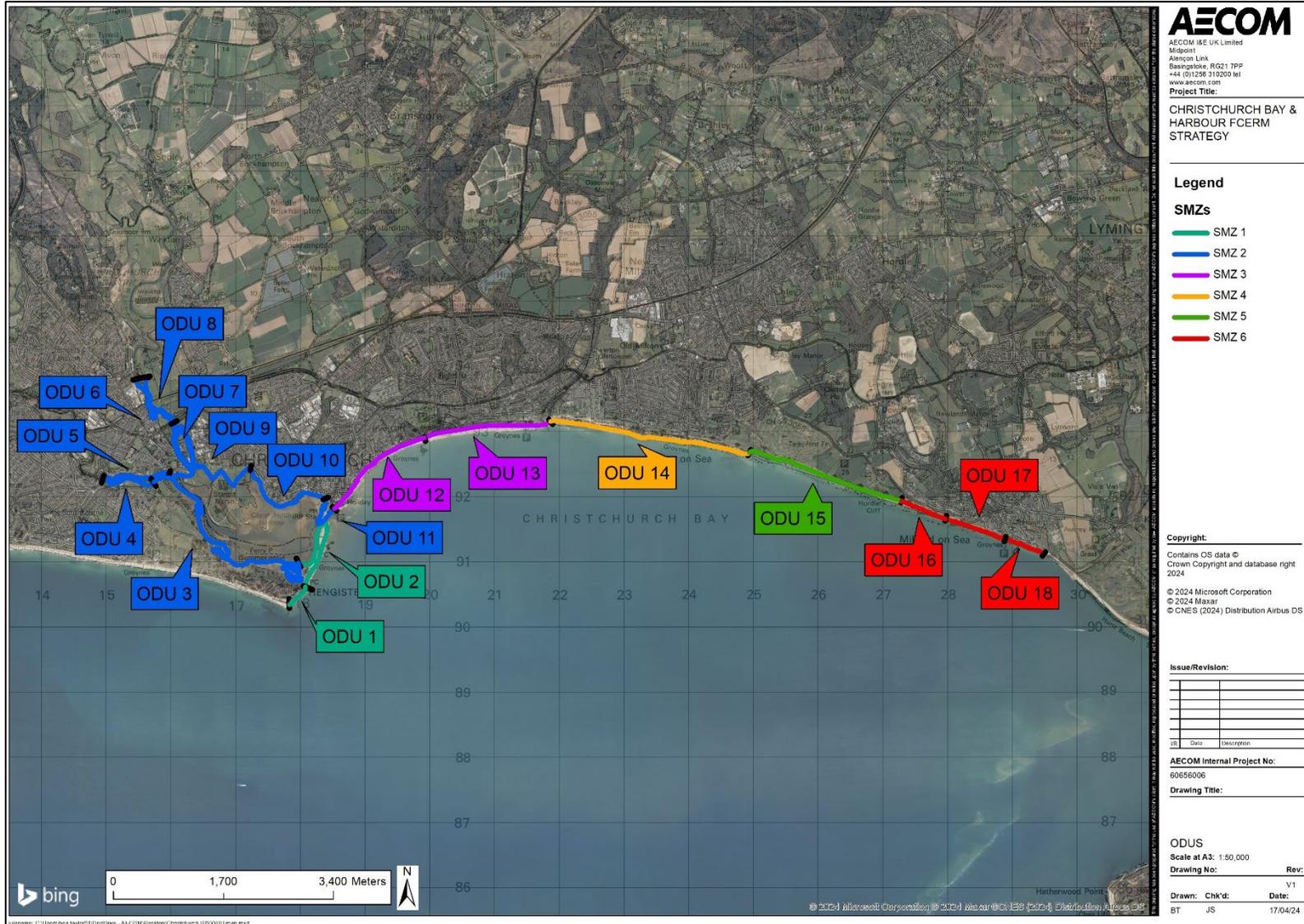


Figure 4-1: Map of ODU and SMZ boundaries

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## Strategy Leading Options

4.1.6 Within each ODU up to three types of leading option have been identified, as follows:

- National Leading Option – the leading option identified by following FCERM-AG decision rules;
- Local Aspirational Option – an option that takes into account local opportunities, wants, and needs to deliver greater or wider benefits. The Local Aspirational Option is typically a higher cost than the National Leading Option.
- Backup Option – an option that is more deliverable from a funding perspective than either the National Leading Option or the Local Aspirational Option. Backup Options typically have lower present value costs and smaller capital funding requirements but deliver less benefits.

4.1.7 As a minimum, each ODU has a National Leading Option identified, but not every ODU has all three option types. In some ODUs only a National Option has been selected if it meets all the Strategy objectives, whereas in other ODUs all three types of option have been identified.

4.1.8 In ODUs where multiple leading option types have been identified, the Strategy has in-built flexibility to move between the options when it is being implemented over the next 100 years. The different routes that can be followed between implementing the options are known as 'adaptive pathways'. Following this approach increases the adaptive capacity of the Strategy, as outlined below.

### Adaptive Capacity

4.1.9 Adaptive capacity is the ability to adjust to future change in order to take advantage of opportunities that arise and to be able to appropriately manage additional risks that are presented. The Strategy option appraisal has embedded adaptive capacity into the appraisal decision making framework and option selection process. This will help the FCERM teams deliver the Strategy over the next 100 years despite a range of future uncertainties.

4.1.10 There are numerous uncertainties relating to FCERM at the coastline. However, the key uncertainties in delivering the Strategy over the next 100 years are considered to be:

- Climate change - the rate and magnitude of climate change is highly uncertain over the next century, influencing the amount of sea level rise and changes to wave climate. The rate and magnitude of climate change will determine the flood and erosion risk along the Strategy frontage;
- Funding - the amount of funding that could be available from both public and private sources for FCERM related activities is also uncertain. A high level estimate of potential FCERM-GiA that could be available for the leading options has been undertaken as part of the option appraisal, but there is uncertainty in these calculations and funding rules could change;
- Project / Construction costs - have the potential to change significantly over short periods of time (as illustrated by the high rate of inflation between 2022-2023) and are influenced by global and national macro-economic factors beyond the control of the local FCERM teams;

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- Potentially contaminated land - there are a number of historic landfill sites located along the Strategy coastline. There is uncertainty as to whether these sites contain contaminated materials and site investigations are required to either confirm the presence of or rule out contamination risk;
- Land ownership / consenting - there are different land owners along the Strategy frontage. This presents uncertainties relating to maintenance responsibilities and support / consenting for options; and
- Future development – future development could occur in the Strategy area, potentially leading to additional sources of funding at certain locations or changes in stakeholder views of FCERM options.

4.1.11 FCERM has always faced the challenges of decision making in the face of multiple uncertainties, including in the climate, the economy and society. Traditionally these have been addressed by adopting a precautionary approach, acting as early as possible to manage potential risks but with typically high costs. For example, constructing a new coastal defence right away with a large freeboard allowance to account for potential increases in climate change that could occur.

4.1.12 A managed adaptive approach is more flexible and capable of addressing challenges and opportunities as they arise. Managed adaptive approaches typically provide greater resilience to negative changes in uncertainties (e.g. if more climate change occurred than expected) and enable opportunities to arise from positive future changes (e.g. changes to FCERM policy, improved scientific knowledge, more funding availability etc.). In addition, a managed adaptive approach helps to avoid potential abortive investment if future scenarios don't develop as anticipated.

4.1.13 To facilitate options that have a managed adaptive approach, the Strategy appraisal has:

- Developed and appraised options on an epoch basis – three time epochs have been used in the Strategy appraisal; the short term (2024-2044), the medium term (2044-2074) and the long term (2074-2124). Each option developed and appraised includes details of what interventions are planned in each epoch. If climate change occurs more quickly or slowly than currently anticipated, then interventions set out on each option can be brought forward or delayed accordingly. This ensures that options have in-built adaptive capacity to respond to changes in climate change as they occur;
- National, Local Aspirational and Backup Options – many of the ODUs have all three option types identified as leading options which provides the FCERM teams with flexibility to choose the most appropriate option as uncertainties resolve, or to take different 'adaptive pathways' between the options as required. For example, should risks change (e.g. if climate change occurs faster than anticipated) or additional funding become available, it is possible for option choices to change over time and to move between the leading options as required; and
- Uncertainty - sensitivity tests have been undertaken on key variables such as cost increase or sea level rise when identifying the leading options. This has ensured that the leading options are robust with multiple key uncertainties.

4.1.14 Whilst managed adaptive options have been fully considered in the appraisal, they have not always been selected as the leading options. In some situations, the leading options for an ODU may include a precautionary 'improve' option whereby defences would be raised to the full height required to provide a desired SoP in 100 years' time. In these

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situations the decision has generally been driven by cost effectiveness, often related to the type of defence being considered. In addition, typically where these precautionary options have been identified, they coincide with undertaking the defence upgrade scheme in the future (i.e. in epochs 2 or 3) when more details on uncertainty such as climate change will be known. When designing these improve options during concept / outline design it is recommended that the design includes foundations / capacity for the defences to be further raised in the future if sea levels rise faster than currently anticipated. This will ensure the precautionary options are robust / reliable / adaptable despite the future uncertainty in climate change projections.

## 4.2 Long list of strategic options

4.2.1 As a starting point for the option development and appraisal, a generic long list of strategic options was developed by the project team (BCP, NFDC, Environment Agency, AECOM) and obtained input from wider specialists within each organisation as required. These strategic options deliver a specific FCERM intent over time and included:

- Do Nothing – No further defence maintenance or construction;
- Do Minimum – Reactive small-scale maintenance to prolong the service life of existing defences over a short-term period and ensure health and safety compliance;
- Maintain – Undertake proactive maintenance / defence refurbishments / beach recycling to prolong the service life of existing defences over a long-term period;
- Sustain – Upgrade the existing defences or construct new defences to reduce flood and erosion risk and provide a standard of protection that keeps pace with sea level rise over time. This option is typically implemented by incrementally increasing the crest height or robustness of a defence over time (i.e. a managed adaptive approach);
- Improve – Upgrade the existing defences or construct new defences to reduce flood and erosion risk and provide a high standard of protection until the end of the appraisal period (i.e. a precautionary approach);
- Managed Realignment – Realign the coastline further inland or seawards, and/or actively manage the erosion rate of the coastline. This option may involve creating a more sustainable coastline position and/or making space for nature; and
- Adaptation / Resilience – Implement property level / community level resilience measures, create adaptation plans and identify Coastal Change Management Areas (CCMAs).

## 4.3 Potential FCERM measures

4.3.1 A wide range of different FCERM measures were considered in the option development and appraisal (e.g. seawall, floodwall, beach nourishment etc.). These FCERM measures are rarely implemented in isolation and have instead been combined into packages of measures that form the strategic options.

4.3.2 Given the diverse characteristics of the Strategy frontage, a broad range of FCERM measures was considered, focussed on managing coastal flood risk, coastal erosion risk or a combination of the two. Measures to improve the resilience against flooding and erosion were also considered (such as property level resilience).

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4.3.3 Table 4-1 presents the FCERM measures considered in the option development and appraisal.

**Table 4-1: FCERM measures considered in the option development and appraisal**

Local level measures		
Patch-repair maintenance	Gabions	Slope armour and reinforcement
Capital refurbishment	Embankment	Cliff slope stabilisation / drainage
Beach recycling	Flood storage areas	Land raising
Beach nourishment	Sheet piling	Land reclamation
Timber groynes	Deployable temporary defences	Offshore breakwater
Rock groynes	Deployable permanent defences	Offshore reef
Crest raising of defences	Tidal barrier	Saltmarsh restoration
Seawall	Armoured sand dunes	Property level resilience
Concrete / masonry revetment	Sand dune enhancements	Community level resilience
Rock revetment	Timber breastwork	Setback floodwall

## 4.4 FCERM measures rejected at preliminary stage

4.4.1 The next stage of the appraisal was to identify which of the FCERM measures would be appropriate for each ODU and which FCERM measures should be ruled out from further appraisal. To facilitate this a multicriteria assessment was undertaken to compare the relative merits of the FCERM measures in each ODU.

4.4.2 The multicriteria assessment considered the following categories; flood / erosion risk management, indicative cost, design life, natural environment, landscape and built environment, carbon, technical complexity, maintenance and operation requirements, and broader outcomes. A clear set of scoring criteria was developed so that each measure could be scored in an objective and consistent manner. The decision making process for each score was informed by the following:

- Supporting data and assessment – a review of a wide range of relevant data and completion of baseline studies provided the understanding of the frontage and the issues, constraints, and opportunities. This information provided the facts from which to screen-out non-viable measures.
- Visual site investigations – numerous site walkovers were undertaken to aid the team’s understanding and appreciation of each of the ODUs site conditions. Aspects such as space availability, position of defences relative to environmental designations and listed buildings were considered.
- Key stakeholder engagement – engagement with key stakeholders and members of the public prior to and during the long list phase of the project informed which of the defence measures had or lacked support.

4.4.3 A long list workshop with key stakeholders was facilitated by the project team. This involved a series of breakout discussions in which the scoring method and draft appraisal of FCERM measures was openly discussed / challenged and ratified. The outcome of this stage of the appraisal was a short list of FCERM measures for each ODU. These measures could then be used / combined into a package of measures over time to deliver the strategic options.

4.4.4 Table 4-2 below outlines which of the FCERM measures were taken forward for further appraisal. Measures not taken forward were rejected at this stage. A detailed breakdown and justification for rejecting the FCERM measures can be found in the Strategy Short List Report.

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4.4.5 In addition to the appraisal of FCERM measures in each ODU, broader Strategy wide measures, such as a tidal barrier and a 'shingle engine' were also appraised. These measures were ruled out from further consideration for various reasons:

- The tidal barrier was ruled out due to technical limitations, prohibitive cost, and environmental impacts.
- The 'shingle engine' was primarily ruled out on technical ground due to unsuitable tidal range and uncertainty around material distribution.

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**Table 4-2: FCERM measures taken forward (highlighted in green)**

FCERM level measures	ODUs																	
	1	2	3	4	5	6	7	9	10	11	12	13	14	15	16	17	18	
Patch-repair maintenance																		
Capital refurbishment																		
Beach recycling																		
Beach nourishment																		
Timber groynes																		
Rock groynes																		
Crest raising of defences																		
Seawall / Quay wall																		
Concrete / masonry revetment																		
Rock revetment																		
Gabions																		
Embankment																		
Setback floodwall																		
Sheet piling																		
Deployable temporary defences																		
Deployable permanent defences																		
Tidal barrier																		
Armoured sand dunes																		
Sand dune enhancements																		
Timber breastwork																		
Slope armour and reinforcement																		
Cliff slope stabilisation / drainage																		
Offshore breakwater																		
Offshore reef																		
Saltmarsh restoration																		
Flood storage areas																		
Property level resilience																		
Community level resilience																		

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## 4.5 Options short-listed for appraisal

4.5.1 The next stage of the process was to tailor the generic long list of strategic options outlined in Section 4.2 to the specific requirements of each location. This ensured that the strategic options being considered in each ODU were appropriate and covered the different risks, opportunities and constraints in each location:

- This process was based on the project team’s understanding of the study site, the distribution of FCERM economic damages, the receptors at risk of flooding and erosion, technical, social and environmental considerations.
- As part of this process the timing of interventions was considered, based on the onset of risk through time. In many ODUs the onset of risk to properties and other features is not until epochs 2 or 3 and therefore in this case the strategic options that look to upgrade defences, such as Sustain or Improve, may not recommend intervening until later on in the appraisal period.
- In some ODUs there are a range of strategic possibilities for defending different parts of the coastline. Therefore in some ODUs multiple strategic options with the same overarching FCERM intent were developed. For example, in ODU 14 there are multiple versions of the Managed Realignment Option to reflect differences in the length of the ODU 14 frontage that could be defended.

4.5.2 The short list of strategic options was developed during a collaborative project team workshop. This included representatives from BCP, NFDC, the Environment Agency and AECOM. Typically, each ODU had an agreed short list of 5-6 strategic options, although in some complex ODUs more options identified.

4.5.3 Once the short list of strategic options had been identified, a package of measures was then developed to implement the strategic options. This package of measures outlined how the strategic intent of the option would be delivered. The measures included in each package of measures was based on the results of the multicriteria appraisal of FCERM measures, outlined in Section 4.4.

4.5.4 A detailed description of the short list of strategic options can be found in the Short List Report and Leading Options Report (Appendix C). The following text provides a summary of the key features of the short list options and strategic themes at the SMZ level.

### **SMZ 1 (Mundeford Sandbank)**

4.5.5 SMZ 1 includes ODUs 1 and 2 (Hengistbury Head and Mundeford Sandbank). There are relatively few properties located in this SMZ and the key risk in this location is from erosion / movement of the coastline and the impact that this could have on coastal morphology, buried services and the shelter provided to Christchurch Harbour by the headland and Sandbank.

4.5.6 The short list of strategic options in SMZ 1 are primarily focussed on how to manage the coastline evolution. The options include Do Nothing, Do Minimum, Maintain, Managed Realignment, Improve and Adaptation / Resilience options.

4.5.7 In ODU 1 the Improve option would result in the least amount of erosion to Hengistbury Head, followed by Managed Realignment. Do Minimum would be expected to lead to the most erosion (except for Do Nothing).

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- 4.5.8 In ODU 2, the Improve option would involve constructing new defences to prevent any rollback of the Sandbank over time. The Maintain option would involve refurbishing the existing defences and undertaking beach nourishment with the aim of reducing / controlling any rollback of the Sandbank and preventing major disruption. The Managed Realignment option would involve proactively moving and refurbishing defences to facilitate the rollback of the Sandbank.
- 4.5.9 A strategic option that considered relocation of assets off the Sandbank was also considered. However, this was ruled out because due to environmental designations there is insufficient space to move assets nearby.

### **SMZ 2 (Christchurch Harbour)**

- 4.5.10 SMZ 2 includes ODUs 3 to 11. The main risk in this location is the flood risk to over 2,000 properties, key infrastructure, and historic assets in Christchurch Harbour over the next 100 years. This is the key driver behind significant Do Nothing economic damages in this area. In addition to this flood risk, there is also a risk of erosion to historic landfill sites.
- 4.5.11 The short list of strategic options in ODUs 3-11 are focussed on how to manage these risks and include Do Nothing, Do Minimum, Maintain, Sustain (various), Improve (various) and Adaptation / Resilience options.
- 4.5.12 The Maintain Options involve maintaining existing defences but accepting that the standard of protection against flood risk would fall over time due to sea level rise. The Sustain options involve constructing new defences or raising existing defences over time to keep pace with sea level rise and deliver a desired SoP against flood risk. The Improve options involve constructing new defences or raising existing defences to a desired SoP at the end of the appraisal period (i.e. a precautionary approach).
- 4.5.13 Multiple variations of the Sustain and Improve options have often been included in the appraisal so that different alignments for flood defences can be tested, as well as differences in how to manage frontline quay walls and erosion defences (i.e. including / excluding defences for historic landfill sites). Different timings of defence upgrades have also been considered to reflect the changing risk profile through time in different locations.

### **SMZ 3 (Christchurch Beaches and Cliffs)**

- 4.5.14 SMZ 3 includes ODUs 12 and 13 (Avon Beach and Friars Cliff, and Highcliffe). The key risk in this location is from coastal erosion which, over the next 100 years, could lead to over 300 properties being lost under the Do Nothing scenario. There is also a risk of outflanking of the existing defences at the eastern end of ODU 13. Here the existing defences end abruptly and there is a transition into the undefended section of Naish Cliff that is actively eroding.
- 4.5.15 The short list of strategic options in ODU 12 and 13 are focussed on how to effectively manage the erosion risk in this location and to prevent outflanking of defences. The strategic options for these units include Do Nothing, Do Minimum, Maintain and Improve (various) options.
- 4.5.16 In ODU 13 consideration has also been made as to how to manage the interaction with Naish Cliff to the east and the short list for ODU 13 also included Managed Realignment options. These options would involve adjusting the defences in ODU 13 to promote a greater feed of beach material from west to east via longshore transport through this unit.

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4.5.17 In SMZ 3, where there are cliffs they are generally stable and the toe of the cliffs is defended by either a wide beach or hard defences. Continuing to provide robust toe defences is the focus of the Improve Options in these units.

#### **SMZ 4 (Naish Cliff and Barton on Sea)**

4.5.18 ODU 14 is the sole unit in SMZ 4. The key risk in this location is from coastal erosion and landslides which could lead to over 470 properties being lost under Do Nothing.

4.5.19 Due to the complex soft cliff geology in this location, it is not feasible to completely stop erosion from occurring. However, it is possible to slow the rate of erosion and delay the onset of economic damages and loss of properties. There is currently an area of amenity grassland at the top of the cliff that provides a buffer zone between the cliff edge and the properties / roadway at risk. The technical viability of cliff drainage solutions will rely on as much of this buffer zone being retained as possible.

4.5.20 The strategic options in ODU 14 are focussed on how to slow the rate of cliff erosion and manage the consequences of any further erosion. The short list of strategic options included Do Nothing, Do Minimum, Maintain, Managed Realignment (various) and Improve (various). In the appraisal the merits of defending different lengths of this frontage have been considered, as well as different timings of intervention.

4.5.21 The improve option focus on defending the whole frontage (including Naish Cliff). The Managed Realignment option focus on defending different lengths of the frontage with an aim of slowing the rate of erosion in the defended locations.

4.5.22 Coastal adaptation will be crucial for this area moving forward as there will be a loss of properties either during the Strategy appraisal period or afterwards.

#### **SMZ 5 (Taddiford)**

4.5.23 ODU 15 (Barton on Sea to Hordle Cliff) is the sole unit in SMZ 5. The key risk in this location is from coastal erosion. However, there are no assets or key features in this location and there is no justification for significant FCERM interventions. The short list options have been identified accordingly as Do Nothing, Do Minimum and Managed Realignment.

#### **SMZ 6 (Milford on Sea)**

4.5.24 SMZ 6 includes ODUs 16 to 18 and the main risk for most of this frontage is from coastal erosion. Under the Do Nothing scenario, over the next 100 years approximately 570 properties are expected to be at risk from erosion.

4.5.25 There is a trend of lowering beach levels in this location which is increasing the vulnerability of defences to undermining and failure. In ODU 18, in addition to the erosion risk there is also a risk from wave overtopping from the open coast and from tidal still water level flooding from the Sturt Pond direction.

4.5.26 The Strategic options in in ODU 16 and 18 consider how to manage the position of the coastline and/or manage the beach levels more effectively to reduce erosion risk. The options also consider how to improve the standard of protection against flooding in the future from both wave overtopping and still water level flooding. The short list of strategic options includes Do Nothing, Do Minimum, Maintain and variations of Managed Realignment and Improve options. Different timings of intervention have been considered.

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# 5 Options appraisal and comparison

## 5.1 Technical issues

- 5.1.1 The appraisal of the short list options considered a range of technical issues and opportunities such as construction and buildability risks, maintenance requirements, adaptability and impacts on wider coastal processes.
- 5.1.2 The detailed flood and erosion risk mapping for the Do Nothing baseline helped develop the understanding of the progression of risk at each ODU. This enabled the identification of ‘triggers’ for when FCERM interventions are required and was important for determining the required phasing of future works across the frontage.
- 5.1.3 The appraisal of the FCERM measures in each ODU provided the mechanism to account for technical aspects at the local scale such as buildability, constraints relating to existing defences and space availability. This approach has ensured that local level details within each ODU have been fully considered, and in doing so means that the strategic options put forward can be carried out, are buildable and are realistic to implement.
- 5.1.4 The key technical considerations for each SMZ are provided in Table 5-1. For more detailed discussion of the technical assessment see the Leading Options Report (Appendix C).

**Table 5-1: Key technical considerations for the appraisal**

SMZ	Key technical considerations
1	<ul style="list-style-type: none"> <li>The leading options need to form a cohesive approach for the Hengistbury Head and sandbank. There is a risk of a disconnect occurring in the shoreline position if either the headland or sandbank are allowed to erode / rollback faster than the other.</li> <li>Hengistbury Head Long Groyne is currently in the process of being replaced which will anchor the west side of the headland for the next 100 years. If the headland is left to erode in an uncontrolled manner on the east side, there is a risk of outflanking of the groyne, potentially compromising FCERM in Poole Bay. Options that aim to control / reduce future movement of the headland in ODU 1 would be preferable from this perspective (i.e. Managed Realignment / Improve).</li> <li>There are buried services beneath the sandbank in ODU 2. Significant movement of the sandbank could lead to exposure / damage to these services. Options that aim to control / minimise future movement of the Sandbank would be preferable from this perspective (i.e. Maintain / Improve).</li> <li>Uncertainty in future morphology of the area if the headland and/or sandbank rollback significantly. Options that control / minimise future movement would be provide more certainty and provide confidence to FCERM within Christchurch Harbour (i.e. Managed Realignment / Improve in ODU 1 and Maintain / Improve in ODU 2).</li> </ul>
2	<ul style="list-style-type: none"> <li>Mudeford Quay (ODU 11) is adjacent to the entrance of the harbour (‘The Run’) and has a controlling influence on the morphology of the harbour. Similar to the Mudeford Sandbank, there is uncertainty as to the morphology changes that would occur if Mudeford Quay defences were to fail. Options to maintain or improve the defences here are therefore preferable from a technical perspective (i.e. Maintain / Sustain / Improve / Adaptation options in ODU 11).</li> <li>Generally there is sufficient space to implement the FCERM measures outlined in the short list options. However, in some locations, such as ODU 7, there could be some space constraints.</li> <li>Tri probability flood risk with the River’s Avon and Stour considered. Strategy has used latest flood modelling from the Environment Agency to inform economic and option appraisal.</li> </ul>
3	<ul style="list-style-type: none"> <li>Options that manage the outflanking risk in ODU 13 (Highcliffe) from Naish Cliff to the east are favourable from a technical perspective (i.e. Managed Realignment / Improve in ODU 13).</li> <li>Promoting the movement of beach material through this area to the east by modifying the defences at Highcliffe has been considered (Managed Realignment options in ODU 13). However, it is challenging to do this sustainably without compromising the effectiveness of the existing defences at Highcliffe. Options that improve the availability of beach material in areas to the east through beach management interventions are therefore preferable (Improve options in ODU 13).</li> </ul>

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SMZ	Key technical considerations
4	<ul style="list-style-type: none"> <li>• Combination of drainage and cliff toe defences required for effective control on erosion. Erosion rate can be reduced but not stopped entirely due to complex cliff geology.</li> <li>• Cliff drainage required to reduce the rate of erosion. The technical feasibility of drainage solutions improves when a greater amount of the existing amenity space at the top of the cliff can be retained (more space improves the buildability, design and efficiency of the scheme. With less space there is a risk that the cost of installing drainage could be higher or even impractical to install.). From a technical perspective, an earlier intervention that reduces the amount of amenity space lost is preferable (variations of the Managed Realignment option with earlier interventions are included in the short list for ODU 14).</li> <li>• Uncertainty around the effectiveness of new defences at Marine Drive West due to slump zone from Naish Cliff.</li> </ul>
5	<ul style="list-style-type: none"> <li>• Actively eroding cliff with little justification for FCERM intervention.</li> </ul>
6	<ul style="list-style-type: none"> <li>• Trend of lowering beach levels that is increasing the vulnerability of the defences. Options that manage the beach levels with a more effective long term approach are preferable, such as improved beach control structures and beach nourishment activities.</li> <li>• Complex flood risk from both open coast (wave overtopping) and from Sturt Pond (still water level).</li> <li>• Options that promote movement of additional beach material onto Hurst Spit to the east are preferable for the management of the Spit (such as options that include beach nourishment that would increase the sediment supply). This would need to be integrated into the preferred option for Hurst Spit once it is established through the Hurst to Lymington Strategy</li> </ul>

## 5.2 Environmental assessment

5.2.1 There are environmentally significant sites of international, national and local importance within or adjacent to the Strategy area and therefore environmental considerations formed an integral part of the option appraisal process. The key designations are outlined in Section 2.2 of this document.

5.2.2 A range of environmental assessments were completed to support the option appraisal. The key environmental considerations for each SMZ are provided in Table 5-2. For more detailed discussion refer to the various environmental reports for the Strategy (Appendices K to N).

5.2.3 Historic England and Natural England have reviewed the relevant environmental assessments (Historic England reviewed the SEA, Natural England reviewed the SEA, HRA and MCZ assessment) and have provided letters of support for the Strategy (see Appendix O).

### Strategic Environmental Assessment

5.2.4 During the baseline stage of the project an Environmental Baseline Report and SEA scoping report were developed. These documents were sent to Natural England, Historic England and the Environment Agency for consultation.

5.2.5 A full SEA report was then developed in parallel with the selection of leading options. This assessment provided the evidence base to assess the environmental impacts of the short list options which informed the selection of the leading option. The SEA also ensured that environmental enhancement opportunities were captured and incorporated into the leading options.

### Habitats Regulations Assessment

5.2.6 Two stages of the HRA were undertaken. Initially a screening report was developed to determine whether the leading options that had been identified could lead to likely significant effects required by the Regulation 63 of the Conservation of Habitats and Species Regulations 2017.

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5.2.7 The screening report concluded that in some locations the leading options could not be screened out from resulting in a likely significant effect and further assessment was required. Following this conclusion, an Appropriate Assessment was carried out to determine if the leading options would have an adverse effect on the qualifying features of the SAC, SPA and Ramsar sites that were screened in.

**Marine Conservation Zone Assessment**

5.2.8 Two stages of the MCZ Assessment were undertaken. Initially a screening assessment was undertaken to determine whether the leading options that had been identified could impact nearby MCZ sites. This assessment screened in the Needles MCZ and Southbourne Rough MCZ for a Stage 1 Assessment due to a potential for a temporary increase in suspended sediment concentrations and sediment deposition from beach nourishment activities.

5.2.9 The Stage 1 Assessment concluded that the leading options would have no significant risk to the conservation objectives of the Needles MCZ and Southbourne Rough MCZ, and no further assessment is required.

**Water Framework Directive Assessment**

5.2.10 A WFD Assessment was undertaken to assess the implications of the leading options on the WFD regulations. This concluded that there are potential impacts on waterbodies in the Strategy area, however, they are anticipated to be minimal for the most part. Where potential impacts have been identified, the WFD suggested mitigation to negate the impacts.

5.2.11 The WFD assessment was consulted upon with the Environment Agency FBG team who agreed with the conclusions of the assessment.

**Carbon Assessment**

5.2.12 Carbon and sustainability has been a consideration for the Strategy development. Carbon was included as key criteria when developing the packages of FCERM measures for the short list strategic options. In addition, a carbon assessment has been undertaken on the leading options to estimate the total carbon footprint and equivalent monetary value.

**Table 5-2: Key environmental considerations for the appraisal**

SMZ	Key environmental considerations
1	<ul style="list-style-type: none"> <li>Hengistbury Head is highly designated and includes a SSSI, LNR, SAC and SPA. The area is also important for the historic environment and forms part of Hengistbury Head scheduled monument. Options that control / reduce the amount of erosion to these designations in ODU 1 are favourable from an environmental perspective (i.e. Managed Realignment / Improve).</li> <li>As part of the option appraisal, relocation of the beach huts and tourism assets from the Sandbank to Hengistbury Head was considered as a way of mitigating the impacts of potential rollback of the Sandbank on the community. However, this was ruled out because Hengistbury Head is highly designated and there is not sufficient space to relocate to this location within negatively impacting the environment.</li> <li>Opportunities for sand dune enhancement on the Sandbank.</li> </ul>

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SMZ	Key environmental considerations
2	<ul style="list-style-type: none"> <li>Erosion of historic landfill sites around the harbour could have negative implications on the environment. This is picked up in the WFD assessment and options that seek to defend the historic landfill sites are preferable from an environmental perspective.</li> <li>There is existing intertidal and saltmarsh habitat within the harbour that could be impacted by coastal squeeze in the future if existing defence lines are held in place by the Strategy. The saltmarsh habitat is not a qualifying feature of the SAC / SPA designations so this is not an issue from the perspective of HRA compliance. However, the WFD recommends that coastal squeeze impacts on saltmarsh are quantified at scheme level to identify the requirement for mitigation (with assistance from Regional Habitat Creation programme as required).</li> <li>There are many opportunities for saltmarsh enhancement / creation around the harbour and the short list options have included these where possible.</li> <li>Cultural heritage assets within the harbour at risk of flooding in the future. Options that defend these assets are preferable, although this is not always possible.</li> </ul>
3	<ul style="list-style-type: none"> <li>Options that defend these areas from erosion are preferable from an environmental perspective (Improve options in ODU 12 and ODU 13).</li> <li>The SEA identified opportunities for Biodiversity Net Gain (BNG) in this zone which should be explored during scheme development and appraisal.</li> </ul>
4	<ul style="list-style-type: none"> <li>Cliffs designated as a SSSI due to geological importance (Earth Heritage). The SSSI designation favours ongoing erosion of the cliff. Options that allow some erosion to continue to occur are therefore preferable from an environmental perspective (Maintain and Managed Realignment Options in ODU 14).</li> </ul>
5	<ul style="list-style-type: none"> <li>Cliffs designated as a SSSI due to geological importance (Earth Heritage). The SSSI designation favours ongoing erosion of the cliff. Options that allow some erosion to continue to occur are therefore preferable from an environmental perspective.</li> </ul>
6	<ul style="list-style-type: none"> <li>Options that defend these areas from erosion are preferable from an environmental perspective. However, proximity to Solent and Southampton Water SPA meant that project level HRA will be required at scheme stage.</li> <li>The SEA identified opportunities for BNG in this zone which should be explored during scheme development and appraisal.</li> </ul>

## 5.3 Social and community impacts

5.3.1 It has been important to understand the concerns and aspirations of the local communities to ensure that the Strategy recommends acceptable options which are supported by current and future generations.

5.3.2 A comprehensive and targeted stakeholder and public engagement process has been carried out during the development of the Strategy. Engagement was carefully planned through the development of a Stakeholder Engagement Plan at the project outset and six rounds of engagement with the public / key stakeholders were planned (five of which have already been undertaken). Each round of engagement has also involved briefings with councillor representatives for the local community.

5.3.3 The stakeholder engagement was led and facilitated by stakeholder engagement specialists from BCP. Each round of engagement was targeted at key points in the project development and included:

- Engagement round 1: raising awareness of the Strategy and seeking data to inform the Strategy baseline;
- Engagement round 2: presentation of Strategy baseline findings and to seek further information that may alter the baseline;
- Engagement round 3: options identification workshops to identify and discuss all possible long list options with key stakeholders and confirm the appraisal process criteria;

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- Engagement round 4: presentation of the short list options to the public to seek feedback before more detailed appraisal;
- Engagement round 5: formal three month consultation period in which the draft leading options and Strategy were presented to the public to seek feedback; and
- Engagement round 6 (yet to occur): informing the public and stakeholders of the completed Strategy and how their feedback has helped shape the project.

5.3.4 The feedback from each round of engagement was collected by a questionnaire and online voting (during webinars). The results were tabulated and the key themes summarised in an engagement round summary report. This provided the project team with a detailed understanding of the key opportunities and concerns raised by stakeholders and the public which fed into the option appraisal process at each stage.

5.3.5 The feedback in particular has enabled the project team to identify which of the short list options best meet the stakeholder and public aspirations and has guided the selection of the Local Aspirational Options in many locations.

5.3.6 The key social issues and considerations are summarised in Table 5-3.

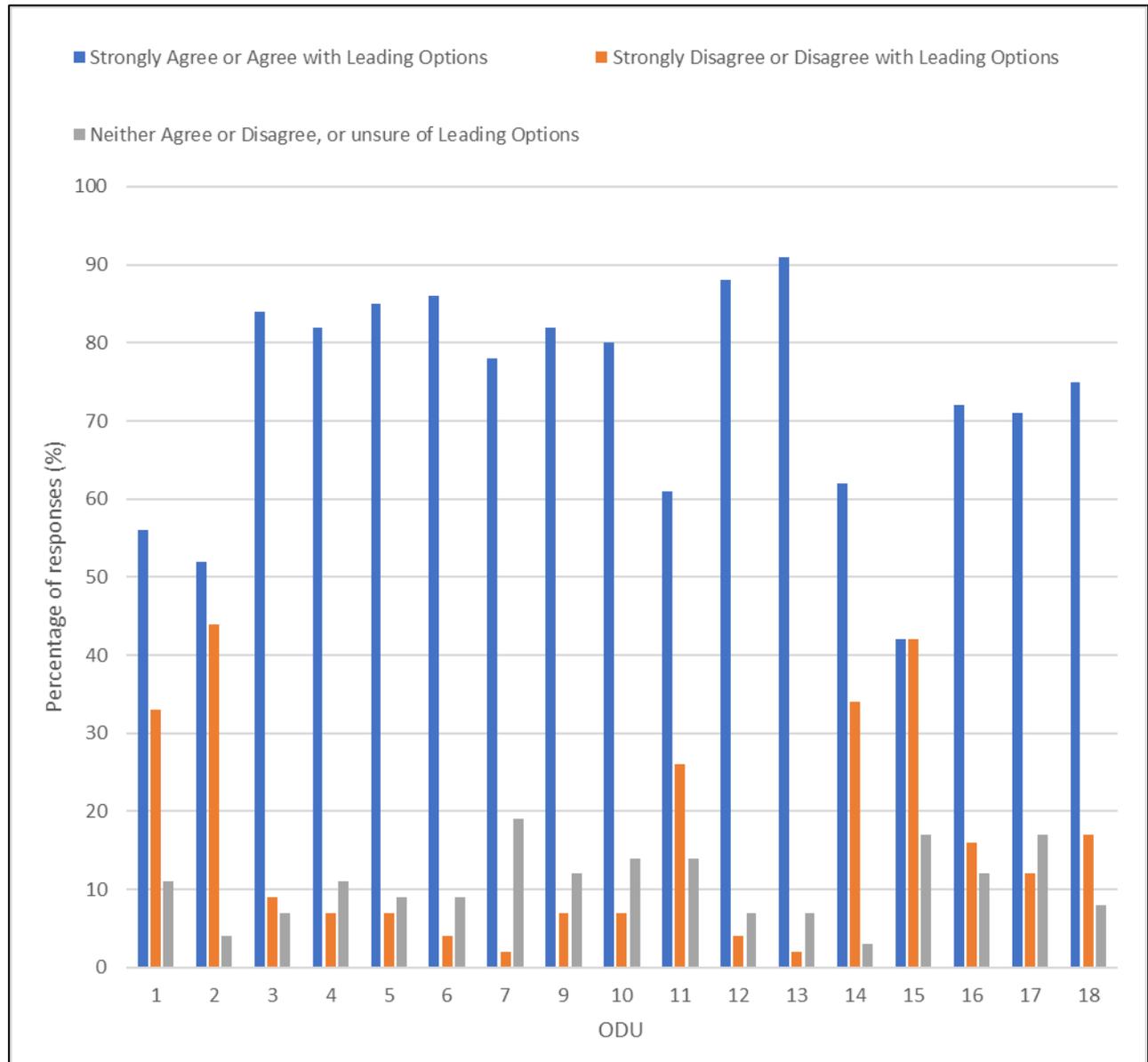
5.3.7 Results from the latest round of engagement (round 5 – public consultation) show strong support for the Strategy leading options. This is based on the questionnaire feedback responses, of which 86 were received. A breakdown of the results are shown in Figure 5-1 and for the vast majority of ODUs the percentage of respondents ‘strongly agreeing’ or ‘agreeing’ with the leading options typically outweighs those ‘disagreeing’ or ‘strongly disagreeing’.

**Table 5-3: Key social considerations for the appraisal**

SMZ	Key social considerations
1	<ul style="list-style-type: none"> <li>• Tourism and recreation is a key feature of the sandbank to the local community and options that help to sustain this are favourable (i.e. Maintain, Managed Realignment, Improve in ODU 1).</li> <li>• Options that control / minimise rollback of the sandbank are preferable for minimising disruption to the beach huts and tourism businesses on the sandbank (i.e. Maintain / Improve in ODU 1).</li> <li>• Stakeholder and public feedback favoured options that included beach management, sand dune enhancements and rock defences, in keeping with the existing defences in this location.</li> </ul>
2	<ul style="list-style-type: none"> <li>• Christchurch harbour has a high concentration of businesses and visitor attractions and therefore the impact of flooding is more widespread than direct property damages.</li> <li>• Options that provide flood defences to properties and key assets at risk within the harbour are favourable from a social perspective (i.e. Sustain / Improve options).</li> <li>• Stakeholder and public feedback favoured options that included maintenance and new / upgraded raised defences.</li> </ul>
3	<ul style="list-style-type: none"> <li>• Area is a key visitor location and important for tourism within the bay.</li> <li>• Opportunities for public realm enhancements would be favoured from a social perspective.</li> <li>• Stakeholder and public feedback favoured options that included maintenance, groynes and beach management in keeping with the existing defences in this location.</li> </ul>
4	<ul style="list-style-type: none"> <li>• Erosion and potential loss of property in the future will impact the community and therefore measures to help mitigate the consequences of erosion will be needed, such as adaptation plans.</li> <li>• Stakeholder and public feedback favoured options that included cliff slope drainage, maintenance, rock defences and beach nourishment. Cliff slope drainage was considered to be the most important measure for this location.</li> </ul>
5	<ul style="list-style-type: none"> <li>• Coastal footpath along the top of the cliff is an important feature to the community. Adaptation measures such as moving the footpath and ensuring health and safety compliance with an eroding cliff have been considered.</li> </ul>

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SMZ	Key social considerations
6	<ul style="list-style-type: none"> <li>Beach is one of the few beaches within NFDC with disabled access. There are large number of beach huts and extensive car parking in this location that make this area important for recreation / tourism. Options that minimise disruption to these features are preferable (i.e. Improve options in ODU 18).</li> <li>Hurst Road landward of existing defences provides access to Hurst Spit and there is limited space to relocate. Options that hold the existing defence line are preferable to avoid disruption / loss of this road (i.e. Improve options in ODU 18).</li> <li>Stakeholder and public feedback favoured options that included maintenance, rock defences, groynes, seawalls and beach nourishment FCERM measures.</li> </ul>



**Figure 5-1: Summary of engagement round 5 survey feedback**

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## 5.4 Option costs

5.4.1 Whole life costs (cash and present value) have been estimated for each of the short list options. This was done by estimating the costs of the packages of measures that comprise each option, and applying the required discount rate to costs that are planned to occur in the future. The whole life costs included capital construction costs (new defences and capital refurbishments) and maintenance costs (small scale patch repairs).

5.4.2 The whole life present value costs for each of the short list options are shown in Section 6. Full details of the costing assumptions can be found in the Economic Appraisal Report (Appendix F).

### Capital Construction Costs

5.4.3 The cost of capital construction works were estimated using a variety of sources such as engineering price books (SPONS, 2024), Environment Agency Cost Guidance (2015) and contractor cost estimates for similar works elsewhere. The costs are presented with a base date of September 2023 developed using the latest costing and inflation data available at the time of writing this document<sup>1</sup>.

5.4.4 Subject to the initial timing and type of FCERM measures in an option, repeat capital interventions were assumed to occur at future points in time when the structures would be expected to come towards the end of their service life.

5.4.5 Many of the short list options included beach nourishment and a cost of £33 per m<sup>3</sup> was applied. This is a standard commercial rate, however, there is potential for this cost to vary depending on the source of material. There is potential for lower costs per m<sup>3</sup> if a local source of material could be used which is something that is being actively explored by BCP and NFDC as part of the Durlston to Hurst Sediment Resource Programme. Sensitivity tests were undertaken on the beach nourishment cost to determine the impact on option selection.

### Maintenance Costs

5.4.6 Maintenance costs were also included in the whole life costs and were estimated using Environment Agency cost guidance (2015), adjusted for inflation. Maintenance costs were applied annually.

### Discounting

5.4.7 Standard discount rates have been applied to convert all costs to 'present value' (PV). Following the recommendations of FCERM-AG, the following variable discount rates have been used within the economic appraisal; 3.5% for years 0 to 30, 3% for years 31 to 75 and 2.5% for years 76 to 99.

### Preliminaries, Appraisal, Optimism bias and Risk

5.4.8 The costs were uplifted by 45% to account for the cost of preliminaries and appraisal (35% preliminaries and 10% appraisal). In line with the HM Treasury guidance an optimism bias of 60% was applied to costs for each option to account for unknown risks and uncertainties. In addition to the optimism bias, a further 30% uplift was applied to take into account known risk factors associated with the Strategy frontage, such as the

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<sup>1</sup> The September 2023 Construction Price Index from the Office for National Statistics was the latest available inflation data when costs were updated in February 2024 prior to submission of the Strategy to the BCP Council and NFDC.

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requirement for tidal working, the potential need for temporary works and the presence of buried services.

## 5.5 Options benefits (Damages avoided)

5.5.1 The short list strategic options aim to reduce the coastal flooding and erosion risk compared to the baseline Do Nothing scenario. This reduction in risk has been quantified in economic terms to generate the option benefits.

5.5.2 The first stage in calculating the option benefits was to calculate the flood and erosion residual damages associated with the options. Residual damages are the damages that would still be expected to occur with the options in place.

5.5.3 Residual damages associated with flood risk were calculated for:

- Damages to properties outside of the option benefit area;
- Damages from flooding from above design return period events greater than the intended SoP of the defences; and
- Damages for the time period before FCERM measures are implemented in the options.

5.5.4 Residual damages associated with erosion risk were calculated for:

- Damages to properties outside of the benefit area;
- Damages due to the intent of the option (i.e. some options aimed to just reduce the rate of further erosion but not prevent it from happening, thus delaying the onset of damages);
- Damages for the time period before any FCERM measures are implemented in the options; and
- Damages associated with the residual risk of erosion occurring after defences were constructed.

5.5.5 Once the residual damages for each short list option had been established, these damages were subtracted from the baseline Do Nothing damages to determine the option benefits. The whole life present value benefits for each of the short list options are shown in Section 6. A full description of the option benefit calculations and assumptions is provided in the Economics Appraisal Report (Appendix F).

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## 6 Selection and details of the leading options

- 6.1.1 As outlined in Section 4.1, up to three types of leading option have been identified in each ODU (National Option, Local Aspirational Option, Backup Option). The process for identifying these options is outlined below.
- 6.1.2 In ODUs where multiple types of option have been identified, the preference for implementing the option is as follows; 1) Local Aspirational Option 2) National Option 3) Backup Option.
- 6.1.3 The Strategy has been developed to allow for adaptive pathways between the different types of leading option and more details can be found in Section 7. In ODUs where Local Aspirational Options have been identified, this option be assumed to be the starting point / preference of the Strategy implementation.

### National Option selection

- 6.1.4 Initially, the National Option was identified first in each ODU using the process outlined in FCERM-AG (Environment Agency, 2020). The key steps are discussed below.
- 6.1.5 For each of the ODUs, Cost Benefit Analysis (CBA) has been used to determine the National Leading Option. Through discussions with the Environment Agency it was determined that cost Effectiveness Analysis (CEA) was not appropriate.
- 6.1.6 As per FCERM-AG, it is typical to use CBA to appraise options at the strategic level where multiple FCERM problems across a large, interconnected area are being considered. CBA balances the range of costs and benefits allowing the appraiser to identify the nationally leading option. There are two different approaches that can be used for CBA, depending on the risks at the location being considered.
- 6.1.7 For options that are primarily focussed on creating a reduction in the flood risk, the process involves:
1. Establish the whole life costs and benefits of the options: Remove any options with an average benefit cost ratio (ABCR)  $<1$  from the remainder of the appraisal. Take forward the options with an ABCR  $>1$ .
  2. Organise the options and select the leading economic option: Organise the options with an ABCR  $>1$  into a list based on reducing Annual Exceedance Probability of flooding (AEP) – improving Standard of Protection (SoP). The AEP for the onset of flooding will vary depending on where it is in a floodplain. The AEP can either be defined by the event probability that the economic impacts start (typically used in inland flood options and sheltered coastal areas) or the event probability that exceeds allowable overtopping rates (typically applied to coastal frontages with significant wave action).
- 6.1.8 Once organised, the incremental benefit cost ratio (IBCR) between options is then used to select the SoP that provides best value for money. The selected option (and SoP) is classified as the provisional economic leading option. The IBCR is calculated as the difference in option benefits between two options divided by the difference in option costs between the options.

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**3. Test for uncertainty:** Using results from a sensitivity analysis, consider whether the choice of the leading economic option needs to change to account for the uncertainties. If the provisional leading economic option stays the same in the sensitivity tests, do not change the option choice. However, if the sensitivity tests are showing that the choice of the provisional leading economic option changes under the test, consider a range of next steps, including whether to change choice of the leading option or to adapt the option to minimise the impact of uncertainties.

**4. Determine National Leading Option:** The leading economic option at the end of step 3 is identified as the National Leading Option.

6.1.9 For options that cannot be ordered by AEP, step 2 uses Net Present Value (NPV) to organise the options rather than reducing probability of flooding. Examples of options that cannot be ordered by AEP within the Strategy are coastal erosion focussed options (where a flood risk SoP is not provided) or strategic based options that deal with different areas within an ODU or other risk factors such as defending historic landfill sites. For this approach, steps 1, 3 and 4 remain the same for options that are reducing the erosion risk, but step 2 involves:

**2. Organise the options and select the leading economic option:** Organise the options with an ABCR >1 into a list based on increasing NPV. The leading economic option is the option with the highest NPV.

6.1.10 For the Strategy appraisal, when the options under consideration were solely focussed on managing flood risk, two different SoPs were considered in step 2; a 1 in 75 year standard and a 1 in 200 year standard. These standards were used as they represent the boundaries of the IBCR thresholds in the FCERM-AG and a recommendation for the SoP can therefore be made in the Strategy. In order to select the 1 in 200 year standard as the leading economic option, the IBCR needs to be greater than 3 relative to the 1 in 75 year standard.

### **Local Aspirational Option selection**

6.1.11 In some ODUs the National Leading Option may not be preferable for local decision makers or communities, and there may be compelling local reasons to choose an alternative option from the short list.

6.1.12 FCERM-AG outlines how a local choice option can be selected as the overarching leading option to replace the National Leading Option if the additional expenditure for the local option is fully funded. Given that the Strategy represents the initial part of the overall appraisal process and funding for subsequent projects has yet to be secured, the local choice option has been termed the 'Local Aspirational Leading Option'. This reflects the intent of the project team to secure funding if possible but acknowledges that at this stage the Local Aspirational Leading Option does not fully replace the National Leading Option.

6.1.13 To decide whether a Local Aspirational Leading Option was required for an ODU, the project team considered the evidence collected during rounds 1-4 of stakeholder engagement to identify the key local opportunities, wants and needs for each ODU. In cases where a Local Aspirational Leading Option has been selected, these have been listed in the relevant section of this report to provide justification for the decision.

6.1.14 In many cases in the Strategy, the difference between the National Leading Option and the Local Aspirational Leading Option is often related to timing. For example, the National Leading Option may not recommend a new coastal defence until epoch 2 or 3 when the risk increases and the economic case provides justification to do so. However, there may

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be a local preference to construct a new defence sooner than this, for example, in epoch 1 to avoid losses or impacts on assets in the interim. Typically the earlier timing of capital interventions negatively impacts the benefit cost ratios of options as the cost of the capital intervention are discounted less than capital interventions undertaken at a later stage.

- 6.1.15 With respect to FCERM-GiA availability for the Local Aspirational Leading Options, this will be capped at the amount of FCERM-GiA available for the National Leading Option. Any Local Aspirational Leading Options will need to secure funding for all other costs.

### **Backup Option selection**

- 6.1.16 On a national basis, funding availability is recognised as a constraint for delivering FCERM options and schemes. This is representative of the situation in the Strategy area and in most cases, both the National Leading Option and Local Aspirational Leading Option for each ODU would not be fully funded by FCERM-GiA. Significant funding shortfalls for both the leading National and Local Options are common.
- 6.1.17 It is the aspiration of both BCP and NFDC to work with funding partners to secure the additional funding to deliver the Strategy, however, it is recognised that this may not always be possible. Therefore, for each ODU where there is a large funding shortfall for the major capital scheme (i.e. > several £million) a Backup Option has also been identified.
- 6.1.18 The Backup Options do not typically involve large capital schemes to upgrade the standard of protection of defences and are instead focussed on more frequent defence maintenance / refurbishments. This means that the Backup Options typically have lower present value cost than the National / Local Aspirational Options and would be more deliverable as there would not be a large one-off funding shortfall associated with a major capital scheme. Instead smaller scale and less costly (but more frequent) interventions would be needed.

### **Partnership Funding**

- 6.1.19 Where possible, indicative Partnership Funding scores have been calculated for the initial major capital schemes recommended by the leading options in the Strategy.
- 6.1.20 For the many of the leading options, the first major capital scheme is not outlined to occur until epoch 2 or 3. To work out indicative GiA availability the base date for the calculation has assumed a ‘jump forward’ in time to the time of the scheme.
- 6.1.21 There are many uncertainties associated with the indicative Partnership Funding calculations that are outlined in the Economic Appraisal Report (Appendix F) and the calculations should be viewed within the context of this uncertainty. The funding calculations therefore should be viewed as a way of illustrating approximate / hypothetical funding availability and to indicate the possible scale of contributions that are likely to be required to deliver the major schemes in the leading options.

## **6.2 SMZ 1 (Mundeford Sandbank)**

### **Selecting the leading options**

- 6.2.1 Table 6-1 presents the benefit cost assessment for the ODUs within SMZ 1. The options have been ranked according to NPV because the options are focussed on managing coastal erosion risk. For erosion risk options it is not possible to rank the options according to flooding AEP and use the incremental AEP decision thresholds.

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**Table 6-1: Benefit-cost assessment for SMZ 1**

Option	Description	PV Costs (£k)	PV Benefits (£k)	ABCR	NPV (£k)	Leading Option(s)
<b>ODU 1 – Hengistbury Head East</b>						
Do Nothing	Baseline option. No active intervention.	0	0	-	0	Provisional economic
Do Minimum	Small scale maintenance but defences may fail in the future.	340	0	-	-340	National
Managed Realignment	Refurbish defences at toe of cliff. Some cliff erosion would still occur due to slope processes and sea level rise but the process would be controlled.	2,823	0	-	-2,823	Local
Improve	Upgrade defences at toe of cliff to make more robust against sea level rise and minimise cliff erosion.	3,240	0	-	-3,240	
<b>ODU 2 – Mudeford Sandbank</b>						
Do Nothing	Baseline option. No active intervention	0	0	-	0	Provisional economic
Do Minimum	Small scale maintenance but defences may fail in the future.	680	0	-	-680	National
Maintain & Adaptation	Maintain option with PLR	5,456	89	0.02	-5,367	Local
Maintain	Undertake defence refurbishments and beach nourishment in the future. Some limited rollback of the Sandbank may occur but the shape / function of the Sandbank would be largely retained.	5,382	0	-	-5,382	
Managed Realignment	Actively facilitate rollback of the Sandbank in a controlled and proactive manner, moving and refurbishing rock defences as required.	5,382	0	-	-5,382	
Improve	Upgrade the defences in the long term and hold the Sandbank in its current position.	6,933	145	0.02	-6,788	

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### **ODU 1 (Hengistbury Head east)**

- 6.2.2 Due to a lack of benefits directly attributed to this location, none of the short list options have an NPV above 0.
- 6.2.3 Do Nothing has the strongest economic case because it does not have a negative NPV and was therefore identified as the provisional economic leading option. However, Do Nothing is not acceptable from a technical perspective because it would lead to increased uncertainty in the morphology of the area, leading to reduced shelter to Christchurch Harbour and outflanking of the Hengistbury Head long groyne.
- 6.2.4 The next strongest option from an economic perspective is Do Minimum and therefore this has been identified as the National Leading Option. However, Do Minimum does not meet wider objectives and there would still be some uncertainty with this option in the long term if erosion were to occur if defences fail in the future.
- 6.2.5 Managed Realignment has therefore been identified as the Local Aspirational Option. This option would provide greater certainty from a technical perspective and would also lead to less environmental and social impacts. The expenditure required for the Local Aspirational Option would need to come from non-GiA sources. Wider local benefits (up to £7.7million) that are not presented in the economic comparison in Table 6-1 would justify the expenditure from a local economic perspective.

### **ODU 2 (Mundeford Sandbank)**

- 6.2.6 Due to a lack of benefits directly attributed to this location, none of the short list options have an NPV above 0.
- 6.2.7 Do Nothing has the strongest economic case because it does not have a negative NPV and was therefore identified as the provisional economic leading option. However, Do Nothing is not acceptable from a technical perspective because it would lead to increased uncertainty in the morphology of the area, leading to unmanaged rollback of the Sandbank, exposure, and damage to buried services and reduced shelter to Christchurch Harbour.
- 6.2.8 The next strongest option from an economic perspective is Do Minimum and therefore this has been identified as the National Leading Option. However, Do Minimum does not meet wider objectives and there would still be some uncertainty with this option in the long term if rollback of the Sandbank were to occur if defences fail in the future.
- 6.2.9 Maintain with Adaptation has therefore been identified as the Local Aspirational Option. This option would provide greater certainty from a technical perspective and would lead to wider benefits such as reduced disruption to the beach huts and businesses on the Sandbank and would continue to support this area as an important recreation and tourism location. The expenditure required for the Local Aspirational Option would need to come from non-GiA sources. Wider local benefits (up to £14million) that are not presented in the economic comparison in Table 6-1 would justify the expenditure from a local economic perspective.

## **Sensitivity testing**

### **Option cost**

- 6.2.10 A key uncertainty in SMZ 1 relates to option cost. As outlined in the previous section, on a national basis there is already no economic case for either the National or Local Options

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due to a lack of nationally eligible benefits in SMZ 1. Therefore sensitivity testing the option cost will not change the comparison of options in the national context.

6.2.11 However, on a local basis, there are estimated to be up to £7.7million and £14million of benefits in ODU 1 and ODU 2 respectively that would be delivered by the Local Aspirational Option in these locations (these benefits not shown in Table 6-1 as they are not nationally eligible). These benefit amounts are approximately twice the estimated cost of the Local Aspirational Options and therefore even with a cost increase of 100% these options would still have a favourable economic case in the local cost / benefit context.

## Details of the leading options

### Technical aspects

6.2.12 The key strategic issue in SMZ 1 relates to the evolution and position of the shoreline in the future. Under a Do Nothing scenario, once existing defences fail then Hengistbury Head would erode and Mudeford Sandbank would be expected to roll back into Christchurch Harbour. This would lead to a number of risks and uncertainties:

- If the erosion to the headland and roll back of the Sandbank occur at different rates then a disconnect in the shoreline position could occur which would threaten the overall stability of the system and could lead to increased risk of breaching, with uncertain consequences for the wider area in terms of physical processes and habitats as well as adversely impacting the management intent in Poole Bay which is to prevent a breach into the harbour from that direction.
- Rollback of the Sandbank would expose buried services which would lead to them becoming damaged.
- Rollback of the Sandbank could be accompanied by other morphological changes such as flattening of the Sandbank. Changes in position or geometry of the Sandbank could lead to the Sandbank providing less shelter to Christchurch Harbour, impacting the flood risk in the Harbour itself.
- Unmanaged erosion of Hengistbury Head and rollback of the Sandbank would lead to erosion of the scheduled monument at Hengistbury Head and would lead to disruption to beach huts and businesses and loss of tourism value from the Sandbank. The Sandbank is a key attraction for visitors within the wider Strategy area and loss or damage to the Sandbank would likely have a wider impact on tourism within the Strategy frontage.
- Unmanaged erosion on the east side of the headland at Hengistbury Head could lead to outflanking of Hengistbury Head long groyne which is a key coastal defence for FCERM within Poole Bay and is shortly due to undergo refurbishment.

6.2.13 In SMZ 1, when appraised on a national basis, due to a lack of nationally eligible damages and benefits there is little economic justification for extensive FCERM interventions and therefore the National Option in both ODU 1 and 2 is to Do Minimum. Do Minimum would involve undertaking small scale maintenance of existing defences to prolong their service life. This would likely prevent the risks outlined above from occurring in the short term, but in the medium and long term there is uncertainty as to how long existing defences could be maintained and therefore some of the risks outlined above could occur.

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- 6.2.14 With this in mind a Local Aspirational Option has been identified in both ODUs which would require additional non-GiA funding but would minimise the likelihood of the risks outlined above from occurring and would provide increased confidence in the shoreline evolution in the medium and long term.
- 6.2.15 In ODU 1 the Local Aspirational Option is Managed Realignment. This would involve a series of refurbishments to the existing defences over time to reduce the amount of wave action at the cliff toe. There would still be some erosion over time due to cliff slope processes and erosion would not be stopped entirely, but the rate of erosion could be controlled and significant erosion of the headland would not be expected to occur.
- 6.2.16 In ODU 2 the Local Aspirational Option is Maintain with Adaptation. This would involve a series of refurbishments to the existing defences on the Sandbank (rock groynes, rock revetment and seawall) and beach nourishment to increase beach levels relative to sea level rise. Property level resilience measures would then be undertaken in the businesses on the Sandbank to help mitigate the consequences of flooding. The goal of this option is to sustain the shape, position and function of the Sandbank over the appraisal period. There may be some limited rollback / movement that occurs in response to storm events, but this would be controlled with beach management so that any movement occurs in unison with Hengistbury Head.
- 6.2.17 A full schedule of proposed works as part of the leading options is provided in the Economic Appraisal Report and Leading Options Report (Appendix F and C). As these are erosion defences, an indicative SoP for the defences has not been determined. Defence heights will need to be established during business case development, considering aspects such as wave run-up, rock sizing, and volume of beach nourishment required.

### **Environmental aspects**

- 6.2.18 The Strategy HRA Appropriate Assessment concluded that the Local Aspirational Options in SMZ 1 would not have any adverse effects on the qualifying features, and thus the integrity of the Dorset Heaths SAC, the Dorset Heathlands SPA or the Solent and Dorset Coast SPA.
- 6.2.19 The Strategy WFD assessment concluded that beach nourishment in ODU 2 as part of the Local Aspirational option has the potential for water quality deterioration in the Coastal Dorset / Hampshire water body. These impacts can be mitigated accordingly and will be confirmed at scheme stage in the design and construction methodologies. Beach nourishment materials will come from licenced dredging areas which will have had separate environmental studies undertaken to confirm impacts.
- 6.2.20 The Strategy SEA assessment concluded that the Local Aspirational Options in SMZ 1 are likely to have an overall positive impact across most of the environmental categories. In categories where there is potential for minor negative impacts (such as the historic environment in ODU 1 due to the potential for some limited erosion of the Hengistbury Head scheduled monument), it is recommended that a programme of recording is established for heritage assets.
- 6.2.21 The MCZ assessment concluded that the leading options would have no significant risk to the conservation objectives of the Needles MCZ and Southbourne Rough MCZ.
- 6.2.22 There is potential for environmental enhancements and BNG as part of the Local Aspirational Options in SMZ 1; including opportunities for sand dune creation at ODU 2 that will be developed as part of the scheme implementation.

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## Costs of the leading options

6.2.23 Table 6-2 presents the present value costs of the leading options in SMZ 1. Costs are presented by capital costs and time epoch.

**Table 6-2 Present Value Costs of Leading Options in SMZ 1**

ODU	Option	Cost	Epoch 1 (2024-2044) (£K)	Epoch 2 (2044-2074) (£K)	Epoch 3 (2074-2144) (£K)	Total (£K)
1	Local Aspirational Option: Managed Realignment	Capital	1,459	632	454	2,545
		Non-Capital	137	91	50	278
		Total	1,596	724	503	2,823
2	Local Aspirational Option: Maintain with Adaptation	Capital	2,588	1,122	1,533	5,243
		Non-Capital	98	74	40	213
		Total	2,686	1,196	1,574	5,456

## Contributions and funding

6.2.24 Where possible indicative Partnership Funding scores have been calculated for the initial capital schemes recommended by the leading options in the Strategy.

6.2.25 However, calculations have not been undertaken for SMZ 1 because both of the Local Aspirational Options do not have a benefit cost ratio above unity in the national benefits context therefore a Partnership Funding calculation would not be valid.

6.2.26 It is recognised that FCERM GiA for SMZ 1 will not be available and funding will need to come from other sources, such as Local Levy, Local Council, private investments etc.

6.2.27 In the Economic Appraisal Report (Appendix F) the local economic damages avoided / benefits for the leading options have been determined and will be used as justification for investment to support the leading options in SMZ 1.

## 6.3 SMZ 2 (Christchurch Harbour)

### Selecting the leading options

6.3.1 Table 6-3 and Table 6-4 present the benefit cost assessment for the ODUs within SMZ 2. For ODUs 3, 4, 5, 6 and 11 the options have been ranked according to NPV (Table 6-3) and for ODUs 7, 9 and 10 the options have been ranked according to AEP (Table 6-4).

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**Table 6-3: Benefit-cost assessment for SMZ 2 (NPV comparisons for ODUs 3, 4, 5, 6 & 11)**

Option	Description	PV Costs (£k)	PV Benefits (£k)	ABCR	NPV (£k)	Leading Option(s)
<b>ODU 3 – Christchurch Harbour South</b>						
Adaptation / Resilience A	Property level resilience measures to properties at risk from flooding	118	669	5.67	551	Provisional Economic / National
Adaptation / Resilience B	Property level resilience measures to properties at risk from flooding, and localised erosion defences to Hengistbury Head access road	253	669	2.64	416	
Adaptation / Resilience C	Property level resilience measures to properties at risk from flooding, and localised erosion defences to Hengistbury Head access road and historic landfill site	776	811	1.05	35	Local
Do Nothing	Baseline option. No active intervention	-	0	-	-	
Do Minimum	Small scale maintenance but defences may fail in the future	44	0	-	-44	
Maintain A	Localised erosion defences to Hengistbury Head access road	204	0	-	-204	
Maintain B	Localised erosion defences to Hengistbury Head access road and historic landfill site	727	143	0.20	-584	
<b>ODU 4 - Wick</b>						
Sustain C	Upgrade setback defences incrementally over time to provide defined SoP.	1,468	3,586	2.44	2,118	Provisional Economic / National
Improve C	Same approach as Sustain C, except defence raised in one intervention to provide defined SoP for the end of the appraisal period.	2,889	3,850	1.33	961	
Sustain B	Upgrade setback defences incrementally over time to provide defined SoP. Refurbish quay wall to defend historic landfill site from erosion.	3,499	3,638	1.04	139	Local
Do Nothing	Baseline option. No active intervention.	-	0	-	-	
Do Minimum	Small scale maintenance but defences may fail in the future.	340	8	0.02	-332	
Improve B	Same approach as Sustain B, except defence raised in one intervention to provide defined SoP for the end of the appraisal period.	4,919	3,902	0.79	-1,017	
Maintain	Capital refurbishments to quay wall and setback flood embankment.	2,684	39	0.01	-2,645	
Sustain A	Upgrade defences incrementally over time to provide defined SoP. Construct new quay wall in epoch 1 with frontline defence that will also defend historic landfill site from erosion.	6,301	3,638	0.58	-2,663	

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Option	Description	PV Costs (£k)	PV Benefits (£k)	ABCR	NPV (£k)	Leading Option(s)
Improve A	Same approach as Sustain A, except defence raised in one intervention to provide defined SoP for the end of the appraisal period.	10,818	3,902	0.36	-6,916	
<b>ODU 5 – Willow Drive and the Quomps</b>						
Improve F	Same approach as Sustain F, except defence raised in one intervention to provide defined SoP for the end of the appraisal period.	11,383	34,424	3.02	23,041	Provisional Economic / National
Improve E	Same approach as Sustain E, except defence raised in one intervention to provide defined SoP for the end of the appraisal period.	13,953	36,424	2.61	22,471	
Improve D	Same approach as Sustain D, except defence raised in one intervention to provide defined SoP for the end of the appraisal period.	14,553	36,424	2.50	21,871	
Improve C	Same approach as Sustain C, except defence raised in one intervention to provide defined SoP for the end of the appraisal period.	13,660	34,439	2.52	20,779	Local
Sustain F	Upgrade defences incrementally over time to provide defined SoP. Same defence alignment as Sustain C but initial intervention from epoch 2.	11,059	31,752	2.87	20,693	
Sustain E	Upgrade defences incrementally over time to provide defined SoP. Same defence alignment as Sustain B but initial intervention from epoch 2.	13,943	33,449	2.40	19,506	
Sustain D	Upgrade defences incrementally over time to provide defined SoP. Same defence alignment as Sustain A but initial intervention from epoch 2.	16,547	33,449	2.02	16,902	
Sustain C	Upgrade defences incrementally over time from epoch 1 to provide defined SoP. Setback defence in east and west part of the unit.	15,398	31,769	2.06	16,371	
Improve B	Same approach as Sustain B, except defence raised in one intervention to provide defined SoP for the end of the appraisal period.	20,908	36,532	1.75	15,624	Local
Improve A	Same approach as Sustain A, except defence raised in one intervention to provide defined SoP for the end of the appraisal period.	22,507	36,532	1.62	14,025	Local
Sustain B	Upgrade defences incrementally over time from epoch 1 to provide defined SoP. Frontline defence in east part of the unit.	21,130	33,481	1.58	12,351	
Sustain A	Upgrade defences incrementally over time from epoch 1 to provide defined SoP. Setback defence in east part of the unit.	24,435	33,481	1.37	9,046	
Adaptation / Resilience	Capital refurbishments to quay wall and defences. PLR to properties at risk from flooding	11,927	16,526	1.39	4,599	Backup

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Option	Description	PV Costs (£k)	PV Benefits (£k)	ABCR	NPV (£k)	Leading Option(s)
Do Minimum	Small scale maintenance but defences may fail in the future.	340	820	2.41	480	
Do Nothing	Baseline option. No active intervention.	-	0	-	-	
Maintain	Capital refurbishments of quay wall and setback flood walls / defences	9,079	7,676	0.85	-1,403	
<b>ODU 6 – River Avon West Bank</b>						
Sustain B	New defences in the central flood cell of the unit in epoch 1 that would be raised incrementally over time to provide defined SoP. PLR measures to properties in southern flood cell of the unit.	3,278	3,666	1.12	388	Provisional Economic
Adaptation / Resilience	Capital refurbishments of quay walls. PLR to properties at risk of flooding	2,802	2,877	1.03	75	National
Do Nothing	Baseline option. No active intervention.	-	0	-	-	
Do Minimum	Small scale maintenance but defences may fail in the future.	170	0	-	-170	
Improve B	Same approach as Sustain B, except defence raised in one intervention to provide defined SoP for the end of the appraisal period.	4,988	3,783	0.76	-1,205	
Maintain	Capital refurbishments of existing quay walls.	1,519	0	-	-1,519	
Sustain A	New defences constructed in the central and southern flood cells of the unit in epoch 1 that would be raised incrementally over time to provide defined SoP.	7,877	4,519	0.57	-3,358	
Improve A	Same approach as Sustain A, except defence raised in one intervention to provide defined SoP for the end of the appraisal period.	10,252	5,774	0.56	-4,478	
<b>ODU 11 – Mundeford Quay</b>						
Do Nothing	Baseline option. No active intervention.	-	-	-	-	Provisional Economic
Do Minimum	Small scale maintenance but defences may fail in the future.	340	0	0	-340	National
Adaptation / Resilience	Capital refurbishments to quay walls. PLR to properties at risk from flooding.	9,530	680	0.07	-8,850	Local
Maintain	Capital refurbishments to quay walls.	9,350	10	0.00	-9,340	
Improve A	Same approach as Sustain A, except defence raised in one intervention to provide defined SoP for the end of the appraisal period.	10,765	1,326	0.12	-9,439	

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Option	Description	PV Costs (£k)	PV Benefits (£k)	ABCR	NPV (£k)	Leading Option(s)
Sustain A	Capital refurbishments to quay walls and construction of new setback flood scheme around properties at risk in epoch 1. Flood defences raised incrementally over time to provide defined SoP.	10,688	1,188	0.11	-9,500	
Sustain B	Same as Sustain A, except new flood defence also constructed in epoch 1 to defend road (Chichester Way) from flooding.	11,615	1,188	0.10	-10,427	
Improve B	Same approach as Sustain B, except defences raised in one intervention to provide defined SoP for the end of the appraisal period.	11,801	1,326	0.11	-10,475	

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**Table 6-4: Benefit-cost assessment for SMZ 2 (AEP comparisons for ODUs 7, 9 and 10)**

Option	Description	PV Costs (£k)	PV Benefits (£k)	ABCR	NPV (£k)	Leading Option(s)
<b>ODU 7 – Rossiters Quay</b>						
Do Nothing	Baseline option. No active intervention.	-	0	-	-	
Do Minimum	Small scale maintenance but defences may fail in the future.	340	313	0.92	-27	
Maintain	Capital refurbishments to existing quay walls and setback defences.	1,975	1,672	0.85	-303	
Adaptation / Resilience	Capital refurbishments to existing quay walls and setback defences. PLR to properties at risk from flooding in the future.	2,630	3,253	1.24	632	Backup
Sustain A (75yr)	Construct new raised defences from epoch 2 and raise incrementally over time to provide defined SoP.	4,031	4,743	1.18	712	
Sustain A (200yr)		4,090	5,178	1.27	1,088	
Improve A (75yr)	Same approach as Sustain except defence raised in one intervention to provide defined SoP for the end of the appraisal period.	4,060	5,244	1.29	1,184	
Improve A (200yr)		4,118	5,329	1.29	1,211	Provisional Economic / National
<b>ODU 9 - Stanpit</b>						
Do Nothing	Baseline option. No active intervention.	-	0	-	-	
Do Minimum	Small scale maintenance but defences may fail in the future.	510	1,293	2.54	783	
Maintain	Capital refurbishments to existing defences and strengthening of verge around historic landfill sites.	7,087	6,700	0.95	-387	
Adaptation / Resilience	Same as Maintain with the addition of PLR measures to properties at risk from flooding in the future.	8,271	12,554	1.52	4,283	Backup
Sustain A (75yr)	Construct new raised defences from epoch 2 and raise incrementally over time to provide defined SoP.	10,859	34,284	3.16	23,425	
Sustain A (200yr)		10,960	37,809	3.45	26,849	Provisional Economic / National
Improve A (75yr)	Same approach as Sustain except defence raised in one intervention to provide defined SoP for the end of the appraisal period.	11,760	37,632	3.20	25,872	
Improve A (200yr)		12,082	39,007	3.23	26,925	
<b>ODU 10 - Mundeford</b>						
Do Nothing	Baseline option. No active intervention.	-	0	-	-	
Do Minimum	Small scale maintenance but defences may fail in the future.	340	0	-	-340	
Maintain	Capital refurbishments to existing quay walls.	3,526	0	-	-3,526	
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Option	Description	PV Costs (£k)	PV Benefits (£k)	ABCR	NPV (£k)	Leading Option(s)
Adaptation / Resilience	Same as Maintain with the addition of PLR measures to properties at risk from flooding in the future.	5,473	2,777	0.51	-2,696	Backup
Improve A (75yr)	Construct new raised defences in epoch 3 to defined SoP at the of the appraisal period.	8,319	10,493	1.26	2,174	
Improve B (75yr)	Construct new raised defences in epoch 3 to defined SoP at the of the appraisal period. Different alignment to Improve A (setback in west part of unit)	9,003	10,493	1.17	1,490	
Improve A (200yr)	Construct new raised defences in epoch 3 to defined SoP at the of the appraisal period.	8,373	11,124	1.33	2,751	Provisional Economic / National
Improve B (200yr)	Construct new raised defences in epoch 3 to defined SoP at the of the appraisal period. Different alignment to Improve A (setback in west part of unit)	9,071	11,124	1.23	2,053	

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### ODU 3 – Christchurch Harbour South

- 6.3.2 In Table 6-3 the short list options have been ranked according to NPV because the options are primarily focussed on managing coastal erosion risk. For erosion risk options it is not possible to rank the options according to flooding AEP and use the incremental AEP decision thresholds.
- 6.3.3 Adaptation / Resilience A has the strongest economic case with the largest NPV and was therefore identified as the provisional economic leading option. After considering uncertainty and sensitivity tests, this option was retained and was identified as the National Option. However, Adaptation / Resilience A does not meet wider objectives because it does not include erosion defences to Hengistbury Head access road or the historic landfill sites.
- 6.3.4 Adaptation / Resilience C has therefore been identified as the Local Aspirational Option. This option would provide erosion defences to these areas and would therefore meet wider objectives and be favourable from an environmental perspective. The additional expenditure required for the Local Aspirational Option would need to come from non-GiA sources. Wider local benefits (up to £6.44million) that are not presented in the economic comparison in Table 6-3 would help justify the additional expenditure from a local economic perspective.

### ODU 4 - Wick

- 6.3.5 The options in ODU 4 consider both flooding and erosion risk. The options cannot be ordered based on AEP as different areas are being defended in each of the options and the options have different strategic intentions such as including / excluding erosion defences. In Table 6-3 the options have therefore been ranked by NPV initially and then once the National Option was identified, additional IBCR testing was carried out to determine the desired SoP. As can be seen in Table 6-3, Sustain C has the strongest economic case with the largest NPV and was identified as the provisional economic leading option. After considering uncertainty and sensitivity tests, this option was retained and was identified as the National Option.
- 6.3.6 Sustain C includes flood defences and therefore in Table 6-5 the AEP IBCR thresholds have been used to determine the desired SoP of these defences:
- For Sustain C the IBCR of moving from a 75yr SoP to a 200yr SoP is greater than the threshold in FCERM-AG (threshold of 3 required).
  - The IBCR of moving from a 200yr SoP to a higher SoP initially (the Improve C option would have an initial SoP higher than 1 in 200 years) is less than the next threshold in FCERM-AG (threshold of 5 required).
- 6.3.7 Based on the IBCR analysis, a 200yr SoP for Sustain C is recommended.

**Table 6-5: IBCR comparison for ODU 4**

	PV Costs (£k)	PV Benefits (£k)	Av. Benefit/Cost Ratio	Incremental BCR	Leading SoP
Sustain C (75yr SoP)	1,468	3,586	2.44	-	
Sustain C (200yr SoP)	1,490	3,898	2.62	14.18	X
Improve C (200yr SoP at end of appraisal period)	3,124	4,029	1.29	0.08	

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- 6.3.8 Sustain C does not meet wider objectives because it does not include refurbishments or replacement of the quay wall adjacent to the historic landfill site. This could lead to failure of this wall and erosion of the historic landfill site in the future.
- 6.3.9 Sustain B has therefore been identified as the Local Aspirational Option. This option would involve refurbishing the quay wall to prevent erosion of the historic landfill. This is more favourable from a wider objective and environmental perspective. The additional expenditure required for the Local Aspirational Option would need to come from non-GiA sources.

### ODU 5 – Willow Drive and the Quomps

- 6.3.10 The options in ODU 5 consider both flooding and erosion risk. The options cannot be ordered based on AEP as different areas are being defended in each of the options and the options have different strategic intentions such as including / excluding erosion defences. In Table 6-3 the options have therefore been ranked by NPV initially and then once the National Option was identified, additional IBCR testing was carried out to determine the desired SoP. As can be seen in Table 6-3, Improve D-F have the strongest economic case with the largest NPVs. Each of these options is similar in intent but would be delivered using different defence alignments. It is too early in the appraisal of these options to identify an exact alignment (further work would be needed during business case development) and therefore each of these options has been identified as provisional economic options. After considering uncertainty and sensitivity tests, these options were retained and identified as the National Options.
- 6.3.11 Improve D-F includes flood defences and therefore in Table 6-6 the AEP IBCR thresholds have been used to determine the desired SoP of these defences:
- For each of these options, the IBCR of moving to a 200yr SoP is greater than the threshold in FCERM-AG (threshold of 3 required)
  - Higher SoPs than 1 in 200 year have not been tested as this SoP is already high being the target for end of the appraisal period with the Improve D-F options.
- 6.3.12 Based on the IBCR analysis, a 200yr SoP is recommended.

**Table 6-6: IBCR comparison for ODU 5**

	PV Costs (£k)	PV Benefits (£k)	Av. Benefit/Cost Ratio	Incremental BCR	Leading SoP
Improve D:					
Improve D (75yr SoP)	14,553	36,424	2.50	-	
Improve D (200yr SoP)	14,702	37,306	2.54	5.92	X
Improve E:					
Improve E (75yr SoP)	13,953	36,424	2.61	-	
Improve E (200yr SoP)	14,059	37,306	2.65	8.32	X
Improve F:					
Improve F (75yr SoP)	11,383	34,424	3.02	-	
Improve F (200yr SoP)	11,397	35,206	3.09	55.86	X

- 6.3.13 Improve D-F does not involve an immediate intervention (new defences not constructed until epoch 2. There is a local aspiration to intervene sooner than this to provide increased confidence in the status of the frontline quay wall in this location because there is historic landfill located landward.

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6.3.14 Improve A-C have therefore been identified as the Local Aspirational Options. This option would involve an earlier intervention in epoch 1 and provide increased confidence in the robustness of the defences over the short term. The additional expenditure required for the Local Aspirational Option would need to come from non-GiA sources.

6.3.15 The Adaptation / Resilience option was identified as a Backup Option in case funding for either the National or Local Options could not be secured.

### ODU 6 – River Avon West Bank

6.3.16 The options in ODU 6 consider both flooding and erosion risk. The options cannot be ordered based on AEP as different areas are being defended in each of the options and the options have different strategic intentions. In Table 6-3 the options have therefore been ranked by NPV. As can be seen in Table 6-3, Sustain B has the strongest economic case with the largest NPV and was identified as the provisional economic leading option. However, upon further sensitivity testing, this option is not considered to be deliverable (see sensitivity testing section for more details).

6.3.17 The Adaptation / Resilience option has the next strongest economic case and was therefore selected as the National Option.

6.3.18 No Local Aspirational Option was identified for ODU 6.

### ODU 7 – Rossiters Quay

6.3.19 The options in ODU 7 are primarily focussed on managing flood risk and have the same benefit areas / strategic intentions. Therefore in Table 6-4 it has been possible to order the options by reducing AEP (increasing SoP). As can be seen in Table 6-4, the option with the highest ABCR is Improve A (200yr SoP) and this option was therefore identified as the provisional economic leading option. After considering uncertainty and sensitivity tests, this option was retained and was identified as the National Option.

6.3.20 Improve A provides the highest SoP of the options considered and whilst it was identified as the National Option, for completeness a comparison of the IBCR between the lower SoPs has been undertaken and presented in Table 6-7:

- For Sustain A the IBCR of moving to a 200yr SoP is greater than the threshold in FCERM-AG (threshold of 3 required).
- The IBCR of moving to Improve A with an even higher SoP initially (the Improve A option would have an initial SoP higher than 1 in 200 years) is 5.39 which is above the threshold (threshold of 5 required).

6.3.21 The IBCR analysis confirms Improve A (200yr SoP) as the recommended SoP.

**Table 6-7: IBCR comparison for ODU 7**

	PV Costs (£k)	PV Benefits (£k)	Av. Benefit/Cost Ratio	Incremental BCR	Leading SoP
Sustain A (75yr SoP)	4,031	4,743	1.18	-	
Sustain A (200yr SoP)	4,090	5,178	1.27	7.37	
Improve A (200yr SoP at end of appraisal period)	4,118	5,329	1.29	5.39	X

6.3.22 No Local Aspirational Option was identified for ODU 7. The Adaptation / Resilience Option has been identified as a Backup Option in case funding for the National Option could not be secured.

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## ODU 9 – Stanpit

6.3.23 The options in ODU 9 have the same benefit areas in terms of flood risk reduction and have the same strategic intentions with regards to defending the historic landfill sites. Therefore in Table 6-4 it has been possible to order the options by reducing AEP (increasing SoP). As can be seen in Table 6-4, the option with the highest ABCR is Sustain A (200yr SoP) and this option was therefore identified as the provisional economic leading option. After considering uncertainty and sensitivity tests, this option was retained and was identified as the National Option.

6.3.24 Sustain A includes flood defences and therefore in Table 6-8 the AEP IBCR thresholds have been used to confirm the desired SoP of these defences:

- For Sustain A the IBCR of moving to a 200yr SoP is greater than the threshold in FCERM-AG (threshold of 3 required), and therefore the 200yr SoP is recommended.
- The IBCR of moving to a higher SoP initially (the Improve A option would have an initial SoP higher than 1 in 200 years) is less than the next threshold (threshold of 5 required).

6.3.25 The IBCR analysis confirms Sustain A (200yr SoP) as the recommended SoP.

**Table 6-8: IBCR comparison for ODU 9**

	PV Costs (£k)	PV Benefits (£k)	Av. Benefit/Cost Ratio	Incremental BCR	Leading SoP
Sustain A (75yr SoP)	10,859	34,284	3.16	-	
Sustain A (200yr SoP)	10,960	37,809	3.45	34.90	X
Improve A (200yr SoP at end of appraisal period)	12,082	39,007	3.23	1.07	

6.3.26 No Local Aspirational Option was identified for ODU 9. The Adaptation / Resilience Option has been identified as a Backup Option in case funding for the National Option could not be secured.

## ODU 10 – Mundeford

6.3.27 The options in ODU 10 have the same benefit areas in terms of flood risk reduction. Therefore in Table 6-4 it has been possible to order the options by reducing AEP (increasing SoP). As can be seen in Table 6-4, the option with the highest ABCR is Improve A (200yr SoP) and this option was therefore identified as the provisional economic leading option. After considering uncertainty and sensitivity tests, this option was retained and was identified as the National Option.

6.3.28 Improve A provides the highest SoP of the options considered and whilst it was identified as the National Option, for completeness a comparison of the IBCR between the lower SoPs has been undertaken and presented in Table 6-9:

- For Improve A (75yr SoP) the IBCR of moving to a 200yr SoP is greater than the threshold in FCERM-AG (threshold of 3 required), and therefore the 200yr SoP is recommended.
- Higher SoPs than 1 in 200 year have not been tested as this SoP is already high being the target for end of the appraisal period with the Improve A option.

6.3.29 The IBCR analysis confirms Improve A (200yr SoP) as the recommended SoP.

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**Table 6-9: IBCR comparison for ODU 10**

	PV Costs (£k)	PV Benefits (£k)	Av. Benefit/Cost Ratio	Incremental BCR	Leading SoP
Improve A (75yr SoP)	8,319	10,493	1.26	-	
Improve A (200yr SoP at end of appraisal period)	8,373	11,124	1.33	11.69	X

**6.3.30** No Local Aspirational Option was identified for ODU 10. The Adaptation / Resilience Option has been identified as a Backup Option in case funding for the National Option could not be secured.

**ODU 11 (Mudford Quay)**

6.3.31 In Table 6-3 the short list options have been ranked according to NPV because the options are primarily focussed on managing coastal erosion risk. For erosion risk options it is not possible to rank the options according to flooding AEP and use the incremental AEP decision thresholds. Due to a lack of benefits directly attributed to this location, none of the short list options have an NPV above 0.

6.3.32 Do Nothing has the strongest economic case because it does not have a negative NPV and was therefore identified as the provisional economic leading option. However, Do Nothing is not acceptable from a technical perspective because it would lead to increased uncertainty in the morphology of the area, potentially leading increased wave activity, exposure and damage to buried services and reduced shelter to Christchurch Harbour.

6.3.33 The next strongest option from an economic perspective is Do Minimum and therefore this has been identified as the National Leading Option. However, Do Minimum does not meet wider objectives and there would still be some uncertainty with this option in the long term if defences fail in the future and Mudford Quay is eroded / lost.

6.3.34 Adaptation / Resilience has therefore been identified as the Local Aspirational Option. This option would provide greater certainty from a technical perspective and would lead to wider benefits such as reduced disruption and would continue to support this area as an important recreation and tourism location. The expenditure required for the Local Aspirational Option would need to come from non-GiA sources. Wider local benefits (up to £14.6million) that are not presented in the economic comparison in Table 6-3 would justify the expenditure from a local economic perspective.

**Sensitivity testing**

6.3.35 A range of sensitivity tests have been undertaken on the option appraisal in SMZ 2. These are summarised below and further details can be found in the Economic Appraisal Report (Appendix F).

**Option cost**

6.3.36 A key uncertainty for the options in SMZ 2 relates to option cost. Sensitivity tests that increase the National Options costs by 10% and 25% have been undertaken to determine whether the increase in cost would change the choice of the National Options. In summary, the results of the cost sensitivity tests and interpretation did not lead to changes in the choice of the National Option in any of the ODUs.

- In many ODUs a rise in the National Option costs by 10-25% would not impact which option had the strongest economic case.

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- In ODUs where a different option would have a stronger economic case as a result of the National Option costs increasing by 10-25%, due to similar packages of measures between options, similar cost increases would be expected to occur with the alternative options. This would negate the economic advantage that alternative options may have over the National Option and no changes would be recommended.

### Increased sea level rise

- 6.3.37 Another uncertainty for the options in SMZ 2 is the amount of sea level rise that could occur over the appraisal period. A sensitivity test was undertaken whereby the height of defences in each short option was increased by 0.9m. This equates to the difference between the H++ sea level rise scenario and the sea level rise value used in the Strategy appraisal.
- 6.3.38 Raising the height of all defences in a short list option would affect different options differently, as the option cost would be impacted to varying extents based on the package of measures that comprise an option. However, in general the results of the sea level rise sensitivity test show that the economic case of all options would be weaker, but the choice of National Option would remain unchanged.

### Consideration of funding mechanism – ODU 6

- 6.3.39 In ODU 6 there are two main flood cells. The main uncertainty associated with the provisional economic leading option (Sustain B) was whether the proposed defences for each flood cell would be deliverable in isolation. This was particularly important given the different pathways and funding mechanisms that could be followed here to deliver the measures in each flood cell.
- 6.3.40 In the south part of the unit, the property level protection could be delivered by individual property owners with support / coordination from BCP Council. The property owners may have access to flood resilience grants to help with funding. However, the flood defences in the north part of the unit would be a capital scheme, most likely with an aspiration to use FCERM-GiA if available and other funding sources.
- 6.3.41 If the benefits / costs from the property level protection in the south part of the unit were removed from the overall option, the economic viability of the flood defences in the north part of the unit was uncertain, which would impact FCERM-GiA availability. Therefore a sensitivity test was undertaken to determine the economic case of the flood defences in the north part of the unit in isolation.
- 6.3.42 The sensitivity test showed that the ABCR of the flood defences in the north part of the unit was below unity (if this was delivered in isolation) and there would be no economic justification to proceed with this part of the option.
- 6.3.43 Based on the results of this sensitivity test the choice of National Option is different to the provisional leading economic option in ODU 6.

## Details of the leading options

### Technical aspects

- 6.3.44 The key strategic issues in SMZ 2 include:
- The impact of sea level rise on the flood risk within Christchurch Harbour and the uncertainty around this; and

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- The erosion risk to historic landfill sites around Christchurch Harbour, such as at Stanpit, Wick and the Quomps.

6.3.45 The leading options in SMZ 2 have been selected to manage these strategic issues effectively, in a proactive and pragmatic way, recognising future uncertainty and potential funding limitations.

6.3.46 In each ODU within SMZ 2, where there is an economic case to do so, the National Option recommends upgraded flood defences to reduce the risk to properties and historic assets within the area. The National Options outline a phased programme of upgrades that are required based on the onset of risk that is expected according to the latest UKCP18 sea level rise projections. However, should sea levels rise faster or slower than anticipated, then the recommended defence upgrades can be brought forward or delayed accordingly, without impacting the overall success of the options.

6.3.47 In the National Options the upgraded flood defences are recommended in ODUs 4, 5, 7, 9 and 10 at various points in time in the future. These are the ODUs where the vast majority of properties, assets and infrastructure are expected to be at risk from flooding within SMZ 2. In total these options will reduce the flood risk to over 1900 properties over the appraisal period.

6.3.48 In ODUs 3, 6 and 11, there are only a small number of properties anticipated to be at risk from flooding over the appraisal period and there is not an economic case to construct new or upgraded flood defences to manage this risk. Instead, property level resilience measures are recommended as part of the National Leading Options in these locations.

6.3.49 In some ODUs (ODUs 5 and 9), it has been possible to incorporate defences to the historic landfill sites as part of the National Option. This has been possible where either the defences to historic landfill site would be dual purpose (i.e. flooding and erosion risk) or where there is a strong enough economic case in the unit to include additional expenditure on frontline defences to defend the historic landfill sites.

6.3.50 However, in other locations (ODUs 3, 4 and 11), due to economic limitations it has not been possible to incorporate erosion defences to the historic landfill sites as part of the National Option. Therefore in these locations a Local Aspirational Option has also been identified that includes erosion defences or frontline wall refurbishments to defend historic landfill sites from erosion.

6.3.51 A full schedule of proposed works as part of the leading options is provided in the Economic Appraisal Report (Appendix F). An indicative SoP for the defences has been identified as outlined previously. However, the SoP will need to be reappraised as part of business case development, including further consideration of defence heights and alignments.

### **Environmental aspects**

6.3.52 The conclusions and suggested mitigations of the Strategy HRA Appropriate Assessment for the leading options in SMZ 2 are summarised in Table 6-10 below.

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**Table 6-10: Summary of HRA Appropriate Assessment for SMZ 2**

European site	Recommendations / Mitigation
Dorset Heathlands SPA	<b>ODU 3</b> – in order to avoid adverse effects on hen harrier and merlin it is recommended to time the works of the Local Aspirational Option outside the over-wintering bird season
River Avon SAC	<p><b>ODU 7</b> – due to space constraints the National Option could cause temporary habitat loss and mitigation would be required during construction. The relevant works are not planned until epoch 2. Permanent habitat loss likely to be minimal but could be compensated for in ODU 3. This should be considered during erosion defence alignment decision here.</p> <p><b>ODU 6, 7 and 9</b> – works on frontline defences as part of the National Option that could affect the river bed should be undertaken at low tide</p>
Avon Valley SPA / Ramsar	<b>ODU 7</b> – due to space constraints the National Option could cause temporary habitat loss and mitigation would be required during construction. The relevant works are not planned until epoch 2. Permanent habitat loss likely to be minimal but could be compensated for in ODU 3. This should be considered during erosion defence alignment decision here.

6.3.53 The Strategy WFD assessment identified a range of potential impacts of the leading options on WFD objectives in SMZ 2 but identified suitable mitigation:

- At the Strategy stage there is considerable uncertainty in defence alignments for the leading options in SMZ 2 but there is a commitment to keeping any new defences within the footprints of existing defences where possible during scheme design. This will help to minimise impacts on WFD objectives.
- Construction will need to consider seasonal working to avoid impacts on sensitive species and construction methodologies will need to be developed in line with the EA’s Pollution Prevention guidance.
- In parts of ODUs 3, 9 and 10 there is potential for coastal squeeze of intertidal habitats in locations where the existing defence line may be held in place (subject to defence alignment decisions during scheme appraisal). The intertidal habitats are not qualifying features of the European sites but the WFD still recommended that any habitat loss is quantified at scheme level (once defence alignments are known). If the scheme appraisal identifies the need for mitigation / compensatory habitat then this should be agreed accordingly with assistance from the Regional Habitat Creation Programme. There is potential for defence realignment in parts of ODU 3 to create new intertidal habitat and this could be explored during scheme appraisal.
- In ODU 3, 4 and 11 there is potential for impacts to water quality to occur with the National Options if historic landfill sites erode, although it is recognised that further investigations to determine the contaminations status of these sites are required. Delivering the Local Aspirational Options in these locations would include defences to these sites and reduce this risk.

6.3.54 The Strategy SEA assessment concluded that the leading options in SMZ 2 are likely to have an overall positive impact across most of the environmental categories. In some areas there is potential for negative impacts to the historic environment due to residual flood risk and it is recommended that at scheme stage resilience measures and heritage impact assessments are undertaken, as well as a programme of recording for heritage assets.

6.3.55 The MCZ assessment concluded that the leading options would have no significant risk to the conservation objectives of the Needles MCZ and Southbourne Rough MCZ.

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6.3.56 There is potential for environmental enhancements and BNG as part of the leading options in SMZ 2; including opportunities for saltmarsh restoration and creation in multiple locations that will be developed as part of scheme implementation.

### Costs of the leading options

6.3.57 Table 6-11 presents the present value costs of the leading options in SMZ 2. Costs are presented by capital costs and time epoch.

**Table 6-11 Present Value Costs of Leading Options in SMZ 2**

ODU	Option	Cost	Epoch 1 (2024- 2044) (£K)	Epoch 2 (2044- 2074) (£K)	Epoch 3 (2074- 2144) (£K)	Total (£K)
3	Local Aspirational Option: Adaptation / Resilience C	Capital	378	164	118	660
		Non-Capital	48	45	24	116
		Total	426	209	142	776
4	Local Aspirational Option: Sustain B	Capital	1,632	931	732	3,294
		Non-Capital	101	67	36	204
		Total	1,733	998	768	3,499
5	Local Aspirational Option: (Improve B shown for reference)	Capital	19,913	0	859	20,772
		Non-Capital	67	45	24	136
		Total	19,980	45	883	20,908
6	National Option: Adaptation / Resilience	Capital	1,572	708	455	2,734
		Non-Capital	34	22	12	68
		Total	1,605	730	467	2,802
7	National Option: Improve A	Capital	0	4016	0	4016
		Non-Capital	34	45	24	103
		Total	34	4061	24	4118
9	National Option: Sustain A	Capital	0	9,487	1,269	10,756
		Non-Capital	101	67	36	204
		Total	101	9,554	1,306	10,960
10	National Option: Improve A	Capital	2,550	658	5,028	8,236
		Non-Capital	67	45	24	136
		Total	2,618	703	5,052	8,373
11	Local Aspirational Option: Adaptation / Resilience	Capital	5,411	2,363	1,689	9,462
		Non-Capital	34	22	12	68
		Total	5,445	2,384	1,701	9,530

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## Contributions and funding

- 6.3.58 Where possible indicative Partnership Funding scores have been calculated for the initial major capital schemes recommended by the leading options in the Strategy.
- 6.3.59 For the majority of the leading options in SMZ 2, the first major capital scheme is not outlined to occur until epoch 2 or 3. To work out indicative GiA availability the base date for the calculation has assumed a 'jump forward' in time to the time of the scheme.
- 6.3.60 Table 6-12 below presents the indicative funding scores. In ODUs where a Local Aspirational Option has been identified, the funding score for this option is shown. In ODUs where no Local Aspirational Option has been identified, the score for the National Option is shown. The funding scores for all the leading options are shown in Appendix F. *Note that the costs and benefits presented in this table are different to the values presented in the option appraisal due to a different base year and appraisal period duration.*
- 6.3.61 As can be seen, the funding scores range between 8-20% and therefore significant non-GiA funding is expected to be required to deliver the Strategy leading options (note that funding scores for National Options in SMZ 2 increase to 40% but significant non-GiA funding still required). BCP as an outcome of the Strategy have committed to developing a funding and implementation plan for the Strategy which will identify where funding will be obtained.
- 6.3.62 No Partnership Funding scores were calculated for ODUs 3, 6 and 11 as the leading options in these units are a combination of maintenance / PLR.
- 6.3.63 Where there is a large amount of non-GiA funding required to deliver either the National and/or Local Aspirational Options in a unit then Backup Options have been identified (ODUs 5, 7, 9 and 10). These Backup Options do not involve large capital schemes to upgrade defences and therefore the one-off funding needs for schemes are less and more deliverable.

**Table 6-12: Indicative Partnership Funding scores for major capital schemes as part of the Leading Options in SMZ 2**

ODU	Option	Capital scheme	PV cost (£k)	PV benefits (£k)	Indicative PF score	PV maximum eligible GiA (£k) for upfront costs	Minimum contribution / savings required (£k) for upfront cost
4	Local: Sustain B	Epoch 3	3,995	11,665	20%	775	3,013
5	Local: Improve B	Epoch 1	21,121	37,417	13%	2,536	17,589
7	National: Improve A	Epoch 2	8,121	8,535	8%	630	7,360
9	National: Sustain A	Epoch 2	21,365	45,966	16%	2,985	15,892
10	National: Improve A	Epoch 3	25,598	28,074	8%	2,093	23,394

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## 6.4 SMZ 3 (Christchurch Beaches and Cliffs)

### Selecting the leading options

6.4.1 Table 6-13 presents the benefit cost assessment for the ODUs within SMZ 3. The options have been ranked according to NPV because the options are focussed on managing coastal erosion risk. For erosion risk options it is not possible to rank the options according to flooding AEP and use the incremental AEP decision thresholds.

#### ODU 12 – Avon Beach and Friars Cliff

6.4.2 Improve A has the strongest economic case with the largest NPV and was therefore identified as the provisional economic leading option. After considering uncertainty and sensitivity tests, this option was retained and was identified as the National Option.

6.4.3 This area is key for tourism and recreation and there are aspirations in this area to improve the public realm, especially in the future when higher / larger sea defences will be required.

6.4.4 Improve C has therefore been identified as the Local Aspirational Option. This option would provide public realm enhancements as well as bringing forward the defence upgrades and beach nourishment, to provide more certainty in the short term and reduce the reliance on existing defences that are ageing. The additional expenditure required for the Local Aspirational Option would need to come from non-GiA sources. Wider local benefits that are not presented in the economic comparison in Table 6-13 could be considered to help justify the additional expenditure. The economic appraisal has identified up to £80million of local damages that could be avoided by either the National or Local Options. Public realm enhancements with the Local Option could differentiate this option and lead to additional recreation / tourism benefits that have not been calculated in the Strategy.

#### ODU 13 – Highcliffe

6.4.5 Improve C has the strongest economic case with the largest NPV and was therefore identified as the provisional economic leading option. After considering uncertainty and sensitivity tests, this option was retained and was identified as the National Option. This option does not include a beach nourishment scheme until epoch 3 which could lead to increased uncertainty before this point in time, particularly in the medium term (i.e. epoch 2) as the beach response to sea level rise is difficult to predict. Improve A has therefore been selected as the Local Aspirational Option as this option brings forward the start of beach nourishment interventions into epoch 2 which will reduce uncertainty.

6.4.6 The Managed Realignment options were considered in detail in this location but the project team decided not to pursue these options due to increased uncertainty, risk of causing instability at Highcliffe and a weaker economic case. Beach levels to the east will instead be managed holistically with beach management activities. More details can be found in the Leading Options report (Appendix C).

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**Table 6-13: Benefit-cost assessment for SMZ 3 (NPV comparisons for ODUs 12 and 13)**

Option	Description	PV Costs (£k)	PV Benefits (£k)	ABCR	NPV (£k)	Leading Option(s)
<b>ODU 12 – Avon Beach and Friars Cliff</b>						
Improve A	Refurbish existing seawall and revetment in epoch 1 and undertake defence upgrades and beach nourishment in epoch 2	8,443	8,978	1.06	535	Provisional Economic / National
Do Nothing	Baseline option. No active intervention.	-	-	-	-	
Do Minimum	Small scale maintenance but defences may fail in the future.	510	162	0.32	-348	
Improve B	Construct new linear defences along length of frontage (no beach nourishment)	11,398	8,978	0.79	-2,420	
Improve C	As per Improve A but undertake defence upgrades and beach nourishment in epoch 1 and also deliver public realm improvements	14,030	8,978	0.64	-5,052	Local
Maintain	Capital refurbishments of existing defences and beach recycling	9,412	3,454	0.37	-5,958	
<b>ODU 13 - Highcliffe</b>						
Improve C	As Improve A, except beach nourishment would be undertaken in epoch 3.	5,431	6,946	1.28	1,515	Provisional Economic / National
Improve A	Construct outflanking defence in epoch 1. In epoch 2 refurbish existing defences and undertake beach nourishment.	6,689	6,946	1.04	257	Local
Do Nothing	Baseline option. No active intervention.	-	0			
Do Minimum	Small scale maintenance but defences may fail in the future.	177	0	-	-177	
Improve B	Construct outflanking defence in epoch 1. In epoch 2 construct new larger cliff toe defences (no beach nourishment)	7,918	6,946	0.88	-972	
Managed Realignment A	As Improve A, except also reduce length of groynes in epoch 1 to promote greater movement of material from west to east, into ODU 14.	7,562	6,577	0.87	-985	
Maintain	Capital refurbishments of existing defences and beach recycling	5,310	2,545	0.48	-2,765	
Managed Realignment B	As Managed Realignment A, except offshore breakwaters also constructed to help defend cliff toe and promote movement of material from west to east, into ODU 14.	11,474	6,577	0.57	-4,897	

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## Sensitivity testing

6.4.7 A range of sensitivity tests have been undertaken on the option appraisal in SMZ 3. These are summarised below and further details can be found in Appendix F (economics report).

### Option cost

6.4.8 A key uncertainty for the options in SMZ 3 relates to option cost. Sensitivity tests that increase the National Options costs by 10% and 25% have been undertaken to determine whether the increase in cost would change the choice of the National Options.

6.4.9 In summary, the results of the cost sensitivity tests and interpretation did not lead to changes in the choice of the National Option in any of the ODUs.

- In ODU 12 a rise in the National Option costs by 10-25% would reduce the ABCR to below unity. In this case there would be no economically viable alternatives so changing the choice of option in this basis is not justified.
- In ODU 13 a rise in the National Option costs by 10-25% would not impact the choice of National Option.

### Cost of beach nourishment

6.4.10 A high proportion of the costs of the leading options in ODUs 12 and 13 are associated with beach nourishment. The beach nourishment cost applied in the economic appraisal was approximately £33 per m<sup>3</sup> of material which is considered a reasonably, mid-level estimate of nourishment costs at the Strategy level. However, there could be potential to reduce this cost if local sources of material are used, or if material with different characteristics (i.e. coarser) is used.

6.4.11 A sensitivity test has been undertaken to determine whether a 50% lower beach nourishment cost changes the choice of the National Option.

6.4.12 In summary, the choice of National Option in ODUs 12 and 13 would remain unchanged with a 50% lower beach nourishment cost and therefore there is no justification to change the National Option on this basis.

## Details of the leading options

### Technical aspects

6.4.13 The main risk in SMZ 3 is from coastal erosion. Erosion would occur if existing defences at the top of the beach were not refurbished and left to fail and to a lesser extent if the defences were not upgraded in response to sea level rise.

6.4.14 The longshore movement of beach material within Christchurch Bay is also a key strategic issue along the open coast. Currently there is general movement of material from west to east. Existing defences at Highcliffe at the eastern end of SMZ 3 are effective at retaining beach material and this area has historically been used as an area of supply for beach management activities in ODUs 12 and 13.

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- 6.4.15 To the east of the Highcliffe defences there is a stretch of undefended cliff at Naish Cliff. This area is actively eroding and continued erosion could threaten the Highcliffe defences by outflanking.
- 6.4.16 The National Options in ODUs 12 and 13 involve refurbishing and upgrading existing toe defences and would be combined with beach nourishment to ensure that continued protection is provided to the toe of the cliffs in this location. This would reduce the risk of any erosion from occurring in the future and defend over 300 properties. In addition, outflanking defences would be constructed in epoch 1 in ODU 13 to reduce the risk of outflanking from the undefended area to the east.
- 6.4.17 The Local Options in ODU 12 and 13 are largely the same as the National Options but bring forward in time the initial interventions to provide more certainty in the short and medium terms.
- 6.4.18 The National and Local Options would work with the natural movement of beach material in this location which is predominantly from west to east. As part of the leading options it is recommended that a bay wide Beach Management Plan is produced that draws on analysis of beach monitoring.
- 6.4.19 In the future it is likely that beach material will continue to accumulate at the Highcliffe area and therefore this area could continue to be used as an area of supply for beach recycling activities within ODUs 12 and 13.
- 6.4.20 The beach nourishment included in the National and Local Options in SMZ 3 will ensure that the beach continues to provide toe protection with rising sea levels in this location. With the recommended upgrades to the groynes in ODU 12 and continued maintenance of the groynes in ODU 13, the majority of the beach nourishment material would be expected to stay within SMZ 3. However, the increased beach levels as a result of the beach nourishment could lead to some bypassing of material around the defences in SMZ 3, moving to the east into SMZ 4 and beyond. If this was to occur it would likely to be a positive development for management of beach levels within the bay as a whole.
- 6.4.21 Depending on the amount of bypassing that is being observed at Highcliffe, there could be merit in supplementing this with additional beach recycling that moves material a short distance from Highcliffe to Naish Cliff. This would provide a more holistic bay wide beach management approach and benefit Barton on Sea and Milford on Sea defences to the east. In addition, the bypassing of material to the east past could be purposefully incorporated into the design of the beach nourishment schemes in SMZ 3.
- 6.4.22 A full schedule of proposed works as part of the leading options is provided in the Economics Appraisal report (Appendix F). As these are erosion defences, an indicative SoP for the defences has not been determined. Defence heights will need to be established during business case development, considering aspects such as wave run-up, rock sizing, and volume of beach nourishment required.

### **Environmental aspects**

- 6.4.23 The Strategy HRA Appropriate Assessment concluded that the Local Aspirational Options in SMZ 3 would not have any adverse effects on the qualifying features, and thus the integrity of the Solent and Dorset Coastal SPA (Marine Components GB).
- 6.4.24 The Strategy WFD assessment identified a range of potential impacts of the leading options on WFD objectives in SMZ 3 but identified suitable mitigation:

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- At the Strategy stage there is considerable uncertainty in defence alignments for the leading options in SMZ 3. Where possible during scheme design there is a commitment to minimise new defence footprints within European sites and aim to keep footprints within those of existing defences. This will help to minimise impacts on WFD objectives.
- Construction will need to consider seasonal working to avoid impacts on sensitive species and construction methodologies will need to be developed in line with the EA's Pollution Prevention guidance.
- Beach nourishment has the potential to lead to water quality deterioration and therefore appropriate mitigation during construction will be required. Beach nourishment materials will come from licenced dredging areas which will have had separate environmental studies undertaken to confirm impacts.

6.4.25 The Strategy SEA assessment concluded that the leading options in SMZ 3 are likely to have a major overall positive impact across the majority of the environmental categories.

6.4.26 The MCZ assessment concluded that the leading options would have no significant risk to the conservation objectives of the Needles MCZ and Southbourne Rough MCZ.

6.4.27 There is potential for environmental enhancements and BNG as part of the Leading in SMZ 3; including opportunities for rock pool creation / intertidal habitat creation within defences that will be developed as part of the scheme implementation.

#### Costs of the leading options

6.4.28 Table 6-14 presents the present value costs of the leading options in SMZ 3. Costs are presented by capital costs and time epoch.

**Table 6-14 Present Value Costs of Leading Options in SMZ 3**

ODU	Option	Cost	Epoch 1 (2024-2044) (£K)	Epoch 2 (2044-2074) (£K)	Epoch 3 (2074-2144) (£K)	Total (£K)
12	Local Aspirational Option: Improve C	Capital	12,880	468	364	13,712
		Non-Capital	146	97	75	318
		Total	13,025	565	439	14,030
13	Local Aspirational Option: Improve A	Capital	482	4,509	1,334	6,325
		Non-Capital	179	119	65	363
		Total	661	4,628	1,399	6,689

#### Contributions and funding

6.4.29 Where possible indicative Partnership Funding scores have been calculated for the initial major capital schemes recommended by the leading options in the Strategy.

6.4.30 For the majority of the leading options in SMZ 3, the first major capital scheme is not outlined to occur until the future. To work out indicative GiA availability the base date for the calculation has assumed a 'jump forward' in time to the time of the scheme.

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6.4.31 Table 6-15 below presents the indicative funding scores. The funding scores for all the leading options are shown in the Economics Appraisal Report (Appendix F). For the purpose of Table 6-15, for ODU 12 the National Option (Improve A) has been shown in rather than the Local Option because the main difference between the two options is public realm enhancements that would not be covered by GiA. Note that the costs and benefits presented in this table are different to the values presented in the option appraisal due to a different base year and appraisal period duration.

6.4.32 As can be seen, the funding scores range between 15-17% and therefore significant non-GiA funding is expected to be required to deliver the Strategy leading options.

6.4.33 Backup Options have been identified for each ODU that involve smaller volumes of beach nourishment in each location. These would be lower cost options and more deliverable but would not be expected to provide a wider benefit to beach levels outside of SMZ 3 as beach levels would be lower and less material would be expected to bypass any defences and move east into SMZ 4.

**Table 6-15: Indicative Partnership Funding scores for major capital schemes as part of the Leading Options in SMZ 3**

ODU	Option	Capital scheme	PV cost (£k)	PV benefits (£k)	Indicative PF score	PV maximum eligible GiA (£k) for upfront costs	Minimum contribution / savings required for upfront costs (£k)
12	National: Improve A	Epoch 2	11,436	15,332	15%	1,454	8,235
13	Local: Improve A	Epoch 2	10,287	11,758	17%	1,537	7,435

## 6.5 SMZ 4 (Naish Cliff and Barton on Sea)

### Selecting the leading options

6.5.1 Table 6-16 presents the benefit cost assessment for the ODU 14 within SMZ 4. The options have been ranked according to NPV because the options are focussed on managing coastal erosion risk. For erosion risk options it is not possible to rank the options according to flooding AEP and use the incremental AEP decision thresholds.

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**Table 6-16: Benefit-cost assessment for SMZ 4 (NPV comparisons for ODU 14)**

Option	Description	PV Costs (£k)	PV Benefits (£k)	ABCR	NPV (£k)	Leading Option(s)
<b>ODU 14 – Naish Cliff and Barton on Sea</b>						
Managed Realignment A	In epoch 1 upgrade and extend toe defences and cliff drainage to cover the full Barton on Sea frontage between Marine Drive West and Marine Drive East. Defences would be more robust against sea level rise and slow rate of erosion but not stop it.	22,211	23,489	1.06	1,278	Provisional Economic / National
Managed Realignment B	As per Managed Realignment A, except upgrades would not happen until epoch 2. Beach nourishment at Naish Cliff would be included with this option.	19,718	20,077	1.02	359	Backup
Managed Realignment D	As per Managed Realignment C, except defences would not be constructed at Marine Drive West and upgrades would not happen until epoch 2. Beach nourishment at Naish Cliff would be included with this option.	14,218	14,391	1.01	173	Backup
Maintain	Capital refurbishments of existing defences at the cliff toe and small-scale annual maintenance to the cliff drainage system.	5,927	5,959	1.01	32	Backup
Do Nothing	Baseline option. No active intervention.	-	-	-	-	
Managed Realignment C	In epoch 1 upgrade existing toe defences and cliff drainage to cover central and eastern parts of the Barton on Sea frontage, between Marine Drive and Marine Drive East. Marine Drive West would remain undefended. Upgraded defences would be more robust against sea level rise. Defended areas would have slower rate of erosion but it would still occur.	15,317	14,391	0.94	-926	
Do Minimum	Small scale maintenance but defences may fail in the future	1,228	286	0.23	-942	
Managed Realignment F	As per Managed Realignment E, except upgrades would not happen until epoch 2. Beach nourishment at Naish Cliff would be included with this option.	11,750	9,214	0.78	-2,536	
Managed Realignment E	In epoch 1 upgrade existing toe defences and cliff drainage to cover eastern parts of the Barton on Sea frontage at Marine Drive East. Marine Drive West would remain undefended and existing defences at Marine Drive would not be replaced. Defended areas would have slower rate of erosion but it would still occur.	11,836	9,214	0.78	-2,622	
Improve B	In epoch 1 upgrade and extend toe defences to cover the full length of the frontage (Naish Cliff to Marine Drive East). No beach nourishment.	46,061	27,275	0.59	-18,786	
Improve A	In epoch 1 refurbish and upgrade rock structures at cliff toe. Undertake large scale beach nourishment scheme to provide wide beach along full frontage length (Naish Cliff to Marine Drive East).	55,527	27,275	0.49	-28,252	

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## ODU 14 – Naish Cliff and Barton on Sea

- 6.5.2 Managed Realignment A has the strongest economic case with the largest NPV and was therefore identified as the provisional economic leading option. After considering uncertainty and sensitivity tests, this option was retained and was identified as the National Option. This option would defend the extent of the built-up area of Barton on Sea but would not defend Naish Cliff. The intervention would be undertaken in epoch 1 which increases confidence in a technically successful solution because more of the amenity open space at the top of the cliff would be retained, improving buildability, and enabling the design to be optimised.
- 6.5.3 No Local Aspirational Option was identified for this location. There is however a need for Backup Options as there are several uncertainties. Three Backup Options have been identified.
- 6.5.4 The first Backup Option is Managed Realignment B. This option is the same as Managed Realignment A, but the initial capital scheme (cliff drainage and toe protection) would be undertaken at the start of epoch 2 (rather than in the first part of epoch 1 with Managed Realignment A). This option has been identified as a Backup Option in case of a scenario in which not enough non-GiA funding could be secured during the first part of epoch 1 to implement Managed Realignment A, and more time is needed to secure all the funding contributions.
- 6.5.5 The second Backup Option is Managed Realignment D. Both Managed Realignment A and B include cliff drainage and toe defences at Marine Drive West, but the effectiveness of cliff drainage and toe defences here is uncertain due to this area being within the slump zone of Naish Cliffs. Managed Realignment D does not include defences at Marine Drive West and could be implemented as a Backup Option if further appraisal work during scheme development determines that defences at Marine Drive West are not likely to be effective.
- 6.5.6 The third Backup Option is Maintain. This has been identified in case the scheme costs for either Managed Realignment A, B or D increase, leading to the benefit cost ratios of these options falling below unity.

## Sensitivity testing

- 6.5.7 Sensitivity tests have been undertaken on the option appraisal in SMZ 4. These are summarised below and further details can be found in Appendix F (Economics Report).

### Option cost

- 6.5.8 Given the marginal ABCRs for the leading options in SMZ 4 a key uncertainty for the options relates to option cost. A sensitivity test that increases the National Option costs by 10% and 25% has been undertaken to determine whether the increase in cost would change the choice of the National Option. In summary, the results of the cost sensitivity tests and interpretation did not lead to changes in the choice of the National option:
- A rise in the Managed Realignment A costs by 10-25% would mean that Managed Realignment B would be selected as the provisional economic leading option. However, given the similarities between Managed Realignment A and B (they are the same option with different timings), any scenarios leading to a cost increase

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would impact both options in a similar way so there is no justification for selecting Managed Realignment B as the National Option due to this test.

- On balance Managed Realignment A is considered a less risky option than Managed Realignment B with greater buildability (owing to the earlier intervention and more space available at the top of the cliff).

### **Scheme timing and funding**

6.5.9 It is recognised that there is a significant funding shortfall for capital schemes at Barton on Sea due to a lack of FCERM-GiA relative to option costs. Therefore an additional sensitivity test specific to the option funding has been undertaken, considering how the potential GiA funding availability may change if the capital scheme is delayed until year 50 or year 75 in the appraisal period. The test indicates that whilst the funding case would improve, there would still be a large funding shortfall at this time and therefore irrespective of when a capital scheme is delivered, significant amounts of non-GiA funding will be needed.

## **Details of the leading options**

### **Technical aspects**

- 6.5.10 The risk in SMZ 4 (ODU 14) is from coastal erosion and land sliding of the complex cliff system. The drivers of the erosion and land sliding are erosion of the cliff toe from wave action and rainfall / groundwater induced instability.
- 6.5.11 The National Option in SMZ 4 (ODU 4) is Managed Realignment A which involves refurbishing and upgrading existing rock toe defences and extending them to the west to cover Marine Drive West. In addition, new cliff drainage would be installed at Marine Drive and Marine Drive West. These upgrades would be undertaken during epoch 1 (estimated to be from year 10).
- 6.5.12 It is not possible to completely stop erosion of the cliff in this location due to the complex underlying geology. However, the National Option would significantly slow the rate of erosion relative to the Do Nothing scenario and would be expected to reduce (but not eliminate) the risk of erosion to over 470 properties over the Strategy appraisal period.
- 6.5.13 There is uncertainty as to how effective defences at Marine Drive West would be given that this part of the cliff is within the wider slump zone of Naish Cliff. It is the aspiration of the National Option to reduce the risk of erosion to the properties at Marine Drive West but this will require further detailed investigation during scheme development to determine if defences here can be effective.
- 6.5.14 As outlined in the Leading Option Report (Appendix C), whilst not included in the leading options at the Strategy stage, beach nourishment at Naish Cliff should be considered during scheme appraisal as there may be merit in placing material here. This requires further investigation and liaison with potential funding partners for this intervention.

### **Environmental aspects**

- 6.5.15 The Strategy HRA Appropriate Assessment concluded that the National Option in SMZ 4 would not have any adverse effects on the qualifying features, and thus the integrity of the Solent and Dorset Coastal SPA (Marine Components GB).
- 6.5.16 The Strategy WFD assessment identified a range of potential impacts of the leading options on WFD objectives in SMZ 4 but identified suitable mitigation:

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- At the Strategy stage there is considerable uncertainty in defence alignments for the leading options in SMZ 4. Where possible during scheme design there is a commitment to minimise new defence footprints within European sites. This will help to minimise impacts on WFD objectives.
- Construction will need to consider seasonal working to avoid impacts on sensitive species and construction methodologies will need to be developed in line with the EA's Pollution Prevention guidance.

6.5.17 The Strategy SEA assessment concluded that the leading options in SMZ 4 are likely to have a major overall positive impact across the majority of the environmental categories. The Managed Realignment A option (National Option) is not expected to worsen the condition of the SSSI designation in this location relative to the baseline. Erosion would not be stopped entirely so continued exposure of geological features would be expected over time.

6.5.18 The MCZ assessment concluded that the leading options would have no significant risk to the conservation objectives of the Needles MCZ and Southbourne Rough MCZ.

6.5.19 There is potential for environmental enhancements and BNG as part of the Leading in SMZ 4; including opportunities for rock pool creation / intertidal habitat creation within defences that will be developed as part of the scheme implementation.

#### Costs of the leading options

6.5.20 Table 6-17 presents the present value costs of the leading options in SMZ 4. Costs are presented by capital costs and time epoch.

**Table 6-17 Present Value Costs of Leading Options in SMZ 4**

ODU	Option	Cost	Epoch 1 (2024-2044) (£K)	Epoch 2 (2044-2074) (£K)	Epoch 3 (2074-2144) (£K)	Total (£K)
14	National Option: Managed Realignment A	Capital	18,503	0	1,820	20,323
		Non-Capital	780	749	360	1,889
		Total	19,283	749	2,179	22,211

#### Contributions and funding

6.5.21 Where possible indicative Partnership Funding scores have been calculated for the initial major capital schemes recommended by the leading options in the Strategy.

6.5.22 For the National Option in SMZ 4 the first major capital scheme is not outlined to occur until the future (estimated year 10). To work out indicative GiA availability the base date for the calculation has assumed a 'jump forward' in time to the time of the scheme.

6.5.23 Table 6-18 below presents the indicative funding score for the National Option. Note that the costs and benefits presented in this table are different to the values presented in the option appraisal due to a different base year and appraisal period duration.

6.5.24 As can be seen, the funding score is 12% and therefore significant non-GiA funding is expected to be required to deliver the Strategy leading option. NFDC as an outcome of the Strategy have committed to developing a funding and implementation plan for the Strategy which will identify where funding will be obtained.

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6.5.25 Backup Options have been identified for this area for various reasons. The Managed Realignment B Backup Option would provide more time to secure the non-GiA funding required to progress the scheme. The Maintain Backup Option would reduce the capital funding requirements as there are no major capital upgrade schemes with this option. This would be more deliverable but would not deliver the same level of benefits and there would be increased uncertainty.

**Table 6-18: Indicative Partnership Funding scores for major capital schemes as part of the Leading Options in SMZ 4**

ODU	Option	Capital scheme	PV cost (£k)	PV benefits (£k)	Indicative PF score	PV maximum eligible GiA (£k) for upfront costs	Minimum contribution / savings required for upfront costs (£k)
14	National: Managed Realignment A	Epoch 1	30,525	30,710	12%	3,215	22,886

## 6.6 SMZ 5 (Taddiford)

### Selecting the leading options

#### ODU 15 –Barton on Sea to Hordle Cliff

- 6.6.1 In Table 6-19 the short list options have been ranked according to NPV because the options are focussed on managing coastal erosion risk. For erosion risk options it is not possible to rank the options according to flooding AEP and use the incremental AEP decision thresholds.
- 6.6.2 Do Nothing has the strongest economic case because it does not have a negative NPV and was therefore identified as the provisional economic leading option. There is no economic, technical, environmental or social justification for FCERM interventions in ODU 15 and therefore Do Nothing was retained and identified as the National Option.

### Sensitivity testing

- 6.6.3 No sensitivity tests were undertaken in SMZ 5 because Do Nothing is the National Option and there is no justification to intervene.

### Details of the leading options

- 6.6.4 There are no specific technical or environmental aspects to consider for the Do Nothing option in this location
- 6.6.5 There is no cost or funding associated with the Do Nothing Option. There may be some costs associated with moving the cliff top footpath inland and ensuring health and safety compliance but these costs are not attributable to FCERM.
- 6.6.6 Erosion of the cliff line in SMZ 5 would be expected to continue which will provide a feed of material to the beach.

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**Table 6-19: Benefit-cost assessment for SMZ 5 (NPV comparisons for ODU 15)**

Option	Description	PV Costs (£k)	PV Benefits (£k)	ABCR	NPV (£k)	Leading Option(s)
<b>ODU 15 –Barton on Sea to Hordle Cliff</b>						
Do Nothing	Baseline option. No active intervention	-	-	-	-	Provisional economic / National
Do Minimum	Health and safety compliance only	44	-	-	-44	
Managed Realignment	Maintain beach levels through beach recycling	110	-	-	-110	

## 6.7 SMZ 6 (Milford on Sea)

### Selecting the leading options

6.7.1 Table 6-20 presents the benefit cost assessment for the ODUs within SMZ 6. The options have been ranked according to NPV because the options are primarily focussed on managing coastal erosion risk. For erosion risk options it is not possible to rank the options according to flooding AEP and use the incremental AEP decision thresholds.

#### ODU 16 – Cliff Road

6.7.2 Managed Realignment C has the strongest economic case with the largest NPV and was therefore identified as the provisional economic leading option. After considering uncertainty and sensitivity tests, this option was retained and was identified as the National Option. However, this option does not include the beach nourishment and strong point scheme until the mid-point of epoch 2 which could lead to increased uncertainty before this point in time as the beach level response to sea level rise is difficult to predict. If additional erosion were to occur then it could make it more technically challenging to implement a strong point / beach nourishment scheme in the future.

6.7.3 Managed Realignment A and B have therefore been selected as Local Aspirational Options as this would bring forward the intervention in time and reduce this uncertainty. It is the aspiration to do a scheme here sooner rather than later so having these options as aspirational options on the adaptive pathways will facilitate this. The additional expenditure required for the Local Aspirational Option would need to come from non-GiA sources. Wider local benefits that are not presented in the economic comparison in Table 6-20 could be considered to help justify the additional expenditure. The economic appraisal has identified up to £26million of local damages that could be partially avoided by the National or Local Options. Approximately £4million of this damage is related to beach hut income and intervening sooner would likely help retain more of this income.

6.7.4 The Maintain option has been identified as a Backup Option in case funding for the Managed Realignment options cannot be secured.

#### ODU 17 – Rook Cliff

6.7.5 Improve C has the strongest economic case with the largest NPV and was therefore identified as the provisional economic leading option. After considering uncertainty and sensitivity tests, this option was retained and was identified as the National Option. However, this option does not include the upgrading the defences until the mid-point of epoch 2 which could lead to increased uncertainty before this point as there will be a reliance on ageing defences.

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**Table 6-20: Benefit-cost assessment for SMZ 6 (NPV comparisons for ODUs 16-18)**

Option	Description	PV Costs (£k)	PV Benefits (£k)	ABCR	NPV (£k)	Leading Option(s)
<b>ODU 16 – Cliff Road</b>						
Managed Realignment C	As Managed Realignment A except beach nourishment and strong point construction at mid-point of epoch 2	4,405	7,400	1.68	2,995	Provisional Economic / National
Managed Realignment B	As Managed Realignment A except beach nourishment and strong point construction at start of epoch 2	5,069	7,400	1.46	2,331	Local
Managed Realignment A	In epoch 1 undertake beach nourishment and construct local strong point to control (but not stop) further erosion and coastline position.	5,612	7,400	1.32	1,788	Local
Maintain	Capital refurbishments to existing defences in the east part of the unit (most of the unit is undefended) and regular small scale beach nourishment to provide some protection to the cliff toe	1,791	3,017	1.68	1,226	Backup
Do Nothing	Baseline option. No active intervention	-	-	-	-	
Do Minimum	Small scale maintenance but defences may fail in the future	469	0	-	-469	
Improve	In epoch 1 construct new hard defence along length of unit to prevent erosion of the cliff toe and minimise further cliff erosion	7,954	7,415	0.93	-539	
<b>ODU 17 – Rook Cliff</b>						
Improve C	As Improve A except upgrade undertaken at mid-point of epoch 2.	9,055	11,516	1.27	2,461	Provisional Economic / National
Improve B	As Improve A except upgrade undertaken at start of epoch 2.	9,376	11,516	1.23	2,140	Local
Maintain	Capital refurbishments to existing defences	4,110	4,222	1.03	112	Backup
Improve A	In epoch 1 upgrade existing cliff toe defences to make more robust against sea level rise	11,471	11,516	1.00	45	Local
Do Nothing	Baseline option. No active intervention	-	-			
Do Minimum	Small scale maintenance but defences may fail in the future	241	0	-	-241	
Managed Realignment A	In epoch 1 retain strong points but remove defences between Rook Cliff and the White House to realign shoreline landwards. Beach nourishment and rock groynes to hold new shoreline in place.	14,021	10,092	0.72	-3,929	

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Option	Description	PV Costs (£k)	PV Benefits (£k)	ABCR	NPV (£k)	Leading Option(s)
Managed Realignment B	In epoch 1 construct nearshore breakwaters and undertake beach nourishment to realign shoreline seawards and promote beach growth	17,269	11,516	0.67	-5,753	
<b>ODU 18 – Milford on Sea</b>						
Improve B	As per Improve A except upgrade the open coast defences and undertake beach nourishment in epoch 2. Refurbish defences in epoch 1 to extend service life. Timing of setback defence construction unchanged and occurs in epoch 2.	11,035	11,155	1.01	120	Provisional Economic / Backup
Improve A	In epoch 1 upgrade open coast defences and undertake large scale beach nourishment and construction of new groynes. Construct setback defences to reduce tidal flood risk from Sturt Pond in epoch 2.	11,060	11,155	1.01	95	Provisional Economic / National
Maintain	Capital refurbishments to existing defences and regular small scale beach nourishment	8,872	8,933	1.01	61	Backup
Do Nothing	Baseline option. No active intervention	-	-	-	-	
Do Minimum	Small scale maintenance but defences may fail in the future	963	83	0.09	-880	
Managed Realignment B	In epoch 1 construct nearshore breakwaters and undertake beach nourishment to realign shoreline seawards and promote beach growth	12,269	11,155	0.91	-1,114	
Managed Realignment A	In epoch 1 retain strong points at White House and Hurst Spit revetment but realign the shoreline landwards between these points. Beach nourishment to help control rates of erosion and shoreline evolution.	11,999	7,618	0.63	-4,381	

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- 6.7.6 Improve A and B have therefore been selected as Local Aspirational Options as this would bring forward the intervention in time and reduce this uncertainty. It is the aspiration to do a scheme here sooner rather than later so having these options as aspirational options on the adaptive pathways will facilitate this. The additional expenditure required for the Local Aspirational Option would need to come from non-GiA sources. Wider local benefits that are not presented in the economic comparison in Table 6-20 could be considered to help secure funding from non-GiA sources.
- 6.7.7 The Maintain option has been identified as a Backup Option in case funding for the Improve options cannot be secured.

### **ODU 18 – Milford on Sea**

- 6.7.8 Improve A and B have very similar NPVs and therefore both were identified as the provisional economic leading options. Both options are similar, but Improve A involves intervening sooner with defence upgrades and beach nourishment (in epoch 1, rather than epoch 2).
- 6.7.9 Currently the defences in ODU 18 are in a poor condition and threatened by lowering beach levels. NFDC need to frequently top up beach levels to ensure there is enough material to protect the defence toe and reduce the risk of failure. As such, with the earlier capital scheme, Improve A provides significantly more certainty to the success of the option. By shortening the time until the capital scheme is undertaken, the existing assets will not need to be relied upon for as long leading to a reduced risk of defence failure before the scheme is implemented. Furthermore, should beach nourishment costs reduce (see sensitivity test), the economic case of Improve A improves relative to Improve B.
- 6.7.10 After considering uncertainty and sensitivity tests, Improve A was identified as the National Option.
- 6.7.11 Improve B was retained as a Backup Option in case funding for the defence improvements and beach nourishment could not be secured in epoch 1. Maintain was also identified as a Backup Option in case funding for either Improve options could not be secured.
- 6.7.12 Lowering beach levels are a key concern in this location and there remains uncertainty as to which defence measures are most likely to be effective in this location. Further work and numerical modelling is required during business case development to reconsider the potential defences measures in more detail.
- 6.7.13 The Improve A and B options include rock groynes and a beach nourishment scheme and the purpose of these measures is to retain a larger beach volume in this location to defend the toe of the defences, whilst providing an added benefit of an amenity and recreation resource. However, the coastal processes are complex here and there is uncertainty as to how successful this approach will be, particularly as there would be no room for the beach to move inland over time with sea level rise.
- 6.7.14 Managed Realignment B included nearshore breakwaters with the aim of transitioning the shoreline seaward, but the estimated cost of this approach at the strategy stage is prohibitive. However during business case development more details and site specific analysis can be undertaken and this may result in the cost of breakwaters coming down, potentially making breakwaters a feasible measure. Breakwaters could have advantages in terms of retaining beach material relative to groynes (due to the fixed seawall position

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and the restriction this imposes on future beach position), but numerical modelling is required to investigate this and confirm the outcome during further appraisal work.

## Sensitivity testing

6.7.15 A range of sensitivity tests have been undertaken on the option appraisal in SMZ 6. These are summarised below and further details can be found in the Economic Appraisal Report (Appendix F).

### Option cost

6.7.16 A key uncertainty for the options in SMZ 6 relates to option cost. Sensitivity tests that increase the National Options costs by 10% and 25% have been undertaken to determine whether the increase in cost would change the choice of the National Options. In summary, the results of the cost sensitivity tests and interpretation did not lead to changes in the choice of the National Option in any of the ODUs.

6.7.17 In each ODU a rise in cost of the National Option would result in an alternative having a stronger economic case and being identified as the provisional economic leading option. However, in each case the alternative that would be identified is similar to the National Option in terms of the package of measures, with the only difference being in implementation timing. Therefore in a scenario whereby costs for the National Option increase, similar cost increases would be expected for the alternative options too. Changing the choice of National Option on this basis is not justified.

### Cost of beach nourishment

6.7.18 A high proportion of the costs of the leading options in ODUs 16 and 18 are associated with beach nourishment. The beach nourishment cost applied in the economic appraisal was approximately £33 per m<sup>3</sup> of material which is considered a reasonably, mid-level estimate of nourishment costs at the Strategy level. However, there could be potential to reduce this cost if local sources of material are used, or if material with different characteristics (i.e. coarser) is used.

6.7.19 A sensitivity test has been undertaken to determine whether a 50% lower beach nourishment cost changes the choice of the National Option. In summary, the choice of National Option in ODUs 16 and 18 would remain unchanged with a 50% lower beach nourishment cost and therefore there is no justification to change the National Option on this basis.

## Details of the leading options

### Technical aspects

6.7.20 The main risk in SMZ 6 is from coastal erosion. Erosion would occur if existing defences were not refurbished and left to fail. Lowering beach levels at Milford on Sea have increased the vulnerability of the ageing defences in this location, resulting in seawall failures in 2008 & 2020.

6.7.21 There is also a risk from flooding in ODU 18 within SMZ 6. The risk is from two directions; wave overtopping from the open coast / beach frontage and still water level tidal flooding from Sturt Pond.

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- 6.7.22 The National Options in SMZ 6 manage these key risks facing the frontage by recommending a series of defence upgrades and beach nourishment schemes to improve beach levels.
- 6.7.23 In ODU 16 the National Option of Managed Realignment would transition the coastline to a more sustainable position over time, aiming to prevent erosion of the roadway and properties by constructing a local strong point and increasing beach levels through nourishment. In ODU 17 existing defences at the toe of Rook Cliff would be upgraded to ensure they are more robust against sea level rise and can continue to perform their erosion defence function in the future. In ODU 18 the seawall would be upgraded (including raising to reduce overtopping risk), a major beach nourishment scheme would be undertaken to improve beach levels and new groynes constructed to help retain this material. Setback flood defences would also be constructed to reduce the risk of tidal flooding from Sturt Pond.
- 6.7.24 The Local Options in ODUs 16-18 are largely the same as the National Options but bring forward in time the initial interventions to provide more certainty in the short and medium term.
- 6.7.25 The National and Local Options aim to use beach nourishment and new beach control structures (groynes) to improve beach levels in this location. It is recommended that numerical modelling is undertaken during scheme appraisal to determine the most appropriate beach material gradings and groyne layout. As outlined in the option selection discussion previously, alternative types of control structures such as fishtail groynes or nearshore breakwaters may also be of merit in this location and should be considered during business case development.
- 6.7.26 A full schedule of proposed works as part of the leading options is provided in the Economics Appraisal Report (Appendix F). As these are primarily erosion defences in SMZ 6, an indicative SoP for the defences has not been determined. Defence heights will need to be established during business case development, considering aspects such as wave run-up and overtopping, groyne layout, rock sizing, and volume of beach nourishment required.

### Environmental aspects

- 6.7.27 The conclusions and suggested mitigations of the Strategy HRA Appropriate Assessment for the leading options in SMZ 6 are summarised in Table 6-21 below.

**Table 6-21: Summary of HRA Appropriate Assessment for SMZ 6**

European site	Recommendations / Mitigation
Solent and Southampton Water SPA	<b>ODUs 16, 17 &amp; 18</b> – project level HRA recommended to help inform defence alignments. Due to the proximity to the designation there is potential for habitat loss / damage and disturbance (noise, visual). There are opportunities to choose alignments that avoid the impact and undertake construction mitigation but more detailed appraisal is required at scheme stage and project level HRA should support this.
Solent Maritime SAC	<b>ODU 18</b> – project level HRA recommended to help inform defence alignments. Due to the proximity to the designation there is potential for habitat loss. There are opportunities to choose alignments that avoid the impact and undertake construction mitigation but more detailed appraisal is required at scheme stage and project level HRA should support this.

- 6.7.28 The Strategy WFD assessment identified a range of potential impacts of the leading options on WFD objectives in SMZ 6 but identified suitable mitigation:

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- At the Strategy stage there is considerable uncertainty in defence alignments for the leading options in SMZ 6 but there is a commitment to minimising encroachment into designated sites where possible during scheme design (see HRA summary table above for more details).
- Construction will need to consider seasonal working to avoid impacts on sensitive species and construction methodologies will need to be developed in line with the EA's Pollution Prevention guidance.

6.7.29 The Strategy SEA assessment concluded that the leading options in SMZ 6 are likely to have an overall positive impact across most of the environmental categories.

6.7.30 The MCZ assessment concluded that the leading options would have no significant risk to the conservation objectives of the Needles MCZ and Southbourne Rough MCZ.

6.7.31 There is potential for ecological enhancements and BNG as part of the leading options in SMZ 6 including opportunities for creating intertidal habitats such as rockpools and 'living' seawalls. These opportunities will be explored further during scheme design.

### Costs of the leading options

6.7.32 Table 6-22 presents the present value costs of the leading options in SMZ 6. Costs are presented by capital costs and time epoch. Note that for ODUs 16 and 17 the Managed Realignment A and Improve A options are shown as these have the highest PV cost (Managed Realignment B and Improve B are also Local Options here).

**Table 6-22 Present Value Costs of Leading Options in SMZ 6**

ODU	Option	Cost	Epoch 1 (2024-2044) (£K)	Epoch 2 (2044-2074) (£K)	Epoch 3 (2074-2144) (£K)	Total (£K)
16	Local: Managed Realignment A	Capital	3,808	597	424	4,829
		Non-Capital	368	270	146	784
		Total	4,176	866	571	5,612
17	Local: Improve A	Capital	10,709	0	464	11,174
		Non-Capital	147	98	53	298
		Total	10,856	98	517	11,472
18	National: Improve A	Capital	8,060	1,249	470	9,779
		Non-Capital	918	170	192	1,280
		Total	8,978	1,419	662	11,060

### Contributions and funding

6.7.33 Where possible indicative Partnership Funding scores have been calculated for the initial major capital schemes recommended by the leading options in the Strategy.

6.7.34 For the majority of the leading options in SMZ 6, the first major capital scheme is not outlined to occur until the future (at the earliest mid-way through epoch 1). To work out indicative GiA availability the base date for the calculation has assumed a 'jump forward' in time to the time of the scheme.

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6.7.35 Table 6-23 below presents the indicative funding scores. In ODUs where a Local Aspirational Option has been identified, the funding score for this option is shown. In ODUs where no Local Aspirational Option has been identified, the score for the National Option is shown. The funding scores for all the leading options are shown in the Economic Appraisal Report (Appendix F). *Note that the costs and benefits presented in this table are different to the values presented in the option appraisal due to a different base year and appraisal period duration.*

6.7.36 As can be seen, the funding scores range between 12-29% and therefore significant non-GiA funding is expected to be required to deliver the Strategy leading options. NFDC as an outcome of the Strategy have committed to developing a funding and implementation plan for the Strategy which will identify where funding will be obtained.

6.7.37 Backup Options have been identified for each ODU that do not involve capital defence upgrade schemes or large scale beach nourishment. These Backup Options would be more deliverable but would not be expected to provide the same levels of benefit and the residual risk of defence failure / erosion would remain elevated.

**Table 6-23: Indicative Partnership Funding scores for major capital schemes as part of the Leading Options in SMZ 6**

ODU	Option	Capital scheme	PV cost (£k)	PV benefits (£k)	Indicative PF score	PV maximum eligible GiA (£k) for upfront costs	Minimum contribution / savings required for upfront costs (£k)
16	Local: Managed Realignment A	Epoch 1 mid	6,533	8,957	29%	1,301	3,221
17	Local: Improve A	Epoch 1 mid	14,458	14,826	18%	2,400	11,225
18	National: Improve A	Epoch 1 mid	12,420	13,999	12%	1,355	9,552

#### Other aspects / interaction with Hurst Spit

6.7.38 The leading options in SMZ 6 include beach nourishment in ODUs 16 and 18 which will help to increase the volume of beach material within the bay. This will support the long term management of Hurst Spit because the dominant longshore transport direction is from west to east and therefore a proportion of the material placed in SMZ 6 would be expected to feed Hurst Spit over time. There would also be benefit from the nourishment in other parts of the bay, such as SMZ 3 (Christchurch Beaches and Cliffs) as some of this beach material placed further west may also be expected to move through to Hurst Spit gradually over time as part of a bay wide approach to managing the beaches.

6.7.39 At the time of writing there is some uncertainty around the final leading options for Hurst Spit, to be identified as part of the Hurst Spit to Lymington Strategy:

- It is currently unclear what the leading options may be with a range of options still being considered, including medium term controlled rollback of the spit. However, through collaboration with the Hurst Spit to Lymington Strategy team it has been agreed that the rock revetment strong point at the base of the spit will be held in place over the next century. This will secure the position of the shoreline immediately to the east of SMZ 6 and create a stable transition point between SMZ 6 and Hurst Spit.

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- If controlled rollback of Hurst spit is the leading option for the Hurst Spit to Lymington Strategy, it will be important to fully understand the coastal processes implications of the rollback and to manage the rollback accordingly. It is important that any rollback does not threaten the rock revetment transition point between the two Strategies or have negative unforeseen coastal process impacts across the wider area which cannot be planned for. This may require studies to understand how changes to the spit alignment could impact coastal processes on the beaches and offshore banks in the area and the sediment transport linkages between the two.
- With the Hurst Spit to Lymington Strategy still ongoing, there is also some uncertainty around when a decision on the leading option for the spit will be made. In the interim whilst the Hurst Spit to Lymington Strategy is completed, the spit will continue to be managed in line with the BMP / SMP policies (i.e. keep maintaining the spit until the long term direction is finalised). The leading options in SMZ 6 will support both the short term management of the spit until the Strategy is finalised (i.e. continuing the status quo) and also a longer term approach once it is decided upon.

6.7.40 When implementing the Strategy leading options and developing the beach nourishment and defence schemes in ODUs 16 and 18, it is recommended that the design considers potential synergies to support the management of the spit. For example, the beach nourishment / scheme design could consider ‘overfilling’ groyne bays in SMZ 6 to encourage additional movement of material to the east if this would support the long term plan and evolution of the spit.

## 6.8 Summary of strategy

6.8.1 A summary of the Strategy leading options is provided below.

6.8.2 The leading options are adaptable to future changes in risks, community aspirations and funding availability. Generally, each option includes a series of interventions through (in three epochs) that can be brought forward or delayed as required. In addition, up to three leading options have been identified in each ODU, providing the FCERM delivery team with suitable flexibility to change course between options as required based on new information / funding that may become available over the course of the Strategy implementation.

6.8.3 In ODUs 1 and 2 it is important to sustain the FCERM function of the Mudeford Sandbank as uncontrolled erosion / movement of Mudeford Sandbank could have uncertain impacts on the wider morphology of the area, potentially impacting flood risk, navigation, sediment transport and buried services in the vicinity. The Local Aspirational Options for this location are focussed on maintaining the existing FCERM function of the Sandbank over the course of the appraisal period. On a national basis there is not a strong economic case to deliver the Local Aspirational Options in ODUs 1-2, but it is important for these to be delivered to ensure the leading options in ODUs 3-10 are successful.

6.8.4 In ODUs 3-10 the main risk is from tidal flooding to properties and other assets. Where there is an economic case, the leading options are generally focussed on upgrading the SoP provided by defences in these locations. This could be achieved by raising existing defences or constructing new defences as required. Different timings are recommended for defence upgrades based on a range of factors such as the onset of risk and the residual life of existing defences. Another risk in ODUs 3-10 is historic landfill sites and the potentially contaminated materials that could be exposed should these locations be undefended and erode. The different approaches to managing this risk (with respect to

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timings and cost) have been explored in the appraisal and are picked up in the leading options.

- 6.8.5 In ODU 11 it is important to sustain the FCERM function of the existing quay walls as erosion / damage to the quay could lead to more widespread morphological changes and impact flood risk elsewhere in the area. The Local Aspirational Option in this location aims to prevent the quay from eroding and provides property level protection to the properties on the quay at risk from flooding. Similar to ODUs 1 and 2, on a national basis there is not a strong economic case to sustain the function of the quay walls in ODU 11, but it is important for the function of these assets to be continued to ensure the leading options in ODUs 3-10 and ODU 12 can be delivered successfully.
- 6.8.6 In ODUs 12-18, along this open coast part of the Strategy frontage the leading options are underpinned by a series of strategically placed beach nourishment interventions over time. The placement locations have been identified to provide an immediate benefit to the placement location but also to provide a long term benefit to areas downdrift over the Strategy period, including Hurst Spit. The leading options recommend beach nourishment is undertaken in ODU 12, ODU 13, ODU 16 and ODU 18 at various points over the next 100 years. There is an opportunity to explore a joined-up approach to scheme delivery in these locations which could deliver efficiencies and cost-savings that could make the economic case more affordable than currently identified. If a combined source of material could be secured for all or many of the areas, the adaptive pathways between the leading options in the Strategy provides the flexibility in timings of interventions to deliver nourishment schemes for each location simultaneously rather than treating each location individually. The beach nourishment will ensure that the beach can continue to provide an integral part of the overall defence system along the open coast. However, in some locations it would need to be supplemented with additional hard defence structures and cliff slope stabilisation. For example in ODU 14 at Barton on Sea new cliff toe defences and cliff slope drainage is recommended.
- 6.8.7 For each of the leading options (National and/or Local Aspirational), the partnership funding score for their initial schemes is typically less than 50%. This indicates that significant funding contributions from non-GiA sources will need to be found to deliver the Strategy and its recommendations. Typically the initial schemes are not recommended to occur for several years at least (with many recommended to occur even later during epoch 2 / 3). This provides the BCP / NFDC FCERM teams with time to source funding contributions and one of the recommendations following the Strategy is to develop a funding action plan to plan, identify and secure contributions before schemes are required.
- 6.8.8 In some ODUs the average benefit cost ratio of the leading options is less than unity. However, this is on a national basis only (i.e. only considering nationally eligible benefits). As part of the Strategy, the wider local impacts of flooding and erosion in each ODU have also been calculated and when these damages (and potential benefits) are considered, this results in a much stronger economic case of the options on a local economic basis.
- 6.8.9 The Strategic links between ODUs have been considered and a sensitivity analysis undertaken to assess the impact of following different adaptive pathways or types of leading option in adjacent units. A full description of this test can be found in the Leading Options report (Appendix C). In summary, if either of the National, Local or Backup Options are delivered in an ODU then this would not be expected to impact the success of options in adjacent units. The main exceptions to this are:

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- ODUs 1, 2 and 11 where it is important that the Local Aspirational Options are delivered to prevent widespread morphological changes to the harbour and harbour entrance.
- In SMZ 6 (Milford on Sea) where there is a clear link between ODUs 16-18 and a reliance on the delivery of one of the leading options in each unit to ensure a cohesive approach. To help manage this uncertainty it is recommended that schemes in ODU 16-18 are delivered concurrently where possible to provide more certainty in the approach and outcomes delivered.

6.8.10 Table 6-24 presents details of the Strategy, including the present value and cash costs, present value benefits and benefit cost ratio. All benefits presented in this table are nationally eligible benefits. Where ODUs have a Local Aspirational Option then this has been presented. Otherwise the National Option is presented.

6.8.11 Table 6-25 presents an estimate of the local economic damages in each ODU from flooding and erosion under the Do Nothing scenario. A significant proportion of these damages would be avoided by implementing the leading options, thus strengthening the economic case of the options on a local basis. The impacts relate to tourism, car park income, beach hut income, health and wellbeing and gross value added (GVA) business impacts. Note that these local impacts are not eligible to be included in a business case on a national basis but can support local decision making and acquiring non-GiA partnership funding. Note that there is some uncertainty in the local economic impact values and it has been necessary to make a range of assumptions. More work is required during scheme level appraisal to refine the values. For more details on the local economic impacts refer to the Strategy Economics Report (Appendix F).

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**Table 6-24 Summary of strategy**

	SMZ 1		SMZ 2								SMZ 3		SMZ 4	SMZ 5	SMZ 6			Total
	ODU 1	ODU 2	ODU 3	ODU 4	ODU 5	ODU 6	ODU 7	ODU 9	ODU 10	ODU 11	ODU 12	ODU 13	ODU 14	ODU 15	ODU 16	ODU 17	ODU 18	Total
<b>Option*</b>	L	L	L	L	L	N	N	N	N	L	L	L	N	N	L	L	L	
<b>PV Costs (£k)</b>																		
<b>Capital</b>	2,545	5,243	660	3,294	20,772	2,734	4,016	10,756	8,236	9,462	13,712	6,325	20,323	0	4,829	11,147	9,779	133,833
<b>Non-capital</b>	278	213	116	204	136	68	103	204	136	68	318	363	1,889	0	784	298	1,280	6,458
<b>Total PV Costs (£k)</b>	2,823	5,456	776	3,499	20,908	2,802	4,118	10,960	8,373	9,530	14,030	6,689	22,211	0	5,612	11,472	11,060	140,319
<b>PV Benefits (£k)**</b>	0	89	811	3,638	36,532	2,877	5,329	37,809	11,124	680	8,978	6,946	23,489	0	7,400	11,516	11,155	168,373
<b>Average Benefit/Cost Ratio</b>	0.00	0.02	1.05	1.04	1.75	1.03	1.29	3.45	1.33	0.07	0.64	1.04	1.06	0.00	1.32	1.00	1.01	<b>1.20</b>
<b>Cash Costs (£k)</b>																		
<b>Capital</b>	8,232	19,076	2,135	10,953	24,268	8,283	7,991	25,312	30,570	30,463	24,429	17,230	38,497	0	9,546	16,354	18,182	291,521
<b>Non-capital</b>	943	728	434	685	457	228	411	685	457	228	1185	1,199	6,848	0	2,697	1,000	3,503	21,688
<b>Total Cash Costs (£k)</b>	9,175	19,804	2,569	11,638	24,725	8,511	8,402	25,997	31,027	30,691	25,614	18,429	45,345	0	12,243	17,354	21,685	313,209

\*National Option denoted by "N". Local Option denoted by "L"

\*\*Only nationally eligible benefits are included (i.e. eligible to be included in FCERM-AG decision criteria and FCERM-GiA funding applications).

**Table 6-25 Local Economic Impacts**

	SMZ 1		SMZ 2								SMZ 3		SMZ 4	SMZ 5	SMZ 6			Total
	ODU 1	ODU 2	ODU 3	ODU 4	ODU 5	ODU 6	ODU 7	ODU 9	ODU 10	ODU 11	ODU 12	ODU 13	ODU 14	ODU 15	ODU 16	ODU 17	ODU 18	Total
<b>Option</b>	L	L	L	L	L	N	N	N	N	L	L	L	N	N	L	L	L	
<b>Total PV Costs (£k)</b>	2,823	5,456	776	3,499	20,908	2,802	4,118	10,960	8,373	9,530	14,030	6,689	22,211	0	5,612	11,472	11,060	140,319
<b>PV Do Nothing local economic damages that could be avoided with Leading Option*</b>	7,754	13,989	6,414	5,955	12,118	6,548	7,974	15,466	7,292	14,559	79,974	35,674	54,327	7,619	26,228	13,838	22,857	338,586

\*Local impacts are in addition to the national eligible benefits outlined in Table 6-24

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# 7 Implementation

## 7.1 Project planning

### Phasing and Approach

7.1.1 The Strategy promotes and supports long term, sustainable adaptive management of the coastal flooding and erosion risks in Christchurch Bay and Harbour. The Strategy has set out the leading options for each ODU. In order to implement these options a series of phased capital interventions and scheduled maintenance is required. This work needs to be planned ahead of time through the development of business cases. Ongoing engagement with stakeholders and communities will be required to manage the risks and consequences of flooding and erosion and to build support for FCERM interventions.

### Adaptive Pathways

7.1.2 As outlined in Section 4.1, the Strategy has been developed to provide adaptive capacity in the future so that there is the flexibility to make changes to the approach in response to key uncertainties such as climate change, funding, land use and development.

7.1.3 The identification of up to three types of leading Option in each ODU (National, Local Aspirational and Backup Options) has been integral to this approach. This provides the FCERM teams implementing the Strategy with flexibility to set out on different pathways and then to move between the option pathways over time.

7.1.4 In ODUs where Local Aspirational Options have been identified, the starting pathway will be this option. In other areas the starting pathway will be the National Option. As uncertainties are reduced or amended over time, the FCERM teams can switch to deliver different leading options (moving pathways to a new option) or choose to stay with the original option (staying on the original pathway). For example, funding is recognised as a key uncertainty. In the short term if funding is not available for a particular location with a Local Aspirational Option, the pathway may be switched to deliver either the National or Backup Options instead. However, if in the future there is success in acquiring additional funding from different sources or there could be potential changes to funding rules and more funding becomes available, then the pathway could switch back to delivering the Local Aspirational Option at that point in time.

7.1.5 The Strategy leading options have been developed to allow the switching between options / pathways without comprising the approach in adjacent areas. Figure 7-1 presents an illustration of the adaptive pathway approach. It shows hypothetical options within an ODU. The epoch by epoch breakdown of the National, Local Aspirational and Backup Options are shown as well as the different adaptive pathways that could be taken through the various options. Decisions on which route to take would be subject to changing risks, opportunities and funding availability.

7.1.6 In the figure, the solid arrows are the anticipated route through each option at the start of the Strategy implementation period. However, there are two dotted arrows shown on the figure, illustrating two different examples of how the FCERM delivery team could change course between options as risks change or more funding became available:

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- the purple dashed line illustrates one pathway that could occur. In this hypothetical example, initially, at the start of the delivery period the back-up option was implemented as there was insufficient funding to deliver the National Option or Local Aspirational Leading Option. However, in epoch 2 the funding rules are altered and more funding becomes available meaning that it is viable to construct a new defence, as planned as part of the Local Aspirational Leading Option. Therefore, there is a change in the pathway and the new defence is delivered.
- the red dashed line illustrates another potential pathway that could occur. In this example a decision may be made initially to start with the National Leading Option with funding committed to future FCERM schemes. This option involves constructing upgraded defences in epoch 3 as flood risk is not expected to impact a significant number of properties until then. However, over the course of epoch 1, new sea level rise guidance and updated modelling becomes available which suggests that flood risk is much more significant than original expectations and many more properties are at risk earlier. Therefore, a shift in approach is required and funding is secured through partnership working to undertake the new defence upgrade sooner and deliver the Local Aspirational Leading Option.

7.1.7 Adaptive pathway illustrations similar to Figure 7-1 have been developed for each of the ODUs in the Strategy. These are presented in Appendix E.

7.1.8 As part of the Strategy an action and implementation plan has been developed and is presented in Appendix G. This plan includes details of the triggers and thresholds to inform key FCERM decisions and movement through the adaptive pathways in each ODU.

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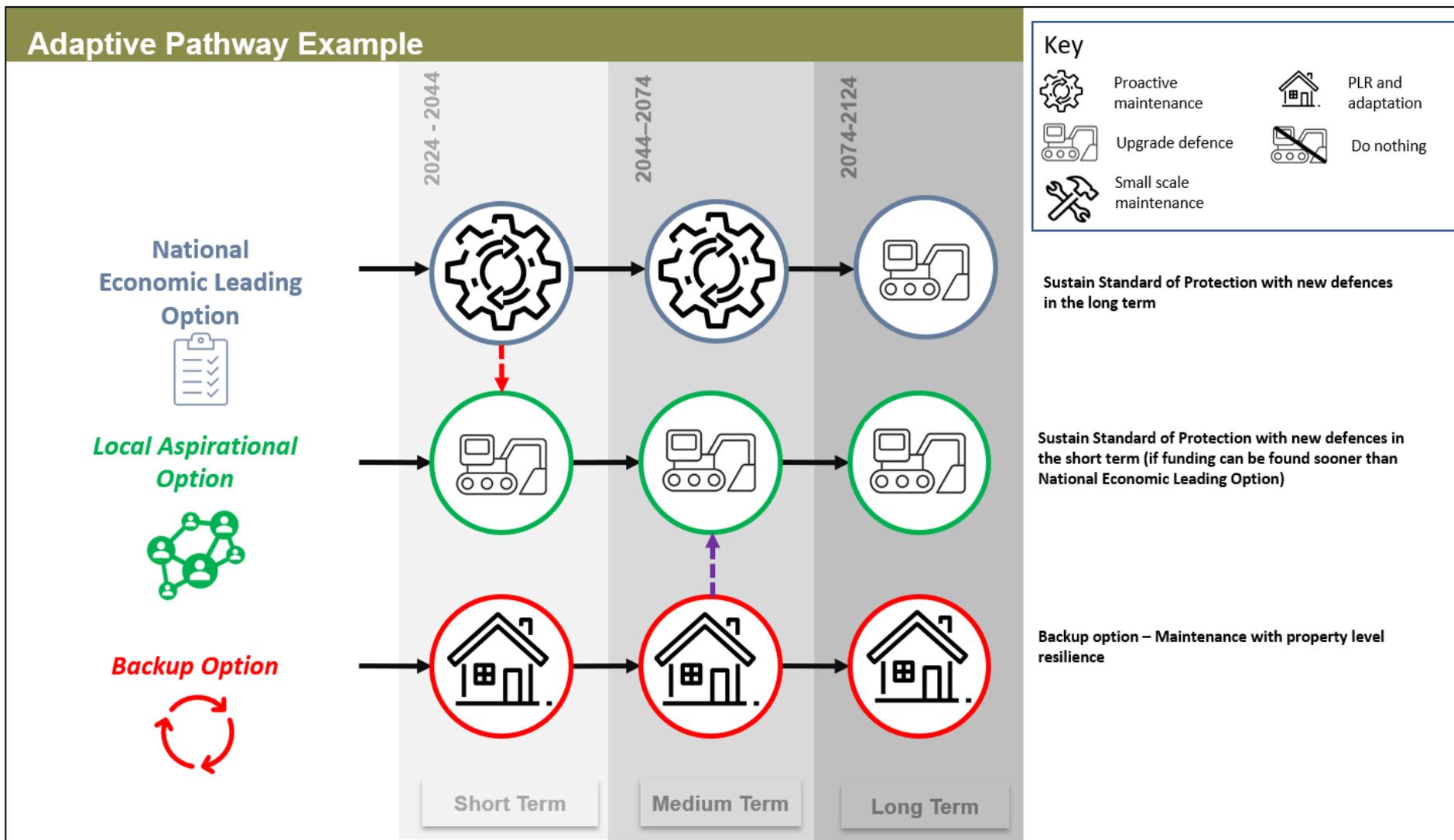


Figure 7-1: Adaptive Pathway illustration

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## Programme and spend profile

- 7.1.9 The Strategy proposes a 100-year schedule of phased capital investments and maintenance to reduce the risks of coastal flooding and erosion for up to three leading options in each ODU.
- 7.1.10 The programme and spend profile for the Strategy will vary depending on which adaptive pathways are implemented. However, for the purposes of this section, the programme of works and spend profiles outlined below assume that the Local Aspirational Option is delivered in ODUs where one has been identified. In other ODUs where there is not a Local Aspirational Option identified it has been assumed that the National Option will be delivered.
- 7.1.11 Table 7-1 shows the programme of works by ODU and time epoch. The programme shows capital defence construction and upgrades, capital refurbishment and beach management activities. Ongoing small scale patch repairs and small scale beach recycling / management are not shown in the table but would be required and have been included for each do something option in the option costing. Full details can be found in the Leading Options Report (Appendix C).
- 7.1.12 Table 7-2 shows the indicative key dates for defence upgrades / beach nourishment schemes recommended by the leading options during epoch 1. The timelines are based on either delivering the Local Aspirational Option (if there is one identified in an ODU) or the National Option. The timings do not account for the different adaptive pathways that could be taken through the options and therefore would be subject to change as the Strategy is delivered. The timings are also subject to acquiring the necessary funding and investment.
- 7.1.13 As can be seen in Table 7-2, there are defence upgrades scheduled during epoch 1 in nine different ODUs. In practice some of the works could be grouped together, for example, works at Milford on Sea in ODUs 16, 17 and 18 could be appraised and constructed as one scheme. The schemes outlined in epoch 1 as part of the leading options are generally 'low regret' and are needed to manage existing risks that are happening now (such as beach lowering at Milford on Sea, outflanking risk at Highcliffe etc.).
- 7.1.14 The timelines set out in Table 7-2 are subject to acquiring the required funding and both BCP and NFDC have committed to developing a funding strategy following approval of the Strategy. If the required funding cannot be secured it may result in the FCERM delivery team following different pathways through the options (for example the Backup or National Options) which may delay scheme delivery.
- 7.1.15 Spend profiles for each of the Strategy leading options can be found in the Economic Appraisal Report (Appendix F). There is uncertainty as to exact year in which measures will be implemented and therefore spend across 5-year increments are shown.

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**Table 7-1: Strategy implementation programme by ODU and time epoch**

ODU	Option shown	2024-2044	2044-2074	2074-2124
1- Hengistbury Head East	Local – Managed Realignment	Capital refurbishment of defences	Capital refurbishment of defences	Capital refurbishment of defences
2 – Mudeford Sandbank	Local – Adaptation / Resilience	Capital refurbishment of defences, PLR	Capital refurbishment of defences, PLR	Beach nourishment scheme, capital refurbishment of defences, PLR
3 – Christchurch Harbor South	Local – Adaptation / Resilience C	Verge / slope armouring, PLR	Capital refurbishment of slope armouring, PLR	Capital refurbishment of slope armouring, PLR
4 – Wick	Local – Sustain B	Raise and lengthen setback embankment, capital refurbishment of frontline quay wall	Further raise and lengthening of setback embankment, capital refurbishment of frontline quay wall.	Further raise and lengthening of setback embankment, capital refurbishment of frontline quay wall
5 – Willow Drive and the Quomps	Local – Improve B (shown as example)	Raise height and lengthen defences (subject to option alignment choice)	-	Capital refurbishment of defences
6 – River Avon West Bank	National – Adaptation / Resilience	Capital refurbishment of existing quay walls, PLR	Capital refurbishment of existing quay walls, PLR	Capital refurbishment of existing quay walls, PLR
7 – Rossiters Quay	National – Improve A	-	Raise height of defences (setback walls, embankment and quay walls)	-
9 - Stanpit	National – Sustain A	-	Raise and lengthen defences	Further raising of defences
10 – Mudeford	National – Improve A	Capital refurbishment of quay walls, PLR	Capital refurbishment of quay walls, PLR	Raise height and lengthen defences
11 - Mudeford Quay	Local – Adaptation / Resilience	Capital refurbishment of quay walls, PLR	Capital refurbishment of quay walls, PLR	Capital refurbishment of quay walls, PLR
12 – Avon Beach and Friars Cliff	Local – Improve C	Beach nourishment scheme, replace / upgrade groynes and upgrade seawall	Beach nourishment top-ups	Beach nourishment top-ups and PLR
13 – Highcliffe	Local – Improve A	New outflanking defence	Beach nourishment scheme and capital refurbishment of defences	Beach nourishment top-ups and upgrades to groynes and rock revetment

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ODU	Option shown	2024-2044	2044-2074	2074-2124
14 – Naish Cliff and Barton on Sea	National – Managed Realignment A	Upgrade rock toe defences and lengthen the revetment to cover Marine Drive West. Install new cliff drainage at Marine Drive and Marine Drive West.	-	Capital refurbishment of rock toe defences and cliff drainage.
15 – Barton on Sea to Hordle Cliff	National – Do Nothing	-	-	-
16 – Cliff Road	Local – Managed Realignment A	Beach nourishment scheme and construct local strong point.	Beach nourishment top-ups	Beach nourishment top-ups
17 – Rook Cliff	Local – Improve A	Upgrade rock defences and construct groynes to help retain beach material.	-	Capital refurbishment of defences
18 – Milford on Sea	Local – Improve A	Beach nourishment scheme, upgrade seawall and upgrade / replace groynes.	Construct setback tidal defences adjacent to Sturt Pond and PLR. Beach nourishment top-ups	Beach nourishment top-ups and PLR

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**Table 7-2 Indicative key dates for defence upgrades in epoch 1, subject to acquiring suitable funding and adaptive pathways / trigger thresholds**

Activity	Date
<b>ODU 3 – Christchurch Harbour South (verge / slope armouring to historic landfill)</b> Historic landfill / contaminated land investigations Commence detailed appraisal Approval Construction start Construction completion	2026 2029 2032 2033 2035
<b>ODU 4 - Wick (lengthening / raising defence embankment)</b> Commence detailed appraisal Approval Construction start Construction completion	2030 2032 2033 2035
<b>ODU 5 – Willow Drive and the Quomps (frontline / setback defence improvements)</b> Commence detailed appraisal Approval Construction start Construction completion	2026 2029 2030 2032
<b>ODU 12 – Avon Beach and Friars Cliff (beach nourishment, groyne / seawall improvement)</b> Commence detailed appraisal Approval Construction start Construction completion	2033 2035 2036 2038
<b>ODU 13 – Highcliffe (outflanking defence)</b> Commence detailed appraisal Approval Construction start Construction completion	2033 2035 2036 2038
<b>ODU 14 – Naish Cliff and Barton on Sea (cliff drainage, toe defence upgrades)</b> Drainage trial and analysis Commence detailed appraisal Approval Construction start Construction completion	2025 2028 2032 2033 2035
<b>ODU 16 – Cliff Road (beach nourishment, local strong point)</b> Commence detailed appraisal Approval Construction start Construction completion	2026 2029 2030 2032
<b>ODU 17 – Rook Cliff (upgrade rock defences)</b> Commence detailed appraisal Approval Construction start Construction completion	2026 2029 2030 2032
<b>ODU 18 – Milford on Sea (beach nourishment, upgrade defences)</b> Commence detailed appraisal Approval Construction start Construction completion	2026 2029 2030 2032

## Outcome measures contributions

7.1.16 Table 7-3 summarises the Outcome Measure (OM) contributions of the leading options in each SMZ. For the purposes of this table it has been assumed that the Local Aspirational Option will be delivered in ODUs where one has been identified. In other ODUs where there is not a Local Aspirational Option identified it has been assumed that the National Option will be delivered.

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7.1.17 Note that the same assumptions as outlined in the Partnership Funding scores presented in Section 6 apply to this table (i.e. assuming a jump forward in time for OM2 and OM3s delivered by schemes).

7.1.18 In total the leading options would be expected to deliver over £168million in PV benefits over the strategy duration.

7.1.19 Over 700 OM2s would be expected in SMZ 2. The OM2a values presented in Table 7-3 only include the residential properties initially at risk from flooding at the time of the scheme implementation and the OM2b properties are the residential properties that would otherwise have been at risk a short time period after (in approx. 20 years, from the 2040s). These OM2 values do not include the additional properties that would become at risk due to sea level rise by the end of the scheme service life, or non-residential properties. When these additional properties are considered, in total 1,977 properties within SMZ 2 (of which 1,656 are residential) would be expected to benefit from an improved standard of protection from flooding by the Strategy.

7.1.20 In total 1,178 OM3s would be expected across SMZ 3, SMZ 4 and SMZ 6. These are the properties that would be better protected against erosion risk.

**Table 7-3 Outcome measures contributions**

<b>Outcome Measure</b>	<b>SMZ 1</b>	<b>SMZ 2</b>	<b>SMZ 3</b>	<b>SMZ 4</b>	<b>SMZ 5</b>	<b>SMZ 6</b>	<b>Total</b>
<b>OM1 Economic Benefit</b>							
PV Benefits (£k)	89	98,800	15,924	23,489	0	30,071	168,373
<b>OM2 Households at risk improving risk bands (nr)</b>		258					258
<b>OM2b Households at risk improving risk Bands (Nr)</b>		446					446
<b>OM3 Households at risk better protected (Nr)</b>			297	303	0	578	1,178

## 7.2 Procurement strategy

7.2.1 Prior to any appraisal or construction works a review of procurement routes available to appoint the required Professional Services and Contractors to deliver the schemes will be undertaken by BCP and NFDC.

7.2.2 Professional Services will be appointed following respective BCP and NFDC procurement rules and would likely utilise the Southern Coastal Group Coastal, Flood & Infrastructure Professional Services Framework or similar – depending on frameworks in place at time of procurement.

7.2.3 Professional Services will be appointed using a standard NEC Professional Services Contract or through a standard ‘design and build’ NEC Engineering and Construction Contract. Secondary contracts for minor or ancillary works will be appointed through standalone quotation / tender procedures or through existing the Southern Coastal Group Coastal Engineering Minor Works Framework.

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## 7.3 Delivery risks

### High level risk register

7.3.1 A high level risk register for the delivery of the Strategy has been developed collaboratively as a project team and is outlined in Table 7-4. The adopted mitigation measures are outlined. It will be reviewed at regular intervals during the Strategy delivery and updated accordingly as new risks develop.

**Table 7-4 High level risk schedule and mitigation**

Key project risk	Adopted mitigation measure
<b>Political</b>	
Change in local authority leadership and priorities resulting in reduced support and resource prioritisation for the schemes	Support already established. It is unlikely that a change would result in reduced support for the Strategy given that the FCERM risk in the area is high and mitigation is high on the public agenda.
<b>Economic</b>	
Affordability of future schemes	BCP / NFDC are committed to raising the external contributions needed to deliver the works from this Strategy.
Requirements for significant external funding, reliance on FCRM GiA funding to augment external funding	Upfront engagement and collaboration with potential beneficiaries has taken place throughout strategy development.
Reduced GiA contribution due to change in guidance of PF score thresholds	BCP / NFDC will develop a funding Strategy upon completion of the Strategy and the adaptive pathways provides sufficient flexibility to delay schemes if required due to funding limitations.
Actual option costs are higher than currently estimated	The maximum recommended optimism bias of 60% has been adopted to the costs in the strategy economics and Partnership Funding calculations. An additional 30% uplift was applied to account for known risks. Costs are based on the latest available cost price information (i.e. SPONS 2024) and have accounted for inflation.
The schemes may not be attractive or in support of the plans of external developers/investors	Ensure early engagement with potential investors to align their development plans with coastal protection options, thus making the schemes more attractive.
<b>Technical</b>	
Climate change / sea level rise occurs at a different rate than predicted	The Strategy has sufficient adaptive capacity to adjust course / adaptive pathways as risks develop. The schemes outlined in epoch 1 as part of the leading options are 'low regret' and needed to manage existing risks that are happening now (such as beach lowering at Milford on Sea, outflanking risk at Highcliffe etc.)
Problems in supply of suitable materials when constructing new defences. Particularly over 100 year implementation timescale	Phasing of works is flexible to allow for variation in materials supply and costs. Further studies such as the scheme business cases and detailed design will establish suitable materials and supply for each scheme.
Publication of new data or guidance	Ensure subsequent strategy updates / additional studies / business cases / detailed designs utilise the most up to date guidance and datasets. A range of sensitivity tests have been carried out on the strategy options and demonstrate a robust strategy. Changes in guidance should therefore not have a significant impact on the Strategy recommendations.
Development of adjacent Hurst Spit to Lymington FCERM Strategy and potential implications of Hurst spit evolution on Christchurch Bay	FCERM decisions made via the Hurst Spit to Lymington Strategy regarding the evolution of Hurst Spit should be cognisant of the potential impacts on coastal processes within the sediment cell and other coast protection risks as a whole (i.e. shoreline alignment and potential sediment source locations). The project teams from both Strategies have liaised throughout the development of both projects and the Christchurch Bay and Harbour Strategy leading options support the short, medium and long term evolution of the spit by providing an additional sediment feed to the spit.
<b>Social</b>	
Implementation difficulties – e.g. on agreeing preferred defence route alignment, planning objections etc.	Early and ongoing engagement with key landowners and stakeholders along the frontage will be carried out to agree and confirm suitable alignments for the schemes required during epoch 1. Any special

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	access requirements or provisions will also be ascertained to ensure the option is feasible.
<b>Environment</b>	
HRA / WFD compliance during scheme development	The Strategy HRA Appropriate Assessment and WFD assessment have identified the locations where project level assessments are required. There are opportunities for the scheme designs to minimise impact (through construction mitigation / alignment decisions) and mechanisms for providing compensatory habitat if required (such as the Regional Habitat Creation Programme).

## Safety plan

- 7.3.2 Public health and safety will form a key consideration in scheme development and will be considered throughout the option appraisal, outline and detailed design phases and will form part of the designer's risk assessment. This approach will be continued through the construction phase with any risks included in the Health and Safety file.
- 7.3.3 Consideration will be given to CDM and key health and safety issues as the leading Strategy options are advanced through further appraisal and design. Designer risk assessments will be written and appropriate records will be kept throughout future stages of each scheme. Where risks are identified that cannot be resolved entirely then appropriate mitigation measures will be developed wherever possible to reduce the probability of the risk occurrence.
- 7.3.4 Risk assessments will be carried out prior to any work starting on site to ensure the safety of the public during and after construction.

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# 8 Appendices

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## Appendix A Project appraisal report data sheet

Entries required in clear boxes, as appropriate.

### GENERAL DETAILS

Authority Project Ref. (as in forward plan):

Project Name  
(60 characters  
max.):

Christchurch Bay and Harbour FCERM Strategy

Promoting Authority: Defra ref (if known)  
Name

Bournemouth, Christchurch and Poole Council

Emergency Works:

No Yes/No

Strategy Plan Reference:

NA

River Basin Management Plan

Hampshire Avon Catchment Flood  
Management Plan (2012)

System Asset Management Plan

NA

Shoreline Management Plan:

Poole and Christchurch Bay SMP 2  
(2011)

Project Type:

FCERM Strategy

Shoreline Management Study/ Preliminary Study/ Strategy Plan/Prelim. Works to Strategy/ Project within Strategy/Stand-alone Project/  
Strategy Implementation/Sustain SOS. Coast Protection/Sea Defence/Tidal Flood Defence/Non-Tidal Flood Defence/Flood Warning  
Tidal/Flood Warning - Fluvial/Special

### CONTRACT DETAILS

Estimated start date of works/study:

03/2021

Estimated duration in months:

45

Contract type\*

Framework

(\*Direct labour, Framework, Non Framework, Design/Construct )

### COSTS

Appraisal:

APPLICATION (£000's)

NA

Costs for Agency approval:

140,319

Total Whole Life Costs (cash):

313,209

For breakdown of costs see Table in Section 2.4

### CONTRIBUTIONS

Windfall Contributions:

NA

Deductible Contributions:

NA

ERDF Grant:

NA

Other Ineligible Items:

NA

### LOCATION - to be completed for all projects

EA Region/Area of project site (all projects):

WSX and SSD

Name of watercourse (fluvial projects only):

Bournemouth, Christchurch and Poole  
Council. New Forest District Council

District Council Area of project (all projects):

EA Asset Management System Reference:

Grid Reference (all projects):

SZ1791

(OS Grid reference of typical midpoint of project in form ST064055)

## DESCRIPTION

Specific town/district to benefit:

Christchurch, Barton on Sea, Milford on Sea

Brief project description including essential elements of proposed project/study  
(Maximum 3 lines each of 80 characters)

FCERM Strategy that sets out the leading options, adaptive pathways and timings to sustainably address coastal flood and erosion risk over the next 100 years

## DETAILS

Design standard (chance per year):	Varies	yrs
Existing standard of protection (chance per year)	Varies	yrs
Design life of project:	100 years	yrs
Fluvial design flow (fluvial projects only):	NA	m <sup>3</sup> /s
Tidal design level (coastal/tidal projects only):	Varies	m
Length of river bank or shoreline improved:	27,000	m
Number of groynes (coastal projects only):	To be determined at scheme stage	
Total length of groynes* (coastal projects only):	To be determined at scheme stage	m
Beach Management Project?	No	Yes/No
Water Level Management (Env) Project?	No	Yes/No
Defence type (embankment, walls, storage etc)	Varies	

\* i.e. total length of all groynes added together, ignore any river training groynes

## ADDITIONAL AGREEMENTS:

Maintenance Agreement(s):	NA	Not Applicable/Received/Awaited
EA Region Consent (LA Projects only):	South West and Southern	Not Applicable/Received/Awaited
Non Statutory Objectors:	No	Yes/No
Date Objections Cleared:	NA	
Other:	NA	Not Applicable/Received/Awaited

## ENVIRONMENTAL CONSIDERATIONS

Natural England (or equivalent) letter:	Received	Not Applicable/Received/Awaited
Date received	14/11/23	

## SITES OF INTERNATIONAL IMPORTANCE

(Answer Y if project is within, adjacent to or potentially affects the designated site)

Special Protection Area (SPA):	Yes	Yes/No
Special Area of Conservation (SAC):	Yes	Yes/No
Ramsar Site	Yes	Yes/No
World Heritage Site	No	Yes/No
Other (Biosphere Reserve etc)	Yes	Yes/No

**SITES OF NATIONAL IMPORTANCE** (Answer Y if project is within, adjacent to or potentially affects the designated site)

Environmentally Sensitive Area (ESA):	Yes	Yes/No
Site of Special Scientific Interest (SSSI):	Yes	Yes/No
National/Regional Landscape Designation:	Yes	Yes/No
National Park/The Broads	No	Yes/No
National Nature Reserve	No	Yes/No
AONB, RSA, RSC, other	No	Yes/No
Scheduled Ancient Monument	Yes	Yes/No
Other designated heritage sites	Yes	Yes/No

**OTHER ENVIRONMENTAL CONSIDERATIONS**

Listed structure consent	NA	Not Applicable/Received/Awaited
Water Level Management Plan Prepared?	No	Yes/No
FEPA licence required?	No	Not Applicable/Received/Awaited
Statutory Planning Approval Required	NA	Yes/No/Not Applicable

**COMPATIBILITY WITH OTHER PLANS**

Shoreline Management Plan	Yes	Yes/No/Not Applicable
River Basin Management Plan	Yes	Yes/No/Not Applicable
Catchment Flood Management Plan	Yes	Yes/No/Not Applicable
Water Level Management Plan	NA	Yes/No/Not Applicable
Local Environment Agency Plan	Yes	Yes/No/Not Applicable

**SEA/ENVIRONMENTAL IMPACT ASSESSMENT**

SEA	Statutory stakeholder approval	Statutory required/Agency voluntary/not applicable
EIA	NA	Yes (schedule 1); Yes (schedule 2); SI1217; not applicable
SEA/EIA status	Final	Scoping report prepared/draft/draft advertised/final

Other agreements	Detail	Result	(Not Applicable/Received/Awaited for each)
	HRA	Natural England letter of support obtained	
	WFD	Reviewed by Environment Agency and support conclusions	
	MCZ	Natural England letter of support obtained	
	SEA	Natural England letter of support obtained. Historic England letter of support obtained. Environment Agency reviewed and support conclusions.	

# Costs, benefits and scoring data

(Apportion to this phase if part of a strategy)

**Local authorities only:** For projects done under Coast Protection Act 1949, please separately identify: FRM = Benefits from reduction of asset flooding risk; CERM = Benefits from reduction of asset erosion risk

**Benefit type** (DEF: reduces risk (contributes to Defra SDA 27); CM: capital maintenance; FW: improves flood warning; ST: study; OTH: other projects)

DEF
-----

## LAND AREA

Total area of land to benefit:	475		Ha
of which present use is:	FRM	CERM	
Agricultural:	0	0	Ha
Developed:	224	147	Ha
Environmental/Amenity:	65	39	Ha
Scheduled for development		0	Ha

## PROPERTY & INFRASTRUCTURE PROTECTED

	Number		Value (£'000s)	
	FRM	CERM	FRM	CERM
<sup>1</sup> Residential	1703	1176	47,492	54,316
Commercial/Industrial	352	185	23,172	4,298
Critical Infrastructure	Various	Various		
Key Civic Sites	NA	NA		
Other (description below):				
Description:				

### costs and Benefits

<sup>1</sup> Present value of total project whole life costs (£'000s):	140,319	
Project to meet statutory requirement? Y/N	N	
	Value (£'000s)	
	FRM	CERM
Present value of residential benefits:	47,492	54,316
Present value of commercial/industrial benefits:	23,172	4,298
Present value of other benefits (infrastructure, agriculture, environment/amenity, health):	39,095	
<sup>1</sup> Present value of total benefits (FRM & CERM)	168,373	
Net present value:	28,054	
Benefit/cost ratio:	1.20	
Base date for estimate:	2024	
FCERM-AG Decision Rule stage 3 applied	Yes	Yes/No
FCERM-AG Decision Rule stage 4 applied	Yes	Yes/No

### OTHER OUTCOME MEASURE SCORING DETAILS

Super Output Area No*:	Varies	Indicate if deprived:	Varies	Yes/No
(*as ranked by Indices of Multiple Deprivation)				
Risk:	N/A	VH, H or N/A		
Net gain of BAP habitat:	Wetland	Saltmarsh/Mudflat	Ha	
	N/A	N/A		
SSSI protected:	N/A	Ha		
Other Habitat:	N/A	Ha		
Heritage Sites:	N/A	"I or II", "II or other" or "N/A"		

### Exemption Details (if exempt from OM scoring system)

Exempt from Scoring:  No  Yes/No

--

Outcome measure prioritisation priority score overleaf based on initial / major scheme recommended in leading options. The values presented assume a 'jump forward' in time to year of scheme implementation and details may vary when schemes are actually implemented in the future. The values presented only include the ODUs that have had Partnership Funding scores calculated and do not cover the full Strategy area (see Table 10-1 in Economics Appendix for more details).

# Outcome measure prioritisation priority score

## Stage 1 - Calculate individual scores

Ref	Description	Project contributions (including adjustments)		Targets	Individual scores
<b>OM1</b>	Present value of Whole Life Benefits (£000s)	227,266 <b>o1</b>		Divided by 3,700,000 <b>t1</b>	Gives OM1 individual score <b>s1</b> 0.061
<b>OM2</b>	Number of households moved from any flood / coastal erosion probability category to a lower one (households)	1,434 <b>o2</b>	Minus o2b 164 <b>o2b</b>	Divided by 100,000 <b>t2</b>	Gives OM2 individual score <b>s2</b> 0.013
<b>OM2b</b>	Number of households moved from the very significant or significant flood probability category to the moderate or low flood probability category; or equivalent coastal erosion probability categories (households)	164 <b>o2b</b>	Minus o3 0 <b>o3</b>	Divided by 36,000 <b>t2b</b>	Gives OM2b individual score <b>s2b</b> 0.005
<b>OM3</b>	Number of households in deprived communities at reduced flood risk (households)	0 <b>o3</b>		Divided by 9,000 <b>t3</b>	Gives OM3 individual score <b>s3</b> 0
<b>OM5</b>	The number of hectares Biodiversity Action Plan habitat created, net of compensatory habitat (Hectares)	0 <b>o5</b>		Divided by 800 <b>t5</b>	Gives OM5 individual score <b>s5</b> 0

**Stage 2 - Calculate overall OM prioritisation score**

**Score**

Outcome Measure prioritisation score (total of individual scores divided by whole life cost)

$$0.061 + 0.013 + 0.005 + 0 + 0 =$$

$$(s1 + s2 + s2b + s3 + s5)$$

Divided by

**140,319**

**Project whole life costs**

Multiplied by  
1,000,000

**0.56**

**OM prioritisation score**

- Appendix B List of Reports Produced**
- Appendix C Leading Option Report**
- Appendix D Long List to Short List Report**
- Appendix E Adaptive Pathway Illustrations**
- Appendix F Economics Appraisal Report**
- Appendix G Action and Implementation Plan**
- Appendix H Cost and Funding Profiles**
- Appendix I List of Consultees**
- Appendix J Stakeholder Engagement Report**
- Appendix K SEA Report**
- Appendix L HRA Report**
- Appendix M WFD Report**
- Appendix N MCZ Assessment Report**
- Appendix O Natural England and Historic England Letters of Support**
- Appendix P Carbon Technical Note**
- Appendix Q Coastal Processes Report**
- Appendix R Defence Condition Report**
- Appendix S Stakeholder Engagement Phases 1-5 Summary Reports**
- Appendix T Option Development Unit Maps**

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Version	Details	Date	Prepared	Checked
1	Draft for client review	02/04/2024	BT	JS
2	Update following review	22/04/2024	BT	JS

General notes

- The sea level rise trigger thresholds are relative to the present day sea level (2024)
- The defence condition trigger threshold of 'poor' is for an the overall asset. However, there may be local variations in the condition of defence assets that could mean that localised repairs are needed before the trigger threshold is reached.
- Defence maintenance should be guided by detailed condition assessments undertaken regularly and this action plan should not be relied upon to inform maintenance requirements / timing
- The adaptive pathway figures are to be updated for all units so the epoch dates match those within this spreadsheet
- The cost profiles have been obtained directly from the 'Christchurch FCERM Strategy funding profiles\_v5\_240130' and the same limitations / assumptions apply (i.e. strategic level costing, subject to change)
- ODU 8 is not included as it has been agreed with the Environment Agency that future River Avon projects will appraise this area

Decision tree notes

- The decision tree diagrams are for illustrative purposes only and may not include all key decisions that need to be made when delivering the Strategy
- The decision tree diagrams have been produced to provide more detail for epoch 1. However, if key decisions within an ODU are due in epoch 2 or 3, the decision tree also provides this information

# ODU 1 - Hengistbury Head East

## Key features / risks

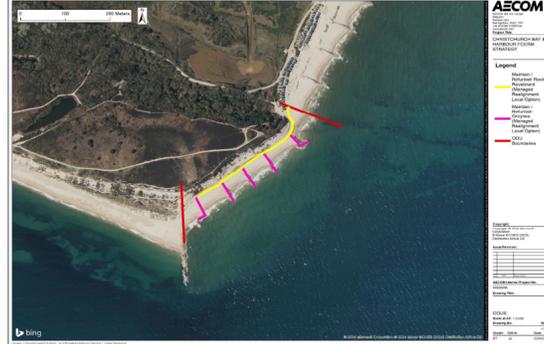
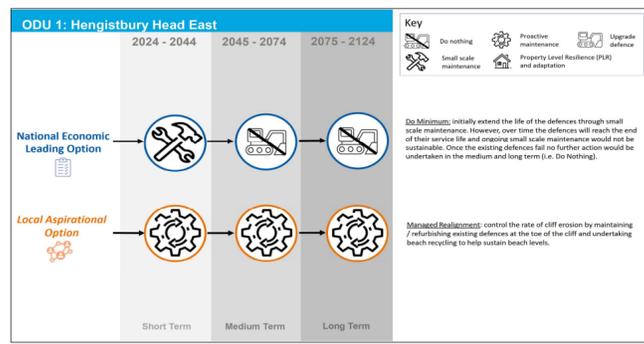
- No flooding / erosion risk to properties
- Erosion risk to headland and scheduled monument / environmental designations (SSSI, SAC, SPA, LNR)
- Existing rock defences at base of cliff including rock revetment and rock groyne
- Unmanaged erosion of headland 'anchor point' could threaten Mudeford Sandbank and wider morphology

## Strategy Leading Options

- National and Local Option identified
- National Option is Do Minimum whereas Local Option is Managed Realignment
- Local Option (Managed Realignment) provides more confidence in future coastline position and would involve refurbishing existing rock defences over time. Some limited erosion expected to occur due to cliff slope processes
- National Option (Do Minimum) would not involve replacing existing defences when they fail and erosion would be expected

## Map of Leading Options

- Alignments are indicative and will vary subject to further appraisal



## Works required to deliver leading options\*

Option	Epoch 1			Epoch 2		Epoch 3
	Years 2025 - 2029	Years 2030 - 2034	Years 2035 - 2039	Years 2040 - 2044	Years 2045-2074	Years 2075-2124
National	No planned works other than small scale patch & repair and ensuring H&S compliance. Review S&P policy to align with the option if this is the option delivered.					
Local	Develop funding strategy. Undertake defence condition assessments. Begin planning defence refurbishments (as condition is already poor for some assets). Secure funding and consenting for refurbishments. Undertake beach management as required.		Refurbish existing rock defences. Undertake beach management as required.		Undertake beach management as required.	Further refurbishments of existing defences.

\*note: not shown in table above, but monitoring and small scale / patch repair maintenance on existing defences and assets should be undertaken annually / as required  
 \*timings of works subject to trigger points such as funding and condition of existing defences

## Cost profile for capital works and maintenance (not including pre-business case / support work)

Leading Option	Indicative option cost (£K) - cash																
	Epoch 1 (years)			Epoch 2 (years)				Epoch 3 (years)			Total						
	2025-2029	2030-2034	2035-2039	2040-2044	2045-2049	2050-2054	2055-2059	2060-2064	2065-2069	2070-2074	2075-2079	2080-2084	2085-2089	2090-2094	2105-2114	2115-2124	
National	23	46	91	183	37	0	0	0	0	0	0	0	0	0	0	0	654
Local	40	54	2,098	54	40	54	40	2,112	40	54	94	2,152	94	2,152	94	9,172	

\*note that defence refurbishments timing may need to be adjusted if refurbishments are required sooner (to be informed by detailed defence condition assessment)

## FCERM GiA funding availability

- FCERM GiA funding unlikely to be available for defence works due to BCR < 1 on national basis

## Trigger Points

Category	Influence on	Details of key decisions when implementing options	Triggers
Defence condition	Timing of defence refurbishments in Local Option	<ul style="list-style-type: none"> <li>If implementing the Local Option:                             <ul style="list-style-type: none"> <li>The existing rock defences were assessed to have a 'Poor' or 'Fair' condition in the Strategy defence condition assessment, with an estimated residual life (without maintenance) of &lt;10 for the 'poor' defences and 10-15 years for the 'fair' defences.</li> <li>Ongoing small scale / patch repair maintenance would be expected to extend the life of these asset but they are still expected to require a refurbishment during epoch 1.</li> <li>More detailed defence condition assessments are required to inform the exact timing of defence refurbishments.</li> <li>The timing of the refurbishments should be based on these detailed condition inspections and may need to be brought forward or delayed accordingly.</li> <li>It is recommended that when the condition reaches a 'poor' rating then a refurbishment is undertaken as soon as possible once funding is secured.</li> <li>Given the Strategy defence condition assessment identified that some of the defences are already in a poor condition, it is recommended that planning for the refurbishments begins in the first years of the Strategy implementation.</li> </ul> </li> </ul>	Condition rating of Poor
Funding	Decision on Local vs National Option and timing of embankment improvements	<ul style="list-style-type: none"> <li>The Local Option will have a funding shortfall for the defence refurbishment works.</li> <li>The Funding Strategy will need to outline how the defence refurbishments will be funded. If funding is not likely, then these refurbishment works could be delayed until the funding is secured or the National Option delivered instead.</li> </ul>	Funding availability Revert to National Option if funding for refurbishments is not secured

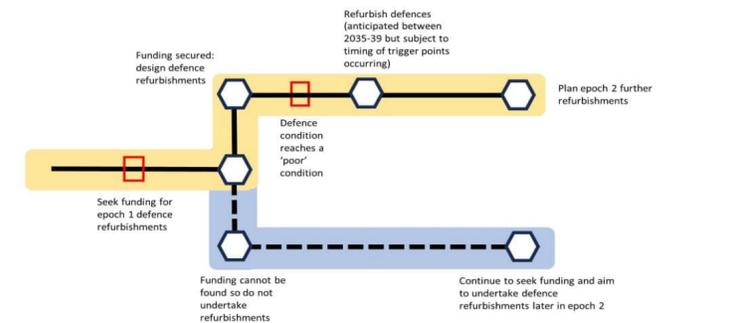
## Decision Tree



## ODU 1: Hengistbury Head East Decision tree

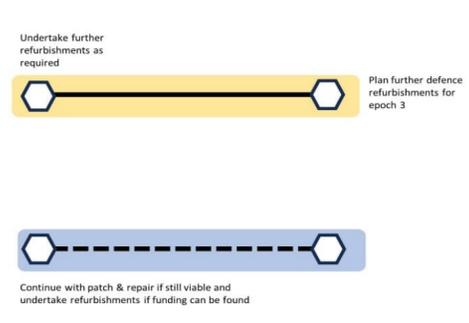
### Epoch 1 (2024-2044)

Present day (2024) Time & Sea level rise 2044 or 0.13m SLR



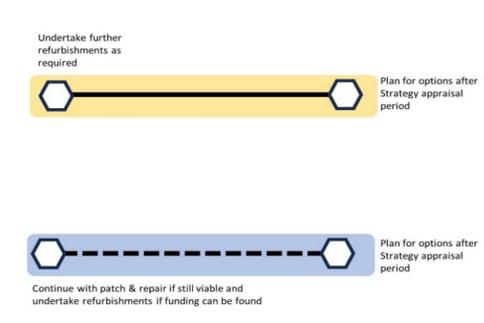
### Epoch 2 (2045-2074)

Time & Sea level rise 2074 or 0.42m SLR



### Epoch 3 (2075-2124)

Time & Sea level rise 2124 or 1.06m SLR



# ODU 2 - Mudeford Sandbank

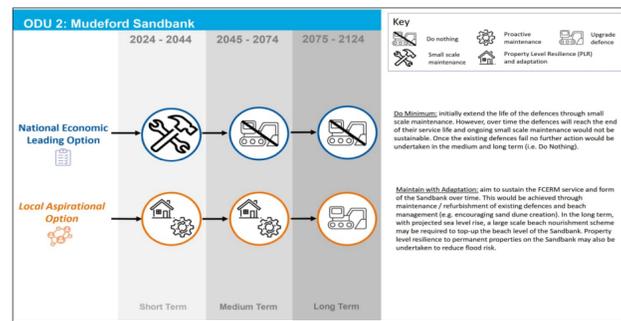
## Key features / risks

- Six properties at risk from flooding (2.124 0.5% AEP) so therefore there is only limited economic benefits on a national basis
- Large number of beach huts and recreational / amenity resource on the Sandbank providing local benefit to the area
- With no further interventions the Sandbank is expected to rollback over time. Risk of breaching
- Buried services beneath the Sandbank which could be damaged if the Sandbank rolls back significantly
- Uncertain impact on coastal morphology should Sandbank roll back in an unconstrained manner



## Strategy Leading Options

- National and Local Option identified
- National Option is Do Minimum whereas Local Option is Maintain with Adaptation
- Local Option (Maintain with Adaptation) aims to sustain the FCERM service of the Sandbank by holding its form over time and aiming to keep it broadly in its current position. Achieved through beach nourishment, defence refurbishments and property level resilience.
- National Option (Do Minimum) would not involve replacing existing defences when they fail and rollback of the Sandbank would be expected



## Map of Leading Options

- Alignments are indicative and will vary subject to further appraisal
- PLR requirements to be determined on property by property basis as required



## Works required to deliver leading options\*

Option	Years 2025 - 2029	Years 2030 - 2034	Years 2035 - 2039	Years 2040 - 2044	Epoch 2 Years 2045-2074	Epoch 3 Years 2075-2124
National	No planned works other than small scale patch repair and ensuring HMA compliance. Review DMP policy to align with this option if this is the option delivered					
Local	Develop funding strategy. Undertake defence condition assessments. Undertake beach management as required. Review DMP policy to align with this option if this is the option delivered	Begin planning defence refurbishments. Secure funding and consenting for refurbishments. Undertake beach management as required	Refurbish existing defences on the Sandbank. Undertake beach management as required	Undertake beach management as required	Further refurbishments of existing defences	Beach Nourishment scheme. Further refurbishments of existing defences

\*note: not shown in table above, but monitoring and small scale / patch repair maintenance on existing defences and assets should be undertaken annually / as required  
 \*timings of works subject to trigger points such as funding and condition of existing defences

## Cost profile for capital works and maintenance (not including pre-business case / support work)

Leading Option	Indicative option cost (£k) - cash												Total			
	Epoch 1 (years)				Epoch 2 (years)				Epoch 3 (years)							
	2025-2029	2030-2034	2035-2039	2040-2044	2045-2049	2050-2054	2055-2059	2060-2064	2065-2069	2070-2074	2075-2084	2085-2094	2095-2104	2105-2114	2115-2124	
National	46	91	183	183	365	365	73	0	0	0	0	0	0	0	0	1,304
Local	23	37	3,688	37	37	37	3,688	37	37	3,057	3,725	1,566	3,725	74	19,805	

\*note that defence refurbishments timing may need to be adjusted if refurbishments are required sooner (to be informed by detailed defence condition assessment)

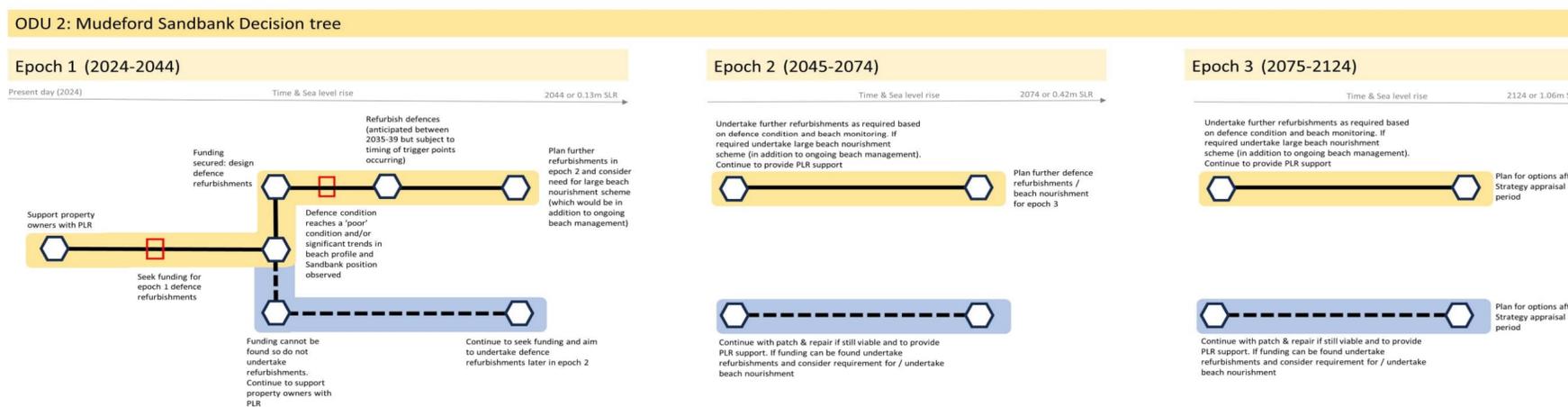
## FCERM GIA funding availability

- FCERM GIA funding unlikely to be available for defence works due to BCR < 1 on national basis

## Trigger Points

Category	Influence on	Details of key decisions when implementing options	Triggers
Defence condition	Timing of defence refurbishments in Local Option	- If implementing the Local Option: - The existing risk defences were assessed to have a "Good" or "Fair" condition in the Strategy defence condition assessment, with an estimated residual life (without maintenance) of >10 years - Ongoing small scale / patch repair maintenance would be expected to extend the life of these asset but they are still expected to require a refurbishment during epoch 1 - The requirement for a refurbishment will need to be determined based on detailed condition inspections and may need to be brought forward or delayed accordingly based on the results of the inspections - It is recommended that when the condition reaches a "Poor" rating then a refurbishment is undertaken	Condition rating of Poor
Sandbank beach monitoring	Timing of defence refurbishments in Local Option	- If implementing the Local Option: - The existing defences (rock groynes) currently help control beach levels and the position of the Sandbank - There is a risk that the existing defences could become less effective over time in response to storms / sea level rise - It is recommended that the Sandbank beach profiles continues to be monitored on a regular basis (i.e. every 6 months) to identify any trends in the beach profile / Sandbank movement. - If the beach profile trends indicate that the beach profile is changing beyond the typical range or there is evidence of the Sandbank position moving significantly then this could be a trigger for refurbishing / modifying the existing defences - A long term record of monitoring is required to enable long term significant trends to be identified relative to typical seasonal variations	- A consistent trend in beach profile change / Sandbank position (not typical seasonal change)
Funding	Decision on Local vs National Option and timing of defence refurbishments	- The Local Option will have a funding shortfall for the defence refurbishment works and beach nourishment (in epoch 3) - The Funding Strategy will need to outline how the defence refurbishments will be funded. If funding is not likely, then these refurbishment works could be delayed until the funding is secured or the National Option could be delivered instead	- Funding availability - Revert to National Option if funding for refurbishments is not secured

## Decision Tree



# ODU 3 - Christchurch Harbour South

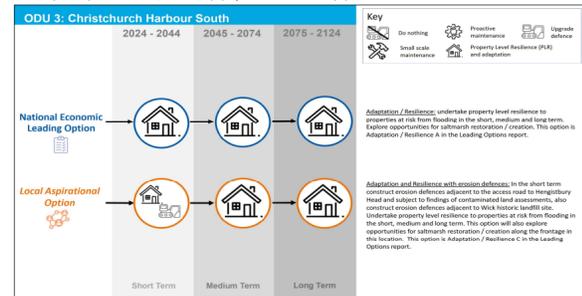
## Key features / risks

- Eight properties at risk from flooding (2124 0.5% AEP event) so therefore there is limited economic benefits on a national basis
- Two historic landfill sites (Wick and east of Double Dykes) adjacent to the shoreline and potentially at risk from erosion
- Contamination status of historic landfill sites is unknown at this stage
- Only access road onto Hengistbury Head also adjacent to shoreline and potentially at risk from erosion



## Strategic Leading Options

- National and Local Option Identified
- National Option is Adaptation / Resilience (A) whereas Local Option is Adaptation / Resilience (C) with erosion defences
- Local Option (Adaptation / Resilience C with defences) aims to provide property level resilience measures to properties at risk of flooding
- and new defences to Wick historic landfill as well as refurbish defences to the access road to Hengistbury Head (also defending Double Dykes historic landfill site)
- National Option (Adaptation / Resilience A) would include property level resilience measures to properties at risk but would not include defences to landfill / access road



## Map of Leading Options

- Alignments are indicative and will vary subject to further appraisal
- PLR requirements to be determined on property by property basis as required



## Works required to deliver leading options\*

Option	Years 2025 - 2029	Years 2030 - 2034	Epoch 1 Years 2035 - 2039	Years 2040 - 2044	Epoch 2 Years 2045-2049	Epoch 3 Years 2050-2124
National	Identify properties that would benefit from property level resilience measures Engage with property owners and support property level resilience funding applications / implementation as required Review SAMP policy to align with this option if this is the option delivered					
Local	Develop leading strategy Undertake historic landfill investigations to determine contamination status of the landfill sites Identify properties that would benefit from property level resilience measures Engage with property owners and support property level resilience funding applications / implementation as required Review SAMP policy to align with this option if this is the option delivered	Business case development, outline design and secure funding for erosion defences at Wick historic landfill and Hengistbury Head Access Road (if required pending contaminated land assessment) Approval of business case Outline design, consenting and procurement for erosion defences Construction of erosion defences			Maintenance / refurbishment of erosion defences as required Continued support for PLR measures to property owners	Maintenance / refurbishment of erosion defences as required Continued support for PLR measures to property owners

\*note: not shown in table above, but monitoring and small scale / patch repair maintenance on existing defences and assets should be undertaken annually / as required  
\*timings of works subject to trigger points such as funding and condition of existing defences

## Cost profile for capital works and maintenance (not including pre-business case / support work)

Leading Option	Indicative option cost (£k - cash)															
	Epoch 1 (years)			Epoch 2 (years)			Epoch 3 (years)			Total						
	2025-2029	2030-2034	2035-2039	2040-2044	2045-2049	2050-2054	2055-2059	2060-2064	2065-2069	2070-2074	2075-2084	2085-2094	2095-2104	2105-2114	2115-2124	
National	11	11	51	11	11	11	11	11	11	11	23	23	63	63	23	385
Local	11	11	55	23	23	23	23	55	23	23	46	579	46	579	46	2,575

\*note that defence upgrades / refurbishments timing may need to be adjusted if works are required sooner (to be informed by detailed defence condition assessment and historic landfill investigations)

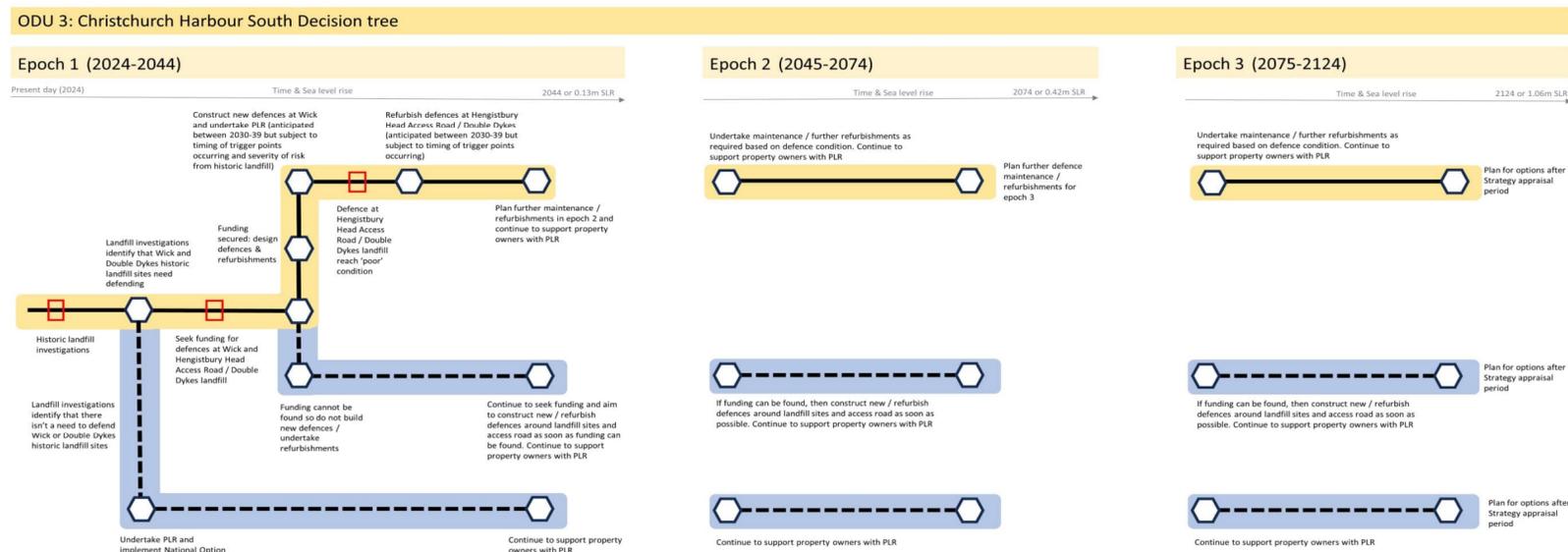
## FCERM GIA funding availability

- FCERM GIA funding likely to be limited for defence works due to very few properties being at risk and lack of funding typically available for historic landfill defences

## Trigger Points

Category	Influence on	Details of key decisions when implementing options	Triggers
Historic landfill status	Decision on Local vs National Option	It is recommended that site investigations into the contaminated land status of the historic landfill sites are undertaken This will inform whether the new defences are required around the historic landfill sites and help steer the decision on whether the Local Option or National Option is delivered If the land is found to be contaminated then the Local Option should be delivered as a preference / if funding allows The investigations will also help better inform environmental assessments, such as WFD assessment, at scheme level appraisal	Contaminated land status
Defence condition	Timing of defence refurbishments / upgrades at Hengistbury Head Access Road in local option	If implementing the Local Option: There is currently a gabion basket wall adjacent to the Hengistbury Head Access road at the location where it is closest to the shoreline The gabion basket wall is not included in the Strategy defence condition assessment and therefore the condition status is not known It is recommended that routine defence condition assessments are undertaken on this site to determine its initial condition status and change over time Ongoing small scale / patch repair maintenance would be expected to extend the life of this asset but it is likely that a refurbishment would be needed during epoch 1 It is recommended that when the condition reaches a "Poor" rating then a refurbishment is undertaken	Condition rating of Poor
Funding	Decision on Local vs National Option and timing of defence refurbishments	The Local Option will have a funding shortfall for the defences around Wick historic landfill and any refurbishments to the defence at the Hengistbury Head Access Road The Funding Strategy will need to outline how the defences will be funded. If funding is not likely, then these defences would be delayed until the funding is secured or the National Option could be delivered instead	Funding availability Revert to National Option if funding for refurbishments is not secured

## Decision Tree



# ODU 4 - Wick

## Key features / risks

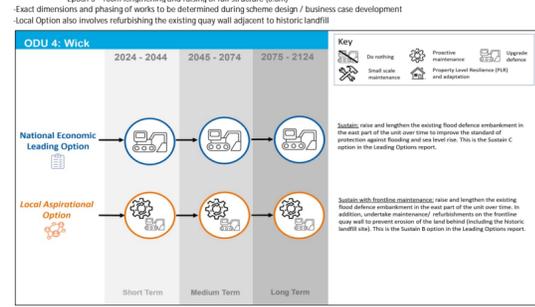
- Flood risk to residential area in west part of unit expected to increase over time with sea level rise
- Two properties at risk from flooding from present day 0.5% AEP event, 121 properties at risk in 2124 0.5% AEP event
- Existing earth embankment defence originally constructed to 2070 20yr SLP (EA comm)
- Latest modelling indicates embankment would be sufficient to the south, increasing in severity over time
- Historic landfill site north of Wick Lane. Contamination status of land unknown
- Quay wall adjacent to historic landfill site will fail at end of service life, leading to erosion of historic landfill
- Adjacent to environmental designations, including LNR & SSSI

## Strategy/Leading Options

- National and Local Option identified
- Both options involve raising and lengthening the setback embankment in the east part of the unit over time
- Raising and lengthening would be done incrementally
- Approx. changes to embankment required:
  - Epoch 1 - subject to alignment, between 100m to 400m lengthening to the south (low height <0.5m)
  - Epoch 2 - 170m lengthening and raising of full structure (<0.5m)
  - Epoch 3 - 100m lengthening and raising of full structure (0.6m)
- Exact dimensions and phasing of works to be determined during scheme design / business case development
- Local Option also involves refurbishing the existing quay wall adjacent to historic landfill

## Map of Leading Options

- Alignments are indicative and will vary subject to further appraisal



## Works required to deliver leading options\*

Option	Years 2025 - 2029		Years 2030 - 2034		Epoch 1		Years 2035 - 2039		Years 2040 - 2044		Epoch 2		Epoch 3		
	2025-2029	2030-2034	2035-2039	2040-2044	2045-2049	2050-2054	2055-2059	2060-2064	2065-2069	2070-2074	2075-2079	2080-2084	2085-2089	2090-2094	2095-2099
National	34	606	34	34	34	34	34	34	34	34	1,929	68	68	68	68
Local	34	606	34	1,904	870	34	34	34	1,903	34	1,900	1,996	68	68	1,996

\*note: not shown in table above, but monitoring and small scale / patch repair maintenance on existing defences and assets should be undertaken annually / as required  
 \*timings of works subject to trigger points such as funding and condition of existing defences

## Cost profile for capital works and maintenance (not including pre-business case / support work)

Leading Option	Indicative option cost (£k) - cash																	
	Epoch 1 (years)				Epoch 2 (years)				Epoch 3 (years)				Total					
	2025-2029	2030-2034	2035-2039	2040-2044	2045-2049	2050-2054	2055-2059	2060-2064	2065-2069	2070-2074	2075-2079	2080-2084	2085-2089	2090-2094	2095-2099	2100-2104	2105-2114	2115-2124
National	34	606	34	34	34	34	34	34	34	34	1,929	68	68	68	68	68	68	3,984
Local	34	606	34	1,904	870	34	34	34	1,903	34	1,900	1,996	68	68	1,996	68	68	11,627

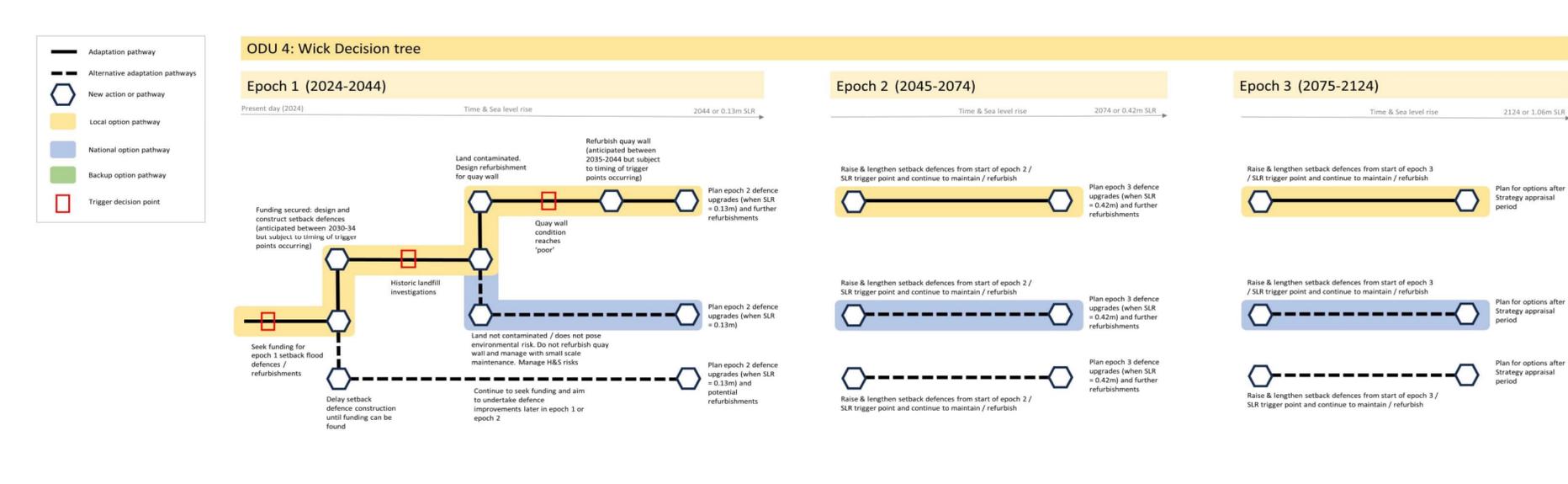
## FCERM GIA funding availability

- Indicative FCERM GIA funding availability calculated for largest scheme as part of the national / local option (epoch 3 defence upgrades)
- Indicative amount of FCERM GIA available for epoch 3 upgrades estimated to be in region of £735-809k
- GIA also likely to be available for defence upgrades in epoch 1 and 2, but fewer benefits so amount of GIA likely to be considerably less
- See economics report for assumptions when calculating indicative GIA availability (such as baseline year)

## Trigger Points

Category	Influence on	Details of key decisions when implementing options	Triggers
Sea level rise	Embarkment improvements for Local and National Options	<ul style="list-style-type: none"> <li>The Strategy National and Local Options follow a managed adaptive approach whereby the setback embankment is raised / lengthened incrementally over time in response to rising sea levels</li> <li>For each embarkment improvement, the target SLP is for a SLP at the end of the epoch. For example, the epoch 2 improvement undertaken at the start of the epoch will aim to achieve a target SLP for 2074.</li> <li>Note that more work to define the SLP will need to be reviewed during business case development</li> <li>In the National and Local options, estimates have been made as to when the embankment will need improving based on projections for sea level rise (UKCP18, RCP 8.5, 70%ile).</li> <li>Should sea level rise occur faster / slower than projected, this will change the timing of when embankment improvements are required</li> <li>The projected sea level rise between present day and the start of epoch 2 is 0.13m</li> <li>The projected sea level rise between present day and the start of epoch 3 is 0.42m</li> <li>The embankment improvement in epoch 1 is not related to sea level rise but due to outflanking risk identified in the River Avon model for present day model simulations. Therefore the timing of this intervention will remain unchanged (i.e. midway through epoch 1).</li> <li>The planning / business case development for the second and third rounds of defence improvements (in epochs 2 and 3 respectively) should be undertaken when the structure design life is close to falling below the design SLP of the previous round of defence upgrades.</li> <li>Based on existing UKCP18 sea level rise projections, and assuming the defences are designed to a target SLP at the start of each epoch, the planning / business case development should begin when sea level rise reaches 0.13m (epoch 2) and 0.42m (epoch 3).</li> </ul>	<ul style="list-style-type: none"> <li>Commencement of second round of embankment planning / upgrades when SLR is 0.13m</li> <li>Commencement of third round of embankment planning / upgrades when SLR is 0.42m</li> </ul>
Historic landfill status	Decision on Local vs National Option	<ul style="list-style-type: none"> <li>It is recommended that site investigations into the contaminated land status of the historic landfill site are undertaken</li> <li>This will help inform how important it is to refurbish the quay wall adjacent to the historic landfill site and help steer the decision on whether the Local Option or National Option are delivered</li> <li>The Local Option includes a provision for refurbishing the frontline quay wall over time to ensure that it continues to provide erosion protection to the historic landfill behind</li> <li>If the land is found to be contaminated then the Local Option should be delivered as a preference / if funding allows</li> <li>The investigations will also help better inform environmental assessments, such as WFD assessment, at scheme level appraisal</li> </ul>	Contaminated land status
Defence condition	Timing of quay wall refurbishments in Local Option	<ul style="list-style-type: none"> <li>If implementing the Local Option</li> <li>The frontline quay wall was assessed to have an 'Fair' condition in the Strategy defence condition assessment, with an estimated residual life (without maintenance) of 10-15 years</li> <li>Ongoing small scale / patch repair maintenance would be expected to extend the life of this asset but it is still expected to require a refurbishment during epoch 1 (assumed to be around year 15 in the appraisal)</li> <li>The requirement for a refurbishment will need to be determined based on detailed condition inspections and may need to be brought forward or delayed accordingly based on the results of the inspections</li> <li>It is recommended that when the condition reaches a 'Poor' rating then a refurbishment is undertaken</li> </ul>	Condition rating of Poor
Funding	Decision on Local vs National Option and timing of embankment improvements	<ul style="list-style-type: none"> <li>The National and Local Options will have a funding shortfall for the embankment improvement works in each epoch (i.e. FCERM GIA will not cover the full cost)</li> <li>The funding shortfall is likely to be most significant for the earlier interventions (i.e. epochs 1 and 2) because the benefits are not expected to have increased significantly yet, relative to epoch 3</li> <li>The Funding Strategy will need to outline how the epoch 1 embankment improvements will be funded. If funding is not likely, then these embankment improvement works could be delayed until the funding is secured</li> <li>This will increase the residual risk to properties at risk from outflanking prior to the works being completed, but it is not until epoch 3 when significant numbers of properties are expected to be at risk here (with current SLR projections) and therefore risks could be managed on an individual property by property basis.</li> <li>With existing FCERM GIA Funding rules, for the Local Option, it is unlikely that FCERM GIA will cover a significant proportion (if any) of the refurbishment costs as the primary benefit will be to defend historic landfill from erosion (and not properties)</li> <li>The Funding Strategy will need to outline how the quay wall refurbishment works will be funded. If funding is not likely then the National Option could be delivered as a fallback in the interim. This could lead to the failure of the quay wall and therefore health and safety compliance measures would be needed in this location.</li> </ul>	Funding availability Revert to National Option if funding for quay wall refurbishment is not secured

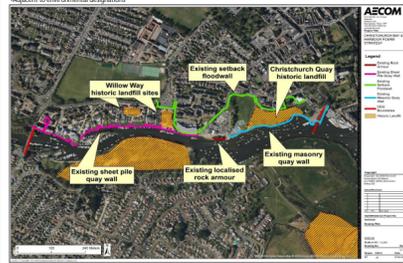
## Decision Tree



# ODU 5 - Willow Drive and the Quomps

## Key features / risks

- Flood risk to residential area
- 27 properties at flood risk from present day 0.5% AEP event primarily in the west part of the unit. 562 properties at risk in 2124 0.5% AEP event across entire unit
- Existing setback flood defence scheme in east part of unit. West part of unit has a quay wall but this is not raised so at risk from flooding
- Outstanding risk of existing flood defence scheme in the future
- Multiple historic landfill sites including beneath the Quomps recreation ground in the east part of the unit
- Quay wall adjacent to Quomps historic landfill site will fail at end of service life, leading to erosion of historic landfill
- Adjacent to environmental designations



## Works required to deliver leading options\*

Option	Years 2020 - 2024	Years 2025 - 2034	Epoch 1	Years 2035 - 2039	Epoch 2	Epoch 3
National	Service funding strategy; Plan for funding; Stakeholder engagement; Design and construction; Operational maintenance of quay wall; Identify properties that would benefit from property level resilience measures; Engage with property owners and support property level resilience funding applications/implementation as required; Stakeholder support for funding and condition of existing defences			Address case development for capital scheme to improve defences; Identify properties that would benefit from property level resilience measures; Engage with property owners and support property level resilience funding applications/implementation as required; Stakeholder support for funding and condition of existing defences	Capital scheme construction; Property level resilience measures; Engage with property owners and support property level resilience funding applications/implementation as required; Stakeholder support for funding and condition of existing defences	Capital scheme construction; Property level resilience measures; Engage with property owners and support property level resilience funding applications/implementation as required; Stakeholder support for funding and condition of existing defences
Local	Stakeholder engagement; Community engagement; Design and construction; Operational maintenance of quay wall; Identify properties that would benefit from property level resilience measures; Engage with property owners and support property level resilience funding applications/implementation as required; Stakeholder support for funding and condition of existing defences			Address case development for capital scheme to improve defences; Identify properties that would benefit from property level resilience measures; Engage with property owners and support property level resilience funding applications/implementation as required; Stakeholder support for funding and condition of existing defences	Capital scheme construction; Property level resilience measures; Engage with property owners and support property level resilience funding applications/implementation as required; Stakeholder support for funding and condition of existing defences	Capital scheme construction; Property level resilience measures; Engage with property owners and support property level resilience funding applications/implementation as required; Stakeholder support for funding and condition of existing defences
Backup	Service funding strategy; Plan for funding; Stakeholder engagement; Design and construction; Operational maintenance of quay wall; Identify properties that would benefit from property level resilience measures; Engage with property owners and support property level resilience funding applications/implementation as required; Stakeholder support for funding and condition of existing defences			Address case development for capital scheme to improve defences; Identify properties that would benefit from property level resilience measures; Engage with property owners and support property level resilience funding applications/implementation as required; Stakeholder support for funding and condition of existing defences	Capital scheme construction; Property level resilience measures; Engage with property owners and support property level resilience funding applications/implementation as required; Stakeholder support for funding and condition of existing defences	Capital scheme construction; Property level resilience measures; Engage with property owners and support property level resilience funding applications/implementation as required; Stakeholder support for funding and condition of existing defences

\*Refer not shown in table above, but monitoring and small scale / patch repair maintenance on existing defences and assets should be undertaken annually / as required  
 \*Timing of works subject to trigger points such as funding and condition of existing defences

## Cost profile for capital works and maintenance (not including pre-business case / support work)

Leading Option	Indicative option cost (£k) - cash													
	Epoch 1 (years)			Epoch 2 (years)			Epoch 3 (years)			Total				
	2025-2029	2030-2034	2035-2039	2040-2044	2045-2049	2050-2054	2055-2059	2060-2064	2065-2069	2070-2074	2075-2114	2115-2124	2125-2134	
National	3,354	23	23	19,499	23	23	2,590	23	46	2,613	2,804	46	2,613	33,670
Local (Improve B shown)	19,916	23	23	23	23	23	4,401	23	46	46	46	46	46	28,275
Backup	2,820	23	23	8,221	23	23	3,581	46	46	4,274	1,666	46	6,224	26,275

\*Note - costing for defence refurbishments / upgrades conservatively assumed in first 5 years, but actual delivery time may be later subject to time taken to acquire funding / undertake design / investigate landfill etc.

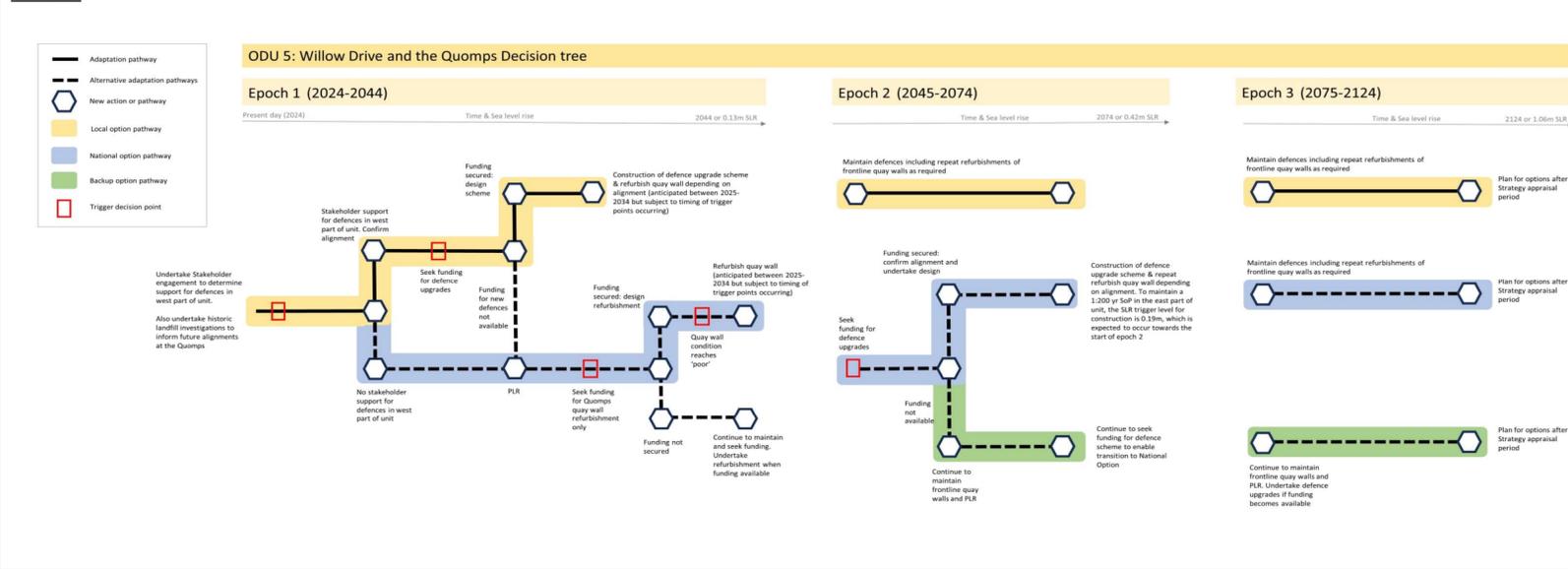
## FCERM GIA funding availability

- Indicates FCERM GIA funding availability calculated for initial defence upgrade scheme as part of the national / local option
- Indicates amount of FCERM GIA available for defence upgrade scheme estimated to be in region of £2.5 million to £4.3 million
- See economics report for assumptions when calculating indicative GIA availability (such as baseline year)

## Trigger Points

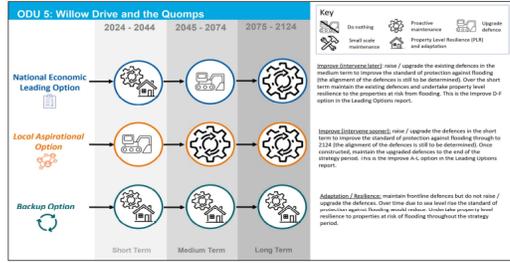
Category	Information	Details of key decisions when implementing options	Triggers
Stakeholder engagement	Choice of Local or National Option, and scheme alignment	Currently there is a setback flood defence in the east part of the unit that reduces the risk of flooding to a large number of residential properties in the east part of the unit (this was constructed in the 1990s). However, there is no raised flood defence in the west part of the unit and therefore this area is at increased risk of flooding. It is understood that during the scheme construction in the east part of the unit, the residents in the west part of the unit are opted out and don't support extending the flood defences to the west. Hence this area remained unattended. It is important that stakeholder / community engagement is undertaken before making a decision on future schemes in this location because to understand the support for a scheme to reduce the risk of flooding in the west part of the unit and potential alignment for a scheme need to be identified. For the Strategy, the economic case for the leading options is based on delivering a combined scheme / PLR across both the west and east parts of the unit. However, the feedback from the stakeholder engagement will determine if the leading options are delivered in this way. This will have an impact on the economic case and potential timing of schemes that can be delivered. If defences / property level resilience measures to reduce flood risk in the west part of the unit are not supported (as outlined by the leading options), then this significantly reduces the economic case for the leading options in ODU 5 in the short term. This is because most of the economic benefits of the leading options in ODU 5 support 1 are associated with the properties in the west part of the unit and removing these benefits reduces the overall economic case for a scheme. If this is the case then the National Option should be followed as that flood defence improvements are delayed and delivered in future epochs. By waiting to deliver the scheme, the flood risk will get worse over time in the east part of the unit due to sea level rise and deteriorating condition of the defences. This will increase the amount of benefits that can be associated with the defence upgrades in the east part of the unit and improve the economic case for the scheme. It is likely that the defence improvements would be delayed until epoch 2 but the exact timing will need to be determined from sea level rise triggers and defence condition triggers for the existing setback defences. However, if new flood defences and/or property level resilience in the west part of the unit is supported, then this improves the economic case for delivering a scheme across the full unit and can help justify improving the defences in the east in epoch 1 (i.e. the Local Option), subject to funding.	Stakeholder support / opposition to defences in the west part of the unit and overall alignment decisions
Sea level rise	Timing of scheme for National Option	The Strategy Local Option involves upgrading defences early in epoch 1 and therefore a sea level rise trigger level for implementing this defence as part of this option is not relevant. However, the National Option involves upgrading the defences at a later point in time (epoch 2). The exact timing of this should be informed by status of sea level rise and the onset of flood risk in the future. According to the Environment Agency AMIS dataset, the existing defences in the east part of the unit have a crest level of approximately 2.3m OD which is in excess of a present day 1 in 1000 year AEP water level in the harbour (not considering any defence headroom or water level gradients up the River Quomps). However, with sea level rise, the SLR of the defence will fall over time and the risk of overflow / outflanking will increase. In the east part of the unit (currently defended), should the objective be to sustain a 1 in 200 year SLR and if a 0.3m freeboard is assumed, the defence will need to be raised once the 200 year extreme water level in the harbour reaches within 0.1m of the existing crest elevation. This equivalent water level is approximately 2.2m OD which is approximately 0.1m sea level rise from the 200 year present day water level. Based on UKCP18 projections, this amount of SLR is expected to occur during epoch 2. However, the actual rate of sea level rise will need to be monitored and once the 0.1m trigger level has been reached then planning for the defence raising should begin.	Begin National Option scheme planning / Business case development when SLR is 19m
Historic landfill sites	Defence alignment	It is recommended that site investigations into the contaminated land status of the historic landfill sites in ODU 5 are undertaken. This will help inform the choice of defence alignment and design for the flood defence scheme. The information will also inform the design of any frontline quay wall refurbishments. If issues such as leaching need to be considered. The investigations will also help better inform environmental assessments, such as WFD assessment, at scheme level appraisal.	Contaminated land status
Defence condition	Timing of scheme / quay wall refurbishment	The condition of the defences in ODU 5 varies but is typically 'fair' or 'poor'. For defence refurbishments it is recommended that refurbishments are undertaken once defences reach a 'poor' condition. However, the requirement for refurbishment works should consider the outcomes of broader work (such as stakeholder engagement) which will inform the choice of scheme alignment. It may not be appropriate to refurbish defences that are likely to be replaced as part of a scheme alignment a few years later. If defences reach a 'poor' condition and are on the proposed alignment of the envisaged scheme, then this is also a trigger for undertaking the scheme as soon as possible. It is recommended that detailed defence condition surveys are undertaken on a regular basis to inform the defence condition and changes over time.	Condition rating of floor
Funding	Decision on Local or National vs Backup Option	The National Local and Backup Options will have a funding shortfall (i.e. FCERM GIA will not cover the full cost). The Funding Strategy will need to outline how the scheme / refurbishments will be funded. If funding is not likely, then the scheme could be delayed until the funding is secured. Delaying the scheme will increase the residual risk to proper risk prior to the works being completed, but this risk could be managed on an individual property by property by using PLR. The availability of funding should be a key point of discussion with stakeholders and will also inform scheme alignment decisions.	Funding availability - Revert to National Option if funding not initially available - Revert to Backup option if funding not available in medium term

## Decision Tree



## Strategy Leading Options

- National, Local and Backup Options identified
- Both of the National and Local options involve raising and lengthening the defence to improve the SLR. National Option is Improve D.F. and Local Option is Improve A-C
- Further work is required after the Strategy to confirm the alignment of the new defences, and this will impact the economic case / timing of interventions
- Provisionally the Local Option involves intervening sooner whereas the National Option involves waiting until the medium term (epoch 2) to raise defences
- Both the National and Local Options have significant funding shortfalls and therefore a Backup Option has been identified (Adaptation / Resilience)
- The Backup option involves PLR to manage flood risk and repair refurbishments of defences. It does not have a large one-off scheme cost like the National / Local Options



## Map of Leading Options

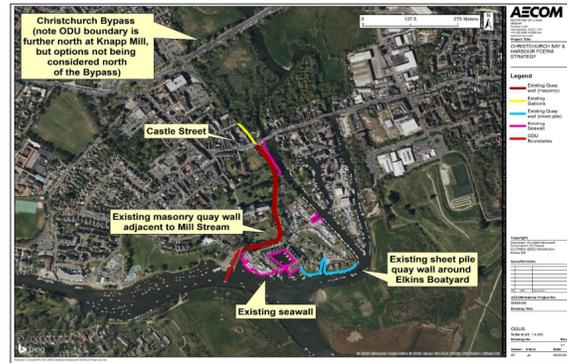
- Alignments are indicative and will vary subject to further appraisal



# ODU 6 - River Avon West Bank

## Key features / risks

- 126 properties at risk from flooding in the future (2124 0.5% AEP event).
- Flooding also in proximity to key historic environment designations such as scheduled monument
- Economic case for new defences is weak due to length of defences required
- Two main areas of flood risk: Elkins Boatyard / Priory Quay and adjacent to Castle Street. Risk comes from River Avon and Millstream

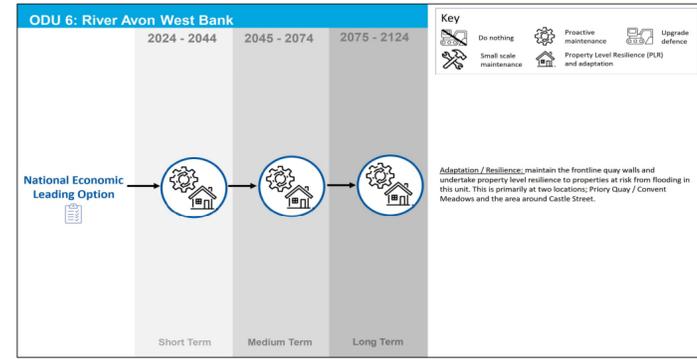


## Strategy Leading Options

- National Option is Adaptation / Resilience which involves PLR and maintenance of defences
- No Local Option identified here

## Map of Leading Options

- Alignments / areas for PLR are indicative and will vary subject to further appraisal



## Works required to deliver leading options\*

Option	Epoch 1		Epoch 2	Epoch 3
	Years 2025 - 2029	Years 2030 - 2034		
National	Identify properties that would benefit from property level resilience measures Engage with property owners and support property level resilience funding applications / implementation as required Develop funding strategy for defence refurbishments		Ongoing PLR measures Plan quay wall refurbishments, acquire consenting and funding for refurbishment Undertake refurbishment of quay wall	Ongoing PLR, maintenance and defence refurbishments Ongoing PLR, maintenance and defence refurbishments

\*note: not shown in table above, but monitoring and small scale / patch repair maintenance on existing defences and assets should be undertaken annually / as required  
\*timings of works subject to trigger points such as funding and condition of existing defences

## Cost profile for capital works and maintenance (not including pre-business case / support work)

Leading Option	Indicative option cost (£k) - cash															
	Epoch 1 (years)			Epoch 2 (years)						Epoch 3 (years)			Total			
	2025-2029	2030-2034	2035-2039	2040-2044	2045-2049	2050-2054	2055-2059	2060-2064	2065-2069	2070-2074	2075-2079	2080-2084		2085-2089	2095-2104	2105-2114
National	641	11	11	1,582	701	11	11	11	1,582	953	23	2,900	23	23	23	8,508

\*note that defence refurbishments timing may need to be adjusted if refurbishments are required sooner (to be informed by detailed defence condition assessment)

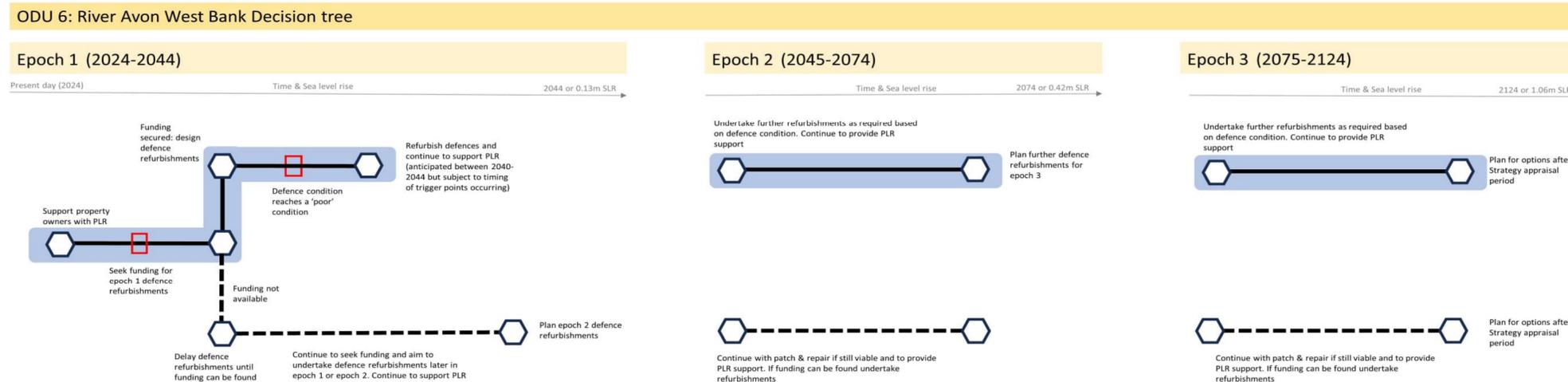
## FCERM GiA funding availability

- FCERM GiA funding unlikely to be available for PLR as part of the leading option. Other sources of funding could be available

## Trigger Points

Category	Influence on	Details of key decisions when implementing options	Triggers
Defence condition	Timing of defence refurbishments	- There are currently quay walls and sheet pile walls in this unit that will need refurbishing over time - Generally in fair / good condition based on Strategy defence condition assessment - In the Strategy costing estimates have been made with regards to the timing of defence refurbishments based on estimated residual life - It is recommended that routine defence condition assessments are undertaken on the structures to determine initial condition status and change over time - Ongoing small scale / patch repair maintenance would be expected to extend the life of these assets but it is likely that a refurbishment would be needed during epoch 1 - It is recommended that when the condition reaches a "Poor" rating then a refurbishment is undertaken	- Condition rating of Poor
Funding	Timing of defence refurbishments	- The National Option may have a funding shortfall for the defence refurbishment works (unlikely FCERM-GiA will cover this work) - The Funding Strategy will need to outline how the defence refurbishments will be funded. If funding is not likely, then these refurbishment works could be delayed until the funding is secured	- Funding availability - Delay refurbishments if funding is not secured

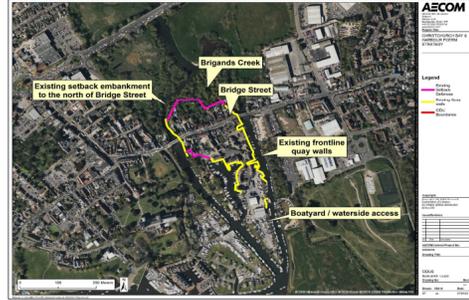
## Decision Tree



# ODU 7 - Rossiters Quay

## Key features / risks

- Island within the River Avon. Residential / non-residential properties either side of Bridge Street
- Area has a high SoP for the present day but over time due to SLR the SoP will fall.
- By 2124 there are 57 properties expected to be at risk from 0.5% AEP event
- A lack of space to construct new defences in parts of this unit and waterside alignments therefore likely to be required
- During design key issues to consider include access to the water and the natural creek (Brigands Creek) that pass through the defences

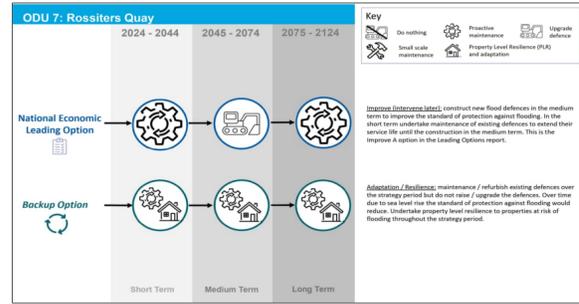


## Strategy/Leading Options

- National Option and Backup Option identified
- National Option is Improve (A) that involves raising existing defences / new defences from epoch 2
- Backup option is Adaptation / Resilience which involves undertaking PLR and maintaining existing defences through refurbishments

## Map of Leading Options

- Alignments are indicative and will vary subject to further appraisal



## Works required to deliver leading options\*

Option	Epoch 1		Epoch 2		Epoch 3	
	Years 2025 - 2029	Years 2030 - 2034	Years 2035 - 2039	Years 2040 - 2044	Years 2045 - 2074	Years 2075 - 2124
National	Develop leading strategy for defence improvements / scheme included to epoch 2			Business case development, outline design and secure funding for defence improvements in epoch 2	Approval of business case	
Backup	Identify properties that would benefit from property level resilience measures. Engage with property owners and support property level resilience funding applications / implementation as required. Develop funding strategy for defence refurbishments.			Engaging PLR measures. Undertake refurbishment, design, consenting and funding for refurbishment	Engaging maintenance and refurbishment measures. Undertake property level resilience for PLR	Engaging maintenance and refurbishment measures. Undertake property level resilience for PLR

\*note: not shown in table above, but monitoring and small scale / patch repair maintenance on existing defences and assets should be undertaken annually / as required  
 \*timings of works subject to trigger points such as funding and condition of existing defences

## Cost profile for capital works and maintenance (not including pre-business case / support work)

Leading Option	Indicative option cost (£k) - cash												Total				
	Epoch 1 (years)			Epoch 2 (years)			Epoch 3 (years)			Total							
	2025-2029	2030-2034	2035-2039	2040-2044	2045-2049	2050-2054	2055-2059	2060-2064	2065-2069	2070-2074	2075-2079	2080-2084	2085-2089	2090-2094	2095-2104	2105-2114	2115-2124
National	11	11	11	11	8,014	10,600	5,054	23	23	23	23	46	46	46	46	46	8,403
Backup	41	11	11	1,821	746	11	11	11	1,821	821	23	1,833	878	23	1,833	9,895	9,895

\*note that defence refurbishments timing may need to be adjusted if refurbishments are required sooner (to be informed by detailed defence condition assessment)

## FCERM GIA funding availability

- Indicative FCERM GIA funding availability calculated for initial defence upgrade scheme as part of the national option
- Indicative amount of FCERM GIA available for defence upgrade scheme estimated to be in region of £632k
- See economics report for assumptions when calculating indicative GIA availability (such as baseline year)

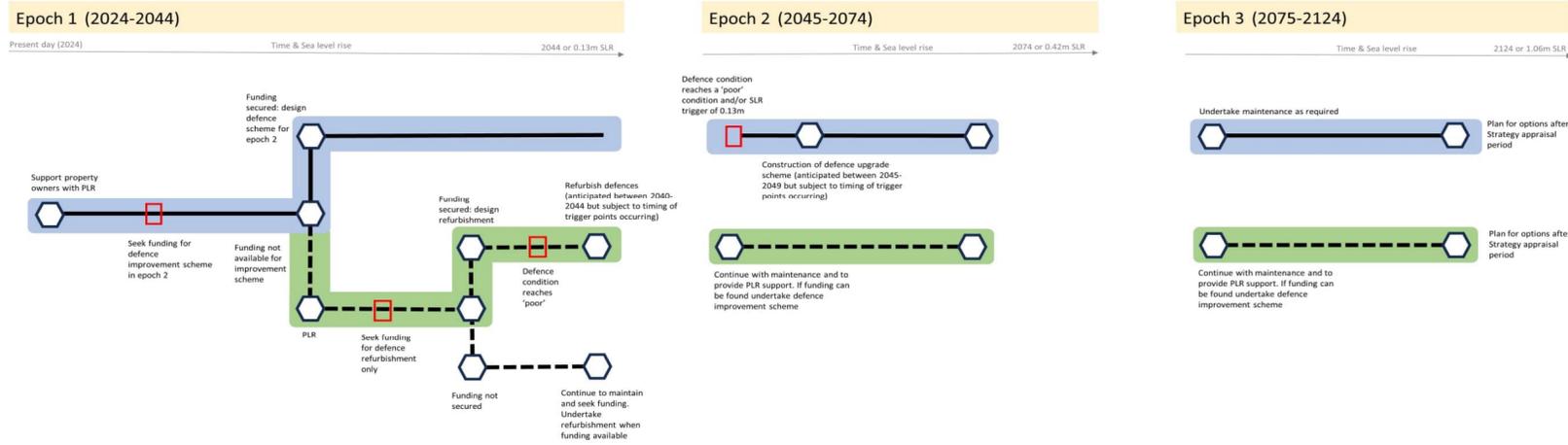
## Trigger Points

Category	Influence on	Details of key decisions when implementing options	Triggers
Defence condition	Timing of scheme for National Option / refurbishments for Backup Option	- There are currently quay walls / raised defences in this unit that provide flood defence - Generally in fair / good condition based on Strategy defence condition assessment - It is recommended that routine defence condition assessments are undertaken on the structures to determine initial condition status and change over time - Ongoing small scale / patch repair maintenance would be expected to extend the life of these assets. - However, when the condition of the defences / quay walls deteriorates then either construction of the defence improvement scheme will be required (national option) or a refurbishment required (backup) - It is recommended that when the condition reaches a "Poor" rating then the scheme / refurbishment is undertaken	- Condition rating of Poor
Sea level rise	Timing of scheme for National Option	- The National Option involves upgrading the defences in the future (most likely in epoch 2). The exact timing of this should be informed by rates of sea level rise and the onset of flood risk in the future (as well as the defence condition) - According to the Environment Agency AIMS dataset, the raised defences in the unit typically have a crest level of approximately 2.4-2.5m OD (although this does vary and there are some sections with a lower crest level, particularly on the west side). - 2.4m OD is in excess of a present day 1 in 1000 year AEP water level in the harbour (not considering any defence freeboard or water level gradients up the River Avon). However, with sea level rise, the SoP of the defence will fall over time and the risk of overflow / outflanking will increase. - Should the objective be to sustain a 1 in 200 year SoP and if a 0.3m freeboard is assumed, the defences will need to be raised once the 200 year extreme water level in the harbour reaches within 0.3m of the existing crest elevation. This equates to a water level of approximately 2.1-2.2m OD which is approximately 0.09-0.19m sea level rise from the 200 year present day water level. - Existing UKCPIB SLR projections indicate 0.13m of sea level rise is expected to occur by the start of epoch 2 and this represents an approximate mid-point for the 0.09m-0.19m range. Therefore it is suggested that a 0.13m trigger for sea level rise is used for undertaking planning / construction for the defence raising. - It should be noted that the crest level in parts of this unit is lower than 2.4-2.5m and therefore some sections may need raising sooner if the desire is to sustain a 1 in 200yr SoP before a scheme is constructed. However, there is not sufficient detail available to assess the need for this in the Strategy and detailed analysis of flow paths / deflecto defences would be required to draw any conclusions.	- Begin National Option scheme planning / business case development when SLR is 0.13m
Funding	Timing of scheme for National Option / choice switching to Backup Option	- The National Option may have a funding shortfall for the scheme / defence improvement works (unlikely FCERM GIA will cover all of this work) - The Funding Strategy will need to outline how the scheme will be funded. If funding is not likely, then the scheme could be delayed or the option choice switched to the Backup Option. - Funding will still be required for the defence refurbishments as part of the Backup Option but this amount is expected to be less	- Funding availability - Delay refurbishments if funding is not secured

## Decision Tree



## ODU 7: Rossiters Quay Decision tree



# ODU 9 - Stanpit

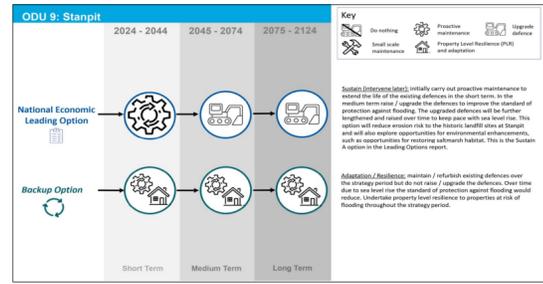
## Key features / risks

- East bank of the River Avon and the North side of Christchurch Ground that are adjacent to the harbour
- Large areas of historic landfill sites at Two Rivermead and Stanpit Recreation Ground that are adjacent to the harbour
- Potentially contaminated land status of landfill sites is unknown
- Also there are expected to be a large number of properties at risk from flooding in the future
- By 2124 expected that 867 properties would be at risk from 0.5m AEP event



## Strategy Leading Options

- National Option and Backup Option identified
- National Option is Sustain (A) that involves raising defences over time to keep pace with SLR (0.05 y SoP) from epoch 2.
- Sustain A also involves defences around the historic landfill and will seek opportunities for saltmarsh refurbishment
- Backup option is Adaptation / Resilience which involves undertaking PLR and maintaining existing defences (including around the historic landfill sites) through refurbishments



## Map of Leading Options

- Alignments are indicative and will vary subject to further appraisal



## Works required to deliver leading options\*

Option	Years 2025 - 2029	Years 2030 - 2034	Epoch 1	Years 2035 - 2039	Years 2040 - 2044	Epoch 2	Epoch 3
National	Operate historic landfill investigations to determine contamination status of the landfill sites Develop funding strategy for defence improvements / scheme considered for epoch 2 Review S&P policy to align with this option if this is the option selected				Determine scheme alignment options to determine protection (landfill investigations) Business case development, scheme design and cost funding for defence improvements Approval of business case Detailed design, consenting and procurement for defence improvements	Construction for defence improvements	Start raising of defences in required / ongoing maintenance
Backup	Operate historic landfill investigations to determine contamination status of the landfill sites Identify properties that would benefit from property level resilience measures Begin to primarily assess and support property level resilience measures Develop funding strategy for defence refurbishments Review S&P policy to align with this option if this is the option selected				Designing PR support Underpin need for defence maintenance around historic landfill sites (subject to outcome of historic landfill investigations). Refurbishment of other defences on the bank of the Avon would still be required if historic landfill defences not raised Plan defence refurbishments, scheme consenting and funding for refurbishment Undertake refurbishment of defences	Designing maintenance and defence refurbishment and support to property owners for PR	Designing maintenance and defence refurbishment and support to property owners for PR

\*Note: not shown in table above, but monitoring and small scale / patch repair maintenance on existing defences and assets should be undertaken annually / as required  
 \*Timings of works subject to trigger points such as funding and condition of existing defences

## Cost profile for capital works and maintenance (not including pre-business case / support work)

Leading Option	Epoch 1 (years)						Epoch 2 (years)						Epoch 3 (years)		Total		
	2025-2029	2030-2034	2035-2039	2040-2044	2045-2049	2050-2054	2055-2059	2060-2064	2065-2069	2070-2074	2075-2079	2080-2084	2085-2089	2090-2104		2105-2114	2115-2124
National	0	34	0	0	18,910	0	0	0	0	0	0	0	0	0	0	0	25,900
Backup	24	34	34	1,811	8,945	34	34	34	1,811	34	4,520	1,845	8,730	68	68	1,350	29,279

\*Note that defence refurbishments timing may need to be adjusted if refurbishments are required sooner (to be informed by detailed defence condition assessments)

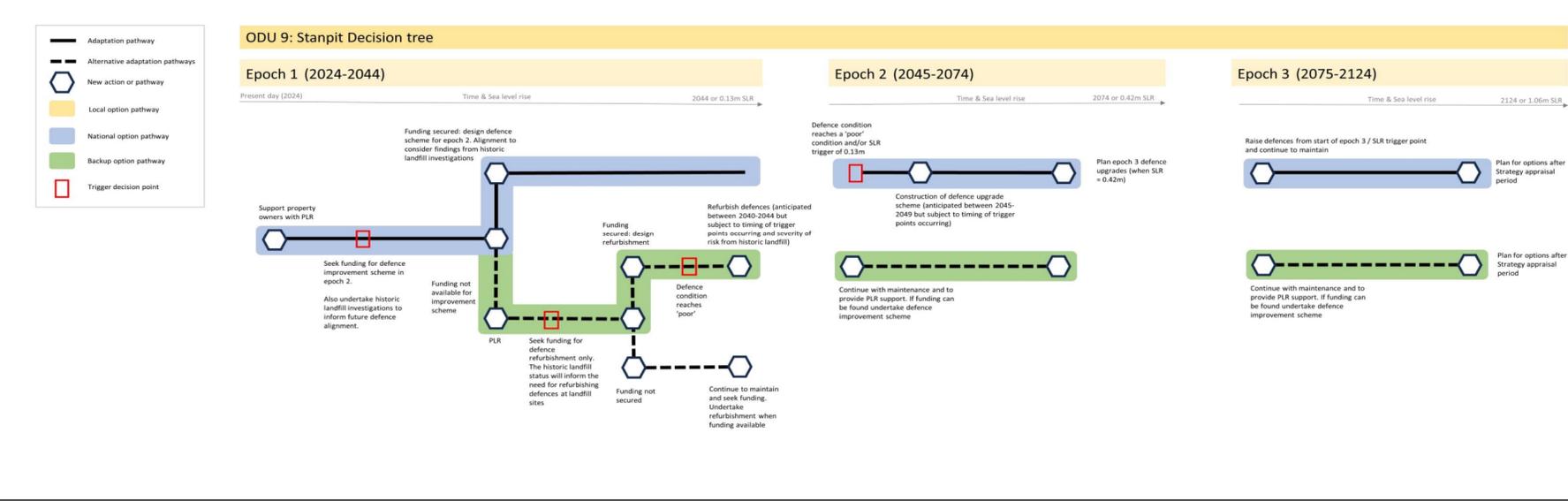
## FCERM GIA funding availability

- Indicative FCERM GIA funding availability calculated for initial defence upgrade scheme as part of the national option
- Indicative amount of FCERM GIA available for defence upgrade scheme estimated to be in region of £2.7 million
- See economics report for assumptions when calculating indicative GIA availability (such as baseline year)

## Trigger Points

Category	Influence on	Details of key decisions when implementing options	Triggers
Historic landfill status	Decision on defence alignment for National Option	It is recommended that site investigations into the contaminated land status of the historic landfill sites are undertaken This will inform whether the new defences are required around the historic landfill sites and help steer the decision on the defence alignment for the National Option If the land is found to be contaminated then defences around the landfill sites should be delivered as a preference / if funding allows The investigations will also help better inform environmental assessments, such as WFD assessment, at scheme level appraisal	Contaminated land status
Defence condition	Timing of scheme for National Option / refurbishments for Backup Option	There are currently raised defences in the unit that provide flood defence The condition for the majority of the defence length is unknown (data not available for the Strategy defence condition assessment). The AMIS dataset suggests a 'Fair' condition although this needs to be confirmed It is recommended that routine defence condition assessments are undertaken on the structure to determine initial condition status and change over time Ongoing small scale / patch repair maintenance would be expected to extend the life of these assets However, when the condition of the defences deteriorates then either construction of the defence improvement scheme will be required (national option) or a refurbishment required (Backup) It is recommended that when the condition reaches a 'Poor' rating then the scheme / refurbishment is undertaken	Condition rating of Poor
Sea level rise	Timing of scheme for National Option	The National Option involves upgrading the defences in the future (most likely in epoch 2). The exact timing of this should be informed by rates of sea level rise and the onset of flood risk in the future (as well as the defence condition) According to the Environment Agency AMIS dataset, the raised defences in the unit typically have a crest level of approximately 2.4.2 5m OD 2.4m OD in excess of a present day 1 in 1000 year AEP water level in the harbour (not considering any defence freeboard or water level gradients up the River Avon). However, with sea level rise, the SoP of the defence will fall over time and the risk of overflow / outflanking will increase Should the objective be to sustain a 1 in 200 year SoP and if a 0.3m freeboard is assumed, the defences will need to be raised once the 200 year extreme water level in the harbour reaches within 0.3m of the existing crest elevation. This equates to a water level of approximately 2.1.2 2m OD which is approximately 0.9m sea level rise from the 200 year present day water level Existing URCP18 SR projections indicate 0.13m of sea level rise is expected to occur by the start of epoch 2 and this represents an approximate mid-point for the 0.09m-0.19m range. Therefore it is suggested that a 0.13m trigger for sea level rise is used for undertaking planning / construction for the defence raising It should be noted that the crest level in parts of the unit is lower than 2.4.2 5m and therefore some sections may need raising sooner if the desire is to sustain a 1 in 200yr SoP before a scheme is constructed. However, there is not sufficient detail available to assess the need for this in the Strategy and detailed analysis of flow paths / defacto defences would be required to draw any conclusions The planning / business case development for the second round of defence improvements (in epoch 3) should be undertaken when the structure design life is close to falling below the design SoP of the previous round of defence upgrades undertaken in epoch 2 Based on existing URCP18 sea level rise projections, and assuming the defences are designed to a target SoP at the start of epoch 3, the planning / business case development for the second round of upgrades should begin when sea level rise reaches 0.42m	Begin National Option scheme planning / business case development when SLR is 0.13m
Funding	Timing of scheme for National Option / choice switches to Backup Option	The National Option may have a funding shortfall for the scheme / defence improvement works (partly FCERM GIA will cover all of this work) The Funding Strategy will need to outline how the scheme will be funded if funding is not likely, then the scheme could be delayed or the option choice switched to the Backup Option Funding will still be required for the defence refurbishments as part of the Backup Option but it does not include one-off capital scheme costs that are as large as the National Option and therefore could be more deliverable.	Funding availability Delay refurbishments if funding is not secured

## Decision Tree



# ODU 10 - Mundeford

## Key features / risks

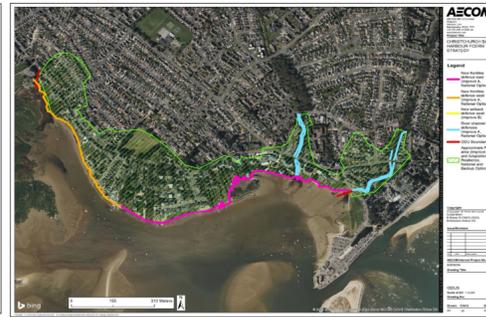
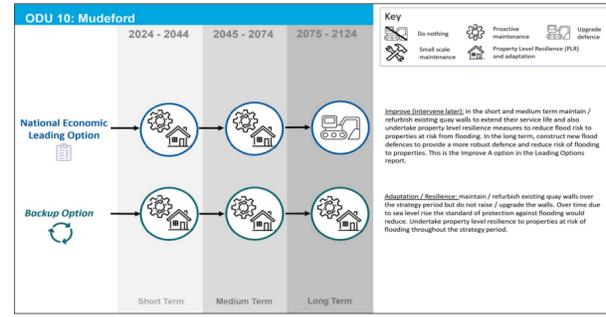
- North side of Christchurch Harbour. Main land use is residential properties / gardens which back onto the shoreline
- River Mude and Bare Brook located at the eastern end of the unit
- Privately owned / maintained quay wall along length of unit
- 25 properties at risk for a present day 0.5% AEP event, increasing to 370 properties by 2124
- Future flood risk is relatively linear along the frontage

## Strategy Leading Options

- National Option and Backup Option identified
- National Option is Improve (A) that involves raising defences in epoch 3 when the flood risk begins to increase significantly
- In epochs 1 and 2 Improve A also involves PLR measures and quay wall refurbishments as required
- Backup option is Adaptation / Resilience which involves undertaking PLR and maintaining existing defences through refurbishments

## Map of Leading Options

- Alignments / PLR areas are indicative and will vary subject to further appraisal



## Works required to deliver leading options\*

Option	Epoch 1			Epoch 2	Epoch 3
	Years 2025 - 2029	Years 2030 - 2034	Years 2035 - 2039		
National	Identify properties that would benefit from property level resilience measures. Engage with property owners and support property level resilience funding applications / implementation as required. Develop funding strategy for defence refurbishments in epochs 1 and 2. Also consider potential funding for scheme in epoch 3 although this will be highly uncertain.			Ongoing PLR measures. Plan quay wall refurbishments, acquire consenting and funding for refurbishment. Undertake refurbishment of quay wall.	Ongoing PLR measures. Refurbishments.
Backup	Identify properties that would benefit from property level resilience measures. Engage with property owners and support property level resilience funding applications / implementation as required. Develop funding strategy for defence refurbishments.			Ongoing PLR measures. Plan quay wall refurbishments, acquire consenting and funding for refurbishment. Undertake refurbishment of quay wall.	Ongoing maintenance and defence refurbishments and support to property owners for PLR.

\*Note: not shown in table above, but monitoring and small scale / patch repair maintenance on existing defences and assets should be undertaken annually / as required  
 \*timings of works subject to trigger points such as funding and condition of existing defences

## Cost profile for capital works and maintenance (not including pre-business case / support work)

Leading Option	Indicative option cost (£k) - cash															
	Epoch 1 (years)				Epoch 2 (years)				Epoch 3 (years)				Total			
	2025-2029	2030-2034	2035-2039	2040-2044	2045-2049	2050-2054	2055-2059	2060-2064	2065-2069	2070-2074	2075-2079	2080-2084		2085-2089	2095-2104	2105-2114
National	763	23	23	3,056	1,333	23	23	23	23	25,533	46	46	46	46	46	31,030
Backup	761	23	23	3,054	1,331	23	23	23	23	1,250	3,079	4,136	46	3,079	20,540	

\*Note that defence refurbishments timing may need to be adjusted if refurbishments are required sooner (to be informed by detailed defence condition assessment)

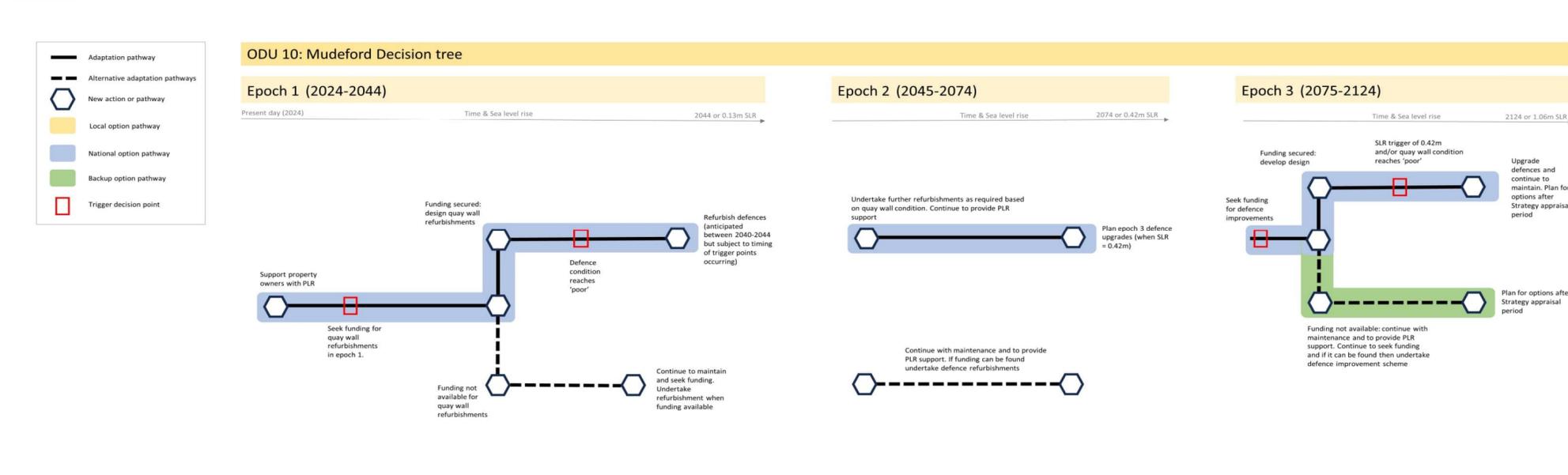
## FCERM GIA funding availability

- Indicative FCERM GIA funding availability calculated for defence upgrade scheme as part of the national option in epoch 3
- Indicative amount of FCERM GIA available for defence upgrade scheme estimated to be in region of £2 million
- See economics report for assumptions when calculating indicative GIA availability (such as baseline year)

## Trigger Points

Category	Influence on	Details of key decisions when implementing options	Triggers
Defence condition	Timing of refurbishments for National and Backup Option. Timing of scheme in epoch 3 for National Option	- There is currently a quay wall along this frontage that provides stability to the land behind and prevents erosion - The condition for the quay wall is unknown (data not available for the Strategy defence condition assessment). - It is recommended that routine defence condition assessments are undertaken on the structures to determine initial condition status and change over time - Ongoing small scale / patch repair maintenance would be expected to extend the life of these assets - However, when the condition of the defences deteriorates then refurbishments will be required with the National and Backup options. - It is recommended that when the condition reaches a 'Poor' rating then the refurbishments are undertaken - In epoch 3 the National Option recommends a new defence scheme. The condition of the quay wall during this time period will also help determine the timing of the scheme in epoch 3	- Condition rating of Poor
Sea level rise	Timing of scheme for National Option	- The National Option involves upgrading the defences in epoch 3 when the flood risk is expected to increase significantly and there is a stronger economic case to improve the defences. - The exact timing of the defence scheme with the National Option should be informed by the observed rates of sea level rise and the onset of flood risk in the future (as well as the defence condition). - The UKCP18 sea level rise projections estimate 0.42m of sea level rise by the start of epoch 3 (2074) relative to today. It is therefore recommended that planning / business case development for the scheme begins when observed sea level rise is around 0.42m	- Begin National Option scheme planning / business case development when SLR is 0.42m
Funding	Timing of refurbishments for National Option / Backup Option. Timing of defence improvement scheme with the National Option	- The National and Backup Options may have a funding shortfall for the quay wall refurbishment works (unlikely FCERM-GIA will cover all of this work) - The Funding Strategy will need to outline how these refurbishments will be funded. If funding is not likely, then the refurbishments could be delayed until funding is secured. However, this will increase the residual risk and localised impacts, such as erosion, could occur in locations where defences fail. - In the long term, there is also expected to be a funding shortfall for the defence scheme as part of the National Option. If funding cannot be secured then the scheme could be delayed until funding can be found. Alternatively the Strategy could implement the Backup option in the long term but there would be increased uncertainty with this due to increased residual risk and deeper flooding and the effectiveness of PLR would reduce.	- Funding availability - Delay refurbishments if funding is not secured

## Decision Tree



# ODU 11 - Mundeford Quay

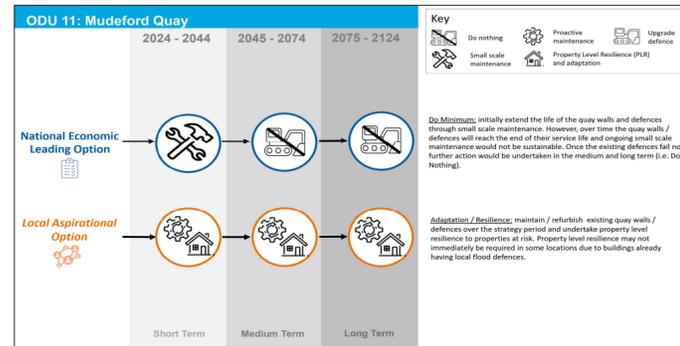
## Key features / risks

- Small number of properties at risk from flooding / erosion so therefore there is limited economic benefits on a national basis for defence improvements / maintenance
- Mundeford Quay at risk from flooding currently and depth of flooding expected to increase significantly over next 100 years
- Three properties at risk for a present day 0.5% AEP event, increasing to 12 by 2124
- The quay is a strategically important features for overall morphology of the area, for example, in acting as a training wall for 'the Run' channel
- Uncertain impact on coastal morphology should quay walls around the quay be left to fail in the future
- Key infrastructure passes beneath 'the Run' from the quay



## Strategy Leading Options

- National and Local Option identified
- National Option is Do Minimum whereas Local Option is Adaptation / Resilience
- Local Option (Adaptation / Resilience) would involve maintaining the quay walls with refurbishments and manage flood risk on the quay using PLR
- National Option (Do Minimum) would not involve replacing existing defences when they fail and long term morphology is uncertain



## Map of Leading Options

- Defence maintenance assumed along existing alignments, however this may vary subject to further appraisal
- PLR requirements to be determined on property by property basis as required



## Works required to deliver leading options\*

Option	Epoch 1				Epoch 2	Epoch 3
	Years 2025 - 2029	Years 2030 - 2034	Years 2035 - 2039	Years 2040 - 2044	Years 2045-2074	Years 2075-2124
National	No planned works other than small scale patch & repair and ensuring H&S compliance. Review S&P policy to align with the option if this is the option delivered.					
Local	Develop funding strategy for quay wall refurbishments. Undertake defence condition assessments. Undertake historic aerial investigations to determine contamination status of landfill sites. Identify properties that would benefit from property level resilience measures. Engage with property owners and support property level resilience funding applications / implementation as required.	Begin planning defence refurbishments. Secure funding and consenting for refurbishments. Continue to provide PLR support.	Refurbish existing quay walls. Continue to provide PLR support.	Continue to provide PLR support.	Further refurbishments of existing defences and PLR.	Further refurbishments of existing defences and PLR.

\*note: not shown in table above, but monitoring and small scale / patch repair maintenance on existing defences and assets should be undertaken annually / as required  
 \*timings of works subject to trigger points such as funding and condition of existing defences

## Cost profile for capital works and maintenance (not including pre-business case / support work)

Leading Option	Indicative option cost (£k) - cash														Total	
	Epoch 1 (years)				Epoch 2 (years)				Epoch 3 (years)				Total			
	2025-2029	2030-2034	2035-2039	2040-2044	2045-2049	2050-2054	2055-2059	2060-2064	2065-2069	2070-2074	2075-2084	2085-2094		2095-2104	2105-2114	2115-2124
National	23	46	91	91	183	183	37	0	0	0	0	0	0	0	0	654
Local	101	11	7,517	11	121	11	11	7,517	11	11	143	7,529	143	7,529	23	30,689

\*note that defence refurbishments timing may need to be adjusted if refurbishments are required sooner (to be informed by detailed defence condition assessment)

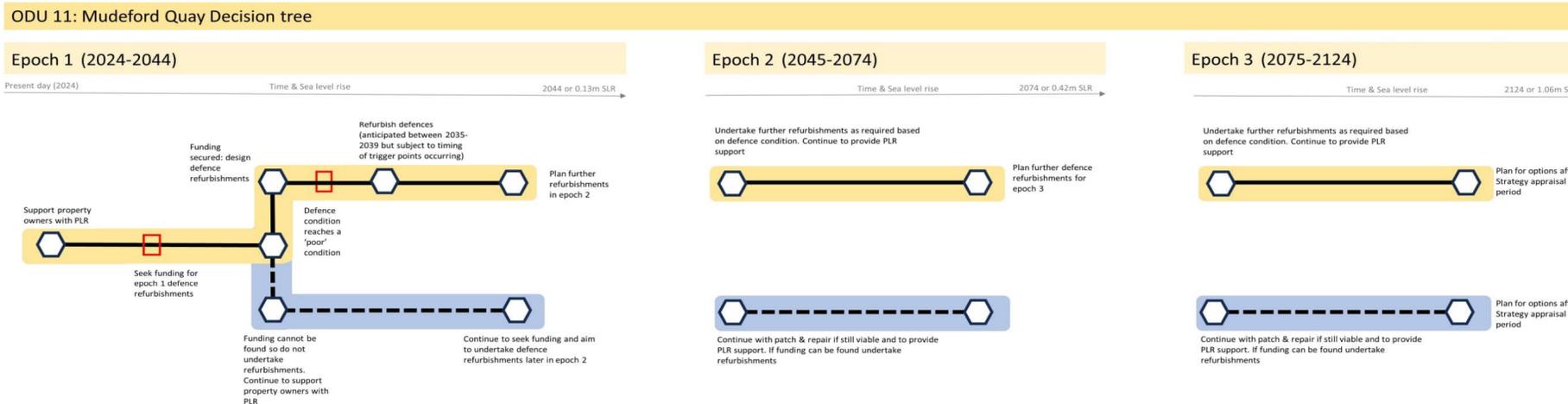
## FCERM GiA funding availability

- FCERM GiA funding unlikely to be available for defence works due to BCR < 1 on national basis. Funding may be available for PLR from separate funding routes

## Trigger Points

Category	Influence on	Details of key decisions when implementing options	Triggers
Defence condition	Timing of defence refurbishments in Local Option	- If implementing the Local Option: - The existing quay wall around Mundeford Quay was assessed to have a 'Fair' condition in the Strategy defence condition assessment, with an estimated residual life (without maintenance) of 10-15 years - Ongoing small scale / patch repair maintenance would be expected to extend the life of these asset but they are still expected to require a refurbishment during epoch 1 - The timing of a refurbishment will need to be determined based on further detailed condition inspections and may need to be brought forward or delayed accordingly based on the results of the inspections - It is recommended that when the condition reaches a 'Poor' rating then a refurbishment is undertaken	- Condition rating of Poor
Funding	Decision on Local vs National Option and timing of defence refurbishments	- The Local Option will have a funding shortfall for the defence refurbishment works - The Funding Strategy will need to outline how the defence refurbishments will be funded. If funding is not likely, then these refurbishment works could be delayed until the funding is secured or the National Option could be delivered instead. - The residual risk of defence failure will increase if refurbishments are delayed or not undertaken and the consequences of this could be erosion / uncertain morphological change.	- Funding availability - Delay refurbishments or revert to National Option if funding for refurbishments is not secured

## Decision Tree





# ODU 13 - Highcliffe

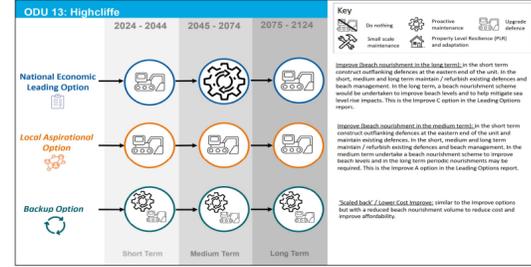
## Key features / risks

- Open coast frontage between Steamer Point and Chewton Bunnery
- Variety of coastal defences including rock groynes, rock revetment and cliff stabilisation / drainage
- Key areas for coastal recreation / tourism
- Main risk is from coastal erosion. Initially erosion risk is low, increasing over time
- 191 properties expected to be at risk from erosion over the next 100 years (cumulative)
- Risk of outflanking at the eastern end of the unit at undeveloped Naish Cliff



## Strategy Leading Options

- National (Improve C), Local (Improve A) and Backup Options (scaled back Improve C) identified
- Each of the leading options involve upgrading the defences to provide erosion defence over the Strategy period and this will also support ongoing maintenance of the cliff drainage and stabilisation system at Highcliffe
- Further work is required after the Strategy to confirm the alignment of the new defences, and this will impact the economic case / timing of interventions
- The National Option (Improve C) involves constructing an outflanking defence in epoch 1 and then maintaining / refurbishing existing defences in epoch 1 and 2. Then in epoch 3 upgrade defences / beach nourishment.
- The Local Option (Improve A) is the same as the National Option but it involves undertaking the beach nourishment from epoch 2 (rather than epoch 3)
- The Backup option is the same as the National Option (Improve C) but is 'scaled back' and involves smaller defence upgrades / less beach nourishment material



## Map of Leading Options

- Alignments are indicative and will vary subject to further appraisal



## Works required to deliver leading options\*

Option	Epoch 1			Epoch 2			Epoch 3		
	Years 2025 - 2029	Years 2030 - 2034	Years 2035 - 2039	Years 2040 - 2044	Years 2045 - 2074	Years 2075 - 2124	Years 2040 - 2044	Years 2045 - 2074	Years 2075 - 2124
National	Develop funding strategy Understand beach management as required	Plan epoch 1 outflanking defence, acquire consenting and funding, and undertake design Understand beach management as required	Construct outflanking defence Understand beach management as required	Plan and business case development for defence refurbishments in epoch 2 if required Understand beach management as required	Understand defence refurbishments as required and ongoing beach management	Beach nourishment scheme and further defence maintenance / upgrades as required and ongoing beach management	Plan and business case development for defence refurbishments in epoch 2 if required Understand beach management as required	Understand defence refurbishments as required and ongoing beach management	Beach nourishment scheme and further defence maintenance / upgrades as required and ongoing beach management
Local	Develop funding strategy Understand beach management as required	Plan epoch 1 outflanking defence, acquire consenting and funding, and undertake design Understand beach management as required	Construct outflanking defence Understand beach management as required	Begin planning for beach nourishment in epoch 2 if required Understand beach management as required	Beach nourishment scheme and further defence maintenance / upgrades as required and ongoing beach management	Further defence maintenance and upgrade delivery if required Ongoing beach management	Plan and business case development for defence refurbishments in epoch 2 if required Understand beach management as required	Understand defence refurbishments as required and ongoing beach management	Beach nourishment scheme and further defence maintenance / upgrades as required and ongoing beach management
Backup	Develop funding strategy Understand beach management as required	Plan epoch 1 outflanking defence, acquire consenting and funding, and undertake design Understand beach management as required	Construct outflanking defence Understand beach management as required	Plan and business case development for defence refurbishments in epoch 2 if required Understand beach management as required	Understand defence refurbishments as required and ongoing beach management	Scaled back beach nourishment scheme and further defence maintenance / upgrades as required and ongoing beach management	Plan and business case development for defence refurbishments in epoch 2 if required Understand beach management as required	Understand defence refurbishments as required and ongoing beach management	Beach nourishment scheme and further defence maintenance / upgrades as required and ongoing beach management

\*Note: not shown in table above, but monitoring and small scale / patch repair maintenance on existing defences and assets should be undertaken annually / as required  
\*Timing of works subject to trigger points such as funding and condition of existing defences

## Cost profile for capital works and maintenance (not including pre-business case / support work)

Leading Option	Indicative option cost (£k) - cash															
	Epoch 1 (years)			Epoch 2 (years)			Epoch 3 (years)			Total						
	2025-2029	2030-2034	2035-2039	2040-2044	2045-2049	2050-2054	2055-2059	2060-2064	2065-2069	2070-2074	2075-2084	2085-2094	2095-2104	2105-2114	2115-2124	Total
National	60	60	740	60	5,919	60	60	60	60	60	6,142	120	1,676	120	120	16,873
Local	60	60	740	60	9,032	60	60	60	60	60	6,142	120	1,676	120	120	18,430

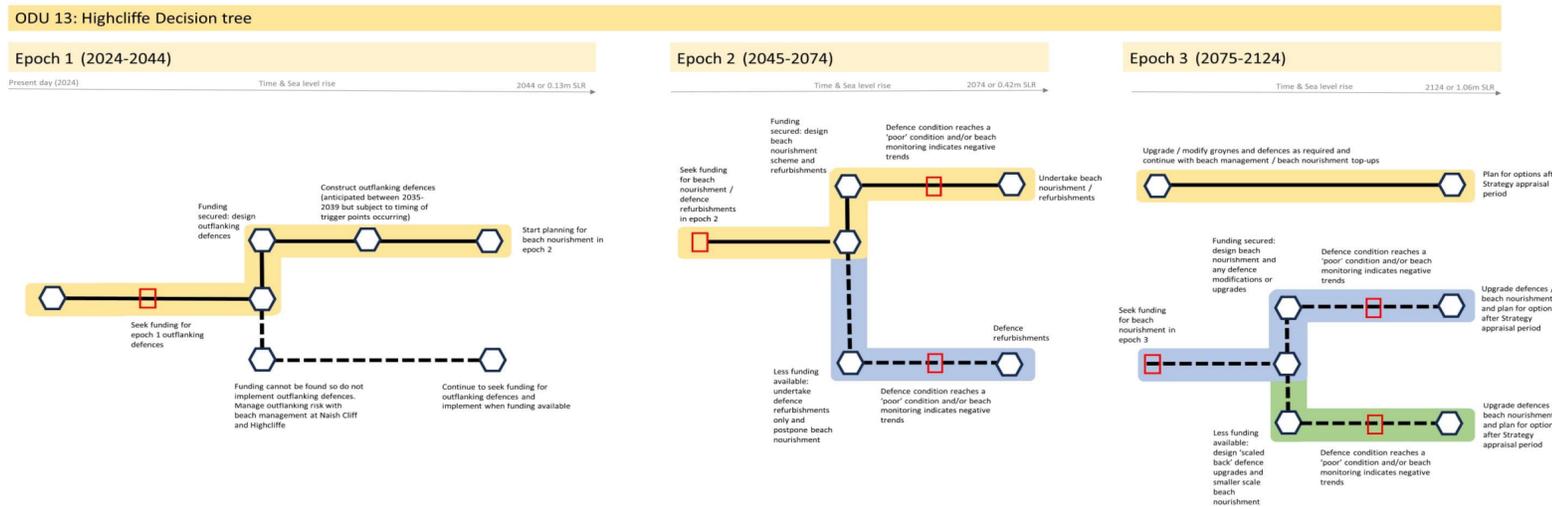
## FCERM GIA funding availability

- Indicative FCERM GIA funding availability calculated for scheme as part of the local option in epoch 2, and the national option in epoch 3
- Indicative amount of FCERM GIA available for defence scheme estimated to be in region of £1.5 million (local option scheme) to £2.2 million (national option scheme)
- See economics report for assumptions when calculating indicative GIA availability (such as baseline year)

## Trigger Points

Category	Influence on	Details of key decisions when implementing options	Triggers
Beach monitoring	Timing of defence upgrades / beach nourishment in Leading Options	The beach is a key component of the defence system in this location and the existing defences (groynes) currently help control beach levels There is a risk that the beach profile could change over time in response to storms/ sea level rise which could reduce the effectiveness of the defence system It is recommended that the beach profiles in ODU 13 continue to be monitored on a regular basis (i.e. every 6 months) to identify any trends in the beach profile movement. If the beach profile trends indicate that the beach profile is lowering beyond the typical range then this could be a trigger for upgrading / modifying the existing defences to help retain more beach material and undertaking a beach nourishment scheme. A long term record of monitoring is required to enable long term significant trends to be identified relative to typical seasonal variations	A consistent trend in beach profile change (not typical seasonal changes)
Defence condition	Timing of defence refurbishments and defence upgrades in Leading Options	The condition of the defences in ODU 13 varies but are typically 'good'. The condition of the defences can also inform the timing of refurbishments and defence upgrades For defence refurbishments it is recommended that refurbishments are undertaken once defences reach a 'poor' condition. Similarly, if a defence upgrade scheme is scheduled within several years and the defences reach a 'poor' condition then this could also be a trigger for undertaking the scheme sooner. It is recommended that detailed defence condition surveys are undertaken on a regular basis to inform the defence condition and changes over time.	Condition rating of Poor
Funding	Decision on Local vs National vs Backup Option	The National, Local and Backup Options will have a funding shortfall (i.e. FCERM GIA will not cover the full cost) The Funding Strategy will need to outline how the scheme / refurbishments will be funded If funding for undertaking the beach nourishment for the Local Option in epoch 2 is not available, then the Strategy could revert to the National Option and undertake the beach nourishment in epoch 3. If funding for the defence improvements and beach nourishment for the National Option in epoch 3 is not available, then the Strategy could revert to the Backup option and reduce the scale of defence improvements / beach nourishment to reduce the overall cost. If funding is not available for the outflanking defences in epoch 1 (recommended in each of the leading options) then the defences could be delayed and beach management could be utilised instead at Naish Cliff to help control rates of erosion at the eastern end of ODU 13 (i.e. moving material from Highcliffe to Naish Cliff)	Funding availability Revert to National Option if funding not available for scheme in epoch 1 Revert to Backup option if not enough funding is available in medium term

## Decision Tree



ODU 14 - Naish Cliff and Barton on Sea

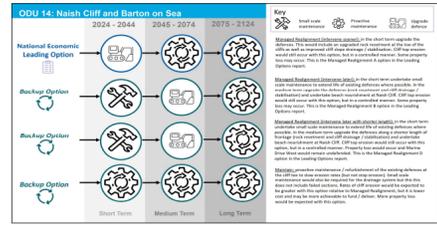
Key features / risks

Operational strategy between Naish Cliff and Barton on Sea. Characterised by eroding shingle cliffs. Variety of coastal defences including rock revetment and cliff stabilisation / drainage. Marine Drive from coastal erosion. Coastal cliff grading with erosion / beach defence used to serve active and residential / retail / SOD development along the cliff face due to geological importance. Erosion risk to properties between Naish Cliff and Barton on Sea in epoch 1 but not at risk by 2124 (contaminated) uncertainty around technical stability of new defences at Marine Drive West due to slumping zone.



Notes on the map

National Managed Regeneration (NMR) and multiple Backup Options identified (Managed Regeneration B, Managed Regeneration C, Managed Regeneration D). The National Option (Managed Regeneration A) involves new / upgraded defences between Marine Drive West and Marine Drive East (main urban area of BOD) undertaken in epoch 1. Erosion would not be stopped entirely due to geology of cliff. Backup Option (Managed Regeneration B) is the same as the National Option (Managed Regeneration A) but would also include the defence scheme until epoch 2. Backup Option (Managed Regeneration C) involves defining a smaller length of the defences between Marine Drive West and Marine Drive East from epoch 2. This is the currently defined area and defences would be upgraded. Backup Option (Managed Regeneration D) involves maintaining existing defences and the functioning of the scheme, but no new defences would be constructed. More erosion would be expected relative to the Managed Regeneration options as a result of defences falling over time.



Map of Localities

Agreements are indicative and will vary subject to further appraisal. Only National Option shown in figure (Backup options not shown).



Works required to deliver leading options\*

Option	Years 2024 - 2029	Years 2030 - 2039	Years 2040 - 2049	Years 2050 - 2059	Years 2060 - 2069	Years 2070 - 2124	
National Managed Regeneration (A)	Design funding strategy and engage with potential funding partners for epoch 1 scheme. Complete detailed design for the scheme. Obtain planning consent for the scheme. Issue O&M plan to begin work through the scheme.	Finalise business case and design of scheme. Issue planning consent and start of construction. Complete detailed design for the scheme. Obtain planning consent for the scheme. Issue O&M plan to begin work through the scheme.	Finalise construction of scheme and undertake maintenance as required. Complete detailed design for the scheme. Obtain planning consent for the scheme. Issue O&M plan to begin work through the scheme.	Finalise construction of scheme and undertake maintenance as required. Complete detailed design for the scheme. Obtain planning consent for the scheme. Issue O&M plan to begin work through the scheme.	Finalise construction of scheme and undertake maintenance as required. Complete detailed design for the scheme. Obtain planning consent for the scheme. Issue O&M plan to begin work through the scheme.	Finalise construction of scheme and undertake maintenance as required. Complete detailed design for the scheme. Obtain planning consent for the scheme. Issue O&M plan to begin work through the scheme.	Finalise construction of scheme and undertake maintenance as required. Complete detailed design for the scheme. Obtain planning consent for the scheme. Issue O&M plan to begin work through the scheme.
Backup Managed Regeneration (B)	Design funding strategy and engage with potential funding partners for epoch 2 scheme. Complete detailed design for the scheme. Obtain planning consent for the scheme. Issue O&M plan to begin work through the scheme.	Finalise business case and design of scheme. Issue planning consent and start of construction. Complete detailed design for the scheme. Obtain planning consent for the scheme. Issue O&M plan to begin work through the scheme.	Finalise construction of scheme and undertake maintenance as required. Complete detailed design for the scheme. Obtain planning consent for the scheme. Issue O&M plan to begin work through the scheme.	Finalise construction of scheme and undertake maintenance as required. Complete detailed design for the scheme. Obtain planning consent for the scheme. Issue O&M plan to begin work through the scheme.	Finalise construction of scheme and undertake maintenance as required. Complete detailed design for the scheme. Obtain planning consent for the scheme. Issue O&M plan to begin work through the scheme.	Finalise construction of scheme and undertake maintenance as required. Complete detailed design for the scheme. Obtain planning consent for the scheme. Issue O&M plan to begin work through the scheme.	Finalise construction of scheme and undertake maintenance as required. Complete detailed design for the scheme. Obtain planning consent for the scheme. Issue O&M plan to begin work through the scheme.
Backup Managed Regeneration (C)	Design funding strategy and engage with potential funding partners for epoch 2 scheme. Complete detailed design for the scheme. Obtain planning consent for the scheme. Issue O&M plan to begin work through the scheme.	Finalise business case and design of scheme. Issue planning consent and start of construction. Complete detailed design for the scheme. Obtain planning consent for the scheme. Issue O&M plan to begin work through the scheme.	Finalise construction of scheme and undertake maintenance as required. Complete detailed design for the scheme. Obtain planning consent for the scheme. Issue O&M plan to begin work through the scheme.	Finalise construction of scheme and undertake maintenance as required. Complete detailed design for the scheme. Obtain planning consent for the scheme. Issue O&M plan to begin work through the scheme.	Finalise construction of scheme and undertake maintenance as required. Complete detailed design for the scheme. Obtain planning consent for the scheme. Issue O&M plan to begin work through the scheme.	Finalise construction of scheme and undertake maintenance as required. Complete detailed design for the scheme. Obtain planning consent for the scheme. Issue O&M plan to begin work through the scheme.	Finalise construction of scheme and undertake maintenance as required. Complete detailed design for the scheme. Obtain planning consent for the scheme. Issue O&M plan to begin work through the scheme.
Backup (Mainland)	Design funding strategy and engage with potential funding partners for epoch 2 scheme. Complete detailed design for the scheme. Obtain planning consent for the scheme. Issue O&M plan to begin work through the scheme.	Finalise business case and design of scheme. Issue planning consent and start of construction. Complete detailed design for the scheme. Obtain planning consent for the scheme. Issue O&M plan to begin work through the scheme.	Finalise construction of scheme and undertake maintenance as required. Complete detailed design for the scheme. Obtain planning consent for the scheme. Issue O&M plan to begin work through the scheme.	Finalise construction of scheme and undertake maintenance as required. Complete detailed design for the scheme. Obtain planning consent for the scheme. Issue O&M plan to begin work through the scheme.	Finalise construction of scheme and undertake maintenance as required. Complete detailed design for the scheme. Obtain planning consent for the scheme. Issue O&M plan to begin work through the scheme.	Finalise construction of scheme and undertake maintenance as required. Complete detailed design for the scheme. Obtain planning consent for the scheme. Issue O&M plan to begin work through the scheme.	Finalise construction of scheme and undertake maintenance as required. Complete detailed design for the scheme. Obtain planning consent for the scheme. Issue O&M plan to begin work through the scheme.

\*Note: not shown if stable above, but monitoring and small scale / patch repair maintenance on existing defences and assets would be undertaken annually as required. \*Range of works subject to trigger points such as funding and condition of existing defences.

Cost profile for capital works and maintenance (not including pre-business case / support work)

Leading Option	Epoch 1 (2024-2029)	Epoch 2 (2030-2039)	Epoch 3 (2040-2049)	Epoch 4 (2050-2059)	Epoch 5 (2060-2069)	Epoch 6 (2070-2079)	Epoch 7 (2080-2089)	Epoch 8 (2090-2099)	Epoch 9 (2100-2109)	Epoch 10 (2110-2119)	Epoch 11 (2120-2124)	Total
National Managed Regeneration (A)	255	255	255	255	255	255	255	255	255	255	255	255
Backup Managed Regeneration (B)	255	255	255	255	255	255	255	255	255	255	255	255
Backup Managed Regeneration (C)	255	255	255	255	255	255	255	255	255	255	255	255
Backup (Mainland)	255	255	255	255	255	255	255	255	255	255	255	255

\*Note that specific for defence upgrade as part of backup option is undertaken these as soon as possible. Therefore the costs outlined in epoch 10 - 21 could occur sooner.

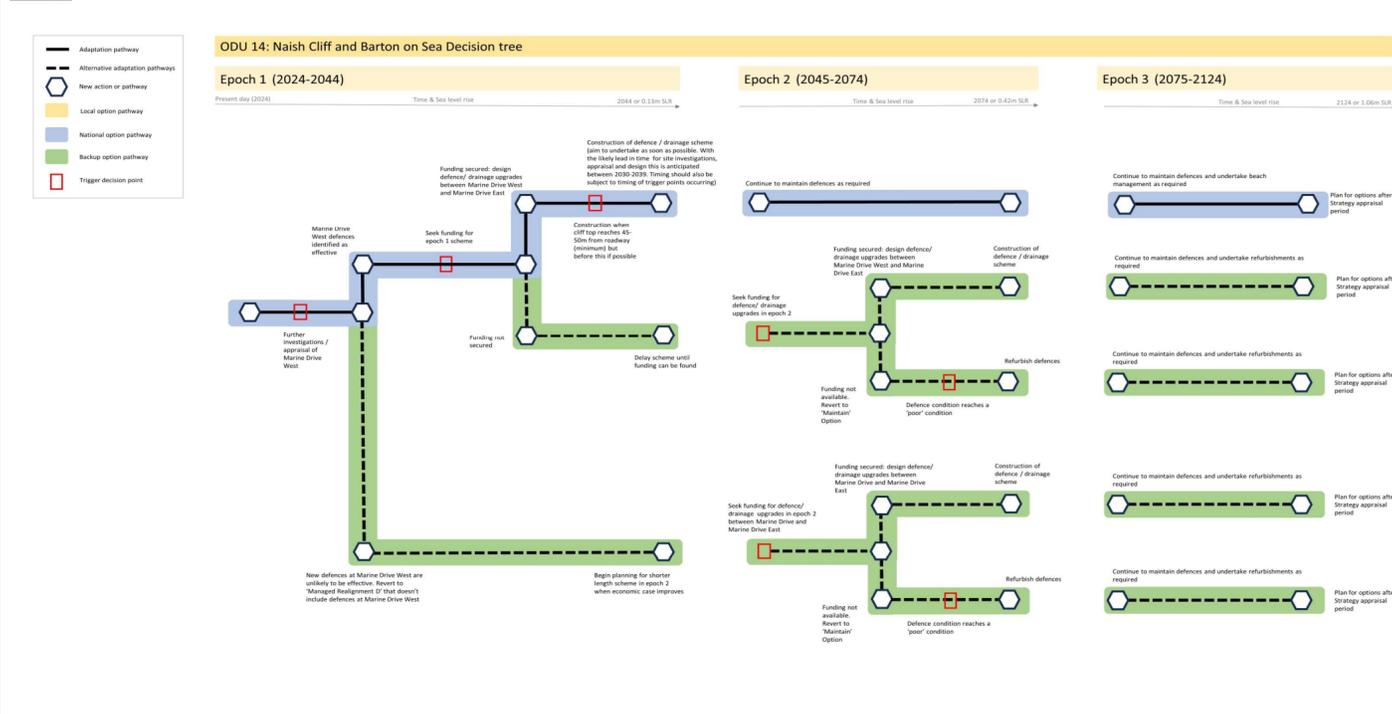
FCEM GIA funding availability

Indicates FCEM GIA funding availability calculated for defence upgrade scheme as part of the national option in epoch 1. Indicates amount of FCEM GIA available for defence scheme in epoch 1 in epoch 1 of 12 million. FCEM GIA would not be eligible to cover off stabilisation / drainage part of the scheme cost. FCEM GIA could be used on cliff face defences. See economic report for assumptions when calculating indicative GIA availability (each business year).

Trigger Points

Category	Influence on	Point of key decision when implementing option	Trigger
Marine Drive West feasibility	Defence alignment for scheme (includes Marine Drive West) and therefore choice of Strategic option	Finalised the design of the O&M plan for Marine Drive West in the water ramp area of the alignment backfill O&M. The effectiveness of new sea defences / cliff drainage in this location is therefore uncertain. Prior to, or during the development of a business case / scheme design for the Barton on Sea Strategic, it is recommended that further appraisal of constructing new defences at Marine Drive West is undertaken. If the appraisal indicates that defences would be effective and provide sufficient cost benefit then it is recommended that they are included in the scheme alignment. This would deliver the National Option that currently assumes that defences would be included here. If the appraisal indicates that defences would not be effective / not provide sufficient cost benefit then it is recommended that they are excluded from the scheme alignment. This would mean that the Strategic reverts to the Managed Regeneration Option that is currently a backup option.	Funding from further appraisal of Marine Drive West (during or prior to business case development)
Observed cliff erosion at top of cliff	Timing of defence / drainage scheme as part of the National Option	As outlined in the Barton on Sea option review, as much as possible in the top of the cliff between the cliff line and the roadway in order to implement the emerging drainage solution being developed by NPOC. An alternative design option is required and should be with reduced to show that this is the most effective way to manage the risk of cliff erosion. Equipment of the cliff typically occurs in increments and is not a linear process. It is typically required to respond to storm / rainfall events rather than a gradual loss every year. The planning and design for the defence and drainage scheme should therefore begin before the cliff reaches the roadway to account for any erosion events that could occur during the planning and design process. It is recommended that planning / scheme development begins when the cliff is between 10-15m from the roadway and construction starts when the cliff is between 40-50m from the roadway (at the latest). Some parts of the cliff are already at this trigger threshold and therefore the National Option requires planning / starting on the scheme delivery as soon as possible.	Begin scheme planning / development and O&M plan for the National Option and construction begins when cliff is 40-50m from roadway (at the latest)
Defence condition	Timing of defence refurbishments / upgrades as part of the leading options	The condition of the defences in ODU 14 varies but are typically 'good' and 'fair' although some groups are in a 'poor' condition. The condition of the defences can also be the trigger for refurbishments and defence upgrades. For defence refurbishments it is recommended that refurbishments are undertaken once defences reach a 'poor' condition. Similarly, if a defence upgrade scheme is scheduled within several years and the defence reaches a 'poor' condition then the cost should be a trigger for undertaking the scheme sooner. It is recommended that detailed defence condition surveys are undertaken on a regular basis to inform the defence condition and changes over time.	Condition rating of Poor
Funding	Decision on National or Backup Options	The National and Backup Options will have a funding shortfall at J in FCEM GIA will not cover the full cost. The funding strategy will need to outline how the scheme / refurbishments will be funded. If funding for undertaking National Option in epoch 1 is not available, then the Strategic could revert to the Backup Option (Managed Regeneration B) and undertake the scheme in epoch 2. If funding for the Backup option scheme in epoch 2 (Managed Regeneration B) is not available, then the Strategic could revert to the other Backup option (Backup A) and undertake defence refurbishments rather than defence / drainage upgrades. In the event of funding not being available for refurbishments then small scale maintenance could be continued but the realistic expectation is that the cost will be covered once defences fail.	Funding availability. Revert to Backup Option if funding not available for National Option

Decision Tree



# ODU 15 - Barton on Sea to Hordle Cliff

## Key features / risks

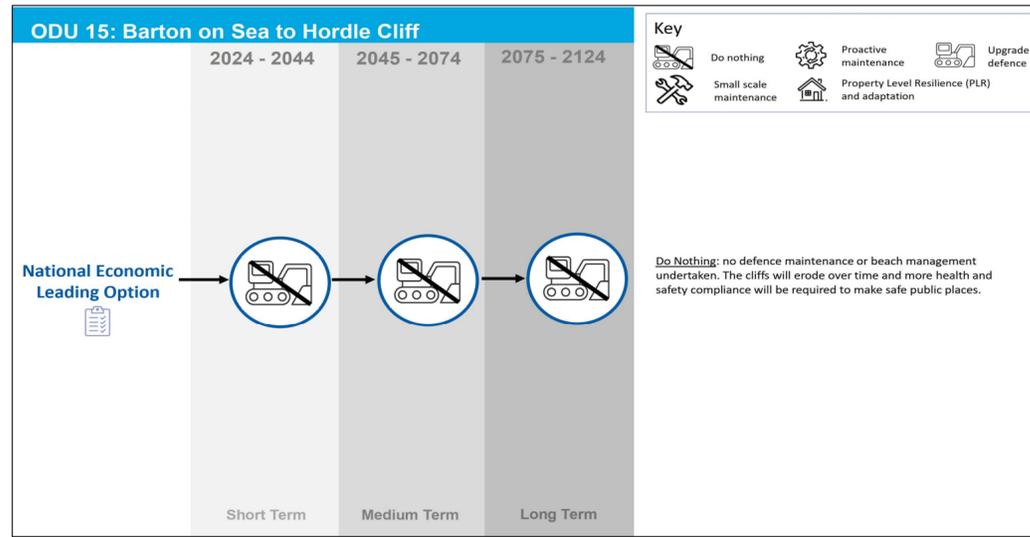
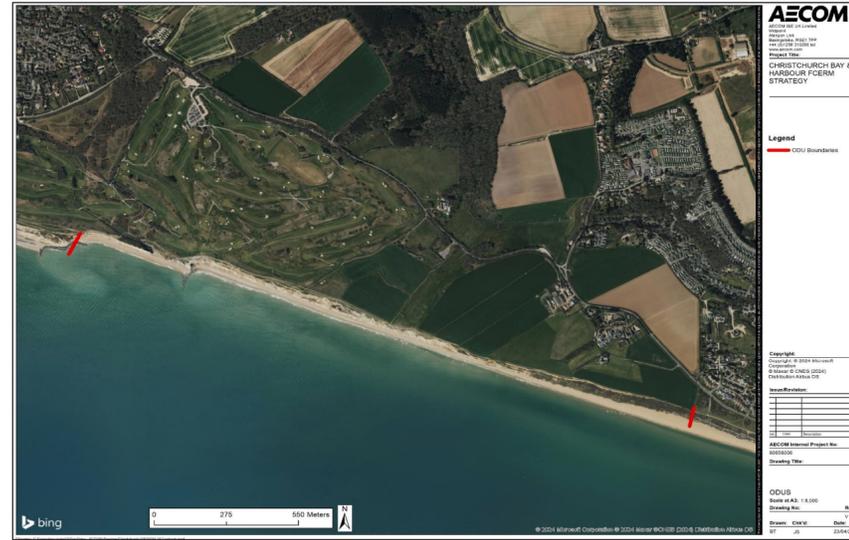
- Undefended open coast frontage between Barton on Sea and Hordle Cliff
- No properties or other assets at risk until epoch 3 (only 1 property at risk in epoch 3)

## Strategy Leading Options

- National option is Do Nothing
- Allow natural processes to occur, supporting the features of the environmental designations found in this area

## Map of Leading Options

- No map of Leading Options provided as Do Nothing does not include any interventions



## Works required to deliver leading options\*

Option	Epoch 1					Epoch 2	Epoch 3
	Years 2025 - 2029	Years 2030 - 2034	Years 2035 - 2039	Years 2040 - 2044	Years 2045-2074	Years 2075-2124	
National	No defence maintenance or beach management undertaken. Undertake health and safety activities following cliff erosion events to make safe public spaces						

## Cost profile for capital works and maintenance (not including pre-business case / support work)

Leading Option	Indicative option cost (£k) - cash															
	Epoch 1 (years)				Epoch 2 (years)					Epoch 3 (years)					Total	
	2025-2029	2030-2034	2035-2039	2040-2044	2045-2049	2050-2054	2055-2059	2060-2064	2065-2069	2070-2074	2075-2084	2085-2094	2095-2104	2105-2114		2115-2124
National	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

## FCERM GiA funding availability

- Not applicable with Do Nothing option

## Trigger Points

Category	Influence on	Details of key decisions when implementing options	Triggers
NA	NA	NA	

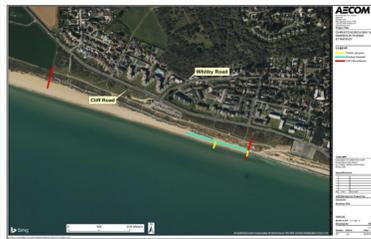
## Decision Tree

- Not applicable with Do Nothing option

# ODU 16 - Cliff Road

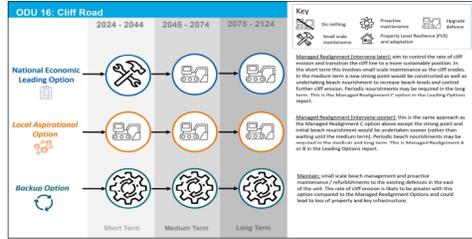
## Key features / risks

- Open coast frontage between the beach huts and the western end of the defences at Cliff Cliff, used extensively for recreation / amenity
- Most of the cliff is underlain by the beach floor of the cliffs providing the main protection to the cliff toe
- However, at the eastern end of the cliff there is a wall and groynes that provide local protection
- Main risk is from coastal erosion. Beach huts at end of cliff are at risk of erosion to the cliff and main road
- Also risk to public amenity features, toilets, car parking and beach access
- Over the next 100 years 223 properties at risk of erosion, but majority of the properties at risk are expected during epoch 3
- Cliff designated as SSSI due to geological importance
- Dominant sediment transport direction is from west to east



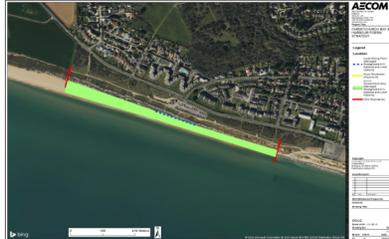
## Strategy Leading Options

- National (Managed Realignment C), Local (Managed Realignment A/B) and Backup Options (Mantain) identified
- The National Option (Managed Realignment C) involves constructing a local strong point and undertaking beach nourishment in epoch 2. The aim will be to limit erosion of the cliff toe and cliff line to reach more sustainable position. However, with the defence improvements this will be done in a controlled manner to avoid property loss / loss of road in the future
- The Local Option (Managed Realignment A/B) as the same as the National Option but it involves undertaking the beach nourishment and construction of local strong point sooner (in other epoch 1 or the start of epoch 2)
- The Backup option involves maintenance of existing defences and beach recycling. However, in the long term the erosion risk is likely to be greater than the National / Local options and property loss could occur
- Further work is required after the Strategy to confirm the alignment of the new defences, and this will impact the economic case / timing of interventions



## Map of Leading Options

- Alignments are indicative and will vary subject to further appraisal



## Works required to deliver leading options\*

Option	Years 2020 - 2029	Years 2030 - 2034	Epoch 1	Years 2035 - 2039	Years 2040 - 2044	Epoch 2	Epoch 3
National	Design and construction of local strong point and beach nourishment scheme as required. The cliff will continue to erode to support beach hut owners as required.	Design and construction of local strong point and beach nourishment scheme as required. The cliff will continue to erode to support beach hut owners as required.	Design and construction of local strong point and beach nourishment scheme as required. The cliff will continue to erode to support beach hut owners as required.	Design and construction of local strong point and beach nourishment scheme as required. The cliff will continue to erode to support beach hut owners as required.	Design and construction of local strong point and beach nourishment scheme as required. The cliff will continue to erode to support beach hut owners as required.	Design and construction of local strong point and beach nourishment scheme as required. The cliff will continue to erode to support beach hut owners as required.	Design and construction of local strong point and beach nourishment scheme as required. The cliff will continue to erode to support beach hut owners as required.
Local Managed Realignment (A shown for reference)	Design and construction of local strong point and beach nourishment scheme as required. The cliff will continue to erode to support beach hut owners as required.	Design and construction of local strong point and beach nourishment scheme as required. The cliff will continue to erode to support beach hut owners as required.	Design and construction of local strong point and beach nourishment scheme as required. The cliff will continue to erode to support beach hut owners as required.	Design and construction of local strong point and beach nourishment scheme as required. The cliff will continue to erode to support beach hut owners as required.	Design and construction of local strong point and beach nourishment scheme as required. The cliff will continue to erode to support beach hut owners as required.	Design and construction of local strong point and beach nourishment scheme as required. The cliff will continue to erode to support beach hut owners as required.	Design and construction of local strong point and beach nourishment scheme as required. The cliff will continue to erode to support beach hut owners as required.
Backup	Design and construction of local strong point and beach nourishment scheme as required. The cliff will continue to erode to support beach hut owners as required.	Design and construction of local strong point and beach nourishment scheme as required. The cliff will continue to erode to support beach hut owners as required.	Design and construction of local strong point and beach nourishment scheme as required. The cliff will continue to erode to support beach hut owners as required.	Design and construction of local strong point and beach nourishment scheme as required. The cliff will continue to erode to support beach hut owners as required.	Design and construction of local strong point and beach nourishment scheme as required. The cliff will continue to erode to support beach hut owners as required.	Design and construction of local strong point and beach nourishment scheme as required. The cliff will continue to erode to support beach hut owners as required.	Design and construction of local strong point and beach nourishment scheme as required. The cliff will continue to erode to support beach hut owners as required.

\*Notes: not shown in table above, but monitoring and small scale / patch repair maintenance on existing defences and assets should be undertaken annually / as required

\*Range of work subject to trigger points such as funding and condition of existing defences

## Cost profile for capital works and maintenance (not including pre-business case / support work)

Leading Option	Indicative option cost (£k) - cash												Total			
	Epoch 1 (years)			Epoch 2 (years)			Epoch 3 (years)			Total						
	2025-2029	2030-2034	2035-2039	2040-2044	2045-2049	2050-2054	2055-2059	2060-2064	2065-2069	2070-2074	2075-2079	2080-2084	2085-2089	2090-2094	2105-2114	2115-2124
National	98	98	193	193	348	264	264	10,237	127	137	211	1,940	274	1,940	271	19,514
Local	98	1,660	137	137	137	137	137	137	137	1,940	274	1,940	274	1,940	271	12,250
Backup	98	491	98	98	348	264	264	348	264	1,000	615	615	615	1,000	615	6,860

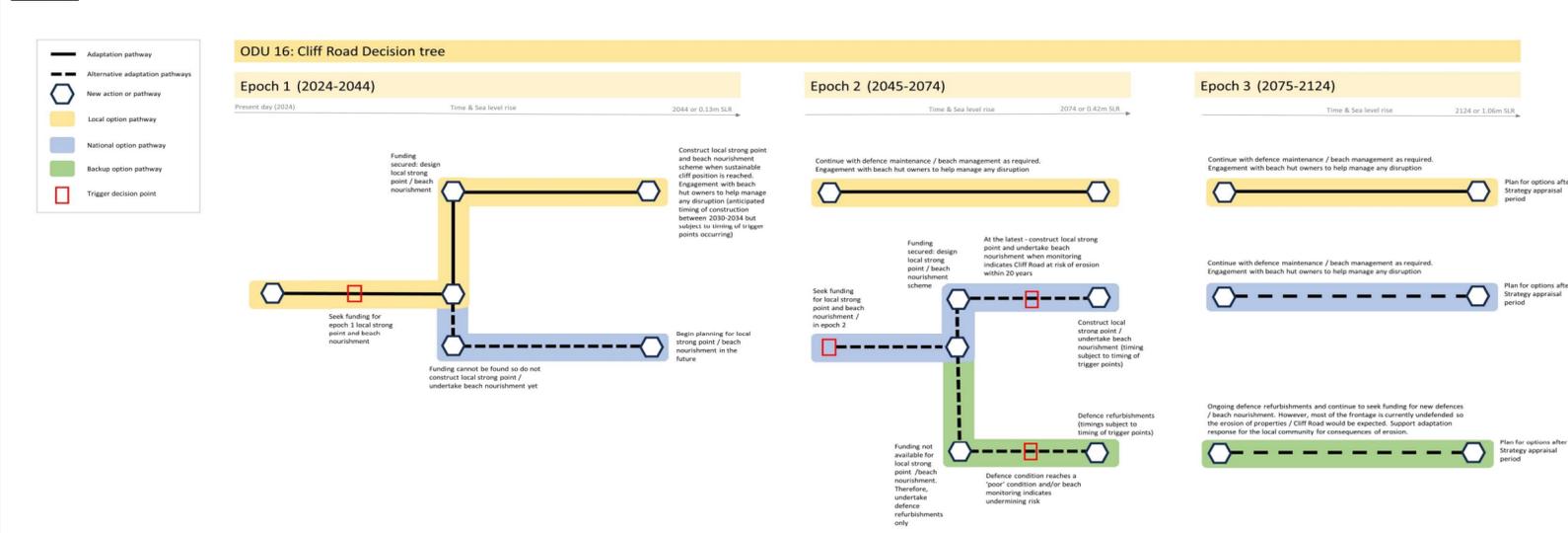
## FCERM GIA funding availability

- Indicative FCERM GIA funding availability calculated for scheme as part of the local option in epoch 1 and the national option in epoch 2
- Indicative amount of FCERM GIA available for defence scheme estimated to be in region of £1.3 million (local option scheme) to £1.9 million (national option scheme)
- \*See economic report for assumptions when calculating indicative GIA availability (such as baseline year)

## Trigger Points

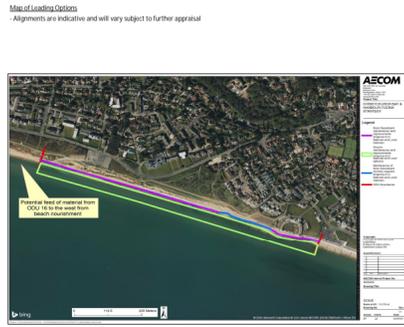
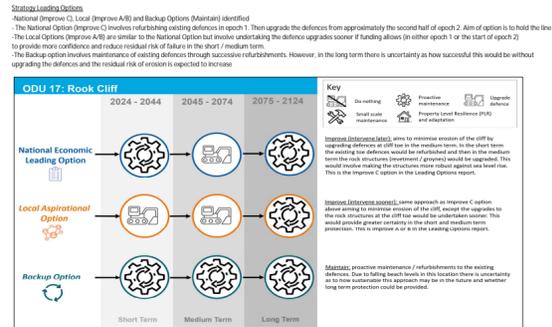
Category	Influence on	Details of key decisions when implementation options	Triggers
Beach nourishment / cliff erosion	Timing of local strong point construction / beach nourishment in National / Local Options	<ul style="list-style-type: none"> <li>The beach is a key component of the defence system in this location and it helps to control rates of cliff erosion. Where the beach is narrower it provides less protection to the cliff toe</li> <li>Over time there is a risk that the beach profile could change further in response to storms / sea level rise which could reduce the effectiveness of the defence system further</li> <li>It is recommended that rates of cliff erosion and the beach profile in ODU 16 continue to be monitored on a regular basis (i.e. every 6 months and in response to storms). This will help to identify any long term trends.</li> <li>The National / Local options aim to allow some erosion of the cliff to occur in the future to create more space for a wider beach. However, the options will ensure that this erosion will be in a controlled manner with the aim of stopping erosion reaching Cliff Road and the properties behind it.</li> <li>The cliff erosion / beach profile trends should therefore be monitored so that the local strong point / beach nourishment scheme as part of these options can be timed appropriately so that the roadway / properties do not become at risk.</li> <li>The timing of the local strong point / beach nourishment will need to be carefully considered so that a buffer zone of land is retained seaward of Cliff Road. This will ensure that any further erosion in the future (after the scheme is in place) does not threaten the Road and properties</li> <li>It is recommended that the trigger for undertaking the local strong point / beach nourishment is when the cliff toe reaches a distance from Cliff Road that puts the road at risk from erosion within a 20 year period. This will need to consider the rate of erosion that is occurring and beach profile changes based on monitoring results, as well as the distance between the cliff top and Cliff Road.</li> <li>The local strong point / beach nourishment could be undertaken sooner (for example in epoch 1 if funding allows), but it should be undertaken no later than the trigger level in order to retain a buffer zone of open space at the cliff top after the scheme is constructed.</li> <li>A long term record of beach profile / cliff erosion monitoring is required to enable long term significant trends to be identified relative to typical seasonal variations. This will also be important after the local strong point / beach nourishment is undertaken because the cliff / beach may continue to erode and the monitoring will inform future interventions to help manage this process.</li> </ul>	Cliff erosion and beach profile trends that threaten Cliff Road & properties within 20 years (i.e. need to intervene before the risk is projected to be at risk within a 20 year period of time)
Defence condition	Timing of defence refurbishments and defence upgrades	<ul style="list-style-type: none"> <li>The condition of the defences in ODU 16 varies but are typically 'fair' or 'poor' and are sensitive to presence and supply of beach material to protect the toe</li> <li>The condition of the defences can inform the timing of refurbishments and defence upgrades</li> <li>For defence refurbishments it is recommended that refurbishments are undertaken once defences reach a 'poor' condition</li> <li>Similarly, if a defence upgrade scheme is scheduled within several years and the defences reach a 'poor' condition then this could also be a trigger for undertaking the scheme sooner.</li> <li>It is recommended that detailed defence condition surveys are undertaken on a regular basis to inform the defence condition and changes over time.</li> </ul>	Condition rating of Poor
Funding	Decision on Local or National or Backup Option	<ul style="list-style-type: none"> <li>The timing of the scheme for the local and National Options should primarily be determined by the beach profile / cliff erosion trigger threshold. However if it is recognised that funding availability may delay the construction of the scheme if funding is not available. If the scheme is delayed, then there is a risk of an increased cost for the scheme as more works may be required to stabilise the cliff position if it gets closer to Cliff Road</li> <li>The National, Local and Backup Options will have a funding shortfall as FCERM GIA will not cover the full cost</li> <li>The Funding Strategy will need to outline how the scheme / refurbishments will be funded</li> <li>Funding for undertaking the local strong point / beach nourishment for Managed Realignment A (Local option) in epoch 1 is not available. Then the Strategy could revert to the undertaking these improvements at later date - i.e. either Managed Realignment B (Local option) or Managed Realignment C (National Option). The exact timing will need to be determined by the erosion risk / beach profile trends. There is a risk that the longer the defence scheme is left, the greater the cost of the scheme as more works may be needed to stabilise the cliff position</li> <li>Funding for the local strong point / beach nourishment as part of the Local / National options is not available, then the Strategy could revert to the Backup option (Mantain) and only undertake defence refurbishments</li> <li>However, this would likely result in increased risk of erosion to Cliff Road / properties and adaptation plans would be required to manage the consequences of this erosion</li> </ul>	Funding availability Undertaking the local strong point / beach nourishment scheme at a later date if funding is not fully to be immediately available Revert to Backup option if it is unlikely that any funding can be found for the local strong point / beach nourishment in the future

## Decision Tree



# ODU 17 - Rook Cliff

**Key features / risks**  
 Open coast frontage between the start of the Rook Cliff defences and the Hunt Road West car park (including the White House)  
 Variety of coastal defences including a concrete seawall fronted by a rock revetment, timber and rock groynes  
 Recent emergency work completed at Westover to stabilise the defences following a failure. Undermining risk with falling beach levels  
 Main risk is from coastal erosion, with 20' properties expected to be at risk over the next 100 years (cumulative)  
 Car parks and open space between the defence line and the properties at risk



## Works required to deliver leading options\*

Option	Epoch 1			Epoch 2			Epoch 3		
	Years 2025 - 2029	Years 2030 - 2034	Years 2035 - 2039	Years 2040 - 2044	Years 2045 - 2049	Years 2050 - 2054	Years 2055 - 2059	Years 2060 - 2064	Years 2065 - 2069
<b>National</b>	Service leading design Sea walling refurbishment, repair concrete and sanding/replacement of sea walling Review RFP policy to align with the option if this is the option delivered	Understand condition of defences	Understand defences maintenance as required	High planning for defence upgrade and beach nourishment in epoch 2 (only red spots) Understand defences maintenance as required	Defence refurbishment				
<b>Local (Improve A/B)</b>	Service leading design Sea walling upgrade and service business case Review RFP policy to align with the option if this is the option delivered	Design defences upgrade Construct scheme	Understand defences maintenance as required	Defence refurbishment	Defence refurbishment	Defence refurbishment	Defence refurbishment	Defence refurbishment	Defence refurbishment
<b>Backup</b>	Service leading design Funding for defences upgrade in the future is unlikely through epoch 1 defences Review RFP policy to align with the option if this is the option delivered	Understand condition of defences	Understand defences maintenance as required	Defence refurbishment	Defence refurbishment	Defence refurbishment	Defence refurbishment	Defence refurbishment	Defence refurbishment

\*Note: Not shown in table above, but monitoring and small scale / patch repair maintenance on existing defences and assets should be undertaken annually / as required  
 \*Timings of works subject to trigger points such as funding and condition of existing defences

## Cost profile for capital works and maintenance (not including pre-business case / support work)

Leading Option	Epoch 1 (years)			Epoch 2 (years)			Epoch 3 (years)			Total
	2025-2029	2030-2034	2035-2039	2040-2044	2045-2049	2050-2054	2055-2059	2060-2064	2065-2069	
National	50	3,836	50	50	50	17,521	50	50	100	24,985
Local	50	13,675	50	50	50	50	50	2,828	100	17,353
Backup	50	2,733	50	50	50	1,114	50	50	2,828	13,298

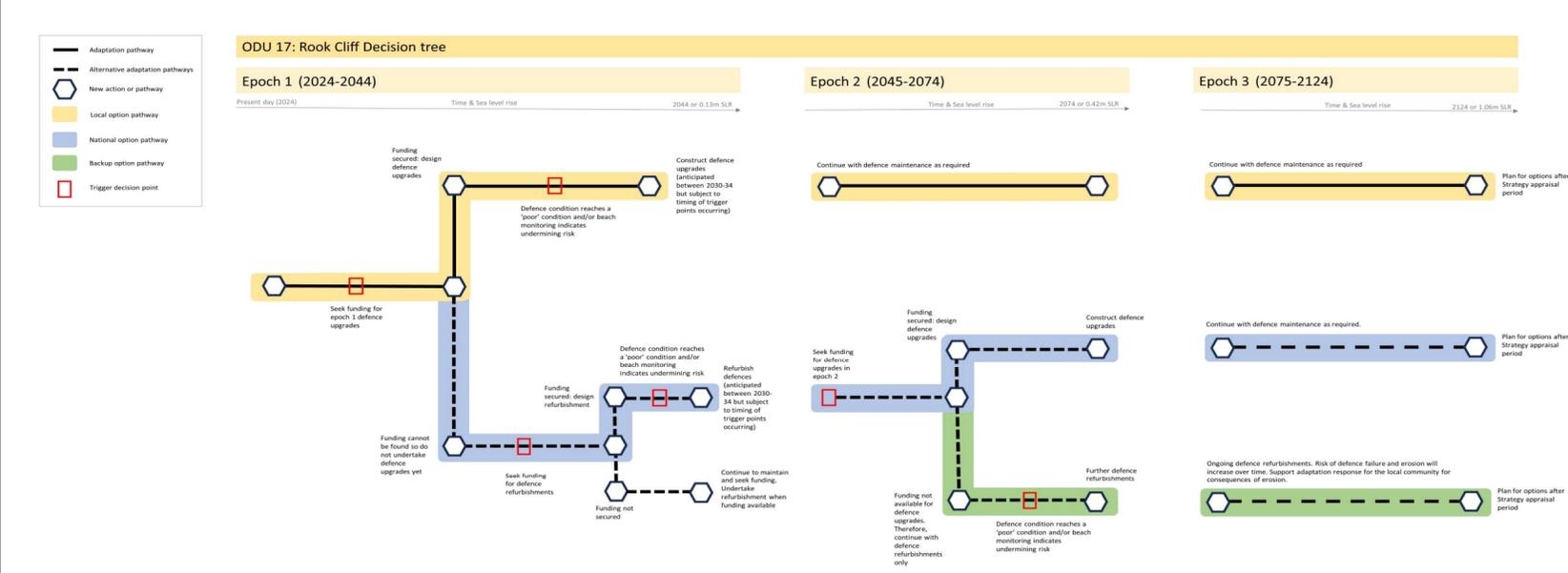
## FCERM GIA funding availability

Indicative FCERM GIA funding availability calculated for scheme as part of the local option in epoch 1, and the national option in epoch 2  
 Indicative amount of FCERM GIA available for defence scheme estimated to be in region of £2.4 million (local option scheme) to £3.4 million (national option scheme)  
 See economics report for assumptions when calculating indicative GIA availability (such as baseline year)

## Trigger Points

Category	Influence on	Details of key decisions when implementing option	Trigger
Beach monitoring	Timing of defence refurbishments and defences upgrades	The beach is a key component of the defence system as it helps to defend the toe of the defences. When the beach level falls, and the toe of the defences becomes exposed, it can increase the risk of the defences failing. This strategy has a risk investment along its full length and undermining risk can cause risks in the lower section of the rock slope to slump or collapse into the ocean zone, decreasing the defence performance. It is recommended that the beach profiles in ODU 17 continue to be monitored on a regular basis (i.e. every 6 months and in response to storms). This will help to identify any trends in beach levels and identify undermining risk. If a trend in beach levels develops which increases undermining risk and threatens the integrity of the defences then this should be a trigger for undertaking defence refurbishments to rebuild the rock slope or upgrades that could improve the toe protection.	Beach profile trends that increase undermining risk and threaten defence integrity
Defence condition	Timing of defence refurbishments and defences upgrades	The condition of the defences in ODU 17 varies between 'very good' and 'poor'. The condition of the defences can inform the timing of refurbishments and defences upgrades. For defence refurbishments it is recommended that refurbishments are undertaken once defences reach a 'poor' condition. Similarly, if a defence upgrade scheme is scheduled within several years and the defences reach a 'poor' condition then this could also be a trigger for undertaking the scheme sooner. It is recommended that detailed defence condition surveys are undertaken on a regular basis to inform the defence condition and changes over time.	Condition rating of Poor
Funding	Decision on Local vs National or Backup Option	The National, Local and Backup Options will have a funding shortfall (i.e. FCERM GIA will not cover the full cost) and if funding cannot be secured then this could delay the timing of defence upgrades and refurbishments. The funding strategy will need to outline how the scheme / refurbishments will be funded. If funding for undertaking the defence upgrade for Improve A (local option) in epoch 1 is not available, then the Strategy could revert to the Backup option (Maintain) and only undertake defence refurbishments. If funding for the defence upgrade as part of the Local / National option is not available, then the Strategy could revert to the Backup option (Maintain) and only undertake defence refurbishments. However, this could result in increased risk of erosion in the future as it is unclear how long existing defences could be refurbished for without compromising performance. Adaptation plans would be required to manage the consequences of any erosion that occurs with this option.	Funding availability Underlying the defence upgrade scheme if a later date of funding is not likely to be immediately available (revert to Backup option if it is unlikely that any funding can be found for the defence upgrades in the future)

## Decision Tree



ODU 18 - Milford on Sea

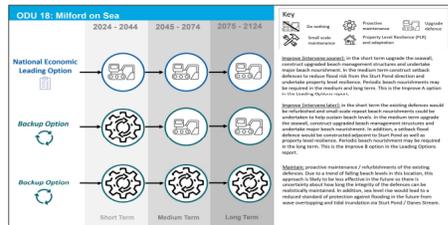
Key features / risks

- Operational strategy between Start Flood West end and the eastern end of Start Flood (Start Flood West end)
- Variety of coastal defences including timber and rock groynes and a concrete seawall / revetment
- Expected residual life for most of the defences in this option - 10 years and a trend of lowering beach levels increasing undermining risk
- Main risk is from coastal erosion, however, there is also a risk of coastal flooding from wave overtopping (Start Flood) and tidal inundation (Start Flood)
- 12 properties expected to be at risk from erosion over the next 10 years, 10 properties at risk from flooding every 20-25 CUSL A1 event
- The beach is important for recreation / amenity and has disabled access
- Beach is located to the east of the coast and the risk with the groyne is to the management of this feature



Notes/Lead-in Option

- National Option (Program A) and Backup Option (Program B) identified
- The National Option (Program A) involves upgrading the seawall, constructing new beach nourishment (e.g. groyne) and undertaking beach nourishment from epoch 1
- The National Option would also include a setback of the defences at the eastern end of the open coast (epoch 2) and epoch 3
- The Backup Option (Program B) follows a similar approach to Program A, except the defences upgrade and beach nourishment would be in epoch 2, in the interim during epoch 1, existing defences would be refurbished
- The Backup Option (Program B) would involve refurbishing existing defences and undertaking beach management
- Due to the lowering beach levels there is significant uncertainty as to how effective this option would be in the long term and there is increased risk of defences failing / erosion occurring



Map of Lead-in Option

Alignments are indicative and will vary subject to further appraisal  
Only National Option shown



Works required to deliver leading options\*

Option	Years 2025 - 2029	Epoch 1	Years 2030 - 2034	Years 2035 - 2039	Epoch 2	Epoch 3	
National	<ul style="list-style-type: none"> <li>Review existing design of groyne / beach nourishment</li> <li>Design beach nourishment and design of other beach nourishment</li> <li>Design seawall / groyne / beach nourishment</li> <li>Design beach nourishment / beach nourishment</li> </ul>	<ul style="list-style-type: none"> <li>Construction of seawall / beach nourishment</li> </ul>	<ul style="list-style-type: none"> <li>Construction of seawall / beach nourishment</li> </ul>	<ul style="list-style-type: none"> <li>Construction of seawall / beach nourishment</li> </ul>	<ul style="list-style-type: none"> <li>Construction of seawall / beach nourishment</li> </ul>	<ul style="list-style-type: none"> <li>Construction of seawall / beach nourishment</li> </ul>	<ul style="list-style-type: none"> <li>Construction of seawall / beach nourishment</li> </ul>
Backup (Program B)	<ul style="list-style-type: none"> <li>Review existing design</li> <li>Design beach nourishment / beach nourishment</li> </ul>	<ul style="list-style-type: none"> <li>Construction of seawall / beach nourishment</li> </ul>	<ul style="list-style-type: none"> <li>Construction of seawall / beach nourishment</li> </ul>	<ul style="list-style-type: none"> <li>Construction of seawall / beach nourishment</li> </ul>	<ul style="list-style-type: none"> <li>Construction of seawall / beach nourishment</li> </ul>	<ul style="list-style-type: none"> <li>Construction of seawall / beach nourishment</li> </ul>	<ul style="list-style-type: none"> <li>Construction of seawall / beach nourishment</li> </ul>
Backup (Mainland)	<ul style="list-style-type: none"> <li>Review existing design</li> <li>Design beach nourishment / beach nourishment</li> </ul>	<ul style="list-style-type: none"> <li>Construction of seawall / beach nourishment</li> </ul>	<ul style="list-style-type: none"> <li>Construction of seawall / beach nourishment</li> </ul>	<ul style="list-style-type: none"> <li>Construction of seawall / beach nourishment</li> </ul>	<ul style="list-style-type: none"> <li>Construction of seawall / beach nourishment</li> </ul>	<ul style="list-style-type: none"> <li>Construction of seawall / beach nourishment</li> </ul>	<ul style="list-style-type: none"> <li>Construction of seawall / beach nourishment</li> </ul>

\*Not all works of other options will be required to deliver leading options. Works required to deliver leading options are indicated in red.

Cost profile for capital works and maintenance (not including pre-business case / support work)

Leading Option	Capital works and maintenance (£m)											
	Epoch 1 (years)			Epoch 2 (years)			Epoch 3 (years)			Total		
	2025-2029	2030-2034	2035-2039	2030-2034	2035-2039	2040-2044	2045-2049	2050-2054	2055-2059	2060-2064	2065-2069	2070-2074
National	80	1,121	4,174	89	1,704	89	89	2,153	426	1,452	114	21,486
Backup (Mainland)	80	1,196	26	89	2,223	89	89	1,728	226	74	426	21,123
Backup (Program B)	1,328	4,472	176	133	174	174	4,401	134	134	134	4,817	753

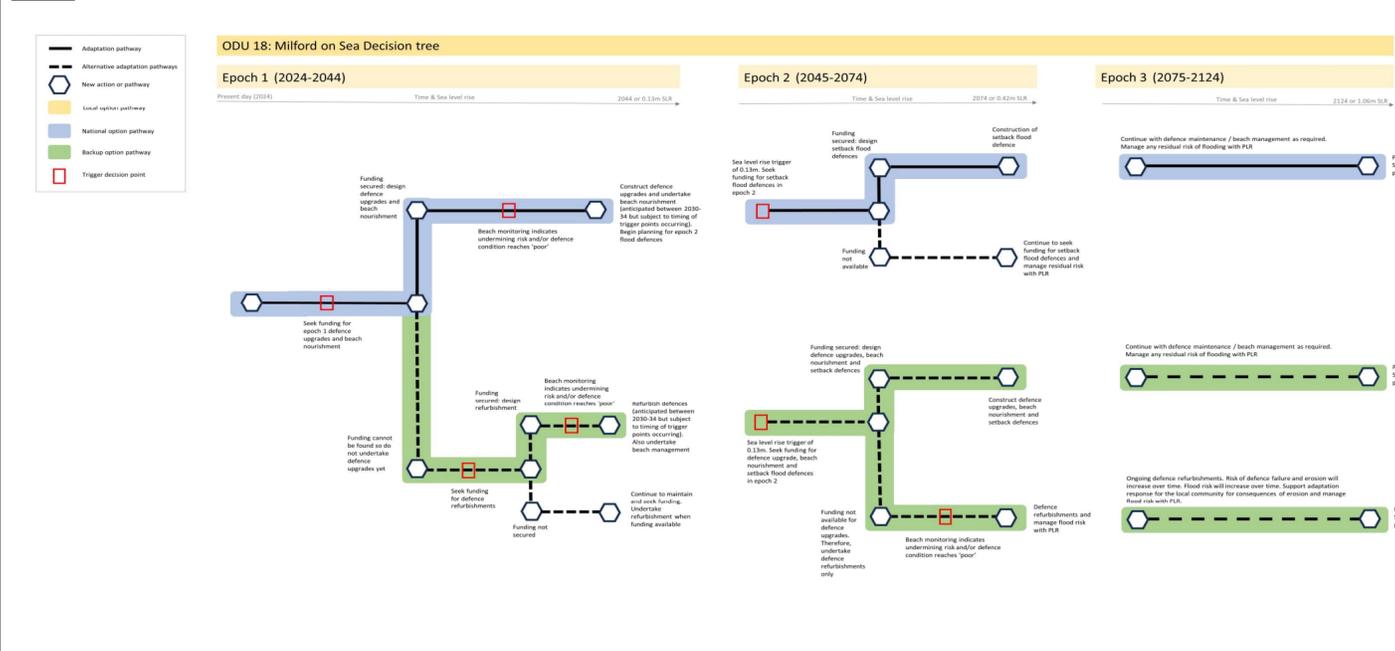
FCERM GIA funding availability

- Indicative FCERM GIA funding availability calculated for scheme as part of the national option in epoch 1
- Indicative amount of FCERM GIA available for defence scheme estimated to be in region of £1.3 million
- See economics report for assumptions when calculating indicative GIA availability (such as baseline year)

Trigger Points

Category	Sub-category	Details of key decisions when implementing options	Triggers
Beach monitoring	Timing of defence refurbishments / defence upgrades and beach management	The beach is a key component of the defence system as it helps to defend the line of the defences. When the beach level falls and the toe of the defences becomes exposed, it can increase the risk of the defences failing. The strategy has a 'beach' / 'reef' / 'nourishment' along its length and undermining risk can occur if the toe of the defences leading to collapse and defences failure. It is recommended that the beach profiles in ODU 18 continue to be monitored on a regular basis (i.e. every 6 months and in response to storms). This will help to identify any trends in beach levels and identify underlying risk. A trend of beach levels falling which increases undermining risk and increases the integrity of the defences then this should be a trigger for undertaking defence refurbishments / upgrades that could improve the toe protection, and/or undertaking beach management to increase beach levels and provide better protection to the toe.	Beach profiles trends that increase undermining risk and increase defences exposure
Defence condition	Timing of defence refurbishments and defence upgrades	The condition of the defences in ODU 18 varies between 'good' and 'poor'. The condition of the defences can be 'poor' if the defences are exposed and defence upgrades. For defence refurbishments it is recommended that refurbishments are undertaken once defences reach a 'poor' condition. Similarly, a defence upgrade scheme is scheduled within several years and the defences reach a 'poor' condition then this could also be a trigger for undertaking the scheme sooner. It is recommended that detailed defence condition surveys are undertaken on a regular basis to inform the defence condition and changes over time.	Condition rating of Poor
Sea level rise	Timing of defence refurbishments and defence upgrades	The National and Local options involve upgrading the defences along the open coast to reduce wave overtopping risk, and constructing a setback flood defence adjacent to Start Flood to reduce the tide flood risk from this direction. The defences upgrade along the open coast should be undertaken when the seawall / revetment is exposed in epoch 1 or 2. Any residual flood risk from wave overtopping prior to the scheme construction should be managed with property flood resilience measures. In epoch 1 and 2 there is a risk of erosion due to the broader defences upgrade which also provides an erosion benefit. The construction of the setback flood wall adjacent to Start Flood should be informed by rates of sea level rise and the extent of flood risk in the future. The flood modelling of this new seawall that the flooding from the Start Flood direction increases in severity in epoch 2 due to sea level rise. Existing WCP18 SLR projections indicate 0.13m of sea level rise is expected to occur by the start of epoch 2. Therefore a 0.13m trigger for sea level rise is recommended for undertaking planning / construction for the setback defence construction. Any residual risk of flooding in this location prior to the defences being upgraded / setback defence construction should be managed with property flood resilience measures. Subject to alignment of the setback defences, it may also be necessary to continue with property flood resilience measures after construction if it may not be possible to include all properties at risk from flooding within the scheme alignment.	Begin scheme planning / business case development for setback flood defence when SLR is 0.13m
Funding	Decision on National vs Backup Options	The National and Backup Options will have a funding shortfall (i.e. FCERM GIA will not cover the full cost) and if funding cannot be secured then this could delay the timing of defence upgrades and refurbishments. The funding strategy will need to outline how the scheme / refurbishments will be funded. If funding for the defences upgrades at a later date is not available (Program B), then the strategy could revert to the alternative Backup option (Mainland) and only undertake defence refurbishments. However, due to the trend of lowering beach levels in this location, this approach could result in increased risk of erosion in the future as it is uncertain how long existing defences could be refurbished for before no longer becomes feasible. Adaptation plans would be required to manage the consequences of any erosion that occurs with this option.	Funding availability Undertaking the defences upgrade scheme at a later date / funding is not likely to be immediately available Revert to Mainland option if it is unlikely that any funding can be found for the defences upgrades in the future

Decision Tree





# Strategic Environmental Assessment (SEA) for the Christchurch Bay & Harbour FCERM

## Environmental Report

Bournemouth, Christchurch and Poole (BCP) Council, New Forest District Council (NFDC) and the Environment Agency

February 2024

Quality information

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# Non-Technical Summary

## Introduction

AECOM has been commissioned by Bournemouth, Christchurch and Poole (BCP) Council to undertake a Strategic Environmental Assessment (SEA) in support of the emerging Flood and Coastal Erosion Risk Management (FCERM) Strategy for the coastal frontage at Christchurch Bay & Harbour (herein referred to as 'the Strategy').

The Strategy is being developed collaboratively by AECOM and the Project Team, which consists of officers of BCP Council, New Forest District Council (NFDC) and the Environment Agency (EA).

The Strategy extent is the coastal frontage between Hengistbury Head (immediately to the east of Hengistbury Head long groyne) and the landward (western) end of Hurst Spit. Within Christchurch Harbour, the Strategy extent is up to Tuckton Bridge on the River Stour and Knapp Mill on the River Avon.

The SEA process will inform the Strategy, through identification of the likely significant effects of the Short List Options, and any reasonable alternatives, on relevant environmental receptors.

## Structure of this Environmental Report

This report, which follows the Scoping Report completed in December 2021 (and updated in 2023), is the Environmental Report for the Strategy and will be published as an appendix to the StAR (Strategy Appraisal Report).

This report begins by introducing the Strategy, then it outlines the scope of the SEA. It then sets out what plan making/ SEA has involved to this point, followed by the methodology for the assessment of the alternative strategic options within each Option Development Units (ODUs), as well as the assessment itself.

## What is the Strategy seeking to achieve?

The aim of this Strategy is to provide an integrated plan for the Christchurch Bay & Harbour frontage, delivering sustainable and long-term management for coastal flood and erosion risks over the next 100 years. The Strategy will further develop the existing SMP policies adopted in 2011 and update the information provided in the 2012 Christchurch Bay & Harbour FCERM Study, using the most up-to-date data and guidance.

The Strategy will provide an assessment of the risks and opportunities associated with coastal processes and develop a management framework to manage these risks, as well as any opportunities, in a sustainable manner. This will form an important element of the policy for flood and coastal defences and provide guidance for spatial planning within the coastal zone. The Strategy will determine the leading options for flood and coastal defences through multi-variate appraisal including a cost-benefit analysis.

## What is the scope of the SEA?

The SEA scope is summarised in a list of topics, objectives, and assessment questions, known as the SEA framework. These draw on the key sustainability issues identified through scoping. The table overleaf presents the SEA framework as broadly agreed in 2020.

Notably, in the absence of any specific air quality issues, and considering that the Strategy is not likely to significantly affect the air quality SEA topic in the future, this topic was scoped out for the purposes of the SEA process. Potential localised changes to air quality were noted during the scoping phase, arising from construction activities. However, during scoping this was considered not likely to lead to significant changes in the current air quality baseline.

SEA topic	SEA objective	Assessment questions (will the proposal help to...)
Biodiversity and geodiversity	To protect and enhance biodiversity and geodiversity habitats and species; achieving biodiversity net gain and improved habitat connectivity within the Strategy area.	<ul style="list-style-type: none"> <li>• Protect and enhance European, nationally and locally designated sites, including species that are important to the integrity of these sites and recognised as priority species?</li> <li>• Protect, enhance and improve connectivity of habitats?</li> <li>• Support the delivery of biodiversity net gain?</li> <li>• Support habitat creation, restoration and recovery in the coastal zone?</li> <li>• Increase the resilience of biodiversity in the Strategy area to the effects of climate change through increased coastal flooding and erosion?</li> </ul>
Climate change	To support the resilience of the Strategy area to the potential effects of climate change, including coastal flooding and erosion.	<ul style="list-style-type: none"> <li>• Contribute to adapting to climate change?</li> <li>• Contribute to mitigating the main causes of climate change by promoting low or zero carbon approaches?</li> </ul>
Landscape	To protect and enhance the character and quality of the Strategy area landscape and seascape.	<ul style="list-style-type: none"> <li>• Conserve and enhance the quality of landscape/ seascape for people, places and nature?</li> <li>• Contribute to better management of landscape/ seascape assets?</li> <li>• Conserve and enhance features of local importance?</li> <li>• Improve linkages to the coastline?</li> <li>• Protect visual amenity?</li> </ul>
Historic environment	To protect, conserve and enhance the historic environment within the Strategy area.	<ul style="list-style-type: none"> <li>• Conserve and enhance heritage assets and their settings, considering the unique nature of heritage assets in the Strategy area and how they may be impacted by coastal defences?</li> <li>• Conserve and enhance the special interest, character and appearance of locally important features and their settings?</li> <li>• Consider the contribution of historic places to the character of the coastal environment?</li> <li>• Support access to, interpretation and understanding of the historic environment and character of the Strategy area?</li> <li>• Support the undertaking of early archaeological investigations and, where appropriate, recommend mitigation strategies?</li> </ul>
Land, soil and water resources	To ensure the efficient and effective use of land in the Strategy area.	<ul style="list-style-type: none"> <li>• Protect and conserve soils and improve resilience to degradation?</li> <li>• Protect and conserve the best and most productive agricultural land?</li> <li>• Prevent contamination from historic landfill sites and support remediation?</li> </ul>
	To protect and enhance water quality and manage water resources within the Strategy area in a sustainable manner.	<ul style="list-style-type: none"> <li>• Help secure compliance with the Water Framework Directive and contribute to enhancing the status of water bodies?</li> <li>• Contribute to the sustainable management of water resources and fisheries?</li> </ul>
Population and communities	Protect and enhance the health and wellbeing of the community within the Strategy area.	<ul style="list-style-type: none"> <li>• Protect and improve the resilience of communities?</li> <li>• Improve and enhance the health and wellbeing of communities?</li> <li>• Improve access to the coastal environment?</li> <li>• Support the provision of more, better quality and accessible green infrastructure/ open space?</li> <li>• Avoid negative impacts to the quality and/ or extent of existing recreational assets, including coastal footpaths?</li> </ul>

## What has plan-making involved to this point?

Work on the Strategy has been underway for some time and the aim here is not to provide a comprehensive explanation of all the work carried out to date. Rather the intention is to provide a high level explanation of the work undertaken to develop and appraise options.

More specifically, this part of the report introduces the Strategic Management Zones (SMZs) and the Option Development Units (ODUs) that have been developed for the Strategy frontage. It then goes on to explain how the options under each ODU were established.

## Strategy Management Zones

The Strategy consists of six Strategy Management Zones (SMZs), which are:

- **SMZ 1 (Mundeford Sandbank)** covers Hengistbury Head to the east of the Long Groyne and Mundeford Sandbank. Both the open coast and harbour sides of Mundeford Sandbank are included in this SMZ.
- **SMZ 2 (Christchurch Harbour)** covers the coastline around Christchurch Harbour, up to Knapp Mill on the River Avon and Tuckton Bridge on the River Stour.
- **SMZ 3 (Christchurch Beaches and Cliffs)** covers the Avon Beach and Highcliffe parts of the frontage.
- **SMZ 4 (Naish Cliff and Barton on Sea)** covers the area between Chewton Bunny to the eastern end of the Barton on Sea coastal defences.
- **SMZ 5 (Taddiford)** covers the area between Barton on Sea and Hordle Cliff. The west boundary of the unit is at the eastern end of the Barton on Sea defences and the east boundary is at West Road (western end of the Hordle beach huts).
- **SMZ 6 (Milford on Sea)** covers the 2.3km frontage between Hordle Cliff and the eastern end of Milford on Sea.

## Option Development Units

Option Development Units (ODUs) have been developed for each SMZ, and these are set out below:

- SMZ 1 (Mundeford Sandbank):
  - **ODU 1: Hengistbury Head East**
  - **ODU 2: Mundeford Sandbank**
- SMZ 2 (Christchurch Harbour):
  - **ODU 3: Christchurch Harbour South**
  - **ODU 4: Wick**
  - **ODU 5: Willow Drive and the Quomps**
  - **ODU 6: River Avon West Bank**
  - **ODU 7: Rossiters Quay**
  - **ODU 8: River Avon East Bank**
  - **ODU 9: Stanpit**
  - **ODU 10: Mundeford**
  - **ODU 11: Mundeford Quay**
- SMZ 3 (Christchurch Beaches and Cliffs):
  - **ODU 12: Avon Beach and Friars Cliff**
  - **ODU 13: Highcliffe**
- SMZ 4 (Naish Cliff and Barton on Sea):

- **ODU 14: Naish Cliff and Barton on Sea**
- SMZ 5 (Taddiford):
  - **ODU 15: Barton on Sea to Hordle Cliff**
- SMZ 6 (Milford on Sea):
  - **ODU 16: Cliff Road**
  - **ODU 17: Rook Cliff**
  - **ODU 18: Milford on Sea Frontage**

## Establishing ODU options

The Short List Options Report, undertaken by AECOM (2023), represents Stage 4 of the options appraisal for the Strategy, in which a draft short list of options is presented. The short list of options comprises a list of high-level strategic options for each SMZ, as well as the supporting appropriate local measures identified for implementing these strategic options in each ODU.

This was followed by Stage 5 of the options appraisal, where the draft short list of options was presented to the public and key stakeholders for review and feedback. This took place in March 2023. Updates to the short list of options were then made to reflect key feedback. Further work was then undertaken to develop the short list of options in more detail (Stage 6) to inform the selection of the leading option(s) (Stage 7).

## Selecting Leading Options

An economic, environmental, technical and social appraisal was undertaken to select the Leading Options from the short list. Full details of this can be found in the Leading Options report (AECOM, 2024). The findings from the SEA fed into the decision-making criteria and formed the environmental appraisal element of the option appraisal process. Up to three types of Leading Option were selected in each ODU:

- The National Economic Leading Option: this is the Leading Option which is identified by following the Environment Agency's Flood and Coastal Erosion Risk Management Appraisal Guidance.
- The Local Aspirational Option: this option considers local opportunities, wants and needs to deliver wider benefits. This option typically costs more than the National Economic Leading Option.
- Backup Option: this option has been identified where there is a large funding shortfall. It is typically a lower cost option that will be more easily funded if funding is limited.

# SMZ 1 – ODU 1: Hengistbury Head East options assessment

## Strategic options

1. **Do Nothing:** no new defences or maintenance of existing defences; ensure health and safety compliance when defences fail.
2. **Do Minimum:** small scale patch-repair maintenance to existing defences (as and when required).
3. **Improve:** new rock revetment (from epoch 1) aiming to minimise any further erosion of the cliff top.
4. **Managed Realignment:** refurbishment of existing defences from epoch 1 and ongoing beach recycling; this would not alter the geometry of the existing defences (e.g. footprint/ height of defences would remain the same as today). The intent would be to let the cliff erode in a controlled manner. Whilst the defences would provide protection to the cliff toe, other erosion processes such as weathering could still lead to recession of the cliff top over time.

## Assessment findings

SEA topic	Option number			
	1	2	3	4
Biodiversity and geodiversity	-	-	0	+
Climate change	--	--	+	?
Landscape	--	--	-	+
Historic environment	--	--	-	-
Land, soil and water resources	0	0	0	0
Population and communities	-	-	+	+
Transport and movement	-	-	+	+

## Key (likely significant effects)

Major positive	Minor positive	Neutral	Uncertain	Minor negative	Major negative
++	+	0	?	-	--

## Leading option selection

Two Leading Options were selected for ODU 1 based on the results of the economic, environmental, technical and social appraisal:

- National Economic Option: Do Minimum.
- Local Aspirational Option: Managed Realignment.

Delivery of the Local Aspirational Option (Managed Realignment) is likely to lead to greater environmental benefits as indicated by the SEA. However, funding is not certain and if funding cannot be achieved the National Economic Option (Do Minimum) would be delivered.

# SMZ 1 – ODU 2: Mundeford Sandbank options assessment

## Strategic options

- Do Nothing:** no new defences or maintenance of existing defences; ensure H&S compliance when defences fail.
- Do Minimum:** small scale patch-repair maintenance to existing defences (as and when required).
- Maintain:** refurbishment of existing defences from epoch 1; this would not alter the geometry of the existing defences (e.g. footprint/ height of defences would remain the same as today); this option also includes beach recycling to help sustain the beach levels. Beach nourishment from epoch 3 to sustain beach levels in line with sea level rise. Objective of this option would be to sustain the service of the Sandbank (in FCERM terms) and aim to hold the Sandbank in its current position. Opportunities for sand dune creation / restoration as part of this option would be explored.
- Improve:** same approach as Maintain over epochs 1 and 2. However, in epoch 3 upgrade the defences to provide a more robust defence system. This would likely involve constructing new larger rock revetment along the length of the Sandbank, rock groynes and a beach nourishment scheme.
- Managed Realignment:** same defence measures as Maintain through the appraisal period. However, intent of this option would be to allow the Sandbank to rollback over time in a controlled manner, whilst sustaining the FCERM service. Existing rock revetment and groynes could be moved over time to encourage / control the rollback process and beach recycling would be used to move material to the desired locations.
- Maintain with Adaptation/ Resilience:** same approach as the Maintain option, but with local level property level protection measures to the small number of permanent properties on the Sandbank.

## Assessment findings

SEA topic	Option number					
	1	2	3	4	5	6
Biodiversity and geodiversity	?	?	+	+	?	+
Climate change	--	--	++	++	++	++
Landscape	--	--	+	+	?	+
Historic environment	--	--	+	+	-	+
Land, soil and water resources	0	0	0	0	0	0
Population and communities	-	--	+	+	+	+
Transport and movement	0	0	0	0	0	0

### Key (likely significant effects)

Major positive	Minor positive	Neutral	Uncertain	Minor negative	Major negative
++	+	0	?	-	--

## Leading option selection

Two Leading Options were selected for ODU 2 based on the results of the economic, environmental, technical and social appraisal:

- National Economic Option: Do Minimum.
- Local Aspirational Option: Maintain with Adaptation.

Delivery of the Local Aspirational Option (Maintain with Adaptation) is likely to lead to environmental benefits across a range of categories as indicated by the SEA. There are also opportunities for BNG with this option such as Sand Dune creation. However, funding is uncertain and if funding cannot be achieved the National Economic Option (Do Minimum) would be delivered.

## SMZ 2 – ODU 3: Christchurch Harbour South options assessment

### Strategic options

- Do Nothing:** no new defences or maintenance of existing defences; ensure health and safety compliance when defences fail.
- Do Minimum:** small scale patch-repair maintenance to existing seawall defences (as and when required).
- Maintain A:** small-scale patch-repair to existing seawall defence (as and when required), but new slope armouring (erosion defence) adjacent to road access point to Hengistbury Head (epoch 1).
- Maintain B:** as per Option 3 (Maintain A), but also with new slope armouring (erosion defence) adjacent to historic landfill site in north-west part of the unit (to prevent this eroding) (epoch 1).
- Adaptation/ Resilience A:** property level protection measures to the small number of properties at risk of flooding (from epoch 1). No erosion defences to access road or historic landfill site.
- Adaptation/ Resilience B:** as per Option 3 (Maintain A), but with property level protection to the small number of properties at risk of flooding (from epoch 1).
- Adaptation/ Resilience C:** as per Option 4 (Maintain B), but with property level protection to the small number of properties at risk of flooding (from epoch 1).

### Assessment findings

SEA topic	Option number						
	1	2	3	4	5	6	7
Biodiversity and geodiversity	-	-	0	0	-	0	0
Climate change	?	?	?	?	+	+	+
Landscape	0	0	0	0	0	0	0
Historic environment	-	-	?	?	-	?	?
Land, soil and water resources	?	?	+	++	?	+	++
Population and communities	?	?	+	+	+	++	++
Transport and movement	?	?	++	++	?	++	++

### Key (likely significant effects)

Major positive	Minor positive	Neutral	Uncertain	Minor negative	Major negative
++	+	0	?	-	--

## Leading option selection

Two Leading Options were selected for ODU 3 based on the results of the economic, environmental, technical and social appraisal:

- National Economic Option: Adaptation / Resilience A.
- Local Aspirational Option: Adaptation / Resilience C.

Delivery of the Local Aspirational Option (Adaptation / Resilience C) is likely to lead to environmental benefits under the transport and movement, land, soil and water resources, and population and communities SEA topics as indicated by the SEA. However, funding is uncertain and if funding cannot be achieved the National Economic Option (Adaptation / Resilience A) would be delivered.

## SMZ 2 – ODU 4: Wick options assessment

### Strategic options

1. **Do Nothing:** no new defences or maintenance of existing defences; ensure H&S compliance when defences fail.
2. **Do Minimum:** small scale patch-repair maintenance to existing defences (as and when required).
3. **Maintain:** refurbishment of existing defences from epoch 1.
4. **Sustain A:** construct new sheet pile/ quay wall along the frontline in the western part of the unit (fully replacing the existing sheet pile wall, epoch 1); in the eastern part of the unit, raise and lengthen the existing setback embankment (epoch 1); continue to raise and lengthen the defences over time to keep pace with SLR (epochs 2 and 3).
5. **Sustain B:** undertake repeat refurbishments of the existing frontline sheet pile wall in the western part of the unit over time; elsewhere raise and lengthen the existing setback embankment (epoch 1) and continue to do this to keep pace with SLR (epochs 2 and 3).
6. **Sustain C:** raise and lengthen the existing setback embankment over time to keep pace with SLR (epoch 1, then in epochs 2 and 3); do not maintain the existing sheet pile wall, leaving this to eventually fail; the sheet pile wall currently protects historic landfill, so risk of this eroding in the future when the wall fails.
7. **Improve A:** same as Sustain A, except the defences are constructed to the full height and length initially (e.g. no new construction in epochs 2 and 3).
8. **Improve B:** same as Sustain B, except the defences are constructed to the full height and length initially (e.g. no new construction in epochs 2 and 3).
9. **Improve C:** same as Sustain C, except the defences are constructed to the full height and length initially (e.g. no new construction in epochs 2 and 3).

### Assessment findings

SEA topic	Option number								
	1	2	3	4	5	6	7	8	9
Biodiversity and geodiversity	?	?	0	+	+	0	+	+	0
Climate change	--	--	-	++	++	+	++	++	+
Landscape	?	?	?	-	-	-	-	-	-
Historic environment	--	--	-	++	++	-	++	++	-
Land, soil and water resources	--	--	+	++	++	--	++	++	--
Population and communities	--	--	-	++	++	--	++	++	--
Transport and movement	--	--	-	++	++	-	++	++	-

### Key (likely significant effects)

Major positive	Minor positive	Neutral	Uncertain	Minor negative	Major negative
++	+	0	?	-	--

## Leading option selection

Two Leading Options were selected for ODU 4 based on the results of the economic, environmental, technical and social appraisal:

- National Economic Option: Sustain C.
- Local Aspirational Option: Sustain B.

Delivery of the Local Aspirational Option (Sustain B) is likely to lead to environmental benefits across a range of categories as indicated by the SEA. However, funding is uncertain for this option as the increase in cost is largely associated with maintaining the frontline quay wall to prevent erosion of the historic landfill which does not currently attract funding as part of the Environment Agency's Partnership Funding process. If funding cannot be achieved the National Economic Option (Sustain C) would be delivered. There are opportunities for BNG for both options but the Local Aspirational Option is the more environmentally sustainable option as it would help prevent potentially negative impacts in the land, soil and water and population and communities categories.

## SMZ 2 – ODU 5: Willow Drive and the Quomps options assessment

### Strategic options

- Do Nothing:** no new defences or maintenance of existing defences; ensure H&S compliance when defences fail.
- Do Minimum:** small scale patch-repair maintenance to existing defences (as and when required).
- Maintain:** refurbishment of existing defences through the appraisal period (from epoch 1).
- Sustain A:** construct a new frontline wall in the western part of the unit (along alignment of the existing quay wall) (epoch 1); this would incorporate a raised wall relative to ground levels to provide a flood defence, which would be further raised over time as sea levels rise; in addition, raise and lengthen the existing setback wall in the eastern part of the unit over time as sea levels rise (epoch 1, then epoch 2 and 3); maintain the frontline quay wall in the eastern part of the unit to prevent erosion of historic landfill site (epochs 1-3). Also includes Sustain D with delayed initial intervention.
- Sustain B:** construct a new frontline wall along the full length of the unit (along alignment of the existing frontline quay wall) (epoch 1); this would incorporate a raised wall relative to ground levels to provide flood defence, which would be further raised over time as sea levels rise (epochs 2 and 3). Also includes Sustain E with delayed initial intervention.
- Sustain C:** construct a new setback wall in the western part of the unit in the future (epoch 3); in addition, raise and lengthen the existing setback wall in the eastern part of the unit over time as sea levels rise (epoch 1, then epochs 2 and 3); maintain the frontline quay wall to prevent erosion of historic landfill (epochs 1-3). Also includes Sustain F with delayed initial intervention.
- Improve A:** as per Sustain A, except the defences are constructed to the full height and length initially (e.g. no new construction in epochs 2 and 3). Also includes Improve D with delayed initial intervention.
- Improve B:** as per Sustain B, except the defences are constructed to the full height and length initially (e.g. no new construction in epochs 2 and 3). Also includes Improve E with delayed initial intervention.
- Improve C:** as per Sustain C, except the defences are constructed to the full height and length initially (e.g. no new construction in epochs 2 and 3). Also includes Improve F with delayed initial intervention.
- Adaptation / Resilience:** same approach to defence maintenance as Maintain, with property level protection to properties at risk of flooding.

### Assessment findings

SEA topic	Option number									
	1	2	3	4	5	6	7	8	9	10
Biodiversity and geodiversity	?	?	?	+	+	+	+	+	+	?
Climate change	--	--	-	++	++	+	++	++	+	-
Landscape	?	?	?	?	?	?	?	?	?	?
Historic environment	--	--	-	+	?	+	+	?	+	-
Land, soil and water resources	--	--	+	++	++	++	++	++	++	+

SEA topic	Option number									
	1	2	3	4	5	6	7	8	9	10
Population and communities	--	--	-	++	++	?	++	++	?	-
Transport and movement	--	--	-	++	++	+	++	++	+	-

### Key (likely significant effects)

Major positive	Minor positive	Neutral	Uncertain	Minor negative	Major negative
++	+	0	?	-	--

### Leading option selection

Three Leading Options were selected for ODU 5 based on the results of the economic, environmental, technical and social appraisal:

- National Economic Option: Improve D-F.
- Local Aspirational Option: Improve A-C.
- Backup: Adaptation / Resilience.

Delivery of the National or Local Aspirational Options (Improve A-F) is likely to lead to environmental benefits across a range of environmental categories as indicated by the SEA. Each of these options has potential to deliver BNG and opportunities will be investigated during further appraisal / design work. However, at this stage funding is uncertain for the Improve options and if funding cannot be achieved the Backup option (Adaptation / Resilience) would be delivered.

## SMZ 2 – ODU 6: River Avon West Bank options assessment

### Strategic options

1. **Do Nothing:** no new defences or maintenance of existing defences. Ensure health and safety compliance when defences fail.
2. **Do Minimum:** small scale patch-repair maintenance to existing defences (as and when required).
3. **Maintain:** refurbishment of existing defences (from epoch 1).
4. **Sustain A:** construct a new frontline / setback defence in the southern part of the unit (epoch 1) at Priory Quay and Convent Meadows. This would be raised over time to keep pace with sea level rise (epochs 2 and 3). In the central part of the unit in proximity to Castle Street, construct a new defence, raised over time to keep pace with sea level rise (epochs 2 and 3).
5. **Sustain B:** construct a new frontline / setback defence in the central part of the unit (epoch 1) in proximity to Castle Street and then raise it over time to keep pace with sea level rise (epochs 2 and 3). In the south part of the unit implement property level protection throughout appraisal period to properties at risk from flooding, but no new raised defences here.
6. **Improve A:** as per Sustain A, except the defences are constructed to the full height and length initially (e.g. no new construction in epochs 2 and 3).
7. **Improve B:** as per Sustain B, except the defences are constructed to the full height and length initially (e.g. no new construction in epochs 2 and 3).
8. **Adaptation / Resilience:** implement property level protection to the properties at risk from flooding throughout the appraisal period, mainly focussed in the south (Priory Quay / Convent Meadows) and central part (Castle Street) of the unit.

### Assessment findings

SEA topic	Option number							
	1	2	3	4	5	6	7	8
Biodiversity and geodiversity	?	?	0	-	-	-	-	0
Climate change	--	--	--	++	+	++	+	-
Landscape	?	?	?	-	-	-	-	?
Historic environment	--	--	--	-	-	-	-	-
Land, soil and water resources	?	?	?	?	?	?	?	?
Population and communities	--	--	--	++	+	++	+	-
Transport and movement	--	--	--	++	+	++	+	-

## Key (likely significant effects)

Major positive	Minor positive	Neutral	Uncertain	Minor negative	Major negative
++	+	0	?	-	--

## Leading Option selection

One Leading Options was selected for ODU 6 based on the results of the economic, environmental, technical and social appraisal:

- National Economic Option: Adaptation / Resilience.

There are likely to be negative environmental impacts associated with the Adaptation / Resilience option. However, there is not an economic case to deliver any of the alternative Do Something options considered and therefore the Adaptation / Resilience option is the viable way forward. The alternative is to undertake Do Nothing or Do Minimum.

## SMZ 2 – ODU 7: Rossiters Quay options assessment

### Strategic options

1. **Do Nothing:** no new defences or maintenance of existing defences; ensure health and safety compliance when defences fail.
2. **Do Minimum:** small scale patch-repair maintenance to existing defences (as and when required).
3. **Maintain:** refurbishment of existing defences (from epoch 1).
4. **Sustain A:** construct new defences (epoch 2) consisting of a setback defence and a new quay wall with a raised front wall; raise the defences over time to keep pace with SLR (epoch 3).
5. **Improve A:** as per Sustain A, except the defences are constructed to the full height initially and not raised over time (e.g. no new construction in epoch 3).
6. **Adaptation / Resilience:** implement property level protection to the properties at risk from flooding throughout the appraisal period and maintain existing defences.

### Assessment findings

SEA topic	Option number					
	1	2	3	4	5	6
Biodiversity and geodiversity	?	?	?	-	-	?
Climate change	--	--	-	+	+	-
Landscape	?	?	?	-	-	?
Historic environment	--	--	-	+	+	-
Land, soil and water resources	0	0	0	0	0	0
Population and communities	--	--	-	+	+	-
Transport and movement	--	--	-	+	+	-

#### Key (likely significant effects)

Major positive	Minor positive	Neutral	Uncertain	Minor negative	Major negative
++	+	0	?	-	--

### Leading option selection

Two Leading Options were selected for ODU 7 based on the results of the economic, environmental, technical and social appraisal:

- National Economic Option: Improve A.
- Backup: Adaptation / Resilience.

Delivery of the National Economic Option (Improve A) is likely to lead to environmental benefits in the climate change, historic environment, transport and movement and population categories as indicated by the SEA. However, funding is uncertain and if funding cannot be achieved the Backup (Adaptation / Resilience) would be delivered.

## SMZ 2 – ODU 8: River Avon East Bank options assessment

As outlined in the Leading Option Report (AECOM, 2023), options in ODU 8 have not been appraised fully as part of the Strategy as it was agreed that options for managing the flood risk would be developed as part of future projects on the Lower River Avon.

No further details are therefore provided in the SEA for the potential environmental impacts of options in ODU 8.

## SMZ 2 – ODU 9: Stanpit options assessment

### Strategic options

1. **Do Nothing:** no new defences or maintenance of existing defences; ensure health and safety compliance when defences fail.
2. **Do Minimum:** small scale patch-repair maintenance to existing defences (as and when required).
3. **Maintain:** refurbishment of existing defences (from epoch 1), approximately every 25 years; construct armoured embankment around Stanpit historic landfill in epoch 2.
4. **Sustain A:** construct a new setback defence adjacent to the River Avon in the north part of the unit (epoch 2); construct new defence around Stanpit historic landfill (epoch 2); raise height of the defences over time to keep pace with SLR (epoch 3); aim to restore/ improve condition of the saltmarsh in front of the defences (epoch 1-3).
5. **Improve A:** as per Sustain A, except the defences are constructed to their full length and height when constructed; aim to restore/ improve condition of the saltmarsh in front of the defences (epochs 1-3).
6. **Adaptation / Resilience:** implement property level protection to the properties at risk from flooding throughout the appraisal period and maintain existing defences.

### Assessment findings

SEA topic	Option number					
	1	2	3	4	5	6
Biodiversity and geodiversity	?	?	0	++	++	0
Climate change	--	--	-	++	++	-
Landscape	?	?	?	-	-	?
Historic environment	--	--	-	+	+	-
Land, soil and water resources	--	--	+	++	++	+
Population and communities	--	--	-	++	++	-
Transport and movement	--	--	-	++	++	-

### Key (likely significant effects)

Major positive	Minor positive	Neutral	Uncertain	Minor negative	Major negative
++	+	0	?	-	--

### Leading option selection

Two Leading Options were selected for ODU 9 based on the results of the economic, environmental, technical and social appraisal:

- National Economic Option: Sustain A.

- Backup Option: Adaptation / Resilience.

Delivery of the National Economic Option (Sustain A) is likely to lead to environmental benefits across most categories as indicated by the SEA. However, funding is uncertain and if funding cannot be achieved the Backup Option (Adaptation / Resilience) would be delivered. For the Sustain A option there are significant potential positive benefits to biodiversity through saltmarsh restoration / enhancement which would provide BNG and would help the saltmarsh habitat adjust to sea level rise and climate change.

## SMZ 2 – ODU 10: Mundeford options assessment

### Strategic options

1. **Do Nothing:** no new defences or maintenance of existing defences; ensure health and safety compliance when defences fail.
2. **Do Minimum:** small scale patch-repair maintenance to existing defences (as and when required).
3. **Maintain:** refurbishment of existing defences (from epoch 1).
4. **Improve A:** initially provide property level protection measures to the properties at risk and maintain the existing quay walls (epoch 1); then in epoch 2 or 3, construct a new frontline quay wall with a raised front wall along the length of the unit and along the banks of the River Mude and Bure Brook; investigate opportunities for saltmarsh restoration in front of defences (epochs 1-3).
5. **Improve B:** initially provide property level protection measures to the properties at risk and maintain the existing quay walls (epoch 1); then in epoch 2 or 3, construct a new frontline quay wall with a raised front wall along the east part of the unit and along the River Mude and Bure Brook; in epoch 2 or 3, construct a new setback wall along the west part of the unit whilst maintaining the existing quay wall in front; investigate opportunities for saltmarsh restoration in front of defences.
6. **Adaptation:** provide property level protection measures to the properties at risk and maintain the existing quay wall (epochs 1-3).

### Assessment findings

SEA topic	Option number					
	1	2	3	4	5	6
Biodiversity and geodiversity	?	?	0	++	++	0
Climate change	--	--	--	++	++	-
Landscape	?	?	?	-	-	?
Historic environment	--	--	--	++	++	-
Land, soil and water resources	0	0	0	0	0	0
Population and communities	--	--	--	++	++	-
Transport and movement	--	--	--	++	++	-

### Key (likely significant effects)

Major positive	Minor positive	Neutral	Uncertain	Minor negative	Major negative
++	+	0	?	-	--

### Leading option selection

Two Leading Options were selected for ODU 10 based on the results of the economic, environmental, technical and social appraisal:

- National Economic Option: Improve A.
- Backup Option: Adaptation / Resilience.

Delivery of the National Economic Option (Improve A) is likely to lead to environmental benefits across most categories as indicated by the SEA. However, funding is uncertain and if funding cannot be achieved the Backup Option (Adaptation / Resilience) would be delivered. For the Improve A option there are significant potential positive benefits to biodiversity through saltmarsh restoration / enhancement which would provide BNG.

## SMZ 2 – ODU 11: Mundeford Quay options assessment

### Strategic options

- Do Nothing:** no new defences or maintenance of existing defences; ensure health and safety compliance when defences fail.
- Do Minimum:** small scale patch-repair maintenance to existing defences (as and when required).
- Maintain:** refurbishment of existing defences (epoch 1).
- Sustain A:** upgraded floodwall around properties at western end of the Quay in epoch 1 or 2; raise over time to keep pace with SLR (epochs 2 and 3); maintain/ refurbish the existing frontline structures around the Quay as required (epochs 1-3).
- Sustain B:** as per Sustain A, except also construct new setback wall in northern part of unit (epochs 1 and 2), between green area and road.
- Improve A:** as per Sustain A, except the defence is constructed to its full length and height initially (e.g. no new construction after epoch 1 or 2).
- Improve B:** as per Sustain B, except the defence is constructed to its full length and height initially (e.g. no new construction after epoch 1 or 2).
- Adaptation/ Resilience:** Maintaining the existing quay walls as per the Maintain Option but also implement property level protection to properties at risk of flooding in the unit.

### Assessment findings

SEA topic	Option number							
	1	2	3	4	5	6	7	8
Biodiversity and geodiversity	?	?	0	0	0	0	0	0
Climate change	--	--	-	+	++	+	++	-
Landscape	--	--	-	+	++	+	++	-
Historic environment	--	--	-	+	++	+	++	-
Land, soil and water resources	--	--	+	++	++	++	++	+
Population and communities	--	--	-	+	++	+	++	-
Transport and movement	--	--	-	-	0	-	0	-

### Key (likely significant effects)

Major positive	Minor positive	Neutral	Uncertain	Minor negative	Major negative
++	+	0	?	-	--

## Leading option selection

Two Leading Options were selected for ODU 11 based on the results of the economic, environmental, technical and social appraisal:

- National Economic Option: Do Minimum.
- Local Aspirational Option: Adaptation / Resilience.

Delivery of the Local Aspirational Option (Adaptation / Resilience) is likely to lead to negative environmental impacts across most categories as indicated by the SEA. However, the magnitude of impacts are likely to be much less than the Do Minimum option. In this unit funding for new coastal management is likely to be very limited and there is limited economic case to do more than Adaptation / Resilience.

## SMZ 3 – ODU 12: Avon Beach and Friars Cliff options assessment

### Strategic options

1. **Do Nothing:** no new defences or maintenance of existing defences; ensure health and safety compliance when defences fail.
2. **Do Minimum:** small scale patch-repair maintenance to existing defences (as and when required).
3. **Maintain:** refurbishment of existing defences (from epoch 1).
4. **Improve A:** refurbish existing defences once they reach the end of their design life (epoch 1) then undertake a beach nourishment scheme in epoch 2 alongside new groynes to help retain the beach material; locally raise seawall at Avon beach to ensure new beach volume can be retained; property level protection in epoch 3 to manage local risk at Mudeford Road.
5. **Improve B:** construct new larger linear defences along the length of the unit to provide the primary defence against flooding and erosion (note no beach nourishment with this option).
6. **Improve C:** this option is similar to Improve A but would also include public realm enhancements such as promenade raising to make the area more compatible with higher sea levels in the future.

### Assessment findings

SEA topic	Option number					
	1	2	3	4	5	6
Biodiversity and geodiversity	++	++	0	0	0	0
Climate change	--	--	-	++	++	++
Landscape	--	--	-	+	-	++
Historic environment	--	--	-	++	++	++
Land, soil and water resources	--	--	+	++	++	++
Population and communities	--	--	-	++	+	++
Transport and movement	--	--	-	++	++	++

### Key (likely significant effects)

Major positive	Minor positive	Neutral	Uncertain	Minor negative	Major negative
++	+	0	?	-	--

### Leading option selection

Three Leading Options were selected for ODU 12 based on the results of the economic, environmental, technical and social appraisal:

- National Economic Option: Improve A.

- Local Aspirational Option: Improve C.
- Backup Option: 'Scaled back' Improve.

Delivery of either of the Leading Options in this unit is likely to lead to major positive impacts across a range of environmental categories. Opportunities for BNG should be explored during further appraisal / design. New groynes in this location as part of these option present an opportunity to create intertidal habitat areas / pools to support ecology and there could also be opportunities to use biodiversity promoting materials and features as part of any refurbishments to the existing seawall defences.

## SMZ 3 – ODU 13: Highcliffe options assessment

### Strategic options

1. **Do Nothing:** no new defences or maintenance of existing defences; ensure health and safety compliance when defences fail.
2. **Do Minimum:** small scale patch-repair maintenance to existing defences (as and when required).
3. **Maintain:** refurbishment of existing defences (from epoch 1); risk of outflanking current defences with this option.
4. **Improve A:** refurbishment of existing defences (from epoch 1) and undertake ongoing beach recycling (epoch 1); in epoch 2/ 3, undertake beach nourishment scheme as well as upgrading the rock groynes to help retain more beach material; during epoch 1, construct outflanking defences (e.g. rock revetment) to the east of the existing defences to prevent outflanking at Naish cliff.
5. **Improve B:** refurbishment of existing defences (from epoch 1) and undertake ongoing beach recycling (epoch 1); in epoch 2/3, construct a new rock revetment along the full length of the frontage; during epoch 1, construct outflanking defences (e.g. rock revetment) to the east of the existing defences to prevent outflanking at Naish cliff.
6. **Improve C:** same approach as Improve A except the beach nourishment intervention would be undertaken later on in the appraisal period.
7. **Managed Realignment A:** reduce length of groynes in the east part of the unit to allow more beach material to bypass the groynes and reach Naish cliff to the east (epoch 1); otherwise implement Improve A.
8. **Managed Realignment B:** reduce length of groynes in the east part of the unit and construct nearshore breakwaters to encourage continuous beach between Highcliffe and Naish cliff and facilitate improved sediment transport to the east (epoch 1).

### Assessment findings

SEA topic	Option number							
	1	2	3	4	5	6	7	8
Biodiversity and geodiversity	++	++	0	0	0	0	+	0
Climate change	--	--	-	++	++	++	++	++
Landscape	--	--	-	++	-	++	-	-
Historic environment	--	--	-	++	++	++	++	++
Land, soil and water resources	0	0	0	0	0	0	0	0
Population and communities	--	--	-	++	+	++	+	+
Transport and movement	--	--	-	++	++	++	++	++

## Key (likely significant effects)

Major positive	Minor positive	Neutral	Uncertain	Minor negative	Major negative
++	+	0	?	-	--

## Leading option selection

Three Leading Options were selected for ODU 13 based on the results of the economic, environmental, technical and social appraisal:

- National Economic Option: Improve C.
- Local Aspirational Option: Improve A.
- Backup Option: 'Scaled back' Improve.

Delivery of either of the Leading Options in this unit is likely to lead to major positive impacts across a range of environmental categories. Opportunities for BNG should be explored during further appraisal / design. Refurbishing / upgrading the rock defences in this location as part of this option present an opportunity to create intertidal habitat areas / pools to support ecology and biodiversity.

## SMZ 4 – ODU 14: Naish Cliff and Barton on Sea options assessment

### Strategic options

1. **Do Nothing:** no new defences or maintenance of existing defences; ensure health and safety compliance when defences fail.
2. **Do Minimum:** small scale patch-repair maintenance to existing defences (as and when required).
3. **Maintain:** refurbishment of existing defences (from epoch 1); significant amounts of cliff recession are expected to occur with this option due to groundwater/ land sliding and also due to toe defences being less effective with SLR.
4. **Improve A:** refurbishment of existing defences in first 10 years and repeated as required thereafter; large scale beach nourishment scheme along full length of unit in epoch 1; construct cliff drainage along full length of unit in epoch 1.
5. **Improve B:** new rock defences along full length of the unit at the toe of the cliff as well as cliff drainage along the full length of the unit (epoch 1).
6. **Managed Realignment A:** beach nourishment scheme at the beach at Naish cliff in epoch 1; construct new / upgrade rock revetment and refurbish rock groynes between Marine Drive West to the Eastern end of the unit (epoch 1); install new cliff drainage from Marine Drive West to the east in epoch 1 (note the eastern 1km of the unit does not need new drainage as it is functioning well); no new drainage at Naish cliff.
7. **Managed Realignment B:** as per Managed Realignment A, but the capital initial intervention would not be undertaken until epoch 2.
8. **Managed Realignment C:** beach nourishment scheme at Naish cliff in epoch 1; construct new / upgrade rock revetment and rock groynes to the currently defended part of the frontage (epoch 1); install new cliff drainage to the currently defended part of the frontage in epoch 1 (note the eastern 1km of the unit does not need new drainage as it is functioning well); no new defences/ drainage at Marine Drive West.
9. **Managed Realignment D:** as per Managed Realignment C, but the capital initial intervention would not be undertaken until epoch 2.
10. **Managed Realignment E:** beach nourishment scheme at Naish cliff in epoch 1; construct new / upgrade rock revetment and rock groynes in the east part of the unit (Marine Drive East) (epoch 1); install new cliff drainage to the currently defended part of the frontage in epoch 1 (note the eastern 1km of the unit does not need new drainage as it is functioning well); no new defences/ drainage at Marine Drive West.
11. **Managed Realignment F:** as per Managed Realignment E, but the capital initial intervention would not be undertaken until epoch 2.

## Assessment findings

SEA topic	Option number										
	1	2	3	4	5	6	7	8	9	10	11
Biodiversity and geodiversity	++	++	+	--	--	0	0	+	+	++	++
Climate change	--	--	-	++	++	++	++	+	+	-	-
Landscape	--	--	-	++	-	++	++	+	+	-	-
Historic environment	?	?	?	?	?	?	?	?	?	?	?
Land, soil and water resources	0	0	0	0	0	0	0	0	0	0	0
Population and communities	--	--	-	++	+	++	++	+	+	-	-
Transport and movement	--	--	-	++	++	++	++	+	+	-	-

### Key (likely significant effects)

Major positive	Minor positive	Neutral	Uncertain	Minor negative	Major negative
++	+	0	?	-	--

### Leading option selection

Multiple Leading Options were selected for ODU 14 based on the results of the economic, environmental, technical and social appraisal:

- National Economic Option: Managed Realignment A.
- Backup Options: Managed Realignment B, Managed Realignment D, Maintain.

Delivery of the National Economic Option in this unit is likely to lead to major positive significant effects across most SEA topics. However, funding for this option is uncertain, and if funding cannot be found, then a choice of the Backup Options may be delivered instead. Managed Realignment B is expected to have similar positive effects, whilst Managed Realignment D and Maintain do not deliver the same level of positive environmental effects. Maintain has negative effects noted for most SEA topics.

## SMZ 5 – ODU 15: Barton on Sea to Hordle Cliff options assessment

### Strategic options

- Option 1 (Do Nothing):** no new defences or maintenance; cliff erosion would continue/ increase in the future due to SLR.
- Option 2 (Do Minimum):** small scale patch repair maintenance to existing defences around outfall (localised health and safety issues, would not provide FCERM benefit).
- Option 3 (Managed Realignment):** undertake beach management (beach recycling) (epochs 1-3) to help control rates of cliff erosion (would not be stopped but could be somewhat controlled by providing uniform beach profile/ topping up areas where erosion is happening more rapidly).

### Assessment findings

SEA topic	Option number		
	1	2	3
Biodiversity and geodiversity	++	++	+
Climate change	-	-	-
Landscape	-	-	-
Historic environment	?	?	?
Land, soil and water resources	0	0	0
Population and communities	-	-	-
Transport and movement	-	-	-

### Key (likely significant effects)

Major positive	Minor positive	Neutral	Uncertain	Minor negative	Major negative
++	+	0	?	-	--

### Leading option selection

One Leading Option was selected for ODU 15 based on the results of the economic, environmental, technical and social appraisal:

- National Economic Option: Do Nothing.

Delivery of the National Economic Option (Do Nothing) is likely to lead to negative environmental impacts across a range of categories. However, there is no economic case in this unit to Do Something and therefore no viable alternatives exist. A positive of the Do Nothing option is that it could lead to improvements to the SSSI condition due to erosion of the cliff face in the future.

## SMZ 6 – ODU 16: Cliff Road options assessment

### Strategic options

1. **Do Nothing:** no new defences or maintenance of existing defences. Ensure health and safety compliance when defences fail.
2. **Do Minimum:** small scale patch-repair maintenance to existing defences (as and when required).
3. **Maintain:** refurbishment of existing defences (from epoch 1).
4. **Improve A:** new rock revetment along the full length of the unit to defend the cliff toe (epoch 1).
5. **Managed Realignment A:** beach nourishment to the full frontage in epoch 1; construct new rock strong point (e.g. rock revetment) at junction of Whitby Road and Cliff Road at the same time (epoch 1).
6. **Managed Realignment B:** as per Managed Realignment A, but construction of strong point delayed until start of epoch 2 (cliff may erode in the interim).
7. **Managed Realignment C:** as per Managed Realignment A, but construction of strong point delayed further until mid-way through epoch 2 (cliff may erode in the interim).

### Assessment findings

SEA topic	Option number						
	1	2	3	4	5	6	7
Biodiversity and geodiversity	++	++	+	0	+	+	+
Climate change	--	--	-	++	+	+	+
Landscape	--	--	-	-	+	+	+
Historic environment	?	?	?	?	?	?	?
Land, soil and water resources	0	0	0	0	0	0	0
Population and communities	--	--	-	+	+	+	+
Transport and movement	--	--	-	++	-	-	-

### Key (likely significant effects)

Major positive	Minor positive	Neutral	Uncertain	Minor negative	Major negative
++	+	0	?	-	--

### Leading option selection

Multiple Leading Options were selected for ODU 16 based on the results of the economic, environmental, technical and social appraisal:

- National Economic Option: Managed Realignment C.
- Local Aspirational Option: Managed Realignment A/B.

- Backup Option: Maintain.

Delivery of either of the National Economic or Local Aspirational Options in this unit is likely to lead to positive impacts across most environmental categories. However, funding for these options is uncertain and if funding cannot be found then the Backup option (Maintain) may be delivered instead. This option does not deliver the same level of positive environmental impacts with negative impacts noted in most categories. With the Managed Realignment options, with the construction of a local strong point, there is potential to explore BNG opportunities. For example, if a rock structure is used opportunities for habitat creation could be explored during further appraisal / design work.

## SMZ 6 – ODU 17: Rook Cliff options assessment

### Strategic options

1. **Do Nothing:** no new defences or maintenance of existing defences. Ensure health and safety compliance when defences fail.
2. **Do Minimum:** small scale patch-repair maintenance to existing defences (as and when required).
3. **Maintain:** refurbishment of existing defences (from epoch 1).
4. **Improve A:** in epoch 1 refurbish / upgrade existing rock revetment, upgraded groynes (epoch 1).
5. **Improve B:** same approach as Improve A, except initial upgrades to defences delayed until the start of epoch 2.
6. **Improve C:** same approach as Improve A, except initial upgrades to defences delayed further until approximately mid-point of epoch 2.
7. **Managed Realignment A:** upgrade rock revetments at Rook Cliff and the White house, then removing the defences in between once failed and letting land realign / erode over time; manage rate of erosion in undefended area with beach nourishment and construction of rock groynes in realigned area to help retain material (from epoch 1).
8. **Managed Realignment B:** construct nearshore breakwaters and undertaken beach nourishment to help retain beach material in this location and control rates of erosion.

### Assessment findings

SEA topic	Option number							
	1	2	3	4	5	6	7	8
Biodiversity and geodiversity	++	++	+	0	0	0	+	0
Climate change	--	--	?	++	++	++	++	++
Landscape	--	--	?	++	++	++	-	-
Historic environment	--	--	?	+	+	+	+	+
Land, soil and water resources	0	0	0	0	0	0	0	0
Population and communities	--	--	-	++	++	++	-	++
Transport and movement	--	--	?	++	++	++	++	++

### Key (likely significant effects)

Major positive	Minor positive	Neutral	Uncertain	Minor negative	Major negative
++	+	0	?	-	--

## Leading option selection

Multiple Leading Options were selected for ODU 17 based on the results of the economic, environmental, technical and social appraisal:

- National Economic Option: Improve C.
- Local Aspirational Option: Improve A/B.
- Backup Option: Maintain.

Delivery of either of the National Economic or Local Aspirational Options in this unit is likely to lead to significant positive effects across most SEA topics. However, funding for these options is uncertain, and if funding cannot be found, then the Backup option (Maintain) may be delivered instead. The impacts with the Maintain option are more uncertain, as it is unclear how the existing defences will perform in the future. With the Improve options, there is potential to explore BNG opportunities during further appraisal / design.

## SMZ 6 – ODU 18: Milford on Sea Frontage options assessment

### Strategic options

1. **Do Nothing:** no new defences or maintenance of existing defences; ensure health and safety compliance when defences fail.
2. **Do Minimum:** small scale patch-repair maintenance to existing defences (as and when required).
3. **Maintain:** refurbishment of existing defences (from epoch 1).
4. **Improve A:** beach nourishment in first part of epoch 1, as well as refurbishment / upgrade of existing seawall and new groynes (also epoch 1); new setback defences (e.g. floodwall or embankment) and property level protection in the east part of the unit in epoch 2 to manage flood risk.
5. **Improve B:** same approach as Improve A except the initial nourishment and defence improvements would be undertaken in epoch 2.
6. **Managed Realignment A:** rock revetment at east end of frontage (root of Hurst Spit) in first few years (epoch 1); allow existing seawall to fail and allow erosion into area of open space behind, creating more space for wider beach; construct new defence alignment in epoch 2 once desired shoreline position reached; use beach nourishment to control rate of erosion (epochs 1-3); new setback defences (e.g. floodwall or embankment) and property level protection in the east part of the unit in epoch 2 to manage flood risk.
7. **Managed Realignment B:** construct nearshore breakwaters and undertaken beach nourishment to help retain beach material in this location and control rates of erosion.

### Assessment findings

SEA topic	Option number						
	1	2	3	4	5	6	7
Biodiversity and geodiversity	--	--	?	+	+	+	+
Climate change	--	--	?	++	++	++	++
Landscape	--	--	?	+	+	-	-
Historic environment	?	?	?	?	?	?	?
Land, soil and water resources	0	0	0	0	0	0	0
Population and communities	--	--	-	++	++	-	++
Transport and movement	--	--	-	++	++	-	++

### Key (likely significant effects)

Major positive	Minor positive	Neutral	Uncertain	Minor negative	Major negative
++	+	0	?	-	--

## Leading option selection

Multiple Leading Options were selected for ODU 18 based on the results of the economic, environmental, technical and social appraisal:

- National Economic Option: Improve A.
- Backup Options: Improve B and Maintain.

Delivery of the National Economic Option in this unit is likely to lead to positive significant effects across most SEA topics. However, funding for this option is uncertain, and if funding cannot be found, then a Backup option Improve B or Maintain may be delivered instead. The impacts of Improve B are similar to Improve A. The impacts with the Maintain option are more uncertain, as it is unclear how the existing defences will perform in the future. The Improve options will benefit the biodiversity and geodiversity SEA topic by helping to preserve the designated sites in the area, and there is potential to explore BNG opportunities during further appraisal / design.

# 1. Introduction

## 1.1 Background

AECOM has been commissioned by Bournemouth, Christchurch and Poole (BCP) Council to undertake a Strategic Environmental Assessment (SEA) in support of the emerging Flood and Coastal Erosion Risk Management (FCERM) Strategy for the coastal frontage at Christchurch Bay & Harbour (herein referred to as 'the Strategy').

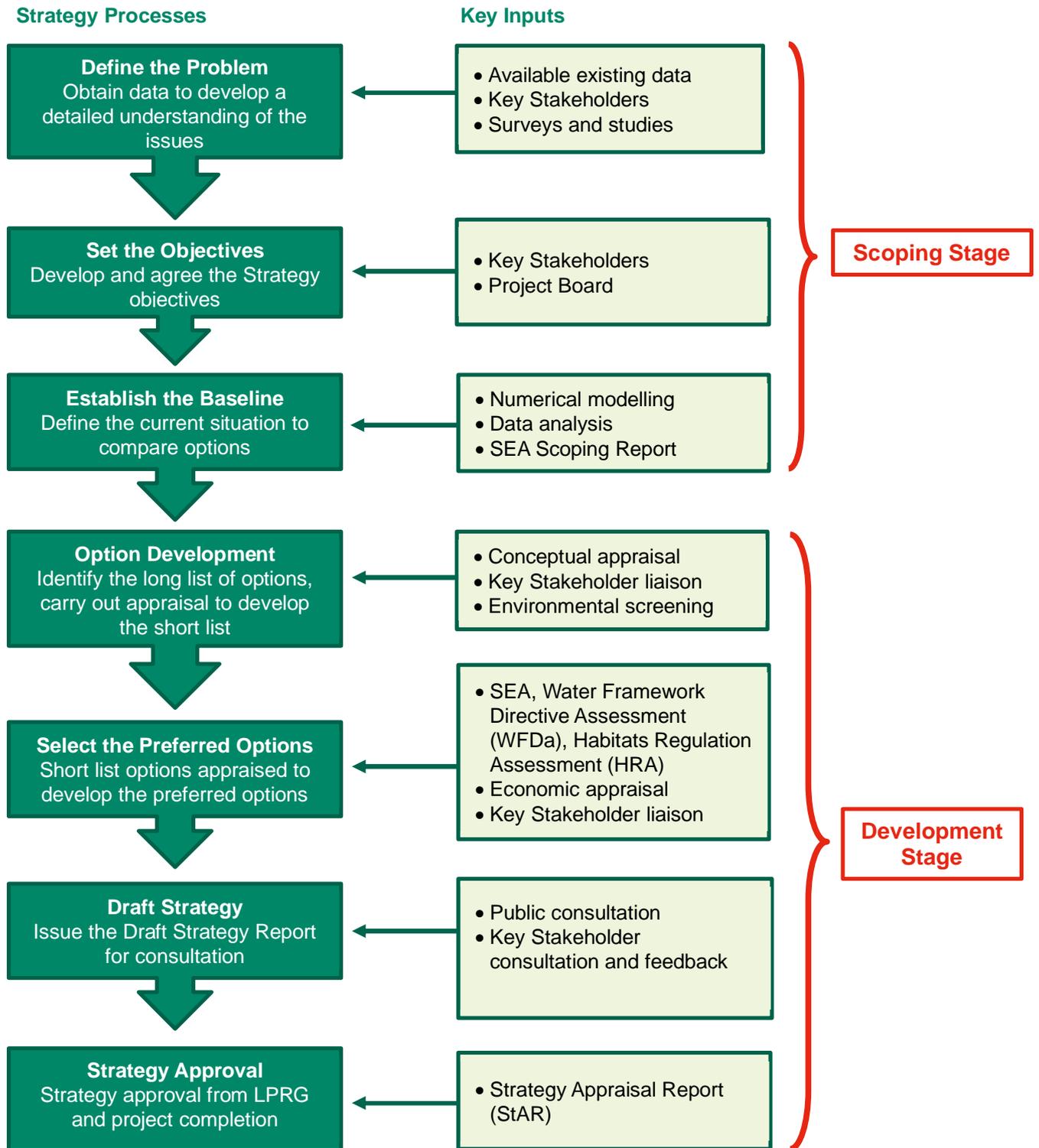
The Strategy is being developed collaboratively by AECOM and the Project Team, which consists of officers of BCP Council, New Forest District Council (NFDC) and the Environment Agency (EA).

The Strategy extent is the coastal frontage between Hengistbury Head (immediately to the east of Hengistbury Head long groyne) and the landward (western) end of Hurst Spit. Within Christchurch Harbour, the Strategy extent is up to Tuckton Bridge on the River Stour and Knapp Mill on the River Avon (see Figure 1.1 below).



**Figure 1.1 Map of the Strategy area**

Figure 1.2 overleaf provides a summary of the Strategy development process. The SEA process will inform the Strategy, through identification of the likely significant effects of the Short List Options, and any reasonable alternatives, on relevant environmental receptors.



**Figure 1.2 Summary of the Christchurch Bay & Harbour FCERM Strategy development process**

## 1.2 Strategic Environmental Assessment

SEA is a mechanism for considering and communicating the likely significant effects of an emerging plan, and reasonable alternatives in terms of key environmental issues. The aim of a SEA is to inform and influence the plan-making process with a view to avoiding or mitigating negative environmental effects and maximising positive effects.

The Environmental Assessment of Plans and Programmes Regulations 2004 (otherwise known as the SEA Regulations) (SI 1633, 2004) require an environmental assessment to be carried out on certain plans and programmes that are likely to have a significant effect upon the environment. Applying the SEA process to flood management plans, including any plan for medium to long-term river or coastal management, is not legally required. However, adopting the SEA approach is strongly encouraged by the Department for Environment, Food and Rural Affairs (DEFRA) to allow a strategic approach to managing the coast. As a result, a full SEA process is being carried out as part of the Christchurch Bay and Harbour FCERM Strategy which satisfies the requirements of the SEA Regulations.

In addition to the SEA, a separate Habitats Regulations Assessment, Marine Conservation Zone Assessment and Water Framework Directive Assessment have/are being undertaken to support the development of the Strategy.

## 1.3 Structure of this Environmental Report

This report, which follows the Scoping Report completed in December 2021, is the Environmental Report for the Strategy and will be published alongside it.

This report begins by introducing the Strategy, then it outlines the scope of the SEA. It then sets out what plan making/ SEA has involved to this point, followed by the methodology for the assessment of the alternative strategic options within each Option Development Units (ODUs), as well as the assessment itself. Finally, next steps are highlighted.

## 2. What is the Strategy seeking to achieve?

### 2.1 Introduction to the Strategy

The aim of this Strategy is to provide an integrated plan for the Christchurch Bay & Harbour frontage, delivering sustainable and long-term management for coastal flood and erosion risks over the next 100 years. The Strategy will further develop the existing SMP policies adopted in 2011 and update the information provided in the 2012 Christchurch Bay & Harbour FCERM Study, using the most up-to-date data and guidance.

The Strategy will provide an assessment of the risks and opportunities associated with coastal processes and develop a management framework to manage these risks, as well as any opportunities, in a sustainable manner. This will form an important element of the policy for flood and coastal defences and provide guidance for spatial planning within the coastal zone. The Strategy will determine the leading options for flood and coastal defences through multi-variate appraisal including a cost-benefit analysis.

## 3. What is the scope of the SEA?

### 3.1 Introduction

SEA scoping was undertaken prior to the development of the SEA. The scoping report (AECOM, 2023) can be found in Appendix A.

The aim of this section of the report is to provide a high level introduction to the SEA scoping, i.e., the sustainability topics and objectives that should be a focus of the assessment of the plan and reasonable alternatives. More detailed information, including the policy review and baseline information that has supported the development of key sustainability issues and objectives is presented in the SEA Scoping Report (Appendix A).

#### 3.1.1 Consultation

The SEA Regulations require that “when deciding on the scope and level of detail of the information that must be included in the report, the responsible authority shall consult the consultation bodies”. In England, the consultation bodies are the Environment Agency, Historic England, and Natural England<sup>1</sup>. The SEA scoping report was consulted on with these organisations in December 2021. Feedback was provided and updates to the scoping report were made. Further feedback on the scoping stage was provided during the consultation of the SEA in summer 2023 and therefore the Scoping Report was further updated to reflect these latest comments from the consultation bodies (see Appendix A for the latest version of the Scoping Report).

#### 3.1.2 Key sustainability issues

The key sustainability issues for the Strategy area, identified through scoping, are presented below under each SEA topic.

##### Air quality

- There are no AQMAs in the Strategy area, or areas known to exceed national objectives for air quality. The main pollutant of concern in the Strategy area is nitrogen dioxide, largely related to emissions from vehicles due to traffic and congestion. Though traffic and congestion have the potential to increase vehicle emissions and reduce air quality.

##### Biodiversity and geodiversity

- There are a number of sites designated for their nature conservation importance within the Strategy area, including internationally, nationally and locally designated nature conservation sites. This includes geological conservation sites along significant lengths of the cliff frontage, highlighting the Strategy area’s rich geological and paleoenvironmental resource. The condition and integrity of the key features within these sites for which they are designated should not be compromised, and efforts should be made to enhance these sites through habitat restoration and re-connection where possible. There are a wide variety of habitats in the Strategy area, particularly in Christchurch Harbour, including mudflats, saltmarsh and sand dunes which support diverse plant and animal communities.
- Coastal defences and development must avoid disruption to coastal processes where it could lead to the loss of important coastal habitats (e.g. through defence footprint encroachment), including those identified which support rare and scarce species. Many of these sites have great ornithological importance, supporting large breeding and over-wintering populations of wildfowl and other birds and preservation of their habitats is important.
- There are a number of management policies, plans and strategies which aim to protect and enhance the biodiversity and geodiversity of Christchurch Bay & Harbour (please refer to the SEA scoping report for full details, AECOM 2022). The implementation of the Strategy would offer further

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<sup>1</sup> These consultation bodies were selected “by reason of their specific environmental responsibilities, [they] are likely to be concerned by the environmental effects of implementing plans and programmes” (SEA Directive, Article 6(3)).

opportunities for the protection of designated sites and prevent their inundation and erosion, complementing the coastal defence measures which are already in place.

- In addition, new defences provide the opportunity to lead to Biodiversity Net Gain (BNG) and potential opportunities for this have been highlighted in this report.

## Climate change

- The IPCC report highlights the urgency to act on climate change now in order to limit the impacts of rising global temperatures as much as possible. If levels of CO<sub>2</sub>, and other greenhouse gas emissions, continue to rise then the increase in temperatures could become irreversible.
- CO<sub>2</sub> emissions per capita are slightly higher than the average for England in the NFDC area, and slightly lower in the BCP Council area; both have followed the national trend of reducing CO<sub>2</sub> emissions since 2005.
- The Strategy area predominantly falls within Flood Zone 1, although there are stretches of Flood Zone 2 and 3 at the coast and running along the Rivers Avon and Stour. Climate change is predicted to lead to an increase in sea levels, temperatures and precipitation, as well as more frequent storm surges and high tides causing more extreme weather events and leading to more widespread fluvial and tidal flooding. Increased precipitation could also lead to increased surface water flooding throughout the Strategy area. Implementing new coastal defences, nature-based solutions and sustainable drainage systems (SuDS) could mitigate some of the impacts of climate change. This could also lead to increased rates of coastal erosion, impacting beach levels and the stability of the soft cliffs.

## Landscape

- Whilst there are no designated landscape sites within the Strategy area, the area is recognised for its special landscape setting. Several locations along the Bay provide nature conservation and recreation, with Christchurch Harbour providing a strong sense of place, combining historic elements with the maritime setting.
- Future development could reduce the landscape quality, however the policies and strategies in place aim to protect and enhance the landscape character and the quality of the coastal environment.
- Increased climate change is likely to lead to further coastal flooding and erosion, which will particularly impact the cliffs located along Christchurch Bay, and the recreational development along the coastline.

## Historic environment

- European, national and local policies and strategies seek to protect and enhance the historic environment within the Strategy area. Although some heritage assets feature on the Heritage at Risk Register, they are not at risk for reasons pertaining to flood risk management. There are some other heritage assets within the Strategy area which are located in areas of flooding and coastal erosion risk. Buried archaeological resources could also be at risk in the future, through the loss of land by erosion, inundation, or the construction of new coastal defences. Consideration is also given to the marine historic environment, including Marine Conservation Zones and Protected Wreck Sites.
- It is important that these assets are protected and enhanced where possible to maintain their integrity and importance. There are potential future pressures in coastal squeeze climate change and development, though it is likely that the Strategy can contribute to reducing some of these pressures through reduced flooding and erosion impacts to the assets and improved management of the coastal zone.

## Land, soil and water resources

- Christchurch Harbour is predominantly low topography, in comparison to the cliff sections along Christchurch Bay. Historic erosion rates suggest retreat of these cliffs and beaches in the future, which could impact land and soil resources. Although there is little agricultural land in Christchurch Harbour, there is agricultural land of varying quality further along the bay towards New Milton and Milford-on-Sea.

- The principal watercourses in the Strategy area are the River Avon and the River Stour, and there are several tributaries throughout the Strategy area (Becton Bunny at Barton-on-Sea, the Walkford Brook and Danes Stream). Fishing is a popular activity in the Strategy area, both commercial and recreational, particularly at Christchurch Harbour, the River Stour and the River Avon.
- The Water Resource Management Plan has not identified pressure on the supply-demand balance in the Strategy area in the next 25 years, with a small (<3%) supply-demand deficit only identified in 2045 for non-household demand. Water quality is monitored by three European Directives: the Water Framework Directive, Urban Waste Water Treatment Directive and the European Bathing Water Directive. All of the watercourses in the Strategy area have a WFD classification of 'good' or 'moderate' for ecological status but fail in terms of their chemical status. Christchurch Harbour is compliant with the Urban Waste Water Directive, and all bathing waters tested have a classification of excellent for 2019.
- A desktop study has identified potential areas of contaminated land, using the EA's historic landfill dataset, and the CIRIA Guidance C718 to define a framework to assess the risks to potential receptors. The receptors include people, properties, environmental designations and watercourses. Increased coastal flooding and erosion in the future is likely to present pathways for contamination to these receptors.

## Population and communities

- Christchurch Bay & Harbour is primarily comprised of residential communities, with tourism and recreation a large sector in the economy. There are five main communities which have developed from historic settlements: Bransgore, Christchurch, Highcliffe and Walkford, Milford-on-Sea and New Milton.
- There are a wide variety of recreational facilities in the Strategy area, which are vital to improving the health and wellbeing of the community including access to the natural coastal environment through beaches and coastal waters, activities such as fishing and water sports, nature conservation sites and historical buildings.
- These communities, and the people and properties within them, are at risk of coastal flooding and erosion in the future. The Strategy will improve the resilience of the community to these risks, through improved coastal management. In some areas, this will involve new coastal defences and improved access to the coast and open space. In other areas of the coast, the management may involve adaptation to the changing coastline through relocation of some popular sites.

## Transportation and movement

- Within the Strategy area, there is a network of smaller roads which connect to the wider area. There are good public transport infrastructure links within and outside of the Strategy area, including trains, harbour and ferry services.
- Public rights of way and cycleways also exist throughout Christchurch Bay and Harbour, with new cycle routes having recently been developed to support an increased uptake in cycling and sustainable transport methods.
- Although there is a risk of coastal flooding and erosion to the transportation and movement within the Strategy area, the implementation of the Strategy could protect key infrastructure as well as enhancing the existing travel networks and promoting use of more sustainable travel methods.

### 3.1.3 The SEA framework

The SEA scope is summarised in a list of topics, objectives, and assessment questions, known as the SEA framework. These draw on the key sustainability issues identified through scoping. **Table 3.2** below presents the SEA framework as broadly agreed in 2020.

Notably, in the absence of any specific air quality issues, and considering that the Strategy is not likely to significantly affect the air quality SEA topic in the future, this topic was scoped out for the purposes of the SEA process. Potential localised changes to air quality were noted during the scoping phase, arising from construction activities. However, during scoping this was considered not likely to lead to significant changes in the current air quality baseline.

**Table 3.2 SEA framework**

SEA topic	SEA objective	Assessment questions (will the proposal help to...)
Biodiversity and geodiversity	To protect and enhance biodiversity and geodiversity habitats and species; achieving biodiversity net gain and improved habitat connectivity within the Strategy area.	<ul style="list-style-type: none"> <li>• Protect and enhance European, nationally and locally designated sites, including species that are important to the integrity of these sites and recognised as priority species?</li> <li>• Protect, enhance and improve connectivity of habitats?</li> <li>• Support the delivery of biodiversity net gain?</li> <li>• Support habitat creation, restoration and recovery in the coastal zone?</li> <li>• Increase the resilience of biodiversity in the Strategy area to the effects of climate change through increased coastal flooding and erosion?</li> </ul>
Climate change	To support the resilience of the Strategy area to the potential effects of climate change, including coastal flooding and erosion.	<ul style="list-style-type: none"> <li>• Contribute to adapting to climate change?</li> <li>• Contribute to mitigating the main causes of climate change by promoting low or zero carbon approaches?</li> </ul>
Landscape	To protect and enhance the character and quality of the Strategy area landscape and seascape.	<ul style="list-style-type: none"> <li>• Conserve and enhance the quality of landscape/ seascape for people, places and nature?</li> <li>• Contribute to better management of landscape/ seascape assets?</li> <li>• Conserve and enhance features of local importance?</li> <li>• Improve linkages to the coastline?</li> <li>• Protect visual amenity?</li> </ul>
Historic environment	To protect, conserve and enhance the historic environment within the Strategy area.	<ul style="list-style-type: none"> <li>• Conserve and enhance heritage assets and their settings, considering the unique nature of heritage assets in the Strategy area and how they may be impacted by coastal defences?</li> <li>• Conserve and enhance the special interest, character and appearance of locally important features and their settings?</li> <li>• Consider the contribution of historic places to the character of the coastal environment?</li> <li>• Support access to, interpretation and understanding of the historic environment and character of the Strategy area?</li> <li>• Support the undertaking of early archaeological investigations and, where appropriate, recommend mitigation strategies?</li> </ul>
Land, soil and water resources	To ensure the efficient and effective use of land in the Strategy area.	<ul style="list-style-type: none"> <li>• Protect and conserve soils and improve resilience to degradation?</li> <li>• Protect and conserve the best and most productive agricultural land?</li> <li>• Prevent contamination from historic landfill sites and support remediation?</li> </ul>

SEA topic	SEA objective	Assessment questions (will the proposal help to...)
	To protect and enhance water quality and manage water resources within the Strategy area in a sustainable manner.	<ul style="list-style-type: none"> <li>• Help secure compliance with the Water Framework Directive and contribute to enhancing the status of water bodies?</li> <li>• Contribute to the sustainable management of water resources and fisheries?</li> </ul>
Population and communities	Protect and enhance the health and wellbeing of the community within the Strategy area.	<ul style="list-style-type: none"> <li>• Protect and improve the resilience of communities?</li> <li>• Improve and enhance the health and wellbeing of communities?</li> <li>• Improve access to the coastal environment?</li> <li>• Support the provision of more, better quality and accessible green infrastructure/ open space?</li> <li>• Avoid negative impacts to the quality and/ or extent of existing recreational assets, including coastal footpaths?</li> </ul>
Transport and movement	Protect and enhance transport infrastructure in the Strategy area.	<ul style="list-style-type: none"> <li>• Protect and improve the resilience of key transport infrastructure?</li> <li>• Extend or improve active travel networks?</li> <li>• Enable sustainable transport infrastructure improvements?</li> </ul>

## 4. What has plan-making involved to this point?

### 4.1 Introduction

Work on the Strategy has been underway for some time and the aim here is not to provide a comprehensive explanation of all the work carried out to date. Rather the intention is to provide a high level explanation of the work undertaken to develop and appraise options.

More specifically, this part of the report introduces the Strategic Management Zones (SMZs) and the Option Development Units (ODUs) that have been developed for the Strategy frontage. It then goes on to explain how the options under each ODU were established.

### 4.2 Strategy Management Zones

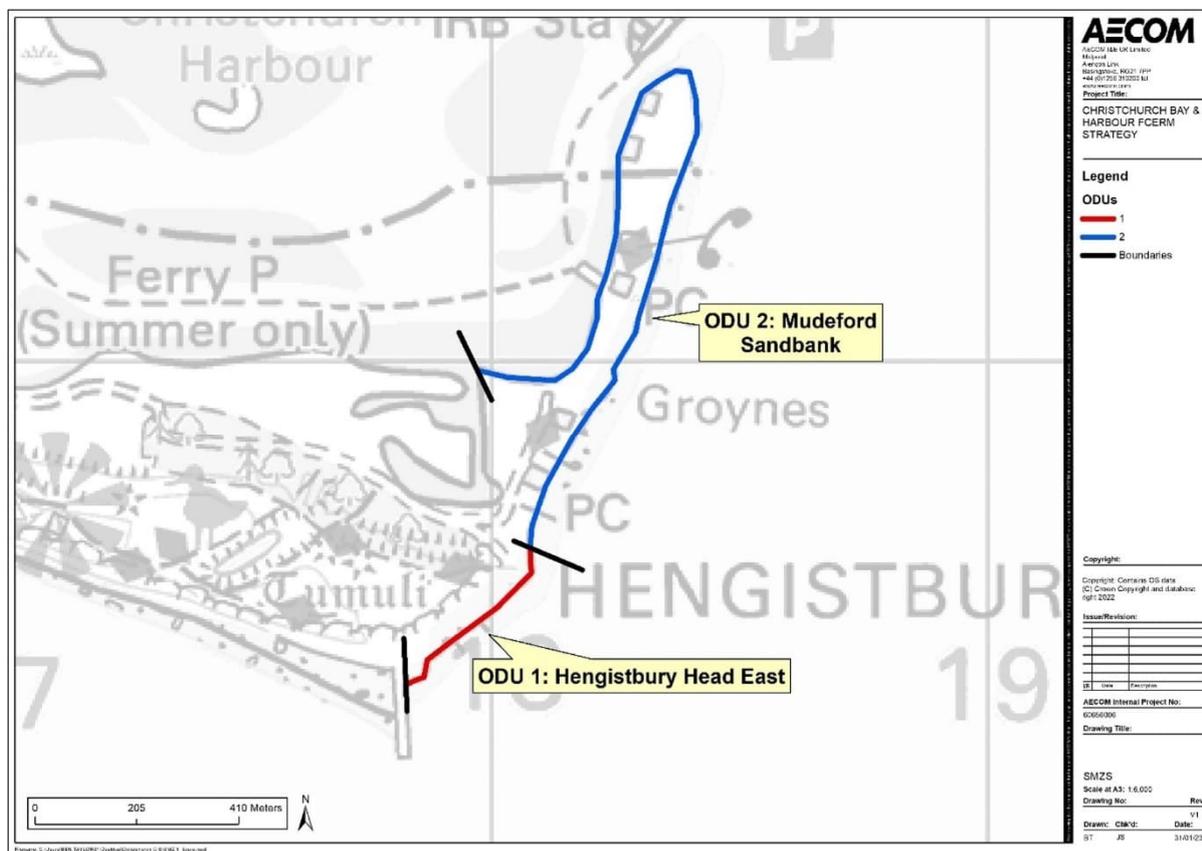
The Strategy frontage consists of six Strategy Management Zones (SMZs), which are:

- **SMZ 1 (Mudford Sandbank)** covers Hengistbury Head to the east of the Long Groyne and Mudford Sandbank. Both the open coast and harbour sides of Mudford Sandbank are included in this SMZ.
- **SMZ 2 (Christchurch Harbour)** covers the coastline around Christchurch Harbour, up to Knapp Mill on the River Avon and Tuckton Bridge on the River Stour.
- **SMZ 3 (Christchurch Beaches and Cliffs)** covers the Avon Beach and Highcliffe parts of the frontage.
- **SMZ 4 (Naish Cliff and Barton on Sea)** covers the area between Chewton Bunny to the eastern end of the Barton on Sea coastal defences.
- **SMZ 5 (Taddiford)** covers the area between Barton on Sea and Hordle Cliff. The west boundary of the unit is at the eastern end of the Barton on Sea defences and the east boundary is at West Road (western end of the Hordle beach huts).
- **SMZ 6 (Milford on Sea)** covers the 2.3km frontage between Hordle Cliff and the eastern end of Milford on Sea.

## 4.2.1 Option Development Units

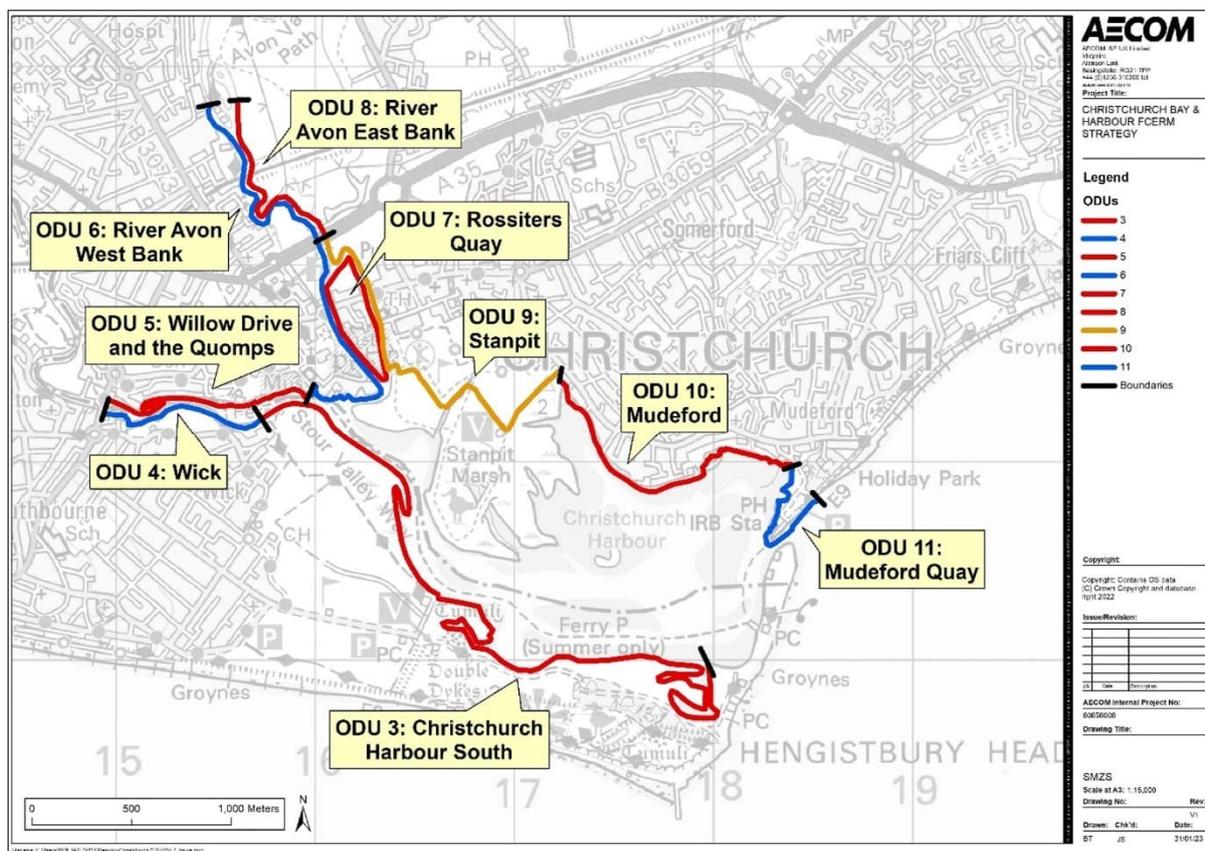
Option Development Units (ODUs) have been developed for each SMZ, and these are set out below:

- SMZ 1 (Mudford Sandbank) (shown in **Figure 4.1** below):
  - **ODU 1: Hengistbury Head East**
  - **ODU 2: Mudford Sandbank**



**Figure 4.1 Location of ODUs within SMZ 1**

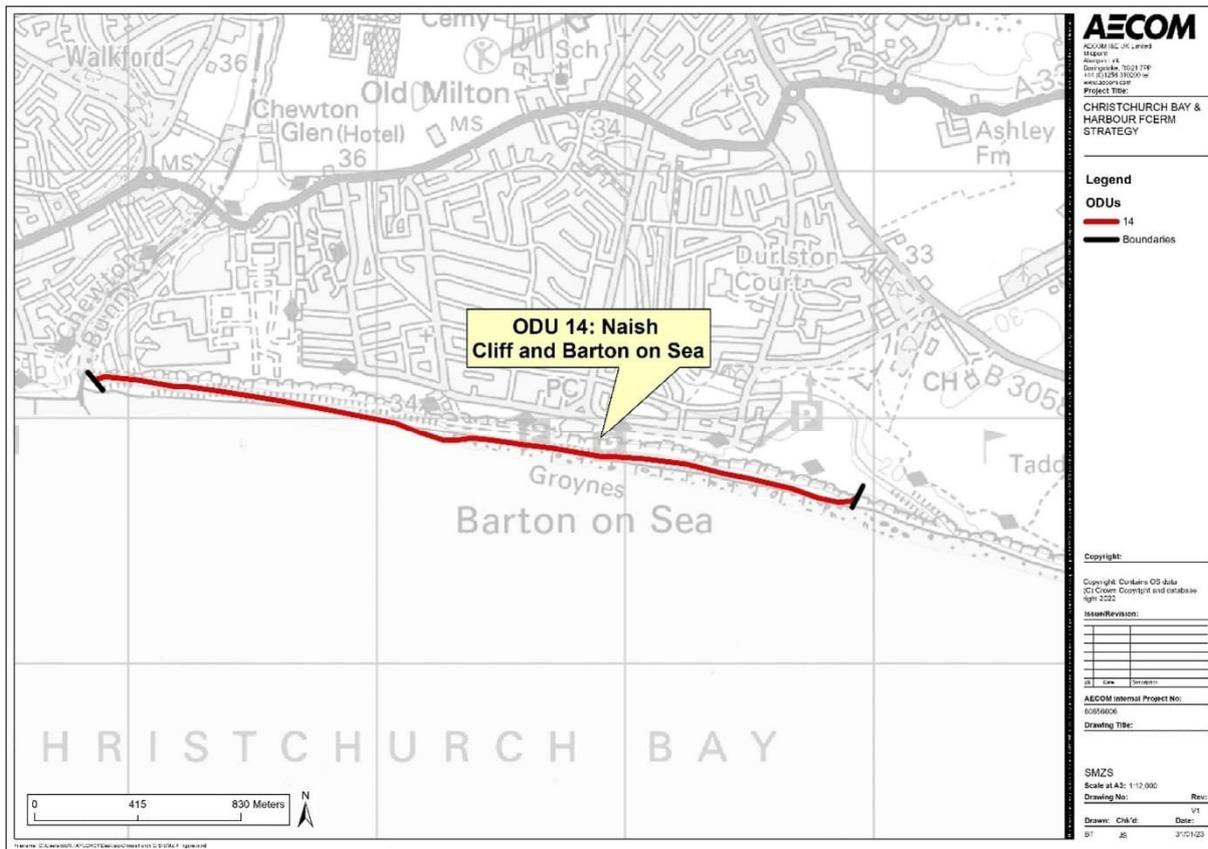
- SMZ 2 (Christchurch Harbour) (shown in **Figure 4.2** below):
  - **ODU 3: Christchurch Harbour South**
  - **ODU 4: Wick**
  - **ODU 5: Willow Drive and the Quomps**
  - **ODU 6: River Avon West Bank**
  - **ODU 7: Rossiters Quay**
  - **ODU 8: River Avon East Bank**
  - **ODU 9: Stanpit**
  - **ODU 10: Mudeford**
  - **ODU 11: Mudeford Quay**



**Figure 4.2 Location of ODUs within SMZ 2**

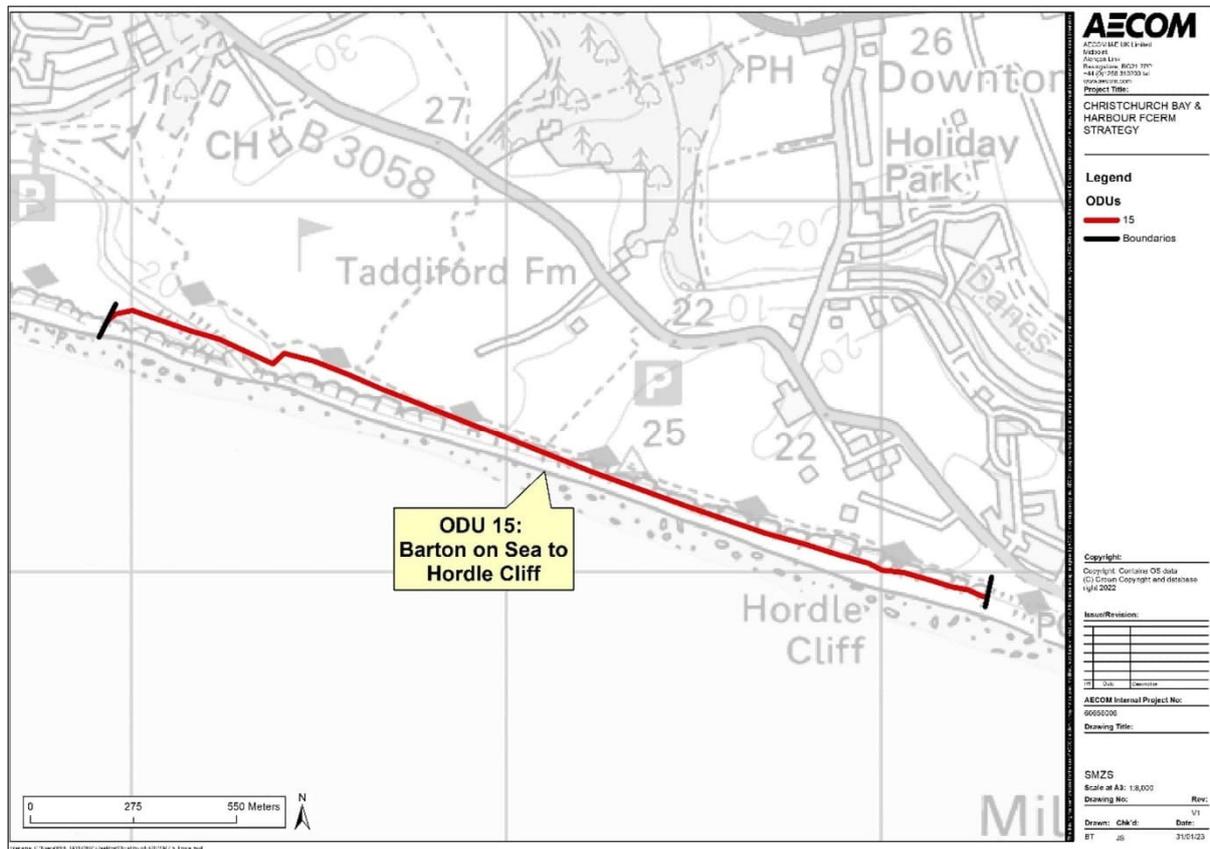


- SMZ 4 (Naish Cliff and Barton on Sea) (shown in **Figure 4.4** below):
  - **ODU 14: Naish Cliff and Barton on Sea**



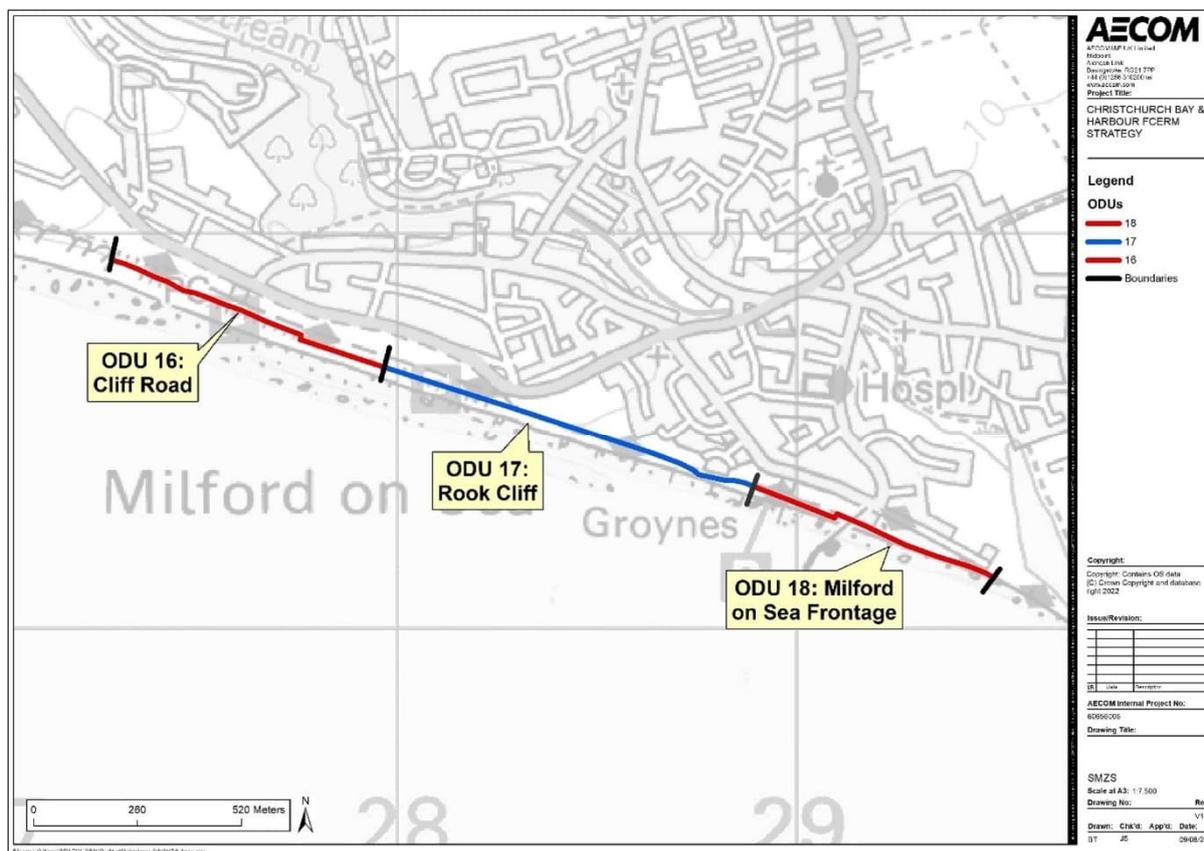
**Figure 4.4 Location of ODUs within SMZ 4**

- SMZ 5 (Taddiford) (shown in **Figure 4.5** below):
  - **ODU 15: Barton on Sea to Hordle Cliff**



**Figure 4.5 Location of ODUs within SMZ 5**

- SMZ 6 (Milford on Sea) (shown in **Figure 4.6** below):
  - **ODU 16: Cliff Road**
  - **ODU 17: Rook Cliff**
  - **ODU 18: Milford on Sea Frontage**



**Figure 4.6 Location of ODUs within SMZ 5**

## 4.3 Establishing ODU options

The Short List Options Report, undertaken by AECOM in November 2022, represents Stage 4 of the options appraisal for the Strategy, in which a draft short list of options is presented. The short list of options comprises a list of high-level strategic options for each SMZ, as well as the supporting appropriate local measures identified for implementing these strategic options in each ODU.

This was followed by Stage 5 of the options appraisal, where the draft short list of options was presented to the public and key stakeholders for review and feedback. This took place in March 2023. Updates to the short list of options were made to reflect key feedback. Further work was then undertaken to develop the short list of options in more detail (Stage 6) to inform the selection of the leading option(s) (Stage 7).

## 4.4 Selecting Leading Options

An economic, environmental, technical and social appraisal was undertaken to select the Leading Options from the short list. Full details of this can be found in the Leading Options report (AECOM, 2024). The findings from the SEA fed into the decision making criteria and formed the environmental appraisal element of the option appraisal process. Up to three types of Leading Option were selected in each ODU:

- The National Economic Leading Option: this is the Leading Option which is identified by following the Environment Agency's Flood and Coastal Erosion Risk Management Appraisal Guidance.
- The Local Aspirational Option: this option considers local opportunities, wants and needs to deliver wider benefits. This option typically costs more than the National Economic Leading Option.
- Backup Option: this option has been identified where there is a large funding shortfall. It is typically a lower cost option that will be more deliverable if funding is limited.

Delivery of the Strategy options will follow an adaptive pathway approach whereby the delivery of schemes are made subject to changing risk profiles (i.e. rates of climate change) and funding availability. This provides flexibility to the delivery team to adapt to changes in circumstances and move between the Leading Options as required over the course of the Strategy delivery. Prior to any schemes being undertaken, the coastal authorities will engage with key stakeholders, such as Natural England and Historic England, and more fully assess the environmental impacts at the local level. It is recognised that the coastal processes are complex in Christchurch Bay, and the area contains a number of internationally and nationally designated sites and features. Early discussions with the key stakeholders prior to scheme delivery will aid the authorities in helping to refine options and provide appropriate mitigation if it is required.

# 5. SEA methodology

## 5.1 Introduction

This chapter sets out the methodology for the strategic environmental assessment of the short list options in each ODUs.

## 5.2 Methodology

For each of the short list options, the assessment examines likely significant effects on the baseline, drawing on the sustainability topics and objectives identified through scoping (see **Table 3.2**) as a methodological framework. As shown below, ‘++’ is used to indicate major positive significant effects, ‘+’ to indicate minor positive significant effects, ‘-’ to indicate minor negative significant effects, and ‘—’ to indicate major negative significant effects. Where appropriate, neutral effects (indicated by ‘0’) or uncertainty (indicated by ‘?’) are noted. These effects will also be discussed in the text under each table.

In terms of establishing significant effects, major and minor significant effects (either positive or negative) are differentiated based on a range of factors including; the sensitivity of receptors (i.e. is the site internationally, nationally or locally designated and what condition is it currently in?), magnitude of effects (i.e. to what extent will there be a change in the baseline conditions?), timescale of effects (i.e. will the effects be short-term or long-term, temporary or permanent?), and the extent to which the effects are likely to occur in the absence of interventions (i.e. to what extent do interventions differ from the existing policy context). Meanwhile, neutral effects are predicted when there is likely to be no change in the baseline conditions, whilst uncertainty is noted where the significance of effects are difficult to predict. This could be due to dependency on external factors that are currently difficult to identify; or potential for effects to be both positive and negative.

Ultimately, a degree of professional judgement is used to determine significance, and this is highly dependent upon the interaction between the range of factors outlined above. However, effects are explained and justified throughout the appraisal text.

Every effort is made to predict effects accurately; however, where there is a need to rely on assumptions to reach a conclusion on a ‘significant effect’ this is made explicit in the assessment text.

Finally, it is important to note that effects are predicted considering the criteria presented within the Regulations.<sup>2</sup> So, for example, account is taken of the duration, frequency, and reversibility of effects.

It is noted that options will be refined in the future at the scheme stage, as the selected pathway is followed.

### Key (likely significant effects)

Major positive	Minor positive	Neutral	Uncertain	Minor negative	Major negative
++	+	0	?	-	--

<sup>2</sup> Schedule 1 of the Environmental Assessment of Plans and Programmes Regulations 2004.

# 6. SMZ 1 – ODU 1: Hengistbury Head East options assessment

## 6.1 Introduction

ODU 1 (shown in **Figure 6.1** below) is 400m long and is located immediately to the east of Hengistbury Head Long Groyne. Hengistbury Head provides a stabilising influence on the shape of the wider bay by acting as an ‘anchor point’, with works planned for an upgrade of the long groyne in the immediate future. This will ensure it remains so for the next century. The erosion rate of the coastline in this unit is likely to have an impact on the position and integrity of Mudeford Sandbank (ODU 2).

There is currently rock armour and gabions providing protection to the toe of the cliffs, although these defences are in a poor condition with an estimated residual life of <10 years.

The Shoreline Management Plan (SMP)<sup>3</sup> policy for this unit is for ‘Managed Realignment’ of the cliff line.



Figure 6.1 ODU 1

## 6.2 Strategic Options

The strategic options for this ODU are as follows:

1. **Do Nothing:** no new defences or maintenance of existing defences; ensure health and safety compliance when defences fail. This could lead to significant erosion of the frontage in the future once defences fail.

<sup>3</sup> Royal Haskoning (2011). ‘Poole & Christchurch Bays Shoreline Management Plan Review (SMP2), [online] available to access via [this link](#)

2. **Do Minimum:** small scale patch-repair maintenance to existing defences (as and when required). This will extend the service life of the existing defences but over time it will become harder to maintain the structures and erosion may occur.
3. **Improve:** new rock revetment (from epoch 1) aiming to minimise any further erosion of the cliff top. A limited amount of erosion may occur due to natural cliff slope processes such as weathering.
4. **Managed Realignment:** refurbishment of existing defences from epoch 1 and ongoing beach recycling; this would not alter the geometry of the existing defences (e.g. footprint/ height of defences would remain the same as today). The intent would be to let the cliff erode in a controlled manner. Whilst the defences would provide protection to the cliff toe, other erosion processes such as weathering could still lead to recession of the cliff top over time.

Erosion of the cliff in ODU 1 is likely to occur with all four of the strategic options in this unit. The precise amount of erosion that would be expected to occur with the options is uncertain as it will depend on future cliff slope processes and rates of toe erosion from the sea which is difficult to predict. With any of the options the erosion should be monitored over time to ensure the options are being delivered as intended.

The Do Nothing option would be expected to lead to the largest amount of erosion in the future and estimated erosion zones for this approach can be found in the Shoreline Management Plan.

The Do Minimum option is the option with the next highest amount of expected erosion (but less than Do Nothing). In the short and medium term whilst the existing defences are maintained and functioning, this option would be expected to preserve the integrity of Hengistbury Head, ensuring the headland continues to provide a stabilising influence on the wider coastline and to provide shelter to Christchurch Harbour. However, during this time localised cliff top erosion of the headland itself could still occur due to continuing cliff slope processes such as weathering. In the long term once the existing defences are no longer functioning, there is more uncertainty around the evolution of the headland. A risk in the long term is for similar rates of erosion to Do Nothing to occur (although delayed) which could reduce the stabilising influence of the headland on the wider coastline, potentially increasing the exposure to storms within the harbour. However, this risk is difficult to quantify currently and more information would be needed through a coastal monitoring programme to assess how the risk evolves over time.

The Managed Realignment option would be expected to result in less erosion than the Do Nothing and Do Minimum options. Refurbishments of the defences will help to ensure the cliff toe remains defended throughout the appraisal period, which will reduce toe erosion. However, the standard of protection of the toe defences would reduce over time due to sea level rise, so some toe erosion could occur (albeit in a more controlled manner). This option would be expected to preserve the integrity of Hengistbury Head and it would continue to provide a stabilising influence on the coastline and provide shelter to Christchurch Harbour. However, localised / minor cliff top erosion on the headland itself could occur leading to damage to land based environmental designations in ODU 1.

The Improve Option would be expected to lead to the least amount of erosion of the options as this option would improve the standard of the defences at the toe of the cliff, ensuring the area has a robust defence into the future against sea level rise. Only minor localised erosion would be expected due to cliff slope processes such as weathering.

## 6.3 Assessment findings

The assessment findings for each option, organised by SEA topic, are set out in **Table 6.1** below and discussed in more detail underneath.

**Table 6.1 Assessment findings for ODU 1**

SEA topic	Option number			
	1	2	3	4
Biodiversity and geodiversity	-	-	0	+
Climate change	--	--	+	?
Landscape	--	--	-	+
Historic environment	--	--	-	-
Land, soil and water resources	0	0	0	0
Population and communities	-	-	+	+
Transport and movement	-	-	+	+

### Key (likely significant effects)

Major positive	Minor positive	Neutral	Uncertain	Minor negative	Major negative
++	+	0	?	-	--

ODU 1 falls within units 1 (Friars Cliff), 2 (High Cliff) and 13 (designated due to geological interest) of the Christchurch Harbour SSSI<sup>4</sup>.

The headland falls within unit 1 (Friars Cliff) of the SSSI. The main habitat here is dwarf scrub heath (lowland). The unit is currently in an unfavourable but recovering condition. This is a large unit containing dry and humid heath, acid grassland, maritime grassland, scrub and ponds. The heathland and acidic grassland remain favourable in most areas and generally the site is well managed. However, some areas are under-managed and have a high cover of gorse and other scrub, including bramble, broom, young oak trees and sallows.

The beach falls within unit 2 (High Cliff) of the SSSI. The main habitat here is supralittoral rock. The unit is currently in an unfavourable but recovering condition because scrub management has commenced and the unit has been grazed. Foredunes at the eastern end of the unit, at the tip of Hengistbury Head, contain dune species lyme grass, sea bindweed, sand sedge, and small populations of the Dorset Rare sea spurge and hare's-tail grass.

The cliff face falls within unit 13 of the SSSI, which was designated due to geological interest. Unlike the other two units, this unit is currently in a favourable condition. Geological interest is exposed along the entire south-facing cliff faces. However, the east-facing defended section, which is covered by ODU 1, has a higher cover of scrub.

The ODU also falls within the Hengistbury Head LNR<sup>5</sup>, whilst the headland falls within the Dorset Heaths SAC<sup>6</sup> and Dorset Heathlands SPA. The full length of the frontage is adjacent to or in proximity of the Solent and Dorset coast marine SPA. Concerning the SAC, the site primarily comprises heath, scrub, maquis and garrigue, and

<sup>4</sup> Natural England (no date): 'Christchurch Harbour SSSI', [online] available to access via [this link](#)

<sup>5</sup> Natural England (no date): 'Hengistbury Head LNR', [online] available to access via [this link](#)

<sup>6</sup> JNCC (no date): 'Dorset Heaths', [online] available to access via [this link](#)

phygrana (86%). The Annex I habitats that are a primary reason for selection of this site are: Northern Atlantic wet heaths with *Erica tetralix*, European dry heaths, and depressions on peat substrates of the *Rhynchosporion*.

In terms of BAP priority habitats, the headland largely comprises lowland heathland. However, there is an area of deciduous woodland near the eastern boundary of the ODU, and the cliff near the western boundary of the ODU comprises maritime cliff and slope. In addition, Natterjack toad – a European protected species – has been recorded in the ODU.

Flood risk in this location is isolated at the bottom of the cliff. Whilst there are no properties in the vicinity of this ODU, there are beach huts along the beach to the north of the eastern boundary of the ODU. There are no official public rights of way (ProWs) in this location. However, there are informal footpaths across the headland, which run close to the cliff face.

The ODU falls within the Dorset Heaths<sup>7</sup> National Character Area (NCA), which today contains some of the best lowland heath left in England. It is also recognised that Hengistbury Head provides a stabilising influence on the shape of the wider bay by acting as an ‘anchor point’ and is therefore key to determining the character of the landscape and seascape in this location.

With regards to the historic environment, the cliff and headland form part of the ‘Multi-period landscape on Hengistbury Head’ scheduled monument<sup>8</sup>. This was designated due to the extensive nature of the archaeological evidence in this location, which make it one of the best-known case studies in British archaeology. The monument comprises a multi-period landscape including settlement, ritual, funerary, agricultural, manufacturing, trading, quarrying and defence activity ranging from the Palaeolithic to the Victorian periods. Geologically, the promontory comprises easily eroded, low dipping Eocene sands and clays. Although the Head could still be at risk from extreme weather events, currently cliff erosion tends to be very limited because of the rock revetment at the base of the cliff, as well as the wide beach created by longshore drift from the beach replenishment schemes at Bournemouth and the Long Groyne.<sup>9</sup> In terms of non-designated heritage assets, there have also been significant occupation sites found around the headland, and whilst not protected by scheduling, these are still considered to be of national significance.

#### Option 1

Under Option 1 (Do Nothing), there will be no new defences or maintenance of existing defences. Due to this, the existing defences are likely to fail over time, resulting in increased coastal erosion. This could have major long-term negative significant effects across the climate change, landscape and historic environment SEA topics due to the potential loss of parts of Hengistbury Head.

This could also have knock-on effects for the wider bay, including Mudeford Sandbank (ODU 2) to the northeast. Regarding the historic environment SEA topic, this option has the potential to result in the large-scale loss of parts of ‘Multi-period landscape on Hengistbury Head’ scheduled monument, as well as the non-designated occupation sites found around the headland. There is also potential for impacts to the historic environment within Christchurch Harbour itself if the stabilising influence and shelter provided by the headland is impacted by erosion in the future.

However, only minor negative long-term significant effects are predicted under the population and communities and transport and movement SEA topics as there are no properties or essential transport infrastructure in the vicinity of the ODU. Still, this option could lead to the loss of beach huts just outside of the ODU, as well as the footpaths on the headland. With respect to biodiversity and geodiversity, Option 1 (Do Nothing) would likely lead to the erosion of parts of the Dorset Heathlands SPA and Dorset Heaths SAC, as well as the Christchurch Harbour SSSI. Due to this, minor negative long-term significant effects are also predicted under this SEA topic. Nevertheless, it is noted that whilst this option could lead to the loss of part of unit 1 of the SSSI due to coastal erosion, it may be beneficial to units 2 and 13 by allowing natural coastal processes to occur.

#### Option 2

Under Option 2 (Do Minimum), only small-scale patch repair maintenance of the existing defences will be carried out as and when required. This would help delay / reduce the rate of erosion in the short and medium term.

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<sup>7</sup> Natural England (2013): ‘NCA Profile: Dorset Heaths (NE506)’, [online] available to access via [this link](#)

<sup>8</sup> Historic England (no date): ‘Multi-period landscape on Hengistbury Head’, [online] available to access via [this link](#)

<sup>9</sup> Johns et al. (2018): ‘Rapid Coastal Zone Assessment Survey Phase One Desk-based Assessment for South-West England (South Coast Dorset) 6673’, [online] available to access via [this link](#)

However, once the defences fail, the impacts of erosion could be to be similar to Option 1 (Do Nothing), and therefore the same likely significant effects are concluded across the SEA topics.

Option 2 is expected to have a major negative effect on the historic environment category based on the same reasoning as Option 1. Whilst the erosion would be delayed and there is uncertainty as to how it would progress when existing defences are no longer maintained in the long term, erosion has the potential to result in the large-scale loss of parts of 'Multi-period landscape on Hengistbury Head' scheduled monument, as well as the non-designated occupation sites found around the headland. There is also potential for impacts to the historic environment and heritage assets within Christchurch Harbour itself if the stabilising influence and shelter provided by the headland is reduced in the future. If this option is taken forward, it is recommended that a programme of recording is undertaken to monitor impacts and findings of any erosion on the historic assets.

### Option 3

Under Option 3 (Improve), a new rock revetment would be constructed along the base of the cliff (during epoch 1), with the aim of minimising further erosion (but not stopping it entirely). Due to this, minor positive long-term significant effects are predicted across the climate change, population and communities, and transport and movement SEA topics.

Under the biodiversity and geodiversity SEA topic, neutral effects are predicted as there would be both positive and negative effects. In terms of positive effects, this option would limit erosion of the Dorset Heathlands SPA and Dorset Heaths SAC. In terms of negative effects, this option would likely hinder natural coastal processes from occurring in units 2 and 13 of the SSSI. The cliff face falls within unit 13 of the SSSI and is currently in a favourable condition. Limiting further erosion under this option could therefore impact the geodiversity of the cliff.

Concerning the landscape SEA topic, minor negative significant effects are considered likely under this option as upgraded defences could be much larger in size than the existing defences, which could impact the landscape and visual appeal of the area. In addition, as some erosion will still take place under this option, landscape and seascape character, both within the ODU and wider bay, is likely to change to some degree.

Minor negative significant effects are also considered likely under the historic environment SEA topic. This option will limit the loss of parts of 'Multi-period landscape on Hengistbury Head' scheduled monument, as well as the non-designated occupation sites found around the headland, by regulating erosion. Rapid or large-scale losses of the archaeological resource would not be expected as part of this option. However, construction could result in some disturbance, compression or loss of archaeological deposits on Hengistbury Head. Construction impacts would need to be mitigated and it is also recommended that a programme of recording is undertaken to monitor impacts and findings.

### Option 4

Under Option 4 (Managed Realignment), the cliff would continue to erode, but the rate of erosion would be controlled through the maintenance / refurbishment of existing toe defences and ongoing beach recycling. The ongoing erosion of the cliff face would help sustain the geological interest of the cliff and could be beneficial to the condition of unit 13 of the SSSI. Furthermore, whilst erosion would still occur, it would be in a controlled manner, which would limit the potential loss of habitat at the Dorset Heaths SAC and Dorset Heathlands SPA. This would lead to an overall benefit to the SAC and SPA relative to Option 1 (Do Nothing) (where erosion would be uncontrolled). Due to this, minor positive long-term significant effects are predicted under the biodiversity and geodiversity and landscape SEA topics, as this option does more to protect the European sites. Note that potential LSE was screened in as part of this option in the HRA screening and will be considered in more detail.

Controlled erosion would enable the area to continue to be used for recreation and amenity, and therefore this option is also considered likely to lead to minor positive significant effects under the population and communities and transport and movement SEA topics.

The impact of controlled erosion on the historic environment, particularly regarding the 'Multi-period landscape on Hengistbury Head' scheduled monument, is difficult to predict under this option. Minor negative significant effects are considered likely under the historic environment SEA topic. Whilst some controlled erosion may occur, relative to the Do Nothing and Do Minimum options, this option is expected to largely limit the loss of parts of 'Multi-period landscape on Hengistbury Head' scheduled monument, as well as the non-designated occupation sites found around the headland. This option would also ensure the integrity of the headland and that it will continue to stabilise the wider coastline and provide shelter to Christchurch harbour. Rapid or large-scale losses of the archaeological resource would not be expected as part of this option. However, construction

(refurbishment of the defences) could result in some disturbance, compression or loss of archaeological deposits on Hengistbury Head. Construction impacts would also need to be mitigated and it is also recommended that a programme of recording is undertaken to monitor impacts and findings of any erosion.

Uncertainty is noted under the climate change SEA topic because the rate of erosion under this option could lead to flooding of the beach huts to the northeast of the ODU (within ODU 2).

#### All Options

Neutral effects are predicted under the land, soil and water resources SEA topic across all four options because they are unlikely to impact these resources. This is because the land in this location is not used for agricultural purposes, nor are there any historical landfill sites, drinking water protected areas/ safeguard zones, or source protection zones in this location.

Under all four options, the disturbance, compression or loss of archaeological remains on Hengistbury Head will need to be monitored and mitigated, for example through a programme of recording.

### 6.3.1 Cumulative effects

The options under ODU 1 could lead to cumulative effects with the project that is underway to replace Hengistbury Head Long Groyne.<sup>10</sup> Improving the long groyne is likely to have a positive influence and support the options in ODU 1 as the long groyne will provide a stabilising influence on the headland by helping to retain beach material in the area, providing a defence against wave attack of the cliff toe from the south-west.

Through discussions with BCP council it is understood that the long groyne is being designed to allow for similar amounts of sediment transport around the groyne in the future, therefore the longshore sediment source to ODUs 1 and 2 should not be impacted by the long groyne replacement.

If taken forward, the Do Nothing option could lead to negative cumulative effects with the long groyne replacement project, as there is a risk of outflanking of the groyne if the coastline in ODU 1 were to erode significantly. If this were to occur then similar environmental effects to those assessed in the section above for Do Nothing could occur. Similar effects could also occur under the Do Minimum option, but the effects would be delayed and only start to occur in the long-term once the existing defences in ODU 1 are no longer able to be repaired sustainably. The Managed Realignment and Improve options support and align with the long groyne replacement scheme, and the positive environmental effects associated with these options would likely still occur with the long groyne replacement.

Any decisions made within this ODU will also have knock-on effects on ODU 2 (Mudford Sandbank), and therefore this should be considered when deciding which option to progress with.

## 6.4 Leading Option selection

Two Leading Options were selected for ODU 1 based on the results of the economic, environmental, technical and social appraisal:

- National Economic Option: Do Minimum.
- Local Aspirational Option: Managed Realignment.

Delivery of the Local Aspirational Option (Managed Realignment) is likely to lead to greater environmental benefits as indicated by the SEA. Minor positive significant effects are predicted under four SEA topics, with uncertainty only noted under the climate change SEA topic. Whilst minor negative significant effects are predicted under the historic environment SEA topic, in terms of the other SEA topics this option performs the most favourably of the four options.

Any negative effects of the leading options on the environmental receptors should be appropriately monitored and mitigated. For example, for the historic environment, it is recommended that a programme of recording is established for heritage assets and an archaeological assessment undertaken.

Overall, whilst the Local Aspirational option is expected to have a negative effect on the historic environment, this would be expected to be less significant relative to the National Economic option. The Local Aspirational option

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<sup>10</sup> BCP Council (2023): 'Repair and upgrade of Hengistbury Head Long Groyne', [online] available to access via [this link](#)

would help retain the stabilising influence of the headland on the coastline and provide shelter to the historic assets within Christchurch Harbour. However, funding is not certain for this option, and if funding cannot be achieved the National Economic Option (Do Minimum) would be delivered.



## 7.2 Strategic options

The strategic options for this ODU are as follows:

1. **Do Nothing:** no new defences or maintenance of existing defences; ensure H&S compliance when defences fail.
2. **Do Minimum:** small scale patch-repair maintenance to existing defences (as and when required).
3. **Maintain:** refurbishment of existing defences from epoch 1; this would not alter the geometry of the existing defences (e.g. footprint/ height of defences would remain the same as today); this option also includes beach recycling to help sustain the beach levels. Beach nourishment from epoch 3 to sustain beach levels in line with sea level rise. Objective of this option would be to sustain the service of the Sandbank (in FCERM terms) and aim to hold the Sandbank in its current position. Opportunities for sand dune creation / restoration as part of this option would be explored.
4. **Improve:** same approach as Maintain over epochs 1 and 2. However, in epoch 3 upgrade the defences to provide a more robust defence system. This would likely involve constructing new larger rock revetment along the length of the Sandbank, rock groynes and a beach nourishment scheme.
5. **Managed Realignment:** same defence measures as Maintain through the appraisal period. However, intent of this option would be to allow the Sandbank to rollback over time in a controlled manner, whilst sustaining the FCERM service. Existing rock revetment and groynes could be moved over time to encourage / control the rollback process and beach recycling would be used to move material to the desired locations.
6. **Maintain with Adaptation/ Resilience:** same approach as the Maintain option, but with local level property level protection measures to the small number of permanent properties on the Sandbank.

## 7.3 Assessment findings

The assessment findings for each option, organised by SEA topic, are set out in **Table 7.1** below and discussed in more detail underneath.

**Table 7.1 Assessment findings for ODU 2**

SEA topic	Option number					
	1	2	3	4	5	6
Biodiversity and geodiversity	?	?	+	+	?	+
Climate change	--	--	++	++	++	++
Landscape	--	--	+	+	?	+
Historic environment	--	--	+	+	-	+
Land, soil and water resources	0	0	0	0	0	0
Population and communities	-	--	+	+	+	+
Transport and movement	0	0	0	0	0	0

### Key (likely significant effects)

Major positive	Minor positive	Neutral	Uncertain	Minor negative	Major negative
++	+	0	?	-	--

The land between the harbour side and open coast boundaries of the ODU falls within unit 3 (Salt Hurns) of the Christchurch Harbour SSSI<sup>12</sup>, whilst the harbour side of the Sandbank borders unit 12 (Christchurch Harbour).

The main habitat of unit 3 (Salt Hurns) of the SSSI is littoral sediment. The unit is currently in a favourable condition, showing gradation of saltmarsh communities from upper to lower middle marsh and frequent creeks and pools.

The full length of the frontage is adjacent to or in proximity of the Solent and Dorset coast marine SPA.

The main habitat of unit 12 (Christchurch Harbour) is also littoral sediment. The unit is also currently in a favourable condition. One of the reasons for notification of this SSSI is the variety of bird species that the site supports. The number of species both breeding and over-wintering are stable and increasing. The SSSI is also important for birds on migration. An assessment has also been made for this unit of the rare plant (Red Data Book species) *Eleocharis parvula*, Dwarf spike rush. The main colony is relatively stable and large numbers are present on substrate exposed at extreme low tides.

The Sandbank is a Site of Nature Conservation Interest (SNCI). In addition, the ODU borders Hengistbury Head LNR<sup>13</sup> to the southwest. The open coast boundary of the ODU also borders Dorset Heaths SAC<sup>14</sup> and Dorset Heathlands SPA, also located to the southwest of the ODU. In terms of BAP priority habitats, there are two small areas of coastal sand dunes in the northern extent of the Sandbank. The land between the harbour side and open coast boundaries of the ODU primarily comprises coastal saltmarsh. The harbour side boundary of the ODU, as well as part of the harbour side of the Sandbank, borders mudflats. In addition, the end of the Sandbank is the only location that ringed plover currently breeds within the BCP area. It is also used as a breeding site for oystercatchers and is an important high tide roost for birds of the harbour. The Sandbank is home to Sea Knotgrass and other vegetated shingle plant species.

In terms of flood risk, much of the Sandbank is within Flood Zone 3, as it is not much higher than sea level. Whilst there are few properties on the Sandbank, beach huts are located along almost the entire length of the Sandbank. In addition, the Sandbank provides flood protection to Christchurch Harbour. Whilst there are no pRoWs in this location, Hengistbury Head to the southwest contains an informal footpath which is used to access the Sandbank.

The ODU falls within the Dorset Heaths<sup>15</sup> National Character Area (NCA), which today contains some of the best lowland heath left in England. It is also recognised that the Sandbank provides shelter to Christchurch Harbour, and therefore greatly influences the landscape here.

With regards to the historic environment, part of the southern extent of the Sandbank falls within the 'Multi-period landscape on Hengistbury Head' scheduled monument<sup>16</sup>. In addition, the northern extent of the ODU is 70m south of grade II listed building 'Dutch Cottages Haven Cottages', located in Mudeford Ferry Terminal on the other side of the mouth to the harbour (in ODU 11). The northern extent of the ODU is adjacent to Mudeford Quay Conservation Area, which covers this listed building. There are also undesignated wreck sites and Grade II listed buildings within the wider area.

### Option 1

Under Option 1 (Do Nothing), there would be no new defences or maintenance of existing defences. The existing defences are likely to fail over time, which could lead to the uncontrolled evolution of the Sandbank, which may include breaching or rolling back into the harbour. This could impact the habitats in the harbour, including the bird species that frequent it, and lead to the erosion of part of the 'Multi-period landscape on Hengistbury Head' scheduled monument and loss of beach huts. In addition, if the Sandbank were to breach, this could have adverse effects on the many designated heritage assets within Christchurch Harbour. Due to this, major negative long-term significant effects are predicted under the climate change, landscape, historic environment, and population and communities SEA topics.

Under this option, the disturbance, compression or loss of archaeological remains on Hengistbury Head will need to be monitored and mitigated, for example through a programme of recording.

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<sup>12</sup> Natural England (no date): 'Christchurch Harbour SSSI', [online] available to access via [this link](#)

<sup>13</sup> Natural England (no date): 'Hengistbury Head LNR', [online] available to access via [this link](#)

<sup>14</sup> JNCC (no date): 'Dorset Heaths', [online] available to access via [this link](#)

<sup>15</sup> Natural England (2013): 'NCA Profile: Dorset Heaths (NE506)', [online] available to access via [this link](#)

<sup>16</sup> Historic England (no date): 'Multi-period landscape on Hengistbury Head', [online] available to access via [this link](#)

With regards to the biodiversity and geodiversity SEA topic, uncertainty is noted under this option as large-scale changes to the morphology of the harbour could arise, which could impact habitats and species in the harbour. However, this will depend on how the Sandbank evolves (which is highly uncertain), and there is potential for both negative and positive effects to arise.

#### Option 2

Under Option 2 (Do Minimum), only small-scale patch repair maintenance of the existing defences will be carried out as and when required. This would help to delay the failure of existing defences in the short-term. However, in the medium- and long-term, the evolution of the Sandbank is likely to be similar to Option 1 (Do Nothing). Therefore, the same likely significant effects are concluded across the SEA topics.

Under this option, the disturbance, compression or loss of archaeological remains on Hengistbury Head will need to be monitored and mitigated, for example through a programme of recording.

#### Option 3

Under Option 3 (Maintain), existing defences would be routinely refurbished, beginning in epoch 1, alongside beach management / recycling to help sustain beach levels. This option also includes beach nourishment in epoch 3, to top-up beach levels in the future so that the FCERM function of the Sandbank can be sustained with sea level rise. This option aims to hold the Sandbank in or close to its current position over time, leading to positive effects across the majority of the SEA topics.

It is noted that under this option, opportunities for sand dune restoration / creation will be explored as part of the beach management activities. This could lead to BNG, and therefore minor positive long-term significant effects are considered likely under the biodiversity and geodiversity SEA topic, as sand dune restoration / creation could create important habitat areas on the Sandbank. In addition, this option provides more certainty with respect to the position of the Sandbank over time, but this has not been factored into the scoring as it is unclear if this would create a positive or negative effect on habitats within the harbour.

Ongoing beach recycling and beach nourishment would help to sustain the crest level of the Sandbank in the future relative to rising sea levels, which is considered likely to lead to major positive significant effects for the climate change SEA topic, and minor positive significant effects across the landscape, historic environment and population and communities SEA topics.

Regarding the historic environment SEA topic, this option will likely prevent the disturbance, compression or loss of the northern and eastern boundaries of the 'Multi-period landscape on Hengistbury Head' scheduled monument. In addition, holding the Sandbank close to its current position will mean that it continues to provide shelter to the numerous designated heritage assets and also undesignated assets / unknown archaeology within Christchurch Harbour.

#### Option 4

Under Option 4 (Improve), a similar approach to Option 3 (Maintain) would be undertaken in epoch 1 and 2. However, in epoch 3, the defences would be upgraded with a new rock revetment, groynes and beach nourishment. Due to this, the same likely significant effects are concluded across the SEA topics as Option 3 (Maintain). This includes biodiversity and geodiversity, as opportunities for sand dune creation would be explored.

#### Option 5

Under Option 5 (Managed Realignment), controlled rollback of the Sandbank would occur over time, and the FCERM standard of service of the Sandbank would be sustained. This would help to retain the recreation and amenity function of the Sandbank, which would lead to major positive significant effects for the climate change SEA topic, and minor positive significant effects for the population and communities SEA topic.

Uncertainty is noted under the biodiversity and geodiversity SEA topic, as it is uncertain how the Sandbank rolling back over time (albeit in a controlled manner) would impact habitats and species in the harbour area. Through feedback and discussions with Natural England, changes to natural processes which may modify the extent of biodiversity features in the harbour could be either positive or negative and more work would be required to confirm this.

Uncertainty is also noted under the landscape SEA topic, as it is unclear how the controlled rollback of the Sandbank may impact the landscape of the Sandbank or the harbour.

Minor negative long-term significant effects are predicted under the historic environment SEA topic as the rollback of the Sandbank could increase the exposure of the eastern boundary of the 'Multi-period landscape on Hengistbury Head' scheduled monument. Under this option, the disturbance, compression or loss of archaeological remains on Hengistbury Head will need to be monitored and mitigated, for example through a programme of recording. It is also unclear whether the controlled rollback of the Sandbank would continue to provide the same level of shelter to the numerous designated heritage assets within Christchurch Harbour. For example, as the Sandbank moves the cross shore profile may change, which may impact the level of protection it provides against wave overtopping and inundation during storm conditions. Due to this uncertainty, minor negative significant effects have been concluded for this option under the historic environment SEA topic.

#### Option 6

Under Option 6 (Maintain with Adaptation / Resilience), similar effects to Option 3 (Maintain) would be expected. This is because this is largely the same option, but with the addition of property level protection to a small number of properties on the Sandbank. This would not be expected to significantly alter the likely significant effects across any of the SEA topics relative to Option 3 (Maintain).

Minor positive significant effects are noted under the biodiversity and geodiversity SEA topic, which is related to opportunities for sand dune creation under this option, and associated BNG. In addition, this option provides more certainty with respect to the position / morphological evolution of the Sandbank over time, which could potentially have a positive or negative effect on existing habitats. However, this has not been factored into the scoring as the impacts are uncertain and more work would be required to investigate this in the future.

Minor positive significant effects are anticipated under the historic environment SEA topic as this option will likely prevent the disturbance, compression or loss of the northern and eastern boundaries of the 'Multi-period landscape on Hengistbury Head' scheduled monument. In addition, holding the Sandbank close to its current position will mean that it continues to provide shelter to the numerous designated heritage assets and also undesignated assets / unknown archaeology within Christchurch Harbour.

#### All Options

Neutral effects are predicted under the land, soil and water resources SEA topic across all six options because they are unlikely to impact these resources. This is because the land in this location is not used for agricultural purposes, nor are there any historical landfill sites, drinking water protected areas/ safeguard zones, or source protection zones in this location.

Neutral effects are also predicted under the transport and movement SEA topic across all six options as there is no official transport infrastructure along the Sandbank.

### **7.3.1 Cumulative effects**

There is potential for decisions made within this ODU to interact with the long groyne replacement at Hengistbury Head (adjacent to ODU 1).<sup>17</sup> Through discussions with BCP council it is understood that the long groyne is being designed to allow similar amounts of sediment transport around the groyne in the future, therefore the longshore sediment source to ODUs 1 and 2 should not be impacted by the long groyne replacement.

The Maintain, Managed Realignment and Improve options would support and align with the long groyne replacement scheme, and the positive environmental effects associated with these options would still be expected to occur with the long groyne replacement.

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<sup>17</sup> Ibid.

## 7.4 Leading Option selection

Two Leading Options were selected for ODU 2 based on the results of the economic, environmental, technical and social appraisal:

- National Economic Option: Do Minimum.
- Local Aspirational Option: Maintain with Adaptation.

Delivery of the Local Aspirational Option (Maintain with Adaptation) is likely to lead to environmental benefits across a range of categories as indicated by the SEA. There are also opportunities for BNG with this option such as Sand Dune creation. However, funding is uncertain and if funding cannot be achieved the National Economic Option (Do Minimum) would be delivered.

Any negative effect of the leading options on the SEA topics should be appropriately monitored and mitigated. For example, from an historic environment perspective, mitigation could include a programme of recording.

For the historic environment, delivering the Local Aspirational option is likely to be preferable compared to the National Option. Holding the Sandbank close to its current position will mean that it continues to provide shelter to the numerous designated heritage assets and also undesignated assets / unknown archaeology within Christchurch Harbour.

# 8. SMZ 2 – ODU 3: Christchurch Harbour South options assessment

## 8.1 Introduction

ODU 3 (shown in **Figure 8.1** below) is over 5km long and covers the southern side of Christchurch Harbour. The ODU is largely undefended with no formal coastal defences present. The SMP2 erosion zones do not cover much of this ODU and therefore the risk of erosion is largely unknown. However, given the sheltered estuary environment, the erosion risk is expected to be low. Over the next 100 years, the total PV damages for this unit are estimated to be approximately £1million under the baseline scenario.

The SMP<sup>18</sup> policy for ODU 3 is therefore ‘No Active Intervention’ from the present day. This approach aligns with the ‘Do Nothing’ strategic option.



Figure 8.1 ODU 3

## 8.2 Strategic options

The strategic options for this ODU are as follows:

1. **Do Nothing:** no new defences or maintenance of existing defences; ensure health and safety compliance when defences fail.
2. **Do Minimum:** small scale patch-repair maintenance to existing seawall defences (as and when required).

<sup>18</sup> Royal Haskoning (2011). ‘Poole & Christchurch Bays Shoreline Management Plan Review (SMP2), [online] available to access via [this link](#)

3. **Maintain A:** small-scale patch-repair to existing seawall defence (as and when required), but new slope armouring (erosion defence) adjacent to road access point to Hengistbury Head (epoch 1).
4. **Maintain B:** as per Option 3 (Maintain A), but also with new slope armouring (erosion defence) adjacent to historic landfill site in north-west part of the unit (to prevent this eroding) (epoch 1).
5. **Adaptation/ Resilience A:** property level protection measures to the small number of properties at risk of flooding (from epoch 1). No erosion defences to access road or historic landfill site.
6. **Adaptation/ Resilience B:** as per Option 3 (Maintain A), but with property level protection to the small number of properties at risk of flooding (from epoch 1).
7. **Adaptation/ Resilience C:** as per Option 4 (Maintain B), but with property level protection to the small number of properties at risk of flooding (from epoch 1).

## 8.3 Assessment findings

The assessment findings for each option, organised by SEA topic, are set out in **Table 8.1** below and discussed in more detail underneath.

**Table 8.1 Assessment findings for ODU 3**

SEA topic	Option number						
	1	2	3	4	5	6	7
Biodiversity and geodiversity	-	-	0	0	-	0	0
Climate change	?	?	?	?	+	+	+
Landscape	0	0	0	0	0	0	0
Historic environment	-	-	?	?	-	?	?
Land, soil and water resources	?	?	+	++	?	+	++
Population and communities	?	?	+	+	+	++	++
Transport and movement	?	?	++	++	?	++	++

### Key (likely significant effects)

Major positive	Minor positive	Neutral	Uncertain	Minor negative	Major negative
++	+	0	?	-	--

The entire length of ODU 3 falls within units 3 (Salt Hurns), 5 (Wick Hams), 6 (Wick Spires), 7 (Wick Fields) and 8 (Wick Farm Meadows) of the Christchurch Harbour SSSI<sup>19</sup>. The main habitat for units 3, 5 and 6 is littoral

<sup>19</sup> Natural England (no date): 'Christchurch Harbour SSSI', [online] available to access via [this link](#)

sediment, whilst for unit 7 it is acid grassland (lowland) and for unit 8 it is neutral grassland (lowland). All of these units are currently in a favourable condition.

The estuary to the north, which borders this ODU, is within unit 12 (Christchurch Harbour) of the SSSI. The main habitat here is littoral sediment and the unit is currently in a favourable condition. One of the reasons for notification of this SSSI is the variety of bird species that the site supports. The number of species both breeding and over-wintering are stable and increasing. The SSSI is also important for birds on migration. An assessment has also been made for this unit of the rare plant (Red Data Book species) *Eleocharis parvula*, Dwarf spike rush. The main colony is relatively stable and large numbers are present on substrate exposed at extreme low tides.

The full length of the frontage is adjacent to or in proximity of the Solent and Dorset coast marine SPA. The entire length of the ODU also falls within Hengistbury Head LNR<sup>20</sup>. In addition, a small part of the ODU, near the south eastern boundary, is within the Dorset Heaths SAC<sup>21</sup> and Dorset Heathlands SPA, which covers Hengistbury Head. The ODU also briefly comes into contact with the River Avon SAC<sup>22</sup> and unit 56 (Hampshire Avon Lower (downstream Fordingbridge)) of the River Avon System SSSI<sup>23</sup>, near the north western boundary. Unit 56 of the SSSI is currently in an unfavourable condition because this part of the river fails to achieve favourable conditions for all six attributes assessed, covering a wide range of condition indicators. Many of these indicator failures are linked with nutrient eutrophication and river channel modification.

In terms of BAP priority habitats, the entire length of the ODU is covered by priority habitats. In order, starting at the north western boundary of the ODU and ending at the south eastern boundary, this includes coastal and floodplain grazing marsh, coastal saltmarsh, lowland dry acid grassland, lowland heathland, deciduous woodland, and mudflats.

In terms of flood risk, much of the southern bank of Christchurch Harbour is within Flood Zone 3, particularly the area to the east of Wick and the area to the north of Hengistbury Head. However, there are very few properties along the length of the ODU; there is one property near the north western boundary, and another (Hengistbury Head Adult Sailors Club) in the mid-section of the ODU. Nevertheless, the south eastern half of the ODU is adjacent to a footpath (Hengistbury Head footpath) that provides access to Hengistbury Head and on to Mudeford Sandbank (ODU 2).

The ODU falls within the Dorset Heaths<sup>24</sup> National Character Area (NCA), which today contains some of the best lowland heath left in England.

With regards to the historic environment, the south eastern half of the ODU falls within the 'Multi-period landscape on Hengistbury Head' scheduled monument<sup>25</sup>. Whilst not within the limits of the ODU, the north western boundary of the ODU is near a cluster of seven grade II listed buildings along Wick Lane and Wick Green, the closest of which is 30m west of the boundary. In addition, the north facing shore of Hengistbury Head – which is covered by the ODU – was important as an Iron Age harbour.<sup>26</sup>

With regards to land, soil and water resources, there are two historic landfill sites<sup>27</sup> along the length of the ODU. The larger of the two is located to the east of Southbourne, whilst the other is located to the west of Hengistbury Head. These areas could potentially have contaminated materials present but this would need to be confirmed by site investigations. The erosion risk to these sites is expected to be low due to the sheltered harbour environment but erosion could still occur in the future. The sites are currently undefended and unlike other historic landfill sites around the harbour, they are not retained by retaining walls, quay walls or embankments. If erosion were to occur it would therefore likely be more gradual and wouldn't be linked to the sudden failure of a retaining structure.

### Option 1

Under Option 1 (Do Nothing), there would be no new defences or maintenance of existing defences. ODU 3 is mainly undefended, apart from a small length of seawall adjacent to Hengistbury Head Adult Sailors Club. Much of the area is at risk of flooding and there is uncertainty as to how each of the SEA topics may be impacted in the future. Given the sheltered harbour environment, the erosion risk is expected to be low / very minor, but it could

<sup>20</sup> Natural England (no date): 'Hengistbury Head LNR', [online] available to access via [this link](#)

<sup>21</sup> JNCC (no date): 'Dorset Heaths', [online] available to access via [this link](#)

<sup>22</sup> JNCC (no date): 'River Avon', [online] available to access via [this link](#)

<sup>23</sup> Natural England (no date): 'River Avon System SSSI', [online] available to access via [this link](#)

<sup>24</sup> Natural England (2013): 'NCA Profile: Dorset Heaths (NE506)', [online] available to access via [this link](#)

<sup>25</sup> Historic England (no date): 'Multi-period landscape on Hengistbury Head', [online] available to access via [this link](#)

<sup>26</sup> Cunliffe (1990): 'Hengistbury Head: A late prehistoric haven', [online] available to access via [this link](#)

<sup>27</sup> Catchment Based Approach Data Hub (2019): 'Historic Landfill Sites', [online] available to access via [this link](#)

still occur, and therefore uncertainty is noted across the majority of SEA topics, except for biodiversity and geodiversity.

Erosion could lead to the loss of important habitats, such as the Dorset Heaths SAC and Dorset Heathlands SPA. Therefore, minor negative significant effects are predicted under the biodiversity and geodiversity SEA topic.

It is recognised that erosion could lead to the loss or realignment of Hengistbury Head footpath, which could result in physical losses of the 'Multi-period landscape on Hengistbury Head' scheduled monument, and/ or reduced public access and enjoyment of the scheduled monument. Due to this, minor negative long-term significant effects is noted under the historic environment SEA topic. It is worth noting that due to the sheltered harbour environment, the erosion would be expected to be very low / minor, but to be conservative a negative scoring for this SEA topic has been provided.

It is also noted that the erosion of Wick historic landfill site could lead to the release of contaminated material into the environment. However, the contaminated status of the historic landfill sites in this location are unknown, and therefore uncertainty is noted under the land, soil and water resources SEA topic.

### Option 2

Under Option 2 (Do Minimum), only small-scale patch repair maintenance of the existing seawall will be carried out as and when required. In this respect, this option does not differ drastically from Option 1 (Do Nothing), and this is reflected in the assessment findings.

### Option 3 and Option 6

Options 3 (Maintain A) and 6 (Adaptation/ Resilience B) deliver small-scale patch-repair to the existing seawall defence, as well as new slope armouring adjacent to the access route to Hengistbury Head, where the smaller historic landfill site is located. Due to this, major/ minor positive long-term significant effects are predicted under the population and communities and transport and movement SEA topics as access to Hengistbury Head would be maintained.

Minor positive significant effects are also predicted under the land, soil and water resources SEA topic, as the slope armouring would help reduce the risk of erosion to the smaller historic landfill site in this location. Whilst there is uncertainty associated with the contamination status of this site, defending the site would reduce the risk of erosion (the pathway). Major positive significant effects have not been predicted under this SEA topic as the larger historic landfill site at Wick would not be defended. Therefore, there remains the potential for erosion of historic landfill in this location.

With respect to the biodiversity and geodiversity SEA topic, both of these options are considered likely to lead to neutral effects. The erosion defences at the access route to Hengistbury Head would prevent erosion of the Dorset Heaths SAC and Dorset Heathlands SPA, helping to preserve the integrity of these designations. However, there is potential for some habitat loss depending on the defence alignment that is used for the erosion defence. The alignment will need to be determined during further design work.

Regarding the historic environment SEA topic, the new slope armouring adjacent to the access route to Hengistbury Head has the potential to disturb archaeological remains, including the 'Multi-period landscape on Hengistbury Head' scheduled monument. It could also impact the setting of the scheduled monument. However, uncertainty is noted at this stage as effects depend on the detailed design of the slope armouring and the mitigation measures implemented. A positive effect of these options are that they would prevent erosion of the access route and therefore public access to the monument would not be reduced.

Option 6 (Adaptation/ Resilience B) differs from Option 3 (Maintain A) as it provides property-level protection to the properties at risk of flooding in this location. Therefore, major positive significant effects are predicted under the population and communities SEA topic for Option 6, and minor positive significant effects are predicted under the climate change SEA topic.

### Option 4 and Option 7

Options 4 (Maintain B) and 7 (Adaptation/ Resilience C) deliver the same measures as those outlined under Option 3 (Maintain A) and Option 6 (Adaptation/Resilience B) respectively, except they also deliver new slope armouring adjacent to the larger historic landfill site in the unit. Similar major/ minor long-term positive significant effects are predicted under these options, and this is reflected in the assessment findings. However, under these

options, the additional defence to the larger historic landfill site is considered likely to lead to major positive significant effects under the land, soil and water resources SEA topic, as both historic landfill sites would be defended from erosion.

With respect to the biodiversity and geodiversity SEA topic, as with Options 3 and 6, neutral effects are predicted. The erosion defences would help to reduce erosion risk to land based habitats and species, but depending on the alignment used, this could lead to some habitat loss along the defence alignment. The HRA screening has identified the potential for an LSE in this location, and therefore the impacts on European sites are to be investigated further as part of the Strategy.

Regarding the historic environment SEA topic, as with Options 3 and 6, the new slope armouring adjacent to the access route to Hengistbury Head has the potential to disturb archaeological remains, including the 'Multi-period landscape on Hengistbury Head' scheduled monument. It could also impact the setting of the scheduled monument. However, uncertainty is noted at this stage as effects depend on the detailed design of the slope armouring and mitigation measures implemented. A positive effect of these options are that they would prevent erosion of the access route and therefore public access to the monument would not be reduced.

Option 7 (Adaptation/ Resilience C) differs from Option 4 (Maintain B) as it provides property level protection to the properties at risk of flooding in this location. Therefore, major positive significant effects are predicted under the population and communities SEA topic for Option 7, and minor positive significant effects are predicted under the climate change SEA topic.

#### Option 5

Option 5 (Adaptation/ Resilience A) would deliver property level protection measures to a small number of properties at risk from flooding in this unit, which will likely lead to minor positive significant effects under the climate change and population and communities SEA topics. However, no new defences would be provided elsewhere, and therefore there is uncertainty as to the impact on other SEA topics for this option (similar to Options 1 (Do Nothing) and 2 (Do Minimum)).

As with Options 1 and 2, it is recognised that erosion could lead to the loss or realignment of Hengistbury Head footpath, which could result in physical loss of the 'Multi-period landscape on Hengistbury Head' scheduled monument, and/ or reduced public access and enjoyment of the scheduled monument. In addition, this could also lead to a minor amount of erosion to land based designations such as Dorset Heathlands SPA and Dorset Heaths SAC. Due to this, minor negative long-term significant effects are noted under the historic environment and biodiversity / geodiversity SEA topics.

#### All Options

Neutral effects are predicted under the landscape SEA topic across all seven options as the risk of erosion in this ODU is low, leaving the landscape largely unchanged outside of extreme flood events, where low lying areas may temporarily flood.

### 8.3.1 Cumulative effects

The options under ODU 3 are unlikely to lead to any cumulative effects with respect to other plans and strategies as the land in this location is largely undeveloped, and unlikely to be developed in the future due to the presence of a scheduled monument and two historic landfill sites.

## 8.4 Leading Option selection

Two Leading Options were selected for ODU 3 based on the results of the economic, environmental, technical and social appraisal:

- National Economic Option: Adaptation / Resilience A.
- Local Aspirational Option: Adaptation / Resilience C.

Delivery of the Local Aspirational Option (Adaptation / Resilience C) is likely to lead to environmental benefits under the transport and movement, land, soil and water resources SEA topics as indicated by the SEA. Funding for the Local Option is uncertain and if funding cannot be achieved the National Economic Option (Adaptation / Resilience A) would be delivered.

Any negative effect of the leading options on the environmental receptors should be appropriately monitoring and mitigated. For example, from a historic environment perspective, this could include a recording programme and also identifying alternative routes to Hengistbury Head if the National Option is delivered.

# 9. SMZ 2 – ODU 4: Wick options assessment

## 9.1 Introduction

ODU 4 (shown in **Figure 9.1** below) spans the southern side of the River Stour up to Tuckton Bridge. There are three main types of defence in this ODU: a natural verge in the eastern part of the ODU, an earth embankment around the northeast of Wick, and a steel sheet pile wall in the western part of the ODU. The large residential area of Wick is located within this ODU.

Whilst the present-day tidal flood risk is minor with only a small number of properties at risk, over time the risk increases with approximately 40 properties at risk from a 1 in 200-year event in 50 years' time, and over 120 properties at risk in 100 years' time. The flood risk will need to be mitigated from both the north and east directions, increasing the length/ cost of defence alignment relative to benefits delivered. Over the next 100 years, the total PV damages for this ODU are estimated to be £4.2 million.

The SMP<sup>28</sup> policy for ODU 4 is to 'Hold the Line' from the present day, with an intent to implement local defence improvements in line with sea level rise.



Figure 9.1 ODU 4

## 9.2 Strategic options

The strategic options for this ODU are as follows:

<sup>28</sup> Royal Haskoning (2011). 'Poole & Christchurch Bays Shoreline Management Plan Review (SMP2)', [online] available to access via [this link](#)

1. **Do Nothing:** no new defences or maintenance of existing defences; ensure H&S compliance when defences fail.
2. **Do Minimum:** small scale patch-repair maintenance to existing defences (as and when required).
3. **Maintain:** refurbishment of existing defences from epoch 1.
4. **Sustain A:** construct new sheet pile/ quay wall along the frontline in the western part of the unit (fully replacing the existing sheet pile wall, epoch 1); in the eastern part of the unit, raise and lengthen the existing setback embankment (epoch 1); continue to raise and lengthen the defences over time to keep pace with SLR (epochs 2 and 3).
5. **Sustain B:** undertake repeat refurbishments of the existing frontline sheet pile wall in the western part of the unit over time; elsewhere raise and lengthen the existing setback embankment (epoch 1) and continue to do this to keep pace with SLR (epochs 2 and 3).
6. **Sustain C:** raise and lengthen the existing setback embankment over time to keep pace with SLR (epoch 1, then in epochs 2 and 3); do not maintain the existing sheet pile wall, leaving this to eventually fail; the sheet pile wall currently protects historic landfill, so risk of this eroding in the future when the wall fails.
7. **Improve A:** same as Sustain A, except the defences are constructed to the full height and length initially (e.g. no new construction in epochs 2 and 3).
8. **Improve B:** same as Sustain B, except the defences are constructed to the full height and length initially (e.g. no new construction in epochs 2 and 3).
9. **Improve C:** same as Sustain C, except the defences are constructed to the full height and length initially (e.g. no new construction in epochs 2 and 3).

## 9.3 Assessment findings

The assessment findings for each option, organised by SEA topic, are set out in **Table 9.1** below and discussed in more detail underneath.

**Table 9.1 Assessment findings for ODU 4**

SEA topic	Option number								
	1	2	3	4	5	6	7	8	9
Biodiversity and geodiversity	?	?	0	+	+	0	+	+	0
Climate change	--	--	-	++	++	+	++	++	+
Landscape	?	?	?	-	-	-	-	-	-
Historic environment	--	--	-	++	++	-	++	++	-
Land, soil and water resources	--	--	+	++	++	--	++	++	--
Population and communities	--	--	-	++	++	--	++	++	--
Transport and movement	--	--	-	++	++	-	++	++	-

### Key (likely significant effects)

Major positive	Minor positive	Neutral	Uncertain	Minor negative	Major negative
++	+	0	?	-	--

The eastern boundary of the ODU borders unit 8 (Wick Farm Meadows) of the Christchurch Harbour SSSI<sup>29</sup>. The main habitat here is neutral grassland (lowland) and the unit is currently in a favourable condition. The eastern boundary of the ODU also borders Hengistbury Head LNR<sup>30</sup> and the unit is also adjacent to the Solent and Dorset Coast marine SPA.

In terms of BAP priority habitats, this ODU contains deciduous woodland and coastal and floodplain grazing marsh.

In terms of flood risk, the southern bank of the River Stour is partially within Flood Zone 2/ 3. There is a public park and garden immediately adjacent to the River Stour. However, to the south of Wick Lane, which borders the southern edge of the park and garden, is the residential area of Wick.

The ODU falls within the Dorset Heaths<sup>31</sup> National Character Area (NCA), which today contains some of the best lowland heath left in England.

With regards to the historic environment, the eastern boundary of the ODU is in proximity to a cluster of seven grade II listed buildings, the closest of which is 25m south of the southern bank of the River Stour. There is another individual grade II listed building closer to the western boundary of the ODU, 150m south of the southern bank of the River Stour. In addition, scheduled monument 'Bowl barrow 390m east of Tuckton Roundabout' is in the mid-section of the ODU, 140m south of the southern bank of the River Stour. Notably, this ODU runs along the edge of Wick Village Conservation Area to the south, which covers some of these designated heritage assets.

With regards to land, soil and water resources, there is a historic landfill site<sup>32</sup> along the length of this ODU, covering the same area as the park and garden. The contamination status of the materials in the historic landfill site are unknown and site investigations would be required to confirm this. The landfill site is currently retained by a quay wall and if this wall were to fail it could lead to the erosion and the potential sudden release of some of the historic landfill material into the environment. Due to the uncertain contamination status, the potential impacts associated with the historic landfill site on the land, soil and water resources SEA topic are therefore uncertain.

#### Option 1

Under Option 1 (Do Nothing), there would be no new defences or maintenance of existing defences. Due to this, the existing quay wall and raised defences are likely to fail over time, increasing the risk of flooding in this location. Notably, approximately 40 properties would be at risk of flooding from a 1 in 200-year event in 50 years' time, and over 120 properties will be at risk in 100 years' time. Therefore, major negative long-term significant effects are predicted across the majority of the SEA topics. This includes major negative significant effects under the land, soil and water resources SEA topic if the historic landfill site is found to include contaminated material.

Regarding the historic environment SEA topic, major negative long-term significant effects are predicted because flood risk is likely to damage the listed buildings within the vicinity of this ODU. Flood risk maps for this location are available in the option development unit report (AECOM, 2022).

#### Option 2

Under Option 2 (Do Minimum), only small-scale patch repair maintenance of the existing defences will be carried out as and when required. This would extend the service life of the existing defences, but only by several years at most. Therefore, the medium- and long-term impacts would be expected to be similar to Option 1 (Do Nothing), and this is reflected in the assessment findings.

#### Option 3

Under Option 3 (Maintain), existing defences will be routinely refurbished, beginning in epoch 1. This would reduce the risk of the defence failing, and therefore minor positive significant effects are predicted under the land, soil and water resources SEA topic as the risk of erosion of historic landfill would be reduced. However, this option would not increase crest levels of the defences, and therefore the flood risk would increase over time due to sea level rise. Minor negative significant effects are therefore predicted across a range of SEA topics,

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<sup>29</sup> Natural England (no date): 'Christchurch Harbour SSSI', [online] available to access via [this link](#)

<sup>30</sup> Natural England (no date): 'Hengistbury Head LNR', [online] available to access via [this link](#)

<sup>31</sup> Natural England (2013): 'NCA Profile: Dorset Heaths (NE506)', [online] available to access via [this link](#)

<sup>32</sup> Catchment Based Approach Data Hub (2019): 'Historic Landfill Sites', [online] available to access via [this link](#)

including climate change, the historic environment, population and communities, and transport and movement. Regarding the historic environment SEA topic, this is because flood risk could damage several listed buildings.

Neutral effects are predicted under the biodiversity and geodiversity SEA topic. It is likely that maintenance would be within the existing defence footprint and therefore habitat loss would be unlikely. The timing of maintenance works would need to be scheduled to avoid noise / disturbance to nearby species.

#### Option 4 and Option 7

Under Options 4 (Sustain A) and 7 (Improve A), a new frontline sheet pile wall would be constructed, replacing the existing sheet pile wall in the west. The existing setback embankment in the eastern part of the ODU would also be raised and lengthened under these options. Therefore, these options would reduce the risk of flooding to the whole of this ODU from both the north and east directions. Due to this, major positive long-term significant effects are predicted under the majority of SEA topics, including climate change, the historic environment, land, soil and water resources, population and communities, and transport and movement.

It is recognised that, whilst this option will likely reduce the risk of flooding to nearby listed buildings, it will be important that the design and construction of defences are sensitive to the character / setting of listed buildings, as well as the setting of the Wick Village Conservation Area. During design of the schemes as part of these options, mitigation to ensure the upgraded defences are in line with the character of the conservation area and listed buildings will be considered.

Both options are considered likely to lead to minor positive significant effects under the biodiversity and geodiversity SEA topic. There is potential for BNG improvements to be incorporated into the upgraded defences, which should be explored during further design / appraisal work. For example, the setback embankment provides an opportunity to develop a vegetated structure that incorporates features of wildlife interest and habitat creation. There is ample space in this unit and therefore construction would likely be within or close to the footprint of the existing defences, or would be setback for the raised defences, which could limit negative impacts. Construction of the new defences would need to be undertaken during a period to limit noise / disturbance on nearby species.

Upgraded defences would be higher than the existing defences and could therefore impact the landscape and views of the area. Minor negative significant effects are therefore predicted under the landscape SEA topic.

#### Option 5 and Option 8

Under Options 5 (Sustain B) and 8 (Improve B), the existing frontline sheet pile wall, which spans the western half of the ODU, would be refurbished (recurring refurbishment over course of appraisal period), whilst the existing setback embankment, which spans the eastern half of the ODU, would be raised and lengthened. Similar effects to Options 4 (Sustain A) and 7 (Improve A) are anticipated under these options, and similar BNG opportunities exist. This is reflected in the assessment findings.

#### Option 6 and Option 9

Under Options 6 (Sustain C) and 9 (Improve C), the existing setback embankment, which spans the eastern half of the ODU, would be raised and lengthened over time. However, the existing frontline sheet pile / quay wall, which spans the western half of the ODU, would not be refurbished. This increases the risk of it failing at the end of its residual service life and could lead to erosion of the park / open space and historic landfill site adjacent to the quay wall. The flood risk in this location would also increase over time due to sea level rise, as it would not be mitigated with new defences.

Under these options, minor negative long-term significant effects are predicted across the historic environment and transport and movement SEA topics due to the increase in flood risk over time in the undefended areas.

Regarding the historic environment SEA topic, flooding and erosion could impact the Wick Village Conservation Area in the park located seawards of the setback embankment alignment which is leading to the negative effect. However, the listed buildings within the conservation area would be defended as part of the setback embankment scheme as these are located landward of the likely alignment. When raising and lengthening of the existing setback embankment, it will be important that the design and construction of this is sensitive to the character / setting of listed buildings, as well as the setting of the Wick Village Conservation Area. During design of the schemes as part of these options, mitigation to ensure the upgraded defences are in line with the character of the conservation area and listed buildings will be considered.

Due to the potential for erosion of the park / open space and historic landfill site, major negative long-term significant effects are predicted under the land, soil and water resources and population and communities SEA topics.

For these options, neutral effects are predicted under the biodiversity and geodiversity SEA topic. For the setback embankment there will be an opportunity for BNG, similar to Options 4, 5, 7 and 8, which can be explored during further appraisal / design work. However, there is uncertainty as to how potential erosion of the historic landfill site along the frontline could impact biodiversity in the area. The HRA screening has screened in a potential LSE for this option, which will be explored in more detail.

Upgraded higher defences could impact the landscape, and therefore minor significant negative effects are considered likely under this SEA topic for these options.

### 9.3.1 Cumulative effects

The options under ODU 4 are unlikely to lead to any cumulative effects with respect to other plans and strategies as the land in this location is already developed, and the undeveloped land is either within Flood Zone 3 or covered by a historic landfill site.

Potential cumulative effects with the Lower Stour Flood Risk Management Strategy that is currently being prepared by the Environment Agency have been considered. The two project teams have engaged in regular dialogue throughout the development of the projects. It is understood from the Lower Stour project team that no major interventions to manage flood risk in the vicinity of ODU 4 are being proposed as part of the Lower Stour Strategy and therefore cumulative effects on environmental receptors in ODU 4 should be minimal. Any cumulative effects on environmental receptors upriver arising from options in ODU 4 are also likely to be minimal given the downstream location and nature of the flood cell.

## 9.4 Leading Option selection

Two Leading Options were selected for ODU 4 based on the results of the economic, environmental, technical and social appraisal:

- National Economic Option: Sustain C.
- Local Aspirational Option: Sustain B.

Delivery of the Local Aspirational Option (Sustain B) is likely to lead to environmental benefits across a range of categories as indicated by the SEA. Funding is uncertain for the Local Aspirational option as the increase in cost is largely associated with maintaining the frontline quay wall to prevent erosion of the historic landfill site, which does not currently attract funding as part of the Environment Agency's Partnership Funding process. If funding cannot be achieved, it would be the aim to instead deliver the National Economic option (Sustain C) (this option is also subject to funding constraints, but less significantly).

Under the SEA topics where negative effects are expected to occur with the leading options, appropriate monitoring and mitigation would be required. For example, for the historic environment SEA topic, mitigation could include a programme of recording around the conservation area and ensuring the setback embankment is designed in accordance with the character / setting of the area and Wick Village Conservation Area.

There are opportunities for BNG for both options, but the Local Aspirational Option is the more environmentally sustainable option as it would help prevent potential negative effects under the land, soil and water resources and population and communities SEA topics.



## 10.2 Strategic options

The strategic options for this ODU are as follows:

1. **Do Nothing:** no new defences or maintenance of existing defences; ensure H&S compliance when defences fail.
2. **Do Minimum:** small scale patch-repair maintenance to existing defences (as and when required).
3. **Maintain:** refurbishment of existing defences through the appraisal period (from epoch 1).
4. **Sustain A:** construct a new frontline wall in the western part of the unit (along alignment of the existing quay wall) (epoch 1); this would incorporate a raised wall relative to ground levels to provide a flood defence, which would be further raised over time as sea levels rise; in addition, raise and lengthen the existing setback wall in the eastern part of the unit over time as sea levels rise (epoch 1, then epoch 2 and 3); maintain the frontline quay wall in the eastern part of the unit to prevent erosion of historic landfill site (epochs 1-3). Also includes Sustain D with delayed initial intervention.
5. **Sustain B:** construct a new frontline wall along the full length of the unit (along alignment of the existing frontline quay wall) (epoch 1); this would incorporate a raised wall relative to ground levels to provide flood defence, which would be further raised over time as sea levels rise (epochs 2 and 3). Also includes Sustain E with delayed initial intervention.
6. **Sustain C:** construct a new setback wall in the western part of the unit in the future (epoch 3); in addition, raise and lengthen the existing setback wall in the eastern part of the unit over time as sea levels rise (epoch 1, then epochs 2 and 3); maintain the frontline quay wall to prevent erosion of historic landfill (epochs 1-3). Also includes Sustain F with delayed initial intervention.
7. **Improve A:** as per Sustain A, except the defences are constructed to the full height and length initially (e.g. no new construction in epochs 2 and 3). Also includes Improve D with delayed initial intervention.
8. **Improve B:** as per Sustain B, except the defences are constructed to the full height and length initially (e.g. no new construction in epochs 2 and 3). Also includes Improve E with delayed initial intervention.
9. **Improve C:** as per Sustain C, except the defences are constructed to the full height and length initially (e.g. no new construction in epochs 2 and 3). Also includes Improve F with delayed initial intervention.
10. **Adaptation / Resilience:** same approach to defence maintenance as Maintain, with property level protection to properties at risk of flooding.

## 10.3 Assessment findings

The assessment findings for each option, organised by SEA topic, are set out in **Table 10.1** below and discussed in more detail underneath.

**Table 10.1 Assessment findings for ODU 5**

SEA topic	Option number									
	1	2	3	4	5	6	7	8	9	10
Biodiversity and geodiversity	?	?	?	+	+	+	+	+	+	?
Climate change	--	--	-	++	++	+	++	++	+	-
Landscape	?	?	?	?	?	?	?	?	?	?
Historic environment	--	--	-	+	?	+	+	?	+	-
Land, soil and water resources	--	--	+	++	++	++	++	++	++	+
Population and communities	--	--	-	++	++	?	++	++	?	-
Transport and movement	--	--	-	++	++	+	++	++	+	-

**Key (likely significant effects)**

Major positive	Minor positive	Neutral	Uncertain	Minor negative	Major negative
++	+	0	?	-	--

ODU 5 is adjacent to the Solent and Dorset Coast marine SPA designated for biodiversity. However it is not adjacent to or within any other internationally, nationally or locally designated sites for biodiversity, nor does it contain any BAP priority habitats.

In terms of flood risk, the ODU is largely within Flood Zone 3. Numerous properties border the northern bank of the River Stour along the length of the ODU, many of which contain gardens that back onto private mooring areas. The Quomps playing field borders the northern bank near the eastern boundary of the ODU. In addition, Willow Way, Sopers Lane and Quay Road are all located close to the northern bank.

The ODU falls within the Dorset Heaths<sup>34</sup> National Character Area (NCA), which today contains some of the best lowland heath left in England.

With regards to the historic environment, the eastern boundary of the ODU is adjacent to one grade II\* listed building and one grade II listed building at Place Mill. There is another grade II listed building located to the west of the eastern boundary of the ODU, in the Quomps, 20m north of the northern bank of the River Stour. Scheduled monument 'Pre-conquest monastery, early Christian cemetery, Augustinian priory and a motte and bailey castle at Christchurch' is also adjacent to the eastern boundary of the ODU, spanning a large area to Castle Street in the north. Notably, the schedule monument contains several listed buildings, including three grade I listed buildings. The eastern extent of the ODU, including the Quomps playing field, falls within Christchurch Central Conservation Area.

With regards to land, soil and water resources, there are two historic landfill sites<sup>35</sup> along the length of this ODU. One is located to the south of Willow Way, whilst the other is located in the Quomps playing field. The contamination status of the materials in the historic landfill sites are unknown and site investigations would be

<sup>34</sup> Natural England (2013): 'NCA Profile: Dorset Heaths (NE506)', [online] available to access via [this link](#)

<sup>35</sup> Catchment Based Approach Data Hub (2019): 'Historic Landfill Sites', [online] available to access via [this link](#)

required to confirm this. The landfill site at the Quomps playing field is retained by a quay wall and if this wall were to fail it could lead to the erosion and the potential release of some of the historic landfill material into the environment. Due to the uncertain contamination status, the potential impacts associated with the historic landfill site on the land, soil and water resources SEA topic are therefore uncertain.

#### Option 1

Under Option 1 (Do Nothing), there would be no new defences or maintenance of existing defences. Due to this, the existing defences are likely to fail over time, and in combination with the impacts of sea level rise, the risk of flooding would be expected to increase in this location. Notably, between 35-40 properties are currently at risk from flooding from a 1 in 200-year event, and over 560 properties would be at risk in 100 years' time. Therefore, major negative long-term significant effects are predicted across the majority of SEA topics. This includes the land, soil and water resources SEA topic if the historic landfill site is found to include contaminated material.

Regarding the historic environment SEA topic, major negative long-term significant effects are predicted because this option will could lead to the damage of listed buildings in the vicinity of ODU 5 as a result of flooding. For example, listed buildings within the flood zones in the future could include the Whitehall Grade II listed building and the Bandstand Grade II listed building in the Quomps recreation ground. Place Mill Grade II\* listed building at the eastern end of the unit on the boundary with ODU 6 could also be impacted by flooding, although this building has a functional relationship with the water. The south-western boundary of the scheduled monument 'Pre-conquest monastery, early Christian cemetery, Augustinian priory and a motte and bailey castle at Christchurch' may also be impacted by flooding, although the land here rises quickly so areas landward of the boundary would not be expected to be at risk.

#### Option 2

Under Option 2 (Do Minimum), only small-scale patch-repair maintenance of the existing defences would be carried out as and when required. This would extend the service life of the existing defences, but only by several years at most. Therefore, the effects would be expected to be similar to Option 1 (Do Nothing), and this is reflected in the assessment findings.

#### Option 3

Under Option 3 (Maintain), the existing quay wall and raised defences would be routinely refurbished, beginning in epoch 1. This would likely protect properties in this location from flooding to a greater degree than Options 1 (Do Nothing) and 2 (Do Minimum). However, over time, as sea level rises, the standard of protection of the raised defences would fall and flooding to large numbers of properties would be expected to occur. Therefore, this option could lead to minor negative significant effects across a range of SEA topics. It would however reduce the risk of erosion to the historic landfill sites, and therefore minor positive significant effects are predicted under the land, soil and water resources SEA topic.

#### Option 4 and Option 7

Under Options 4 (Sustain A) and 7 (Improve A), a new frontline wall would be constructed in the western part of the unit. In addition, the existing setback wall, in the eastern part of the ODU, would be raised and lengthened. The existing frontline quay wall, also in the eastern part of the ODU, would be maintained / refurbished to prevent erosion of the historic landfill site. In this respect, these options provide new and improved defences where they are most needed, in the western part of the ODU where numerous properties border the northern bank of the River Stour. At the same time, these options provide continued erosion protection to the Quomps playing field and historic landfill site in the eastern part of the ODU, as well as the properties to the north of this area. Due to this, major positive long-term significant effects are predicted under the majority of the SEA topics.

With respect to the biodiversity and geodiversity SEA topic, there are potential opportunities for the defences to improve biodiversity and deliver BNG. For example, the refurbished / new frontline walls could be ecologically engineered and constructed using materials and features that provide important habitats. Likewise, any setback structures could include habitat areas / planting to encourage biodiversity in the area. These opportunities should be investigated during further appraisal / design following the Strategy. Generally, in this location there is sufficient space to construct within or close to existing defence footprints, and therefore direct encroachment / habitat loss into the marine SPA designation would be limited. Mitigation during construction would be required, for example, by not undertaking construction during the sensitive bird seasons.

Regarding the historic environment SEA topic, minor positive significant effects are predicted. These options provide protection to some of the listed buildings in the vicinity of the ODU, such as the Whitehall Grade II listed building and 56, 58 and 60 Sopers Lane Grade II listed buildings (otherwise at risk from extreme events in the future). However, these options do not provide improved flood protection to the grade II listed building 'Bandstand in Quomps recreation ground', the grade II\* listed building 'Place Mill' and the grade II listed 'Place Mill Bridge'. However, it is recognised that 'Place Mill' and 'Place Mill Bridge' have a functional relationship with the water, and therefore they may not need to be defended in their entirety. This should be considered in more detail during the scheme design phase. Subject to the defence alignment and tie-in location with higher ground (which will be investigated further during scheme design), there may be a flood risk benefit to the south-west boundary of the scheduled monument 'Pre-conquest monastery, early Christian cemetery, Augustinian priory and a motte and bailey castle at Christchurch'.

#### Option 5 and Option 8

Under Options 5 (Sustain B) and 8 (Improve B), a new frontline sheet pile wall would be constructed along the full length of the ODU, which would provide a frontline flood defence to the unit. Similar effects and opportunities would be expected as those under Options 4 (Sustain A) and 7 (Improve A), and this is reflected in the assessment findings.

It is noted that these options are the only options that provide improved flood protection to grade II listed building 'Bandstand in Quomps recreation ground'. The eastern tie-in location is currently uncertain and would need to be determined during scheme design, but there is potential for these options to provide some protection to grade II\* listed building 'Place Mill' and grade II listed 'Place Mill Bridge'. As mentioned above, 'Place Mill' and 'Place Mill Bridge' have a functional relationship with the water and therefore they may not need to be defended in their entirety. Nevertheless, it is recognised that the new frontline sheet pile wall may impact on the historic significance, fabric and setting of 'Place Mill' and 'Place Mill Bridge', and therefore this should be considered in more detail during the scheme design phase and mitigation agreed accordingly. Due to this, uncertainty is noted under this SEA topic.

#### Option 6 and Option 9

Under Options 6 (Sustain C) and 9 (Improve C), a new setback wall would be constructed in the western part of the ODU. In the eastern part of the ODU, the existing setback would be raised and length over time. Existing frontline quay walls would be maintained / refurbished as part of this option.

In the western part of the ODU, the new setback wall would be constructed landward of the properties immediately at risk in this location. Therefore, the flood risk associated benefits would not be as great as under Options 4 and 5 and 7 and 8. This is reflected in the assessment findings, with only minor positive significant effects predicted under the climate change, historic environment, and transport and movement SEA topics.

As with Options 4 and 7, only minor positive significant effects are predicted under the historic environment SEA topic because these options do not provide improved flood protection to the grade II listed building 'Bandstand in Quomps recreation ground', the grade II\* listed building 'Place Mill' and the grade II listed 'Place Mill Bridge'. However, it is recognised that 'Place Mill' and 'Place Mill Bridge' have a functional relationship with the water, and therefore they may not need to be defended in their entirety. This will be considered in more detail during the scheme design phase.

Uncertainty is noted under the population and communities SEA topic given the potential for increased flood risk over time (due to sea level rise) in the western part of the unit, seaward of the new setback defence. Whilst this area would have property level protection, it is unclear how effective this may be in the long-term in this location.

The biodiversity and geodiversity SEA topic is predicted to lead to the same effects as Options 4, 5, 7 and 8, and similar opportunities for BNG exist under these options. This is reflected in the assessment findings.

#### Option 10

Similar impacts to Maintain are expected. Flood risk would be managed on a property by property basis but risk would still increase over time across the wider public realm.

#### All Options

Uncertainty is noted under the landscape SEA topic across all nine options. This is because the impact of the options on landscape is currently difficult to predict. Options 4-9 would require higher defences than there are currently, and if traditional construction techniques are used, this could have a negative effect on the landscape. However, techniques such as glass topped floodwalls or broader landscaped areas could be included as part of the design, which could limit negative effects, and even improve the landscape in some parts of the unit. With frontline defences in the east part of the unit in particular, there is ample space available to incorporate broad landscape features into the defence alignment.

### 10.3.1 Cumulative effects

The options under ODU 5 are unlikely to lead to any cumulative effects with respect to other plans and strategies as the land in this location is already developed, and the undeveloped land is either within Flood Zone 3 or covered by a historic landfill site.

Potential cumulative effects with the Lower Stour Flood Risk Management Strategy that is currently being prepared by the Environment Agency have been considered. The project teams have engaged in regular dialogue throughout the development of the projects. It is understood from the Lower Stour project team that no major interventions to manage flood risk in the vicinity of ODU 5 are being proposed as part of the Lower Stour Strategy and therefore cumulative effects on environmental receptors in ODU 5 should be minimal. Any cumulative effects on environmental receptors upriver arising from options in ODU 5 are also likely to be minimal given the downstream location and nature of the flood cell.

## 10.4 Leading Option selection

Three Leading Options were selected for ODU 5 based on the results of the economic, environmental, technical and social appraisal:

- National Economic Option: Improve D-F.
- Local Aspirational Option: Improve A-C.
- Backup: Adaptation / Resilience.

Delivery of the National or Local Aspirational Options (Improve A-F) is likely to lead to environmental benefits across a range of SEA topics, as indicated by the SEA. Each of these options has potential to deliver BNG and opportunities will be investigated during further appraisal / design work. However, at this stage funding is uncertain for the Improve options, and if funding cannot be achieved the Backup option (Adaptation / Resilience) would be delivered.

Appropriate monitoring and mitigation will be required with either the National or Local Options to address any negative environmental effects. For example, for the historic environment SEA topic it will be important for scheme design to consider solutions that are in keeping with the character and setting of the conservation areas and listed buildings, making use of appropriate design materials and defence alignments.



2. **Do Minimum:** small scale patch-repair maintenance to existing defences (as and when required).
3. **Maintain:** refurbishment of existing defences (from epoch 1).
4. **Sustain A:** construct a new frontline / setback defence in the southern part of the unit (epoch 1) at Priory Quay and Convent Meadows. This would be raised over time to keep pace with sea level rise (epochs 2 and 3). In the central part of the unit in proximity to Castle Street, construct a new defence, raised over time to keep pace with sea level rise (epochs 2 and 3).
5. **Sustain B:** construct a new frontline / setback defence in the central part of the unit (epoch 1) in proximity to Castle Street and then raise it over time to keep pace with sea level rise (epochs 2 and 3). In the south part of the unit implement property level protection throughout appraisal period to properties at risk from flooding, but no new raised defences here.
6. **Improve A:** as per Sustain A, except the defences are constructed to the full height and length initially (e.g. no new construction in epochs 2 and 3).
7. **Improve B:** as per Sustain B, except the defences are constructed to the full height and length initially (e.g. no new construction in epochs 2 and 3).
8. **Adaptation / Resilience:** implement property level protection to the properties at risk from flooding throughout the appraisal period, mainly focussed in the south (Priory Quay / Convent Meadows) and central part (Castle Street) of the unit. Consider natural flood management where adjacent land is not residential.

## 11.3 Assessment findings

The assessment findings for each option, organised by SEA topic, are set out in **Table 11.1** below and discussed in more detail underneath.

**Table 11.1 Assessment findings for ODU 6**

SEA topic	Option number							
	1	2	3	4	5	6	7	8
Biodiversity and geodiversity	?	?	0	-	-	-	-	0
Climate change	--	--	--	++	+	++	+	-
Landscape	?	?	?	-	-	-	-	?
Historic environment	--	--	--	-	-	-	-	-
Land, soil and water resources	?	?	?	?	?	?	?	?
Population and communities	--	--	--	++	+	++	+	-
Transport and movement	--	--	--	++	+	++	+	-

## Key (likely significant effects)

Major positive	Minor positive	Neutral	Uncertain	Minor negative	Major negative
++	+	0	?	-	--

The River Avon SAC<sup>37</sup>, Avon Valley SPA/ Ramsar site, River Avon System SSSI<sup>38</sup>, and Avon Valley (Bickton to Christchurch) SSSI<sup>39</sup> run adjacent to the majority of the length of the ODU, all covering the River Avon. The full length of the frontage is adjacent to or in proximity of the Solent and Dorset coast marine SPA.

This stretch of the River Avon System SSSI is covered by unit 56 (Hampshire Avon Lower (downstream Fordingbridge)). This unit is currently in an unfavourable condition because this part of the river fails to achieve favourable conditions for all six attributes assessed, covering a wide range of condition indicators. Many of these indicator failures are linked with nutrient eutrophication and river channel modification.

This stretch of the Avon Valley (Bickton to Christchurch) SSSI is covered by unit 154 (open running water – River Avon). This unit is currently in an unfavourable but recovering condition. Of particular concern is the decline of 'Desmoulin' whorl snail. However, the status of the other two molluscs found in this part of the SSSI is currently unknown. In addition, Salmon populations are below the conservation limit and considered to be at risk. It is noted that this may be due to external factors, such as survival at sea and climate change, causing higher river temperatures, as well as the riverine habitat.

In terms of BAP priority habitats, this ODU contains an area of coastal and floodplain grazing marsh, located where the A35 (Christchurch Bypass) crosses the river, as well as a small area of deciduous woodland.

In terms of flood risk, a large part of the western bank of the River Avon is within Flood Zone 3, particularly near the southern border of the ODU, as well as where the A35 crosses the River Avon. Numerous properties border the western bank of the River Avon, including part of Christchurch town centre. There is also an industrial estate near the northern boundary of the ODU. The area where the A35 crosses the river comprises open green space. Several roads pass near the western boundary of the River Avon, including Quay Road, Covent Walk, Castle Street, the A35, and Mill Road.

The ODU primarily falls within the New Forest<sup>40</sup> National Character Area (NCA), which includes the Lower Hampshire Avon Valley. However, the southern boundary of the ODU falls within the Dorset Heaths<sup>41</sup> NCA, which today contains some of the best lowland heath left in England.

With regards to the historic environment, the southern boundary of the ODU borders one grade II\* listed building and one grade II listed building at Place Mill. Scheduled monument 'Pre-conquest monastery, early Christian cemetery, Augustinian priory and a motte and bailey castle at Christchurch' is also adjacent to the southern boundary of the ODU, spanning a large area to Castle Street in the north. Notably, the schedule monument contains several listed buildings, including three grade I listed buildings. In addition, there are two grade I listed buildings on Castle Street, 'Redford Bridge' and 'Town Bridge', which pass over Mill Stream and the River Avon respectively. Further to the north, where the railway line crosses the River Avon, is scheduled monument 'World War II pillbox and tank traps in former railway yard north of town', 60m west of the western bank of the River Avon.

With regards to land, soil and water resources, the northern part of the ODU falls within the Hampshire Avon (Lower) drinking water protected area (surface water).

### Option 1

Under Option 1 (Do Nothing), there would be no new defences or maintenance of quay walls. With projected sea level rise, the risk of flooding in this location is expected to increase over time. Notably, between 35-40

<sup>37</sup> JNCC (no date): 'River Avon', [online] available to access via [this link](#)

<sup>38</sup> Natural England (no date): 'River Avon System SSSI', [online] available to access via [this link](#)

<sup>39</sup> Natural England (no date): 'Avon Valley (Bickton to Christchurch) SSSI', [online] available to access via [this link](#)

<sup>40</sup> Natural England (2013): 'NCA Profile: New Forest (NE477)', [online] available to access via [this link](#)

<sup>41</sup> Natural England (2013): 'NCA Profile: Dorset Heaths (NE506)', [online] available to access via [this link](#)

properties are currently at risk of flooding from a 1 in 200-year event, and over 120 properties are expected to be at risk in 100 years' time. Therefore, major negative long-term significant effects are considered likely across the majority of the SEA topics, as flood risk would not be managed or reduced in the future.

Regarding the historic environment SEA topic, major negative long-term significant effects are predicted because this option is likely to lead to flooding of listed buildings in the vicinity of this ODU. There is potential for more regular flooding with sea level rise in the future, particularly in the area around Castle Street where there is a high concentration of listed buildings. The scheduled monument 'Pre-conquest monastery, early Christian cemetery, Augustinian priory and a motte and bailey castle at Christchurch' could also be at risk. The vast majority of this scheduled monument is located on higher ground, above the projected flood zones. However, flooding around the boundary of the monument could occur, as well as to isolated areas of higher risk in the north-east corner of the monument, around the Constable House Grade I listed building and adjacent to Castle Steet, and the south-west corner of the monument, adjacent to ODU 5 (appraised in ODU 5). These areas that are around the boundary to the scheduled monument and the north-east and south-west corner are presently at risk from a 1 in 2 year flood event and have no mitigation in place, however, the frequency and depth of flooding is likely to increase in the future if nothing is done to manage the risk.

Under the Do Nothing option, once existing quay walls fail in the future, this option could also lead to instability of ground adjacent to the walls potentially impacting listed buildings and the boundary of the scheduled monument 'Pre-conquest monastery, early Christian cemetery, Augustinian priory and a motte and bailey castle at Christchurch'.

#### Option 2 and Option 3

Under Option 2 (Do Minimum) and Option 3 (Maintain), patch repairs / maintenance of the existing quay walls would be carried out as and when required. Given that there are no formal raised defences in this unit, this is not likely to improve the flood risk, and therefore the effects across the SEA topics for these options would be similar to Option 1 (Do Nothing).

The effect on biodiversity and geodiversity under Option 3 (Maintain) is predicted to be neutral given that it only involves maintaining existing quay walls in their current position. This is reflected in the assessment findings.

#### Option 4 and Option 6

Under Options 4 (Sustain A) and 6 (Improve A), new defences would be constructed in ODU 6. Indicative defence alignments for these options have been developed for the Strategy and include defences in both the southern and central parts of the ODU. The indicative defence alignments for these options are not final and would require further appraisal during scheme design. The indicative alignments were identified primarily for the purposes of costing and supporting the economic appraisal, and therefore are primarily focussed around defending residential and commercial properties as this is the key driver of FCERM GiA funding. The indicative alignments that have been assumed defend the area of highly concentrated listed buildings in the Castle Street area. However, they do not include defences for the area around the scheduled monument 'Pre-conquest monastery, early Christian cemetery, Augustinian priory and a motte and bailey castle at Christchurch' given that this area is generally higher ground and only the boundary of the site and a small number of properties are at risk in this location. Should either of these options be taken forward, it is recommended that the defence alignments are further appraised and opportunities for defending the scheduled monument area are considered to determine if this would be feasible from a technical, economic and environmental perspective.

For Options 4 and 6, major positive long-term significant effects are predicted under the majority of SEA topics, including climate change, population and communities, and transport and movement. With respect to the biodiversity and geodiversity SEA topic, both options are predicted to lead to minor negative significant effects. This is because both options would involve construction in proximity to environmental designations and habitats, such as the River Avon SAC, Avon Valley SPA / Ramsar, and River Avon System SSSI. In the northern part of the unit in particular, there are space constraints which increases the likelihood of new defences being located seaward of the existing defence alignment. This would need to be determined during further design / appraisal following the Strategy if either of these options were taken forward. However, for the purposes of the SEA, it has conservatively been assumed that these options could lead to some encroachment into the designated areas and some habitat loss may occur.

Regarding the historic environment SEA topic, based on the defence alignments that have been assumed and used in the appraisal, the new defences in the central parts of the ODU would protect a large cluster of listed

buildings in this location from flooding around the Castle Street area. However, the options would not provide protection to the listed buildings to the south of Castle Street, including grade I listed 'The Constable's House', which is situated in a depression behind the Millstream wall. In addition, the boundary of the scheduled monument 'Pre-conquest monastery, early Christian cemetery, Augustinian priory and a motte and bailey castle at Christchurch' would remain vulnerable to flooding, particularly at the north eastern boundary which is left undefended under the assumed alignments. Due to this, minor negative long-term significant effects is noted under this SEA topic. However, there is potential to explore different alignments during scheme development if this option were to be taken forward, and opportunities to incorporate the listed buildings and scheduled monument into the defence area could be considered.

New defences as part of this option could be in excess of 1m high and could impact on the landscape and views of the area. Therefore, minor negative significant effects are predicted under the landscape SEA topic.

#### Option 5 and Option 7

Under Options 5 (Sustain B) and 7 (Improve B), new defences would be constructed in the central part of the ODU. However, property-level protection would be implemented in the southern part of the ODU. These options perform less favourably than Options (Sustain A) and 6 (Improve A), as the level of flood defence provided by the property level protection to the properties in the southern part of the unit would be to a lower standard of protection. In addition, public spaces and transport links would not be defended from flooding in the southern part of the unit. This is reflected in the assessment findings, with only minor positive significant effects predicted under the climate change, population and communities, and transport and movement SEA topics.

Predicted effects under the biodiversity and geodiversity, landscape and historic environment SEA topics for these options are similar to those predicted for Options 4 and 6.

#### Option 8

Under Option 8 (Adaptation / Resilience), property level protection would be implemented in the southern and central parts of the unit. However, the property level protection would not provide a high standard of protection (deep flooding could still cause flood damage to properties with property level protection). Furthermore, no new permanent raised defences would be constructed, and therefore public spaces and transport links would not be defended from flooding in the southern and central parts of the unit. This is reflected in the assessment findings, with minor negative significant effects predicted across several SEA topics.

The option is expected to lead to minor negative significant effects under the historic environment SEA topic because listed buildings and the boundary to the scheduled monument would remain vulnerable to flooding which could lead to damage. Property level protection measures would be used to reduce the risk of damage to the listed buildings where possible, but given the historic nature of these assets, care will be required to ensure the property level protection is appropriate. If traditional property level protection measures such as flood gates and waterproofing are not viable, then bespoke / alternative methods could be utilised depending on the structure characteristics, setting and building fabric. This could even involve localised hard defences such as new flood walls to individual properties, but it is likely that more expensive measures such as this would need to be funded by the property owner or other stakeholders. This is because the additional costs associated with these bespoke defence measures could mean that the option as a whole becomes unviable from an economic standpoint (i.e. benefit cost ratio less than 1) and therefore the bespoke defences would not be eligible for funding from FCERM GiA or other public funding pots.

Maintenance and refurbishment of the existing quay walls would be undertaken as part of this option which reduces the risk of land instability in the future. This would help to ensure the integrity of the buildings close the water's edge and the boundary to the scheduled monument.

Neutral effects are predicted under the biodiversity and geodiversity SEA topic, which is the same as Option 3 (Maintain), given that existing quay walls would be maintained with the same approach, and property level protection would not be expected to impact biodiversity and geodiversity. There is potential for noise / vibration impacts to habitats / species under this option, associated with maintenance of the quay walls / installation of PLP. Appropriate mitigation, such as undertaking works away from sensitive bird /species seasons, would need to be undertaken to limit this impact.

## All Options

Uncertainty is noted under the land, soil and water resources SEA topic across all eight options. Whilst the land in this location is not used for agricultural purposes, nor are there any historic landfill sites in this location, the northern part of the ODU falls within the Hampshire Avon (Lower) drinking water protected area (surface water).

### 11.3.1 Cumulative effects

The options under ODU 6 are unlikely to lead to any cumulative effects with respect to other plans and strategies as the land in this location is already developed, and the undeveloped land is within Flood Zone 3.

Potential cumulative effects with the Lower River Avon Strategy that is currently being prepared by the Environment Agency have been considered. The two project teams have engaged in regular dialogue throughout the development of the projects. It is understood from the Lower River Avon project team that no major interventions to manage flood risk in the vicinity of ODU 6 are being proposed as part of the Lower River Avon Project and therefore cumulative effects on environmental receptors in ODU 6 should be minimal. Any cumulative effects on environmental receptors upriver arising from options in ODU 6 are likely to be minimal given the downstream location and nature of the flood cell.

It is also recognised that the options under ODU 7 that involve raising of defences at Rossiter's Quay, on the opposite bank of the river, could have implications for fluvial flood risk in ODU 6. This would need to be investigated at the scheme level. Given that the Rossiter's Quay area is already surrounded by quay walls and a flood defence and is of a relatively small area, any impacts would be anticipated to be minor, but require further assessment during scheme appraisal.

## 11.4 Leading Option selection

One Leading Options was selected for ODU 6 based on the results of the economic, environmental, technical and social appraisal:

- National Economic Option: Adaptation / Resilience

There are likely to be negative environmental effects associated with the Adaptation / Resilience option. However, there is not an economic case to deliver any of the alternative Do Something options considered, and therefore the Adaptation / Resilience option is considered to be the most appropriate way forward in the context of the full appraisal that considers social, economic and environmental factors.

Due to economic constraints, the National Option doesn't include any new raised flood defences and therefore represents a continuation of the existing situation where many of the residential properties, historic assets and listed buildings are currently at risk of flooding with no mitigation in place. Where possible, this option will seek to deliver property level protection measures to reduce the risk of flooding on a property-by-property basis. This could include bespoke defence measures for individual properties and property owners will have the flexibility to seek bespoke solutions providing they meet consenting criteria. This includes for historic assets that may be at risk, such as Constable's House adjacent to the Mill Stream.

There are many designated and undesignated features in this area that are nationally important from a historic environment perspective for which traditional property level protection measures may not be appropriate. If the risk of flooding cannot be reduced, then appropriate resilience measures could be put in place to reduce the impact of flooding when it occurs. Resilience measures should depend on the building characteristics. Some examples of resilience measures may involve regular surveys to check for structural problems, post storm clean-up and drying, and implementation of flood response plans. Examples of mitigation for water compatible buildings could include a programme of survey work to identify the need for repairs on a regular basis and minor building adjustments to ensure water can exit quickly following flood events to improve drying.

It is beyond the scope of the Strategy to determine potential impacts of flooding to individual heritage assets and archaeology and to design bespoke mitigation solutions on an asset by asset basis. It is therefore recommended that further work is undertaken prior to delivering a scheme in ODU 6. This should include a heritage impact assessment and archaeological assessment to better understand the how each heritage asset may be impacted by increased flood risk. This should be followed by a scheme level option heritage appraisal study to explore options for mitigation on an asset by asset basis. The heritage option appraisal study should consider funding availability and devise a funding strategy so that any proposed solutions are realistic and achievable. In the

interim it recommended that monitoring is carried out to assess damage following flood events. This may need to be continued following a scheme in this location depending on its extent.

# 12. SMZ 2 – ODU 7: Rossiters Quay options assessment

## 12.1 Introduction

ODU 7 (shown in **Figure 12.1** below) covers the Rossiters Quay island in the middle of the River Avon. Defences in this ODU consist of natural verges, embankment and masonry walls. There are also a large number of flood gates in this ODU. Notably, many properties are located close to the water's edge and therefore there is generally a lack of space to construct new defences. Given the numerous private landowners in this location, for a flood risk mitigation scheme to be successful, there will need to be collaboration between the numerous land owners and the flood risk authorities.

Access to the river, as well as to the natural creek (Brigands Creek) running through the defences in the north eastern corner of the island, is a key issue to consider.

Over 50 properties are expected to be at risk from a 1 in 200 year event in 100 years' time. Over the next 100 years, the total PV damages for this ODU are estimated to be £5.4million.

Similar to ODU 6, this area does not have an SMP policy as it is not included within the SMP. However, within the CFMP (2012)<sup>42</sup> the unit falls within the 'Christchurch Area', in which the plan is to take further action to reduce flood risk, subject to additional appraisal.

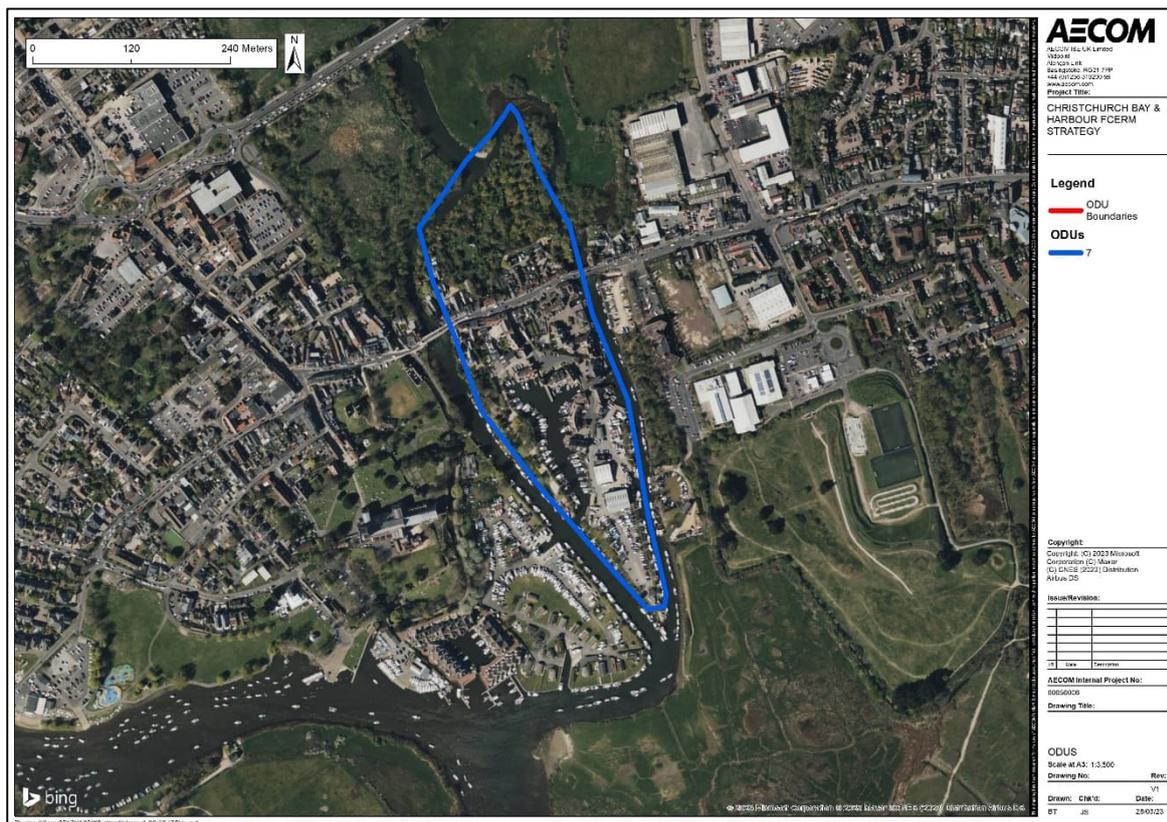


Figure 12.1 ODU 7

<sup>42</sup> Environment Agency (2012) Hampshire Avon Catchment Flood Management Plan [online]. Available to access via this [link](#)

## 12.2 Strategic options

The strategic options for this ODU are as follows:

1. **Do Nothing:** no new defences or maintenance of existing defences; ensure health and safety compliance when defences fail.
2. **Do Minimum:** small scale patch-repair maintenance to existing defences (as and when required).
3. **Maintain:** refurbishment of existing defences (from epoch 1).
4. **Sustain A:** construct new defences (epoch 2) consisting of a setback defence and a new quay wall with a raised front wall; raise the defences over time to keep pace with SLR (epoch 3).
5. **Improve A:** as per Sustain A, except the defences are constructed to the full height initially and not raised over time (e.g. no new construction in epoch 3).
6. **Adaptation / Resilience:** implement property level protection to the properties at risk from flooding throughout the appraisal period and maintain existing defences.

## 12.3 Assessment findings

The assessment findings for each option, organised by SEA topic, are set out in **Table 12.1** below and discussed in more detail underneath.

**Table 12.1 Assessment findings for ODU 7**

SEA topic	Option number					
	1	2	3	4	5	6
Biodiversity and geodiversity	?	?	?	-	-	?
Climate change	--	--	-	+	+	-
Landscape	?	?	?	-	-	?
Historic environment	--	--	-	+	+	-
Land, soil and water resources	0	0	0	0	0	0
Population and communities	--	--	-	+	+	-
Transport and movement	--	--	-	+	+	-

### Key (likely significant effects)

Major positive	Minor positive	Neutral	Uncertain	Minor negative	Major negative
++	+	0	?	-	--

This ODU is surrounded by the River Avon SAC<sup>43</sup>, the Avon Valley SPA/ Ramsar site, the River Avon System SSSI<sup>44</sup>, and the Avon Valley (Bickton to Christchurch) SSSI<sup>45</sup>. The full length of the frontage is adjacent to or in proximity of the Solent and Dorset coast marine SPA.

This stretch of the River Avon System SSSI is covered by unit 56 (Hampshire Avon Lower (downstream Fordingbridge)). This unit is currently in an unfavourable condition because this part of the river fails to achieve favourable conditions for all six attributes assessed, covering a wide range of condition indicators. Many of these indicator failures are linked with nutrient eutrophication and river channel modification.

This stretch of the Avon Valley (Bickton to Christchurch) SSSI is covered by unit 154 (open running water – River Avon). This unit is currently in an unfavourable but recovering condition. Of particular concern is the decline of Desmoulin' whorl snail. However, the status of the other two molluscs found in this part of the SSSI is currently unknown. In addition, Salmon populations are below the conservation limit and considered to be at risk. It is noted that this may be due to external factors, such as survival at sea and climate change causing higher river temperatures, as well as the riverine habitat.

In terms of BAP priority habitats, the northern part of the ODU contains deciduous woodland. There is also a small slither of coastal saltmarsh along the eastern boundary of the southern part of the ODU.

In terms of flood risk, almost the entire ODU is within Flood Zone 3. The quay contains numerous properties, as well as the Avon Marina. Bridge Street and Avon Wharf are the only roads on the quay.

The ODU falls within the New Forest<sup>46</sup> National Character Area (National Character Area (NCA), which includes the Lower Hampshire Avon Valley.

With regards to the historic environment, Bridge Street, which intersects with the ODU, is lined by several listed buildings, including two grade II\*. Moreover, Town Bridge, which connects the quay to the west, is grade I listed, as is Waterloo Bridge, which connects the quay to the east. The entire ODU is covered by Christchurch Central Conservation Area.

### Option 1

Under Option 1 (Do Nothing), there would be no new defences or maintenance of existing defences. Due to this, the existing defences are likely to fail over time, and when combined with sea level rise, this would increase the risk of flooding in this location. Notably, only two properties are currently at risk of flooding from a present day 1 in 200-year event due to the existing raised defences; however, over 50 properties would be expected to be at risk in 100 years' time under this option. Therefore, major negative long-term significant effects are predicted across the majority of the SEA topics, including climate change, the historic environment, population and communities, and transport and movement.

Regarding the historic environment SEA topic, major negative long-term significant effects are predicted because this option would leave the listed buildings along Bridge Street at risk of damage from flooding.

### Option 2

Under Option 2 (Do Minimum), only small-scale patch-repair maintenance of the existing defences would be carried out as and when required. This is likely to extend the service life of the existing defences by up to several years. However, in the medium- and long-term the defences would not be replaced when they reach the end of their service life, and therefore the flood risk would be similar to Option 1 (Do Nothing). This is reflected in the assessment findings.

### Option 3

Under Option 3 (Maintain), existing defences would be routinely refurbished, beginning in epoch 1 and continuing throughout the appraisal period. This would help to reduce the risk of the existing raised defences failing, and therefore the risk of flooding relative to Options 1 (Do Nothing) and 2 (Do Minimum) would be reduced. However, the defences would not be raised, and due to sea level rise, the flood risk would increase over time compared to

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<sup>43</sup> JNCC (no date): 'River Avon', [online] available to access via [this link](#)

<sup>44</sup> Natural England (no date): 'River Avon System SSSI', [online] available to access via [this link](#)

<sup>45</sup> Natural England (no date): 'Avon Valley (Bickton to Christchurch) SSSI', [online] available to access via [this link](#)

<sup>46</sup> Natural England (2013): 'NCA Profile: New Forest (NE477)', [online] available to access via [this link](#)

the present day. Minor negative significant effects are therefore predicted across the climate change, historic environment, population and communities, and transport and movement SEA topics.

Uncertainty is noted under the biodiversity and geodiversity SEA topic, as there is uncertainty as to whether defences could be refurbished within their existing defence footprint (this will need to be investigated further during further appraisal / design work following the Strategy).

#### Option 4 and Option 5

Under Options 4 (Sustain A) and 5 (Improve A), new / upgraded raised defences would be constructed. This would provide a high standard of protection against flooding to the central portion of the quay, where the majority of properties/ listed buildings are located. However, this will not protect the properties in the south eastern extent of the quay, or the Avon Marina. Due to this, only minor positive long-term significant effects are predicted across the majority of the SEA topics. This includes the historic environment SEA topic, as listed buildings along Bridge Street will be protected from flooding. However, it is noted that the design of the new / upgraded raised defences should seek to conserve the character of the conservation area and the setting of the listed buildings within it, taking particular care at interfaces with designated heritage assets, including grade I listed 'Town Bridge' and 'Waterloo Bridge'.

There is generally a lack of space to construct new defences in this ODU as part of Options 4 (Sustain A) and 5 (Improve A). The aim during design / construction would be to make use of existing defence footprints to minimise any encroachment into the adjacent designations and habitats, such as the River Avon SAC, Avon Valley SPA / Ramsar, various SSSIs, and BAP deciduous woodland habitat. However, there is uncertainty around this, and in some locations a small amount of encroachment / habitat loss may be unavoidable, which could lead to minor negative significant effects under the biodiversity and geodiversity SEA topic due to habitat loss. The design of the structures will be undertaken at the next stage of appraisal, and therefore there is considerable uncertainty as to whether habitat loss may occur. There could be viable alternatives, such as using existing defence structure foundations, or incorporating existing building walls into part of the defence system. Minor negative significant effects have therefore been predicted under the biodiversity and geodiversity SEA topic for both of these options, but a degree of uncertainty is noted. This area / option has been screened in during the HRA screening process (potential for an LSE) for further consideration during the next stage of the process.

#### Option 6

Under Option 6 (Adaptation / Resilience), property level protection would be implemented to properties at risk of flooding in this unit, and existing defences / quay walls would be refurbished / maintained. However, the property level protection would not provide a high standard of protection (deep flooding could still cause flood damage to properties with property level protection). Furthermore, no new permanent raised defences would be constructed, and therefore public spaces and transport links would not be defended from flooding. This is reflected in the assessment findings, with minor negative significant effects predicted across a range of SEA topics. This includes the historic environment SEA topic, as listed buildings along Bridge Street would remain vulnerable to damage from flooding.

Uncertainty is noted under the biodiversity and geodiversity SEA topic, as there is uncertainty as to whether defences could be refurbished within their existing defence footprint (this will need to be investigated further during further appraisal / design work following the Strategy).

#### All Options

Neutral effects are predicted under the land, soil and water resources SEA topic across all six options because they are unlikely to impact these resources. This is because the land in this location is not used for agricultural purposes, nor are there any historic landfill sites, drinking water protected areas/ safeguard zones, or source protection zones in this location.

### **12.3.1 Cumulative effects**

The options under ODU 7 are unlikely to lead to any cumulative effects with respect to other plans and strategies as the land in this location is already developed, and the undeveloped land is covered by deciduous woodland.

Potential cumulative effects with the Lower River Avon Strategy that is currently being prepared by the Environment Agency have been considered. The two project teams have engaged in regular dialogue throughout

the development of the projects. It is understood from the Lower River Avon project team that no major interventions to manage flood risk in the vicinity of ODU 7 are being proposed as part of the Lower River Avon project and therefore cumulative effects on environmental receptors in ODU 7 should be minimal. Any cumulative effects on environmental receptors upriver arising from options in ODU 7 are likely to be minimal given the downstream location and nature of the flood cell.

It is also recognised that the options under ODU 7 that involve raising of defences at Rossiter's Quay could have implications for flood risk in ODU 6, on the opposite bank of the river but this will be investigated further during scheme design. The impact would be expected to be minor if any, given that ODU 7 is already surrounded by a quay wall / raised defences.

## 12.4 Leading Option selection

Two Leading Options were selected for ODU 7 based on the results of the economic, environmental, technical and social appraisal:

- National Economic Option: Improve A.
- Backup: Adaptation / Resilience.

Delivery of the National Economic Option (Improve A) is likely to lead to environmental benefits in the climate change, historic environment, transport and movement and population categories as indicated by the SEA. However, it is noted that the design of the new / upgraded raised defences should seek to conserve the character of the conservation area and the setting of the listed buildings within it, taking particular care at interfaces with designated heritage assets, including grade I listed 'Town Bridge' and 'Waterloo Bridge'. Funding for the National Economic option is uncertain and if funding cannot be achieved the Backup (Adaptation / Resilience) would be delivered.

# 13. SMZ 2 – ODU 8: River Avon East Bank options assessment

## 13.1 Introduction

ODU 8 spans 1.1km along the eastern bank of the River Avon, from Knapp Mill to Christchurch Bypass. The eastern bank of the River Avon in this ODU is characterised by open space/ natural floodplain. The defence along the eastern bank of the River Avon in this ODU is a natural verge. It does not have a condition grade assigned and is privately maintained.

As outlined in the Leading Option Report (AECOM, 2023), options in ODU 8 have not been appraised fully as part of the Strategy as it was agreed that options for managing the flood risk would be developed as part future projects on the Lower River Avon.

No further details are therefore provided in the SEA for the potential environmental effects of options in ODU 8.



## 14.2 Strategic options

The strategic options for this ODU are as follows:

1. **Do Nothing:** no new defences or maintenance of existing defences; ensure health and safety compliance when defences fail.
2. **Do Minimum:** small scale patch-repair maintenance to existing defences (as and when required).
3. **Maintain:** refurbishment of existing defences (from epoch 1), approximately every 25 years; construct armoured embankment around Stanpit historic landfill in epoch 2.
4. **Sustain A:** construct a new setback defence adjacent to the River Avon in the north part of the unit (epoch 2); construct new defence around Stanpit historic landfill (epoch 2); raise height of the defences over time to keep pace with SLR (epoch 3); aim to restore/ improve condition of the saltmarsh in front of the defences (epoch 1-3).
5. **Improve A:** as per Sustain A, except the defences are constructed to their full length and height when constructed; aim to restore/ improve condition of the saltmarsh in front of the defences (epochs 1-3).
6. **Adaptation / Resilience:** implement property level protection to the properties at risk from flooding throughout the appraisal period and maintain existing defences.

## 14.3 Assessment findings

The assessment findings for each option, organised by SEA topic, are set out in **Table 14.1** below and discussed in more detail underneath.

**Table 14.1 Assessment findings for ODU 9**

SEA topic	Option number					
	1	2	3	4	5	6
Biodiversity and geodiversity	?	?	0	++	++	0
Climate change	--	--	-	++	++	-
Landscape	?	?	?	-	-	?
Historic environment	--	--	-	+	+	-
Land, soil and water resources	--	--	+	++	++	+
Population and communities	--	--	-	++	++	-
Transport and movement	--	--	-	++	++	-

### Key (likely significant effects)

Major positive	Minor positive	Neutral	Uncertain	Minor negative	Major negative
++	+	0	?	-	--

Approximately half of the length of the ODU, starting at the north western boundary, runs adjacent to the River Avon SAC<sup>48</sup>, Avon Valley SPA/ Ramsar site, the River Avon System SSSI<sup>49</sup>, and the Avon Valley (Bickton to Christchurch) SSSI<sup>50</sup>. Meanwhile, the other half of the length of the ODU, starting at the south eastern boundary, runs adjacent to the Christchurch Harbour SSSI<sup>51</sup> and Stanpit Marsh, Christchurch LNR. The full length of the frontage is adjacent to or in proximity of the Solent and Dorset coast marine SPA.

Concerning the River Avon System SSSI, the ODU borders unit 56 (Hampshire Avon Lower (downstream Fordingbridge)). This unit is currently in an unfavourable condition because this part of the river fails to achieve favourable conditions for all six attributes assessed, covering a wide range of condition indicators. Many of these indicator failures are linked with nutrient eutrophication and river channel modification.

Concerning the Avon Valley (Bickton to Christchurch) SSSI, the ODU borders unit 154 (open running water – River Avon). This unit is currently in an unfavourable but recovering condition. Of particular concern is the decline of Desmoulin' whorl snail. However, the status of the other two molluscs found in this part of the SSSI is currently unknown. In addition, Salmon populations are below the conservation limit and considered to be at risk. It is noted that this may be due to external factors, such as survival at sea and climate change causing higher river temperatures, as well as the riverine habitat.

Concerning Christchurch Harbour SSSI, the ODU borders units 9 (Priory Marsh) and 11 (Stanpit Marsh), which are both currently in a favourable condition. The main habitat in unit 9 is neutral grassland (lowland), whilst in unit 11 it is littoral sediment. Notably, unit 11 is a nature reserve that is frequently visited by the public, containing extensive areas of saltmarsh plus smaller areas of brackish wet grassland, acidic grassland, reedbed and scrub.

In terms of BAP priority habitats, the ODU falls within/ adjacent to several habitats, including coastal and floodplain grazing marsh, coastal saltmarsh, reedbeds, and deciduous woodland.

In terms of flood risk, the northern part of the ODU is within Flood Zone 3, whilst the open green space (golf course and Stanpit Recreation Ground) in the southern part of the ODU is within Flood Zone 1. However, the area immediately to the south of the southern part of the ODU is within Flood Zone 3. Only the central part of the ODU, to the south of Bridge Street, borders properties, which are primarily industrial/ businesses. In addition to Bridge Street, the ODU lies close to Commercial Road.

The ODU falls within the New Forest<sup>52</sup> National Character Area (NCA), which includes the Lower Hampshire Avon Valley.

With regards to the historic environment, the part of the ODU that passes Rossiters Quay is adjacent to grade I listed Waterloo Bridge to the west, as well as a cluster of five grade II listed buildings to the east along Bridge Street. This part of the ODU is located within Christchurch Central Conservation Area. There is another cluster of grade II listed buildings further inland to the east, along Purewell Road, the closest of which is 250m from the eastern bank of the River Avon. In addition, the south eastern boundary of the ODU is near two grade II listed buildings on Stanpit Road. It is also noted that a Mesolithic occupation site is present at Mother Siller's Channel on Stanpit Marsh, which raises the possibility of other prehistoric and later sites.

In terms of land, soil and water resources, the golf course and Stanpit Recreation Ground comprise a large historic landfill site. The contamination status of the materials for much of the historic landfill site is unknown and site investigations would be required to confirm this. The potential impacts associated with the historic landfill site on the land, soil and water resources SEA topic are therefore uncertain.

### Option 1

Under Option 1 (Do Nothing), there would be no new defences or maintenance of existing defences. Due to this, the existing defences are likely to fail over time, and when combined with sea level rise, the risk of flooding is expected to increase in this location. Notably, whilst there are some properties in the ODU currently at risk of flooding, in 100 years' time, over 850 properties would be expected to be at risk from a 1 in 200-year event. Therefore, major negative long-term significant effects are predicted across the majority of the SEA topics. This

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<sup>48</sup> JNCC (no date): 'River Avon', [online] available to access via [this link](#)

<sup>49</sup> Natural England (no date): 'River Avon System SSSI', [online] available to access via [this link](#)

<sup>50</sup> Natural England (no date): 'Avon Valley (Bickton to Christchurch) SSSI', [online] available to access via [this link](#)

<sup>51</sup> Natural England (no date): 'Christchurch Harbour SSSI', [online] available to access via [this link](#)

<sup>52</sup> Natural England (2013): 'NCA Profile: New Forest (NE477)', [online] available to access via [this link](#)

includes the land, soil and water resources SEA topic if the historic landfill site is found to include contaminated material. The exception is the biodiversity and geodiversity SEA topic, where uncertainty is noted.

Regarding the historic environment SEA topic, major negative long-term significant effects are predicted because listed buildings will remain vulnerable to damage from flooding under this option.

### Option 2

Under Option 2 (Do Minimum), only small-scale patch repair maintenance of the existing defences would be carried out as and when required. This is likely to extend the service life of the existing defences by up to several years. However, in the medium- and long-term, the defences would not be replaced when they reach the end of their service life, and therefore the flood risk would be expected to be similar to Option 1 (Do Nothing). This is reflected in the assessment findings.

### Option 3

Under Option 3 (Maintain), the existing defences would be routinely refurbished, beginning in epoch 1. This would help to reduce the risk of the existing raised defences failing, and therefore the risk of flooding relative to Option 1 (Do Nothing) and Option 2 (Do Minimum) would be reduced. However, the defences would not be raised any further, and due to sea level rise, flood risk would increase over time compared to the present day. Minor negative significant effects are therefore predicted under the climate change, historic environment, population and communities, and transport and movement SEA topics. By maintaining the existing verge around Stanpit, this would help to reduce the erosion risk to the historic landfill site, and could therefore provide a benefit to the land, soil and water resources SEA topic.

### Option 4 and Option 5

Under Options 4 (Sustain A) and 5 (Improve A), a new / upgraded defence would be constructed adjacent to the River Avon in the north western part of the ODU. Meanwhile, a new defence would be constructed around Stanpit historic landfill site in the south eastern part of the ODU. There would also be an aspiration to restore/improve the saltmarsh in front of the defences in this location. This would provide BNG, as well as help attenuate waves in front of the defences. In this respect, these options provide a comprehensive set of defences, protecting the entire length of the ODU whilst positively contributing towards the biodiversity designations in this area. As a result, major positive long-term significant effects are predicted under the majority of the SEA topics.

Major positive significant effects are noted for Options 4 and 5 under the biodiversity and geodiversity and landscape SEA topics. With regards to biodiversity and geodiversity, there are significant potential positive benefits to biodiversity through saltmarsh restoration / enhancement, which would provide BNG and help the saltmarsh habitat adjust to sea level rise and climate change. Without this restoration / enhancement, there is a risk that the saltmarsh could be lost / damaged due to coastal squeeze in the future.

The new defences as part of these options would be constructed in close proximity to a number of environmental designations, such as the River Avon SAC, Avon Valley SPA / Ramsar, Solent and Dorset coast marine SPA, River Avon SSSI and Avon Valley SSSI. Generally, there is sufficient space to construct defences either setback or within the footprint of the existing defences, and therefore opportunities to limit encroachment / habitat loss of designated areas could be achieved through design. This would limit the impacts on these designated sites. Whilst there is potential for disturbance, such as noise and vibration during construction, these impacts would be temporary and appropriate mitigation would be required to limit the impact (such as avoiding construction during sensitive seasons for species).

Higher defences as part of this option could have negative impacts on the local landscape, and this is reflected in the assessment findings.

Regarding the historic environment SEA topic, whilst these options will provide flood protection to listed buildings in the vicinity of this ODU, it is recognised that the construction of new defences may have adverse impacts on heritage assets, particularly the Mesolithic occupation site at Mother Siller's Channel on Stanpit Marsh. This is because remains at this site could be disturbed as a result of the construction of new defences. Due to this, only minor positive long-term significant effects are predicted overall. It is also noted that the new / upgraded defence near Bridge Street should seek to conserve the character of the conservation area and the setting of listed buildings within it, taking particular care at the interface with grade I listed 'Waterloo Bridge'.

## Option 6

Under Option 6 (Adaptation / Resilience), property level protection would be implemented to properties at risk of flooding in this unit, and existing defences would be refurbished / maintained. However, the property level protection would not provide a high standard of protection (deep flooding could still cause flood damage to properties with property level protection). Furthermore, no new permanent raised defences would be constructed, and therefore public spaces and transport links would not be defended from flooding. This is reflected in the assessment findings, with minor negative significant effects predicted across a range of SEA topics. This includes the historic environment SEA topic, as listed buildings in the vicinity of this ODU may remain at risk of damage from flooding if property level protection measures are not appropriate.

By maintaining the existing verge around Stanpit, this would help to reduce the erosion risk to the historic landfill site, and could therefore be beneficial to the land, soil and water resources SEA topic. Due to this, minor positive significant effects are predicted under this SEA topic.

### 14.3.1 Cumulative effects

The options under ODU 9 are unlikely to lead to any cumulative effects with respect to other plans and strategies as the land in this location is largely developed, and the undeveloped land is unlikely to be developed in the future as it covers a historic landfill site and flood plain.

Potential cumulative effects with the Lower River Avon Strategy that is currently being prepared by the Environment Agency have been considered. The two project teams have engaged in regular dialogue throughout the development of the projects. It is understood from the Lower River Avon project team that no major interventions to manage flood risk in the vicinity of ODU 9 are being proposed as part of the Lower River Avon project and therefore cumulative effects on environmental receptors in ODU 9 should be minimal. Any cumulative effects on environmental receptors upriver arising from options in ODU 9 are likely to be minimal given the downstream location and nature of the flood cell.

## 14.4 Leading Option selection

Two Leading Options were selected for ODU 9 based on the results of the economic, environmental, technical and social appraisal:

- National Economic Option: Sustain A.
- Backup Option: Adaptation / Resilience.

Delivery of the National Economic Option (Sustain A) is likely to lead to environmental benefits across most SEA topics, as indicated by the SEA. However, funding is uncertain, and if funding cannot be achieved, the Backup Option (Adaptation / Resilience) would be delivered. For the Sustain A option, there are significant potential positive benefits to biodiversity through saltmarsh restoration / enhancement, which would provide BNG and would help the saltmarsh habitat adjust to sea level rise and climate change.

Appropriate monitoring and mitigation will be required with the leading options to address any negative environmental effects. For example, for the historic environment it will be important for scheme design to consider solutions that are in keeping with the character and setting of the conservation areas and listed buildings, making use of appropriate design materials. It is also noted that the new / upgraded defence near Bridge Street should seek to conserve the character of the conservation area and the setting of listed buildings within it, taking particular care at the interface with grade I listed 'Waterloo Bridge'.

# 15. SMZ 2 – ODU 10: Mundeford options assessment

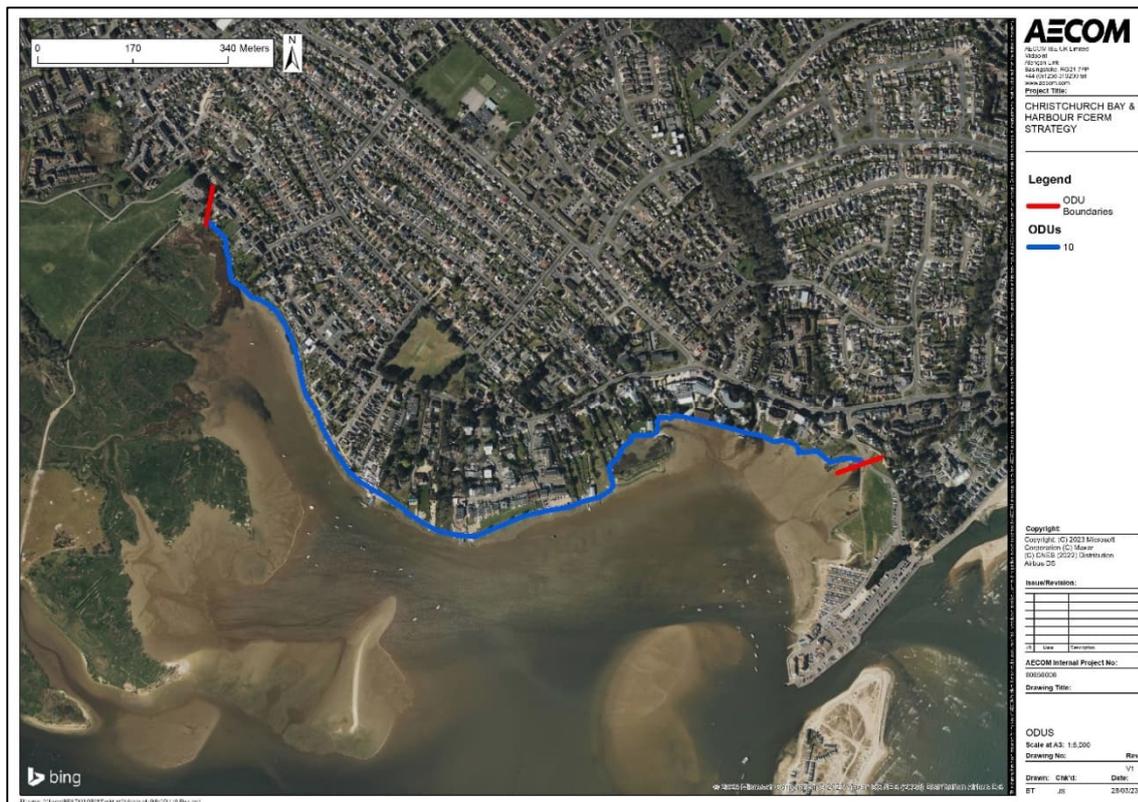
## 15.1 Introduction

ODU 10 (shown in **Figure 15.1** below) spans the northern side of Christchurch Harbour between Stanpit Marsh and Chichester Way. Due to buildings being close to the water's edge, and a range of private ownerships along the frontage, developing a scheme that includes frontline defences would need to encompass extensive engagement with landowners/ stakeholders.

For a present day 1 in 200-year tidal flood event, an estimated 25 properties will be at risk within this unit, increasing to 370 properties in 100 years' time. Over the next 100 years, the total PV damages for this ODU are estimated to be just over £12.7million.

The SMP policy for this unit is 'Hold the Line' in the short-term, followed by 'Managed Realignment' in the medium-term and then reverting back to 'Hold the Line' in the long-term. The SMP intent for this policy is to manage flood risk initially through local protection and flood warning, recognising a potential need for a combination of setback defences to complement existing foreshore structures. The SMP Refresh (2020) recommended that the policy is revisited/ potentially amended pending outcomes of contaminated land assessments.

The eastern boundary of ODU 10 is different to the SMP<sup>53</sup> policy unit boundary. It is noted that the main area discussed in the SMP for potential realignment, as part of the SMP policy, is the area of open space immediately to the north of Mundeford Quay. This area of open space is actually included in ODU 11 rather than ODU 10.



**Figure 15.1 ODU 10**

<sup>53</sup> Royal Haskoning (2011). 'Poole & Christchurch Bays Shoreline Management Plan Review (SMP2)', [online] available to access via [this link](#)

## 15.2 Strategic options

The strategic options for this ODU are as follows:

1. **Do Nothing:** no new defences or maintenance of existing defences; ensure health and safety compliance when defences fail.
2. **Do Minimum:** small scale patch-repair maintenance to existing defences (as and when required).
3. **Maintain:** refurbishment of existing defences (from epoch 1).
4. **Improve A:** initially provide property level protection measures to the properties at risk and maintain the existing quay walls (epoch 1); then in epoch 2 or 3, construct a new frontline quay wall with a raised front wall along the length of the unit and along the banks of the River Mude and Bure Brook; investigate opportunities for saltmarsh restoration in front of defences (epochs 1-3).
5. **Improve B:** initially provide property level protection measures to the properties at risk and maintain the existing quay walls (epoch 1); then in epoch 2 or 3, construct a new frontline quay wall with a raised front wall along the east part of the unit and along the River Mude and Bure Brook; in epoch 2 or 3, construct a new setback wall along the west part of the unit whilst maintaining the existing quay wall in front; investigate opportunities for saltmarsh restoration in front of defences.
6. **Adaptation:** provide property level protection measures to the properties at risk and maintain the existing quay wall (epochs 1-3).

## 15.3 Assessment findings

The assessment findings for each option, organised by SEA topic, are set out in **Table 15.1** below and discussed in more detail underneath.

**Table 15.1 Assessment findings for ODU 10**

SEA topic	Option number					
	1	2	3	4	5	6
Biodiversity and geodiversity	?	?	0	++	++	0
Climate change	--	--	--	++	++	-
Landscape	?	?	?	-	-	?
Historic environment	--	--	--	++	++	-
Land, soil and water resources	0	0	0	0	0	0
Population and communities	--	--	--	++	++	-
Transport and movement	--	--	--	++	++	-

### Key (likely significant effects)

Major positive	Minor positive	Neutral	Uncertain	Minor negative	Major negative
++	+	0	?	-	--

The whole length of the ODU borders Christchurch Harbour SSSI<sup>54</sup>. This includes unit 11 (Stanpit Marsh) for a short distance near the western boundary of the ODU, and then unit 12 (Christchurch Harbour) for the remainder of the length of the ODU. The main habitat in both of these units is littoral sediment, and both are currently in a favourable condition. Notably, one of the reasons for notification of unit 12 of this SSSI is the variety of bird species that the site supports. The number of species both breeding and over-wintering are stable and increasing, which is reflected by the unit's favourable condition.

The part of the ODU that borders unit 11 of Christchurch Harbour SSSI also borders Stanpit Marsh, Christchurch LNR. The full length of the frontage is adjacent to or in proximity of the Solent and Dorset coast marine SPA.

In terms of BAP priority habitats, the majority of the length of the ODU borders mudflats, whilst the part of the ODU nearest the western boundary borders coastal saltmarsh.

In terms of flood risk, the length of the ODU is primarily within Flood Zone 3. However, this does not extend far inland, especially along the western part of the ODU. The entire length of the ODU borders properties, and several roads are located near the harbour, including Stanpit Road, Fisherman's Bank, Waterside, Inveravon, Mude Gardens, and Chichester Way.

The ODU runs along the boundary of the New Forest<sup>55</sup> National Character Area (NCA) to the north, which includes the Lower Hampshire Avon Valley, and the Dorset Heaths<sup>56</sup> NCA to the south, which contains some of the best lowland heath left in England.

With regards to the historic environment, there is a cluster of listed buildings along Mudeford Road to the north of the eastern part of the ODU, including one grade II\* listed building near the western boundary, only 40m inland. This part of the ODU is within Mudeford Quay Conservation Area. In addition, there are two grade II listed buildings on Stanpit Road to the north of the western boundary of the ODU. This part of the ODU follows the frontage of Stanpit and Fisherman's Bank Conservation Area. There have been a number of significant artefacts found within the vicinity of ODU 10 showing the high archaeological potential of the area.

#### Option 1

Under Option 1 (Do Nothing), there would be no new defences or maintenance of existing quay walls. Due to this, the existing quay walls are likely to fail over time. Combined with sea level rise, the risk of flooding would increase over time in this location. Notably, 25 properties are currently at risk from flooding from a 1 in 200-year event, and 370 properties are expected to be at risk in 100 years' time from the same return period. Therefore, major negative long-term significant effects are predicted across the majority of the SEA topics, including climate change, the historic environment, population and communities, and transport and movement. For the historic environment SEA topic, the negative effect is due to flood risk to several listed buildings in the unit.

#### Option 2 and Option 3

Under Option 2 (Do Minimum) and Option 3 (Maintain), repair / maintenance of the existing quay walls would be carried out as and when required. Given that there are no formal raised defences in this unit, this is not likely to improve the flood risk, and therefore the effects across the SEA topics for these options would be similar to Option 1 (Do Nothing). The effect on biodiversity and geodiversity under Option 3 (Maintain) is expected to be neutral given that it only involves maintaining existing quay walls in their current position. This is reflected in the assessment findings.

#### Option 4 and Option 5

Under Option 4 (Improve A) and Option 5 (Improve B), property-level protection measures would initially be provided to properties at risk, and the existing quay walls would be maintained (both during epoch 1). After this, a new frontline quay wall and defences would be constructed along the length of the unit (during epochs 2 and 3). Opportunities for saltmarsh restoration in front of the defences would also be investigated. This option performs well as it would reduce the risk of flooding to properties along the whole length of the ODU, as well as those either side of the channels of the River Mude and Bure Brook. Due to this, major positive long-term significant effects are predicted across the majority of the SEA topics for this option. The exceptions are the biodiversity and geodiversity and landscape SEA topics.

<sup>54</sup> Natural England (no date): 'Christchurch Harbour SSSI', [online] available to access via [this link](#)

<sup>55</sup> Natural England (2013): 'NCA Profile: New Forest (NE477)', [online] available to access via [this link](#)

<sup>56</sup> Natural England (2013): 'NCA Profile: Dorset Heaths (NE506)', [online] available to access via [this link](#)

Major positive significant effects are noted for Options 4 and 5 regarding the biodiversity and geodiversity and landscape SEA topics. Concerning biodiversity and geodiversity, there are significant potential positive benefits to biodiversity through saltmarsh restoration / enhancement, which would provide BNG. The new defences as part of these options would be constructed in close proximity to a number of environmental designations, such as Christchurch Harbour SSSI and Solent and Dorset Coast marine SPA, and BAP habitats such as mudflats and saltmarsh. Generally, there is sufficient space to construct defences either setback or within the footprint of the existing defences, and therefore opportunities to limit encroachment / habitat loss of designated areas could be explored during the design phase. This would limit the impacts on these designated sites.

Higher defences along the quay as part of this option could have negative effects on the local landscape, and this is reflected in the assessment findings.

With respect to the historic environment SEA topic, new raised flood defences and property level protection will reduce the risk to listed buildings and the conservation area and therefore a positive effect is noted. The design of any raised defences should seek to conserve the character of the conservation areas and the setting of the listed buildings within them. This design would be undertaken during scheme appraisal and development after the Strategy.

#### Option 6

Under Option 6 (Adaptation), property level protection would be implemented in the areas at risk from flooding. However, the property level protection would not provide a high standard of protection (deep flooding could still cause flood damage to properties with property level protection). Furthermore, no new permanent raised defences would be constructed, and therefore public spaces and transport links would not be defended from flooding in the southern and central parts of the unit. This is reflected in the assessment findings, with minor negative significant effects predicted across the majority of the SEA topics.

Minor significant negative effects are noted for the historic environment SEA topic due to flood risk to the Mudeford Quay Conservation Area. Property level protection measures could be used on listed buildings but these may need to be bespoke to the individual structures if traditional measures such as flood gates / waterproofing are not appropriate.

#### All Options

Neutral effects are predicted under the land, soil and water resources SEA topic across all six options because they are unlikely to impact these resources. This is because the land in this location is not used for agricultural purposes, nor are there any historic landfill sites, drinking water protected areas/ safeguard zones, or source protection zones in this location.

### 15.3.1 Cumulative effects

The options under ODU 10 are unlikely to lead to any cumulative effects with respect to other plans and strategies as the land in this location is fully developed, with no room for future development.

## 15.4 Leading Option selection

Two Leading Options were selected for ODU 10 based on the results of the economic, environmental, technical and social appraisal:

- National Economic Option: Improve A.
- Backup Option: Adaptation / Resilience.

Delivery of the National Economic Option (Improve A) is likely to lead to environmental benefits across most SEA topics, as indicated by the SEA. However, funding is uncertain, and if funding cannot be achieved, the Backup Option (Adaptation / Resilience) would be delivered. For the Improve A option, there are significant potential positive benefits to biodiversity through saltmarsh restoration / enhancement, which would provide BNG.

Appropriate monitoring and mitigation will be required with the leading options to address any negative environmental effects. For example, for the historic environment it will be important for scheme design to consider solutions that are in keeping with the character and setting of the conservation areas and listed buildings, making use of appropriate design materials.



## 16.2 Strategic options

The strategic options for this ODU are as follows:

1. **Do Nothing:** no new defences or maintenance of existing defences; ensure health and safety compliance when defences fail.
2. **Do Minimum:** small scale patch-repair maintenance to existing defences (as and when required).
3. **Maintain:** refurbishment of existing defences (epoch 1).
4. **Sustain A:** upgraded floodwall around properties at western end of the Quay in epoch 1 or 2; raise over time to keep pace with SLR (epochs 2 and 3); maintain/ refurbish the existing frontline structures around the Quay as required (epochs 1-3).
5. **Sustain B:** as per Sustain A, except also construct new setback wall in northern part of unit (epochs 1 and 2), between green area and road.
6. **Improve A:** as per Sustain A, except the defence is constructed to its full length and height initially (e.g. no new construction after epoch 1 or 2).
7. **Improve B:** as per Sustain B, except the defence is constructed to its full length and height initially (e.g. no new construction after epoch 1 or 2).
8. **Adaptation/ Resilience:** Maintaining the existing quay walls as per the Maintain Option but also implement property level protection to properties at risk of flooding in the unit.

## 16.3 Assessment findings

The assessment findings for each option, organised by SEA topic, are set out in **Table 16.1** below and discussed in more detail underneath.

**Table 16.1 Assessment findings for ODU 11**

SEA topic	Option number							
	1	2	3	4	5	6	7	8
Biodiversity and geodiversity	?	?	0	0	0	0	0	0
Climate change	--	--	-	+	++	+	++	-
Landscape	--	--	-	+	++	+	++	-
Historic environment	--	--	-	+	++	+	++	-
Land, soil and water resources	--	--	+	++	++	++	++	+
Population and communities	--	--	-	+	++	+	++	-
Transport and movement	--	--	-	-	0	-	0	-

## Key (likely significant effects)

Major positive	Minor positive	Neutral	Uncertain	Minor negative	Major negative
++	+	0	?	-	--

The western side of the ODU lies adjacent to unit 12 (Christchurch Harbour) of the Christchurch Harbour SSSI<sup>58</sup>. The main habitat in this unit is littoral sediment, and it is currently in a favourable condition. Notably, one of the reasons for notification of this SSSI is the variety of bird species that the site supports. The number of species both breeding and over-wintering are stable and increasing, which is reflected by the unit's favourable condition.

The full length of the frontage is adjacent to or in proximity of the Solent and Dorset coast marine SPA.

It is also noted that the ODU is adjacent to the Mudeford Sandbank SNCI, which covers ODU 2.

In terms of BAP priority habitats, the western side of the ODU borders mudflats and a few small, isolated areas of coastal saltmarsh near the harbour side boundary of the ODU. The eastern side of the ODU does not border any habitats. However, the open coast boundary of the ODU is just south of an area of deciduous woodland.

In terms of flood risk, almost the entire quay is within Flood Zone 3. The southern end of the quay contains some properties, and Mudeford Quay Road provides access to the quay. Whilst not within the ODU, the area to the north of the quay contains visitor accommodation.

The ODU falls within the Dorset Heaths<sup>59</sup> National Character Area (NCA), which today contains some of the best lowland heath left in England.

With regards to the historic environment, grade II listed building 'Dutch Cottages Haven Cottages' is located at Mudeford Ferry Terminal, at the southern end of the quay. Whilst not within the ODU, there is another grade II listed building where the visitor accommodation is located, 140m north of the open coast boundary of the ODU. The ODU frontage is within Mudeford Quay Conservation Area.

With regards to land, soil and water resources, there is a historic landfill site<sup>60</sup> just below the harbour side boundary of the ODU, within the harbour. The contamination status of the materials for much of the historic landfill site is unknown and site investigations would be required to confirm this. The potential impacts associated with the historic landfill site on the land, soil and water resources SEA topic are therefore uncertain.

### Option 1

Under Option 1 (Do Nothing), there will be no new defences or maintenance of existing defences and quay walls. Due to this, the existing defences are likely to fail over time. This could have a significant impact on the harbour entrance and the harbour itself, as it could lead to large-scale morphological changes to the area and increases in flood risk in some locations. Therefore, major negative long-term significant effects are predicted across the majority of the SEA topics.

Uncertainty is noted under the biodiversity and geodiversity SEA topic for this option, as large-scale changes to the morphology of the harbour could arise, which could impact habitats and species in the harbour. This could lead to positive or negative biodiversity changes. However, this will depend on how the harbour entrance evolves if Mudeford Quay were to erode (which is highly uncertain), and there is potential for both negative and positive effects.

With respect to the historic environment, this option may lead to damage to the Dutch Cottages Grade II listed building on the quay. Large-scale changes to the morphology of the harbour and a reduction in the sheltering provided by the quay in ODU 11 could also result in impacts to the historic environment within Christchurch Harbour itself if the flood risk were to increase across the wider area.

<sup>58</sup> Natural England (no date): 'Christchurch Harbour SSSI', [online] available to access via [this link](#)

<sup>59</sup> Natural England (2013): 'NCA Profile: Dorset Heaths (NE506)', [online] available to access via [this link](#)

<sup>60</sup> Catchment Based Approach Data Hub (2019): 'Historic Landfill Sites', [online] available to access via [this link](#)

### Option 2

Under Option 2 (Do Minimum), only small-scale patch-repair maintenance of the existing defences will be carried out as and when required. This is likely to extend the service life of the existing defences, but only by several years, and therefore in the medium- and long-term, the same risks / effects as Option 1 (Do Nothing) are predicted.

Similar to Do Nothing, this option could lead to positive or negative changes to biodiversity in the future. Feedback from Natural England indicates that this option may lead to positive biodiversity changes, but more work would be needed to investigate this as any changes to morphology make this uncertain.

With respect to the historic environment, similar effects to the Do Nothing option could occur, but at a later date once it is no longer feasible to maintain the existing defences around the quay.

### Option 3

Under Option 3 (Maintain), existing defences and quay walls will be routinely refurbished, beginning in epoch 1. The maintenance of the quay walls would ensure the FCERM standard of service of the quay would be sustained, which would reduce the risk of large-scale morphological changes from occurring. By also maintaining the raised defences in this location, the flood risk to the properties on the quay would be less than Options 1 and 2 but would still increase over time due to sea level rise. Due to this increase in flood risk on the quay, minor negative significant effects are predicted under the climate change, landscape, historic environment, population and communities, and transport and movement SEA topics. This option could lead to minor positive significant effects under the land, soil and water resources SEA topic by reducing the risk of the historic landfill site eroding in the northern part of the unit (through maintenance of the quay wall). The effect of this option on biodiversity and geodiversity is expected to be neutral given that it only involves maintaining existing quay walls.

### Option 4 and Option 6

Under Options 4 (Sustain A) and 6 (Improve A), the floodwall around the properties at the southern end of the quay would be upgraded, and the existing frontline structures around the quay would be maintained/ refurbished as required. This option would reduce the risk of flooding to the properties at the southern end of the quay but would not stop the rest of the quay from flooding, nor the access road / infrastructure to the north. Due to this, minor positive long-term significant effects are predicted under the majority of the SEA topics. This includes the historic environment SEA topic, as grade II listed building 'Dutch Cottages Haven Cottages' would likely be protected from damage as a result of flooding. The design of a wall in this location would need to consider the setting and character of the listed buildings and the conservation area and appropriate mitigation, such as selecting suitable materials for construction, should be undertaken.

Given that the quay would still be at risk from flooding on a frequent basis, minor negative significant effects are predicted under the transport and movement SEA topic. This is because the quay is used as a car park, and the standard of protection to the road to the north would also not be improved.

The effect on biodiversity and geodiversity under Options 4 and 6 is expected to be neutral. For the frontline structures adjacent to environmental designations, such as the Solent and Dorset coast marine SPA, the option involves maintaining / refurbishing these quay walls, which is not expected to impact biodiversity. The floodwall around the properties at the southern end of the quay would likely be setback and would also not be expected to lead to any impacts. There is potential for noise / vibration disturbance, but this could be mitigated by undertaking the defence refurbishments / construction outside of sensitive seasons for the species. During further appraisal / design, opportunities for BNG could be explored as part of the defence refurbishment / new defence construction.

### Option 5 and Option 7

Under Options 5 (Sustain B) and 7 (Improve B), the same measures would be undertaken as those outlined under Option 4; however, a new setback wall in the northern part of the unit would also be constructed to defend the road. This option is considered to perform more favourably than Options 4 and 6 as it provides wider benefits, including to infrastructure and public open space. Due to this, major positive long-term significant effects are predicted under the majority of the SEA topics. This includes the historic environment SEA topic, as all listed buildings within / within proximity to the ODU will be protected from flooding. However, it is noted that the new setback wall should be designed with the Mudeford Quay Conservation Area in mind, as so not to adversely affect its character or the setting of the listed buildings within it.

Under the transport and movement SEA topic, neutral effects are predicted, as whilst this option would defend the road, the public car park on the quay would still be at significant risk of flooding. It would likely require frequent closure in the future, to prevent access during flooding conditions. Similar neutral effects are predicted under the biodiversity and geodiversity SEA topic as those predicted under Options 4 and 6.

#### Option 8

Under Option 8 (Adaptation / Resilience), property level protection would be implemented to the properties at risk from flooding and the quay walls would be maintained. By maintaining the quay walls, the quay would remain in place in the future and large-scale morphological changes to the area associated with the loss of the quay would be prevented. However, the property level protection would not provide a high standard of protection (deep flooding could still cause flood damage to properties with property level protection). Furthermore, no new permanent raised defences would be constructed, and therefore public spaces and transport links would not be defended from flooding. This is reflected in the assessment findings, with minor negative significant effects predicted across the majority of SEA topics.

Minor negative significant effects are noted for the historic environment SEA topic due to flood risk to the Mundeford Quay Conservation Area. Property level protection measures could be used on listed buildings but these may need to be bespoke to the individual structures if traditional measures such as flood gates / waterproofing are not appropriate.

### **16.3.1 Cumulative effects**

The options under ODU 11 are unlikely to lead to any cumulative effects with respect to other plans and strategies as the land in this location has no capacity for further development.

## **16.4 Leading Option selection**

Two Leading Options were selected for ODU 11 based on the results of the economic, environmental, technical and social appraisal:

- National Economic Option: Do Minimum.
- Local Aspirational Option: Adaptation / Resilience.

Delivery of the Local Aspirational Option (Adaptation / Resilience) is likely to lead to negative environmental effects across most of SEA topics, as indicated by the SEA. However, the magnitude of impacts are likely to be much less than the Do Minimum option. In this unit, funding for new coastal management is likely to be very limited and there is a limited economic case to do more than Adaptation / Resilience. Notably, by maintaining the quay walls, the quay would remain in place in the future and large-scale morphological changes to the area associated with the loss of the quay would be prevented.

Monitoring and mitigation will be required with the leading options to address any negative environmental effects. For example, with respect to the historic environment SEA topic, the listed buildings that remain at risk of flooding could have appropriate mitigation put in place to address the risk on a property-by-property basis and make the properties more resilient.

# 17. SMZ 3 – ODU 12: Avon Beach and Friars Cliff options assessment

## 17.1 Introduction

ODU 12 (shown in **Figure 17.1** below) spans the open coast frontage between Mundeford Quay and Steamer Point. There are a variety of existing coastal defences in this ODU, including rock groynes, timber groynes, hybrid groynes, rock revetment and seawalls. The condition of these defences varies from good to poor. The area is a popular site for recreation and is used by people visiting the beach and beach huts.

The main risk in this ODU is from coastal erosion, although there is some localised flood risk. Over the next 100 years, the total PV damages for this ODU are estimated to be £8.9million. Over the next 20 years, nine properties are expected to be at risk from erosion under the 'Do Nothing' scenario, increasing to 140 properties over the next 100 years.

The SMP<sup>61</sup> policy for this area is 'Hold the Line' from the present day, with the intent to maintain the integrity of the beach through control structures and recharge. A strategic option for 'Managed Realignment' has not been included in the appraisal given the proximity of properties to the coastline in this location.

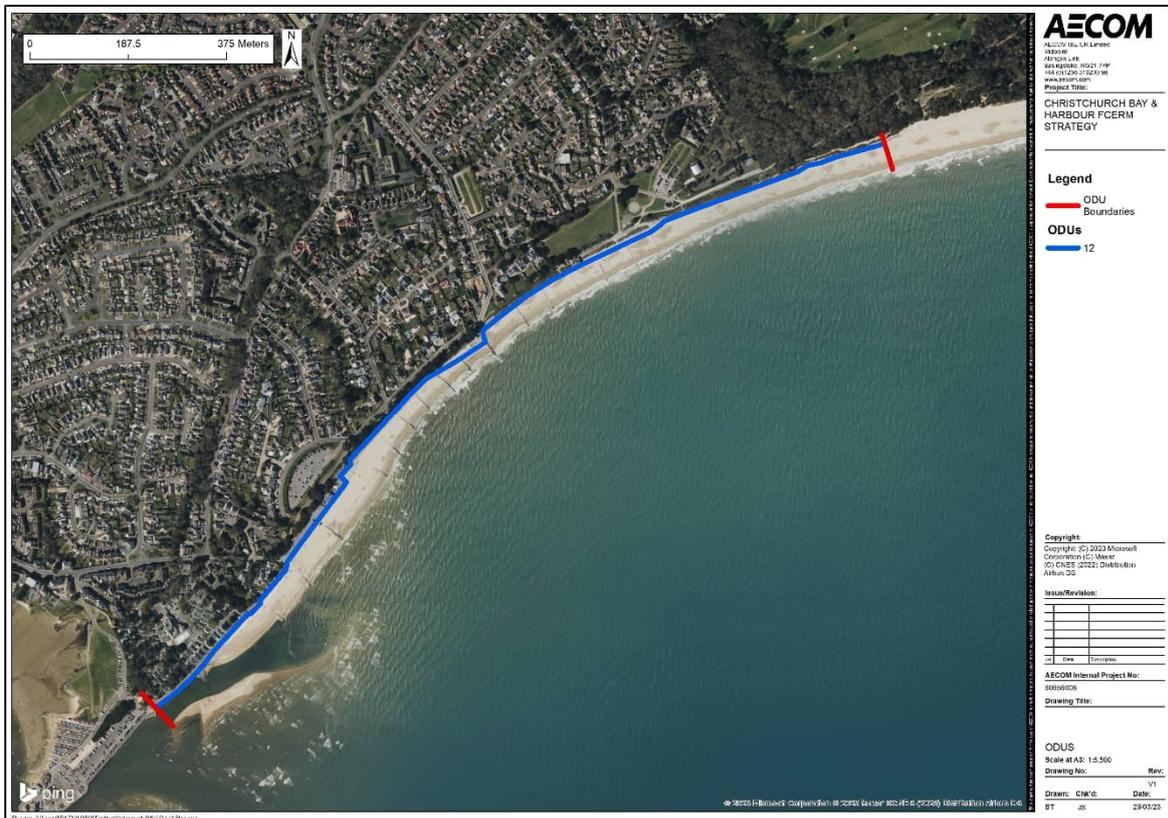


Figure 17.1 ODU 12

## 17.2 Strategic options

The strategic options for this ODU are as follows:

1. **Do Nothing:** no new defences or maintenance of existing defences; ensure health and safety compliance when defences fail.

<sup>61</sup> Royal Haskoning (2011). 'Poole & Christchurch Bays Shoreline Management Plan Review (SMP2)', [online] available to access via [this link](#)

2. **Do Minimum:** small scale patch-repair maintenance to existing defences (as and when required).
3. **Maintain:** refurbishment of existing defences (from epoch 1).
4. **Improve A:** refurbish existing defences once they reach the end of their design life (epoch 1) then undertake a beach nourishment scheme in epoch 2 alongside new groynes to help retain the beach material; locally raise seawall at Avon beach to ensure new beach volume can be retained; property level protection in epoch 3 to manage local risk at Mudeford Road.
5. **Improve B:** construct new larger linear defences along the length of the unit to provide the primary defence against flooding and erosion (note no beach nourishment with this option).
6. **Improve C:** this option is similar to Improve A but would also include public realm enhancements such as promenade raising to make the area more compatible with higher sea levels in the future.

Note that for the Improve A and C options, design of the groynes will be undertaken at the scheme stage and will aim to ensure sustainable beach levels whilst also allowing west-east sediment flows to work with natural coastal processes.

## 17.3 Assessment findings

The assessment findings for each option, organised by SEA topic, are set out in **Table 17.1** below and discussed in more detail underneath.

**Table 17.1 Assessment findings for ODU 12**

SEA topic	Option number					
	1	2	3	4	5	6
Biodiversity and geodiversity	++	++	0	0	0	0
Climate change	--	--	-	++	++	++
Landscape	--	--	-	+	-	++
Historic environment	--	--	-	++	++	++
Land, soil and water resources	--	--	+	++	++	++
Population and communities	--	--	-	++	+	++
Transport and movement	--	--	-	++	++	++

### Key (likely significant effects)

Major positive	Minor positive	Neutral	Uncertain	Minor negative	Major negative
++	+	0	?	-	--

The eastern boundary of the ODU falls within unit 1 (Friars Cliff) of the Highcliffe to Milford Cliffs SSSI<sup>62</sup> for 380m. Unit 1 is currently in an unfavourable condition as the majority of the frontage is obscured by vegetation and/ or scree build up and is therefore inaccessible for study. The seawall in this location has disconnected the beach

<sup>62</sup> Natural England (no date): 'Highcliffe to Milford Cliffs SSSI', [online] available to access via [this link](#)

from the cliff face, interrupting natural coastal processes, restricting erosion and allowing vegetation encroachment. In addition, drainage pipes discharging along the cliff top are accelerating slumping in places.

The eastern boundary of the ODU is also adjacent to Steamer Point LNR to the north and the full length of the frontage is adjacent to or in proximity of the Solent and Dorset coast marine SPA.

In terms of BAP priority habitats, both boundaries of the ODU are south of an area of deciduous woodland. Other than this, this stretch of the beach does not fall within/ lie adjacent to any priority habitats.

In terms of flood risk, a large stretch of the beach in this ODU is within Flood Zone 2. However, the properties behind the beach are within Flood Zone 1. Properties border the beach for much of the length of the ODU, except near the eastern boundary where Steamer Point LNR is located. Avon Run Road runs parallel to the beach along part of the ODU, as do footpaths Mudeford Quay to Avon Beach and Steamer Point Path.

The western boundary of the ODU falls within the Dorset Heaths National Character Area (NCA), whilst the remainder of the ODU falls within the New Forest NCA.

With regards to the historic environment, the western boundary of the ODU is near a cluster of grade II listed buildings, largely located off Mudeford Road, the closest of which is 70m inland. Scheduled monument 'Round barrow east of Southcliffe Road, Mudeford' is located 240m inland, in the central part of the ODU. There are also two grade II listed buildings in roughly the same location as the scheduled monument, to the west off Bure Lane. Notably, there have been a number of significant artefacts found within the vicinity of the ODU, showing the high archaeological potential of the area. This includes the remains of a WWII pillbox close to the cliff.

In terms of land, soil and water resources, there are two small historic landfill sites along this ODU, just south of the western end of Avon Run Road. The contamination status of the materials for much of the historic landfill site is unknown and site investigations would be required to confirm this. The potential impacts associated with the historic landfill site on the land, soil and water resources SEA topics are therefore uncertain.

#### Option 1

Under Option 1 (Do Nothing), there would be no new defences or maintenance of existing defences. Due to this, the existing defences are likely to fail over time, increasing the risk of the erosion to the land and cliffs behind. Notably, over the next 20 years, nine properties would be expected to be at risk from erosion under this option, increasing to 140 properties over the next 100 years. Therefore, major negative long-term significant effects are predicted under the majority of the SEA topics. This includes the historic environment SEA topic, as nearby designated heritage assets will be at risk of flooding / erosion.

Major positive long-term significant effects are predicted under the biodiversity and geodiversity SEA topic. This is because, under this option, the rate of natural coastal processes and erosion would increase along unit 1 of the SSSI, potentially improving its condition (which is currently unfavourable).

#### Option 2

Under Option 2 (Do Minimum), only small-scale patch-repair maintenance of the existing defences would be carried out as and when required. This is expected to extend the residual life of the defences by up to several years. However, once the defences fail in the medium- and long-term, the erosion risk would be similar to Option 1 (Do Nothing), and therefore the environmental effects would be similar. This is reflected in the assessment findings.

#### Option 3

Under Option 3 (Maintain), existing defences would be routinely refurbished, beginning in epoch 1. Whilst this would help to reduce the risk of erosion, the long-term coastal evolution is more uncertain under this option, and erosion could impact key assets in this location. There could be negative effects associated with lower beach levels relative to sea levels in the future (particular with regards to landscape and population and communities).

#### Option 4

Under Option 4 (Improve A), the existing defences would be refurbished once they reach the end of their design life, then a beach nourishment scheme would be undertaken later on in the appraisal period alongside the construction of new groynes. The seawall at Avon Beach would also be raised to ensure the new beach volume could be retained. This combination of new defences and improvements to existing defences would protect the

most vulnerable areas within this ODU, whilst utilising less invasive measures such as beach nourishment. In addition, it would help to retain the recreation and amenity function of this area by sustaining beach levels with sea level rise. Due to this, major positive long-term significant effects are predicted under the majority of the SEA topics.

Major positive significant effects are noted under the historic environment SEA topic as this option would prevent the listed buildings adjacent to Mudeford road from eroding and would also seek to reduce the flood risk in this location in the future.

The condition of the SSSI is a key consideration regarding the potential effects on geodiversity under this option. With this option the toe of the cliff would continue to be defended, but cliff drainage would not be installed. This would help to stabilise the cliff, but a limited amount of natural erosion may occur as cliff slope processes and weathering may continue. However, the erosion would be expected to be limited. This could result in geological features being available, but less so relative to an unconstrained / undefended scenario. Whilst this is not expected to worsen the condition of the SSSI relative to the baseline (it is currently in an unfavourable condition), it is unlikely that this option would lead to an improvement of the SSSI condition, and therefore this option is predicted to lead to a neutral effect under this SEA topic.

Opportunities for BNG should be explored during further appraisal / design. New groynes in this location as part of this option present an opportunity to create intertidal habitat areas / pools to support ecology. There could also be opportunities to use biodiversity promoting materials and features as part of any refurbishments to the existing seawall defences.

#### Option 5

Under Option 5 (Improve B), a new larger defence seawall would be constructed along the length of the unit. Whilst this option would minimise the risk of erosion to properties in this location, the beach is likely to erode over time without improvements to the existing rock groynes and/ or beach nourishment, which could lead to the loss or reduced function of this valued amenity asset. In general, the option would likely lead to similar positive effects to Option 4 (Improve A). However, minor negative significant effects are predicted under the landscape SEA topic due to the impact of lowering beach levels. In addition, only minor positive significant effects are predicted under the population and communities SEA topic. This is because, whilst the option would defend properties from erosion, there could be a loss / reduction in the recreational function of the area. Similar neutral effects to Option 4 (Improve A) would also be expected under the biodiversity and geodiversity SEA topic, due to the defence of the cliff toe. There would also be opportunities to improve biodiversity and BNG as part of this option, which should be explored during further appraisal / design.

#### Option 6

Under Option 6 (Improve C), very similar impacts to Option 4 (Improve A) would be anticipated given the overall approach is the same, with the addition of wider public realm enhancements / promenade raising. To reflect the potential improvements to the public realm as part of this option, major positive significant effects are predicted under the landscape SEA topic.

### **17.3.1 Cumulative effects**

The options under ODU 12 that include beach nourishment could lead to positive cumulative effects with the Hurst Spit to Lymington Strategy. The dominant direction of movement for littoral transport is from west to east within the bay and therefore placing material in ODU 12 could have a benefit as some of this material would be expected to travel east towards Hurst Spit and provide a sediment feed over time. This could positively impact the management of the spit due to the greater supply of sediment to the area. Larger beach volumes on the spit are considered positive as the beach provides the first line of defence against erosion and flooding to assets on the Spit, such as Hurst Castle and Lighthouse which are scheduled monuments / listed buildings.

## **17.4 Leading Option selection**

Three Leading Options were selected for ODU 12 based on the results of the economic, environmental, technical and social appraisal:

- National Economic Option: Improve A.

- Local Aspirational Option: Improve C.
- Backup Option: 'Scaled back' Improve.

Delivery of either of the Leading Options in this unit is likely to lead to major positive significant effects across a range of SEA topics. Opportunities for BNG should be explored during further appraisal / design. New groynes in this location as part of these option present an opportunity to create intertidal habitat areas / pools to support ecology. There could also be opportunities to use biodiversity promoting materials and features as part of any refurbishments to the existing seawall defences. Upgrades to the defences should also take into account the character and setting of the area and ensure building materials are appropriate in relation to the historic environment.

# 18. SMZ 3 – ODU 13: Highcliffe options assessment

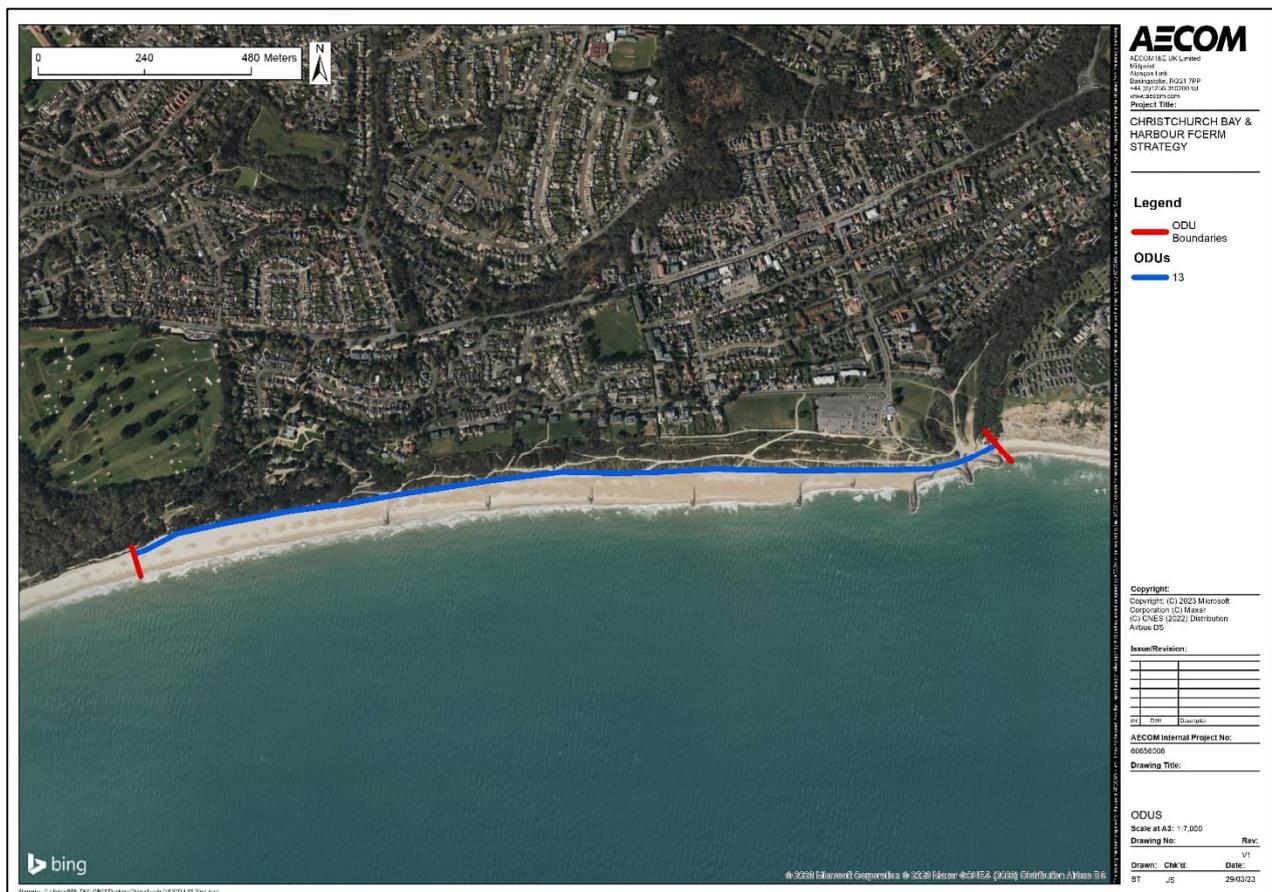
## 18.1 Introduction

ODU 13 (shown in **Figure 18.1** below) covers the frontage between Steamer Point and Chewton Bunny. The western part of the ODU does not currently have any hard coastal defences, with the beach providing the only protection to the cliff toe. To the east of Highcliffe Castle, a coastal defence scheme consisting of slope stabilisation (Highcliffe counterfort drains), a rock revetment, and rock groynes is present. The rock defences are currently in a good condition. Similarly to ODU 12, the area is a popular site for recreation and is used by people visiting the beach.

The main risk in this ODU is from coastal erosion with 18 properties expected to be at risk by 2074 and 173 properties at risk by 2124 under a Do Nothing scenario. Over the next 100 years, the total PV damages for this ODU are estimated to be over £6.9 million.

A key part of the option appraisal will be to consider how to effectively manage the transition from the currently defended coastline in ODU 13 to the undefended coastline in ODU 14 to the east.

The SMP<sup>63</sup> policy for this area is to 'Hold the Line' in the short-, medium- and long-term, with a note to consider the need for defences at Highcliffe Castle in the long-term.



**Figure 18.1 ODU 13**

<sup>63</sup> Royal Haskoning (2011). 'Poole & Christchurch Bays Shoreline Management Plan Review (SMP2)', [online] available to access via [this link](#)

## 18.2 Strategic options

The strategic options for this ODU are as follows:

1. **Do Nothing:** no new defences or maintenance of existing defences; ensure health and safety compliance when defences fail.
2. **Do Minimum:** small scale patch-repair maintenance to existing defences (as and when required).
3. **Maintain:** refurbishment of existing defences (from epoch 1); risk of outflanking current defences with this option.
4. **Improve A:** refurbishment of existing defences (from epoch 1) and undertake ongoing beach recycling (epoch 1); in epoch 2/ 3, undertake beach nourishment scheme as well as upgrading the rock groynes to help retain beach material (erosion will not be stopped entirely; some erosion will still occur); during epoch 1, construct outflanking defences (e.g. rock revetment) to the east of the existing defences to prevent outflanking at Naish cliff.
5. **Improve B:** refurbishment of existing defences (from epoch 1) and undertake ongoing beach recycling (epoch 1); in epoch 2/3, construct a new rock revetment along the full length of the frontage (erosion will not be stopped entirely; some erosion will still occur); during epoch 1, construct outflanking defences (e.g. rock revetment) to the east of the existing defences to prevent outflanking at Naish cliff.
6. **Improve C:** same approach as Improve A except the beach nourishment intervention would be undertaken later on in the appraisal period (erosion will not be stopped entirely; some erosion will still occur).
7. **Managed Realignment A:** reduce length of groynes in the east part of the unit to allow more beach material to bypass the groynes and reach Naish cliff to the east (epoch 1); otherwise implement Improve A.
8. **Managed Realignment B:** reduce length of groynes in the east part of the unit and construct nearshore breakwaters to encourage continuous beach between Highcliffe and Naish cliff and facilitate improved sediment transport to the east (epoch 1) (erosion will not be stopped entirely; some erosion will still occur).

Note that for the options that involve groyne upgrades / modifications, design of the groynes will be undertaken at the scheme stage and will aim to ensure sustainable beach levels whilst also allowing west-east sediment flows to work with natural coastal processes.

## 18.3 Assessment findings

The assessment findings for each option, organised by SEA topic, are set out in **Table 18.1** below and discussed in more detail underneath.

**Table 18.1 Assessment findings for ODU 13**

SEA topic	Option number							
	1	2	3	4	5	6	7	8
Biodiversity and geodiversity	++	++	0	0	0	0	+	0
Climate change	--	--	-	++	++	++	++	++
Landscape	--	--	-	++	-	++	-	-
Historic environment	--	--	-	++	++	++	++	++
Land, soil and water resources	0	0	0	0	0	0	0	0
Population and communities	--	--	-	++	+	++	+	+
Transport and movement	--	--	-	++	++	++	++	++

**Key (likely significant effects)**

Major positive	Minor positive	Neutral	Uncertain	Minor negative	Major negative
++	+	0	?	-	--

The whole length of the ODU intersects with Highcliffe to Milford Cliffs SSSI<sup>64</sup>. Whilst this includes unit 1 (Friars Cliff) for a very short distance at the western boundary, and unit 5 (Naish Cliff) for a very short distance at the eastern boundary, the majority of the length of the ODU comprises unit 2 (High Cliff). Notably, units 1 and 2 are currently in an unfavourable condition, whilst unit 5 is in a favourably condition. Concerning unit 2, this is because the majority of the frontage is affected by engineering works. Rock groyne prevent natural coastal processes and restrict erosion of the cliff face, whilst landscaped hard footpaths and drainage channels obscure the exposures of interest. Vegetation is also obscuring approximately 80% of the frontage.

Starting at the western boundary of the ODU, the ODU runs adjacent to Steamer Point LNR to the north for 340m and the full length of the frontage is adjacent to or in proximity of the Solent and Dorset coast marine SPA.

In terms of BAP priority habitats, the length of the ODU largely comprises maritime cliff and slope. Both boundaries of the ODU are also adjacent to areas of deciduous woodland, the largest being the one near the western boundary, covering the same area as Steamer Point LNR.

In terms of flood risk, the stretch of the beach within this ODU is partially within Flood Zone 3. However, the area behind the beach, where properties are located, is within Flood Zone 1. Whilst there are numerous properties along this stretch of the coast, they are set slightly further back inland compared to ODU 12. The same can be said for the roads in this area.

The ODU falls within the New Forest<sup>65</sup> National Character Area (NCA), which includes the Lower Hampshire Avon Valley.

With regards to the historic environment, there are several listed buildings to the north of this ODU, particularly along Lymington Road. However, these are relatively far away from the coastline. Set back from the road is a

<sup>64</sup> Natural England (no date): 'Highcliffe to Milford Cliffs SSSI', [online] available to access via [this link](#)

<sup>65</sup> Natural England (2013): 'NCA Profile: New Forest (NE477)', [online] available to access via [this link](#)

grade I listed building (Highcliffe Castle), 250m from the coastline. There is also a grade II\* listed building (Greystones) set back from the road, near the eastern boundary of the ODU, 310m from the coastline.

#### Option 1

Under Option 1 (Do Nothing), there would be no new defences or maintenance of existing defences. Due to this, the existing defences are likely to fail over time, increasing the risk of the beach and cliffs eroding. Notably, 18 properties are expected to be at risk from erosion by 2074, increasing to 173 properties at risk by 2124 under this option. Due to this, major negative long-term significant effects are predicted under almost all of the SEA topics. This includes the historic environment SEA topic, as the grounds of Highcliffe Castle (Grade I listed) could be at risk from erosion.

Major positive long-term significant effects are predicted for biodiversity and geodiversity, as under this option, natural coastal processes will be allowed to take place along the full length of the frontage, including unit 2 of the SSSI, potentially improving its condition which is currently unfavourable.

#### Option 2

Under Option 2 (Do Minimum), only small-scale patch-repair maintenance of the existing defences would be carried out as and when required. This would be expected to extend the residual life of the defences by up to several years. However, once the defences fail in the medium- and long-term, the erosion risk would be similar to Option 1 (Do Nothing), and therefore the environmental effects would be similar. This is reflected in the assessment findings.

#### Option 3

Under Option 3 (Maintain), existing defences will be routinely refurbished, beginning in epoch 1. Whilst this would help to reduce the risk of erosion, the long-term coastal evolution is more uncertain under this option, and erosion could impact key assets in this location. There could be negative effects associated with lower beach levels relative to sea levels in the future (particularly regarding landscape and population and communities).

#### Option 4 and Option 6

Under Option 4 (Improve A) and Option 6 (Improve C), existing defences would be refurbished and ongoing beach recycling will be undertaken (both during epoch 1). Also during this time period, outflanking defences would be constructed to the east of the existing defences. Following this, a beach nourishment scheme would be implemented and the rock groynes would be upgraded to help retain beach material (both during epochs 2 and 3). This combination of new defences and improvements to existing defences would protect the most vulnerable areas within this ODU, whilst utilising less invasive measures such as beach recycling/ nourishment. Due to this, major positive long-term significant effects are predicted under the majority of the SEA topics for these options.

Major positive significant effects are recorded for the historic environment SEA topic as erosion of the grounds of Highcliffe Castle would be prevented under these options.

The condition of the SSSI is a key consideration regarding the potential impacts to geodiversity under this option. With this option the toe of the cliff would continue to be defended. This would help to stabilise the cliff, but a limited amount of natural erosion may occur as cliff slope processes and weathering may continue. However, the erosion would be expected to be limited. This could result in some geological features being available, but less so relative to an unconstrained / undefended scenario. Whilst this would not be expected to worsen the condition of unit 2 of the SSSI relative to the baseline (it is currently in an unfavourable condition), there may be reduced potential for the condition of the SSSI to improve. Therefore, this option is considered likely to lead to neutral effects under this SEA topic.

Opportunities for BNG should be explored during further appraisal / design. Refurbishing / upgrading the rock defences in this location as part of this option present an opportunity to create intertidal habitat areas / pools to support ecology and biodiversity.

#### Option 5

Under Option 5 (Improve B), the same measures will be taken as those set to take place during epoch 1 under Option 4. However, a new rock revetment would be constructed along the full length of the frontage during epoch 2/3 (instead of the beach nourishment scheme and rock groyne upgrades). In general, the option is considered likely to lead to major/ minor positive significant effects across the majority of SEA topics, as with Options 4

(Improve A) and 6 (Improve C). However, minor negative significant effects are predicted under the landscape SEA topic as a new larger hard structure would be required. There could also be potentially lower beach levels relative to sea level rise. In addition, only minor positive significant effects are predicted under the population and communities SEA topic as whilst the option would defend properties from erosion, there could be a loss / reduction in the recreational function of the area. A similar neutral effect to Option 4 (Improve A) is expected under the biodiversity and geodiversity SEA topic.

#### Option 7

Under Option 7 (Managed Realignment A), the length of the groynes would be reduced in the eastern part of the ODU, otherwise Option 5 will be implemented. Due to this, the beach / cliffs in the eastern part of the ODU is likely to erode faster and be realigned inland. The intent of this option would be to limit loss of property and assets, and therefore there are likely to be major/minor positive significant effects across several SEA topics. This includes minor positive significant effects under the biodiversity and geodiversity SEA topic, as the erosion of the cliff / reorientation of the shoreline in the eastern part of the unit could help improve the condition of the SSSI in this location. Minor negative significant effects are also predicted under the landscape SEA topic. This is associated with the reorientation of the coastline and erosion that would occur in the eastern part of the unit under this option. Major positive significant effects are recorded under the historic environment SEA topic as erosion of the grounds of Highcliffe Castle would be prevented under this option.

#### Option 8

Option 8 (Managed Realignment B) would be expected to have similar impacts to Option 7 (Managed Realignment A). However, it is expected that there would be a neutral effect on biodiversity / ecology as the cliff position would not be expected to erode significantly and the condition of the SSSI would likely remain the same.

#### All Options

Neutral effects are predicted under the land, soil and water resources SEA topic across all eight options because they are unlikely to impact these resources. This is because the land in this location is not used for agricultural purposes, nor are there any historic landfill sites, drinking water protected areas/ safeguard zones, or source protection zones in this location.

### 18.3.1 Cumulative effects

The options under ODU 13 that include beach nourishment could lead to positive cumulative effects with the Hurst Spit to Lymington Strategy. The dominant direction of movement for littoral transport is from west to east within the bay and therefore placing material in ODU 13 could have a benefit as some of this material would be expected to travel east towards Hurst Spit and provide a sediment feed over time. This could positively impact the management of the spit due to the greater supply of sediment to the area. Larger beach volumes on the spit are considered positive as the beach provides the first line of defence against erosion and flooding to assets on the Spit, such as Hurst Castle and Lighthouse which are scheduled monuments / listed buildings.

In addition, any decisions made within this ODU will have knock-on effects on ODU 14 (Naish Cliff and Barton on Sea), and therefore this should be considered when deciding which option to progress with.

## 18.4 Leading Option selection

Three Leading Options were selected for ODU 13 based on the results of the economic, environmental, technical and social appraisal:

- National Economic Option: Improve C.
- Local Aspirational Option: Improve A.
- Backup Option: 'Scaled back' Improve.

Delivery of either of the Leading Options in this unit is likely to lead to major positive effects across a range of SEA topics. Opportunities for BNG should be explored during further appraisal / design. Refurbishing / upgrading the rock defences in this location as part of this option present an opportunity to create intertidal habitat areas / pools to support ecology and biodiversity.

# 19. SMZ 4 – ODU 14: Naish Cliff and Barton on Sea options assessment

## 19.1 Introduction

SMZ 4 is an open coast environment between Naish Cliff and Barton on Sea, characterised by steep topography and an active cliff face. ODU 14 (shown in **Figure 19.1** overleaf) is the sole ODU in SMZ 4.

There are a variety of coastal defences in ODU 14. In the western part of the ODU, at Naish Cliff, the coastline is currently undefended and actively eroding. However, at Barton on Sea, there is a rock revetment at the toe of the cliffs, as well as rock groynes. In addition, various cliff drainage schemes have been undertaken in the past at Barton on Sea.

In the western part of the ODU, at Naish Cliffs, there is a beach in front of the cliff line and a privately owned caravan park at the top of the cliff. There is generally a lack of beach material in front of the Barton on Sea defences, and there are properties along the cliff top, beach huts and a cliff path located landward of the coastal defences. The area is an important recreation site.

The main risk in this area is from coastal erosion caused by cliff toe erosion and groundwater induced cliff slope instability. There is a risk of outflanking the defences at either end of this ODU. The interaction with the adjacent ODUs is therefore a crucial element in the option appraisal in this location. Over the next 100 years the total PV damages for this location are estimated to be £28.3million.

The SMP<sup>66</sup> policy in ODU 14 is 'Managed Realignment' in the short-, medium- and long-term. There are three SMP policy units within SMZ 4/ ODU 14 (B2, B3 and B4) and the SMP 'Managed Realignment' policy intent is slightly different for each area. In B2 (the eastern part of the ODU), the SMP policy intent is to maintain and improve the drainage system but acknowledge that the cliff top will continue to erode over time. In B3 (the central part of ODU), the intent is to initially maintain the areas with defences and drainage, allowing this to adapt to provide a transitional defence to Naish Cliff. In B4 (the western part of ODU), a potential way forward mentioned in the SMP was a limited intervention with recharge to allow adaptation of use. In the SMP refresh, it was noted that more clarification is needed for B4 regarding what cliff works are acceptable.

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<sup>66</sup> Royal Haskoning (2011). 'Poole & Christchurch Bays Shoreline Management Plan Review (SMP2)', [online] available to access via [this link](#)

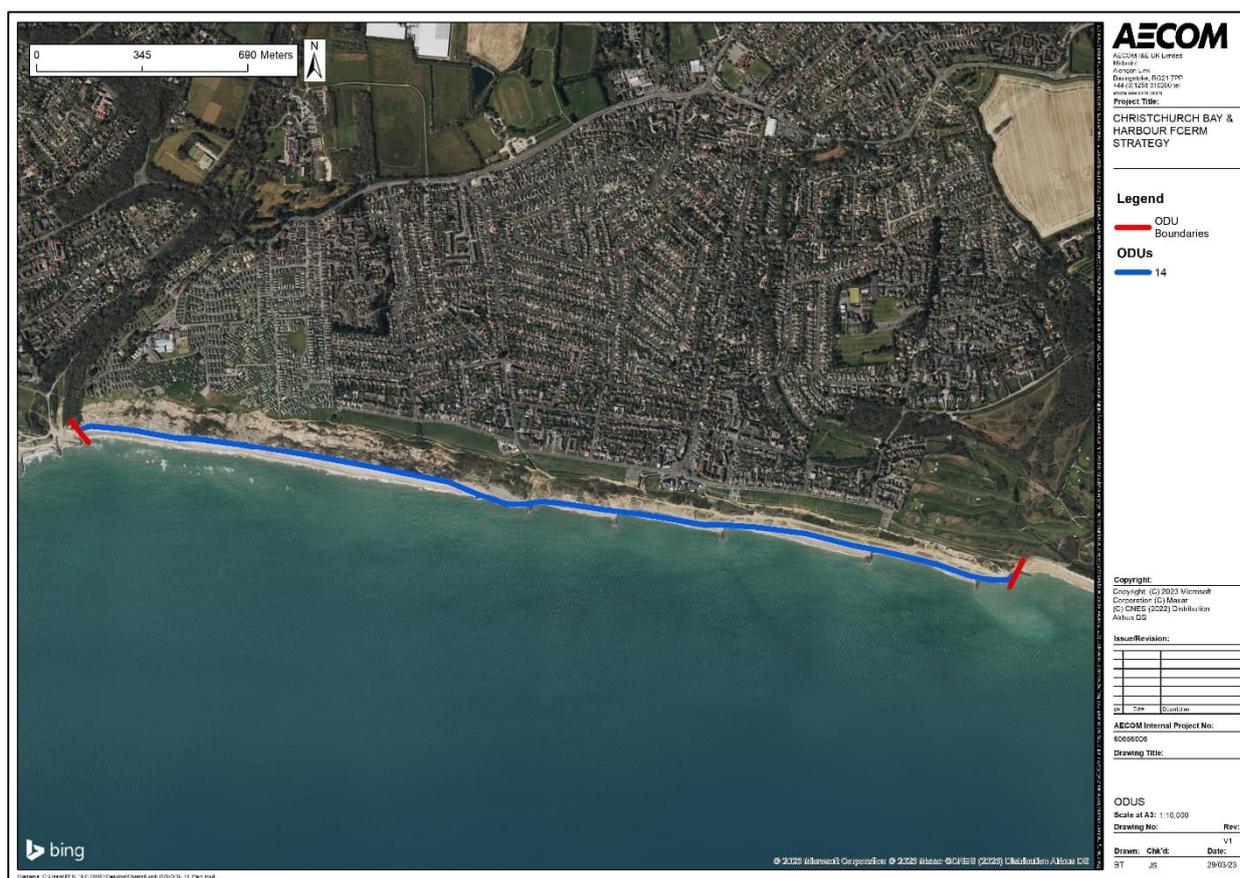


Figure 19.1 ODU 14

## 19.2 Strategic options

The strategic options for this ODU are as follows:

1. **Do Nothing:** no new defences or maintenance of existing defences; ensure health and safety compliance when defences fail.
2. **Do Minimum:** small scale patch-repair maintenance to existing defences (as and when required).
3. **Maintain:** refurbishment of existing defences (from epoch 1); significant amounts of cliff recession are expected to occur with this option due to groundwater/ land sliding and also due to toe defences being less effective with SLR.
4. **Improve A:** refurbishment of existing defences in first 10 years and repeated as required thereafter; large scale beach nourishment scheme along full length of unit in epoch 1 (erosion will not be stopped entirely; some erosion will still occur); construct cliff drainage along full length of unit in epoch 1.
5. **Improve B:** new rock defences along full length of the unit at the toe of the cliff as well as cliff drainage along the full length of the unit (epoch 1) (erosion will not be stopped entirely; some erosion will still occur).
6. **Managed Realignment A:** construct new / upgrade rock revetment and refurbish rock groyne between Marine Drive West to the Eastern end of the unit (epoch 1) (erosion will not be stopped entirely; some erosion will still occur); install new cliff drainage from Marine Drive West to the east in epoch 1 (note the eastern 1km of the unit does not need new drainage as it is functioning well); no new drainage at Naish cliff.
7. **Managed Realignment B:** as per Managed Realignment A, but the capital initial intervention would not be undertaken until epoch 2 (erosion will not be stopped entirely; some erosion will still occur) and a localised beach nourishment scheme at Naish Cliff would be undertaken.
8. **Managed Realignment C:** construct new / upgrade rock revetment and rock groyne to the currently defended part of the frontage (epoch 1) ; install new cliff drainage to the currently defended part of the

frontage in epoch 1 (note the eastern 1km of the unit does not need new drainage as it is functioning well); no new defences/ drainage at Marine Drive West.

9. **Managed Realignment D:** as per Managed Realignment C, but the capital initial intervention would not be undertaken until epoch 2 and a localised beach nourishment scheme at Naish Cliff would be undertaken.
10. **Managed Realignment E:** construct new / upgrade rock revetment and rock groyne in the east part of the unit (Marine Drive East) (epoch 1); install new cliff drainage to the currently defended part of the frontage in epoch 1 (note the eastern 1km of the unit does not need new drainage as it is functioning well); no new defences/ drainage at Marine Drive West.
11. **Managed Realignment F:** as per Managed Realignment E, but the capital initial intervention would not be undertaken until epoch 2 and a localised beach nourishment scheme at Naish Cliff would be undertaken.

Note that for the options that involve groyne upgrades / modifications, design of the groyne will be undertaken at the scheme stage and will aim to ensure sustainable beach levels whilst also allowing west-east sediment flows to work with natural coastal processes.

## 19.3 Assessment findings

The assessment findings for each option, organised by SEA topic, are set out in **Table 19.1** below and discussed in more detail underneath.

**Table 19.1 Assessment findings for ODU 14**

SEA topic	Option number										
	1	2	3	4	5	6	7	8	9	10	11
Biodiversity and geodiversity	++	++	+	--	--	0	0	+	+	++	++
Climate change	--	--	-	++	++	++	++	+	+	-	-
Landscape	--	--	-	++	-	++	++	+	+	-	-
Historic environment	?	?	?	?	?	?	?	?	?	?	?
Land, soil and water resources	0	0	0	0	0	0	0	0	0	0	0
Population and communities	--	--	-	++	+	++	++	+	+	-	-
Transport and movement	--	--	-	++	++	++	++	+	+	-	-

### Key (likely significant effects)

Major positive	Minor positive	Neutral	Uncertain	Minor negative	Major negative
++	+	0	?	-	--

The whole length of the ODU is covered by the Highcliffe to Milford Cliffs SSSI<sup>67</sup>, specifically units 5 (Naish Cliff) and 6 (Barton Cliff).

<sup>67</sup> Natural England (no date): 'Highcliffe to Milford Cliffs SSSI', [online] available to access via [this link](#)

Unit 5 (Naish Cliff) is currently in a favourable condition as it is one of only three undefended, naturally eroding sections of cliff within the SSSI, with good geological exposures and no vegetation encroachment.

Conversely, unit 6 (Barton Cliff) is currently in an unfavourable condition as the majority of the frontage is affected by engineering works. Rock groyne restrict the rate of littoral sediment transport in this location and where present the rock revetment at the cliff toe reduces the erosion of the cliff face, whilst permanent hard footpaths and drainage have been installed which obscure much of the exposures of interest. Vegetation is also obscuring the exposure along approximately 40% of the frontage.

The full length of the frontage is adjacent to or in proximity of the Solent and Dorset coast marine SPA.

In terms of BAP priority habitats, the whole length of the ODU is covered by maritime cliff and slope. In addition, the area to the north of the western boundary of the ODU contains deciduous woodland.

In terms of flood risk, parts of the stretch of the beach in this ODU are within Flood Zone 2/3, especially in the western half. However, the properties to the north of the beach are within Flood Zone 1. As with ODU 13, the properties are set back slightly from the coastline and located on higher ground so are not at risk from tidal / coastal flooding.

The ODU falls within the New Forest<sup>68</sup> National Character Area (NCA), which includes the Lower Hampshire Avon Valley.

With regards to the historic environment, this ODU is relatively unconstrained with little in the way of designated assets. However, there are several listed buildings inland along the length of the ODU, the closest of which is a memorial located at the junction between Marine Drive East and Barton Court Avenue. The remaining listed buildings are largely concentrated to the north of the western boundary of the ODU. Notably, there have been a number of significant artefacts found within the vicinity of the ODU, showing the high archaeological potential of the area. This includes several structures relating to WWII and during scheme development a desk-based assessment should be undertaken to assess these structures in detail.

#### Option 1

Under Option 1 (Do Nothing), there would be no new defences or maintenance of existing defences. Due to this, the existing defences will fail over time, increasing the risk of the beach and cliffs eroding. Therefore, major negative long-term significant effects are predicted under the majority of the SEA topics. However, major positive long-term significant effects are predicted under biodiversity and geodiversity as under this option, natural coastal processes would increase along units 5 and 6 of the SSSI, which could help maintain the favourable condition of unit 5 and help improve the condition of unit 6. The area contains little in the way of designated heritage assets therefore the impact on the historic environment is neutral.

#### Option 2

Under Option 2 (Do Minimum), only small-scale patch repair maintenance of the existing defences would be carried out as and when required. This would be expected to extend the residual life of the defences by up to several years. However, once the defences fail in the medium- and long-term, the erosion risk would be similar to Option 1 (Do Nothing), and therefore the environmental effects would be similar. This is reflected in the assessment findings.

#### Option 3

Under Option 3 (Maintain), existing defences would be routinely refurbished, beginning in epoch 1. However, significant cliff recession would be expected to occur under this option due to groundwater/ land sliding, as well as toe defences being less effective with SLR. Due to this, minor negative significant effects are considered likely across a range of SEA topics.

#### Option 4

Under Option 4 (Improve A), existing defences would be refurbished. In addition, a large-scale beach nourishment and cliff drainage scheme would take place along the full length of the ODU (both during epoch 1). This option would aim to minimise the rate of erosion of the cliff (although some may still occur), but in doing so, it could have an adverse impact on the condition of the SSSI, particularly unit 5 (Naish Cliff), which is currently in a

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<sup>68</sup> Natural England (2013): 'NCA Profile: New Forest (NE477)', [online] available to access via [this link](#)

favourable condition. Due to this, whilst positive long-term significant effects are predicted under the majority of the SEA topics, major negative long-term significant effects are predicted for biodiversity and geodiversity. Notably, the beach nourishment as part of this option would help to restore some of the supply of natural beach material that has been lost following the construction of coastal protection structures.

#### Option 5

Under Option 5 (Improve B), new rock defences at the toe of the cliff would be constructed and cliff drainage would be undertaken along the full length of the ODU (during epoch 1). This option faces the same issues as those outlined under Option 4 with regards to the SSSI at Naish Cliff, and therefore similar effects are predicted under the biodiversity and geodiversity SEA topic. As Option 5 does not deliver beach nourishment, there is a higher likelihood of lower beach levels relative to sea level rise under this option. Therefore, only minor positive significant effects are predicted under the population and communities SEA topic, as the recreation use of the beach could be impacted.

#### Option 6 and Option 7

Under Option 6 and 7 (Managed Realignment A and B), a rock revetment would be constructed between Marine Drive West (central part of the ODU) and the eastern end of the ODU, and the rock groynes could be refurbished as required. New cliff drainage would also be installed from Marine Drive West, but no drainage would be implemented at Naish Cliff. The aim of these options would be to control rates of erosion and reduce the loss of property and assets in the built-up areas of the unit. These options could therefore lead to major positive significant effects across the majority of SEA topics.

These options are predicted to have a neutral effect on the biodiversity and geodiversity SEA topic. The defences at the toe of the cliff would help to slow the erosion rate under this option, but erosion would still occur in units 5 and 6 of the SSSI (in a controlled manner). With respect to unit 6 of the SSSI, this option would not be expected to worsen the condition of the designation relative to the baseline (it is currently in an unfavourable position). However, there may be reduced potential for the SSSI condition to improve given the toe of the cliff would still be defended and there would be an element of control on the rate of erosion (relative to Option 1 (Do Nothing)). At unit 5 of the SSSI, erosion would still be expected to continue, and therefore it is unlikely that these options would change the favourable condition of the SSSI in this location.

The construction of new defences in this unit would be in close proximity to other environmental designations, such as the Solent and Dorset Coast marine SPA. These options are not expected to negatively affect this designation.

#### Option 8 and Option 9

Under Option 8 and Option 9 (Managed Realignment C and D), an upgraded rock revetment and rock groynes would be constructed at the currently defended part of the frontage. New cliff drainage would also be installed at the currently defended part of the frontage but not at Naish Cliff. These options do not provide toe defences along the whole length, and therefore there could be more properties at risk of erosion. Therefore only minor positive significant effects are predicted across the majority of the SEA topics (compared to major positive significant effects for Options 6 and 7).

Option 8 and Option 9 are however more likely to, on balance, have a minor positive significant effect under the biodiversity and geodiversity SEA topic. For geodiversity, there is potential for an improvement to the condition of the west part of unit 6 of the SSSI in the future, as this area of cliff would remain undefended.

The construction of new defences in this unit would be in close proximity to other environmental designations, such as the Solent and Dorset Coast marine SPA. These options are not expected to negatively affect this designation.

#### Option 10 and Option 11

Under Option 10 and 11 (Managed Realignment E and F), a new rock revetment and rock groynes would be constructed in the eastern part of the unit. New cliff drainage would also be installed at the currently defended part of the frontage. Relative to Options 6-9, this option would lead to a greater risk of erosion to properties along the frontage, and therefore minor negative significant effects are predicted across the majority of SEA topics.

The exception is the biodiversity and geodiversity SEA topic, where major positive significant effects are considered likely, given that most of the frontage would not have upgraded toe protection, and rates of cliff erosion could increase over time due to sea level rise. This could help contribute to an improvement of the condition of unit 6 of the SSSI.

Similar to Options 6-9, defence maintenance / construction works would be undertaken in close proximity to other environmental designations, such as the Solent and Dorset Coast marine SPA. These options are not expected to negatively affect this designation.

#### All Options

An uncertain effect is predicted under the historic environment SEA topic across all eleven options. This is because there are a few designated heritage assets within proximity of the coastline along the length of this ODU, including WWII structures, and there is potential for erosion or defensive works to impact on known or unknown assets. There is likely to be little difference between options under this SEA topic. Nevertheless, Historic England will be consulted in the future as options progress.

Neutral effects are also predicted under the land, soil and water resources SEA topic across all eleven options because they are unlikely to impact these resources. This is because the land in this location is not used for agricultural purposes, nor are there any historic landfill sites, drinking water protected areas/ safeguard zones, or source protection zones in this location.

### 19.3.1 Cumulative effects

The options under ODU 14 that include beach nourishment could lead to positive cumulative effects with the Hurst Spit to Lymington Strategy. The dominant direction of movement for littoral transport is from west to east within the bay and therefore placing material in ODU 14 could have a benefit as some of this material would be expected to travel east towards Hurst Spit and provide a sediment feed over time. This could positively impact the management of the spit due to the greater supply of sediment to the area. Larger beach volumes on the spit are considered positive as the beach provides the first line of defence against erosion and flooding to assets on the Spit, such as Hurst Castle and Lighthouse which are scheduled monuments / listed buildings.

Any decisions made within this ODU will have knock-on effects on ODUs 13 (Highcliffe) and 15 (Barton on Sea to Hordle), and therefore this should be considered when deciding which option to progress with. Due to the prevailing littoral drift direction (from west to east) the potential for impacts in adjacent units will be greater in ODU 15.

### 19.4 Leading Option selection

Multiple Leading Options were selected for ODU 14 based on the results of the economic, environmental, technical and social appraisal:

- National Economic Option: Managed Realignment A.
- Backup Options: Managed Realignment B, Managed Realignment D, Maintain.

Delivery of the National Economic Option in this unit is likely to lead to major positive significant effects across most SEA topics. However, funding for this option is uncertain, and if funding cannot be found, then a choice of the Backup Options may be delivered instead. Managed Realignment B is expected to have similar positive effects, whilst Managed Realignment D and Maintain do not deliver the same level of positive environmental effects. Maintain has negative effects noted for most SEA topics.



2. **Option 2 (Do Minimum):** small scale patch repair maintenance to existing defences around outfall (localised health and safety issues, would not provide FCERM benefit).
3. **Option 3 (Managed Realignment):** undertake beach management (beach recycling) (epochs 1-3) to help control rates of cliff erosion (would not be stopped but could be somewhat controlled by providing uniform beach profile/ topping up areas where erosion is happening more rapidly).

## 20.3 Assessment findings

The assessment findings for each option, organised by SEA topic, are set out in **Table 20.1** below and discussed in more detail underneath.

**Table 20.1 Assessment findings for ODU 15**

SEA topic	1	2	3
Biodiversity and geodiversity	++	++	+
Climate change	-	-	-
Landscape	-	-	-
Historic environment	?	?	?
Land, soil and water resources	0	0	0
Population and communities	-	-	-
Transport and movement	-	-	-

### Key (likely significant effects)

Major positive	Minor positive	Neutral	Uncertain	Minor negative	Major negative
++	+	0	?	-	--

The whole length of the ODU falls within the Highcliffe to Milford Cliffs SSSI<sup>70</sup>, specifically units 6 (Barton Cliff), 7 (Becton Bunny/ Hordle Cliff West), 8 (Hordle Cliff East) and 9 (Milford on Sea Cliff).

Unit 6 (Barton Cliff), which the ODU only falls within for a short distance (90m) at the western boundary, is designated for its exposures of fossil rich Barton Beds and Headon Beds. This unit is currently in an unfavourable condition as the majority of the frontage is affected by engineering works. Rock groynes and beach huts are preventing natural coastal processes and restricting erosion of the cliff face, whilst permanent hard footpaths and drainage have been installed which obscure much of the exposures of interest. Vegetation is also obscuring approximately 40% of the frontage.

Unit 7 (Becton Bunny/ Hordle Cliff West), which the ODU spans the length of, is designated for its exposures of fossil rich Barton Beds and Headon Beds. This unit is currently in a favourable condition as it is one of only three undefended, naturally eroding sections of cliff within the SSSI with good geological exposures and no vegetation encroachment.

Unit 8 (Hordle Cliff East), which the ODU spans the length of, is designated for its exposures of fossil rich Barton Beds and Headon Beds. This unit is currently in a favourable condition as it is one of only three undefended, naturally eroding sections of cliff within the SSSI with good geological exposures. There is some grassy vegetation present on the lower parts of slumped cliffs but most of the cliff frontage is fully exposed with no vegetation encroachment.

<sup>70</sup> Natural England (no date): 'Highcliffe to Milford Cliffs SSSI', [online] available to access via [this link](#)

Unit 9 (Milford on Sea Cliff), which the ODU only falls within for a short distance (60m) at the eastern boundary, is designated for its exposures of fossil rich Barton Beds and Headon Beds. This unit is currently in an unfavourable condition as there are beach huts (at the western end of the unit) and rock armour/ sea wall defences (at the eastern end of unit) present along the frontage, which are restricting natural coastal processes and reducing erosion of the cliff face. This has led to the cliff face becoming densely vegetated, obscuring the exposures of interest.

In addition to the above, the eastern boundary of the ODU is 220m southwest of Milford on Sea LNR and the full length of the frontage is adjacent to or in proximity of the Solent and Dorset coast marine SPA.

In terms of BAP priority habitats, almost the entire length of the ODU is covered by maritime cliff and slope. In addition, 240m north of the western boundary of the ODU is an area of lowland dry acid grassland, and there are several areas of deciduous woodland further inland along the length of the ODU.

In terms of flood risk, only the base of the cliffs along this stretch of the coastline are within Flood Zone 2/ 3. The land to the north of the cliffs is primarily within Flood Zone 1, with the exception of the path of the Becton Bunny stream, which enters the sea just east of the western boundary of the ODU.

There are very few properties within this ODU, which largely borders a golf course and agricultural land. However, there is a small cluster of properties along Whatley Road, which is 240m inland. To the south of this cluster of properties is Hordle Point House, which is only 180m inland. Moreover, Cliff Road is only 150m north of the coastal at the eastern boundary of the ODU, and to the north of this road is a larger residential area containing properties.

The ODU falls within the New Forest<sup>71</sup> National Character Area (NCA), which includes the Lower Hampshire Avon Valley.

With regards to the historic environment, the ODU is relatively unconstrained. The closest heritage asset to the coastline is a grade II listed building on the B3058 (Cliff Road), which is 430m north of the coastline. Notably, Hordle Cliff is a rich source of fossil remains, and there have been a number of significant artefacts found within the vicinity of this ODU, showing the high archaeological potential of the area.

#### All Options

Under Option 1, 2 and 3 (Do Nothing, Do Minimum and Managed Realignment), cliff erosion would continue over time, which could be beneficial to the condition of the SSSI. Due to this, major/ minor positive long-term significant effects are predicted under the biodiversity and geodiversity SEA topic for these options. However, the erosion of the cliff could lead to minor negative significant effects across the other SEA topics.

Uncertain effects are predicted under the historic environment SEA topic across all three options, due to the number of significant artefacts found within the vicinity of this ODU. Nevertheless, Historic England will be consulted in the future as options progress.

Neutral effects are also predicted under the land, soil and water resources SEA topic across all three options either, because they are unlikely to impact these resources. This is because the land in this location because there are not any historic landfill sites, no drinking water protected areas/ safeguard zones, or source protection zones in this location.

### 20.3.1 Cumulative effects

The options under ODU 15 are unlikely to lead to any cumulative effects with respect to other plans and strategies as the land in this location primarily comprises a golf course. However, it is possible that the agricultural land may be developed in the future, although this is uncertain at this stage.

In addition, any decisions made within this ODU will have knock-on effects on ODU 14 (Naish Cliff and Barton on Sea), and therefore this should be considered when deciding which option to progress with.

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<sup>71</sup> Natural England (2013): 'NCA Profile: New Forest (NE477)', [online] available to access via [this link](#)

## 20.4 Leading Option Selection

One Leading Option was selected for ODU 15 based on the results of the economic, environmental, technical and social appraisal:

- National Economic Option: Do Nothing.

Delivery of the National Economic Option (Do Nothing) is likely to lead to negative environmental effects across a range of SEA topics. However, there is no economic case in this unit to Do Something, and therefore no viable alternatives exist. A positive of the Do Nothing option is that it could lead to improvements to the SSSI condition, due to erosion of the cliff face in the future.



## 21.2 Strategic options

The strategic options for this ODU are as follows:

1. **Do Nothing:** no new defences or maintenance of existing defences. Ensure health and safety compliance when defences fail.
2. **Do Minimum:** small scale patch-repair maintenance to existing defences (as and when required).
3. **Maintain:** refurbishment of existing defences (from epoch 1).
4. **Improve A:** new rock revetment along the full length of the unit to defend the cliff toe (epoch 1) (erosion will not be stopped entirely; some erosion will still occur).
5. **Managed Realignment A:** beach nourishment to the full frontage in epoch 1; construct new rock strong point (e.g. rock revetment) at junction of Whitby Road and Cliff Road at the same time (epoch 1).
6. **Managed Realignment B:** as per Managed Realignment A, but construction of strong point delayed until start of epoch 2 (cliff may erode in the interim).
7. **Managed Realignment C:** as per Managed Realignment A, but construction of strong point delayed further until mid-way through epoch 2 (cliff may erode in the interim).

## 21.3 Assessment findings

The assessment findings for each option, organised by SEA topic, are set out in **Table 21.1** below and discussed in more detail underneath.

**Table 21.1 Assessment findings for ODU 16**

SEA topic	Option number						
	1	2	3	4	5	6	7
Biodiversity and geodiversity	++	++	+	0	+	+	+
Climate change	--	--	-	++	+	+	+
Landscape	--	--	-	-	+	+	+
Historic environment	?	?	?	?	?	?	?
Land, soil and water resources	0	0	0	0	0	0	0
Population and communities	--	--	-	+	+	+	+
Transport and movement	--	--	-	++	-	-	-

### Key (likely significant effects)

Major positive	Minor positive	Neutral	Uncertain	Minor negative	Major negative
++	+	0	?	-	--

The whole length of the ODU is covered by unit 9 (Milford on Sea Cliff) of the Highcliffe to Milford Cliffs SSSI<sup>73</sup>. Unit 9 is currently in an unfavourable condition as the cliff face is densely vegetated, obscuring the exposures of interest. There are currently beach huts (at the western end of the unit) and rock armour/ sea wall defences (at the eastern end of unit) present along the frontage. In the eastern part of the unit the coastal defences restrict natural coastal processes and help to reduce erosion of the cliff face whereas in the undefended western end there is a wider natural beach that provides defence to the cliff toe. There is uncertainty as to whether or not the beach huts influence the erosion rate in this location. The beach is narrower and eroding at the eastern side and this has contributed to loss of huts in that area.

The Milford on Sea LNR is also located to the north of the ODU, 220m inland and the full length of the frontage is adjacent to or in proximity of the Solent and Dorset coast marine SPA.

In terms of BAP priority habitats, the entire length of the ODU is covered by maritime cliff and slope. Further inland, covering the same area as the Milford on Sea LNR, is an area deciduous woodland, good quality semi-improved grassland, and lowland dry acidic grassland.

In terms of flood risk, this ODU is at low risk of coastal flooding due to the higher topography of assets.

The ODU falls within the New Forest<sup>74</sup> National Character Area (NCA), which includes the Lower Hampshire Avon Valley.

With regards to the historic environment, there is only one designated heritage asset within proximity to this ODU, which is a grade II listed building near the eastern boundary, 210m north of the coastline. Notably, a number of structures relating to WWII have been recorded within the vicinity of this ODU.

#### Option 1

Under Option 1 (Do Nothing), there would be no new defences or maintenance of existing defences. Combined with sea level rise, the cliffs would be expected to erode in the future, leading to a loss of property and key infrastructure. Notably, the risk to property is mainly expected to occur between 2074-2124, when 190 properties will be at risk from coastal erosion. Therefore, major negative long-term significant effects are predicted under the majority of the SEA topics. However, major positive long-term significant effects are predicted under biodiversity and geodiversity for this option, as it would allow natural coastal processes and erosion of the cliff to take place along unit 9 of the SSSI, which could contribute to improvements in the condition of the unit.

#### Option 2

Under Option 2 (Do Minimum), given that most of the unit is undefended (in terms of hard defences), the assessment findings under this option are considered likely to be similar to Option 1 (Do Nothing).

#### Option 3

Under Option 3 (Maintain), existing defences in the eastern part of the unit would be routinely refurbished and beach recycling would be undertaken, beginning in epoch 1. This would likely lead to a slower rate of erosion than Option 1 (Do Nothing) and Option 2 (Do Minimum), but properties would still be at risk of erosion in the future. Minor negative significant effects are therefore predicted across the majority of the SEA topics, with the exception of biodiversity and geodiversity, where erosion of the cliff is likely to improve the condition of the SSSI.

#### Option 4

Under Option 4 (Improve A), a new rock revetment would be constructed along the full length of the ODU to defend the cliff toe. This would lead to reduced erosion risk to properties and key infrastructure in this unit, and therefore could lead to major positive significant effects across a range of SEA topics, including climate change, and transport and movement. However, only minor positive significant effects are predicted under the population and communities SEA topic, as construction of the revetment may require removal / replacement of the beach huts (subject to the design of the structure).

Neutral effects are predicted under the biodiversity and geodiversity SEA topic for Option 4. This is because this option would reduce the rate of natural coastal processes / and limit erosion along unit 9 of the SSSI. Whilst this

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<sup>73</sup> Natural England (no date): 'Highcliffe to Milford Cliffs SSSI', [online] available to access via [this link](#)

<sup>74</sup> Natural England (2013): 'NCA Profile: New Forest (NE477)', [online] available to access via [this link](#)

would not be expected to worsen the condition of the SSSI relative to the baseline (it is currently in an unfavourable condition), there may be reduced potential for the condition of the SSSI to improve.

Minor negative significant effects are predicted under the landscape SEA topic, with a large rock revetment along the length of the frontage potentially impacting views / landscape of the area, which is used extensively for amenity and recreation.

#### Option 5, Option 6 and Option 7

With Options 5, 6 and 7 (Managed Realignment A-C), a beach nourishment scheme would be carried out along the full frontage and a new rock strong point (e.g. rock revetment) would be constructed at the junction of Whitby Road and Cliff Road (different timings subject to the option). These options are likely to slow and help control the rate of coastal erosion, especially in the most vulnerable locations, but would not stop it entirely. Beach nourishment could have a positive effect on Hurst Spit to the east of the ODU, through sediment supply and longshore drift. Due to this, minor positive long-term significant effects are predicted under the majority of the SEA topics.

This includes minor positive significant effects under the biodiversity and geodiversity SEA topic, as some erosion would occur, which may lead to an improvement in the condition of the SSSI. With the construction of a local strong point, there is potential to explore BNG opportunities. For example, if a rock structure is used, opportunities for habitat creation could be explored during appraisal / design work.

Minor negative significant effects are considered likely under the transport and movement SEA topic as it is uncertain whether the car park at Hordle Cliff west would be fully defended in the future. With Options 6 and 7, a number of beach huts are likely to be lost to erosion in the interim period before a scheme is implemented, and there is also greater potential for impacts on cliff top amenities / access. However, on balance, these options are likely to score similarly to Option 5 under the population and communities SEA topic, given that the intent would be to defend permanent properties against erosion.

#### All Options

Uncertain effects are predicted under the historic environment SEA topic across all seven options, due to the notable number of structures relating to WWII have been recorded within the vicinity of this ODU. Nevertheless, Historic England will be consulted in the future as options progress.

Neutral effects are also predicted under the land, soil and water resources SEA topic across all seven options because they are unlikely to impact these resources. This is because the land in this location does not include any historic landfill sites, drinking water protected areas/ safeguard zones, or source protection zones in this location.

### 21.3.1 Cumulative effects

The options under ODU 16 that include beach nourishment could lead to positive cumulative effects with the Hurst Spit to Lymington Strategy. The dominant direction of movement for littoral transport is from west to east within the bay and therefore placing material in ODU 16 could have a benefit as some of this material would be expected to travel east towards Hurst Spit and provide a sediment feed over time. This could positively impact the management of the spit due to the greater supply of sediment to the area. Larger beach volumes on the spit are considered positive as the beach provides the first line of defence against erosion and flooding to assets on the Spit, such as Hurst Castle and Lighthouse which are scheduled monuments / listed buildings.

## 21.4 Leading Option selection

Multiple Leading Options were selected for ODU 16 based on the results of the economic, environmental, technical and social appraisal:

- National Economic Option: Managed Realignment C.
- Local Aspirational Option: Managed Realignment A/B.
- Backup Option: Maintain.

Delivery of either of the National Economic or Local Aspirational Options in this unit is likely to lead to positive effects across most SEA topics. However, funding for these options is uncertain, and if funding cannot be found, then the Backup option (Maintain) may be delivered instead. This option does not deliver the same level of positive environmental effects, with negative significant effects predicted across most SEA topics. With the Managed Realignment options, with the construction of a local strong point, there is potential to explore BNG opportunities. For example, if a rock structure is used, opportunities for habitat creation could be explored during further appraisal / design work.

# 22. SMZ 6 – ODU 17: Rook Cliff options assessment

## 22.1 Introduction

ODU 17 (shown in **Figure 22.1** below) is located between the start of the Rook Cliff defences and the Hurst Road West car park (just to the east of the White House). There are a variety of defences in this ODU, including concrete seawalls, a rock revetment, timber groynes and rock groyne. The condition of the defences is variable, with some defences in a poor condition with a low residual life. Recent work has been undertaken in this area to stabilise the defences following a failure at Westover.

The main risk in this location is from erosion with over 300 properties are expected to be at risk. Over the next 100 years, the total PV damages for this area are estimated to be over £11.5 million.

The SMP<sup>75</sup> policy for this area is to 'Hold the Line' in the short-, medium- and long-term. The SMP refresh (2020) recommended investigating options for future management (due to serious damage to defences during the 2019/20 storms), and potentially revisit the SMP policy subject to the outcome of the investigations.

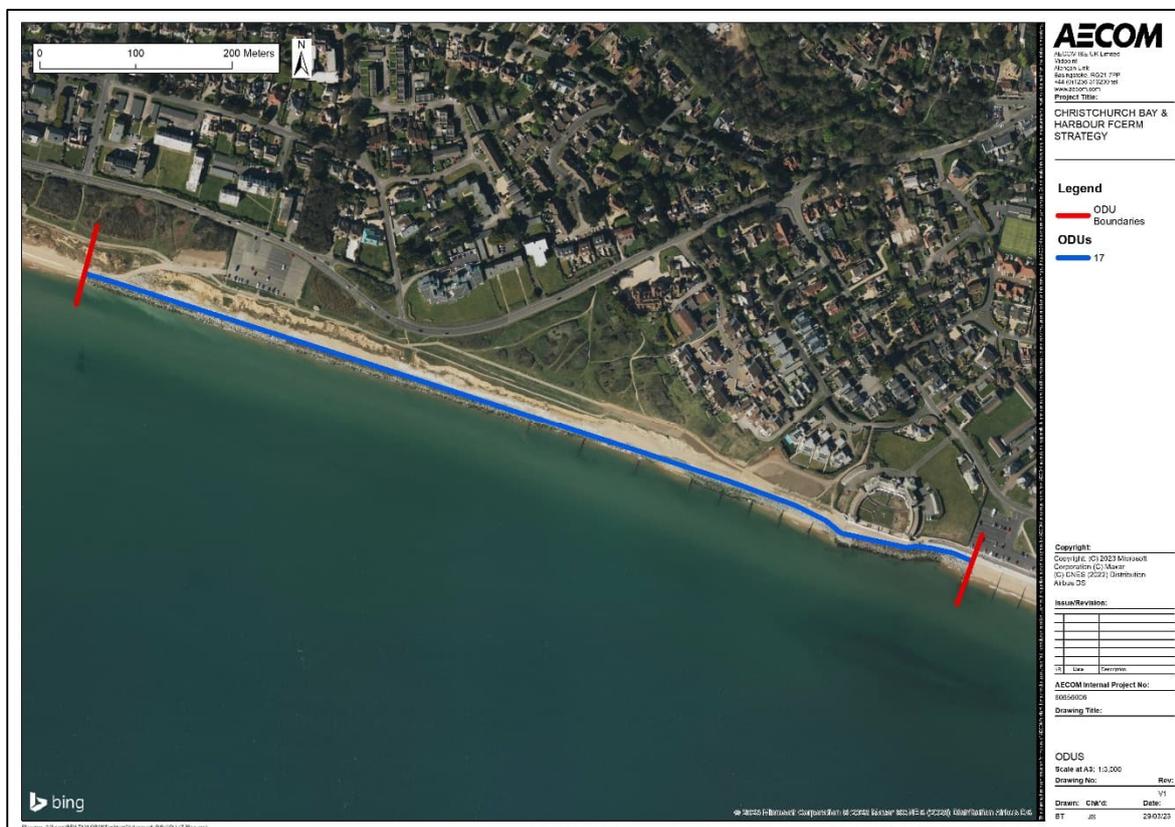


Figure 22.1 ODU 17

## 22.2 Strategic options

The strategic options for this ODU are as follows:

1. **Do Nothing:** no new defences or maintenance of existing defences. Ensure health and safety compliance when defences fail.

<sup>75</sup> Royal Haskoning (2011). 'Poole & Christchurch Bays Shoreline Management Plan Review (SMP2)', [online] available to access via [this link](#)

2. **Do Minimum:** small scale patch-repair maintenance to existing defences (as and when required).
3. **Maintain:** refurbishment of existing defences (from epoch 1).
4. **Improve A:** in epoch 1 refurbish / upgrade existing rock revetment, upgraded groynes (epoch 1) (erosion will not be stopped entirely; some erosion will still occur).
5. **Improve B:** same approach as Improve A, except initial upgrades to defences delayed until the start of epoch 2.
6. **Improve C:** same approach as Improve A, except initial upgrades to defences delayed further until approximately mid-point of epoch 2.
7. **Managed Realignment A:** upgrade rock revetments at Rook Cliff and the White house, then removing the defences in between once failed and letting land realign / erode over time; manage rate of erosion (erosion will not be stopped entirely; some erosion will still occur). in undefended area with beach nourishment and construction of rock groynes in realigned area to help retain material (from epoch 1).
8. **Managed Realignment B:** construct nearshore breakwaters and undertaken beach nourishment to help retain beach material in this location and control rates of erosion.

Note that for the Improve options that involve groyne upgrades / modifications, design of the groynes will be undertaken at the scheme stage and will aim to ensure sustainable beach levels whilst also allowing west-east sediment flows to work with natural coastal processes.

## 22.3 Assessment findings

The assessment findings for each option, organised by SEA topic, are set out in **Table 22.1** below and discussed in more detail underneath.

**Table 22.1 Assessment findings for ODU 17**

SEA topic	Option number							
	1	2	3	4	5	6	7	8
Biodiversity and geodiversity	++	++	+	0	0	0	+	0
Climate change	--	--	?	++	++	++	++	++
Landscape	--	--	?	++	++	++	-	-
Historic environment	--	--	?	+	+	+	+	+
Land, soil and water resources	0	0	0	0	0	0	0	0
Population and communities	--	--	-	++	++	++	-	++
Transport and movement	--	--	?	++	++	++	++	++

## Key (likely significant effects)

Major positive	Minor positive	Neutral	Uncertain	Minor negative	Major negative
++	+	0	?	-	--

The western half of this ODU falls within unit 9 (Milford on Sea Cliff) of the Highcliffe to Milford Cliffs SSSI<sup>76</sup>. Unit 9 is currently in an unfavourable condition as the cliff face is densely vegetated, obscuring the exposures of interest. There are rock armour / seawall defences present along the frontage which defend the cliff toe and reduce erosion of the cliff face.

In addition to the above, Milford on Sea LNR is located to the north of the ODU, 370m north of the coastline and the full length of the frontage is adjacent to or in proximity of the Solent and Dorset coast marine SPA.

In terms of BAP priority habitats, the western half of the ODU contains maritime cliff and slope. Further inland, covering the same area as the Milford on Sea LNR, is an area of deciduous woodland.

In terms of flood risk, this ODU is primarily within Flood Zone 1. Cliff Road/ Park Lane runs close to the coastline in the western part of the ODU, and there are several properties near the coastline, particularly in the eastern part of the ODU.

The ODU falls within the New Forest<sup>77</sup> National Character Area (NCA), which includes the Lower Hampshire Avon Valley.

With regards to the historic environment, there are several grade II listed buildings within this stretch of coast, the closest of which (The White House) is near the eastern boundary of the ODU, 20m from the coastline. Notably, structures from WWII have been recorded in the vicinity of the ODU and during scheme development a desk-based assessment should be undertaken to assess these structures in detail.

### Option 1

Under Option 1 (Do Nothing), there would be no new defences or maintenance of existing defences. Due to this, the existing defences will fail over time, increasing the risk of the coastline eroding. Notably, in epoch 3 (between 2074-2124), over 300 properties are expected to be at risk of coastal erosion. Therefore, major negative long-term significant effects are predicted across the majority of the SEA topics. This includes the historic environment SEA topic, as grade II listed building 'The White House' would be at risk of damage from erosion under this option.

Major positive long-term significant effects are considered likely under biodiversity and geodiversity for this option, as it would allow natural coastal processes / erosion to take place along unit 9 of the SSSI, which may help contribute to an improvement in its condition, which is currently unfavourable.

### Option 2

Under Option 2 (Do Minimum), only small-scale patch-repair maintenance of the existing defences would be carried out as and when required. This would extend the service life of the existing defences, but only by several years at most. Therefore, the effects would be expected to be similar to Option 1 (Do Nothing), and this is reflected in the assessment findings.

### Option 3

Under Option 3 (Maintain), the existing defences would be routinely refurbished, beginning in epoch 1. There is a trend of falling beach levels in this location, and this could continue in the future with rising sea levels. Therefore, whilst the intent of this option would be to sustain the service of the existing coastal defences, there is a risk that this may not be possible and defence failure / erosion could occur, leading to loss of properties and infrastructure. Uncertainty is noted under this option across most of the SEA topics, as it is unclear whether the existing defences will continue to prevent erosion in this location, particularly with SLR.

<sup>76</sup> Natural England (no date): 'Highcliffe to Milford Cliffs SSSI', [online] available to access via [this link](#)

<sup>77</sup> Natural England (2013): 'NCA Profile: New Forest (NE477)', [online] available to access via [this link](#)

### Option 4, Option 5 and Option 6

Options 4, 5 and 6 (Improve A-C) would upgrade the defences and lead to reduced risk of erosion to properties and infrastructure in this unit. These options could therefore lead to major positive long-term significant effects across the majority of the SEA topics.

These options are likely to lead to neutral effects under the biodiversity and geodiversity SEA topic. The condition of the SSSI is a key consideration regarding the potential impacts to geodiversity under these options. With these options the cliff toe would continue to be defended, but there would be no drainage to the cliff face. This would help to stabilise the cliff, but a limited amount of natural erosion may occur as cliff slope processes and weathering may continue. However, the erosion would be expected to be limited. This could result in some geological features being available, but less so relative to an unconstrained / undefended scenario. Whilst this would not be expected to worsen the condition of the SSSI relative to the baseline (it is currently in an unfavourable condition in this location), there may be reduced potential for the condition of the SSSI to improve. Therefore, these options are considered likely to lead to neutral effects under this SEA topic. There would be opportunities to explore BNG as part of these options, for example, by creating intertidal habitats as part of the works to upgrade the rock defences. BNG opportunities should be explored as part of further appraisal / design work following the Strategy.

Minor positive long-term significant effects are predicted under the historic environment SEA topic as these options would provide protection to the grade II listed building 'The White House' through upgrades to the existing rock revetment along the length of the ODU. However, it is recognised that the rock revetment will need to be sensitively upgraded as not to adversely affect the setting of the listed building. This will be considered at the scheme level.

### Option 7

Option 7 (Managed Realignment A) is likely to be favourable from a geodiversity perspective, as the managed realignment approach would allow part of the cliff to erode, which could have a positive impact on the condition of the SSSI. However, it is noted that the potential realignment area may be just to the east of the SSSI designation, so there is uncertainty on how significant of an effect this may have for local geodiversity.

Minor negative significant effects are predicted under the landscape SEA topic, given the potential landscape changes associated with realigning part of the coastline in this unit. Minor negative significant effects are also predicted under the population and communities SEA topic, as the area of open space at the cliff would be lost. Otherwise, this options is considered likely to lead to major positive significant effects across many of the remaining SEA topics, due to reducing the long-term erosion risk to properties and infrastructure.

Minor positive long-term significant effects are predicted under the historic environment SEA topic as this option would provide protection to the grade II listed building 'The White House' through an upgraded rock revetment at this location. However, it is recognised that the rock revetment will need to be sensitively designed as not to adversely affect the setting of the listed building. This will be considered at the scheme level.

### Option 8

Similar scoring and rationale to the Improve options. However, potential for a minor negative impact in the landscape category as nearshore breakwaters are likely to change the landscape of this location.

### All Options

Neutral effects are predicted under the land, soil and water resources SEA topic across all eight options because they are unlikely to impact these resources. This is because the land in this location is not used for agricultural purposes, nor are there any historic landfill sites, drinking water protected areas/ safeguard zones, or source protection zones in this location.

## **22.3.1 Cumulative effects**

The options under ODU 17 are unlikely to lead to any cumulative effects with respect to other plans and strategies as the land in this location is largely developed, with little room for future development. Options in this unit do not include beach nourishment but would not be expected to restrict the natural movement of material to the east towards Hurst Spit relative to the existing situation.

## 22.4 Leading Option selection

Multiple Leading Options were selected for ODU 17 based on the results of the economic, environmental, technical and social appraisal:

- National Economic Option: Improve C.
- Local Aspirational Option: Improve A/B.
- Backup Option: Maintain.

Delivery of either of the National Economic or Local Aspirational Options in this unit is likely to lead to significant positive effects across most SEA topics. However, funding for these options is uncertain, and if funding cannot be found, then the Backup option (Maintain) may be delivered instead. The impacts with the Maintain option are more uncertain, as it is unclear how the existing defences will perform in the future. With the Improve options, there is potential to explore BNG opportunities during further appraisal / design.

Refurbishments and upgrades to the existing defences will need to consider mitigation to the environmental receptors which could be impacted. For example, in relation to the historic environment the upgrades should be undertaken in a way as not to adversely affect the setting of the White House listed building. This will be considered at the scheme level.

# 23. SMZ 6 – ODU 18: Milford on Sea Frontage options assessment

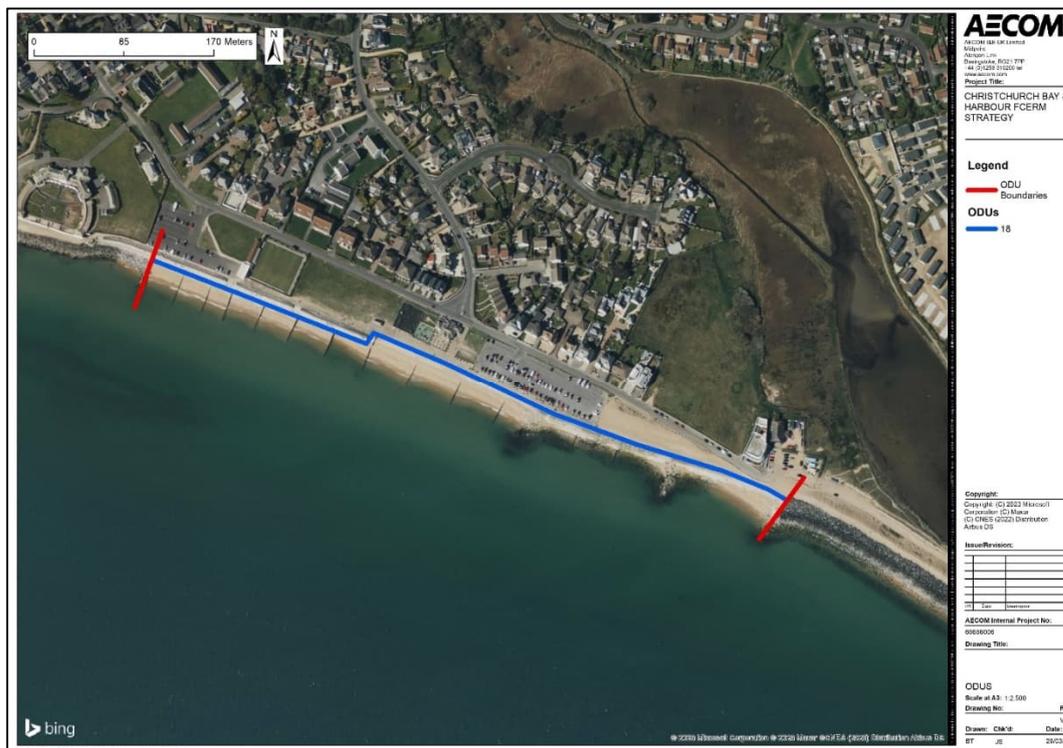
## 23.1 Introduction

ODU 18 (shown in **Figure 23.1** below) covers the area between Hurst Road West car park and the eastern end of Hurst Road, at the start of the rock revetment at the west end of Hurst Spit. There are a variety of defences in this ODU, including rock and timber groynes and a concrete seawall. The estimated residual life of most of the defences in this unit is <10 years.

The beach in this location has a long-term trend of erosion. Small-scale beach recharges have been undertaken on this beach since 2004, but with slightly increased frequency after 2008 after a seawall failure. However, the erosion of the beach is ongoing and beach volumes are declining. The beach in ODU 18 is used for recreation/amenity. Beach huts are located in this unit as part of the structure that forms the seawall/ promenade at the western end of this frontage.

The main risk to the area is from coastal erosion. However, there is also a risk of flooding due to wave overtopping along the frontage (particularly at the eastern end of the ODU), as well as from tidal inundation from behind Hurst spit in the Keyhaven direction. Recent flooding occurred in the Valentine's storm of 2014, such as at Marine Café (now the Lighthouse). Over the next 100 years, the total PV damages from flooding and erosion are estimated to be over £11.4 million.

The SMP<sup>78</sup> policy for ODU 18 is to 'Hold the Line' in the short-term, followed by 'Managed Realignment' in the medium- and long-term. The SMP recommended considering options for developing a continuous beach between Rook Cliff and Hurst Spit.



**Figure 23.1 ODU 18**

<sup>78</sup> Royal Haskoning (2011). 'Poole & Christchurch Bays Shoreline Management Plan Review (SMP2)', [online] available to access via [this link](#)

## 23.2 Strategic options

The strategic options for this ODU are as follows:

1. **Do Nothing:** no new defences or maintenance of existing defences; ensure health and safety compliance when defences fail.
2. **Do Minimum:** small scale patch-repair maintenance to existing defences (as and when required).
3. **Maintain:** refurbishment of existing defences (from epoch 1).
4. **Improve A:** beach nourishment in first part of epoch 1, as well as refurbishment / upgrade of existing seawall and new groynes (also epoch 1) (erosion will not be stopped entirely; some erosion will still occur); new setback defences (e.g. floodwall or embankment) and property level protection in the east part of the unit in epoch 2 to manage flood risk.
5. **Improve B:** same approach as Improve A except the initial nourishment and defence improvements would be undertaken in epoch 2.
6. **Managed Realignment A:** rock revetment at east end of frontage (root of Hurst Spit) in first few years (epoch 1); allow existing seawall to fail and allow erosion into area of open space behind, creating more space for wider beach; construct new defence alignment in epoch 2 once desired shoreline position reached; use beach nourishment to control rate of erosion (epochs 1-3); new setback defences (e.g. floodwall or embankment) and property level protection in the east part of the unit in epoch 2 to manage flood risk.
7. **Managed Realignment B:** construct nearshore breakwaters and undertaken beach nourishment to help retain beach material in this location and control rates of erosion.

Note that for the options that involve groyne upgrades / modifications, design of the groynes will be undertaken at the scheme stage and will aim to ensure sustainable beach levels whilst also allowing west-east sediment flows to work with natural coastal processes.

## 23.3 Assessment findings

The assessment findings for each option, organised by SEA topic, are set out in **Table 23.1** below and discussed in more detail underneath.

**Table 5.18 Assessment findings for ODU 18**

SEA topic	Option number						
	1	2	3	4	5	6	7
Biodiversity and geodiversity	--	--	?	+	+	+	+
Climate change	--	--	?	++	++	++	++
Landscape	--	--	?	+	+	-	-
Historic environment	?	?	?	?	?	?	?
Land, soil and water resources	0	0	0	0	0	0	0
Population and communities	--	--	-	++	++	-	++
Transport and movement	--	--	-	++	++	-	++

## Key (likely significant effects)

Major positive	Minor positive	Neutral	Uncertain	Minor negative	Major negative
++	+	0	?	-	--

The full length of the frontage is adjacent to or in proximity of the Solent and Dorset coast marine SPA. In addition, the area to the north of the ODU is covered by the Solent and Southampton Water SPA/ Ramsar site, the Solent Maritime SAC<sup>79</sup>, the Hurst Castle and Lymington River Estuary SSSI<sup>80</sup>, and the Sturt Pond LNR. The LNR is only 40m from this stretch of the coastline, whilst the remaining sites are 70m northeast from the eastern boundary of the ODU at the closest point.

In terms of BAP priority habitats, the beach (open coast) along this ODU is not covered by a priority habitat but the area to the north of Hurst Spit consists of a mix of coastal saltmarsh, saline lagoons and reedbeds.

In terms of flood risk, whilst the land to the north of the coastline along this ODU is within Flood Zone 1, the land to the northeast of the eastern boundary of the ODU is within Flood Zone 3, as this is where Danes Stream enters the sea. There are properties within this ODU, north of Hurst Road, which runs parallel to the coastline. There are two car parks adjacent to the beach.

The ODU falls within the New Forest<sup>81</sup> National Character Area (NCA), which includes the Lower Hampshire Avon Valley.

With regards to the historic environment, this ODU is relatively unconstrained. The nearest cluster of listed buildings directly to the north of this ODU is along Keyhaven Road, 540m from the coastline. However, there are three listed buildings in neighbouring ODU 17 (Rook Cliff), the closest of which (The White House) is 60m west of the western boundary of this ODU. Notably, structures relating to WWII have been recorded in the vicinity of the ODU and during scheme development a desk-based assessment should be undertaken to assess these structures in detail.

It is recognised that the ODU is immediately adjacent to Hurst Spit, which contains two grade II listed buildings and scheduled monument 'Hurst Castle and lighthouse'. The scheduled monument is considered one of the best-preserved defence forts in the country. It is in an extremely vulnerable position, situated on a remote and exposed shingle spit which commands the Needles Passage between the Isle of Wight and the mainland. With rising sea levels and more frequent storms and the historic construction of sea defences around Christchurch Bay, the integrity of the spit is now under increasing pressure. The impact of options in ODU 18 (as well as other units within the bay) has been considered in the cumulate effects section of the ODU.

### Option 1

Under Option 1 (Do Nothing), there would be no new defences or maintenance of existing defences. Due to this, the existing defences will fail over time, increasing the risk of the coastline eroding. In addition, due to sea level rise, the flood risk would be expected to increase over time. Notably, 58 properties are expected to be at risk from coastal erosion by 2074, and a further 79 properties will be at risk by 2124. Therefore, major negative long-term significant effects are predicted across the majority of the SEA topics for this option.

With respect to the biodiversity and geodiversity SEA topic, major negative significant effects are expected under this option, as failure of defences could lead to damage to a range of environmental designations, including the European designated sites at Sturt Pond / behind Hurst Spit.

### Option 2

Under Option 2 (Do Minimum), only small-scale patch-repair maintenance of the existing defences would be carried out as and when required. This would extend the service life of the existing defences, but only by several years at most, and this is not sufficient to prevent the decline in the condition of defences. Therefore, effects are expected to be similar to Option 1 (Do Nothing), and this is reflected in the assessment findings.

<sup>79</sup> JNCC (no date): 'Solent Maritime', [online] available to access via [this link](#)

<sup>80</sup> Natural England (no date): 'Hurst Castle and Lymington River Estuary SSSI', [online] available to access via [this link](#)

<sup>81</sup> Natural England (2013): 'NCA Profile: New Forest (NE477)', [online] available to access via [this link](#)

### Option 3

Under Option 3 (Maintain), the existing defences would be routinely refurbished, beginning in epoch 1, alongside small-scale beach management (i.e. small regular replenishment). There is a trend of falling beach levels in this location, and this could continue in future with rising sea level. Therefore, whilst the intent of this option would be sustaining the service of the existing coastal defences, there is a risk that this may not be possible, and defence failure / erosion could occur, leading to loss of properties and infrastructure. Uncertainty is noted under this option across the biodiversity and geodiversity, climate change, and landscape SEA topics, as it is unclear whether the existing defences will continue to prevent erosion in this location, particularly with sea level rise.

Minor negative significant effects are considered likely under the population and communities and transport and movement SEA topics as properties and infrastructure remain at risk of erosion / flooding under this option, although not to the same severity as under Options 1 and 2.

### Option 4 and Option 5

Under Option 4 and 5 (Improve A and B), the existing defences would be upgraded, new flood defences constructed, and beach nourishment would be undertaken. This would help to reduce the risk of flooding and erosion to properties and assets in the unit. Therefore, major positive significant effects are predicted across the majority of the SEA topics.

Minor positive significant effects are considered likely under the landscape SEA topic, as despite higher defences (relative to now), beach nourishment would lead to a larger beach in the area and improve the overall visual appeal of the location.

Minor positive significant effects are also expected under the biodiversity and geodiversity SEA topic, as Options 4 and 5 would involve construction of new defences, which would help to preserve the integrity of the designated sites / habitats in this location. Without new defences, there is a risk of erosion or a breach occurring at the eastern end of the unit, which could impact the designated sites at Sturt Pond / Hurst Spit (such as the SPA, SAC, Ramsar / Local Nature Reserve). Construction of new defences is likely to be in proximity to these designations, and further appraisal / design will be needed following the Strategy. However, there is generally expected to be space to avoid encroachment and habitat loss. There is potential for disruption from noise / vibration, but this can be mitigated by undertaking works during periods that are less sensitive to species in the location. Construction may also need to be avoided during the summer months, as the area is used for recreation and tourism, and bathing water quality is important. Opportunities for BNG should be explored during further appraisal / design, such as the use of materials / features on the seawall to encourage biodiversity and encouraging intertidal habitats on or within new groyne structures.

### Option 6

Option 6 (Managed Realignment A) could lead to minor negative significant effects across several SEA topics, including landscape, population and communities, and transport and movement. Whilst the flood and erosion risk to properties would be reduced, these options are likely to lead to significant changes in the coastline. For example, the landscape could be changed considerably with a realignment coastline, and there could be loss of parking facilities / public open space (Hurst Road East car park provides the only access to the beach for people with mobility issues in the whole of the area). Similar positive effects to Options 4 and 5 (Improve A and B) would likely occur under the biodiversity and geodiversity SEA topic.

### Option 7

Option 7 (Managed Realignment B) has a similar scoring and rationale to the Improve options. However, potential for a minor negative impact in the landscape category as nearshore breakwaters are likely to change the landscape of this area which is popular for amenity and recreation.

### All Options

Uncertain effects are predicted under the historic environment SEA topic across all seven options, due to adjacency of Hurst Spit. Nevertheless, Historic England will be consulted in the future as options progress.

Neutral effects are also predicted under the land, soil and water resources SEA topic across all seven options because they are unlikely to impact these resources. This is because the land in this location is not used for

agricultural purposes, nor are there any historic landfill sites, drinking water protected areas/ safeguard zones, or source protection zones in this.

### 23.3.1 Cumulative effects

The options in ODU 18 are likely to have a strong functional relationship with coastal processes at the adjacent Hurst Spit to the east, which contains two grade II listed buildings and scheduled monument 'Hurst Castle and lighthouse'. Therefore, there is potential for both positive and negative cumulative effects with the Hurst Spit to Lymington Strategy depending on the option.

The options under ODU 18 that include beach nourishment (Options 4 and 5) could lead to positive cumulative effects with the Hurst Spit to Lymington Strategy. The dominant direction of movement for littoral transport is from west to east within the bay and therefore placing material in ODU 18 could have a benefit as some of this material would be expected to travel east towards Hurst Spit and provide a sediment feed over time. This could positively impact the management of the spit due to the greater supply of sediment to the area. Larger beach volumes on the spit are considered positive as the beach provides the first line of defence against erosion and flooding to assets on the Spit, such as Hurst Castle and Lighthouse which are scheduled monuments / listed buildings.

However, on the contrary, the Do Nothing and Do Minimum options would be expected to have negative cumulative effects on Hurst Spit. Under these options, once existing defences fail, the coastline would be expected to erode in an unconstrained manner. This risks a breach in the coastline occurring at the root of the spit adjacent to Sturt Pond. This could interrupt the sediment transport onto the spit and also lead to large morphological changes in the position of the spit over time, threatening a range of environmental receptors on the spit and in adjacent areas.

## 23.4 Leading Option selection

Multiple Leading Options were selected for ODU 18 based on the results of the economic, environmental, technical and social appraisal:

- National Economic Option: Improve A.
- Backup Options: Improve B and Maintain.

Delivery of the National Economic Option in this unit is likely to lead to positive significant effects across most SEA topics. However, funding for this option is uncertain, and if funding cannot be found, then a Backup option Improve B or Maintain may be delivered instead. The impacts of Improve B are similar to Improve A. The impacts with the Maintain option are more uncertain, as it is unclear how the existing defences will perform in the future. The Improve options will benefit the biodiversity and geodiversity SEA topic by helping to preserve the designated sites in the area, and there is potential to explore BNG opportunities during further appraisal / design.

## 24. What are the next steps?

### 24.1 Strategy updates and approvals

Following stakeholder review of the Strategy consultation materials, the Strategy will be updated and then submitted for BCP and NFDC council review and approval by the Environment Agency. This will involve the production of a Strategy Appraisal Report (StAR). Once approved, a Strategy action plan will be produced and the coastal management authorities will start planning for an implementing the leading options. Further appraisal of scheme solutions will be undertaken, during which design and appraisal of defence alignments will be undertaken alongside further engagement with key stakeholders.

### 24.2 Monitoring

The SEA regulations require 'measures envisaged concerning monitoring' to be outlined in this report. This refers to the monitoring of likely significant effects of the Strategy to identify any unforeseen effects early and take remedial action as appropriate.

It is anticipated that monitoring of effects of the Strategy will be undertaken by BCP / NFDC Councils and the Environment Agency as part of the process of preparing their Annual Monitoring Report (AMR). However, BCP / NFDC Councils and other key stakeholders could undertake additional monitoring specific to Flood and Coastal Erosion Risk Management and coastal change if budget and resources are available. Environmental monitoring that could be undertaken is outlined in Table 24-1 below.

**Table 24-1: Environmental Monitoring that could be undertaken to support delivery of Strategy**

Category	Monitoring / further studies	Location
Historic environment	<ul style="list-style-type: none"> <li>BCP council, in consultation with Historic England, to develop specific monitoring plan for ODU 1 and ODU 6 to capture impacts of coastal change and undertake archaeological assessments.</li> </ul>	ODU 1 and 6
	<ul style="list-style-type: none"> <li>Monitoring of flood and erosion damage to historic assets, such as listed buildings and scheduled monuments</li> </ul>	Historic assets impacted by flooding and/or erosion
	<ul style="list-style-type: none"> <li>Program of recording in erosion prone areas</li> </ul>	Historical designations within near term erosion zones (i.e. epoch 1 and 2)
	<ul style="list-style-type: none"> <li>Heritage impact and archaeological assessment. Option appraisal study for heritage assets.</li> </ul>	ODU 6
Marine environment	<ul style="list-style-type: none"> <li>Develop monitoring programme to understand impacts of beach nourishment on biodiversity on beaches and nearshore waters in relation to planned renourishments</li> </ul>	ODU 2, 12, 13, 16, 18
Biodiversity and intertidal habitat	<ul style="list-style-type: none"> <li>Monitor condition of intertidal habitats and other key areas of biodiversity / habitats along the frontage to determine changes in condition and extent over time</li> </ul>	Environmental designations and intertidal habitats (i.e. saltmarsh and mudflats)
Geodiversity	<ul style="list-style-type: none"> <li>Monitor exposure of geological features in cliff SSSI designation</li> </ul>	Highcliffe to Milford Cliff SSSI
Historic landfill sites	<ul style="list-style-type: none"> <li>Monitor erosion rate of historic landfill sites and undertake assessment of potential for contaminated materials</li> </ul>	ODU 3, 4, 5, 9, 11

# 25. Appendix A



# Christchurch Bay & Harbour FCERM Strategy

Strategic Environmental Assessment (SEA) Scoping  
Report

Bournemouth, Christchurch and Poole (BCP) Council and  
New Forest District Council (NFDC) and the Environment  
Agency

Project number: 60656006

18 October 2023

## Quality information

Prepared by	Checked by	Verified by	Approved by
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## Revision History

Revision	Revision date	Details	Authorized	Name	Position
00	06/08/21	Draft for Comment	JCAS	Jon Short	Associate Director
01	19/11/21	Updated with client and stakeholder comments	JCAS	Jon Short	Associate Director
02	21/12/2021	Minor text updates	JCAS	Jon Short	Project Manager
03	16/10/2023	Update with stakeholder comments	JCAS	Jon Short	Project Manager

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# 1. Introduction

## 1.1 Christchurch Bay & Harbour FCERM Strategy

AECOM has been commissioned by Bournemouth, Christchurch and Poole (BCP) Council to develop a Flood and Coastal Risk Management (FCERM) Strategy for the coastal frontage at Christchurch Bay & Harbour (herein referred to as ‘the Strategy’). The Strategy will be developed collaboratively by AECOM, and the Project Board consisting of officers of BCP Council, New Forest District Council (NFDC) and the Environment Agency (EA).

The Strategy extent is the coastal frontage between Hengistbury Head (immediately to the east of Hengistbury Head long groyne) and the landward (western) end of Hurst Spit. Within Christchurch Harbour, the Strategy extent is up to the tidal limit on the River Stour at Tuckton Bridge and up to the tidal limit on the River Avon at Knapp Mill (see Figure 1-1).

The aim of this Strategy is to provide an integrated plan for the Christchurch Bay & Harbour frontage, delivering sustainable and long-term management for coastal flood and erosion risks over the next 100 years. The Strategy will further develop the existing SMP policies adopted in 2011 and update the information provided in the 2012 Christchurch Bay & Harbour FCERM Study using the most up-to-date data and guidance.

The Strategy will provide an assessment of the risks and opportunities associated with coastal processes and develop a management framework to manage these risks, as well as any opportunities, in a sustainable manner. This will form an important element of the policy for flood and coastal defences and provide guidance for spatial planning within the coastal zone. The Strategy will determine the preferred options for flood and coastal defences through multi-variate appraisal including a cost-benefit analysis.

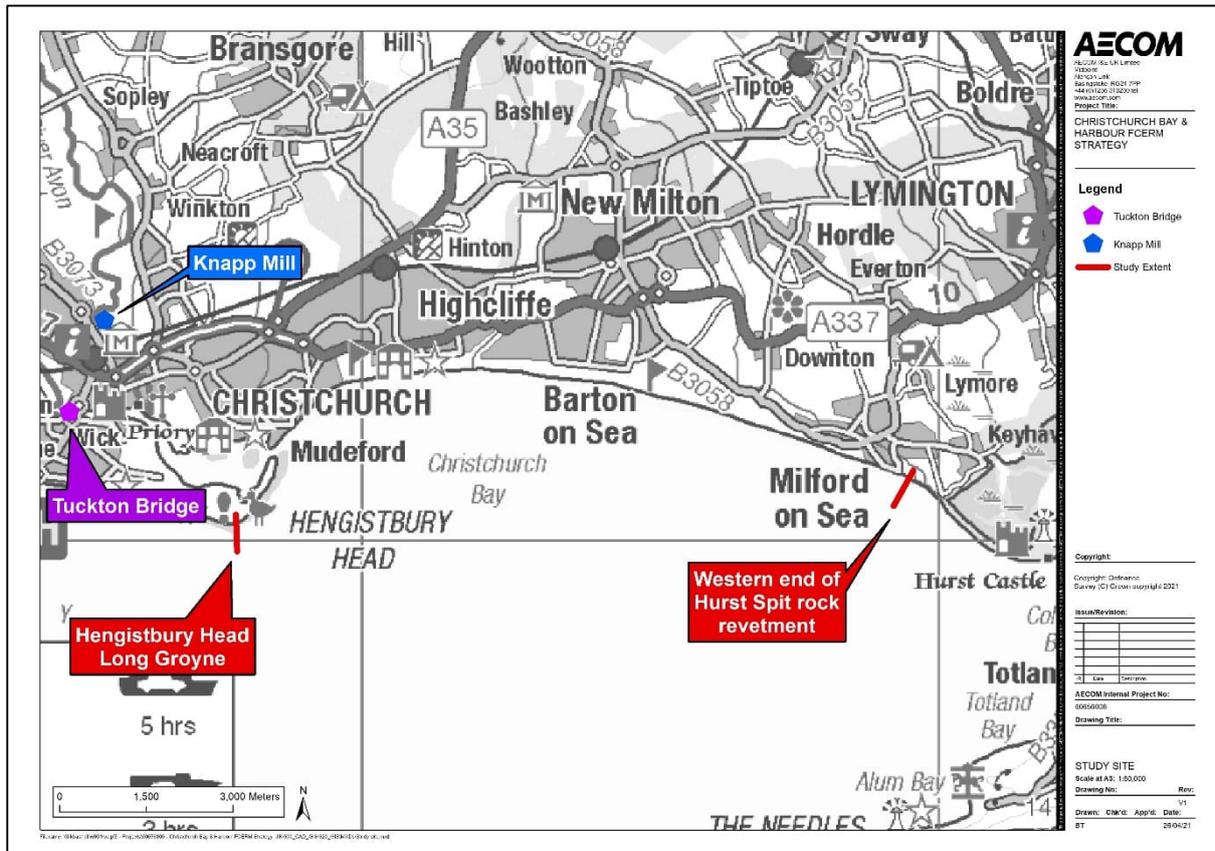


Figure 1-1: Map of Strategy Area

Figure 1-2 provides a summary of the Strategy development process. The Strategic Environmental Assessment (SEA) process will inform the Strategy, through identification of the likely significant effects of the implementation of the Strategy, and any reasonable alternatives, on relevant environmental receptors.

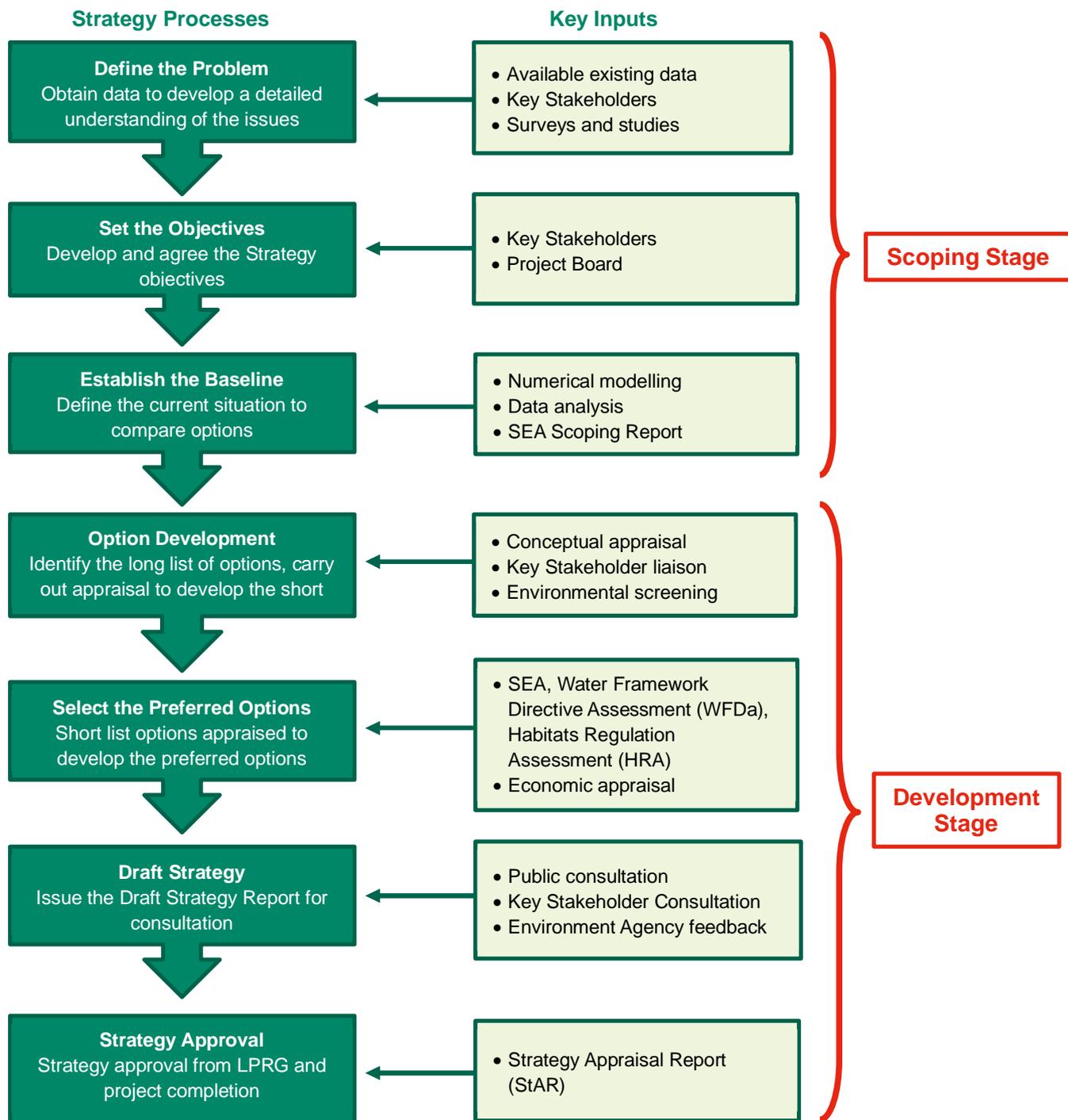


Figure 1-2: Summary of the Christchurch Bay & Harbour FCERM Strategy Development Process

## 1.2 Strategic Environmental Assessment

SEA is a mechanism for considering and communicating the likely significant effects of an emerging plan, and reasonable alternatives in terms of key environmental issues. The aim of a SEA is to inform and influence the plan-making process with a view to avoiding or mitigating negative environmental effects and maximising positive effects.

The Environmental Assessment of Plans and Programmes Regulations 2004 (otherwise known as the SEA Regulations) (SI 1633, 2004)<sup>1</sup> require an environmental assessment to be carried out on certain plans and programmes that are likely to have a significant effect upon the environment. Applying the SEA process to flood management plans, including any plan for medium to long-term river or coastal management, is not legally required. However, adopting the SEA approach is strongly encouraged by the Department for Environment, Food and Rural Affairs (DEFRA) to allow a strategic approach to managing the coast. As a result, a full SEA process is being carried out as part of the Christchurch Bay and Harbour FCERM Strategy which satisfies the requirements of the SEA Regulations.

After establishing that an SEA is required, the next stage seeks to establish the suggested scope for the SEA. This scoping stage is outlined in this report. A key procedural requirement of the SEA Regulations is to present this scope for the SEA, so that the designated authorities (Historic England, Natural England and the Environment Agency) can provide timely comment.

### 1.2.1 SEA Scoping

Developing the draft scope has involved the following tasks:

- Exploring the policy context for the Strategy and SEA through identification of other relevant plans, policies and strategies to summarise the key messages;
- Establishing the baseline of the SEA in order to provide the evidence base for the identification of environmental problems and to help in the identification of key issues;
- Identifying particular risks or opportunities, termed key issues, that should be a particular focus of the SEA; and,
- Developing an SEA framework comprising SEA objectives and assessment questions to address the key issues, which can be used as a guiding framework for the subsequent assessment.

### 1.2.2 Structure of this report

The outcomes of the scoping tasks set out above are presented under a series of SEA themes, as follows:

- Air Quality;
- Biodiversity and Geodiversity;
- Climate Change;
- Landscape;
- Historic Environment;
- Land, Soil and Water Resources;
- Population and Communities; and
- Transport and Movement.

These themes incorporate the 'SEA topics' suggested by Schedule 2 of the SEA Regulations<sup>2</sup>. Each of these themes is presented in Sections 2 to 9 with the context review, baseline data and identified environmental issues. As part of the next stage within the SEA Environmental Report, the cumulative effects between themes will be considered. This will include the cumulative impact of any plans, programmes and strategies on key receptors across the themes.

<sup>1</sup> Environmental Assessment of Plans and Programmes Regulations (2004) [online] available at: <https://www.legislation.gov.uk/uksi/2004/1633/contents/made> [Accessed 26 July 2021]

<sup>2</sup> The SEA Directive (Directive 2001/42/EC) does not require particular issues to be included, beyond 'the environment, including biodiversity, population, human health, fauna, flora, soil, water, air, climatic factors, material assets, cultural heritage including architectural and archaeological heritage, landscape and the interrelationship between the above factors'.

The proposed SEA framework is presented in Appendix A. The SEA objectives for each of the SEA themes have been developed to align with the National FCERM Strategy<sup>3</sup> and the SEA Environmental Report for the Draft National FCERM Strategy<sup>4</sup>.

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<sup>3</sup> National Flood and Coastal Erosion Risk Management (FCERM) Strategy (2020) [online] available at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/920944/023\\_15482\\_Environment\\_agency\\_digitalAW\\_Strategy.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/920944/023_15482_Environment_agency_digitalAW_Strategy.pdf) [Accessed 05 August 2021]

<sup>4</sup> Draft FCERM Strategy for England: Amended Strategic Environmental Assessment (SEA) Environmental Report (2019) [online] available at: [https://consult.environment-agency.gov.uk/fcrm/national-strategy-public/user\\_uploads/sea-er-2019-amended-final-submission-for-client.pdf](https://consult.environment-agency.gov.uk/fcrm/national-strategy-public/user_uploads/sea-er-2019-amended-final-submission-for-client.pdf) [Accessed 05 August 2021]

## 2. Air Quality

This section focuses on air quality and air pollution levels across the Strategy area.

### 2.1 Policy Context

Table 2-1 presents the most relevant documents identified for monitoring and managing air quality in the Strategy area.

**Table 2-1: Plans, policies and strategies reviewed in relation to air quality**

Policy	Year of publication	Weblink
<b>National Planning Policy Framework (NPPF)</b>	2021	<a href="https://www.gov.uk/government/publications/national-planning-policy-framework--2">https://www.gov.uk/government/publications/national-planning-policy-framework--2</a>
<b>Environment Bill 2020</b>	2020	<a href="https://www.gov.uk/government/publications/environment-bill-2020">https://www.gov.uk/government/publications/environment-bill-2020</a>
<b>Water Environment (Water Framework Directive) (England and Wales) Regulations 2017</b>	2017	<a href="https://www.legislation.gov.uk/uksi/2017/407/contents/made">https://www.legislation.gov.uk/uksi/2017/407/contents/made</a>
<b>The Clean Air Strategy</b>	2019	<a href="https://www.gov.uk/government/publications/clean-air-strategy-2019">https://www.gov.uk/government/publications/clean-air-strategy-2019</a>
<b>A Green Future: Our 25 Year Plan to Improve the Environment</b>	2018	<a href="https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/693158/25-year-environment-plan.pdf">https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/693158/25-year-environment-plan.pdf</a>
<b>South Inshore and South Offshore Marine Plan</b>	2018	<a href="https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/726867/South_Marine_Plan_2018.pdf">https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/726867/South_Marine_Plan_2018.pdf</a>
<b>Dorset Heathlands Interim Air Quality Strategy</b>	2021	<a href="https://www.bcpccouncil.gov.uk/Planning-and-building-control/Planning-policy/Current-Local-Plans/Bournemouth/Docs/Air-Quality-mitigation-FINAL-1.pdf">https://www.bcpccouncil.gov.uk/Planning-and-building-control/Planning-policy/Current-Local-Plans/Bournemouth/Docs/Air-Quality-mitigation-FINAL-1.pdf</a>
<b>Bournemouth Local Plan</b>	2012	<a href="https://www.bcpccouncil.gov.uk/Planning-and-building-control/Planning-policy/Current-Local-Plans/Bournemouth/Docs/Core-Strategy-1.pdf">https://www.bcpccouncil.gov.uk/Planning-and-building-control/Planning-policy/Current-Local-Plans/Bournemouth/Docs/Core-Strategy-1.pdf</a>
<b>Christchurch and East Dorset Local Plan</b>	2014	<a href="https://www.bcpccouncil.gov.uk/Planning-and-building-control/Planning-policy/Current-Local-Plans/Christchurch/docs/christchurch-and-east-dorset-adopted-core-strategy.pdf">https://www.bcpccouncil.gov.uk/Planning-and-building-control/Planning-policy/Current-Local-Plans/Christchurch/docs/christchurch-and-east-dorset-adopted-core-strategy.pdf</a>
<b>New Forest District Council Local Plan 2016 - 2036</b>	2020	<a href="https://www.newforest.gov.uk/media/705/Local-Plan-Document-2016-2036/pdf/Local_Plan_2016-2036_Part_One_FINAL.pdf?m=637329191351130000">https://www.newforest.gov.uk/media/705/Local-Plan-Document-2016-2036/pdf/Local_Plan_2016-2036_Part_One_FINAL.pdf?m=637329191351130000</a>
<b>New Forest National Park Local Plan 2016 - 2036</b>	2019	<a href="https://www.newforestnpa.gov.uk/app/uploads/2019/09/Local-Plan-2016-2036-finalforweb.pdf">https://www.newforestnpa.gov.uk/app/uploads/2019/09/Local-Plan-2016-2036-finalforweb.pdf</a>
<b>New Forest District Council: 2020 Air Quality Annual Status Report</b>	2020	<a href="https://www.newforest.gov.uk/media/1129/Air-Quality-Annual-Status-Report-Summary-2020/pdf/Air_Quality_Annual_Status_Report_Summary_2020.pdf?m=637357085023900000">https://www.newforest.gov.uk/media/1129/Air-Quality-Annual-Status-Report-Summary-2020/pdf/Air_Quality_Annual_Status_Report_Summary_2020.pdf?m=637357085023900000</a>

Policy	Year of publication	Weblink
<b>BCP Council: 2020 Air Quality Annual Status Report</b>	2020	<a href="https://www.bournemouth.gov.uk/environment-and-sustainability/air-quality/documents/2020-annual-status-report.pdf">https://www.bournemouth.gov.uk/environment-and-sustainability/air-quality/documents/2020-annual-status-report.pdf</a>

Any flood and coastal erosion management schemes that are recommended by the Strategy and require planning permission will be required to adhere to the NPPF, which seeks to reduce and mitigate air quality impacts associated with development, including opportunities to improve air quality. It will also be necessary to conform with the Local Plans for Bournemouth, Christchurch, Poole, New Forest District Council, and the New Forest National Park, according to the annual status reports for air quality. Following royal assent of the emerging Environment Bill, new developments will also be required to adhere to air quality regulations and PM<sub>2.5</sub> targets.

The South Inshore and South Offshore Marine Plan also includes a policy which requires all development proposals to assess their impacts on local air quality, and states they will not be supported if they cannot avoid, minimise or mitigate air pollution in line with national and local objectives.

The Dorset Heathlands Interim Air Quality Strategy has been developed to address the adverse effect of airborne nitrogen (NO<sub>x</sub>) on the Dorset Heathlands, including Dorset Heathlands Special Protection Area (SPA) and Dorset Heaths Special Area of Conservation (SAC), which are partially located within the Strategy area.

## 2.2 Current Baseline

The policy context has identified that there are no declared AQMAs within the Strategy area, although there is a strategy to reduce the effects of NO<sub>x</sub> on the Dorset Heathlands. The main pollutant of concern across both BCP Council and NFDC is nitrogen dioxide emissions from traffic congestion. In Christchurch, the concentration of Nitrogen dioxide in June 2021<sup>5</sup> was approximately 35ug/m<sup>3</sup>, compared to the annual mean objective of less than 40ug/m<sup>3</sup>.

Monitoring results indicated that in the Christchurch area there have been no significant changes in the concentration of Nitrogen dioxide between 2015 and 2019. Similarly in the NFDC area, between 2015 and 2019 there was no monitored exceedance of any Air Quality Objectives at the locations identified for exposure.

## 2.3 Future Baseline

Future change in coastal flooding and erosion has the potential to damage existing road networks in the Strategy area, which could lead to other roads in the BCP Council and NFDC areas becoming more congested through increased traffic flows, leading to higher vehicle emissions. However, the amount of coastal flooding and erosion is not expected to lead to significant changes in the current baseline.

There is also potential for temporary localised changes in air quality, arising from the construction of coastal defences which require heavy machinery. However, this is not likely to lead to significant changes in the current baseline, even for short periods of time.

The air quality in the Strategy area has the potential to improve from reduced vehicle emissions, through initiatives and investments proposed through the Local Transport Plans for Bournemouth, Poole and Dorset<sup>6</sup> and Hampshire driving towards more sustainable methods of transport such as cycling and electric vehicles. This supports the UK's overarching aim of phasing out the sale of new combustion engine cars by 2030, and all new cars and vans having zero emissions by 2035.

## 2.4 Key Issues

There are no AQMAs in the Strategy area, or areas known to exceed national objectives for air quality. The main pollutant of concern in the Strategy area is nitrogen dioxide, largely related to emissions from vehicles due to traffic and congestion. Though traffic and congestion have the potential to increase vehicle emissions and reduce air

<sup>5</sup> Air Quality England (2021) New Forest District Council Monitoring Data [online] available at: [https://www.airqualityengland.co.uk/local-authority/?ja\\_id=236](https://www.airqualityengland.co.uk/local-authority/?ja_id=236) [Accessed 15 June 2021]

<sup>6</sup> Dorset Council (2012) Bournemouth, Poole and Dorset Transport Plan [online] available at: <https://www.dorsetcouncil.gov.uk/roads-highways-maintenance/documents/improvements-and-transport-planning/ltp3-bournemouth-poole-dorset-summary-document-final.pdf> [Accessed 02 July 2021]

quality in the area, the effects of the Strategy on transport are discussed in further detail in Section 9, including the potential of the Strategy to improve and support sustainable travel throughout the Strategy area.

## 2.5 Scoping Outcome

In the absence of any specific air quality issues and that the Strategy is not likely to significantly affect this theme in the future, the **Air Quality theme has been scoped out** for the purposes of the SEA process.

## 3. Biodiversity and Geodiversity

This section focuses on nature conservation designations, habitats, species, geology, palaeontology and geomorphology within the Strategy area.

### 3.1 Policy Context

Table 3-1 presents the most relevant documents identified for managing the natural environment in the Strategy area.

**Table 3-1: Plans, policies and strategies reviewed in relation to biodiversity and geodiversity**

Policy	Year of publication	Weblink
<b>The Conservation of Habitats and Species Regulations 2017 (as amended)</b>	2017	<a href="https://www.legislation.gov.uk/uksi/2017/1012/contents/made">https://www.legislation.gov.uk/uksi/2017/1012/contents/made</a>
<b>The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019</b>	2019	<a href="https://www.legislation.gov.uk/ukdsi/2019/9780111179512/contents">https://www.legislation.gov.uk/ukdsi/2019/9780111179512/contents</a>
<b>Water Environment (Water Framework Directive) (England and Wales) Regulations 2017</b>	2017	<a href="https://www.legislation.gov.uk/uksi/2017/407/contents/made">https://www.legislation.gov.uk/uksi/2017/407/contents/made</a>
<b>The Wildlife &amp; Countryside Act</b>	1981	<a href="https://www.legislation.gov.uk/ukpga/1981/69/pdfs/ukpga_19810069_en.pdf">https://www.legislation.gov.uk/ukpga/1981/69/pdfs/ukpga_19810069_en.pdf</a>
<b>The Ramsar Convention on Wetlands of International Importance</b>	1971	<a href="https://www.ramsar.org/">https://www.ramsar.org/</a>
<b>Natural Environment and Rural Communities Act 2006</b>	2006	<a href="https://www.legislation.gov.uk/ukpga/2006/16/section/41">https://www.legislation.gov.uk/ukpga/2006/16/section/41</a>
<b>Environment Bill 2020</b>	2020	<a href="https://www.gov.uk/government/publications/environment-bill-2020">https://www.gov.uk/government/publications/environment-bill-2020</a>
<b>Convention on Biological Diversity: Strategic Plan for Biodiversity 2011–2020 and the Aichi Targets</b>	2014	<a href="https://www.cbd.int/sp/">https://www.cbd.int/sp/</a>
<b>National Flood and Coastal Risk Management Strategy for England</b>	2020	<a href="https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/920944/023_1_5482_Environment_agency_digitalAW_Strategy.pdf">https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/920944/023_1_5482_Environment_agency_digitalAW_Strategy.pdf</a>
<b>National Planning Policy Framework (NPPF)</b>	2021	<a href="https://www.gov.uk/government/publications/national-planning-policy-framework--2">https://www.gov.uk/government/publications/national-planning-policy-framework--2</a>
<b>A Green Future: Our 25 Year Plan to Improve the Environment</b>	2018	<a href="https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/693158/25-year-environment-plan.pdf">https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/693158/25-year-environment-plan.pdf</a>

Policy	Year of publication	Weblink
<b>Biodiversity 2020: A Strategy for England's Wildlife and Ecosystem Services</b>	2011	<a href="https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/69446/pb13583-biodiversity-strategy-2020-111111.pdf">https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/69446/pb13583-biodiversity-strategy-2020-111111.pdf</a>
<b>Natural Environment White Paper</b>	2014	<a href="https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/366526/newp-imp-update-oct-2014.pdf">https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/366526/newp-imp-update-oct-2014.pdf</a>
<b>Nature Recovery Network</b>	2020	<a href="https://www.gov.uk/government/publications/nature-recovery-network/nature-recovery-network">https://www.gov.uk/government/publications/nature-recovery-network/nature-recovery-network</a>
<b>Poole &amp; Christchurch Bays Shoreline Management Plan (SMP2)</b>	2010	<a href="http://www.twobays.net/index.htm">http://www.twobays.net/index.htm</a>
<b>South Inshore and South Offshore Marine Plan</b>	2018	<a href="https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/726867/South_Marine_Plan_2018.pdf">https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/726867/South_Marine_Plan_2018.pdf</a>
<b>South East River Basin District River Basin Management Plan</b>	2016	<a href="https://www.gov.uk/government/publications/south-east-river-basin-district-river-basin-management-plan">https://www.gov.uk/government/publications/south-east-river-basin-district-river-basin-management-plan</a>
<b>South West River Basin District River Basin Management Plan</b>	2016	<a href="https://www.gov.uk/government/publications/south-west-river-basin-district-river-basin-management-plan">https://www.gov.uk/government/publications/south-west-river-basin-district-river-basin-management-plan</a>
<b>The Great Britain Invasive Non-native Species Strategy</b>	2015	<a href="https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/455526/gb-non-native-species-strategy-pb14324.pdf">https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/455526/gb-non-native-species-strategy-pb14324.pdf</a>
<b>Dorset Biodiversity Strategy</b>	2003	<a href="https://dorsetlnp.org.uk/wp-content/uploads/2019/01/Dorset-Biodiversity-Strategy-2003.pdf">https://dorsetlnp.org.uk/wp-content/uploads/2019/01/Dorset-Biodiversity-Strategy-2003.pdf</a>
<b>Dorset's Ecological Networks</b>	2020	<a href="https://dorsetlnp.org.uk/wp-content/uploads/2020/11/Ecological-Networks-Guidance-2020.pdf">https://dorsetlnp.org.uk/wp-content/uploads/2020/11/Ecological-Networks-Guidance-2020.pdf</a>
<b>Dorset Heathlands Planning Framework Supplementary Planning Document 2020 - 2025</b>	2020	<a href="https://www.dorsetcouncil.gov.uk/planning-buildings-land/planning-policy/supplementary-planning-documents-and-guidance/all-of-dorset/dorset-heathlands-planning-framework-update/dorset-heathlands-2020-2025-spd-adopted.pdf">https://www.dorsetcouncil.gov.uk/planning-buildings-land/planning-policy/supplementary-planning-documents-and-guidance/all-of-dorset/dorset-heathlands-planning-framework-update/dorset-heathlands-2020-2025-spd-adopted.pdf</a>
<b>Bournemouth Local Plan</b>	2012	<a href="https://www.bcpccouncil.gov.uk/Planning-and-building-control/Planning-policy/Current-Local-Plans/Bournemouth/Docs/Core-Strategy-1.pdf">https://www.bcpccouncil.gov.uk/Planning-and-building-control/Planning-policy/Current-Local-Plans/Bournemouth/Docs/Core-Strategy-1.pdf</a>
<b>Christchurch and East Dorset Local Plan</b>	2014	<a href="https://www.bcpccouncil.gov.uk/Planning-and-building-control/Planning-policy/Current-Local-Plans/Christchurch/docs/christchurch-and-east-dorset-adopted-core-strategy.pdf">https://www.bcpccouncil.gov.uk/Planning-and-building-control/Planning-policy/Current-Local-Plans/Christchurch/docs/christchurch-and-east-dorset-adopted-core-strategy.pdf</a>
<b>New Forest District Council Local Plan 2016 - 2036</b>	2020	<a href="https://www.newforest.gov.uk/media/705/Local-Plan-Document-2016-2036/pdf/Local_Plan_2016-2036_Part_One_FINAL.pdf?m=637329191351130000">https://www.newforest.gov.uk/media/705/Local-Plan-Document-2016-2036/pdf/Local_Plan_2016-2036_Part_One_FINAL.pdf?m=637329191351130000</a>

Policy	Year of publication	Weblink
<b>The Climate and Ecological Emergency Action Plan</b>	2019	<a href="https://democracy.bcpCouncil.gov.uk/documents/s14048/Response%20to%20Climate%20and%20Ecological%20Emergency.pdf">https://democracy.bcpCouncil.gov.uk/documents/s14048/Response%20to%20Climate%20and%20Ecological%20Emergency.pdf</a>

There are several designated sites in the Strategy area which have international and national importance, protected by the policies in Table 3-1. The Conservation of Habitats and Species Regulations 2017 and the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019, transposed from EU Directives, seek to conserve habitats and species of European importance, taking measures to maintain or restore natural habitats and species at a favourable conservation status. Similarly, the Ramsar Convention on Wetlands of International Importance seeks to conserve and promote the sustainable use of wetlands. At the national level there is both legislation and guidance in relation to the conservation of biodiversity. The Wildlife & Countryside Act (1981) provides for the protection of Sites of Special Scientific Interest (SSSI) and protects listed species.

In accordance with the National FCERM Strategy for England, and the FCERM Appraisal Guidance (FCERM-AG), FCERM strategies are encouraged to find nature-based solutions to coastal management, protecting the natural environment. Measure 2.2.1 states that from 2021, all flood and coastal defence projects and programmes must deliver biodiversity gain and seek to encourage other environmental benefits. Biodiversity net gain is defined by the Department for Environment, Food and Rural Affairs (DEFRA) as 'an approach to development that aims to leave the natural environment in a measurably better state than it was before'. This may include restoration, recovery and re-connection of habitats in intertidal areas of the coastline to enhance and protect the natural environment. This approach avoids the loss of biodiversity and supports the provision of ecosystem services such as health and wellbeing.

The South Inshore and South Offshore Marine Plan (HM Government, 2018) includes similar policies to ensure that new development proposals deliver biodiversity gains for fish habitats as well as conserving, restoring and enhancing coastal habitats. Both the South East and South West River Basin Management Plans (DEFRA, 2016) also include aims for enhancing biodiversity through river restoration and improvements to estuarine and coastal waters.

Any flood and coastal erosion management schemes that are recommended by the Strategy and require planning permission will be required to adhere to the NPPF, which emphasises the importance of improving biodiversity and measurable net gain in development. This includes a strategic approach to maintaining and enhancing marine and terrestrial habitats at a larger scale, through strategic options such as managed realignment, to create more sustainable resilient environments for the future. This Strategy should also refer to the policies set out in the Poole and Christchurch Bays SMP2, where there are impacts on biodiversity through managed realignment.

Biodiversity 2020 (DEFRA, 2011) demonstrated a new way of working towards protecting biodiversity, by focusing on strategic management of the natural environment. As part of the Natural Environment White Paper (DEFRA, 2014) a new biodiversity strategy is to be published. This is supported in the 25 Year Environmental Plan (HM Government, 2018), which emphasises improvements to the natural environment and working at a landscape level to connect habitats into larger corridors for wildlife. The Nature Recovery Network (NRN) is a part of this strategy, which aims to enhance wildlife and habitat connectivity.

Any developments along the coastline of the Strategy area should also aim to protect biodiversity by limiting the spread of Invasive Non-native Species (INNS). The Invasive Non-native Species Strategy (Great Britain Non-native Species Secretariat, 2015) aims to protect biodiversity, quality of life and economic interests against the adverse impacts of INNS. This includes minimising the risk of INNS becoming established in a new environment, and managing the potential impacts of the establishment of INNS. Any schemes developed as part of this Strategy will consider the impact of INNS, and show compliance with good biosecurity practices.

The emerging Environment Bill will provide further provisions in relation to biodiversity when granted royal assent. The Bill will set parameters for biodiversity net gain as a condition of planning permission, as well as biodiversity net gain site registers and biodiversity credits. The Bill identifies a general duty to conserve and enhance biodiversity, including through biodiversity reports and local nature recovery strategies. Further to this, the Aichi Biodiversity Targets (developed as part of the Convention on Biological Diversity Strategic Plan 2011 – 2020), detail five strategic goals for addressing biodiversity loss and enhancing the natural environment including ecosystem restoration.

The existing Bournemouth, Christchurch, NFDC and New Forest National Park Local Plans contain policies directly relating to biodiversity and geodiversity, encouraging the provision of a sustainable environment. BCP Council declared a climate and ecological emergency in 2019, developing the Climate and Ecological Emergency Plan to set out future plans including working with local wildlife groups to support large scale wildlife conservation for

Christchurch Harbour. NFDC has produced interim guidance on ecology and biodiversity net gain, which details how all new build developments will be required to deliver biodiversity net gain to make positive environmental impacts.

Similarly, the Dorset Biodiversity Strategy (Dorset Biodiversity Partnership, 2003) sets out a programme of actions for the variety of habitats within the county to protect and enhance biodiversity. Dorset's Ecological Networks (Dorset Local Nature Partnership, 2020) present the value of connectivity between habitats of wildlife importance in accordance with the NPPF, which are used to inform Local Plan policies and protect natural environments by limiting development. Further to this the Dorset Heathlands Planning Framework 2020 - 2025 Supplementary Planning Document (SPD) sets out a strategy for the avoidance and mitigation of impacts of development upon the Dorset Heathlands, including restrictions within 400m of Heathland and mitigation within 5km.

## 3.2 Current Baseline

Christchurch Bay falls within the Solent and Poole Bay Maritime Natural Area, which has its own characteristic of wildlife and natural features. The Natural Area extends inland to all habitats with a coastal influence and offshore to the 12 mile territorial limit. The area has important natural lengths of coast, with unusual transitions from semi-aquatic, freshwater/brackish and marine habitats which combine to form a varied stretch of open coast. Significant features in the Bay include:

- Coastal sand dunes;
- Coastal saltmarsh;
- Coastal vegetated shingle;
- Earth heritage;
- Inshore sublittoral rock;
- Maritime cliff and slopes;
- Reedbeds; and,
- Saline Lagoons.

The cliffs between Highcliffe and Milford-on-Sea are of national importance and are potentially internationally significant because of the underlying geology. This includes:

- The cliffs between Highcliffe and Milford-on-Sea;
- The coastal section from Friars Cliff to Milford on Sea; and,
- Hordle Cliff.

### 3.2.1 Designated Sites

Parts of the coastline at Christchurch Bay & Harbour are designated as conservation areas; they are recognised as having important biodiversity, geology and landscapes. These sites can be designated through domestic and international regulations, both statutory and non-statutory. Designated sites can be used to ensure the protection of the natural environment and control environmentally sensitive areas of the coast with other legislation and regulations, including voluntary management agreements.

The coastline along Christchurch Bay and Harbour features many sites of international and national nature conservation, geological and landscape importance which is reflected in the statutory and non-statutory site designations. Table 3-2 provides definitions of the sites designated for nature conservation within the Strategy area with a summary of the characteristics. The extents of the designations are shown in Figure 3-1 (not including Geological Conservation Review Sites or Sites of Nature Conservation Interest (SNCIs) in Dorset or Sites of Importance for Nature Conservation (SINCs) in Hampshire).

Table 3-2: Designated sites for nature conservation and geology within the Strategy area

Level	Type of Designation	Site	Reason for Designation
European Designation	<b>Special Areas of Conservation (SAC)</b> Designated under the EU Habitats Directive and implemented in the UK through the Conservation Regulations 1994 to protect habitats / species of European importance.	The Solent Maritime (overlapping the Strategy area)	<ul style="list-style-type: none"> <li>Estuaries – the site encompasses a major estuarine system, with four coastal plain estuaries and four bar-built estuaries. This site is the only one to contain more than one physiographic sub-type of estuary and the only cluster site, making it unique in England and Europe.</li> <li>Cordgrass swards – the only site in the UK for smooth cord-grass <i>Spartina alterniflora</i> in the UK, and is one of the only two sites where significant amounts of small cord-grass <i>S. maritima</i> are found.</li> <li>Atlantic salt meadows – the second largest aggregation in the south and south-west of England, composed of large areas of saltmarsh.</li> <li>Coastal lagoons as a priority feature.</li> </ul>
		Dorset Heaths (within the Strategy area)	This site extends into the western boundary of the Strategy area at Hengistbury Head, featuring areas of maritime heathland and grassland. This includes North Atlantic wet heaths and European dry heaths.
		Avon River (overlapping the Strategy area)	The River Avon is a large, lowland river system with sections running through chalk and clay, featuring river water-crowfoot ( <i>Ranunculus fluitantis</i> ) vegetation.
		South Wight Maritime (outside of the Strategy area)	This site is located outside of the Strategy area, on the southern coast of the Isle of Wight. The site features subtidal reefs that support a diverse range of species in both subtidal and intertidal, as well as vegetated sea cliffs and sea caves.
	<b>Special Protection Areas (SPA)</b> Designated under the EU Birds Directive, and implemented in the UK by the Wildlife and Countryside Act 1981 and the Conservation Regulations 1994.	Solent and Southampton Water (overlapping the Strategy area)	<p>This site extends from Hurst Spit to Lee-on-the-Solent, along the south coast of Hampshire and the north coast of the Isle of Wight. The site qualifies under Article 4.1 of the EU Birds Directive, regularly supporting nationally important breeding populations of:</p> <ul style="list-style-type: none"> <li>Little tern (<i>Sterna albifrons</i>) 40 pairs (1.6% of the British population);</li> <li>Sandwich tern (<i>Sterna sandvicensis</i>) 162 pairs (1.2% of the British population);</li> <li>Common tern (<i>Sterna hirundo</i>) 262 pairs (2.0% of British population);</li> <li>Roseate tern (<i>Sterna dougalli</i>) average of 4 pairs (3.6% of British population).</li> </ul> <p>The site also qualifies under Article 4.2 as a wetland of international importance by regularly supporting over 20,000 waterfowl in winter and internationally important numbers of wintering migratory waterfowl:</p> <ul style="list-style-type: none"> <li>Dark-bellied brent geese (<i>Branta bernicla bernicla</i>) 7.2% of British population &amp; 2.9% of NW European;</li> <li>704 black-tailed godwit (<i>Limosa limosa</i>) 91.4% of British, 1.0% of east Atlantic flyway population.</li> </ul>
		Dorset Heathlands (within the Strategy area)	This site extends to the Avon Valley, bordered by the Wessex Downs to the north and west, and by the Purbeck chalk ridge to the south. The site qualifies under Article 4.1 of the EC Birds Directive by supporting nationally important breeding populations of three species listed on the Annex 1 of the Directive; Nightjar ( <i>Caprimulgus europaeus</i> ) (13% of the British population); Woodlark ( <i>Lullula arborea</i> ) 56 pairs (16% of the British population); Dartford warbler ( <i>Sylvia undata</i> ) (38% of the British population).

Level	Type of Designation	Site	Reason for Designation
			The site also qualifies under Article 4.1 by supporting up to 20 hen harrier ( <i>Circus cyaneus</i> ) and 15 merlin ( <i>Falco columbaris</i> ), approximately 2% and 1% respectively of the British wintering population, both Annex 1 species.
<b>European Designation</b>	<b>Special Protection Areas (SPA)</b> Designated under the EU Birds Directive, and implemented in the UK by the Wildlife and Countryside Act 1981 and the Conservation Regulations 1994.	Avon Valley (overlapping the Strategy area)	<p>This site encompasses the lower reaches of the River Avon and its floodplain between Bickton and Christchurch. It supports a nationally important assemblage of breeding wetland birds and is especially important for breeding waders associated with lowland wet grassland. The site qualifies under:</p> <ul style="list-style-type: none"> <li>Article 4.1 for supporting nationally important numbers of Annex 1 species Bewick swan (<i>Cygnus bewickii</i>), an average of 156 in the five year period 1988/89 to 1992/93, representing 2.2% of the population;</li> <li>Article 4.2 for supporting internationally important wintering populations of gadwall (<i>Anas strepera</i>) and nationally important wintering populations of the white fronted geese (<i>Anser albifrons albifrons</i>), pochard (<i>Aythya ferina</i>) and coot (<i>Fulica atra</i>).</li> </ul> <p>A nationally important assemblage of breeding birds is also associated with the lowland open water and its margins.</p>
		Solent and Dorset Coast (overlapping the Strategy area)	<p>This site encompasses four existing SPAs, including the Solent and Southampton Water SPA. It includes sub-tidal areas which are not encompassed by the other SPAs.</p> <p>It has been designated under Article 4 for regularly supporting more than 1% of the Great Britain populations of three breeding tern species: Sandwich tern (<i>Sterna sandvicensis</i>), Little tern (<i>Sterna albifrons</i>) and Common tern (<i>Sterna hirundo</i>).</p>
	<b>Ramsar</b> Designated under the Ramsar Convention on Wetlands of Importance.	Solent and Southampton Water (overlapping the Strategy area)	<p>The site extends from Hurst Spit to Gilkicker Point along the south coast of Hampshire and along the north coast of the Isle of Wight. The site qualifies under the following aspects of the Ramsar Convention:</p> <ul style="list-style-type: none"> <li>Criterion 1a - contains good and representative e.g. of wetland habitats characteristic of the biogeographical region including saline lagoons, saltmarshes, estuaries and reefs;</li> <li>Criterion 2a - supports important assemblage of rare plants and invertebrates (including 39 red data book (RDB) invertebrates and 8 RDB plants);</li> <li>Criterion 2c - important staging area for migratory waterfowl (notably black-tailed godwit <i>Limosa limosa</i>);</li> <li>Criterion 3a - regularly supports over 20,000 waterfowl in winter.</li> </ul> <p>The site also qualifies under Criterion 3c for the same reasons as those given for SPA qualification under Article 4.2 above.</p>
		Avon Valley (overlapping the Strategy area)	<p>The boundaries of the Ramsar Site largely follow those of the Avon Valley SPA. The site qualifies under:</p> <ul style="list-style-type: none"> <li>Criterion 1a – a greater range of habitats than any other chalk river in Britain including fens and mires, lowland wet grassland and small areas of woodland. The diversity of habitats supports a notable assemblage of breeding wetland birds and provides roosting and feeding areas for an important assemblage of wintering wildfowl;</li> <li>Criterion 2a – supports a diverse assemblages of wetland plants and animals, including several nationally rare species, including two wetland RDB plants and four wetland RDB invertebrate species;</li> <li>The site also qualifies under Criterion 3c for the same reasons as those given for SPA qualification under Articles 4.2 and 4.3 of the Birds Directive.</li> </ul>

Level	Type of Designation	Site	Reason for Designation
National Designation	<b>Site of Special Scientific Interest (SSSI)</b> Sites notified by English Nature, which represent some of the best examples of Britain's natural features. Designated under the Wildlife & Countryside Act 1981.	Hurst Castle and Lymington River (located outside of the Strategy area)	<p>This site is designated for its ecology and geomorphology. It extends along 9km of the north west Solent shore. The SSSI below the seawall comprises the estuaries of three substantial streams, intertidal muds, cord-grass marshes and high level mixed saltmarsh. Behind the seawall is a belt of marsh including a series of lagoons.</p> <p>The site supports nationally important populations of black-headed gulls (<i>Larus ridibundus</i>), black-tailed godwit (<i>Limosa limosa</i>) and three species of tern which are listed under Annex 1 of the EU Directive on the Conservation of wild birds. This is also an important habitat for internationally important over-wintering populations of wildfowl and waders, including dark-bellied brent geese (<i>Branta bernicla bernicla</i>).</p> <p>Condition of the site: 21.46% favourable, 75.67% unfavourable – recovering and 2.88% unfavourable – declining.</p>
		Highcliffe to Milford Cliffs (within the Strategy area)	<p>The site is designated for its geology and as a key site for European Tertiary palaeobotany and palaeoecology (see Section 5 for further detail). It extends for 9km along the cliffs of Christchurch Bay and comprises steep coastal slopes and cliffs, which are locally dissected by deeply incised ravines. The site contains the standard succession of the fossil rich Barton Beds and Headon Beds, various exposures of which are of national and international importance.</p> <p>All Geological Conservation Review Sites identified below have statutory protection through this SSSI designation.</p> <p>Condition of the site: 44.02% favourable, 55.98% unfavourable – no change.</p>
		Christchurch Harbour (within the Strategy area)	<p>The site is designated for its ecology and geology. It comprises the drowned estuary of the Rivers Stour and Avon and the peninsula of Hengistbury Head. The varied habitats include saltmarsh, wet meadows, drier grassland, heath, sand dune, woodland and scrub. This site is rich in invertebrates, with 260 species of beetle recorded as well as a number of nationally rare hoverflies and dragonfly. The site is also important for supporting a number of rare breeding and wintering bird species.</p> <p>Condition of the site: 80.56% favourable and 19.44% unfavourable – recovering.</p>
		Avon River (overlapping the Strategy area)	<p>This site is designated for its ecology, occupying 11km of the lower River Avon, its flood plain and some of the associated river terraces. The River Avon system shows a greater range of habitat diversity and a more diverse flora and fauna than any other range of chalk river in Britain. The flood plain within the SSSI comprises a variety of habitats ranging from herb rich hay meadows and pastures to flood meadows, relic bog, riparian woods and river terraces.</p> <p>The lower Avon valley grasslands are used as feeding grounds by large flocks of the white fronted geese (<i>Anser albifrons albifrons</i>), Bewick swan (<i>Cygnus bewickii</i>) and black-tailed godwit (<i>Limosa limosa</i>).</p> <p>Condition of the site: 2.82% favourable, 7.46% unfavourable – recovering, 85.61% unfavourable – no change and 4.10% unfavourable – declining.</p>

Level	Type of Designation	Site	Reason for Designation
	<b>Marine Conservation Zone (MCZ)</b> Sites notified by DEFRA, JNCC and Natural England which protect a range of nationally important, rare or threatened habitats and species in territorial and offshore waters. Designated under UK Ministerial Orders.	The Needles (outside of the Strategy area)	This site is located outside of the Strategy area, adjacent to the northwest side of the Isle of Wight just south of the needles and includes a series of sheltered bays. The MCZ protects a number of rare and fragile habitats, including chalk on the seabed, shallow water (infralittoral) rock and soft sediments which support communities of algae, sponges, sea squirts and delicate anemones. It is a highly productive area biologically and important spawning and nursery area with a range of fish species including common smelt, bass, sole, pout and mullet; lobsters and whelks are also known to occur here.
	<b>Geological Conservation Review Sites (GCR)</b> Areas containing geological and geomorphological features of national and international importance. Designated under the Wildlife & Countryside Act 1981, they often have statutory protection through designation in SSSIs.	Paddy's Gap (within the Strategy area)	This site shows the thin Limnolobos Band, within the Eocene Headon Beds, crowded with the fruits of an extinct pondweed relative, to the exclusion of almost all other plant fossils. This is the only site now exposing this horizon.
<b>National Designation</b>		Highcliffe (within the Strategy area)	This is the only locality with a diverse flora from the Boscombe Sands of Eocene age. Over fifty species have been recorded, and this is the type locality for fourteen species and two genera. Eleven species and three genera are unique to this site within Britain.
		Friars Cliff (within the Strategy area)	Composed of marginal marine sediments deposited during the regressive phase of the Auversian (Upper Bracklesham) and the earliest, marine transgressive phase of the Bartonian, the section provides a unique exposure of distributary mouth-bar sequences in the uppermost Bracklesham Beds.
		Barton (within the Strategy area)	The site yields fossil plants from lower Barton Beds (of early late Eocene age). At least twenty-eight plant species occur, and the make-up of the flora here reveals the first indication of the climatic cooling which affected Britain in later Tertiary times.
<b>Local / Regional Designation</b>	<b>Local Nature Reserve (LNR)</b> Established by Local Authorities with English Nature, these sites are of local significance.	Stanpit Marsh (within the Strategy area)	This site is designated for grazing marsh and is located at the north side of Christchurch Harbour. It features salt marsh, reed beds, freshwater marsh, gravel estuarine banks and sandy scrub. It is also a habitat for 313 bird species and Natterjack toads.
		Hengistbury Head (within the Strategy area)	This site comprises a range of habitats including heathland, woodland, reedbed, saltmarsh and sand dunes. It is located at the western end of the Strategy area, with Christchurch Harbour immediately to the north. A quarter of all of Britain's plant species can be found here, along with rare animals such as Natterjack toads and the Dartford warbler.
		Steamer Point (within the Strategy area)	This site is designated for broadleaf woodland, pond and grassland habitats. It is located between Highcliffe Castle and Friar's Cliff on the Christchurch coastline, with some areas overlapped by Highcliffe to Milford Cliffs SSSI.
		Milford on Sea (within the Strategy area)	This site is designated for its ancient woodland with a large meadow in the Western corner, which follows the Dane Stream.
		Sturt Pond (overlapping the Strategy area)	This site is located at Hurst Road, Milford on Sea. It includes the reed beds either side of the Dane Stream, the tidal Sturt Pond, lagoons and saltmarsh. All of these habitats attract a range of bird species, with a bird hide found at the end of Milford Beach and the beginning of Hurst Spit.

Level	Type of Designation	Site	Reason for Designation
	<b>Sites of Importance for Nature Conservation (SINC) Hampshire</b> Defined by Wildlife Trusts and Local Authorities as sites of local nature conservation interest.	Barton Common (within the Strategy area)	Heathland
		Sturt Pond (overlapping the Strategy area)	Semi-natural coastal habitat
		Studland Common (within the Strategy area)	Unimproved grassland
		Becton Bunny (within the Strategy area)	Heathland
	<b>Sites of Nature Conservation Interest (SNCIs) Dorset</b> Defined by Wildlife Trusts and Local Authorities as sites of local nature conservation interest.	Hengistbury Head (within the Strategy area)	Sand dunes, gravel and shingle foreshore
		Mudford Quay (within the Strategy area)	Dry ruderal grassland
		Stanpit (within the Strategy area)	Semi-improved grassland and fen
		Stony Lane Drain (within the Strategy area)	Wet grassland and ditch
		Mude Valley (within the Strategy area)	Woodland
<b>Local / Regional Designation</b>		Chewton Bunny (within the Strategy area)	Deciduous woodland

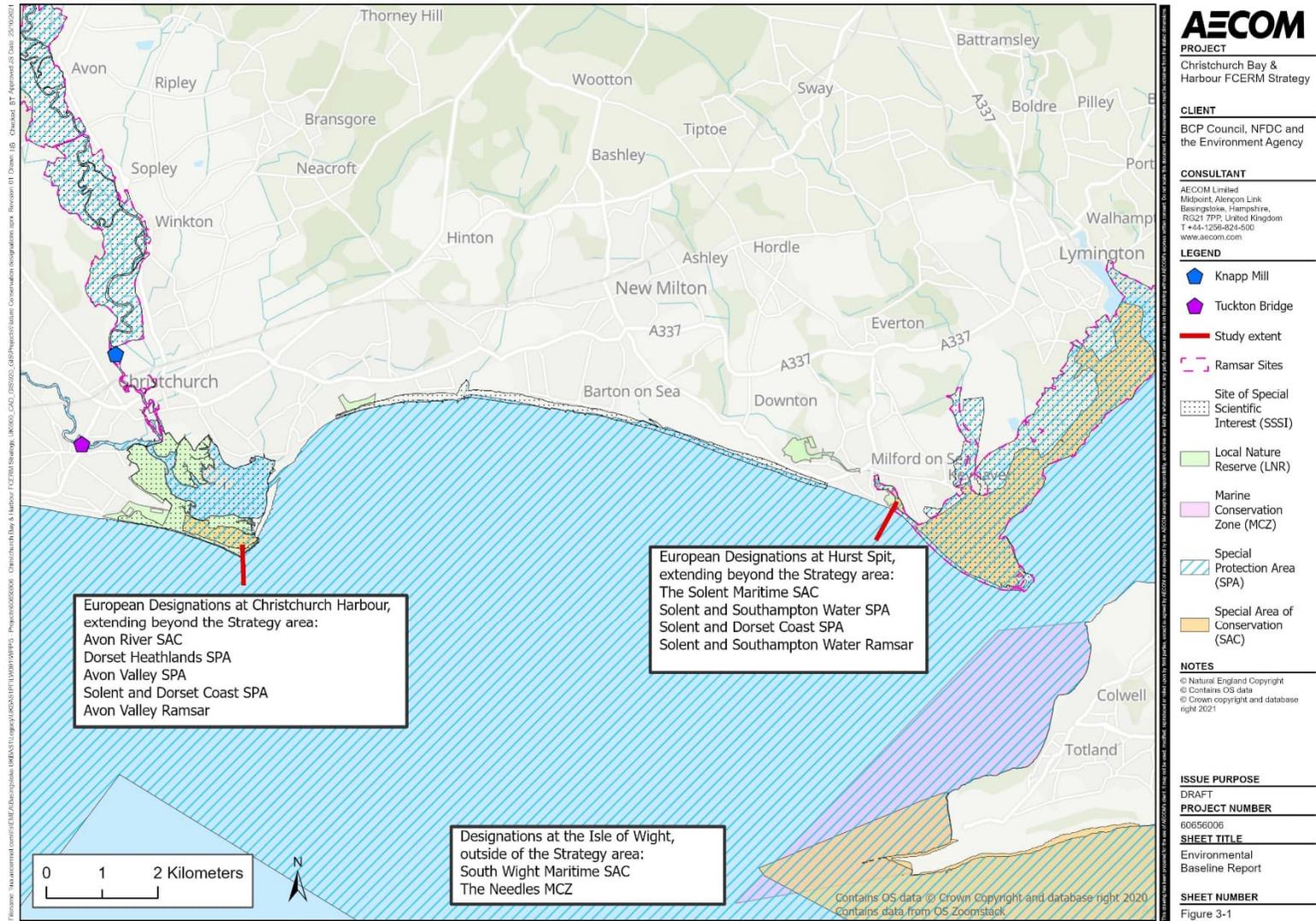


Figure 3-1: European and Nationally Designated Nature Conservation Sites in the Strategy area

## 3.2.2 Coastal Habitats

The coastal cliffs in the Strategy area form a habitat associated with soft cliffs, due the vegetation that covers the majority of the cliffs. This includes species such as willow (*Salix spp.*), reeds (*Phragmites australis*), reedmace (*Typha spp.*) (within soft cliffs) and coltsfoot (*Tussilago farfara*). These cliffs provide habitats for a range of invertebrates. In some areas where the cliffs have less vegetation, there is more active erosion.

Hengistbury Head comprises a mosaic of habitats ranging from dunes and maritime cliff-top grassland (neutral to acidic) to scrub, heathland and woodland. On the Christchurch Harbour side of the spit, there are areas of saltmarsh and extensive reedbeds. Mudeford sandbank supports populations of sea daffodil (*Pancratium maritimum*), sea kale (*Crambe maritima*) and yellow horned poppy (*Glaucium flavum*). Hengistbury Head also supports species of sand lizard (*Lacerta agilis*), natterjack toad (*Epidalea calamita*) and Dartford warbler (*Curruca undata*). The beach at Hurst Spit is mainly composed of shingle, which supports vegetation that has grown in extent and richness over the past 4-years. The shingle ridges at Hurst Spit support an important flora which is dependent on the substrate. Intertidal mudflats, cord-grass marshes and level mixed saltmarsh occur to the north of Hurst Spit and around Sturt Pond. These areas support large breeding and over-wintering populations of wildfowl and other birds. There is a spatial variation in the recovery of vegetated shingle species here following storms and beach management activities. Current beach management activities aim to avoid disturbing these areas as much as possible.

Christchurch Harbour contains a wide range of habitats including shallow mudflats, saltmarsh, reed beds, ditches, wet meadows, sand dunes, dry and neutral grassland, heath, woodland and scrub. These habitats support diverse plant and animal communities, and the site is of great ornithological importance.

The River Avon is an ecologically important chalk river that drains into Christchurch Harbour. The Avon Valley shows a greater range of habitats and a more diverse flora and fauna than any other chalk river in Britain.

## 3.2.3 Marine Environment

An ironstone reef stretches 5km out into Christchurch Bay from the east of Hengistbury Head, forming the Christchurch Ledges. The Ledges provide a solid substrate in an area dominated by mobile sandy sediments, which support diverse assemblages of kelp and other algae, along with a variety of animals including nationally rare fish (gobies), bryozoans, sponges and anemones.

Offshore of Hurst Spit is the deepest area of the Solent, reaching 60 metres in depth, which has an unusual tidal regime and encompasses a diverse range of habitats and communities. The subtidal marine life represents a transition between the warm temperate (Lusitanian) and cold temperate (Boreal) marine biogeographic provinces, resulting in a rich variety of organisms including representatives of both provinces. The seabed is composed of sandy sediment, which supports a variety of organisms including the slipper limpet (*Crepidula fornicata*) and red macroalgae, some of which are non-native species, burrowing polychaete worms and molluscs. The coastal marine environment acts as a spawning and nursery area for several species of commercially important fish including Dover sole, cod, and bass.

The narrow entrance to Christchurch Harbour reduces the level of flushing, creating an internationally rare habitat of brackish lagoon conditions, consisting of relatively low species abundance but with large populations of intertidal and subtidal marine invertebrates. Extensive areas of shallow intertidal mudflats support dense populations of burrowing organisms, which provide an important food source for the internationally important bird life in the Harbour. Rare brackish water species include the protected amphipod (*Gammarus insensibilis*), nationally scarce tentacled lagoon worm (*Alkmaria romijni*), nationally rare *Epistomia bursaria*, critically endangered *Anguilla*, nationally scarce *Trapania pallida*, *Phoca vitulina* and nationally scarce *Stenosoma lancifer*. The Harbour also acts as an important nursery ground for several commercial species of fish, including bass, Dover sole, thick-lipped mullet, thin lipped mullet, pollack and flounder. The estuaries that form the Harbour are important salmon and eel fisheries and recreational angling occurs throughout the year.

## 3.2.4 Geology

The coastline between Highcliffe and Milford-on-Sea is designated as Highcliffe to Milford SSSI for its earth heritage.

From Hurst Spit westwards, the geology comprises Headon Beds for most of the coastal strip up to the Becton Bunny outfall, where the geology changes to Barton Sand. It is part of a complex known as the Hampshire Basin, a wider geological area extending over the New Forest catchment. The Hampshire Basin comprises silts, sands

and clays laid down in alternating marine, estuarine and freshwater environments during the Bartonian Age (30 to 40 million of years ago).

Hengistbury Head has Boscombe sand at its base, moving up into Lower and Upper Hengistbury beds. Upper Hengistbury beds contain ironstone nodules. Above this are the Highcliffe beds, which extend east before the Barton Clay (from Highcliffe through to Naish and Barton-on-Sea) onto Headon beds.

### 3.2.5 Palaeontology

The cliffs between Highcliffe and Milford-on-Sea provide access to the standard succession of the fossil rich Barton and Headon Beds. The area from Friars Cliff to Milford-on-Sea is the type locality for the Barton Beds and the best exposure of the Lower Headon Beds.

Chewton Bunny is the only site to yield fossil plants from the Lower Barton Beds and is an internationally important site, whilst the Barton Cliffs are important for early Tertiary reptiles, particularly turtles. Paddy's Gap is a famous fossil plant locality with abundant fossil fruit remains.

Hordle Cliff is a key site for fossil birds, mammals, reptiles and plants. Seven genera of fossil plants found here are limited to this site in Britain and many species are unique in Tertiary deposits worldwide. Associations of plant fossil with faunal remains make this a valuable site for paleoenvironmental analysis. This is a critical site for European Tertiary palaeobotany and palaeoecology.

### 3.2.6 Geomorphology

Littoral drift in the study area is predominantly from west to east, corresponding with the direction of greatest fetch along the English Channel.

Hengistbury Head is a feature of major environmental interest, which has undergone significant erosion. Archaeological evidence suggests that the Head has reduced in size very significantly over the last 2,000 years since the Iron Age Double Dykes fortification was constructed (Middlesex Polytechnic, 1987). Erosion is believed to have accelerated in the 19th century as a result of mining ironstone from the soft cliffs, which formerly provided a natural defence. These cliffs are weak / unstable, and subject to land sliding due to erosion. This process provides a source of material into the system, however defences along sections of this coastline reduce the amount of material produced to protect the cliffs.

Over the last 200 years, the coastline of the Head has retreated approximately 100m northwards and Warren Hill has been reduced to half its former area. Examination of historic Ordnance Survey maps and aerial photographs indicate that the recent rate of retreat is 1 to 2 metres per year. However, the construction of Hengistbury long groyne has led to beach accretion and sand dune formation on the south west corner of the Head, which has stabilised this area and protected it from wave attack. The currently most vulnerable part of the Head to erosion is thought to be in the area of Double Dykes.

Hengistbury Head plays a key role in the overall morphology of Christchurch Bay, firstly by forming the southern side of Christchurch Harbour and protecting the town of Christchurch, and secondly by acting as a hard point which separates Christchurch Bay from Poole Bay to the west. In the absence of the Head, it is likely that the coast from Durlston Head to Hurst Spit would evolve into a single bay with its head inland of the present position of Christchurch.

Mudford Spit extends from Hengistbury Head northwards across the mouth of Christchurch Harbour. It is believed to have undergone accretion as a result of ironstone mining from the Head in the 19th Century and by 1880 the spit extended a kilometre further east than its present position. However, since 1950 the spit has eroded as a result of lack of replenishment material from the south, increasing the exposure of the cliffs at Highcliffe to wave attack.

Hurst Spit, at the eastern boundary of the study area, lies across the western end of the Solent and protects Keyhaven Marshes, on its northern shore, from direct wave action. The spit is a mobile feature formed from deposited flint gravels, and it provides a key role in the morphology of Christchurch Bay (see AECOM coastal processes report for more details). Narrowing and recession of the spit over the past century or so has been attributed to a shortage of material from the cliffs within Christchurch Bay, which have been progressively protected by sea defence works, although the erosion of Plateau gravel is the main source of gravel sized material. The spit breached in 1989, as a result of the ongoing depletion in the natural supply of material from the west. Further to this, the storm in February 2014 led to damage to the spit through over-washing. Recent engineering work has been undertaken to stabilise the spit, including recharge in 1996 using sediment dredged from the Shingles Bank a short distance offshore of the spit.

The baseline geomorphology of the Strategy area will be further described within the coastal processes baseline report.

### 3.3 Future Baseline

Designated sites and important habitats identified in Section 3.2 are likely to come under pressure, due to the increased risks of coastal flooding and erosion arising through the effects of climate change over the next 100 years. In particular, the beaches and historic cliffs which hold high geological and palaeontological importance are likely to retreat, in line with historic rates. Further to this, as older coastal defences fail, coastal erosion rates may increase in the future and there may be an element of erosion 'catch-up' where initial erosion rates may exceed historical averages in response to defences failing. This has the potential to impact designated sites located along the coastline, and further inland, leading to a loss of habitat and coastal squeeze.

The policies and plans in Table 3-1, including the NPPF, the Dorset Heathlands Planning Framework 2020 – 2025 and the Local Plans will continue to provide protection to all of the identified designated sites and important coastal habitats. Without the implementation of the Strategy, the existing coastal defences may be maintained in some areas to protect these sites.

The Strategy provides an opportunity to ensure that future coastal flooding and erosion has minimal effects on biodiversity, by implementing coastal defence measures to improve coastal habitats such as those identified in the National FCERM Strategy. This could lead to restoration, recovery and re-connection of habitats in intertidal areas of the coastline to enhance and protect the natural environment.

### 3.4 Key Issues

There are a number of sites designated for their nature conservation importance within the Strategy area, including internationally, nationally and locally designated nature conservation sites. The condition and integrity of the key features within these sites for which they are designated should not be compromised, and efforts should be made to enhance these sites through habitat restoration and re-connection where possible. There are a wide variety of habitats in the Strategy area, particularly in Christchurch Harbour, including mudflats, saltmarsh and sand dunes which support diverse plant and animal communities.

Coastal defences and development must avoid disruption to coastal processes where it could lead to the loss of important coastal habitats (e.g. through defence footprint encroachment), including those identified which support rare and scarce species. Many of these sites have great ornithological importance, supporting large breeding and over-wintering populations of wildfowl and other birds and preservation of their habitats is important.

There are a number of management policies, plans and strategies which aim to protect and enhance the biodiversity and geodiversity of Christchurch Bay & Harbour. The implementation of the Strategy would offer further opportunities for the protection of designated sites and prevent their inundation and erosion, complimenting the coastal defence measures which are already in place.

### 3.5 Scoping Outcome

The **Biodiversity and Geodiversity** theme has been **scoped in to the SEA**, as there is potential for significant effects on coastal habitats and designated sites where new coastal defence measures may be implemented as part of the Strategy. It will be important to ensure that there are no significant adverse effects on the designated sites such as MCZ, SAC, SPA, SSSI and RAMSAR sites. There will also be opportunities to enhance biodiversity in the Strategy area, to achieve biodiversity net gain.

## 3.6 SEA Objective

Table 3-3 presents the SEA objective and appraisal questions that will be used to assess the Strategy in relation to this theme.

**Table 3-3: SEA Framework of objectives and assessment questions: Biodiversity and Geodiversity**

SEA Objective	Supporting Questions (will the policy option help to...)
<p>To protect and enhance biodiversity and geodiversity habitats and species; achieving biodiversity net gain and improved habitat connectivity within the Strategy area.</p>	<ul style="list-style-type: none"> <li>• Protect and enhance European, nationally and locally designated sites, including species that are important to the integrity of these sites and recognised as priority species?</li> <li>• Protect, enhance and improve connectivity of habitats?</li> <li>• Support the delivery of biodiversity net gain?</li> <li>• Support habitat creation, restoration and recovery in the coastal environment?</li> <li>• Increase the resilience of biodiversity in the Strategy area to the effects of climate change through increased coastal flooding and erosion?</li> </ul>

## 4. Climate Change

This section focuses on activities in the Strategy area that contribute to climate change and mitigation, including the effects of climate change on flooding and coastal erosion.

### 4.1 Policy Context

Table 4-1 presents the most relevant documents identified for policies to manage climate change.

**Table 4-1: Plans, policies and strategies reviewed in relation to climate change**

Policy	Year of publication	Weblink
<b>Environment Bill 2020</b>	2020	<a href="https://www.gov.uk/government/publications/environment-bill-2020">https://www.gov.uk/government/publications/environment-bill-2020</a>
<b>National Flood and Coastal Risk Management Strategy for England</b>	2020	<a href="https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/920944/023_15482_Environment_agency_digitalAW_Strategy.pdf">https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/920944/023_15482_Environment_agency_digitalAW_Strategy.pdf</a>
<b>National Planning Policy Framework (NPPF)</b>	2021	<a href="https://www.gov.uk/government/publications/national-planning-policy-framework--2">https://www.gov.uk/government/publications/national-planning-policy-framework--2</a>
<b>The Clean Air Strategy</b>	2019	<a href="https://www.gov.uk/government/publications/clean-air-strategy-2019">https://www.gov.uk/government/publications/clean-air-strategy-2019</a>
<b>Clean Growth Strategy</b>	2017	<a href="https://www.gov.uk/government/publications/clean-growth-strategy">https://www.gov.uk/government/publications/clean-growth-strategy</a>
<b>A Green Future: Our 25 Year Plan to Improve the Environment</b>	2018	<a href="https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/693158/25-year-environment-plan.pdf">https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/693158/25-year-environment-plan.pdf</a>
<b>South Inshore and South Offshore Marine Plan</b>	2018	<a href="https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/726867/South_Marine_Plan_2018.pdf">https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/726867/South_Marine_Plan_2018.pdf</a>
<b>Decarbonising Transport: Setting the Challenge</b>	2020	<a href="https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/932122/decarb-onising-transport-setting-the-challenge.pdf">https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/932122/decarb-onising-transport-setting-the-challenge.pdf</a>
<b>UK (second) National Adaptation Programme 2018 to 2023</b>	2018	<a href="https://www.gov.uk/government/publications/climate-change-second-national-adaptation-programme-2018-to-2023">https://www.gov.uk/government/publications/climate-change-second-national-adaptation-programme-2018-to-2023</a>
<b>Bournemouth Local Plan</b>	2012	<a href="https://www.bpcouncil.gov.uk/Planning-and-building-control/Planning-policy/Current-Local-Plans/Bournemouth/Docs/Core-Strategy-1.pdf">https://www.bpcouncil.gov.uk/Planning-and-building-control/Planning-policy/Current-Local-Plans/Bournemouth/Docs/Core-Strategy-1.pdf</a>
<b>Christchurch and East Dorset Local Plan</b>	2014	<a href="https://www.bpcouncil.gov.uk/Planning-and-building-control/Planning-policy/Current-Local-Plans/Christchurch/docs/christchurch-and-east-dorset-adopted-core-strategy.pdf">https://www.bpcouncil.gov.uk/Planning-and-building-control/Planning-policy/Current-Local-Plans/Christchurch/docs/christchurch-and-east-dorset-adopted-core-strategy.pdf</a>
<b>New Forest District Council Local Plan 2016 - 2036</b>	2020	<a href="https://www.newforest.gov.uk/media/705/Local-Plan-Document-2016-2036/pdf/Local_Plan_2016-2036_Part_One_FINAL.pdf?m=637329191351130000">https://www.newforest.gov.uk/media/705/Local-Plan-Document-2016-2036/pdf/Local_Plan_2016-2036_Part_One_FINAL.pdf?m=637329191351130000</a>
<b>New Forest National Park Local Plan 2016 - 2036</b>	2019	<a href="https://www.newforestnpa.gov.uk/app/uploads/2019/09/Local-Plan-2016-2036-finalforweb.pdf">https://www.newforestnpa.gov.uk/app/uploads/2019/09/Local-Plan-2016-2036-finalforweb.pdf</a>

Policy	Year of publication	Weblink
<b>The Climate and Ecological Emergency Action Plan</b>	2019	<a href="https://democracy.bcpCouncil.gov.uk/documents/s14048/Response%20to%20Climate%20and%20Ecological%20Emergency.pdf">https://democracy.bcpCouncil.gov.uk/documents/s14048/Response%20to%20Climate%20and%20Ecological%20Emergency.pdf</a>

The Strategy will be developed in accordance with the National FCERM Strategy and FCERM-AG, considering the risks of climate change in the decision-making process by assessing future impacts of sea level rise on flood and erosion risks and incorporating these risks into the strategy economics and optional development / appraisal. This will include assessing the impact of the most up-to-date climate change projections on flooding and coastal erosion. The Strategy will support the aims of the National FCERM Strategy: creating climate resilient places, making today's growth and infrastructure resilient in tomorrow's climate and creating a nation ready to respond and adapt to flooding and coastal change.

Any flood and coastal erosion management schemes that come forward and require planning permission will adhere to the NPPF, by developing a sustainable plan to manage the increased risks of flooding and coastal erosion over the next 100 years. The coastal management measures to be implemented with the Strategy will be primarily designed as a method of adaptation to climate change, although the carbon emissions associated with these measures will be minimised where possible to support the national strategies and Local Plan policies.

The Clean Growth Strategy, Clean Air Strategy and the 25 Year Environment Plan will all be adhered to, supporting the government's commitment for net zero carbon emissions by 2050 under the UK Climate Change Act. Where possible, coastal management measures will seek to use resources efficiently with minimal carbon emissions, improve water quality, reinstate natural habitats, and enhance biodiversity. This will also meet the aims of the emerging Environment Bill for climate change mitigation. Additionally, BCP Council's Climate and Ecological Emergency Action Plan sets out more localised targets for mitigation and adaptation against the impacts of climate change, to reach the goal of zero net carbon by 2050.

The South Inshore and South Offshore Marine Plan (HM Government, 2018) includes similar policies to ensure that new development proposals are resilient to the impacts of climate change for their lifetime, and they should demonstrate they can avoid, minimise and mitigate the impact of climate change.

## 4.2 Current Baseline

### 4.2.1 Carbon Emissions

CO2 emissions in kilo tonnes (kt) are shown by sector for BCP Council area and NFDC area<sup>7</sup> in Figure 4-1 and Figure 4-2. Figure 4-3 shows the total CO2 emissions in tonnes (t) per capita per year for these two areas and across England.

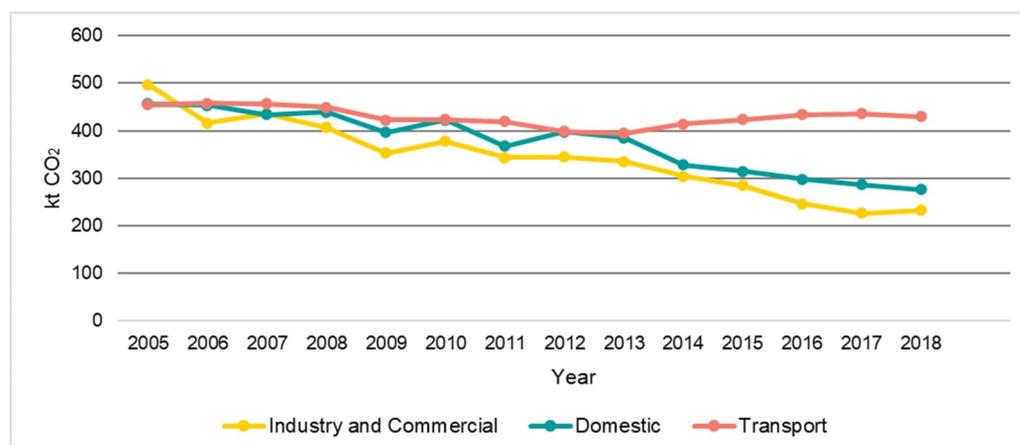


Figure 4-1: CO2 Emissions by Sector in Bournemouth, Christchurch and Poole

<sup>7</sup> Department for Business, Energy and Industrial Strategy (2020) UK local authority and regional carbon dioxide emissions national statistics: 2005 to 2018. Available from: <https://www.gov.uk/government/statistics/uk-local-authority-and-regional-carbon-dioxide-emissions-national-statistics-2005-to-2018> [Accessed 21 October 2021]

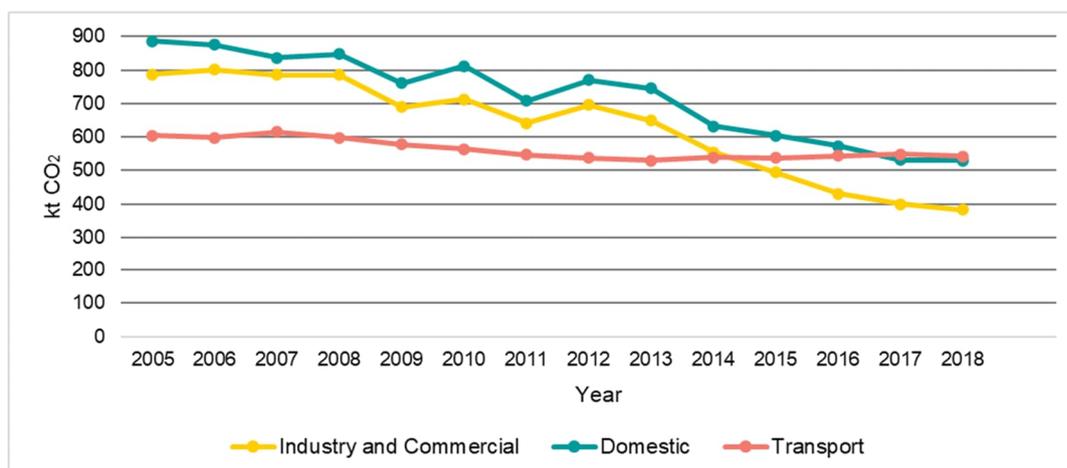


Figure 4-2: CO2 Emissions by Sector in the New Forest District

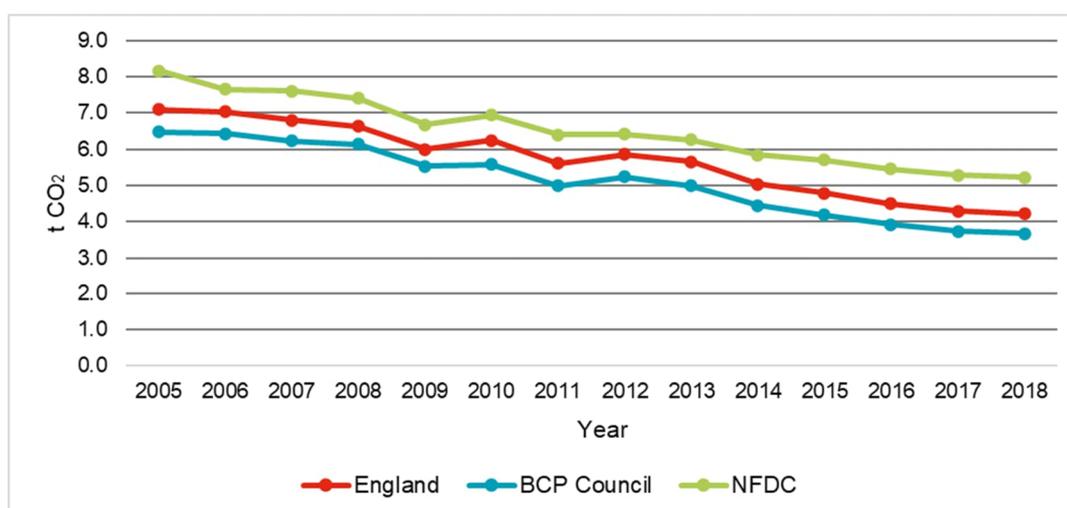


Figure 4-3: CO2 Emissions per Capita for England, BCP Council and NFDC

In the BCP Council area, the total CO<sub>2</sub> emissions in 2018 were estimated at 1407kt, a 49.8% reduction from 2005 levels. Similarly, the total CO<sub>2</sub> emissions for the NFDC area reduced 56.6% between 2005 and 2018, to 2276kt. This follows the national trend, as the energy mix has become less dependent on coal with a preference for renewable energy. Per capita emissions are slightly lower than the average for England in the BCP Council area, although NFDC emissions per capita are slightly higher.

In the NFDC area, the largest source of emissions is from domestic use, and the reduction has primarily been due to the reduction in emissions generated by electricity and increased efficiency of appliances. However in the BCP Council area, transport continues to be the biggest contributing sector with emissions from minor road being the highest, followed by emissions from A-roads.

## 4.2.2 Climate Change Projections

The Intergovernmental Panel on Climate Change (IPCC) produces a report every six to seven years to assess the scientific, technical and socio-economic information concerning climate change. The most recent report, the Sixth Assessment Report (AR6)<sup>8</sup> (2021) provides an understanding of the current state of climate change and knowledge of possible futures.

Various climate change models have been developed based on the previous IPCC reports to evaluate the future effects of climate change using simulations, including UK Climate Projections UKCP18. Projections are provided at a regional level, shown in probabilistic form to illustrate the full range of potential changes and the level of confidence in each prediction.

<sup>8</sup> IPCC (2021) Sixth Assessment Report [online]. Available from: <https://www.ipcc.ch/report/ar6/wg1/#SPM> [25 October 2021]

UKCP18 (2021) has been developed by the Met Office Hadley Centre, in partnership with DEFRA, the Department for Business, Energy and Industrial Strategy (BEIS), the Devolved Administrations and the Environment Agency based on the IPCC Fifth Assessment Report. Based on the UKCP18 climate change projections, the Environment Agency has produced guidance<sup>9</sup> for which site emissions scenario and specific sea level rise values should be used in coastal strategies and schemes. This guidance will be utilised for further modelling as part of this Strategy, to show the risk of tidal flooding over the next 100 years.

A medium emissions scenario (RCP4.5) in the Strategy area would lead to an increase in summer mean temperature of 3°C, and an increase in mean winter precipitation of 34%<sup>10</sup>. This would lead to rising sea levels, an increased risk of flooding and coastal erosion, and a requirement for new coastal defences. Other impacts include:

- Reduction in availability of water, such as groundwater for extraction and a need to increase capacity of wastewater treatment plants and sewers;
- Reduced water quality from low stream levels and turbulent stream flow after heavy rain;
- Soil erosion due to flash flooding; and,
- Loss of habitat and species in the marine and coastal environment.

The Climate and Ecological Emergency Draft Action Plan for BCP Council identifies actions to be taken to prevent these impacts, including investigating natural flood defence and coastal protection opportunities for intertidal habitat creation which would reduce flood risk and act as a carbon store.

### 4.2.3 Flood Risk

Tidal and fluvial flood risk for the present day in the Strategy area is shown below in Figure 4-4, from the Environment Agency's flood risk modelling in the following three flood zones:

- Flood Zone 1: Less than 0.1% probability of flooding in any year;
- Flood Zone 2: Between 0.1% and 1% probability of flooding from rivers, or between 0.1% and 0.5% probability of flooding from the sea; and,
- Flood Zone 3: 1% or greater probability of flooding from rivers, or 0.5% or greater probability of flooding from the sea.

Surface water flood risk is shown in Figure 4-5 and Figure 4-6, where the extent of flooding is denoted by the shade of blue:

- High risk (dark blue) – each year the area has a 3.3% probability of flooding from surface water;
- Medium risk – each year the area has between a 1% and 3.33% of flooding from surface water; and,
- Low risk – each year the area has between a 0.1% and 1% probability of flooding from surface water.

<sup>9</sup> Environment Agency (2020) Flood and coastal risk projects, schemes and strategies: climate change allowances [online] Available from: <https://www.gov.uk/guidance/flood-and-coastal-risk-projects-schemes-and-strategies-climate-change-allowances#general-approach> [Accessed 12 July 2021]

<sup>10</sup> Met Office (2020) UKCP18 key results for the probabilistic projections for aggregated regions and sea level rise information [online] Available from: <https://www.metoffice.gov.uk/research/approach/collaboration/ukcp/key-results> [Accessed 21 June 2021]



Figure 4-4: Tidal and Fluvial Flood Risk in the Strategy area

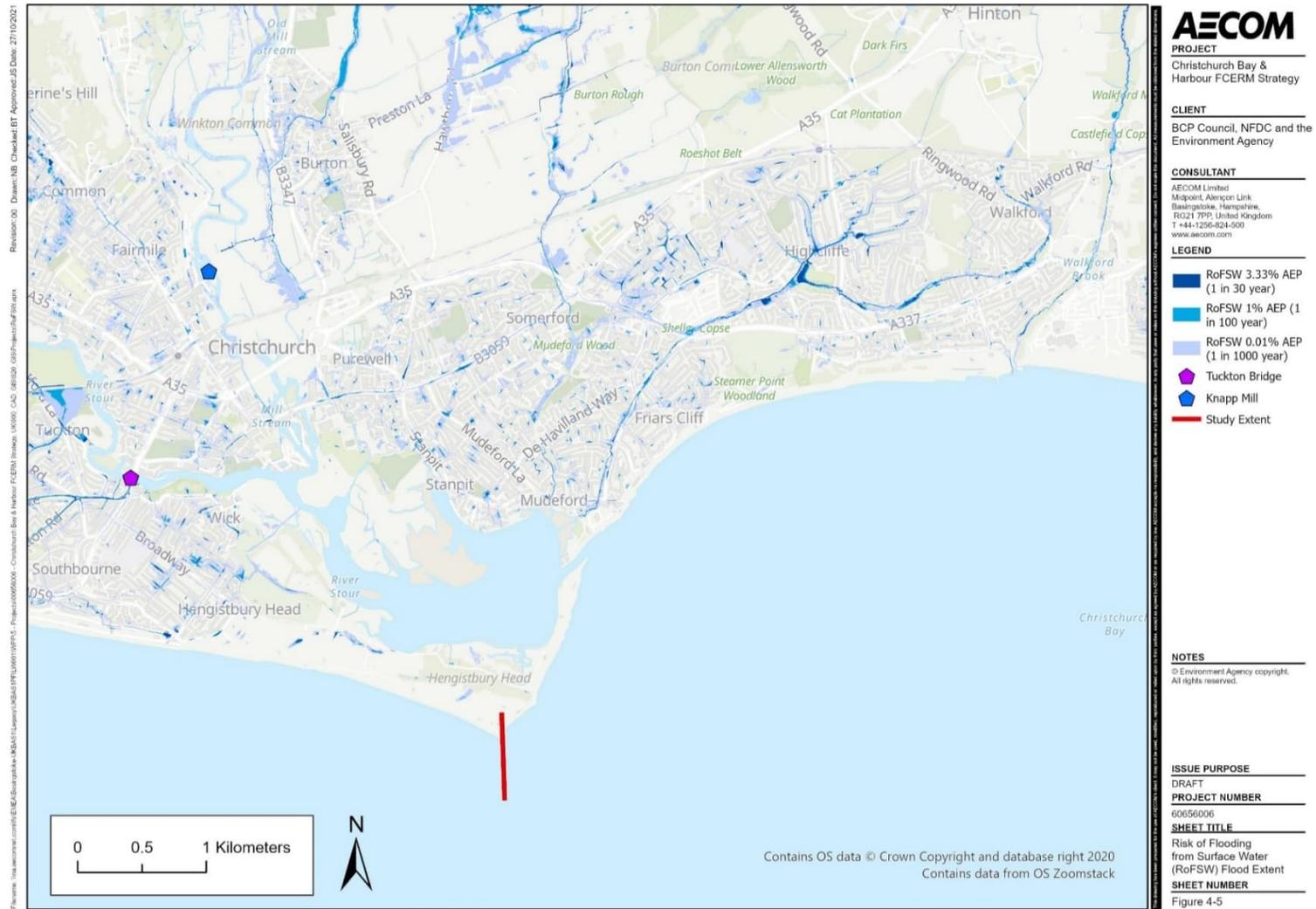


Figure 4-5: Surface Water Flood Risk from Hengistbury Head to Barton-on-Sea

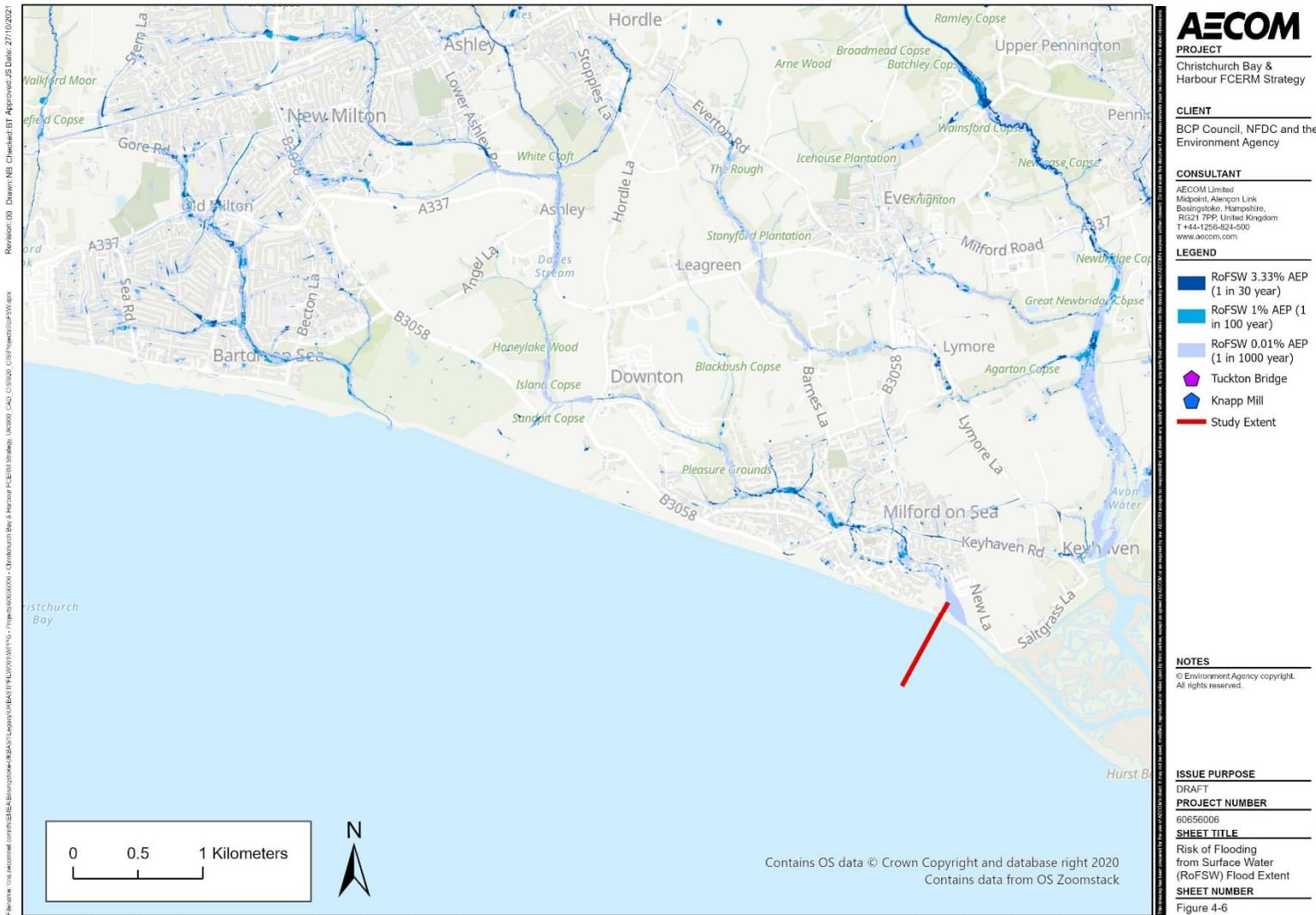


Figure 4-6: Surface Water Flood Risk from Barton-on-Sea to Milford-on-Sea

## 4.2.4 Erosion Risk

Sea level rise caused by climate change can lead to an increase in coastal erosion, as waves begin to extend further up and along beaches and cliffs. The National Coastal Erosion Risk Mapping (NCERM, 2020) has been produced by the Environment Agency (original version 2018, updated in 2020) to show coastal erosion zones around the country's coastline for the next 100 years.

The dataset provides erosion zones for the Strategy area in a 'No Active Intervention' Scenario. This is the baseline scenario to be used in the Strategy, which is a hypothetical walkway where there is no provision or maintenance of any defences, leading to the coastline evolving naturally. This is divided into three time periods over the next 100 years: Short Term (0 – 20 years), Medium Term (20 – 50 years) and Long Term (50 – 100 years). This is presented in Figure 4-7.

Recession of the soft rock cliff along Christchurch Bay is controlled by a range of factors, but it is the continued exposure of the cliff toe to marine erosion that is often the key driver behind the recession process. The degree to which a cliff toe is exposed to erosion is determined by factors such as the erodibility of the cliff toe material, the local hydrodynamic conditions and longshore distribution of wave energy, and the level of protection offered to the cliff toe by beach material or coastal defences. Large parts of the frontage have had coastal engineering works undertaken to improve the stability of the cliffs, which play an important role in the cliff erosion and determine which erosion processes have the most influence along different parts of the frontage. For example, at Hordle cliffs, which are currently undefended, the rate of erosion is greatly influenced by beach levels and exposure of the cliff toe whereas at Barton on Sea, where extensive coastal protection works are in place, the cliff recession is more closely related to groundwater processes and rainfall.

The cliffs in Christchurch Bay erode in a cyclical pattern, with sections of cliff failing before a period of stabilisation. For the exposed sections of cliff, for example at Hordle, the timing of cliff failures typically coincides with stormy periods. After periods of stability that may last 3-4 years, "coastal catch-up" is often experienced resulting in significant losses within a relatively short timescale. For example, in 2004 approximately 8-9m of cliff was lost during one storm. At Barton on Sea, typically movement in the cliffs is observed if rainfall exceeds 80mm per month for three successive months (as per communications with local engineers). Drainage improvements at this location, designed to reduce the risk of slope failures, have previously had a limited effect lasting a few years before coastal catch-up is re-established.

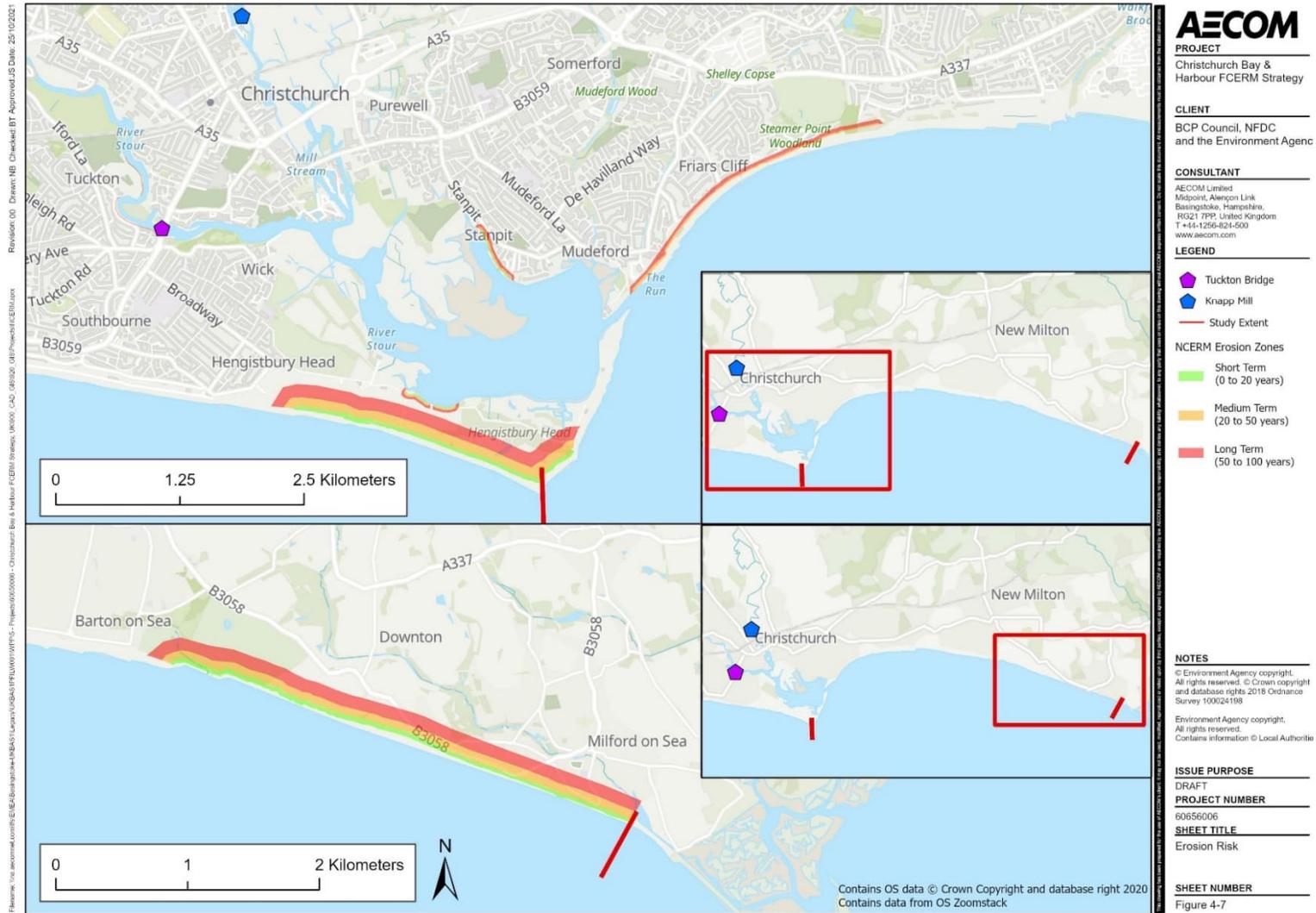


Figure 4-7: No Active Intervention Zones from the NCERM Dataset

## 4.3 Future Baseline

It is likely that CO<sub>2</sub> emissions from the Strategy area will decrease in the future, following the trend from 2005 to 2018, with the adoption of energy efficiency measures as indicated in BCP Council's Climate and Ecological Emergency Draft Action Plan and the 25 Year Environment Plan to reach the goal of zero net carbon by 2050.

The climate change projections presented in Section 4.2.2 detail that a medium emissions scenario will lead to rising sea levels with more frequent and extreme storm events, leading to increased wave heights. Such weather events will increase the risks associated with flooding and coastal erosion, with an increased need for resilience and adaptation. Similarly, more extreme storm events may lead to increased coastal erosion, exposing the soft rock cliffs and causing further instability and cliff recession.

Flood risk at any specific location in the Strategy area may be influenced by local factors such as existing formal or informal coastal defences and the capacity of existing drainage systems. The implementation of upgraded or new coastal defence measures and sustainable urban drainage systems (SuDS) could reduce the onset of flooding and have positive effects in terms of mitigating flood risk. These solutions could also reduce coastal erosion, supporting the stabilisation of the cliffs. Furthermore, nature based solutions identified within the Strategy will provide protection as well as reducing CO<sub>2</sub> emissions compared to traditional coastal defences, and creating new habitats which could act as carbon stores.

## 4.4 Key Issues

The IPCC report highlights the urgency to act on climate change now in order to limit the impacts of rising global temperatures as much as possible. If levels of CO<sub>2</sub>, and other greenhouse gas emissions, continue to rise then the increase in temperatures could become irreversible.

CO<sub>2</sub> emissions per capita are slightly higher than the average for England in the NFDC area, and slightly lower in the BCP Council area; both have followed the national trend of reducing CO<sub>2</sub> emissions since 2005.

The Strategy area predominantly falls within Flood Zone 1, although there are stretches of Flood Zone 2 and 3 at the coast, and running along the Rivers Avon and Stour. Climate change is predicted to lead to an increase in sea levels, temperatures and precipitation, as well as more frequent storm surges and high tides causing more extreme weather events and leading to more widespread fluvial and tidal flooding. Increased precipitation could also lead to increased surface water flooding throughout the Strategy area. Implementing new coastal defences, nature based solutions and SuDS could mitigate some of the impacts of climate change. This could also lead to increased rates of coastal erosion, impacting beach levels and the stability of the soft cliffs

## 4.5 Scoping Outcome

The **Climate Change theme has been scoped in to the SEA**, as the Strategy is likely to have positive significant effects on coastal flood and erosion risks over the next 100 years, which are predicted to increase due to climate change. The Strategy will explore opportunities to provide climate resilience and mitigate coastal flood and erosion risks, through new coastal defence and policy measures. The Strategy will also look to promote low or zero carbon approaches to coastal management, in line with the National FCERM Strategy and aim to minimise the carbon impact of FCERM in the area.

## 4.6 SEA Objective

Table 4-2 presents the SEA objective and appraisal questions that will be used to assess the Strategy in relation to this theme.

**Table 4-2: SEA Framework of objectives and assessment questions: Climate Change**

SEA Objective	Supporting Questions (will the policy option help to...)
To support the resilience of the Strategy area to the potential effects of climate change, including coastal flooding and erosion.	<ul style="list-style-type: none"> <li>Contribute to adapting to climate change?</li> <li>Contribute to mitigating the main causes of climate change by promoting low or zero carbon approaches?</li> </ul>

## 5. Landscape

This section focuses landscape and seascape character and quality, as well as the visual amenity of Christchurch Bay & Harbour.

### 5.1 Policy Context

Table 5-1 presents the most relevant documents identified for managing the landscape.

**Table 5-1: Plans, policies and strategies reviewed in relation to landscape**

Policy	Year of publication	Weblink
<b>National Flood and Coastal Risk Management Strategy for England</b>	2020	<a href="https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/920944/023_15482_Environment_agency_digitalAW_Strategy.pdf">https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/920944/023_15482_Environment_agency_digitalAW_Strategy.pdf</a>
<b>European Landscape Convention</b>	2000	<a href="https://www.coe.int/en/web/landscape/the-european-landscape-convention">https://www.coe.int/en/web/landscape/the-european-landscape-convention</a>
<b>National Planning Policy Framework (NPPF)</b>	201	<a href="https://www.gov.uk/government/publications/national-planning-policy-framework--2">https://www.gov.uk/government/publications/national-planning-policy-framework--2</a>
<b>A Green Future: Our 25 Year Plan to Improve the Environment</b>	2018	<a href="https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/693158/25-year-environment-plan.pdf">https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/693158/25-year-environment-plan.pdf</a>
<b>South Inshore and South Offshore Marine Plan</b>	2018	<a href="https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/726867/South_Marine_Plan_2018.pdf">https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/726867/South_Marine_Plan_2018.pdf</a>
<b>Bournemouth Local Plan</b>	2012	<a href="https://www.bcpccouncil.gov.uk/Planning-and-building-control/Planning-policy/Current-Local-Plans/Bournemouth/Docs/Core-Strategy-1.pdf">https://www.bcpccouncil.gov.uk/Planning-and-building-control/Planning-policy/Current-Local-Plans/Bournemouth/Docs/Core-Strategy-1.pdf</a>
<b>Christchurch and East Dorset Local Plan</b>	2014	<a href="https://www.bcpccouncil.gov.uk/Planning-and-building-control/Planning-policy/Current-Local-Plans/Christchurch/docs/christchurch-and-east-dorset-adopted-core-strategy.pdf">https://www.bcpccouncil.gov.uk/Planning-and-building-control/Planning-policy/Current-Local-Plans/Christchurch/docs/christchurch-and-east-dorset-adopted-core-strategy.pdf</a>
<b>New Forest District Council Local Plan 2016 - 2036</b>	2020	<a href="https://www.newforest.gov.uk/media/705/Local-Plan-Document-2016-2036/pdf/Local_Plan_2016-2036_Part_One_FINAL.pdf?m=637329191351130000">https://www.newforest.gov.uk/media/705/Local-Plan-Document-2016-2036/pdf/Local_Plan_2016-2036_Part_One_FINAL.pdf?m=637329191351130000</a>
<b>New Forest National Park Local Plan 2016 - 2036</b>	2019	<a href="https://www.newforestnpa.gov.uk/app/uploads/2019/09/Local-Plan-2016-2036-finalforweb.pdf">https://www.newforestnpa.gov.uk/app/uploads/2019/09/Local-Plan-2016-2036-finalforweb.pdf</a>

The Strategy will be developed in accordance with the National FCERM Strategy, which details the importance of developing innovative approaches to conservation which enable adaptation to flooding and coastal erosion, in order to sustain natural landscapes for the future.

All landscapes are afforded protection for their intrinsic contribution to the character of an area. This is supported by the European and Landscape Convention (2000) which promotes actions at the landscape scale from protection and conservation to management, improvement and even the creation of landscapes. Any flood and coastal erosion management schemes that are recommended by the Strategy and require planning permission will comply with the policies in the NPPF, which relate to conserving and enhancing protected landscapes and scenic beauty. This will also be in accordance with the 25 Year Environmental Plan which seeks to enhance natural habitats and landscapes to protect the local character, and provide green spaces.

The Strategy will align with the policies within the South Inshore and South Offshore Marine Plan (HM Government, 2021), to consider the seascape and marine character of the area as part of all new developments. Similarly, it will adhere to Local Plan policies which relate to valuing landscapes, landscape character, green infrastructure and design, according to the landscape character assessments for Christchurch, Dorset and Hampshire.

## 5.2 Current Baseline

### 5.2.1 Designated Sites

The landscape within the Strategy area is not nationally designated. However, the New Forest National Park is an area of outstanding landscape importance located outside of the Strategy area to the northeast. This includes Hurst Spit, which is located just eastwards of the Strategy area.

### 5.2.2 Landscape and Seascape Character

The coastline at Christchurch Bay, and most of Christchurch Harbour, is located within the New Forest National Character Area (NCA)<sup>11</sup>, with the western end of Christchurch Harbour at Hengistbury Head located within the Dorset Heaths NCA<sup>12</sup>.

#### 5.2.2.1 Christchurch Bay

The Bay from Mudeford Quay to Highcliffe is composed of a narrow beach, consisting of sand and shingle with coastal defences interspersed (timber and rock groynes and concrete sea walls) to protect against erosion. On the flat land behind the beach, there are residential properties. Although the cliff tops are fringed by trees, they allow views out to sea. This tree line is an important element in the views back into the coast from the sea and along the coast. There are larger settlements at Milford-on-Sea, Barton-on-Sea and Highcliffe, setback from the cliff edge.

The landscape here is composed of low-lying slumped cliffs, behind a popular sand and shingle beach, with beach huts at various locations along the base of the cliffs. On the eastern side of Highcliffe and Walkford Brook, there is a deep valley cut which creates a narrow cliff frontage, referred to as 'Chewton Bunny'.

Mudeford Quay is an open breakwater at the harbour entrance, which provides a hard quayside setting and green space inside. It is a popular access point for people to reach the sea and look back into the harbour areas. The Quay is based on a natural shingle spit that forms the edge of a double spit formation at the harbour entrance, with the outer area referred to as Mudeford Sandbank.

Steamer Point is located on the western side of Highcliffe, which features Steamer Point Nature Reserve, Highcliffe Castle and the golf course. Highcliffe Castle is a public site, and retains a strong landscape setting as well as being one of the few remaining vestiges of the former pattern of country houses in the Highcliffe area. These areas provide significant green space including woodlands and a coastal footpath between Mudeford and Highcliffe, acting as a unique and accessible environment.

Between Friars Cliff and the western end of Highcliffe, the cliff faces are nearly vertical. The cliff faces below the evergreen oak woodland are sparsely vegetated. There are some hard paved paths along sections of the back of the beach, although these are not continuous and do not cover the full length of the bay.

The urban areas of Barton-on-Sea and Milford-on-Sea provide large residential settlements, with recreational developments along the beaches and cliff tops including Hordle Cliff Beach. They provide stunning views across to Christchurch Harbour and the Isle of Wight, key fishing spots in Milford-on-Sea Beach and Hurst Spit and popular coastal walks. There are a range of coastal defences located along Christchurch Bay, including rock revetments, rock strongpoints and cliff drainage at Barton-on-Sea; timber groynes and concrete seawalls at Milford-on-Sea.

At Hurst Spit, there is a narrow shingle embankment which extends approximately 2.5km and features a castle and lighthouse at the tip. There is water on both sides of the spit, with open sea to the south and saltmarsh creeks to the north. This is an area with a special sense of remoteness, being accessible only by foot or boat, and is of great natural beauty.

<sup>11</sup> Natural England (2014) NCA Profile 131: New Forest (NE477) [online] available at: <http://publications.naturalengland.org.uk/publication/5545755456569344?category=587130> [Accessed 15 June 2021]

<sup>12</sup> Natural England (2014) NCA Profile 135: Dorset Heaths (NE506) [online available at: <http://publications.naturalengland.org.uk/publication/6271645295575040?category=587130> [Accessed 15 June 2021]

### 5.2.2.2 Christchurch Harbour

Christchurch Harbour is a natural harbour sheltered to the south by the higher ground of Hengistbury Head, although part of the harbour has been reclaimed. The estuary, surrounding marshes, heath and woodland present a natural landscape creating a distinct attractive character.

The main rivers the Stour and Avon drain into Christchurch Harbour and their alluvial deposits have created a flat floodplain to the west. There are also a series of small streams and creeks which enter the Christchurch side of the basin from Stanpit and Mundeford (Purewell Stream, the River Mude and Bure Brook). The Stanpit and Grimbury Marshes are extensive areas of grazed saltmarsh within the harbour – at low tide, these areas are expanded by the mud flats between the deeper channels.

The area is a popular sailing and mooring location, with numerous boat yards and river moorings particularly in the Harbour. The town of Christchurch lies adjacent to the Harbour on the west and north side, combining historic settlement, strong landscape and dynamic maritime settings.

Christchurch Harbour provides a strong sense of place, acting as an important setting to significant parts of the Strategy area. It is particularly valuable as a small scale natural estuary with areas for nature conservation and recreation.

## 5.3 Future Baseline

There are no designated landscape sites within the Strategy area, however national policies and strategies identified in Table 5-1 are likely to ensure protection and enhancement of the landscape and seascape for the future. The Local Plans for the Strategy area also include policies which will protect the landscape character by limiting new developments in some coastal zones, as well as introducing opportunities to enhance the landscape through the delivery of green infrastructure and recreational development.

Future coastal flooding and erosion may lead to changes to the coastal landscape, including landslides and slope failures on the cliffs along Christchurch Bay. This will also be influenced by the coastal defences measures that are maintained as part of the existing SMP. The implementation of the Strategy is likely to reduce the risks associated with coastal flooding and erosion, providing protection to the landscape. Conversely, new defence structures may reduce the quality of the landscape by impacting the visual amenity.

## 5.4 Key Issues

Whilst there are no designated landscape sites within the Strategy area, the area is recognised for its special landscape setting. Several locations along the Bay provide nature conservation and recreation, with Christchurch Harbour providing a strong sense of place, combining historic elements with the maritime setting.

Future development could reduce the landscape quality, however the policies and strategies in place aim to protect and enhance the landscape character and the quality of the coastal environment.

Increased climate change is likely to lead to further coastal flooding and erosion, which will particularly impact the cliffs located along Christchurch Bay, and the recreational development along the coastline.

## 5.5 Scoping Outcome

The **Landscape theme has been scoped in to the SEA**, as there is potential for significant effects upon the character of the landscape through the implementation of new coastal defence measures.

## 5.6 SEA Objective

Table 5-2 presents the SEA objective and appraisal questions that will be used to assess the Strategy in relation to this theme.

**Table 5-2: SEA Framework of objectives and assessment questions: Landscape**

SEA Objective	Supporting Questions (will the policy option help to...)
To protect and enhance the character and quality of the Strategy area landscape and seascape.	<ul style="list-style-type: none"> <li>• Conserve and enhance the quality of landscape / seascape for people, places and nature?</li> <li>• Contribute to better management of landscape / seascape assets?</li> <li>• Conserve and enhance features of local importance?</li> <li>• Improve linkages to the coastline?</li> <li>• Protect visual amenity?</li> </ul>

## 6. Historic Environment

This section focuses on designated and non-designated heritage assets, the setting of cultural heritage assets and archaeology within the Strategy area.

### 6.1 Policy Context

Table 6-1 presents the most relevant documents identified for managing the historic environment in the Strategy area.

**Table 6-1: Plans, policies and strategies reviewed in relation to the historic environment**

Policy	Year of publication	Weblink
<b>European Landscape Convention</b>	2000	<a href="https://www.coe.int/en/web/conventions/full-list?module=treaty-detail&amp;treatyid=176">https://www.coe.int/en/web/conventions/full-list?module=treaty-detail&amp;treatyid=176</a>
<b>Convention for the Protection of the Architectural Heritage of Europe</b>	1985	<a href="https://www.coe.int/en/web/conventions/full-list?module=treaty-detail&amp;treatyid=121">https://www.coe.int/en/web/conventions/full-list?module=treaty-detail&amp;treatyid=121</a>
<b>European Convention on the Protection of Archaeological Heritage</b>	1992	<a href="https://www.coe.int/en/web/conventions/full-list?module=treaty-detail&amp;treatyid=143">https://www.coe.int/en/web/conventions/full-list?module=treaty-detail&amp;treatyid=143</a>
<b>Planning (Listed Buildings &amp; Conservation Areas) Act 1990</b>	1990	<a href="https://www.legislation.gov.uk/ukpga/1990/9/contents">https://www.legislation.gov.uk/ukpga/1990/9/contents</a>
<b>Ancient Monuments and Archaeological Areas Act 1979</b>	1979	<a href="https://www.legislation.gov.uk/ukpga/1979/46/contents?lang=en">https://www.legislation.gov.uk/ukpga/1979/46/contents?lang=en</a>
<b>National Planning Policy Framework (NPPF)</b>	2021	<a href="https://www.gov.uk/government/publications/national-planning-policy-framework--2">https://www.gov.uk/government/publications/national-planning-policy-framework--2</a>
<b>A Green Future: Our 25 Year Plan to Improve the Environment</b>	2018	<a href="https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/693158/25-year-environment-plan.pdf">https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/693158/25-year-environment-plan.pdf</a>
<b>South Inshore and South Offshore Marine Plan</b>	2018	<a href="https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/726867/South_Marine_Plan_2018.pdf">https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/726867/South_Marine_Plan_2018.pdf</a>
<b>Heritage at Risk Programme</b>	2021	<a href="https://historicengland.org.uk/advice/heritage-at-risk/types/">https://historicengland.org.uk/advice/heritage-at-risk/types/</a>
<b>Historic England Advice Note 1: Conservation Area Appraisal, Designation and Management</b>	2019	<a href="https://historicengland.org.uk/images-books/publications/conservation-area-appraisal-designation-management-advice-note-1/">https://historicengland.org.uk/images-books/publications/conservation-area-appraisal-designation-management-advice-note-1/</a>
<b>Historic England Advice Note 3: The Setting of Heritage Assets</b>	2017	<a href="https://historicengland.org.uk/images-books/publications/gpa3-setting-of-heritage-assets/">https://historicengland.org.uk/images-books/publications/gpa3-setting-of-heritage-assets/</a>

Policy	Year of publication	Weblink
<b>Recording Dorset's Past Historic Environment Record Draft Forward Plan 2021 - 2025</b>	2020	<a href="https://www.dorsetcouncil.gov.uk/libraries-history-culture/local-history-heritage/her/forward-plan/forward-plan-2021-25.aspx">https://www.dorsetcouncil.gov.uk/libraries-history-culture/local-history-heritage/her/forward-plan/forward-plan-2021-25.aspx</a>
<b>Bournemouth Local Plan</b>	2012	<a href="https://www.bpcouncil.gov.uk/Planning-and-building-control/Planning-policy/Current-Local-Plans/Bournemouth/Docs/Core-Strategy-1.pdf">https://www.bpcouncil.gov.uk/Planning-and-building-control/Planning-policy/Current-Local-Plans/Bournemouth/Docs/Core-Strategy-1.pdf</a>
<b>Christchurch and East Dorset Local Plan</b>	2014	<a href="https://www.bpcouncil.gov.uk/Planning-and-building-control/Planning-policy/Current-Local-Plans/Christchurch/docs/christchurch-and-east-dorset-adopted-core-strategy.pdf">https://www.bpcouncil.gov.uk/Planning-and-building-control/Planning-policy/Current-Local-Plans/Christchurch/docs/christchurch-and-east-dorset-adopted-core-strategy.pdf</a>
<b>New Forest District Council Local Plan 2016 - 2036</b>	2020	<a href="https://www.newforest.gov.uk/media/705/Local-Plan-Document-2016-2036/pdf/Local_Plan_2016-2036_Part_One_FINAL.pdf?m=637329191351130000">https://www.newforest.gov.uk/media/705/Local-Plan-Document-2016-2036/pdf/Local_Plan_2016-2036_Part_One_FINAL.pdf?m=637329191351130000</a>
<b>New Forest National Park Local Plan 2016 - 2036</b>	2019	<a href="https://www.newforestnpa.gov.uk/app/uploads/2019/09/Local-Plan-2016-2036-finalforweb.pdf">https://www.newforestnpa.gov.uk/app/uploads/2019/09/Local-Plan-2016-2036-finalforweb.pdf</a>
<b>Christchurch Central Conservation Area Appraisal and Management Plan</b>	2005	<a href="http://christchurch-central-town-centre-conservation-area-appraisal-management-plan-adopted-sept-2005">christchurch-central-town-centre-conservation-area-appraisal-management-plan-adopted-sept-2005</a> (bpcouncil.gov.uk)
<b>Hurst Spit to Lymington Coastal Flood and Erosion Risk Management Strategy</b>	ongoing	<a href="https://consult.environment-agency.gov.uk/solent-and-south-downs/hurst-spit-to-lymington-project/">https://consult.environment-agency.gov.uk/solent-and-south-downs/hurst-spit-to-lymington-project/</a>
<b>Lower Stour Flood Risk Management Strategy</b>	Ongoing	Liaison between the project teams but project at relatively early stage of development at present.
<b>Lower Avon Flood Risk Management Strategy</b>	ongoing	Liaison between the project teams but project at relatively early stage of development at present.

In accordance with the NPPF, any flood and coastal erosion management schemes that come forward and require planning permission will be required to conserve and enhance the historic environment and assets in a manner appropriate to their significance. Options for coastal management should recognise the value of the local character and history, without preventing options for adaptation and innovative change. This should include consideration of cultural heritage as part of the landscape, as discussed in the European Landscape Convention. This is recognised in the 25 Year Environment Plan, which identifies the role of the historic environment in providing settlement identity, landscape and cultural value. There are also policies within the South Inshore and South Offshore Marine Plan (HM Government, 2018) to avoid, minimise and mitigate the impacts of any development on the historic environment and to maximise opportunities for enhancement.

The Strategy should allow for measures to be taken to protect architectural heritage, in line with the Convention for the Protection of the Architectural Heritage of Europe, the European Convention on the Protection of the Archaeological Heritage and the Ancient Monuments and Archaeological Areas Act 1979. The Strategy should also promote controls for Listed Buildings and Conservation areas, in accordance with the Planning (Listed Buildings and Conservation Areas) Act 2000.

Historic England's Advice Notes provide further guidance for conservation and enhancement of the historic environment, including understanding how settings and views contribute to the significance of heritage assets. By identifying the value of the historic environment, coastal management measures can consider any potential impacts on assets or character. The Strategy should also consider the Heritage at Risk (HAR) programme to understand the current state of the historic sites within the Strategy area, to help safeguard those most at risk for the future. The Historic Environment Record draft 2021 – 2025 sets out the operating framework for Dorset's Historic Environment Record (HER). Once fully developed, it will provide comprehensive information on the historic

environment as an evidence base for management strategies such as this FCERM Strategy. The Strategy will also conform to all Local Plan policies in reference to the historic environment.

## 6.2 Current Baseline

### 6.2.1 Designated Heritage Assets

There are four national designations for heritage assets within the Strategy area which recognise their importance and support their protection:

- Listed Buildings – special architectural or historic interest considered to be of importance, given a grade to express the level of interest (Grade I, Grade II\* or Grade II). Grade I Listed Buildings are of exceptional interest. Grade II\* buildings are particularly important buildings of more than special interest, whilst Grade II buildings are of special interest;
- Scheduled Monuments – nationally important archaeological sites or historic buildings;
- Protected Wrecks – restricted areas around shipwrecks which are likely to contain the remains of a vessel, or its contents, which are of historical, artistic or archaeological importance; and,
- Conservation Areas – areas of special architectural or historic interest designated by Local Authorities, the appearance of which it is desirable to preserve or enhance.

The Listed Buildings and Scheduled Monuments are shown in Figure 6-1. Locally, some sites are also recognised for archaeological value. These are listed on the Dorset and Hampshire Historic Environment Record (HER).



### 6.2.1.1 Listed Buildings

Highcliffe Castle is a Grade I Listed Building and one of the most important Listed Buildings in the Area. The Castle has undergone a £5.2 million programme of repair works recently, and it is now owned by BCP Council. The older 'hamlets' of Purewell, Stanpit and Mudeford also have numerous statutory Listed and Locally Listed Buildings situated along historic streets. It is noticeable that there are five Grade I Listed Buildings in the town centre of Christchurch. Those that fall within the study area boundary include Christchurch Priory, Constable's House, Town Bridge and the Castle.

A number of other listed buildings of importance are also located within the Strategy area, as shown in Figure 6-1.

Beyond the east of the Strategy area, there are Grade II Listed Buildings including Hurst Lighthouse and the Lighthouse Keeper's Cottage, located on Hurst Spit.

### 6.2.1.2 Scheduled Monuments

All the Scheduled Monuments in the Strategy area are included in Figure 6-1 and Table 6-2.

Hengistbury Head was formed in the Iron Age fortification of Double Dykes. It is the only non-cave occupation site known in the region that dates back from the earliest (Palaeolithic) period. Hengistbury Head includes evidence of occupation from Palaeolithic, Mesolithic and Neolithic times through the Bronze and Iron Ages until the end of the Roman period. A significant part of the Scheduled Monument at Hengistbury Head has been lost to erosion, particularly over the last 200 years. There is concern that continued erosion and rising sea levels will lead to a breach or overtopping at the location of Double Dykes and ultimately the complete loss significant features within the Monument.

Hurst Castle is an historic defence complex, including a mid-16th century stone castle, and defensive structures dating to the two World Wars. The Hurst Lighthouse, a Grade II Listed Building, is included within the complex. The Scheduled Monument is on Hurst Spit, which is at risk of the impacts of continued erosion and coastal processes. Rapid erosion after an intense storm in 2021 led to part of the east wing being undermined and collapsing, with areas of the west wing also being considered at risk.

**Table 6-2: Scheduled Monuments in the Strategy area**

HER List Entry Number	Description	National Grid Reference
1002350	Bowl barrow	SZ 15287 92092
1002367	Multi-period landscape on Hengistbury Head	SZ 17289 90789
1002369	Staple Cross	SZ 17192 93808
1002371	Site of Town Walls, in and east of, Druitt Gardens	SZ 15675 92723
1002397	Two bowl barrows north west of Barn Cottage, Hengistbury Head	SZ 16354 91357
1002398	Round barrow east of Southcliffe Road, Mudeford	SZ 19181 92814
1005579	World War II pillbox and tank traps	SZ 15432 93353
1015699	Hurst Castle and lighthouse	SZ 31663 89733
1018277	Pre-conquest monastery	SZ 16015 92560

### 6.2.1.3 Protected Wrecks

A number of wrecks exist offshore, including two British Dumb barges that were stranded in 1889, the S.B Hume which was stranded in 1895 and an English Merchant Vessel that was lost in 1884. All known wreck sites in the Strategy area are included in Table 6-3.

### 6.2.1.4 Other Artefacts in the Historic Environment Record

Many artefacts have been found along this coastline to the west of Hurst Spit as the eroding cliff face reveals archaeological material, particularly at Barton-on-Sea. One find consisted of 128 implements including 97 Palaeolithic hand axes. A number of isolated finds of worked flint tools have been found in the Friars Cliff and Mudeford, dating from Prehistoric, Neolithic and Bronze Age eras, including a deserted Medieval village that included six salt houses. The only archaeological site above the cliffs that could be under threat from erosion are the earthworks at Taddiford Gap that may have been associated with the Medieval village of Hordle.

There is substantial evidence of submerged land surfaces within Christchurch Harbour. The presence of a Mesolithic occupation site, at Mother Siller's Channel on Stanpit Marsh, raises the possibility of other prehistoric, and later sites. Christchurch Bay also contains evidence of a submerged land surface. Evidence of human occupation includes worked flints from 12m depth, reported to be the deepest evidence of human occupation in the UK and estimated to be from 8,500 years ago when the western Solent was an extensive saltmarsh on the margin of a small estuary. A Neolithic hand axe, probably the finest ever found in Hampshire, has also been discovered offshore.

Table 6-3: Protected Wreck sites in the Strategy area

Name	Site and Monument Record (SMR)	Location	Description	Period	National Grid Reference (NGR)
Rachel Harrison	SZ39SW 60	Pennington Spit	Built in 1856, Wooden schooner stranded and lost in W force 4 on Pennington Spit on 24th January.	Post Medieval 1540 to 1900	SZ 31880 91070
Triton	SZ39SW 57	Lymington	Wooden sailing vessel burnt and foundered off Lymington on 3 <sup>rd</sup> December 1802.		SZ 31880 91070
Providence	SZ38NW 58		Wooden sailing cargo vessel stranded and lost on 26 <sup>th</sup> February 1802.		SZ 31770 89650
Surprise	SZ38NW 57	Hurst Castle	Wooden sailing cargo vessel stranded and lost near Hurst Castle on 23 <sup>rd</sup> October 1780.		SZ 31770 89650
Three Brothers	SZ38NW 56	Lymington	Wooden smuggling lugger lost between Lymington and Christchurch on 25th January 1775.		SZ 31770 89650
Samuel	SZ38NW 55		Wooden sailing, cargo vessel (170T) stranded and lost on 16th January 1753.		SZ 31770 89650
Unknown	SZ38NW 49	Isle of Wight	Unknown vessel stranded at Cliff End, Isle of Wight, 1746.		SZ 32900 89080
Saint	SZ38NW 48	Isle of Wight	British schooner stranded at Cliff End, Isle of Wight, 1904.	Modern 1901 to 1940	SZ 32900 89080
Lively	SZ38NW 47	Totland Bay, Isle of Wight	English cutter foundered following a collision off Totland Bay, Isle of Wight, 1893.	Post Medieval 1540 to 1900	SZ 32900 89080
Emma	SZ38NW 46	Colwell Bay, Isle of Wight	British smack stranded at Totland Bay, 1883.		SZ 32900 89080
Foam	SZ38NW 45	Isle of Wight	French sloop stranded on Warden Ledge, Totland Bay, Isle of Wight, 1881.		SZ 32900 89080
Providence	SZ38NW 44	Isle of Wight	English smack stranded at Warden Ledge, Colwell Bay, Isle of Wight, 1842.		SZ 32900 89080
Tygar	SZ38NW 4	Isle of Wight	British vessel stranded at Cliff End, Colwell Bay, Isle of Wight, 1746. Forced ashore by a French privateer.		SZ 32900 89080
Hind	SZ38NW 40	Hurst Castle	Royal Navy warship, 6th rate, lost near Hurst Castle, 1709.		SZ 31790 89700
Comet	SZ38NW 39	Hurst	English merchantman, lost at Hurst, West Solent, in 1888. Built 1858.		SZ 31790 89700
Ann and Eliza	SZ38NW 38	Hurst Castle	English merchantman, lost near Hurst Castle, West Solent in 1859.		SZ 31790 89700
Jessie	SZ38NW 37	Hurst	Schooner, lost on Chisel Strap. opposite Hurst, Solent, 1867.		SZ 31790 89700
Hope	SZ38NW 36	Hurst Camber	Lost at Hurst Camber, Isle of Wight, in 1865.		SZ 31790 89700
Archibald	SZ38NW 35	Hurst Castle	British schooner stranded on the beach at Hurst Castle, West Solent in 1880.	SZ 31790 89700	
Three Brothers	SZ38NW 34	Hurst Castle	British fishing smack, stranded 0.5 miles west of the Low Light, Hurst Castle, West Solent in 1876. Lost at same time as the Jemima (SZ38NW 33). Built in 1856.	SZ 31790 89700	
Jemima	SZ38NW 33	Hurst Castle	British fishing smack, stranded 0.5 miles west of Low Light, Hurst Castle, West Solent, 1876. Built 1852.	SZ 31790 89700	
Ann and Eliza	SZ38NW 32	Hurst Castle beach	British vessel stranded on Hurst Castle Beach, Solent, in 1859. Built in 1842.	SZ 31790 89700	
Friends	SZ38NW 31	Hurst Castle	British merchantman foundered near Hurst Castle, Solent, in 1853.	SZ 31790 89700	
Good Intent	SZ38NW 30	Hurst beach	British vessel stranded on Hurst Beach, Solent, in 1826.	SZ 31790 89700	
Good Intent	SZ38NW 29	Hurst Castle	British merchantman stranded near Hurst Castle, Milford, West Solent, in 1814. Wooden sailing vessel stranded and lost near Hurst Castle on 13th December 1814.	SZ 31790 89700	

Name	Site and Monument Record (SMR)	Location	Description	Period	National Grid Reference (NGR)
Unknown	SZ38NW 4		Unknown Vessel	Modern 1901 to 1940	SZ 30192 88246
Mabel	SZ39SW 16	Pennington Spit	Welsh brigantine, lost at Pennington Spit, Isle of Wight, 1870.	Post Medieval 1540 to 1900	SZ 31880 91080
Unknown	SZ39SW 6		Unidentified Feature	Unknown	SZ 32338 93417
Unknown	SZ39SW 5		Unidentified Feature		SZ 31362 91063
Unknown	SZ39SW 4		Unidentified Feature		SZ 31686 91065
S.B.Hume	SZ29SE 21	Milford-on-Sea	British brigantine, stranded at Milford-On-Sea, 1895.	Post Medieval 1540 to 1900	SZ 28500 91450
Rose	SZ29SE 20	Hordle Cliff	British dumb barge, stranded at Hordle Cliff, Milford, Solent, 1889.		SZ 28500 91450
Thistle	SZ29SE 19	Hordle Cliff	British dumb barge, stranded at Hordle Cliff, Milford, Solent, 1889.		SZ 28500 91450
William & Eliza		Milford	English merchantman lost at Milford, near Hurst Castle Isle of Wight in 1884.		SZ 28500 91450
Unknown		Christchurch Harbour	Vessel	200 (Roman)	417566E – 91585N
Unknown		Christchurch Harbour	Sailing Vessel	1796	418824E – 90880N
Caroline Susan			Vessel	1940	422766E – 86077N

### 6.2.1.5 Conservation Areas

Conservation areas are of special architectural or historic interest, with a character or appearance which is desirable to preserve or enhance. The principal consideration in identifying a conservation area is its quality and interest, rather than individual buildings. Table 6-4 describes the 8 Conservation Areas in the Strategy area.

**Table 6-4: Conservation Areas in the Strategy area**

Name	Description
<b>Avon Buildings</b>	Located adjacent to the River Avon in the centre of Christchurch, this conservation area encompasses a group of listed buildings of local interest.
<b>Bramble Lane</b>	Situated in an area to the north of Chewton Common Road, Bramble Lane comprises a number of residential developments from different historical periods. The oldest buildings were once part of an 18th Century hamlet. A number of the cottages are Grade II Listed and are of local interest.
<b>Christchurch Central Conservation Area</b>	Retaining its Saxon street plan and millstream, the character of the historic town centre is maintained through its network of narrow streets, the quality of its buildings and variety of architecture. The importance of the town centre is reflected in the number of statutory Listed and Local Interest Buildings that it contains.
<b>Milford-on-Sea</b>	This conservation area is centred around the green in the village centre and the church. The previously derelict White House hospital on the sea front at Milford has now undergone redevelopment, and is an important Listed Building and prominent coastal landmark.
<b>Mudford Quay</b>	The Quay has a long association with the fishing community and this is reflected in the terraces of fishermen's cottages found in the area. These are grouped closely together with an inn on the head. The area also contains a number of listed cottages of the 17th and 18th century including Grade II 18th century house 'The Moorings.' The historical interest and visual quality of the area are integral to the character. The Quay has particular policies to protect its historical and amenity interest within the Christchurch Local Plan.
<b>Purewell</b>	Purewell forms part of the suburban development extending east of Christchurch to Highcliffe, including Mudford and Stanpit. The main feature of the settlement is Hengistbury Head, an important archaeological site. There are 13 statutory listed buildings which make an important contribution to the special historic and architectural interest of the area.
<b>Stanpit and Fishermans Bank</b>	Groups of white or cream rendered, or painted brick terraced cottages characterise the area. Other properties of interest include a Grade II Listed Building, a row of 18th century Coastguard cottages along Stanpit and The Watch House at Fisherman's Bank.
<b>Verno Lane</b>	The 19 <sup>th</sup> Century Verno House lies here, based around a small farming hamlet which appears to have existed since the late 18 <sup>th</sup> Century. Other key buildings include the Grade II Listed Little Thatch on Roeshot Hill, Verno House Lodge and outbuildings and Lilac Lodge on Hoburne Lane.
<b>Wick Village Conservation Area</b>	The village is known as the last village on the River Stour, with many listed buildings. The Round Barrow Scheduled Monument falls within this conservation area.

### 6.2.2 Heritage at Risk Register

Historic England's Heritage at Risk Register includes Listed Buildings, Scheduled Monuments, Protected Wrecks and Conservation Areas at risk across England. There are two Scheduled Monuments at risk to the west of the Strategy area - two bowl barrows 405m north west of Barn Cottage, north west of Hengistbury Head.

### 6.2.3 Other Archaeological Features

There are other archaeological features within the Strategy area which are not part of designated sites, however they are important to the heritage of Christchurch Bay and Harbour. Many of these sites are recognised in the

archaeological research frameworks which have been developed regionally in the UK, to provide an effective structure for decision making regarding archaeological research. The frameworks comprise of:

1. Resource Assessment: an overview of the current state of knowledge and understanding in the region.
2. Research Agenda: recognition of the potential of the resource, gaps in our knowledge and an unprioritised list of research topics.
3. Research Strategy: a prioritised list of research objectives (seen as flexible over time), furthered by implementing specific Research Projects.

There are two archaeological research frameworks which cover the Strategy area: Solent Thames (Hampshire) and South West (Dorset). As well as these research frameworks, there are several resources which assess the Palaeolithic archaeology of the Strategy area.

In addition to the designated sites identified and considered at the FCERM Strategy level, it will be important for future FCERM schemes which emerge from the Strategy to adequately consider impacts not only these designated assets but also to evaluate and mitigate potential impacts on other nationally significant sites, and non-designated heritage assets, once scheme options and details are developed and understood in more detail.

## 6.3 Future Baseline

There is potential for pressure on the historic environment in the future, through development, coastal squeeze, coastal flooding and erosion exacerbated by climate change. Some heritage assets are already at risk of neglect, decay, or inappropriate development, as identified in the Heritage at Risk Register. Some of these assets may be compromised further by coastal flooding or erosion in the future. Furthermore, there are several national and local policies and strategies which have been implemented to protect these assets. As such, it is likely that the implementation of the Strategy can lead to enhancement of the quality of the historic environment by offering better protection from coastal flooding and erosion.

Within the strategy area there are also buried archaeological resources which are not fully understood at present. This includes buried off-shore channels (extensions of the current onshore drainage network) mapped as part of offshore projects in this area. Protection of the coastline in the future could support protection of these archaeological resources, however construction in the foreshore could also negatively impact these buried resources where they are undiscovered.

## 6.4 Key Issues

European, national and local policies and strategies seek to protect and enhance the historic environment within the Strategy area. Although some heritage assets feature on the Heritage at Risk Register, they are not at risk for reasons pertaining to flood risk management. There are some other heritage assets within the Strategy area which are located in areas of flooding and coastal erosion risk. Buried archaeological resources could also be at risk in the future, through the construction of new coastal defences.

It is important that these assets are protected and enhanced where possible to maintain their integrity and importance. There are potential future pressures in coastal squeeze climate change and development, though it is likely that the Strategy can contribute to reducing some of these pressures through reduced flooding and erosion impacts to the assets and improved management of the coastal zone.

## 6.5 Scoping Outcome

The **Historic Environment** theme has been **scoped in to the SEA**, as there is potential for significant effects upon heritage assets and their settings. It is also important that the wider character of the built and natural environment is protected and enhanced. Although adjacent strategies such as the Lower Avon and Stour flood risk management projects and Hurst Spit to Lymington Coastal Flood and Erosion Risk Management Strategy are still being developed, and their outcomes are not yet known, the potential for in combination effects on key historic environment assets and conservation areas must be considered, or at least in the appraisal and development of future schemes in these areas of overlap or adjacency.

## 6.6 SEA Objective

Table 6-5 presents the SEA objective and appraisal questions that will be used to assess the Strategy in relation to this theme.

**Table 6-5: SEA Framework of objectives and assessment questions: Historic Environment**

SEA Objective	Supporting Questions (will the policy option help to...)
To protect, conserve and enhance the historic environment within the Strategy area.	<ul style="list-style-type: none"> <li>• Conserve and enhance designated and non-designated heritage assets and their settings?</li> <li>• Conserve and enhance the special interest, character and appearance of locally important features and their settings?</li> <li>• Consider the contribution of historic places to the character of the coastal environment?</li> <li>• Support access to the historic environment?</li> </ul>

## 7. Land, Soil and Water Resources

This section focuses on the quality of soil and mineral resources, water supply, water quality and fisheries in the Strategy area.

### 7.1 Policy Context

Table 7-1 presents the most relevant documents identified for managing land, soil and water resources in the Strategy area.

**Table 7-1: Plans, policies and strategies reviewed in relation to land, soil and water resources**

Policy	Year of publication	Weblink
<b>Water Framework Directive (2000/60/EC)</b>	2000	<a href="https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32000L0060">https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32000L0060</a>
<b>National Flood and Coastal Risk Management Strategy for England</b>	2020	<a href="https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/920944/023_1_5482_Environment_agency_digitalAW_Strategy.pdf">https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/920944/023_1_5482_Environment_agency_digitalAW_Strategy.pdf</a>
<b>National Planning Policy Framework (NPPF)</b>	2021	<a href="https://www.gov.uk/government/publications/national-planning-policy-framework--2">https://www.gov.uk/government/publications/national-planning-policy-framework--2</a>
<b>A Green Future: Our 25 Year Plan to Improve the Environment</b>	2018	<a href="https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/693158/25-year-environment-plan.pdf">https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/693158/25-year-environment-plan.pdf</a>
<b>South Inshore and South Offshore Marine Plan</b>	2018	<a href="https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/726867/South_Marine_Plan_2018.pdf">https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/726867/South_Marine_Plan_2018.pdf</a>
<b>Safeguarding our Soils: A strategy for England</b>	2009	<a href="https://www.gov.uk/government/publications/safeguarding-our-soils-a-strategy-for-england">https://www.gov.uk/government/publications/safeguarding-our-soils-a-strategy-for-england</a>
<b>Future Water: The government's water strategy for England</b>	2011	<a href="https://www.gov.uk/government/publications/future-water-the-government-s-water-strategy-for-england">https://www.gov.uk/government/publications/future-water-the-government-s-water-strategy-for-england</a>
<b>Environmental Land Management Schemes</b>	2021	<a href="https://www.gov.uk/government/publications/environmental-land-management-schemes-overview/environmental-land-management-scheme-overview">https://www.gov.uk/government/publications/environmental-land-management-schemes-overview/environmental-land-management-scheme-overview</a>
<b>South East River Basin District River Basin Management Plan</b>	2016	<a href="https://www.gov.uk/government/publications/south-east-river-basin-district-river-basin-management-plan">https://www.gov.uk/government/publications/south-east-river-basin-district-river-basin-management-plan</a>
<b>South West River Basin District River Basin Management Plan</b>	2016	<a href="https://www.gov.uk/government/publications/south-west-river-basin-district-river-basin-management-plan">https://www.gov.uk/government/publications/south-west-river-basin-district-river-basin-management-plan</a>
<b>South East River Basin District FRMP 2015 to 2021</b>	2016	<a href="https://www.gov.uk/government/publications/south-east-river-basin-district-flood-risk-management-plan">https://www.gov.uk/government/publications/south-east-river-basin-district-flood-risk-management-plan</a>
<b>South West River Basin District FRMP 2015 to 2021</b>	2016	<a href="https://www.gov.uk/government/publications/south-west-river-basin-district-flood-risk-management-plan">https://www.gov.uk/government/publications/south-west-river-basin-district-flood-risk-management-plan</a>
<b>Bournemouth Local Plan</b>	2012	<a href="https://www.bccouncil.gov.uk/Planning-and-building-control/Planning-policy/Current-Local-Plans/Bournemouth/Docs/Core-Strategy-1.pdf">https://www.bccouncil.gov.uk/Planning-and-building-control/Planning-policy/Current-Local-Plans/Bournemouth/Docs/Core-Strategy-1.pdf</a>

Policy	Year of publication	Weblink
<b>Christchurch and East Dorset Local Plan</b>	2014	<a href="https://www.bcpccouncil.gov.uk/Planning-and-building-control/Planning-policy/Current-Local-Plans/Christchurch/docs/christchurch-and-east-dorset-adopted-core-strategy.pdf">https://www.bcpccouncil.gov.uk/Planning-and-building-control/Planning-policy/Current-Local-Plans/Christchurch/docs/christchurch-and-east-dorset-adopted-core-strategy.pdf</a>
<b>New Forest District Council Local Plan 2016 - 2036</b>	2020	<a href="https://www.newforest.gov.uk/media/705/Local-Plan-Document-2016-2036/pdf/Local_Plan_2016-2036_Part_One_FINAL.pdf?m=637329191351130000">https://www.newforest.gov.uk/media/705/Local-Plan-Document-2016-2036/pdf/Local_Plan_2016-2036_Part_One_FINAL.pdf?m=637329191351130000</a>
<b>Bournemouth, Christchurch, Poole and Dorset Mineral Sites Plan</b>	2019	<a href="https://www.dorsetcouncil.gov.uk/planning-buildings-land/planning-policy/dorset-county-council/minerals-planning-policy/mineral-sites-plan/mineral-sites-plan.aspx">https://www.dorsetcouncil.gov.uk/planning-buildings-land/planning-policy/dorset-county-council/minerals-planning-policy/mineral-sites-plan/mineral-sites-plan.aspx</a>
<b>New Forest National Park Local Plan 2016 - 2036</b>	2019	<a href="https://www.newforestnpa.gov.uk/app/uploads/2019/09/Local-Plan-2016-2036-finalforweb.pdf">https://www.newforestnpa.gov.uk/app/uploads/2019/09/Local-Plan-2016-2036-finalforweb.pdf</a>
<b>Hampshire Minerals and Waste Plan</b>	2013	<a href="https://www.hants.gov.uk/landplanningandenvironment/strategic-planning/hampshire-minerals-waste-plan">https://www.hants.gov.uk/landplanningandenvironment/strategic-planning/hampshire-minerals-waste-plan</a>
<b>South West Water Bournemouth Water – Final Water Resources Management Plan (WRMP)</b>	2019	<a href="https://www.southwestwater.co.uk/SysSiteAssets/document-repository/environment/sww-bw-wrmp19---finalplan_aug2019.pdf">https://www.southwestwater.co.uk/SysSiteAssets/document-repository/environment/sww-bw-wrmp19---finalplan_aug2019.pdf</a>
<b>New Forest District Council Contaminated Land Strategy</b>	2018	<a href="https://www.newforest.gov.uk/media/1182/Contaminated-Land-Policy/pdf/Contaminated_Land_Strategy_2018.pdf?m=637402772197500000">https://www.newforest.gov.uk/media/1182/Contaminated-Land-Policy/pdf/Contaminated_Land_Strategy_2018.pdf?m=637402772197500000</a>

The Strategy will be developed in accordance with the National FCERM Strategy, which highlights the importance of nature based solutions in FCERM to improve our natural environment whilst reducing flooding and erosion risks. This includes avoiding inappropriate development in the floodplain and highlighting the environmental benefits associated with schemes. Nature based solutions will also help to support the ambitions of the 25 year Environment Plan. The South East and South West Flood Risk Management Plans (DEFRA, 2016) discuss the importance of preventing flood risk, ensuring that any new development is appropriate, safe and does not increase flood risk elsewhere. Measures are also in place to reduce the likelihood of flooding through habitat creation, realigning flood banks, implementing property level protection and improving the standard of protection of river and coastal defences.

The South Offshore and South Inshore Marine Plan (HM Government, 2018) includes a number of objectives and policies related to land, soil and water resources which the Strategy will be in accordance with. This includes contributing to the achievement of maintenance of Good Ecological Status under the Water Framework Directive, avoiding impacts of development on the water environment and delivering benefits or enhancements to the water environment and water quality where possible. Furthermore, developments should safeguard ecosystem services associated with fisheries and support resilience of the sustainable fishing industry. Both the South East and South West River Basin Management Plans (DEFRA, 2016) also include aims for enhancing the water environment in accordance with the Water Framework Directive.

Any flood and coastal erosion management schemes that come forward and require planning permission will be required to adhere to the NPPF in terms of recognising the wider benefits associated with ecosystem services. This includes preserving and enhancing high quality soil resources, water quality and water resources through the implementation of coastal defence measures to minimise the impacts of climate change.

This is supported by the upcoming Environmental Land Management (ELM) Schemes, which will pay farmers and other land managers to deliver clean air and water, thriving plants and wildlife, protection from environmental hazards, reduction of and adaptation to climate change and beauty, heritage and engagement with the environment. This also helps to implement the soil strategy for England, which seeks to reduce soil degradation and manage it sustainably by 2030, and the national water strategy which aims to secure sustainable water resources and improve water quality. These plans are supported by the Local Plan policies for BCP Council, NFDC and the New Forest National Park.

The baseline assessment of the contaminated land sites within the Strategy area will enable the Strategy to ensure all coastal management measures are suitable for the land conditions. The NFDC Local Plan recognises the importance of remediation of contaminated, polluted or unstable land before it can be used for other purposes. NFDC's Contaminated Land Strategy sets out further detail on how the Environmental Protection Act 1990 will be implemented, with contaminated land sites identified and guidance for further site assessments.

## 7.2 Current Baseline

### 7.2.1 Topography

The topography of the Strategy area is shown in Figure 7-1. Christchurch Harbour is predominantly comprised of relatively low, flat topography. The highest ground is located along the cliff sections of Christchurch Bay, with Highcliffe to Barton-on-Sea reaching 50 metres above Ordnance Datum (mAOD), then lowering towards the eastern end of the Strategy area at Milford-on-Sea.

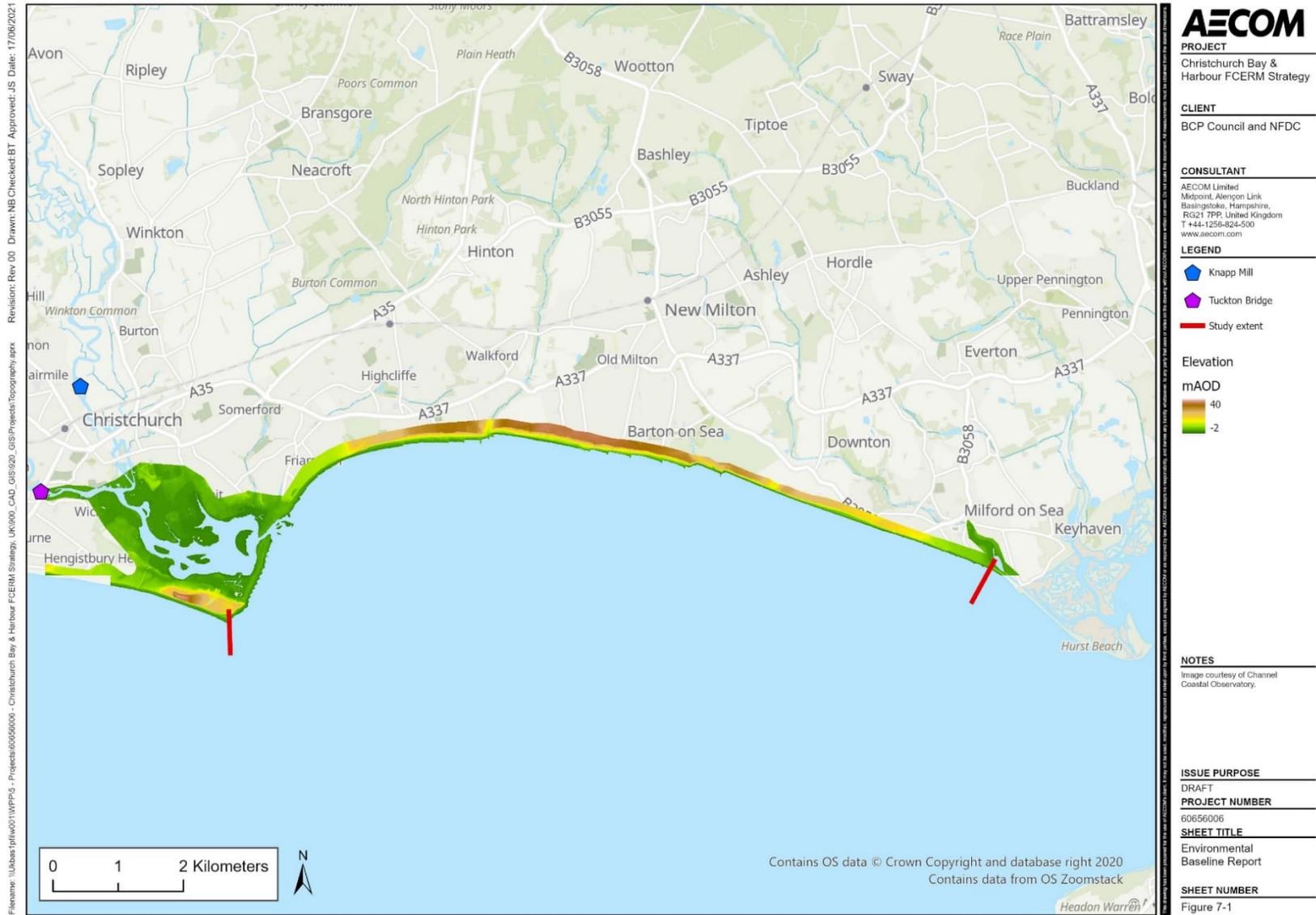


Figure 7-1: Topography of the Strategy area

## 7.2.2 Minerals and Waste

There is no mineral production in the Strategy area, and no sites for mineral development have been identified in the BCP Council Mineral Sites Plan or the Hampshire Minerals and Waste Plan.

## 7.2.3 Soil Resources

The Agricultural Land Classification (ALC)<sup>13</sup> classifies land into six grades, plus 'non-agricultural' and 'urban'. Grades 1 – 3a are recognised as the best and most versatile land (BMV) and Grades 3b – 5 are of poorer quality. There is very little agricultural land in Christchurch Harbour as it is highly developed, however there are inputs of eroded material and nutrients moving downstream from the Avon and Stour catchments. To the north in Purewell there is a small area of Grade 4 agricultural land which is used for rough grazing and horticultural crops.

To the east of Christchurch Harbour, agricultural land between Hurst Spit and Milford is of varying quality and characterised as open coastal plain by Hampshire County Council. At Stanpit and Hengistbury, there are areas of conservation grazing and agri-environment schemes. The majority of the area around Keyhaven, up to the boundary of Milford-on-Sea, is Grade 2.

In New Milton and Milford-on-Sea, the main agricultural uses are livestock rearing and arable crop production. Land between Milford and Barton is predominately Grade 3, and broken up by a strip of Grade 4 along this length which consists of large open fields of pasture and arable land. The remainder of this area is residential and not used for agriculture. Parts of Hurst Spit and Milford-on-Sea are designated under Avon Water Nitrate Vulnerable Zone (NVZ). It is at risk from agricultural nitrate pollution, and must not use nitrogen fertiliser or store organic manure.

The Avon Valley is classified as an Environmentally Sensitive Area (ESA), designated in 1993. It is a voluntary scheme whereby farmers and landowners receive annual payments for entering into a ten-year management agreement. The ESA has four environmental objectives:

- To maintain and enhance landscape quality and wildlife conservation value by retention of existing grassland and by increasing the area of grassland;
- To enhance the wildlife conservation value of wet grassland without detriment to the landscape by maintaining higher water levels in ditches and watercourses;
- To maintain and enhance landscape quality through management of characteristic landscape elements;
- Maintain and enhance the archaeological and historic features.

## 7.2.4 Water Resources

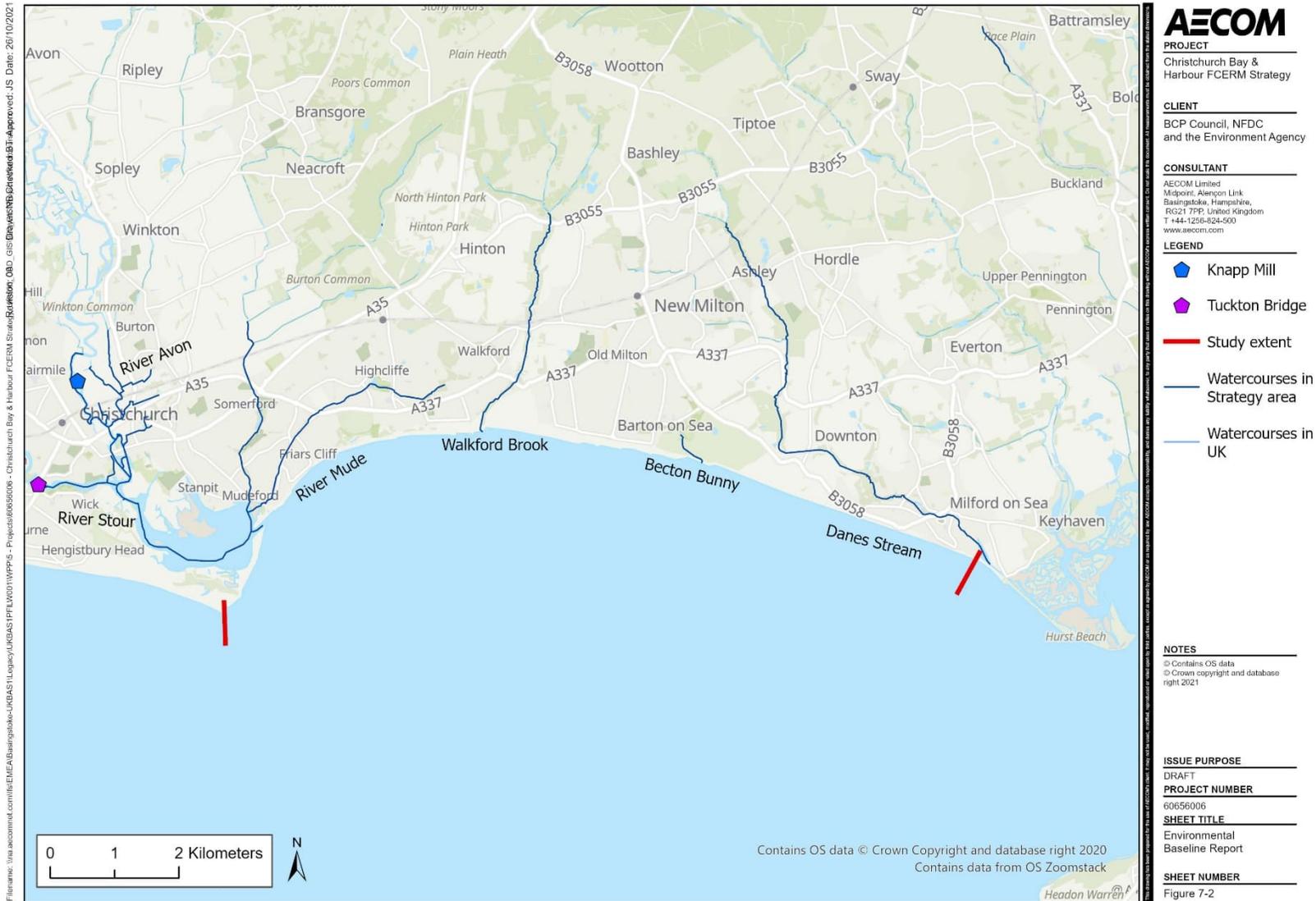
The watercourses in the Strategy are shown in Figure 7-2. The principle watercourses in the Strategy area are the River Avon and the River Stour, which converge at Christchurch Harbour. The River Avon flows in a southerly direction from Knapp Mill towards Christchurch Bay. The River Stour enters the Strategy area from Tuckton, flowing in a south easterly direction to Christchurch Bay. Tributaries of these watercourses include the River Mude. Other watercourses in the Strategy area include Becton Bunny at Barton-on-Sea, the Walkford Brook which flows to Chewton Bunny and Danes Stream which flows through Milford-on-Sea.

The Strategy area is served by Bournemouth Water (with wastewater facilities supplied by Wessex Water and Southern Water), and their Water Resource Management Plan identifies supply and demand from 2017/18 to 2044/45. The supply-demand balance in the Strategy area is not predicted to be under pressure in the next 25 years, with a small (<3%) supply-demand deficit only identified in 2045 for non-household demand. These water companies are also in the process of developing Drainage and Wastewater Management Plans (DWMP) to plan for future drainage, wastewater and environmental water quality.

Towards the eastern end of Barton-on-Sea, there is a Southern Water pumping station which pumps to Pennington WWTW, with emergency overflow that discharges into the sea at Marine Drive East. At Mudeford Sandbank, there is a sewerage system including four pumping stations which run underneath the Harbour entrance channel towards Mudeford Quay. There are two large chambers within Mudeford Quay, which connect to the sewage disposal facilities at Mudeford Sandbank via a 1m diameter concrete tunnel built underneath The Run.

<sup>13</sup> Natural England (2021) Guidance to assessing development proposals on agricultural land [online] Available from: <https://www.gov.uk/government/publications/agricultural-land-assess-proposals-for-development/guide-to-assessing-development-proposals-on-agricultural-land> [Accessed 16 June 2021]

There are a number of licensed ground water abstraction sites for spray irrigation purposes, all of which are less than 50,000 m<sup>3</sup> per annum. Five of these are in the vicinity of Walkford Brook and one is located to the east of Becton Bunny. There are also three surface water abstractions within, or just outside the study area. Two abstractions of less than 50,000 m<sup>3</sup> for spray irrigation purposes are located at Walkford Brook and Danes Stream. There is also an abstraction at Becton Bunny of less than 50,000 m<sup>3</sup>, which may be for gravel washing, fish farming or impoundments.



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Figure 7-2: Watercourses in the Strategy area

## 7.2.5 Water Quality

The quality of the coastal waters is dependent on natural effects, such as weather and ocean currents, and human influences such as discharge of sewage, industrial waste and other pollutants. The Hampshire Avon Partnership and the Stour Catchment Partnership provide information on the quality of the two main rivers in the Strategy area – the River Avon and the River Stour.

### 7.2.5.1 Water Framework Directive

The watercourses identified in Figure 7-2 fall within the Avon Hampshire, Becton Bunny and New Forest – Lymington and Beaulieu operational catchments, and the Dorset / Hampshire coastal operational. All watercourses have a Water Framework Directive (WFD) classification of 'good' or 'moderate' for ecological status, but fail in terms of their chemical status. Reasons for not achieving good status across the watercourses include sewage, poor nutrient management, surface water abstraction, natural mineralisation and trade/industry discharge.

### 7.2.5.2 Urban Waste Water Treatment Directive

Data is collected from Christchurch Harbour, the freshwater inputs to the harbour, and Christchurch Wastewater Treatment Works (WWTW) which discharges into the harbour. The samples are analysed to determine if the harbour should be defined as a sensitive area which is eutrophic due to nutrient inputs.

The recent data from 2020 shows Christchurch Harbour to be compliant with discharges and not a sensitive area.

### 7.2.5.3 European Bathing Water Directive

As part of the European Bathing Water Directive (76/160/EEC), the Environment Agency tests the quality of seawater along the beaches in Christchurch Bay during the summer (15<sup>th</sup> May to 30<sup>th</sup> September) for amenity value and to protect public health. Sampling commences two weeks before the start of the season, with twenty samples taken at regular intervals throughout the season at each site. All samples are taken at predetermined points where the daily average density of bathers is at its highest.

Tested sites in the Strategy area are Avon Beach, Friars Cliff, Highcliffe, Highcliffe Castle, Mudeford Sand Bank, Barton-on-Sea and Milford-on-Sea. Based on samples from 2016 to 2019, the recent classification for all sites is excellent.

## 7.2.6 Fisheries

Commercial fishing takes place in Christchurch Harbour and along stretches of the bay. The Southern Inshore Fisheries and Conservation Authority (Southern IFCA) has jurisdiction over commercial fishing activity within the Strategy area, and manages all activities through a system of byelaws which restrict fishing for certain species through the implementation of closed seasons.

As part of the licensing for ongoing beach management activities, BCP council has undertaken fish surveys to understand the potential impact of beach renourishment on fisheries. BCP Council will also be undertaking dive surveys this year (including within Christchurch ledge) to understand if there is any impact from beach nourishment on the ledge.

Figure 7-3 presents the most recent fish survey from Christchurch Harbour, carried out in June 2021. The species of fish vary between Wick Hams and Mudeford Spit, with Goby spp. being the most abundant species at Wick Hams, and Herring the most abundant at Mudeford Spit.

Licensed netting for salmon and migratory trout takes place in Christchurch Harbour, the joint estuary of the Rivers Avon and Stour, in the Mudeford run, the narrow mouth of the estuary, and from the beach within the public fishery part of the harbour. Fishing is solely by means of seine nets. The number of nets is limited to six in accordance with the NRA (Poole Harbour and Christchurch Harbour) (Limitation of Draft and Seine Net Licences) Order 1993, and these are licensed by the Environment Agency. Christchurch Harbour also has sub-littoral habitats around Hengistbury Head which are important for crabs and lobster. Christchurch Bay is important for fin fish species, which are targeted through a variety of measures as well as potting for whelks.

The River Stour supports a range of sport fishery types, all are catch and release in nature. Small numbers of salmon and sea trout ascend the Stour, although few are caught to maintain stocks for conservation. The river is now primarily a coarse fishery, with very limited trout fishing. Some commercial fishing for eels takes place using fixed eel traps at various locations on the lower River Avon.

There are no designated areas for freshwater fisheries, the nearest being in the lee of Hurst Spit towards Keyhaven.

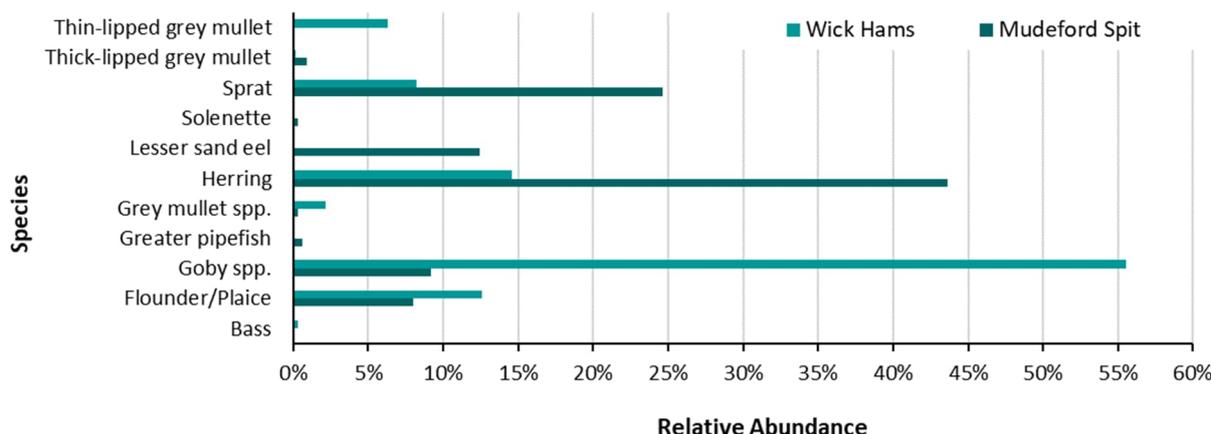


Figure 7-3: Christchurch Harbour Fish Survey (June 2021)

### 7.2.1 Contaminated Land

Contaminated land has implications on coastal management measures that can be considered, and these measures in turn have the potential to influence or improve current issues associated with contaminated land. Management of the coast where there are areas of contaminated land can lead to beneficial remediation and environmental enhancement. For example, implementation of new defences along a contaminated coastline at risk of coastal flooding or erosion can remove a current pollution hazard by blocking the pathway that is linking sources (e.g. former landfill sites) to receptors (e.g. environmentally sensitive habitats).

A desktop study was completed as part of the environmental baseline report, to assess contaminated land risk within the Strategy area. This was carried out in line with CIRIA Guidance C718<sup>14</sup>, using the EA’s Historic Landfill dataset to establish the risk of contamination. This assessment highlighted the key issues and potential contamination areas for the Strategy, rather than providing specific details of minor contaminants found at localised sites. The process of identifying potential contamination utilised GIS spatial analysis, considering potential sites where pollution sources may be present, the possible pollutant linkages relevant to The Strategy (i.e. through coastal flooding and erosion), and potential receptors.

Each Historic Landfill was classified according to the potential contamination risk to receptors, based on the risk of flooding and coastal erosion rather than what contaminants are potentially within each of the sites. This assessment found that 7 out of the 13 sites within the Strategy area are at risk of flooding and/or coastal erosion in the present day; 5 sites may be at risk in the future over the next 100 years, and 1 site is not considered to be at risk.

At present, there is insufficient data to confirm whether the high risk sites would meet the statutory definition of Contaminated Land in Part IIA of the Environmental Protection Act 1990. To confirm the contamination status of these areas, further detailed site studies and intrusive surveys would be required to understand what contaminants are present in these sites. This would establish whether significant harm is being caused, or if there is a significant possibility of significant harm being, or likely to be caused to the identified receptors or pollution of controlled waters.

### 7.3 Future Baseline

Impacts of coastal flooding and erosion on land, soil and water resources in the future are likely to be complex, due to the interrelations between them. In the future there is likely to be an increase in the frequency and severity of extreme weather events, which may lead to increased erosion and degradation of land. Development pressure may also impact water resources; without the use of SuDS, more impermeable surfaces are likely to increase surface runoff which could mobilise pollutants and compromise water quality.

Increased surface run off, combined with increased coastal flooding and erosion, may increase incident of pollution through mobilisation of contaminants from historic landfill sites to the wider area and water resources, as identified

<sup>14</sup> CIRIA (2013) C718: Guidance on the Management of Landfill Sites and Land Contamination on Eroding or Low-lying Coastlines. Available from: <https://www.ciria.org/ItemDetail?iProductCode=C718&Category=BOOK> [Accessed 06 July 2021]

in the risk assessment for contaminated land in Section 7.2.1. This is likely to be worse in areas where the coastal defences are deteriorating or are subject to overtopping.

There is also potential for degradation of both the countryside and urban environment through increased flooding affecting land drainage and increased pressure from development. However, there are several national and local plans and policies in place to preserve and enhance land, soil and water resources. The Strategy, which aims to protect and enhance the coastline and its assets, may prevent some of these losses in the future with the support of nature-based solutions.

## 7.4 Key Issues

Christchurch Harbour is predominantly low topography, in comparison to the cliff sections along Christchurch Bay. Historic erosion rates suggest retreat of these cliffs and beaches in the future, which could impact land and soil resources. Although there is little agricultural land in Christchurch Harbour, there is agricultural land of varying quality further along the bay towards New Milton and Milford-on-Sea.

The principle watercourses in the Strategy area are the River Avon and the River Stour, and there are several tributaries throughout the Strategy area (Becton Bunny at Barton-on-Sea, the Walkford Brook and Danes Stream). Fishing is a popular activity in the Strategy area, both commercial and recreational, particularly at Christchurch Harbour, the River Stour and the River Avon.

The Water Resource Management Plan has not identified pressure on the supply-demand balance in the Strategy area in the next 25 years, with a small (<3%) supply-demand deficit only identified in 2045 for non-household demand. Water quality is monitored by three European Directives: the Water Framework Directive, Urban Waste Water Treatment Directive and the European Bathing Water Directive. All of the watercourses in the Strategy area have a WFD classification of 'good' or 'moderate' for ecological status, but fail in terms of their chemical status. Christchurch Harbour is compliant with the Urban Waste Water Directive, and all bathing waters tested have a classification of excellent for 2019.

A desktop study has identified potential areas of contaminated land, using the EA's historic landfill dataset, and the CIRIA Guidance C718 to define a framework to assess the risks to potential receptors. The receptors include people, properties, environmental designations and watercourses. Increased coastal flooding and erosion in the future is likely to present pathways for contamination to these receptors.

## 7.5 Scoping Outcome

The **Land, Soil and Water Resources theme has been scoped in to the SEA**, as there is potential for significant effects through the implementation of new coastal management measures. As part of the Strategy development, a WFD Assessment will be carried out to fully consider the impacts of the Strategy on water resources.

## 7.6 SEA Objective

Table 7-2 presents the SEA objective and appraisal questions that will be used to assess the Strategy in relation to this theme.

**Table 7-2: SEA Framework of objectives and assessment questions: Land, Soil and Water Resources**

SEA Objective	Supporting Questions (will the policy option help to...)
To ensure the efficient and effective use of land in the Strategy area.	<ul style="list-style-type: none"> <li>• Protect and conserve soils and improve resilience to degradation?</li> <li>• Protect and conserve the best and most productive agricultural land?</li> <li>• Prevent contamination from historic landfill sites and support remediation?</li> </ul>
To protect and enhance water quality, and manage water resources within the Strategy area in a sustainable manner.	<ul style="list-style-type: none"> <li>• Help secure compliance with the Water Framework Directive and contribute to enhancing the status of water bodies?</li> <li>• Contribute to the sustainable management of water resources and fisheries?</li> </ul>

## 8. Population and Communities

This section focuses on the demographics, health and wellbeing of the communities in the Strategy area.

### 8.1 Policy Context

Table 8-1 presents the most relevant documents identified for population and communities.

**Table 8-1: Plans, policies and strategies reviewed in relation to population and communities**

Policy	Year of publication	Weblink
<b>National Flood and Coastal Risk Management Strategy for England</b>	2020	<a href="https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/920944/023_15482_Environment_agency_digitalAW_Strategy.pdf">https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/920944/023_15482_Environment_agency_digitalAW_Strategy.pdf</a>
<b>National Planning Policy Framework (NPPF)</b>	2021	<a href="https://www.gov.uk/government/publications/national-planning-policy-framework--2">https://www.gov.uk/government/publications/national-planning-policy-framework--2</a>
<b>South Inshore and South Offshore Marine Plan</b>	2018	<a href="https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/726867/South_Marine_Plan_2018.pdf">https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/726867/South_Marine_Plan_2018.pdf</a>
<b>Bournemouth Local Plan</b>	2012	<a href="https://www.bcpccouncil.gov.uk/Planning-and-building-control/Planning-policy/Current-Local-Plans/Bournemouth/Docs/Core-Strategy-1.pdf">https://www.bcpccouncil.gov.uk/Planning-and-building-control/Planning-policy/Current-Local-Plans/Bournemouth/Docs/Core-Strategy-1.pdf</a>
<b>Christchurch and East Dorset Local Plan</b>	2014	<a href="https://www.bcpccouncil.gov.uk/Planning-and-building-control/Planning-policy/Current-Local-Plans/Christchurch/docs/christchurch-and-east-dorset-adopted-core-strategy.pdf">https://www.bcpccouncil.gov.uk/Planning-and-building-control/Planning-policy/Current-Local-Plans/Christchurch/docs/christchurch-and-east-dorset-adopted-core-strategy.pdf</a>
<b>New Forest District Council Local Plan 2016 - 2036</b>	2020	<a href="https://www.newforest.gov.uk/media/705/Local-Plan-Document-2016-2036/pdf/Local_Plan_2016-2036_Part_One_FINAL.pdf?m=637329191351130000">https://www.newforest.gov.uk/media/705/Local-Plan-Document-2016-2036/pdf/Local_Plan_2016-2036_Part_One_FINAL.pdf?m=637329191351130000</a>
<b>New Forest National Park Local Plan 2016 - 2036</b>	2019	<a href="https://www.newforestnpa.gov.uk/app/uploads/2019/09/Local-Plan-2016-2036-finalforweb.pdf">https://www.newforestnpa.gov.uk/app/uploads/2019/09/Local-Plan-2016-2036-finalforweb.pdf</a>

The Strategy will be developed in accordance with the National FCERM Strategy, aiming to provide protection from flooding and coastal erosion to the communities within Christchurch Bay & Harbour. It must support communities to better prepare and respond to flooding and coastal erosion, help support them with managing long-term impacts, and give them a say in the management solutions that are developed in the area.

Any flood and coastal erosion management schemes that come forward and require planning permission will adhere to the requirements of the NPPF, implementing coastal defence measures to retain access to community services and facilities, including health facilities, educational facilities and open space, recognising the importance of community needs and interests. The Strategy will also adhere to the policies set out in the South Inshore and South Offshore Marine Plan, ensuring that it supports diversification of activities which improve socio-economic conditions where possible. This will also be in line with Local Plan policies which relate to housing, community services and facilities, accessibility and infrastructure requirements. It will also protect access to the coast to safeguard recreational activities which improve the health and wellbeing of the local community. All three of the local plans for the Strategy area include policies which support the protection and growth of recreation for the region.

The Health Protection Agency has published advice for flooding, which outlines the main threats to public health during and immediately after a flood event. In addition to physical injuries, mental health and wellbeing are considered flood hazards.

## 8.2 Current Baseline

### 8.2.1 Population

The Strategy area of Christchurch Bay and Harbour is divided into the following parishes:

- Christchurch;
- Highcliffe and Walkford;
- Milford-on-Sea; and,
- New Milton.

The towns and villages to the east of Christchurch are mainly residential, with tourism and service industries providing the main form of employment. As seaside settlements, they generally have an older average population as popular retirement destination. Table 8-2 shows the population estimates from the Office for National Statistics (ONS) 2011 Census results<sup>15</sup>.

**Table 8-2: 2011 Population estimates for the Strategy area**

Area	2011 Population Estimate
Christchurch	54,210
Highcliffe and Walkford	12,681
Milford-on-Sea	4,647
New Milton	25,710
<b>Strategy area</b>	<b>101,489</b>
<b>BCP Council</b>	<b>392,419</b>
<b>NFDC</b>	<b>176,462</b>
<b>South West of England</b>	<b>5,281,000</b>
<b>England</b>	<b>53,010,000</b>

### 8.2.2 Health

The health of the populations in both the BCP area and NFDC area, is generally better than the England average<sup>16</sup>. The life expectancy for both men and women is greater in the BCP and NFDC areas than the average for England, as are the mortality rates for all people under 75 for all causes. For BCP, crude mortality rates (deaths per 1,000 people) have decreased from 13.3 to 11.7 between 2011 and 2019; for NFDC, crude mortality rates have increased from 11.3 to 12.5 between 2011 and 2019<sup>17</sup>.

The Indices of Deprivation (IoD) measure relative deprivation at a local area level across England, considering income, employment, education, health, crime, barriers to housing and services and the living environment. All of these elements combined form the Index of Multiple Deprivation (IMD), which ranks each area in England from 1 (most deprived area) to 32,844 (least deprived area). In 2019, the BCP area and NFDC area had an IMD rank of 14,820.73 and 10,782.29 respectively<sup>18</sup>.

### 8.2.3 Christchurch

The town of Christchurch borders the northern edge of Christchurch Harbour. It is a residential town and tourist hotspot, providing locally important services and attracting approximately 1.5 million visitors per year. More than 30% of the population here is aged 65 and over, which is the highest percentage of retired people in any district in the Country. Most of the buildings are residential although there is some holiday accommodation in the form of

<sup>15</sup> Office for National Statistics (2018) Population estimates for Parishes in England and Wales, mid-2002 to mid-2017 [online] available from:

<https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/adhocs/009305populationestimatesforparishesinenglandandwalesmid2002tomid2017> [Accessed 17 June 2021]

<sup>16</sup> Public Health England (2020) Local Authority Health Profiles [online] available from:

<https://fingertips.phe.org.uk/profile/health-profiles> [Accessed 06 August 2021]

<sup>17</sup> Office for National Statistics (2021) Deaths registered by area of usual residence, UK [online] available from:

<https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/deaths/datasets/deathsregisteredbyareaofusualresidenceenglandandwales> [Accessed 06 August 2021]

<sup>18</sup> Office for National Statistics (2019) English indices of deprivation 2019 [online] available from:

<https://www.gov.uk/government/statistics/english-indices-of-deprivation-2019> [Accessed 06 August 2021]

hotels, guest hotels and bed and breakfast establishments; these are predominantly located in Mudeford and Stanpit. Static caravans are situated at Sandhills, adjoining the coast and situated close to Mudeford Quay.

Christchurch lies in a green belt which extends into Dorset and Hampshire, in place to reduce urban sprawl and prevent further convergence with the towns in South East Dorset, protect the identity of the community and preserve nearby countryside.

## 8.2.4 Highcliffe and Walkford

Highcliffe and Walkford parish consists of the two villages, located adjacent to the coastline, in close proximity to the New Forest National Park. This has established the areas as a popular tourist destination particularly for Highcliffe and Friars Cliff beaches, however the houses are largely residential, rather than holiday accommodation.

## 8.2.5 Milford-on-Sea

Milford-on-Sea originated in the centre of an agricultural parish, when the coastline was further south than it is now. Much of the parish is still recognised and protected from urbanisation by the surrounding green belt, recognising the high quality soil resources for agricultural use. The village is still centred around the village green, although it has expanded rapidly over the past 100 years. There has been substantial redevelopment at the western end of the cliff top in recent years, both residential and in support of the strong tourism economy here. There are large open spaces (Hordle and Rook Cliff) as well as Studland Common and sports grounds to the west of the village, and popular shingle beaches.

## 8.2.6 New Milton

New Milton is a modern settlement, an expansion of Old Milton, which includes the village of Barton-on-Sea. Barton-on-Sea comprises mainly suburban housing developments, with some holiday parks located here. There are some large areas of public open space along the cliff tops at both settlements.

## 8.2.7 Recreation and Wellbeing

There are several coastal recreational areas within the Strategy area which are vital to the community's character, and support the health and wellbeing of Christchurch Bay & Harbour.

The beaches within Christchurch Bay & Harbour include Highcliffe Castle Beach, Highcliffe Beach, Gundimore, Mudeford, Friar Cliff, Avon Beach, Naish Beach, Barton-on-Sea Beach, Hordle Cliff Beach and Milford-on-Sea. There are beach huts located at Mudeford Sandbank, Avon Beach, Hordle Cliff, Milford-on-Sea and Barton-on-Sea, which remain a popular and traditional element of the coastline although many are now at risk of flooding and coastal erosion. Mudeford Sandbank also has a wide range of supporting facilities such as buried services / a sewage system and pumping stations. There are also two golf courses – one at Highcliffe and one at Barton-on-Sea – and the clifftops at Barton-on-Sea are often used by paragliders. There are also two golf courses – one at Highcliffe and one at Barton-on-Sea. Bathing and swimming are popular at these beaches, as Christchurch Bay is designated as bathing waters for the 2021 season under the Bathing Waters Regulations 2013.

Recreational fishing also takes place along the coastline, including shore and coarse fishing. Recreational bass fishing is popular at the mouth of the Harbour, although the fishing rights extend along a considerable length of the Harbour bank.

There is a significant sailing community within Christchurch Harbour, with three sailing clubs (Christchurch, Highcliffe and Mudeford) located there. The Harbour is also a base for Christchurch rowing club, host to national competitions for windsurfing and a popular location for kayaking and paddle boarding. Mooring facilities for boats is dictated by the physical nature of the Harbour, although the existing moorings are being used to their full potential. Large areas of the Harbour are accessible to the public for recreation, and leisure boats can be hired from the Quay. Similarly at Milford-on-Sea there are opportunities for water based recreation, including Hurst Castle Sailing Club, The New Forest Paddle Sport Company, and Keyhaven Yacht Club. Keyhaven Harbour is also a launch site with moorings located behind the spit. Surfing is also popular at Avon beach.

Away from the beach, the Strategy area features two historical castles: Christchurch Castle and Highcliffe Castle. Hurst Castle is located adjacent to the study area, at the eastern end of Hurst Spit. The Red House Museum and Gardens is another popular site; located in Christchurch town centre, it dates back to 1764 when it was originally a workhouse and provides an insight into the heritage of Christchurch, including information on natural history, geology and archaeology. Next to Christchurch Quay is the Quomps, an open grassed area containing a splash park and children's play area.

Other open spaces in the Strategy area provide recreational value for the local community, many of which are discussed in Section 0 as they are designated nature conservation sites. Stanpit Marsh Nature Reserve, located on the north side of Christchurch Harbour, is an important 65 hectare LNR with habitats including salt marsh with creeks, salt pans, reed beds, freshwater marsh, gravel estuarine banks and sandy scrub. Steamer Point is another LNR situated between Highcliffe Castle and Friars Cliff, which covers 11 hectares of deciduous woodland, with areas of grassland, ponds, wetland and sea cliffs.

A coastal footpath (the national footpath Barton to Hurst), provides access along the coastline from Mudeford Quay to Chewton Bunny, which is important for visitors and local residents. A number of amenity car parks exist at various points along this stretch of coast including Avon Beach, Highcliffe, Barton-on-Sea and Milford-on-Sea. There are two public car parks within the Purewell area of Christchurch, and several other small car parks within the Strategy area. Traffic congestion can be high in this area, particularly around the summer months when there is more tourism.

## 8.3 Future Baseline

Development pressures and coastal flooding and erosion impacts associated with climate change are likely to increase in the future, negatively affecting the communities within Christchurch Bay & Harbour. Those located adjacent to the coastline such as Highcliffe and Walkford, Milford-on-Sea and Barton-on-Sea are likely to experience coastal erosion, with potential loss of assets. Flooding in Christchurch Harbour could lead to loss of life, which is of particular concern due to the vulnerability of the population here as 30% are aged 65 and over. The NFDC Local Plan predicts an ageing population, with the population ages 65 and over projected to increase by 40% between 2016 and 2036. Similarly in the Christchurch and East Dorset Local Plan, the working population is predicted to drop from 50% to 47% by 2033.

The coastal recreation areas will continue to be popular amongst residents and tourists in the future, though they are also subject to pressure from coastal flooding and erosion. There is potential for the beaches, nature conservation sites and coastal footpaths along Christchurch Bay to be lost through erosion, and more frequent flooding and extreme weather events may impact water sports and fishing activities.

The Strategy would outline the measures and options to provide resilience to the coastline in the future, against the risks of coastal flooding and erosion, protecting the community and their assets. There are also opportunities for the Strategy to enhance access to the coast and open space, improving the existing infrastructure to allow for more coastal recreation.

## 8.4 Key Issues

Christchurch Bay & Harbour is primarily comprised of residential communities, with tourism and recreation a large sector in the economy. There are five main communities which have developed from historic settlements: Bransgore, Christchurch, Highcliffe and Walkford, Milford-on-Sea and New Milton.

There are a wide variety of recreational facilities in the Strategy area, which are vital to improving the health and wellbeing of the community including access to the natural coastal environment through beaches and coastal waters, activities such as fishing and water sports, nature conservation sites and historical buildings.

These communities, and the people and properties within them, are at risk of coastal flooding and erosion in the future. The Strategy will improve the resilience of the community to these risks, through improved coastal management. In some areas, this will involve new coastal defences and improved access to the coast and open space. In other areas of the coast, the management may involve adaptation to the changing coastline through relocation of some popular sites.

## 8.5 Scoping Outcome

The **Population and Communities** theme has been **scoped in to the SEA**, as there is potential for the Strategy to have significant impacts on the health and wellbeing of the communities within Christchurch Bay & Harbour.

## 8.6 SEA Objective

Table 8-3 presents the SEA objective and appraisal questions that will be used to assess the Strategy in relation to this theme.

**Table 8-3: SEA Framework of objectives and assessment questions: Population and Communities**

SEA Objective	Supporting Questions (will the policy option help to...)
Protect and enhance the health and wellbeing of the community within the Strategy area.	<ul style="list-style-type: none"> <li>• Protect and improve the resilience of communities?</li> <li>• Improve and enhance the health and wellbeing of communities?</li> <li>• Improve access to the coastal environment?</li> <li>• Support the provision of more, better quality and accessible green infrastructure / open space?</li> <li>• Avoid negative impacts to the quality and / or extent of existing recreational assets, including coastal footpaths?</li> </ul>

## 9. Transportation and Movement

This section focuses on transport infrastructure and usage across the Strategy area.

### 9.1 Policy Context

Table 9-1 presents the most relevant documents identified for population and communities.

**Table 9-1: Plans, policies and strategies reviewed in relation to transportation and movement**

Policy	Year of publication	Weblink
<b>National Flood and Coastal Risk Management Strategy for England</b>	2020	<a href="https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/920944/023_15482_Environment_agency_digitalAW_Strategy.pdf">https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/920944/023_15482_Environment_agency_digitalAW_Strategy.pdf</a>
<b>National Planning Policy Framework (NPPF)</b>	2021	<a href="https://www.gov.uk/government/publications/national-planning-policy-framework--2">https://www.gov.uk/government/publications/national-planning-policy-framework--2</a>
<b>South Inshore and South Offshore Marine Plan</b>	2018	<a href="https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/726867/South_Marine_Plan_2018.pdf">https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/726867/South_Marine_Plan_2018.pdf</a>
<b>Marine and Coastal Access Act</b>	2009	<a href="https://www.legislation.gov.uk/ukpga/2009/23/contents">https://www.legislation.gov.uk/ukpga/2009/23/contents</a>
<b>The Department for Transport's Cycling and Walking Investment Strategy</b>	2016	<a href="https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/512895/cycling-and-walking-investment-strategy.pdf">https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/512895/cycling-and-walking-investment-strategy.pdf</a>
<b>Decarbonising Transport: Setting the Challenge</b>	2020	<a href="https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/932122/decarb-onising-transport-setting-the-challenge.pdf">https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/932122/decarb-onising-transport-setting-the-challenge.pdf</a>
<b>Bournemouth Local Plan</b>	2012	<a href="https://www.bcpccouncil.gov.uk/Planning-and-building-control/Planning-policy/Current-Local-Plans/Bournemouth/Docs/Core-Strategy-1.pdf">https://www.bcpccouncil.gov.uk/Planning-and-building-control/Planning-policy/Current-Local-Plans/Bournemouth/Docs/Core-Strategy-1.pdf</a>
<b>Christchurch and East Dorset Local Plan</b>	2014	<a href="https://www.bcpccouncil.gov.uk/Planning-and-building-control/Planning-policy/Current-Local-Plans/Christchurch/docs/christchurch-and-east-dorset-adopted-core-strategy.pdf">https://www.bcpccouncil.gov.uk/Planning-and-building-control/Planning-policy/Current-Local-Plans/Christchurch/docs/christchurch-and-east-dorset-adopted-core-strategy.pdf</a>
<b>New Forest District Council Local Plan 2016 - 2036</b>	2020	<a href="https://www.newforest.gov.uk/media/705/Local-Plan-Document-2016-2036/pdf/Local_Plan_2016-2036_Part_One_FINAL.pdf?m=637329191351130000">https://www.newforest.gov.uk/media/705/Local-Plan-Document-2016-2036/pdf/Local_Plan_2016-2036_Part_One_FINAL.pdf?m=637329191351130000</a>
<b>New Forest National Park Local Plan 2016 - 2036</b>	2019	<a href="https://www.newforestnpa.gov.uk/app/uploads/2019/09/Local-Plan-2016-2036-finalforweb.pdf">https://www.newforestnpa.gov.uk/app/uploads/2019/09/Local-Plan-2016-2036-finalforweb.pdf</a>
<b>Bournemouth, Poole and Dorset Local Transport Plan 2011 to 2026</b>	2012	<a href="https://www.dorsetcouncil.gov.uk/roads-highways-maintenance/documents/improvements-and-transport-planning/ltp3-bournemouth-poole-dorset-summary-document-final.pdf">https://www.dorsetcouncil.gov.uk/roads-highways-maintenance/documents/improvements-and-transport-planning/ltp3-bournemouth-poole-dorset-summary-document-final.pdf</a>
<b>Hampshire Local Transport Plan 2011 - 2031</b>	2013	<a href="https://documents.hants.gov.uk/transport/HampshireLTPPartALongTermStrategy2011-2031RevisedApril2013.pdf">https://documents.hants.gov.uk/transport/HampshireLTPPartALongTermStrategy2011-2031RevisedApril2013.pdf</a>

The Strategy will be developed in accordance with the National FCERM Strategy, which highlights the importance of infrastructure resilience as part of climate resilient schemes. Infrastructure must be resilient to flooding and coastal erosion to avoid disruption to peoples' lives and livelihoods. This includes coastal access as part of the England Coast Path, to be developed as part of the Marine and Coastal Access Act 2009 by Natural England.

Any flood and coastal erosion management schemes that come forward and require planning permission will adhere to the NPPF, considering the impact of any coastal management measures on transport routes including walking, cycling and public transport. The effects of flooding and coastal erosion are likely to impact these transport routes, therefore the Strategy will look to enhance and protect them. Similarly, the Strategy should consider the objectives of the South Inshore and South Offshore Marine Plan (HM Government, 2018) to manage existing and aid the provision of new infrastructure supporting marine activities such as harbours and ferry services.

National transport strategies set out investment priorities, seeking to improve the connectivity and reliability of transport networks, whilst reducing transport impacts on the natural environment (including through decarbonisation and Nature Recovery Networks reconnecting species and habitats). There is more emphasis on choosing walking and cycling over other transport methods, and a focus on investment to encourage this. The Local Transport Plans identify the transport investment priorities and policies at a more localised scale, in line with the Local Plan policies.

## 9.2 Current Baseline

### 9.2.1 Road and Rail Links

The principal road networks through Christchurch Bay & Harbour are linked to the A35 from Bournemouth to Christchurch. The A337 continues along the coast to Lymington, with the B3058 branching off to Milford-on-Sea. A network of smaller roads run close to the coast for much of the area, particularly at Barton-on-Sea where the road runs parallel to the cliff top. There are approximately thirteen coastal carparks across Christchurch Bay.

Within the Strategy area, there are three train stations serviced by South Western Railway: Hinton Admiral, New Milton and Christchurch. The trains operate between London, Southampton and Weymouth.

### 9.2.2 Harbour and Ferry Services

Christchurch Harbour provides access to the Solent and Poole Harbour, popular areas for boating on the south coast. The entrance to the harbour is at the downstream end of Mudeford Quay, known as 'The Run'. Vessels are permitted to come along side Mudeford Quay within The Run, including commercial fishing vessels and ferries. There are multiple slipways into the harbour, including at Avon Bridge, Christchurch Sailing Club and a public landing area at Christchurch Quay. There are also several moorings and boat yards within the harbour, including trot moorings to the south east of the harbour and self-laid moorings at Mudeford,

A car and passenger ferry is operated between Yarmouth, Isle of Wight, and Lymington, located to the east of the Strategy area. Seasonal passenger ferries operate between Keyhaven and Yarmouth, and Keyhaven to Hurst Castle. Within Christchurch Harbour, passenger ferries operate from Mudeford Quay to Mudeford Sandbank, and between Tuckton Tea Gardens, Mudeford Sandbank, Wick Ferry and Christchurch Quay. Major ports are located immediately to the east and west of Christchurch Bay in Southampton and Poole.

### 9.2.3 Public Rights of Way

There are a significant number of public footpaths<sup>19</sup> across the Strategy area, including those along the beach front at Mudeford, Highcliffe and Milford-on-Sea. Solent Way (the E9 European Long-Distance Path) runs along the clifftops around Christchurch Bay, starting from Milford-on-Sea. Natural England are currently in the process of developing the England Coast Path<sup>20</sup>, opening it in sections. Solent Way will form part of this coastal path once the proposals have been approved. Solent Way is currently at risk of coastal erosion in the present day; therefore the path position needs to be managed in the future.

<sup>19</sup> Rights of Way maps [online] Available at: <https://www.rowmaps.com/> [Accessed 17 June 2021]

<sup>20</sup> The England Coast Path [online] Available at: [https://www.nationaltrail.co.uk/en\\_GB/trails/england-coast-path/](https://www.nationaltrail.co.uk/en_GB/trails/england-coast-path/) [Accessed 26 October 2021]

## 9.2.4 Cycleways

In the BCP area, a cycle route map<sup>21</sup> has been produced to encourage more cycling with the use of the Beryl bike hire company. The map shows a network of routes recommended by cyclists and highlights the locations of the preferred parking areas for the Beryl bike scheme. The council is continuing to invest in facilities for cyclists, with many principal roads featuring cycle lanes.

Similarly in the NFDC area, a cycle route map has been produced<sup>22</sup>. It brings together all managed routes within the New Forest National Park and surrounding area, including Milford-on-Sea and New Milton. At cycle hire shops, cyclists can hire Garmin satellite navigation systems to guide them.

## 9.3 Future Baseline

Coastal flooding and erosion has the potential to impact the key land-based travel infrastructure in the future, restricting transport and movement both within and surrounding the Strategy area. Predominantly small roads run along the coast, and flooding or coastal erosion of these could cut off access to some properties and areas of the coastal environment. Similarly, public footpaths and cycleways which are close to the coastline will be at risk in the future. Climate change is likely to lead to more frequent extreme storm events, impacting the infrastructure associated with the harbour and ferry services.

Coastal management measures implemented by the Strategy could protect access to key transport infrastructure, limiting the impacts of flooding and erosion, through options which support new coastal defence measures. The Strategy could also support improvements to these transport networks, including more sustainable transport methods such as walking and cycling.

## 9.4 Key Issues

Within the Strategy area, there is a network of smaller roads which connect to the wider area. There are good public transport infrastructure links within and outside of the Strategy area, including trains, harbour and ferry services.

Public rights of way and cycleways also exist throughout Christchurch Bay and Harbour, with new cycle routes having recently been developed to support an increased uptake in cycling and sustainable transport methods.

Although there is a risk of coastal flooding and erosion to the transportation and movement within the Strategy area, the implementation of the Strategy could protect key infrastructure as well as enhancing the existing travel networks and promoting use of more sustainable travel methods.

## 9.5 Scoping Outcome

The **Transportation and Movement theme has been scoped in to the SEA**, as there is potential for the Strategy to have significant impacts on the transport infrastructure within Christchurch Bay & Harbour.

## 9.6 SEA Objective

Table 9-2 presents the SEA objective and appraisal questions that will be used to assess the Strategy in relation to this theme.

**Table 9-2: SEA Framework of objectives and assessment questions: Transportation and Movement**

SEA Objective	Supporting Questions (will the policy option help to...)
Protect and enhance transport infrastructure in the Strategy area.	<ul style="list-style-type: none"> <li>• Protect and improve the resilience of key transport infrastructure?</li> <li>• Extend or improve active travel networks?</li> <li>• Enable sustainable transport infrastructure improvements?</li> </ul>

<sup>21</sup> BCP Council (2019) Bournemouth, Christchurch and Poole Cycle Map [online] Available at:

<https://www.christchurch.gov.uk/sport-leisure/cycling/documents/bpc-area-cycle-map-christchurch.pdf> [Accessed 17 June 2021]

<sup>22</sup> New Forest National Park Authority (2018) New Forest Cycle Trails [online] Available at:

<https://www.newforestnpa.gov.uk/app/uploads/2018/01/New-Forest-Cycle-Routes-Map.pdf> [Accessed 17 June 2021]

# 10. Next Steps

## 10.1 Subsequent stages for the SEA process

Scoping is the first stage in a five-stage SEA process. The following steps are outlined below:

1. Scoping;
2. Develop and assess reasonable alternatives, with a view to informing preparation of the draft plan, and subsequent assessment of the draft plan;
3. Preparation of the Environmental Report with a view to informing consultation;
4. Consultation on the Environmental Report; and,
5. Publication of a statement at the time of plan adoption which ‘tells the story’ of plan-making and SEA.

Accordingly, the next stage after scoping will therefore involve the development and assessment of reasonable alternatives for the Strategy. The findings of this work will be fed back to BCP Council and NFDC so that they can be taken into consideration when finalising the draft Strategy. The draft Strategy will then be subject to assessment, and the Environmental Report will be published for consultation alongside it.

## 10.2 Consultation

Public involvement through consultation is a key element of the SEA process. At this scoping stage, the SEA Regulations require consultation with statutory consultees the Environment Agency (EA), Historic England (HE) and Natural England (NE).

The Scoping Report was released to these statutory consultees for comment between August and October 2021, with particular focus on the evidence base for the SEA, the identified key issues and the proposed SEA framework.

All comments received on the Scoping Report have been reviewed and will influence the development of the SEA where appropriate.

# Appendix A Proposed SEA Framework

The proposed SEA objectives and assessment questions for each of the themes explored in this report have been pulled together, presenting the proposed SEA Framework. For the purposes of this SEA, it is proposed that Air Quality is scoped out of the proposed framework.

SEA Theme	SEA Objective	Supporting Questions (will the policy option help to...)
<b>Biodiversity and Geodiversity</b>	To protect and enhance biodiversity and geodiversity habitats and species; achieving biodiversity net gain and improved habitat connectivity within the Strategy area.	<ul style="list-style-type: none"> <li>• Protect and enhance European, nationally and locally designated sites, including species that are important to the integrity of these sites and recognised as priority species?</li> <li>• Protect, enhance and improve connectivity of habitats?</li> <li>• Support the delivery of biodiversity net gain?</li> <li>• Support habitat creation, restoration and recovery in the coastal zone?</li> <li>• Increase the resilience of biodiversity in the Strategy area to the effects of climate change through increased coastal flooding and erosion?</li> </ul>
<b>Climate Change</b>	To support the resilience of the Strategy area to the potential effects of climate change, including coastal flooding and erosion.	<ul style="list-style-type: none"> <li>• Contribute to adapting to climate change?</li> <li>• Contribute to mitigating the main causes of climate change by promoting low or zero carbon approaches?</li> </ul>
<b>Landscape</b>	To protect and enhance the character and quality of the Strategy area landscape and seascape.	<ul style="list-style-type: none"> <li>• Conserve and enhance the quality of landscape / seascape for people, places and nature?</li> <li>• Contribute to better management of landscape / seascape assets?</li> <li>• Conserve and enhance features of local importance?</li> <li>• Improve linkages to the coastline?</li> <li>• Protect visual amenity?</li> </ul>
<b>Historic Environment</b>	To protect, conserve and enhance the historic environment within the Strategy area.	<ul style="list-style-type: none"> <li>• Conserve and enhance heritage assets and their settings?</li> <li>• Conserve and enhance the special interest, character and appearance of locally important features and their settings?</li> <li>• Consider the contribution of historic places to the character of the coastal environment?</li> <li>• Support access to the historic environment?</li> </ul>
<b>Land, Soil and Water Resources</b>	To ensure the efficient and effective use of land in the Strategy area.	<ul style="list-style-type: none"> <li>• Protect and conserve soils and improve resilience to degradation?</li> <li>• Protect and conserve the best and most productive agricultural land?</li> <li>• Prevent contamination from historic landfill sites and support remediation?</li> </ul>
	To protect and enhance water quality, and manage water resources within the Strategy area in a sustainable manner.	<ul style="list-style-type: none"> <li>• Help secure compliance with the Water Framework Directive and contribute to enhancing the status of water bodies?</li> <li>• Contribute to the sustainable management of water resources and fisheries?</li> </ul>
<b>Population and Communities</b>	Protect and enhance the health and wellbeing of the community within the Strategy area.	<ul style="list-style-type: none"> <li>• Protect and improve the resilience of communities?</li> <li>• Improve and enhance the health and wellbeing of communities?</li> <li>• Improve access to the coastal environment?</li> <li>• Support the provision of more, better quality and accessible green infrastructure / open space?</li> <li>• Avoid negative impacts to the quality and / or extent of existing recreational assets, including coastal footpaths?</li> </ul>

SEA Theme	SEA Objective	Supporting Questions (will the policy option help to...)
<b>Transport and Movement</b>	Protect and enhance transport infrastructure in the Strategy area.	<ul style="list-style-type: none"> <li>• Protect and improve the resilience of key transport infrastructure?</li> <li>• Extend or improve active travel networks?</li> <li>• Enable sustainable transport infrastructure improvements?</li> </ul>



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30<sup>th</sup> October 2023



Alan Frampton  
BCP Council  
Civic Centre  
Poole  
Dorset  
BH15 2RU

Hornbeam House  
Crewe Business  
Park  
Electra Way  
Crewe  
Cheshire  
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T 0300 060 3900

Dear Mr Alan Frampton

### **Christchurch FCERM Strategy**

I am writing to confirm Natural England's support, in principle, of Bournemouth Christchurch and Poole (BCP) Council's proposal for the Flood and Coastal Erosion Risk Management strategy. Natural England are comfortable and supportive of the FCERM Strategy and its recommendations. Natural England can confirm the process BCP Council have followed is in line with the relevant guidance, and the regulations have been adequately appraised and assessed in the various reports.

Natural England's support is based on the understanding that BCP council will carry out project level HRAs and MCZ assessments for each pressure that has been screened in.

It is understood that the proposed Strategy Management Zones (SMZs) and eighteen smaller Option Development Units (ODUs) are important measures currently needed to meet the policies identified in the Shoreline Management Plan for the stretch of coastline between Hengistbury Head (immediately to the east of Hengistbury Head long groyne) and the landward (western) end of Hurst Spit, and within Christchurch Harbour.

Natural England is happy to continue working with BCP council to review the options within the Strategy in relation to protected sites.

Yours sincerely,  
Elanor James  
Marine Lead Adviser  
[Elanor.james@naturalengland.org.uk](mailto:Elanor.james@naturalengland.org.uk)



Historic England

By email: [alan.frampton@bcpcouncil.gov.uk](mailto:alan.frampton@bcpcouncil.gov.uk)  
Cc: [cally.barnes@bcpcouncil.gov.uk](mailto:cally.barnes@bcpcouncil.gov.uk)

Our ref: PL00754402

27 October 2023

Dear Mr Frampton,

**Strategic Environmental Assessment (SEA) Environmental Report 2023 for the Christchurch Bay & Harbour Flood and Coastal Erosion Risk Management Strategy (FCERM)**

Thank you for sharing the final draft of the SEA for Christchurch Harbour and Bay FCERM with Historic England. As the Government's adviser for the historic environment, we are keen to ensure that conservation and enhancement of the historic environment are taken into account in the preparation of the associated strategy.

We can confirm that BCP Council and its consultants have worked positively with us during the process of preparing this SEA. We are not in a position to check and validate all information in the final report at this stage. However, according to our understanding of adjustments that have been made in response to our previous comments, we are content that this represents a reasonable assessment of the likely effects of the strategy on the historic environment. While we do have concerns about potential for future harm to the historic environment that may result from some strategy choices, we are content at this strategic stage that adequate safeguards and monitoring and mitigation recommendations have been included in the SEA to inform further detailed work on schemes in future.

This opinion is based on the information provided by you and, for the avoidance of doubt, does not affect our obligation to advise you on, and potentially object to any specific development proposal which may subsequently arise from the plan, and which may, despite the assessment, have adverse effects on the historic environment.

Yours sincerely

Kim Miller, MRTPI IHBC  
Historic Environment Planning Adviser  
South West Region

Cc: Sasha Chapman, Inspector of Ancient Monuments



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0117 9751308 [HistoricEngland.org.uk](http://HistoricEngland.org.uk)

Please note that Historic England operates an access to information policy.  
Correspondence or information which you send us may therefore become publicly available.





# CHRISTCHURCH BAY & HARBOUR FLOOD AND COASTAL EROSION RISK MANAGEMENT (FCERM) STRATEGY

## PHASE 5 CONSULTATION

5 June to 27 August 2023

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Report March 2024

Research and Consultation Team

## Executive Summary

The formal Christchurch Bay & Harbour Strategy public consultation ran for 12 weeks during June to August 2023. Activities, led by the Flood and Coastal Erosion Risk Management (FCERM) team, resulted in high levels of engagement across the strategy area. Over 4,000 people viewed our website content, approximately 20,000 people viewed our social media posts, over 3,000 people interacted with our Facebook content, around 700 people came to our face-to-face and online events, and 91 people completed a survey.

Below is a breakdown of our engagement activity:

1. Senior Management briefing sessions – BCP Council and NFDC
2. Councillor briefings – BCP Council and NFDC – 169 invited, 27 attended
3. Employee / Councillor drop-in session – NFDC
4. Press release / media interviews – 4 positive press articles + radio coverage
5. Social media & e-newsletters – Almost 20,000 people viewed content posts
6. Stakeholders – email information sent to +450 contacts
7. Flyer distribution – +2,000 to council venues and local businesses / orgs
8. Community magazine adverts – 4 publications distributed to +23,000 homes
9. Online public meeting – 91 registered, 53 attended
10. Facebook campaign – reached +7,500 people with +3,000 interactions
11. Face to face events – 2 events attended by +120 people
12. New Forest County Show – +500 people viewed Strategy displays
13. BCP Council Youth Forum – Strategy discussion and feedback session
14. STEM Resources – +25 curriculum information downloads by schools
15. BCP consultation website – +3,000 users viewed the content
16. Strategy website – +1,000 new users viewed the content (twobays.net)
17. Online and paper surveys – 91 responses.

This report shows the detail of the Phase 5 Consultation and includes stakeholder responses which have been considered during this final stage of Strategy development before it is presented to Council for adoption in 2024. Consultation feedback highlighted above is in addition to the 4 phases of engagement feedback received while the Strategy was being developed (see [section 1.2](#)) This has helped shape the Strategy from the outset. All feedback can be viewed on the BCP Council Strategy webpage: [haveyoursay.bcpCouncil.gov.uk/christchurchstrategy](https://haveyoursay.bcpCouncil.gov.uk/christchurchstrategy).



- 91 survey responses in total:
  - 82 online (PC Laptop – 53, Smartphone – 24, Tablet – 5)
  - 9 paper surveys
  - 3 other responses via 2 emails and 1 letter that will be considered alongside the main responses to the consultation
  - Most respondents were BCP and NFDC residents. See a full demographic breakdown in [Appendix 1](#)
  - See a full breakdown of respondent postcodes in Appendix 5



- Respondents commented on Christchurch Harbour (Zone 2) and Mundeford Sandbank (Zone 1) the most. Taddiford (Zone 5) was commented on the least.
- Respondents agreed most with the proposed Leading Options for:
  - **ODU3**: Christchurch Harbour South in Zone 2
  - **ODU13**: Highcliffe in Zone 3
  - **ODU6**: River Avon West Bank in Zone 2
  - Detailed breakdown in [Appendix 2](#)
- Respondents disagreed most with the proposed Leading Options for:
  - **ODU2**: Mundeford Sandbank in Zone 1
  - **ODU1**: Hengitsbury Head East in Zone 1
  - **ODU11**: Mundeford Quay in Zone 2.
- Respondents said they would prefer to be kept informed, and engaged with, about the FCERM Strategy through email newsletters.
- Respondents said they would be willing to help deliver the Strategy in the future mostly by working in partnership.

**Note – Zones refer to identified Strategic Management Zones (SMZs) across the Strategy area which are split further into smaller Option Development Units (ODUs). See [Section 1.1](#) for further explanation.**

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# 1 Introduction and background

Bournemouth, Christchurch and Poole Council (BCP) and New Forest District Council (NFDC) are working together with the Environment Agency to produce a new Coastal Strategy. It will guide how flood and coastal erosion risk along the frontage from Hengistbury Head to Hurst Spit, encompassing Christchurch Harbour, will be sustainably managed for the next 100 years.

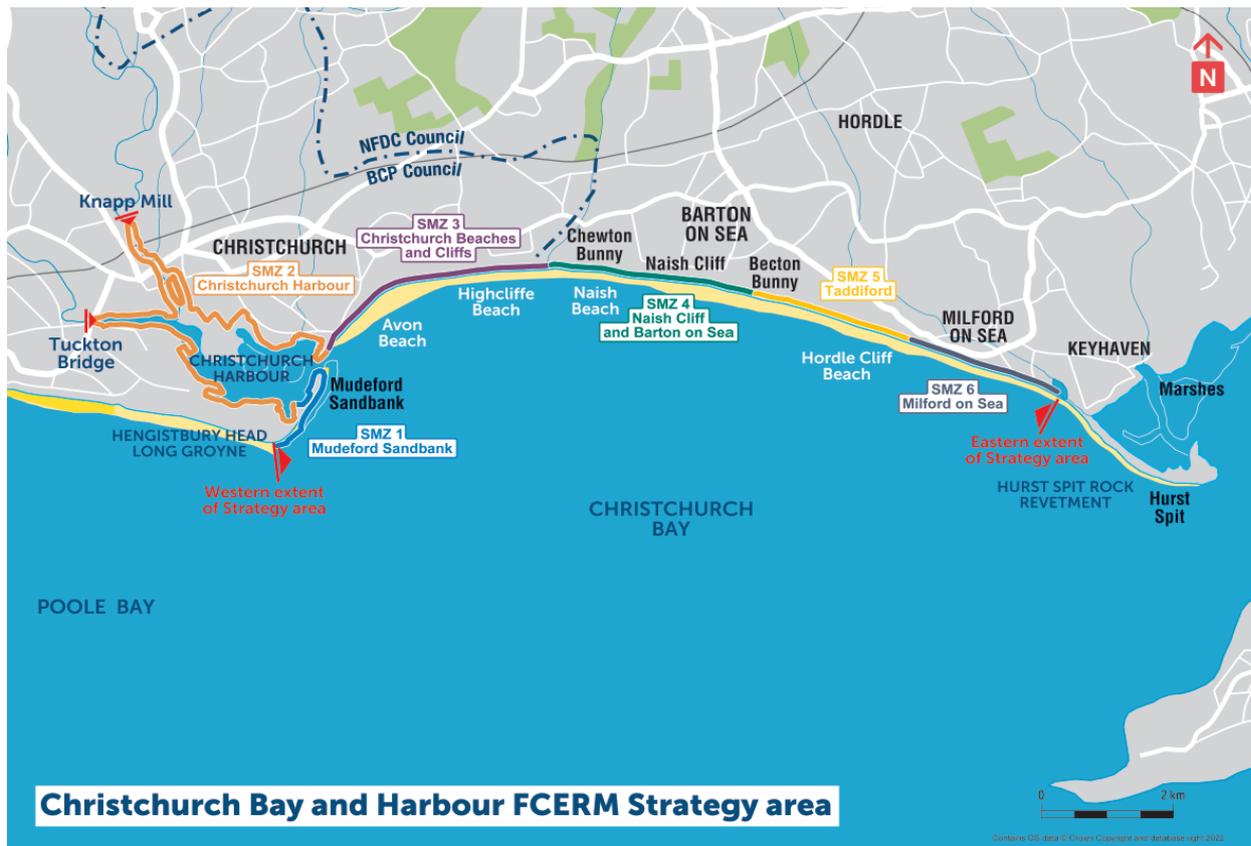
As Coast Protection Authorities, BCP and NFDC have permissive powers to enable management of coastal erosion risk where it is appropriate and feasible to do so. In addition, along with the Environment Agency, BCP as Lead Local Flood Authority (LLFA) has statutory responsibilities for managing flood risk; Hampshire County Council are the LLFA covering the NFDC area.

In Autumn 2020, BCP Council successfully secured £525,000 of government Flood and Coastal Erosion Risk Management Grant in Aid (FCERM-GiA) to produce the Strategy on behalf of the partners. The council appointed specialist consultant AECOM to help support this work. It is anticipated that the final Strategy will be adopted by the end of 2024.

A phased approach was developed to deliver the Strategy identifying where, when and broadly what type of works are needed to manage the risks of coastal flooding and erosion and what they may cost. It will also consider the effects of predicted climate change on coastal communities, including sea level rise and the increased frequency of storm events.

The final adopted Strategy will enable BCP Council and New Forest District Council to bid for government funding to develop and deliver viable and realistic coast protection schemes to implement [Shoreline Management Plan](#) policy. Although there is no guarantee that 100% funding would be received for schemes, it will help us to understand the level of partnership funding required to deliver them.

## 1.1 Strategy area



The Strategy area stretches from immediately east of Hengistbury Head long groyne to the western end of Hurst Spit and encompasses Christchurch Harbour up to Tuckton Bridge on the River Stour, and Knapp Mill on the River Avon.

Five key coastline areas for the Bay and Harbour were initially identified to aid early stages of the strategy development. Later these evolved into six Strategic Management Zones (SMZs), because each one has their own specific coastal risks. The SMZs help us identify and manage the links between each coastal area. These will be referred to from now on as "zones". The smaller Option Development Units (ODUs) in each zone, of which there are 18, allow us to carry out an options appraisal process to consider how we can manage the local requirements.

## 1.2 Engagement Phases 1–4

Four engagements took place to support the development of the strategy, spanning from July 2021 to January 2023.

In that time we gathered information, research and technical data to understand what would happen if we 'Do Nothing' to defend our coast. Along with public and stakeholder views from the first three engagements, we produced a long list of potential coastal risk management measures to 'Do Something' to ensure our coastal communities are more resilient to flooding, erosion and the impacts of

climate change over the next 100 years. Feedback on the long list of options was considered by the Strategy Team and a short list of options was proposed in the fourth engagement period. Following this engagement, the final short list of measures was further appraised to ensure that they would be technically, economically and environmentally viable.

Engagement phases 1–4, saw that nearly 12,000 people viewed our website info, approx. 5,500 engaged with our social media posts, around 680 people attended our face-to-face and online events and over 250 people completed a survey.

Go to [haveyoursay.bcpCouncil.gov.uk/christchurchstrategy](https://haveyoursay.bcpCouncil.gov.uk/christchurchstrategy) for more information on phases 1-4.

### 1.3 Engagement Phase 5 – Consultation

The fifth engagement for the FCERM Strategy was a formal public consultation. It ran from 5<sup>th</sup> June to 27<sup>th</sup> August 2023 and asked the public and key stakeholders for their views on the proposed leading options for managing coastal flooding and erosion risk across the Christchurch Bay and Harbour frontage.

In each ODU, up to three types of proposed leading options were identified. The National Economic Leading Option formed the basis of the appraisal. In some locations a Local Aspirational Option was also identified. This option delivers wider / local benefits (compared to the National Economic Option) and was developed using public and stakeholder feedback. In some cases, the funding shortfall to deliver both of these options was expected to be large, and therefore a Backup Option was also identified. This is typically lower cost, has lower capital investment and the requirements should be easier to deliver but does not deliver long-term protection against the risk of coastal flooding and erosion. Each option type outlined the planned flood / erosion interventions during the short, medium and long term.

The [findings](#) from the phase five consultation will be used to firm-up the leading options for each ODU which will be included in the final Strategy.

### 1.4 Methodology

The consultation was hosted on the BCP [Engagement HQ](#) platform and was promoted through various channels including:

- [BCP \(and NFDC\) Council Press Release](#)
- [Virtual and face-to-face public engagement events](#)
- [Distributed over 2,000 flyers across Bournemouth, Christchurch and Poole and the New Forest](#)
- [Paid for adverts in four community magazines sent to 23,000 homes](#)
- A [Have your Say Strategy Hub was created so that people could easily follow the Strategy development and engagement](#)

- Details of online engagement rates can be found in the [Engagement HQ Analytics](#) and [Two Bays Website Analytics](#) sections
- E-newsletters
- Social media posts (Facebook, Twitter, Instagram, LinkedIn) by BCP Council, NFDC Council and [Dorset Coast Forum](#)
- [Paid for Facebook campaign](#)
- Emails to over 450 public and commercial stakeholders
- [News articles](#)
- [Councillor briefings](#)
- A full breakdown of the communications activity for the Phase 5 consultation can be found in the [Communications Report](#).

The main project page was hosted from the council's Engagement HQ Platform along with a brief description of the project:  
[haveyoursay.bcpCouncil.gov.uk/christchurchstrategyphase5](https://haveyoursay.bcpCouncil.gov.uk/christchurchstrategyphase5).

The consultation was designed in Engagement HQ (engagement platform software). The online responses were downloaded from the software for analysis. The data was checked and verified in preparation for analysis and held in the Insight Team's secure area.

The online survey was designed in 'Snap' (survey design software). The online responses were downloaded into Snap for analysis. The data was checked and verified in preparation for analysis and held in the BCP Council Insight Team's secure area. Quantitative analysis was carried out using Snap to identify the frequencies for each question.

The write in (qualitative) responses were exported into Excel and coded into categories. Qualitative research does not seek to quantify data, instead, its purpose is to provide deeper insights into reasoning and impact and many researchers therefore believe that numbers should not be included in reporting. The numbers of people mentioning the most prevalent codes are provided in this report to give an indication of the magnitude of response. Importantly, however, given the nature of the data, this does not provide an indication of significance or salience in relation to the question asked.

## 1.5 Support

Respondents were encouraged to read the [information document](#) and complete the online survey by **midnight on Sunday 27 August 2023**. Alternatively, they could collect a paper copy of the survey and information document from the following libraries:

- Christchurch Library - Druitt Buildings, High Street, Christchurch, BH23 1AW

- Highcliffe Library - Gordon Road, Highcliffe, BH23 5HN
- Tuckton Library - Wick Lane, Tuckton, Bournemouth, BH6 4LF
- New Milton Library - Gore Road, New Milton, BH25 6RW
- Lymington Library - North Close, Lymington, SO41 9BW.

They could also download a copy of the paper surveys and information document from our main consultation page:

[haveyoursay.bcpccouncil.gov.uk/christchurchstrategyphase5](https://haveyoursay.bcpccouncil.gov.uk/christchurchstrategyphase5).

If they had any queries or needed support responding to the consultation, they could email [coastal@bcpccouncil.gov.uk](mailto:coastal@bcpccouncil.gov.uk), ask questions at our [virtual public engagement event](#).

## 2 Engagement Figures

This section shows the engagement figures for each method used during the consultation for Phase 5.

### 2.1 Public engagement events

In addition to the main methods for responding, people could attend virtual or face-to-face public engagement events where they could view the proposals in detail, speak to officers and collect paper copies of the consultation materials. Around 200 people attended and/or engaged with the public events, with an additional 500+ people viewing the display at the New Forest Show. Events included:

- **Milford on Sea Community Centre** - 13 June 2023 at 10am-4pm. The address is: Milford on Sea Village Community Centre, 9 Sea Rd, Milford on Sea, Lymington SO41 0PH – **80+ people attended**.
- **Christchurch Library** - 19 June 2023 at 10am-5:30pm. The address is: Druitt Buildings, High Street, Christchurch, BH23 1AW – **40+ people attended**.
- **Public on-line event** - 27 June 2023 at 7:00-8:15pm. Hosted by [Dorset Coast Forum](#). Free tickets could be booked by any interested parties. 91 people registered and **53 attended**.
- **New Forest Show** - 25-27 July 2023 at The Showground, New Park, Brockenhurst, Hampshire, SO42 7QH. **Over 500 people visited** the marquee over the three days and had a clear view of the consultation display.



- In addition to the public events, the Strategy Team presented at:
  - A special Councillor Briefing on 12 June 2023. 169 invites were sent out for Councillor briefings with 27 Councillors attending.
  - [BCP Youth Forum](#) on 19 July 2023 where 8 members provided feedback.

## 2.2 Engagement HQ Analytics

The consultation was hosted on the council's engagement platform [Engagement HQ](#). There were over 3,300 visits to the [consultation page](#) with 2,215 **aware visitors** (i.e. a visitor who has made at least one single visit to the webpage) and 611 **informed visitors** (i.e. a visitor who has taken the 'next step' from being aware and clicked on something).

### Engagement HQ Measurement Figures



Visitors engaged with the content on the main consultation page as follows:

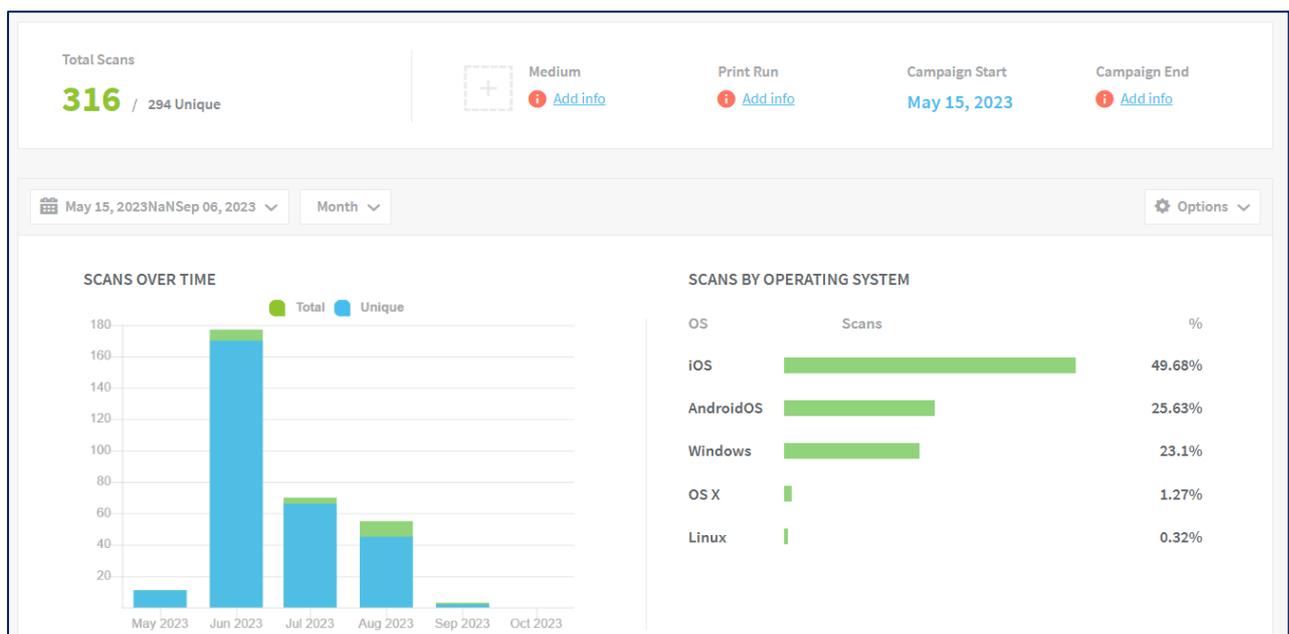
- 449 visitors downloaded documents 816 times, including:
  - 507 downloads of the [Consultation Information Document](#)
  - 68 downloads of the [draft FCERM Strategy Document](#)
  - 52 downloads of the [paper survey](#)
  - 37 downloads of the [ODU1: Hengitsbury Head East Information Board](#)
  - 22 downloads of the [Christchurch FCERM SEA Environment Report](#)
  - 18 downloads of the [ODU2: Mundeford Sandbank Information Board](#)
  - 16 downloads of the [ODU3: Christchurch Harbour South Information Board](#)
  - 16 downloads of the [ODU14: Naish Cliff and Barton on Sea Information Board](#)
  - 9 downloads of the [ODU9: Stanpit Information Board](#)
  - 9 downloads of the [ODU18: Milford on Sean Frontage Information Board](#)
  - 8 downloads of the [ODU12: Avon Beach and Friars Cliff Information Board](#)
  - 8 downloads of the [ODU15: Taddiford Information Board](#)
  - 7 downloads of the [ODU4: Wick Information Board](#)
  - 6 downloads of the [ODU6: River Avon, West Bank Information Board](#)
  - 6 downloads of the [ODU10: Mundeford Information Board](#)
  - 5 downloads of the [ODU16: Cliff Road Information Board](#)
  - 5 downloads of the [ODU17: Rook Cliff Information Board](#)
  - 4 downloads of the [ODU5: Willow Drive and the Quomps Information Board](#)
  - 4 downloads of the [ODU7: Rossiters Quay Information Board](#)
  - 4 downloads of the [ODU11: Mundeford Quay Information Board](#)
  - 4 downloads of the [ODU13: Highcliffe Information Board.](#)

The majority of visitors to the consultation page on Engagement HQ came via Facebook (222 visits), followed by the Two Bays (204 visits) and BCP Council (58 visits) websites. A full breakdown of the site referrals can be seen below:

REFERRER URL	Visits
twobays.net	204
m.facebook.com	150
online1.snapsurveys.com	69
www.google.com	67
lm.facebook.com	46
l.facebook.com	26
www.google.co.uk	20
t.co	19
bcpcouncil.sharepoint.com	16
www.bing.com	16
www.bcpcouncil.gov.uk	13
instagram.com	12
www.linkedin.com	11
android-app	11
www.newforest.gov.uk	7

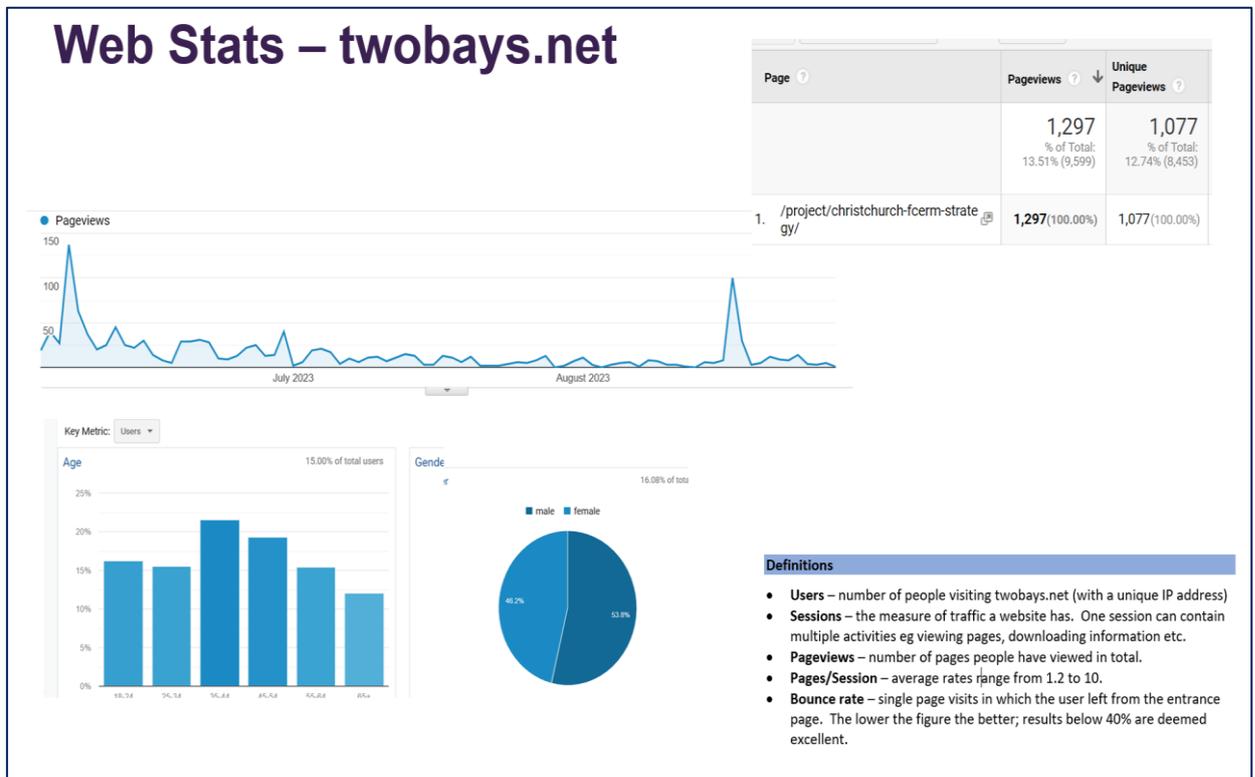
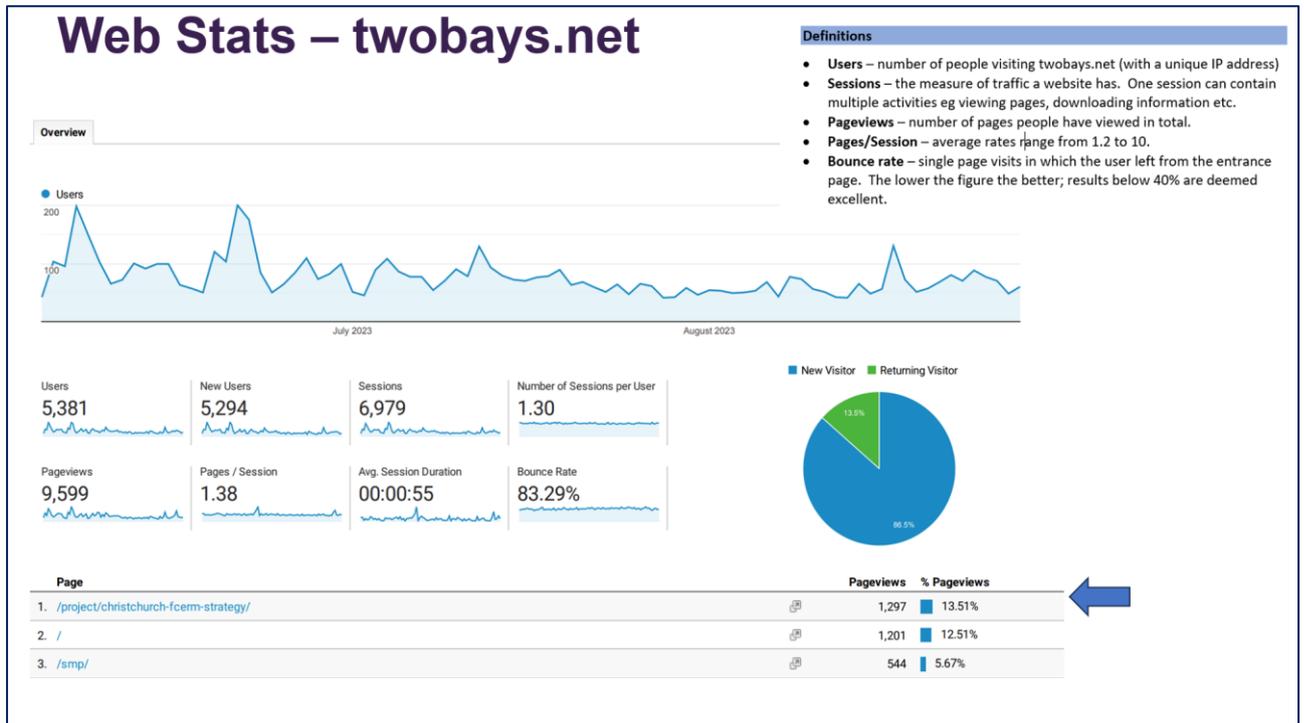
## 2.3 QR Code Analytics

Below is a summary of how members of the public interacted with the QR code on posters in libraries and on flyers promoting the consultation. The code could be scanned using a smartphone camera which then linked directly to the main Engagement HQ consultation page. In total, the QR code was scanned 316 times by 294 people:



## 2.4 Two Bays Website Analytics

Below is a breakdown of the web statistics from the [twobays.net](http://twobays.net) website which was used to promote the consultation:

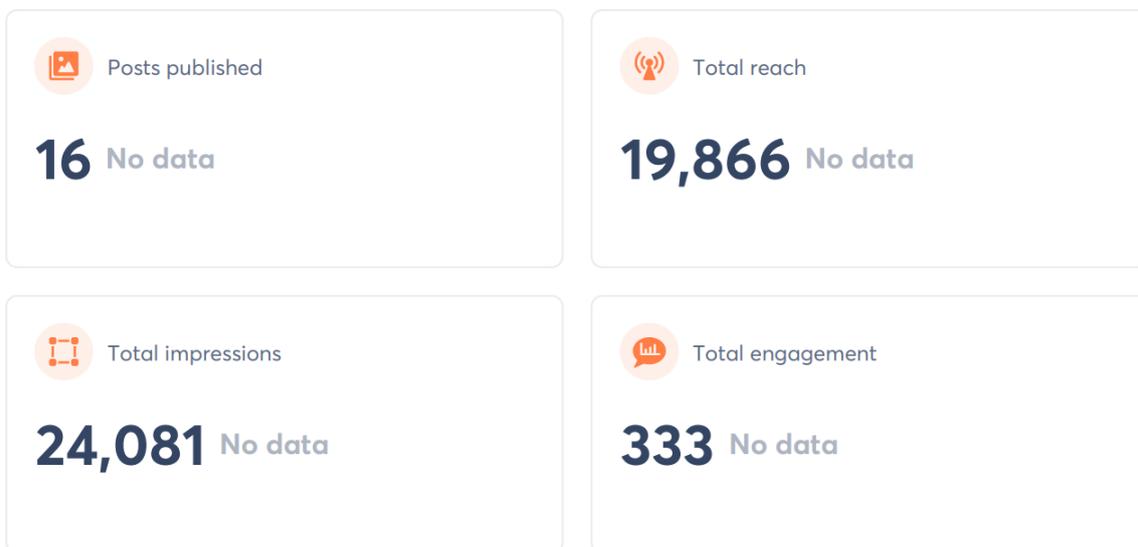


### 3 Communications Report

Below is a breakdown of the communications activity carried out by BCP Council, NFDC and Dorset Coast Forum (DCF) to promote the consultation as widely as possible.

#### 3.1 BCP Council Communications Activity

Almost 20,000 people viewed the content across all the social media posts used to promote the consultation. The posts were displayed 24,081 times while over 300 people engaged with the social media posts.



There was a total of 333 interactions across Facebook, Instagram, LinkedIn and Twitter. Below are the engagement figures for each platform:

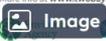
 Facebook	 Instagram	 LinkedIn	 Twitter
Reactions 16	Likes 60	Likes 7	Likes 15
Clicks 81	Saved 3	Clicks 30	Retweets 7
Other clicks 90	Comments 3	Comments 0	
Comments 3		Shares 2	
Shares 15			

Below are the best performing social media posts based on reach<sup>1</sup> and engagement:

**Tell us what you think of our proposals to manage coastal flood and erosion risk over the next 100 years. From Hengistbury Head Long Groyne to Hurst Spit, encompassing Christchurch Harbour.**

Come and see us at Christchurch Library on 19th June from 10am to 5.30pm. We look forward to seeing you!

More info at [www.twobays.net](http://www.twobays.net)

Jun. 15 2023

**Share your views on the proposals to protect our l...**

 Reach	3.3K
 Impressions	4.3K
 Engagement	39



Aug. 18 2023

**Have your say on the proposed options for managing...**

 Reach	3.1K
 Impressions	3.2K
 Engagement	74

**coastal flood and erosion risk over the next 100 years.**  
The strategy area stretches from Hengistbury Head Long Groyne to Hurst Spit, encompassing Christchurch Harbour up to Tuckton Bridge on the River Stour and Knapp Mill on the River Avon.

**The deadline to complete a survey is 27th August 2023.**  
Please visit [www.twobays.net](http://www.twobays.net) to have your say. We look forward to hearing your views!

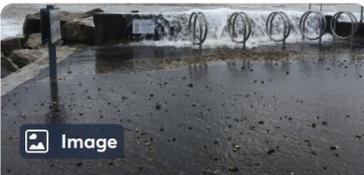
More info at [www.twobays.net](http://www.twobays.net)

Jul. 21 2023

**We will be at the New Forest Show from 25-27 July ...**

 Reach	2.3K
 Impressions	2.5K
 Engagement	18



Aug. 18 2023

**Have your say on the proposed options for managing...**

 Reach	4.6K
 Impressions	4.9K
 Engagement	49

**Tell us what you think of our proposals to manage coastal flood and erosion risk over the next 100 years. From Hengistbury Head Long Groyne to Hurst Spit, encompassing Christchurch Harbour.**

Come and see us at Christchurch Library on 19th June from 10am to 5.30pm. We look forward to seeing you!

More info at [www.twobays.net](http://www.twobays.net)

Jun. 15 2023

**Share your views on the proposals to protect our l...**

 Reach	1.3K
 Impressions	1.4K
 Engagement	6

**coastal flood and erosion risk over the next 100 years.**  
From Hengistbury Head Long Groyne to Hurst Spit and from Hurst Spit to Lyminster.

Come and see us at Milford on Sea Community Centre on 13th June from 10am to 4pm. We look forward to seeing you!

More info at [www.twobays.net](http://www.twobays.net)

Jun. 8 2023

**Share your views on the proposals to protect our l...**

 Reach	1.3K
 Impressions	1.4K
 Engagement	11

Below are the best performing social media posts based on impressions<sup>2</sup> and engagement:



Aug. 18 2023

**Have your say on the proposed options for managing...**

 Impressions	1.1K
 Engagement	27

**coastal flood and erosion risk over the next 100 years.**  
The strategy area stretches from Hengistbury Head Long Groyne to Hurst Spit, encompassing Christchurch Harbour up to Tuckton Bridge on the River Stour and Knapp Mill on the River Avon.

**The deadline to complete a survey is 27th August 2023.**  
Please visit [www.twobays.net](http://www.twobays.net) to have your say. We look forward to hearing your views!

More info at [www.twobays.net](http://www.twobays.net)

Jul. 21 2023

**We will be at the New Forest Show from 25-27 July ...**

 Impressions	616
 Engagement	11

**coastal flood and erosion risk over the next 100 years.**  
From Hengistbury Head Long Groyne to Hurst Spit, encompassing Christchurch Harbour.

Book your free ticket to join our online presentation and Q&A on 27 June 2023, from 7:00pm - 8:15pm. We look forward to seeing you!

More info at [www.twobays.net](http://www.twobays.net)

Jun. 22 2023

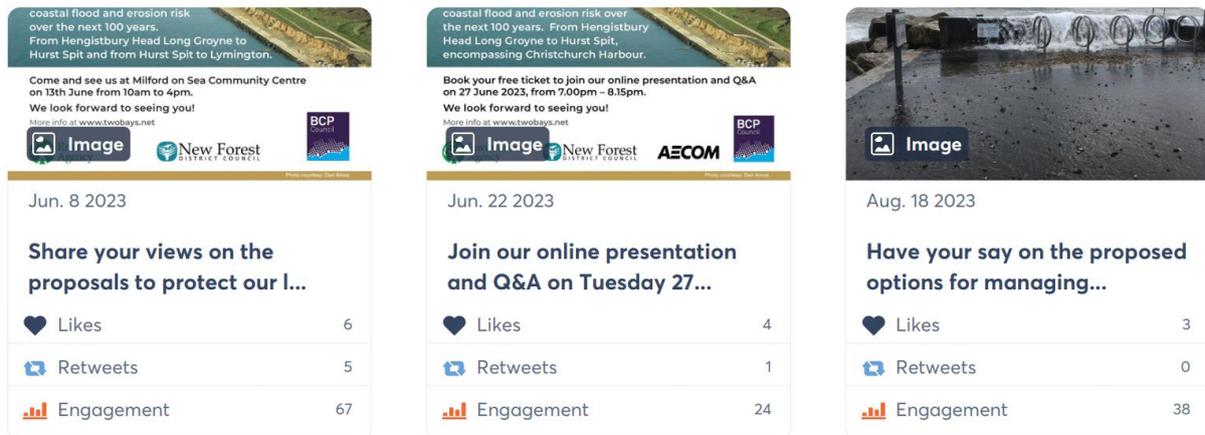
**Join our online presentation and Q&A on Tuesday 27...**

 Impressions	230
 Engagement	1

<sup>1</sup> The total number of people who see the post.

<sup>2</sup> The number of times your content is displayed, no matter if it was clicked or not.

Below are the best performing social media posts based on likes and engagement:



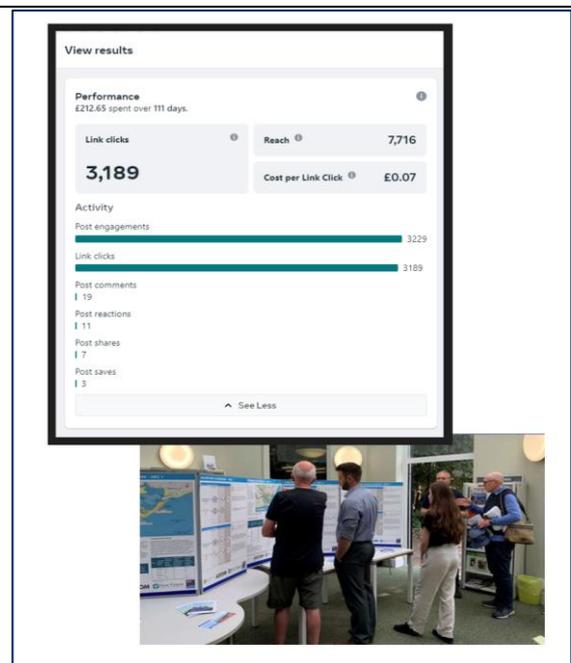
### 3.2 BCP Facebook Campaign

Utilising paid for advertising within the strategy area...

- Targeted local reach = +7,700 people
- Number of people clicking to content = +3,100 people

Although Climate Change and its impacts can be a contentious issue (favoured by Facebook algorithms), our content and engagement approach did not trigger a negative reaction.

The complexity of specific issues and risks in each ODU may explain the high attendance at the face-to-face events.



### 3.3 DCF Communications Activity

Below is a summary of Dorset Coast Forum’s communications during the consultation period:

#### Newsletter/website

- Included in DCF eNews July 2023 sent to DCF mailing list (485 members) - [DCF eNews July 2023](#).
- Shared on [DCF events page](#) promoting drop-in events, online event, and online survey.

## Social media posts

Date shared	Platform	Detail	Reach	Comments	Likes	Shares
24 Aug	Facebook	DCF post to promote survey before closes	62	0	0	0
17 Aug	Facebook	Shared BCP post from 21 July with DCF quote	89	0	0	0
26 June	Facebook	Shared BCP post from 22 June with DCF quote	64	0	1	0
26 June	Twitter	Retweeted BCP post from 22 June	97	0	0	0
22 June	Facebook	Shared BCP post from 22 June with DCF quote	1001	0	5	3
19 June	Twitter	DCF post to promote public event	54	0	0	0
16 June	Twitter	Retweeted BCP post from 8 June with quote	80	0	0	0
13 June	Twitter	Retweeted BCP post from 15 June	64	0	0	0
8 June	Facebook	Shared BCP post from 8 Jun with DCF quote	49	0	1	0

## Councillor Briefing, 12th June 2023, 6:00pm–7:30pm, Online Teams

### Host:

Sara Parker, Project Officer, Dorset Coast Forum

### Presenters:

- Alan Frampton, Strategy, Policy & Environment Manager, BCP Council
- Ben Taylor, Project Manager, AECOM
- Peter Ferguson, Coastal Projects Engineer, New Forest District Council.

### Panel:

- Matt Hosey, Head of FCERM, BCP Council
- Steve Cook, Service Manager Coastal, New Forest District Council
- Catherine Corbin, Stakeholder Engagement & Comms Lead, BCP Council.

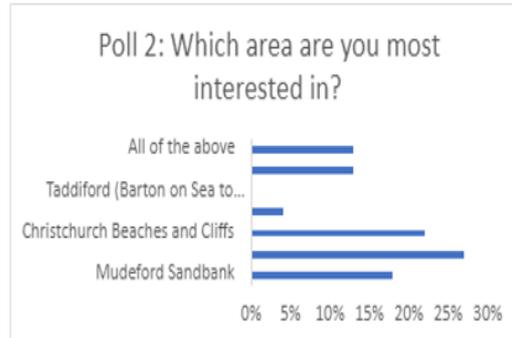
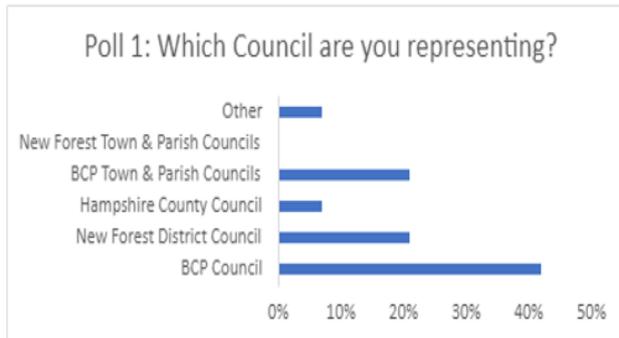
**Recording of meeting:** [Christchurch Bay & Harbour Strategy Engagement Phase 5 Councillors Briefing 12 June 2023 – YouTube.](#)

Number of Views (as at 10-Jul-23): 22 views

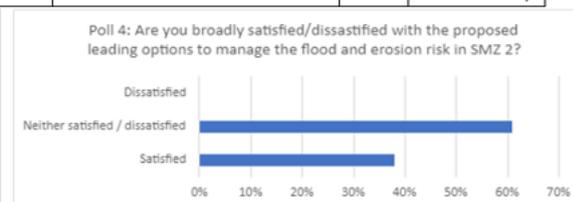
**Number of attendees:**

Number registered via Eventbrite	22
Participants attended	27
Project team attended	9
<b>Total attended</b>	<b>36</b>

**Quick Poll Results**



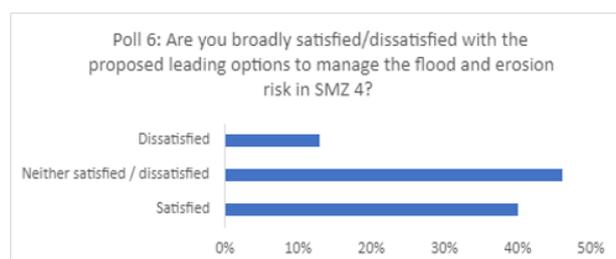
Poll 1. Which Council are you representing?	%	No. of responses	Poll 2. Which area are you most interested in? (multiple choice)	%	No. of responses
BCP Council	42%	6	Mudeford Sandbank	18%	4
New Forest District Council	21%	3	Christchurch Harbour	27%	6
Hampshire County Council	7%	1	Christchurch Beaches and Cliffs	22%	5
BCP Town & Parish Councils	21%	3	Naish Cliff and Barton on Sea	4%	1
New Forest Town & Parish Councils	0%	0	Taddiford (Barton on Sea to Hordle Cliff)	0%	0
Other	7%	1	Milford on Sea	13%	3
			All of the above	13%	3
		14			22 (14 individuals)



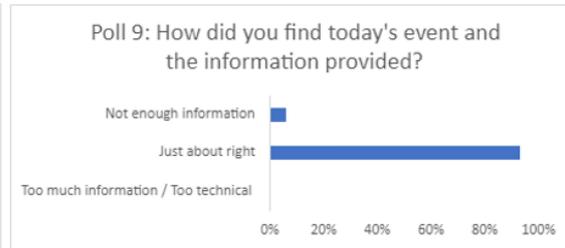
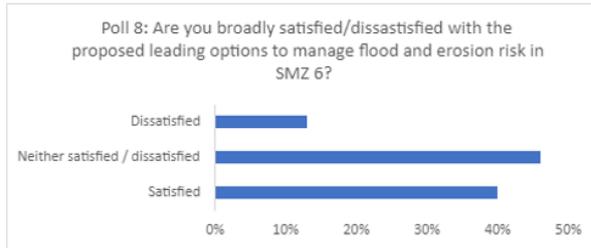
Poll 3. Are you broadly satisfied / dissatisfied with the proposed leading options to manage the flood and erosion risk in SMZ 1?	%	No. of responses	Poll 5. Are you broadly satisfied / dissatisfied with the proposed leading options to manage the flood and erosion risk in SMZ 3?	%	No. of responses
Satisfied	46%	6	Satisfied	30%	4
Neither satisfied / dissatisfied	53%	7	Neither satisfied / dissatisfied	69%	9
Dissatisfied	0%	0	Dissatisfied	0%	0
		13			13



Poll 3. Are you broadly satisfied / dissatisfied with the proposed leading options to manage the flood and erosion risk in SMZ 1?	%	No. of responses	Poll 5. Are you broadly satisfied / dissatisfied with the proposed leading options to manage the flood and erosion risk in SMZ 3?	%	No. of responses
Satisfied	46%	6	Satisfied	30%	4
Neither satisfied / dissatisfied	53%	7	Neither satisfied / dissatisfied	69%	9
Dissatisfied	0%	0	Dissatisfied	0%	0
		13			13



Poll 6. Are you broadly satisfied / dissatisfied with the proposed leading options to manage the flood and erosion risk in SMZ 4?	%	No. of responses	Poll 7. Are you broadly satisfied / dissatisfied with the proposed leading options to manage the flood and erosion risk in SMZ 5?	%	No. of responses
Satisfied	40%	6	Satisfied	46%	6
Neither satisfied / dissatisfied	46%	7	Neither satisfied / dissatisfied	46%	6
Dissatisfied	13%	2	Dissatisfied	7%	1
		15			13



Poll 8. Are you broadly satisfied / dissatisfied with the proposed leading options to manage the flood and erosion risk in SMZ 6?	%	No. of responses	Poll 9. How did you find today's event and the information presented?	%	No. of responses
Satisfied	40%	6	Too much information / Too technical	0%	0
Neither satisfied / dissatisfied	46%	7	Just about right	93%	14
Dissatisfied	13%	2	Not enough information	6%	1
		15			15

**[CB-P9]**

## Councillor Briefing, Q&A Transcript

**[CB-Q1] Q1: The difficulty with these historic landfill sites is that there is no money from government to protect them, and the figures look costly so, we will need to find out the time frame and how can we lobby central government to fund it?**

A1: It is certainly an issue that is gaining more awareness and prominence on a nationwide basis. For the Strategy we will be developing some funding profiles for these options so there is clear visibility of when money will be needed for these options to help and take a partnership funding approach.

**[CB-Q2] Q2: How confident are you that the projected sea level rise is realistic, and is there any sign of increase in the rate of sea level rise in recent years?**

A2: We are basing our estimates off National guidance developed by the Environment Agency in DEFRA using the latest research available. It is based on the UK CP-18 projections, so it is the industry leading data that we are using. With any of these projections there is uncertainty, and they provide a range of sea level rise projections based on confidence intervals. The guidance that we have followed is based on the 70th percentile so that means there is 70 percent confidence that it would not be exceeded. We have sensitivity tested all the options with a sea level rise value much higher and it leads us to the same conclusions in terms of the strategic option selection, particularly around the harbour. The challenge would mean we have to do that work sooner and faster and the costs would need to be found earlier. From a strategic point of view, we have the flexibility to deal with that

for the next 100 years. (The question mark is what the risk is longer term beyond but that is not what we are guided to appraise during this project).

Generally, there is new information coming out all the time and direction of travel of sea level rise might happen higher and faster, but the sensitivity test led us to the same strategic options in the main. The challenge will be that it could mean that we have to do all that work sooner and faster and the costs would need to be found earlier and the funding profile would have to be condensed. From a strategic point of view, we have the flexibility to deal with that here for 100 years, but the question mark is, "what is the risk longer term beyond that?"

**[CB-Q3] Q3: At Highcliffe ground water schemes have been very successful over the years, even though the geology may change, intervention on schemes would seem to be something which needs to really be pushed forward, what are your views?**

A3: I completely agree. The geology does change as you move from Highcliffe to the east. Barton on Sea potentially being the most challenging area of geology to manage. The Highcliffe groundwater drainage system that is in place on that cliff has worked successfully in managing groundwater and stabilising that area but as you move to the east of Barton it is more challenging. Our leading option at Barton on Sea does include groundwater management and cliff drainage to manage that risk, but it is accepted that it is more challenging and more costly to do it hence the high cost along the Barton frontage.

The drainage is older at Barton than at Highcliffe, so it has been installed for a longer period and has failed in some areas although it has been there for 50 plus years. There are differences in the geology and there is more instability potentially with those slip surfaces as you move around the bay. Another issue is there is a SSSI through the whole section of cliffs and that does have a bearing on what defences can be installed and particularly the drainage so that there is a balance between what is environmentally acceptable and what is possible. So, it has changed over time and the goal posts and situation are now different.

**[CB-Q4] Q4: As you move round to Barton, that is where the properties start to kick in. So, I am struggling to get my mind around why it has been so successful at Highcliffe, then suddenly we get to Chewton Bunny where nothing was done and we go into an area of instability, but am I oversimplifying it?**

A4: Clearly there is a link of the coastal process side of things by defending the Highcliffe section, that has reduced and had an impact on the sediment movement through there and Naish has particularly been affected as a result, so it is a combination of things, and it is complex as you say. As the council we are looking at a number of measures to try and investigate what type of drainage (at Barton on Sea) could be taken forward. We need the strategy in place properly until we can then further those better, but work is certainly underway already on looking at developing some of the options.

For clarification, some of the timings when some of these schemes were put in place were around funding and funding rules. It is more difficult now to get funding, which is part of the reason why there are different approaches. The Naish section has not got properties on top and has not had the case for a scheme before but with the strategy being finalised, would allow us to lobby where there are funding rules which do not favour areas like Barton on Sea. So, you are right to challenge that, there is a buffer zone on top of the cliff which means that the cost benefit analysis is affected because of the time frame before properties are affected. Why would we leave it until we are eating into the properties before we make a decision on building a scheme, surely this should be done sooner than that? We completely understand the situation and it should allow us to demonstrate to Defra and Environment Agency where the funding rules have a negative impact on certain types of frontages like Barton. Hopefully in the future, we might see funding rules changed to recognise that constraint.

**[CB-Q5] Q5: There is no doubt based on underwater filming that longshore drift is impacting both Beerpan Rocks and Christchurch Ledge. The drift then flows into Christchurch Bay where with increasing sandbars seen at low tide, this potentially could impact areas such as Mudeford Quay due to potentially high swell overtopping?**

A5: Longshore drift is certainly something we see across the two bays, we have got a two bays model of sediment transport which our principal scientist hosts (MIKE 21 model). It has always been a phenomenon of the bay. In a sense of controlling that where we are we have the two scheme areas as well as Poole Bay area and the beach management there. We have the long groyne at Hengistbury Head which gives us some element of control of sediment bypassing Hengistbury Head itself. That is due to be rebuilt next spring, we are doing the design now and have suppliers on board for the construction. The changes of Christchurch Bay and the mouth of Christchurch Harbour have always been a known factor there, there has been recycling of some of the offshore sandbars in the past. The local option that we talked about for that frontage could include recycling in the form of taking material from the sandbars like we have done in the past.

The other part of your question (which you put into chat) was around the risk of breach of Mudeford Spit. We have talked about that at project level and the ability potentially for us in the future to bed in the Mudeford spit part into the broader Poole Bay beach management. We also recognise that a breach of Mudeford Quay could have impact for Hengistbury Head and the Poole Bay area management scheme as well. Until recently there used to be borders (boundaries between) each of the individual authorities, but now at BCP we are not delivering projects with those borders (boundaries), and we are working jointly with neighbouring New Forest as well. Looking at that more holistically, maybe bedding in recycling and beach management on the Mudeford Spit area as part of the Poole Bay area management scheme could be a way of bringing in funding more broadly to allow that to happen.

## Councillor Briefing, Teams Chat

12/06 18:29 (Guest)

Hi, for information, I'm unable to vote on the various polls as my screen is not showing any tick boxes. I have accessed via a different computer and the same issue.

[12/06 18:30] Sara Parker

Okay - I will make sure you are given the poll questions and choices so we can record your answers, thank you.

[12/06 18:39] Sara Parker to Guest

I have emailed you, we will sort your answers to all polls. Sara

[12/06 18:39] Catherine Corbin (Transportation) (Guest)

Coastal landfill sites > Featured on BBC's Panorama on 22 May 2023 - Available on BBC iplayer... Panorama: Landfill, Britain's Toxic Secrets.

[12/06 18:47] (Guest)

Comment really. Firstly, thanks to Sara for sending me the polls etc. My concern with ODU1 and ODU2 - do minimum is that whilst obviously there are few properties in this area, a breach along either of these areas would potentially impact and make flooding in the harbour, particularly if this coincided with a large fluvial flow from the Stour and Avon. We are already seeing underscoring of the Hengistbury Head around the Coastwatch station due to both pluvial and tidal impacts. My concern basically is that a do minimum strategy in ODU1 and ODU 2 may result in potentially catastrophic flooding and later interventions may therefore be too late.

[12/06 18:48] Sara Parker - we will have Q&A time so can raise that but will be noted in the transcription of this meeting.

[12/06 18:49] (Guest)

If the undermining of Coastwatch station is from the sea, this is part of the Poole Bay strategy, the Long Groin is part of defending that.

[12/06 18:53] (Guest)

I totally agree, hence my concern expressed at previous meetings that our strategy needs to be interlinked between the different areas, rather than what comes across as somewhat discrete projects. There is no doubt based on underwater filming that longshore drift in impacting both Beerpan rocks and Christchurch ledge. The drift then flows into Christchurch Bay with increasing sand bars seen at low tide. This potentially them could impact area such as Mudeford Quay due to potentially high swell overtopping.

[12/06 18:55] (Guest)

How confident are you that the projected sea level rise is realistic? Is there any sign of an increase in the rate of sea level rise in recent years? – responded in the Q&A

[12/06 19:02] Catherine Corbin (Transportation) (Guest)

Sediment transport modelling shows that sediment, either deposited naturally through erosion, or placed on the beach, passes Hengistbury Head and into Christchurch Bay, where it continues to travel eastwards before eventually being deposited about 7km offshore at Dolphin Sands. You can read more about sediment transport in Poole and Christchurch Bays here. See map on page 2 [Gallop et al, SCOPAC Final Report Offshore sediment transport pathways in Poole and Christchurch Bays.pdf \(southerncoastalgroup-scopac.org.uk\)](#)

[12/06 19:06] Catherine Corbin (Transportation) (Guest)

Hengistbury Head Long Groyne works 2021/22 - [Poole & Christchurch Bays Flood & Coastal Erosion Risk Management \(twobays.net\)](#)

[12/06 19:09] Catherine Corbin (Transportation) (Guest)

A note about Climate Change. As sea levels continue to rise, it is anticipated there will be an increase in stormy weather too. In January 2021, Dr Matt Wadey, BCP Council's Principal Coastal Scientist delivered the findings of a SCOPAC Storm Analysis Study\* to the Royal Geographical Society. The study helps us to better understand how our region is affected by storms, how their frequency and intensity is changing, and their potential impact on beach loss and asset failures.

\*The SCOPAC Storm Analysis Study technical report is available at [southerncoastalgroup-scopac.org.uk](#)

[12/06 19:11] (Guest)

Could the links to other documents be circulated please?

[12/06 19:11] Sara Parker

Yes, we will.

[12/06 19:12] Sara Parker

We will need to move onto next section but everything in the chat you have raised will be included, sorry about the tech issues.

[12/06 19:14] (Guest)

No problem, I hope my comments explain my concern, but in summary my concern is the potential impact of a breach of Mudeford Spit or collapse of Hengistbury Head impacting suddenly the water levels in the harbour. Whilst it is perhaps ad hoc evidence as someone who spends a lot of time both on and around the harbour, it is noticeable that at low tide (especially with Spring tides (there seems to be more sand showing). At the same time, we are seeing increasing incidents with boats going aground in the channel leading to the run. The concern here being as previously

outlined that a large swell will impact increasingly the Quay etc. Sorry with issues with Apple connection but leave comments here for inclusion. responded in the Q&A

[12/06 19:18] Catherine Corbin (Transportation) (Guest)

Sara, when we get to Q&A might be worth touching on Cllr Luscombe's comment at 18:53. The areas in the strategy need to be interlinked (Alan or Ben may want to comment) and longshore drift (Matt H may want to comment).

[12/06 19:26] Catherine Corbin (Transportation) (Guest) <https://twobays.net/> shows past projects including Beach Recycling on Christchurch Beaches and Beach renourishments in Poole Bay.

[12/06 19:29] (Guest)

Thank you!

## Public Meeting, 27th June 2023, 7:00pm–8:30pm, online via Zoom

### Host:

Sara Parker, Project Officer, Dorset Coast Forum

### Presenters:

- Alan Frampton, Strategy, Policy & Environment Manager, BCP Council
- Ben Taylor, Project Manager, AECOM
- Peter Ferguson, Coastal Projects Engineer, New Forest District Council.

### Panel:

- Matt Hosey, Head of FCERM, BCP Council
- Steve Cook, Service Manager Coastal, New Forest District Council
- Dave Picksley, Senior Coastal Advisor, Environment Agency
- Catherine Corbin, Stakeholder Engagement & Comms Lead, BCP Council.

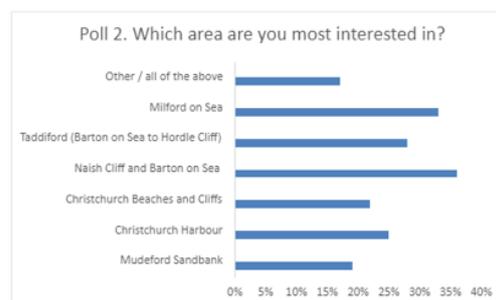
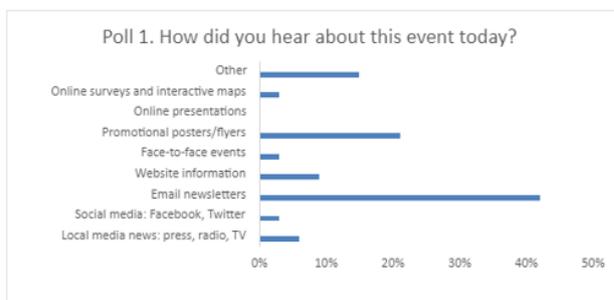
**Recording of meeting:** [Christchurch Bay & Harbour Strategy Phase 5 Public Meeting 27June23 - YouTube](#)

**Number of Views** (as at 10-Jul-23): 33 views

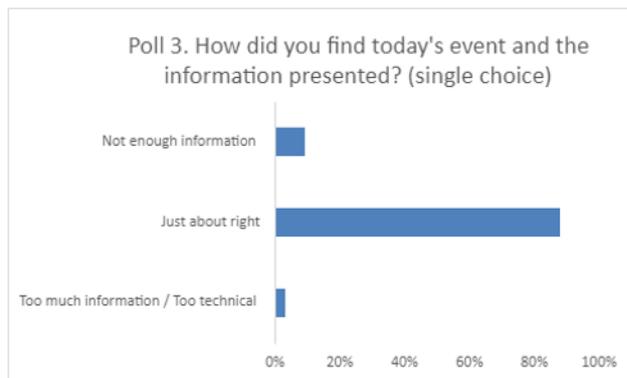
### Number of attendees:

Number registered via Eventbrite	91
Participants attended	53
Project team attended	9
<b>Total attended</b>	<b>44</b>

## Quick Poll Results



Poll 1 – How did you hear about this event?	% of Votes	Poll 2 – Which area are you most interested in?	% of Votes
Local media news: press, radio, TV	6%	Mudford Sandbank	19%
Social media: Facebook, Twitter	3%	Christchurch Harbour	25%
Email newsletters	42%	Christchurch Beaches and Cliffs	22%
Website information	9%	Naish Cliff and Barton on Sea	36%
Face-to-face events	3%	Taddiford (Barton on Sea to Hordle Cliff)	28%
Promotional posters/flyers	21%	Milford on Sea	33%
Online presentations	0%	Other / all of the above	17%
Online surveys and interactive maps	3%		
Other	15%		



Poll 3. How did you find today's event and the information presented	% of Votes
Too much information / Too technical	3%
Just about right	88%
Not enough information	9%

**[PM-P3]**

## Public Meeting Q&A Transcript

**[PM-Q1] Q1: Which of the six is the most vulnerable zone?**

A1: It depends how you view vulnerable. When we go through the slides in a moment you will see the numbers of properties and things at risk in each zone so that might become evident as we go through.

**[PM-Q2] Q2: Will that have an effect on which zones and which order that you do them in?**

A2: In terms of schemes and prioritisation, once we have gone through this consultation phase, we'll take on board feedback, we will maybe make adjustments depending on the feedback we get. Once we have got a final preferred option for each area we will pull together a prioritised forward plan and we will come back once

everything is approved to share what the next steps are and what that is looking like but it will depend on a number of factors in terms of whether the funding is available, what the condition of the defences etc, as well as when is the risk of rising. Those things will probably become more evident as Ben talks through the options but happy to come back to that question at the end.

**[PM-Q3] Q3: I know we will come on to funding but I am wondering whether any additional funding resourcing might be possible, like some sort of crowdfunding locally? Can the funding that is available be supplemented by fundraising?**

A3: That has certainly been done in other areas, so it is certainly something to explore, probably once the strategy is adopted and you start looking at developing schemes in local areas you start drilling into that more. I know other places have tried that with limited success but certainly every option is open from that point of view as long as it is legal.

A little further clarification for when we go through, so what we are setting out within this is the funding that is available from the flood defence grant in aid, using the FCERM AG?? rules. We will certainly look at other forms of funding other than public crowdfunding as well. There are other areas of funding, like local levy, like CIL and other pots that we would look at. The strategy is all about building up the foundation to know where we sit, know how much we can get from central government so that we can plan our way forward once we have got that known from the strategy.

**[PM-Q4a] Q4a: In the analysis of the Mudeford sandbank, whilst there are no properties there, if that sandbank is eroded and breached then other properties in the harbour are at risk, once that happens the cost of replacing the sandbank would be quite high. Has that been factored into the assessment?**

A4a: Yes, as part of developing our baseline understanding we modelled in a hydraulic model, a breach of the sandbank approximately 100 meters wide just to understand what impact that would have on the wave activity in the harbour. What we found with even a breach that wide, the waves would not increase significantly in the areas where you have got properties at risk, it was all in the order of 10 – 20 centimetres maximum. The full-scale loss of the sandbank is another issue given that there is some sediment movement around the long groyne to replenish the sandbank at the moment naturally. Our feeling is that overtime it would almost self-repair and it would not necessarily be a permanent loss.

**[PM-Q4b] Q4b: Historically there have been breaches of that sandbank and the concrete wall that was installed but there has been obviously work done to reinforce and strengthen that sandbank and protect it from those sort of breaches?**

A4b: The basis for the scheme was that what we have there was installed in the 2000s, so the idea with the local option is to maintain that scheme that is there now

to reduce that risk from happening. The other question we have is, if we did stop managing that and the breaches were to develop is, the wider implications for the sudden increase of sediment released into and hydrodynamics for the wider area as well so it is quite a lot of uncertainty if we did that. Models can tell you so much but there is a still inherent uncertainty in that and the principle we have had with the long groyne is that it is too uncertain to do anything other than replace it like for like. So, if that principle holds on the adjacent bit of coast as well you would say managing the spit at the sandbank in its current form is the least risky option.

**[PM-Q4c] Q4c: I wonder why it did not quite pass the national hurdle, is it just because there is no immediate housing? Even though housing could be at risk?**

A4c: Yes, it is going to sound blunt but beach huts in the National guidance are not worth anything, and I know that is controversial given how much those beach huts transact for, but we are not allowed to count that in the economics; they are temporary structures. We can only count permanent buildings which is the six that we have counted. *(After meeting note > beach hut income is considered in non-FCERM GiA compliant wider benefits).*

**[PM-Q4d] Q4d: I was more interested in in the knock-on effect on the harbour side and all the properties on that side?**

A4d: The modelling we have done indicates it is very low additional impact in the harbour, it does not really tick any significant extra properties from doing it.

**[PM-Q4e] Q4e: When you do hydraulic modelling is that with surge conditions from the sea or is that just with static pressure?**

A4e: We have modelled an extreme storm event with a breach in place just to see. What we did is a range of return periods, but we certainly look at the 1 in 200-year storm return period, which is a very extreme event and modelled the waves during that return period.

Further answer: Just to reinforce some of the bits that have been mentioned and to go back to the fact that we use this as a foundation for us to understand our next steps. One of the things we have talked about for the spit is recognising how it interacts with the broader environment and Hengistbury Head itself and the long groyne. We may look in the future to try and embed that with the Poole Bay beach management type business case, so we are playing with the national funding rules. We know that the Mundeford spit feature has its dependencies with the long groyne and also with how the harbour side of Double Dykes could be affected. As a team we are looking at other options to find funding to allow us to do those maintenance works if we need them.

Comment to A4c: Building on the previous point about the model not allowing beach huts an economic value because they are temporary structures, but it occurs to me that actually the sandspit is a special case in terms of the extremely high value of them. Therefore, it might be something that the owners of the beach huts might be

prepared to fund a levy, especially if it is over 25-30 years. £15 million is a big number but over 30 years split between everyone it might well be that there is an affordable levy with some top-up funding. It is worth noting that it is something quite quirky and you might be able to fund through alternative things such as a levy.

Further comment to A4c: We certainly recognise that and with this being the foundation it does allow us to have that conversation because it obviously represents quite an income stream to the council. If you were to allow it to breach, then we need to understand those impacts and where contributions may come from because you know there are various methods, we could look at to raise incomes to do the works and that could be one.

Further answer to A4c: As part of the strategy and part of the baseline evidence we have looked at, we have valued the local economic impact of tourism and recreation to the whole strategy frontage, including Mudeford sandbank. Whilst that is not included in the numbers shown on these slides, it can provide the evidence base moving forward to help with those funding discussions just to illustrate how important areas are.

**[PM-Q5] Q5: Is the first planned choice always the national option? I have noticed for all ODU in zone six the local option delivers more for less money, so in that case the local preferred option would save money compared to the national option. Funding could then be used for other zones?**

A5: Generally speaking, the preferred or leading option has to be the national one, because that is the consistent one that we have defined for each section. There is some flexibility between the two, but you may be referring to SMZ 6 rather than ODU 6 because some of the local options are lower cost.

**[PM-Q6] Q6: Is the whole life cost calculated over the 100-year period from 2023 – 2123? And is the estimated government funded amount for the same period, or is it for a shorter time horizon for instance five years?**

A6: For the whole life costing, you are correct; it is based on the full 100-year appraisal period. The amount of central government funding that we are estimating is based on the major capital scheme, that is part of an option. For example, we have an option that involves upgrading the defences in year 20, that major capital scheme in year 20, that is what the funding amount is referring to.

**[PM-Q7] Q7: Is it the choice for Tuckton Bridge on the River Stour as the boundary for Christchurch Harbour and would Iford Bridge not be better?**

A7: The choice of Tuckton Bridge is to align with the existing shoreline management plan and remain consistent across our strategic plans. Further upstream is covered by the Lower Stour strategy, being developed by the Environment Agency at the moment.

**[PM-Q8] Q8: Why are the historic landfill sites so relevant?**

A8: Mainly from an environmental perspective. At the moment there is a huge amount of uncertainty as to what materials are in those historic landfill sites, and if we were just to leave them undefended there is a real risk that some potentially nasty stuff could be released out into the environment. From a water body perspective, we need to be mindful of the water framework directive, and it is not ideal to be potentially leading to the detriment of any bodies of water on the coastline. It is a national issue, and it is gaining more focus, the real challenge we have at the moment is the funding system is not necessarily set up to help defend historical landfill sites. It is all focused on protecting properties so that is often why it is our local aspirational option around Christchurch Harbour to defend the historical landfill sites, whereas the national option; it is not.

Further A8: We are lobbying as a team around funding for landfill sites. The scientists on our team have led on research on that, so it is something that we are actively seeking funding for, but it is not fitting with the government rules at present.

**[PM-Q9] Q9: How far back do these landfill sites go?**

A9: In time they go back over the last century, and some are certainly 19th century.

*(After meeting note > you can read more about the Landfill Study here: [SCOPAC Coastal Landfills Study • The Southern Coastal Group and SCOPAC \(southerncoastalgroup-scopac.org.uk\)](https://southerncoastalgroup-scopac.org.uk)).*

**[PM-Q10] Q10: Can we see a breakdown of the national versus local whole life cost, and available government funding broken down across short / mid / long term, as the information document only provides the overall totals?** It will be useful to see the spend versus the shortfall in the short-term period, as for the public it is easier for us to get our heads around shortfall funding for the next 20 years rather than looking over one hundred years.

A10: There is no report currently that has that, but we are preparing an economics report and I will make sure it includes that information.

*(After meeting note > This information is in the process of being prepared and will be provided as part of the final strategy reports and papers submitted to BCP and NFDC for cabinet approvals).*

**[PM-Q11] Q11: It seems a bit crazy delaying intervention for 20 years resulting in the national option being more expensive than the local option?**

A11: There are two parts to this question. I will start with ODU 16; the national option involves delaying the intervention, as you say, between block two, with that we have assumed that a larger strong point in which a nourishment scheme would be needed to help control the rates of erosion from that point forward, because there would be an element of erosion that has happened between now and then which you would not necessarily have with the local approach. That is why the costs are higher for the

national option. Deviating from this a little bit, when we look at it from an Environment Agency perspective, we have to provide our costs in discounted terms, which means that when you look at things in discounted terms, because your national intervention is being delayed into the future it has a higher discount rate applied to it. From an Environment Agency perspective, the local option would remain the least cost but from a cash perspective without any discount. You're right it does seem crazy to delay it and I think that is something we are pushing for, is to do the local aspirational option rather than the national one.

Further A11: Just to expand on that point as well, we have recognised that exact point. This is one of the cases where national funding laws do not seem fair, and having a discounted approach to a cliff zone, where if something goes over the cliff it is gone, it is lost. It is not like a flooding event where houses are recoverable, so I totally agree with the point. We have talked about doing some sensitivity testing once the strategy is finished, so that we can take that message nationally and have that debate with the national funding laws and how they are set, to show that sort of vulnerability. We also spoke about this at the consultation event, when we get LPRG (the large project review group) on site to talk about the strategy it is something that we plan on discussing and seeing if there is any potential in lobbying for rule changes.

*(After meeting note – as part of finalising the Strategy, we are doing some sensitivity testing to show vulnerability alongside national funding laws. We aim to demonstrate this in the final strategy).*

**[PM-Q12] Q12: What are the whole studies estimated minimum and maximum totals of its projected funding needs?**

A12: With the numbers that have been presented today, for BCP it is in the order of £100-140 million and for the New Forest area it is in the order of £90-95 million in cash terms over the next one hundred years. So, you are roughly looking at £200-250 million thereabouts, give or take £10 million.

## **Public Meeting Zoom Chat**

Guest: I cannot hear anything. Is anyone else having issues?

Guest: Working fine here

Catherine Corbin: Please leave and come back in to see if this clears the problem - thanks

Sara Parker: Can you hear now?

Guest: Reacted to "please leave..." with 👍

Sara Parker: If you cannot see how to raise your hand (virtually) during Q&A sessions, the 3 dots titled 'more' on your screen will take you to reactions where you can raise your hand. Thank you

Guest: Thanks -all good now. I have sound

Sara Parker: Reacted to "Thanks -all good n..." with 🙌

Guest: Is the first planned choice always the national option? Asking as noticed for all ODU in Zone 6 the local option delivers more for less money. So, in that case local preferred option would save money compared to the national option, which funding could then be used for other zones.

Sara Parker: Welcome if you have just joined the meeting - please use the chat function to ask any questions or 'raise' your virtual hand during Q&A times, thanks

Guest: The choice of Tuckton Bridge on the River Stour seems a bit random as the boundary for Christchurch Harbour would Iford Bridge not be better as it forms a greater restriction of the watercourse + I think there is a weir there? (Upstream of which tidal effects are minimised). + properties on the south bank of the river would then be taken into consideration between the two bridges.

Dave Picksley: Replying to "The choice of Tuckto..." The choice of Tuckton bridge is to align with the existing Shoreline Management Plan and remain consistent across our strategic plans. Further upstream is covered by the Lower Stour Strategy being developed by the Environment Agency at the moment.

Sara Parker: Reacted to "The choice of Tuck..." with 👍

Catherine Corbin: Hi Everyone. If you want to refer to these slides again, you will be able to see them in the Information Document on the right-hand side of this webpage > <https://haveyoursay.bcpCouncil.gov.uk/christchurchstrategyphase5> Please also complete the survey so we have your views - thank you.

Sara Parker: Reacted to "Hi Everyone. If yo..." with 👍

Guest: Why are the historic landfill sites so relevant?

Sara Parker: Reacted to "Why are the histor..." with 👍

Guest: How far back do these landfill sites go?

Sara Parker: Hi Jan - we will make sure the team see that question and answer, thanks

Dave Picksley: <https://southerncoastalgroup-scopac.org.uk/scopac-research/scopac-storm-analysis-study/> great piece of work locally which highlights some of the extreme events that we have been experiencing in recent times and a look at the impacts of sea level rise and increasing storminess.

Sara Parker: Reacted to "https://southernco..." with 👍

Guest: yes

Guest: Can we see a breakdown somewhere of the National vs Local whole life cost and available Govt funding, broken down across short/mid/long term as the Information Document only provides the overall totals. It would be useful to see the spend vs shortfalls in say the short-term period only as for the public it's easier for us to figure out how to plug shortfall funding for the next 20 years rather than looking out 100 years?

Guest:Replying to "Can we see a breakdo..." Thanks for answering.

Sara Parker: Reacted to "Thanks for answeri..." with 👍

Guest: Apologies, my computer crashed when we got to ODU 16, did my question get answered?

Guest: For SMZ6, seems crazy delaying intervention for 20 years resulting in National being more expensive than Local option?

Guest: On local cheaper than national and what gets done.

Guest: Thank you.

Sara Parker: Reacted to "apologies, my comp..." with 👍

Sara Parker: Reacted to "thank you" with 👍

Guest: When will the final strategy be ready?

Sara Parker: Reacted to "when will the fina..." with 👍

Guest: What are the whole study's estimated min/max totals of its projected funding needs please?

Sara Parker: Reacted to "What are the whole..." with 👍

Sara Parker: Is that enough info for you on timings?

Guest: Yes thank you.

Sara Parker: Reacted to "yes thank you" with 👍

Guest: Thank everyone for info.

Guest: Thank you, I look forward to the next instalment, as a Coastal Engineer myself and Cllr I found it very interesting.

End of chat.

*This report was prepared by the Dorset Coast Forum.*

*The Strategy is being developed by BCP Council in partnership with New Forest District Council, AECOM and the Environment Agency.*

### 3.4 NFDC Communications Activity

Below is a summary of New Forest District Council's communications during the consultation period:

#### Facebook

2023					
Date	Link	Reach	Likes	Shares	Comments
July 2023	<a href="#">Christchurch Bay consultation online... - New Forest District Council   Facebook</a>	1,107	2	4	0
27 June	<a href="#">There's still time to register to... - New Forest District Council   Facebook</a>	934	1	1	0
25 June	<a href="#">New Forest District Council   Facebook</a>	668	1	1	0
23 June	<a href="#">Christchurch Bay consultation online... - New Forest District Council   Facebook</a>	1,107	2	4	1
19 June	<a href="#">ICYMI at Milford on Sea last week,... - New Forest District Council   Facebook</a>	750	1	0	0
9 June	<a href="#">Join us at Milford-on-Sea Community... - New Forest District Council   Facebook</a>	837	2	2	0
5 June	<a href="#">Coastal flood and erosion risk for... - New Forest District Council   Facebook</a>	898	4	2	0
2 January	<a href="#">We are working with Bournemouth,... - New Forest District Council   Facebook</a>	1,439	6	0	2
2022					
2 June	<a href="#">Do you live or work near the coast... - New Forest District Council   Facebook</a>	2,124	6	6	7
2021					

9 August	<a href="#">We're developing a plan with BCP... - New Forest District Council   Facebook</a>	96	9	2	7
8 July	<a href="#">Together with BCP Council, we're... - New Forest District Council   Facebook</a>	7	5	2	0

### Twitter (now called X)

2023					
Date	Link	Reach	Likes	Retweets	Comments
12 July	<a href="https://twitter.com/newforestdc/status/1679140522403803137">https://twitter.com/newforestdc/status/1679140522403803137</a>	285	0	0	0
27 June	<a href="https://twitter.com/newforestdc/status/1673725934468317185">https://twitter.com/newforestdc/status/1673725934468317185</a>	669	0	0	0
23 June	<a href="https://twitter.com/newforestdc/status/1672167613416501249">https://twitter.com/newforestdc/status/1672167613416501249</a>	975	0	2	0
22 June	<a href="https://twitter.com/BCPCouncil/status/1671805723846516736">https://twitter.com/BCPCouncil/status/1671805723846516736</a>	1,844	4	2	0
9 June	<a href="https://twitter.com/newforestdc/status/1667170110883221504">https://twitter.com/newforestdc/status/1667170110883221504</a>	428	1	0	0
5 June	<a href="https://twitter.com/newforestdc/status/1665758487387701271">https://twitter.com/newforestdc/status/1665758487387701271</a>	741	0	1	2

### NextDoor

Date	Link	Reactions	Shares	Comments
5 June 2023	<a href="https://nextdoor.co.uk/p/P7tRzTyY7zjj?utm_source=share&amp;extras=MTc1OTlyMDIzNjY2NDg%3D">https://nextdoor.co.uk/p/P7tRzTyY7zjj?utm_source=share&amp;extras=MTc1OTlyMDIzNjY2NDg%3D</a>	4	0	7
1 December 2022	<a href="https://nextdoor.co.uk/p/RhFr75cngMfp?utm_source=share&amp;extras=MTc1OTlyMDIzNjY2NDg%3D">https://nextdoor.co.uk/p/RhFr75cngMfp?utm_source=share&amp;extras=MTc1OTlyMDIzNjY2NDg%3D</a>	5	0	2

### LinkedIn

Date	Link	Reactions	Reposts	Comments
8 August	<a href="https://www.linkedin.com/feed/update/urn:li:activity:7094606498256838656">https://www.linkedin.com/feed/update/urn:li:activity:7094606498256838656</a>	8	1	0

6 June	<a href="https://www.linkedin.com/feed/update/urn:li:activity:7071524228688138240">https://www.linkedin.com/feed/update/urn:li:activity:7071524228688138240</a>	12	2	0
12 January	<a href="https://www.linkedin.com/feed/update/urn:li:activity:7004043382326972417">https://www.linkedin.com/feed/update/urn:li:activity:7004043382326972417</a>	12	2	0

## NFDC Residents' Email Newsletters

### **22 June 2023: Christchurch Bay and Harbour online consultation event**

Share your views on proposals to manage coastal flood and erosion risk over the next 100 years, from Hengistbury Head Long Groyne to Hurst Spit, encompassing Christchurch Harbour.

Book your free ticket to join an online presentation and question and answer session.

27 June 2023, from 7-8:15 pm. <https://twobays.net/have-your-say-on-draft-christchurch-bay-and-harbour-strategy/>.

### **8 June 2023: Christchurch Bay and Harbour online consultation event**

This article is about the coastal flood and erosion risk for Christchurch Bay and Harbour over the next 100 years and how you can have your say on the options.

Climate change is putting significantly more properties, infrastructure and open spaces at risk from coastal flooding and erosion.

Assessments indicate that, if there is no action, the coastal frontage in the Christchurch Bay and Harbour area will suffer around £1 billion in damages over the next 100 years. This includes erosion risk to around 1,600 properties, and coastal flood risk to over 2,200 homes and non-residential buildings.

A 'Christchurch Bay and Harbour Flood and Coastal Erosion Risk Management Strategy' is being produced by BCP Council and New Forest District Council, in partnership with the Environment Agency and AECOM (technical consultants).

The strategy will allow a bid to government for coast protection funding.

Complete the Christchurch Bay and Harbour survey at <https://haveyoursay.bcpCouncil.gov.uk/christchurchstrategyphase5>.

You can meet the Strategy Team at face-to-face and online events:

- **Tuesday 13 June 2023** – Milford-on-Sea Village Community Centre, 10am to 4pm

- **Monday 19 June 2023** – Christchurch Library, Octagon Space, 10am to 5.30pm
- **Tuesday 27 June 2023** – online event, 7-8:15pm, hosted by Dorset Coast Forum, book your free ticket at <https://www.eventbrite.co.uk/e/christchurch-bay-harbour-strategy-engagement-phase-5-public-event-tickets-642029987977>.

Discover more about the project at <https://twobays.net/project/christchurch-fcerm-strategy/>.

### **Media coverage**

- [One billion pounds required to rectify coastal erosion damage in Christchurch Harbour area if ignored – Dorset Eye](#)
- [Strategy launched to protect Dorset and New Forest coastline | Bournemouth Echo](#)
- [Coastal erosion could cost £1 billion damages over next 100 years if action is not taken now warn councils who are inviting public to have their say on how it should be tackled \(advertiserandtimes.co.uk\)](#)
- [Coastline to suffer £1bn in damages and risk thousands of homes if we ‘do nothing’ \(yahoo.com\).](#)

## 4 Survey analysis and results

A total of 91 people responded to the consultation survey. Please see the [Engagement HQ Analytics](#) section for additional information on the levels of engagement with the project in addition to those who responded.

Figures in this report are presented as a percentage of people who answered the question i.e. excluding 'don't know', 'not applicable' and 'no reply', unless otherwise stated.

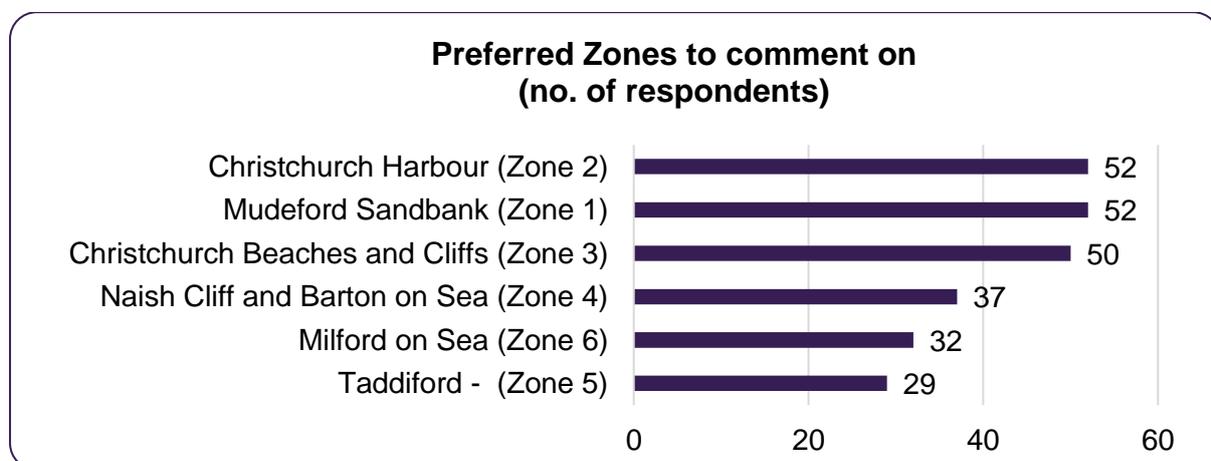
As there are 18 ODUs, responses to most questions are low so counts are reported instead of percentages to avoid misinterpretations of the data. Where there are significant differences between groups of respondents, this has been stated within the report.

Please note that where numbers have been provided for the most prevalent codes to open-ended questions in this report, this is to give an indication of the magnitude of response rather than an indication of significance or salience in relation to the question asked.

The Strategy Team has considered all the feedback received during the consultation period. Responses to the consultation comments have been included in this report and have been allocated a reference number. A summary of consultation responses will be referred to in the final Strategy document and the reference numbers enable easy cross-referencing with this report.

### 4.1 Preferred zones to comment on

Respondents did not have to complete all the sections of the survey; they instead could simply select the zones relevant or of interest to them. Respondents said they wanted to comment on 'Christchurch Harbour (Zone 2)' and 'Mudford Sandbank (Zone 1)' the most (both n=52), followed by 'Christchurch Beaches and Cliffs (Zone 3)' (n=50).



Base: 89 respondents.

## 4.2 Zone 1 – Mudeford Sandbank



Zone 1 stretches from Hengistbury Head, immediately to the east of the Long Groyne, and Mudeford Sandbank including both the open coast and harbour sides.

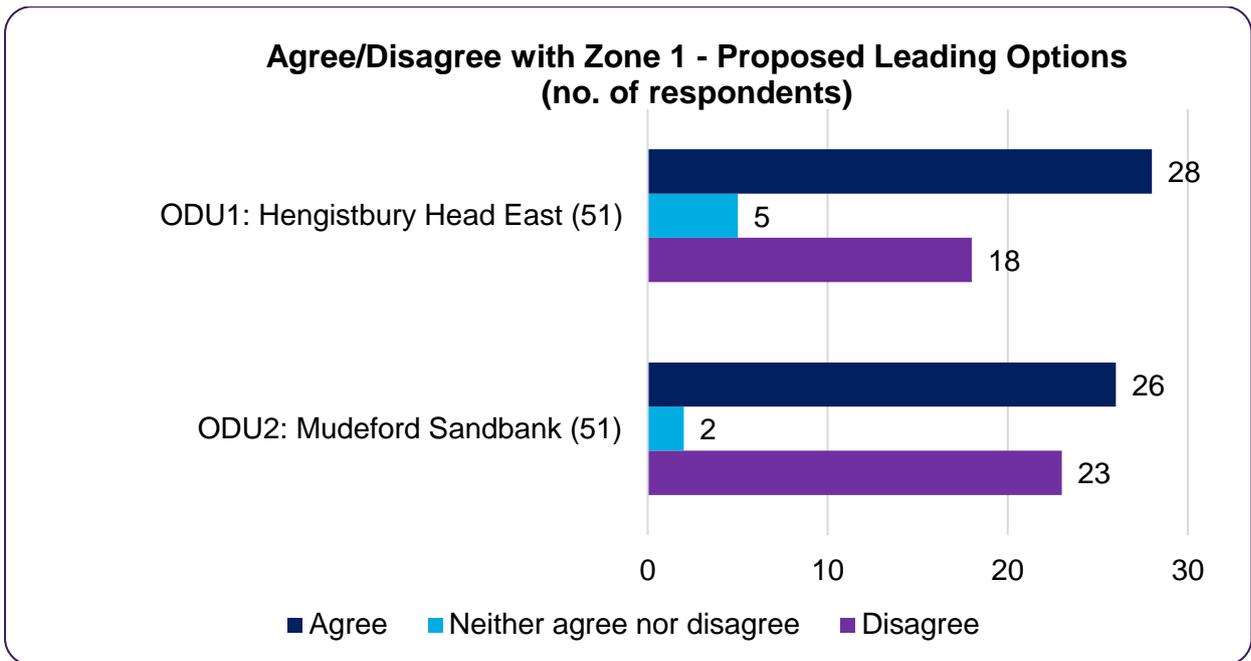
Respondents were asked to read the proposed options in the [information document](#) before responding.

### 4.2.1 Hengistbury Head East (ODU1) and Mudeford Sandbank (ODU2)

**Q1. To what extent do you agree or disagree with the proposed leading options for Hengistbury Head East (ODU1) and Mudeford Sandbank (ODU2)?**

Over half of respondents said they 'strongly agree' or 'agree' with the proposed leading options for Hengistbury Head East (ODU1) (n=28), while over a third 'strongly disagree' or 'disagree' (n=18), and five respondents said they 'neither agree nor disagree'.

Over half of respondents also said they 'strongly agree' or 'agree' with the proposed leading options for Mudeford Sandbank (ODU2) (n=26), while less than half 'strongly disagree' or 'disagree' (n=23), and two respondents said they 'neither agree nor disagree'.



Bases: as labelled.

**Q2. Please tell us if you have any comments on the proposed options for Hengistbury Head East (ODU1) and Mudeford Sandbank (ODU2).**



**10 comments by survey respondents**

These respondents provided additional comments that were mainly ‘suggestions’ (6 comments) for alternative options at Hengistbury Head East (ODU1) and Mudeford Sandbank (ODU2). Other suggestions related to beach huts, funding, urgency of implementing preventative measures and doing more than proposed options:



**[SMZ1 a]** "ODU1: **There is no mention of the beach huts** which provide a large income for BCP through licensing. The money generated could be used in the short-term for defences and coastal strategies in the immediate area and protect the licencing income in the long term."



**[SMZ1 b]** "ODU1: **The harbour needs to be protected by the maintenance of this area.** ODU2: The harbour needs to be protected by the maintenance of this area."



**[SMZ1 c]** "ODU2: Mudeford Sandbank - do a "one-off" beach re-charge, stabilise the material by planting Marram-grass/Sea Lime-grass, section-off areas with no access to the public (to prevent erosion) and leave alone. Tell holiday homeowners what's going to happen and then they're aware of the plans that after that, no more money will be spent on defending this section."



**[SMZ1 d]** “ODU2: I think it's **imperative to take pro-active actions to maintain sea defences** in this Zone to reflect how important the Spit is to the protection of Christchurch Harbour and the numerous properties within. No good waiting for a breach particularly during Autumn/Winter storms.”



**[SMZ1 e]** “Both **Hengistbury and the Mundeford need urgent attention to ensure their maintenance and continued existence** both for wildlife and for the local economy. They are important for tourism and for areas of interest for the local community and need urgent careful attention.”

**[SMZ1 f]** “You need to do more to protect the area.”

Full details of other themes to emerge from these responses and/or a full list of all the comments is available on request from the Research and Consultation Team.



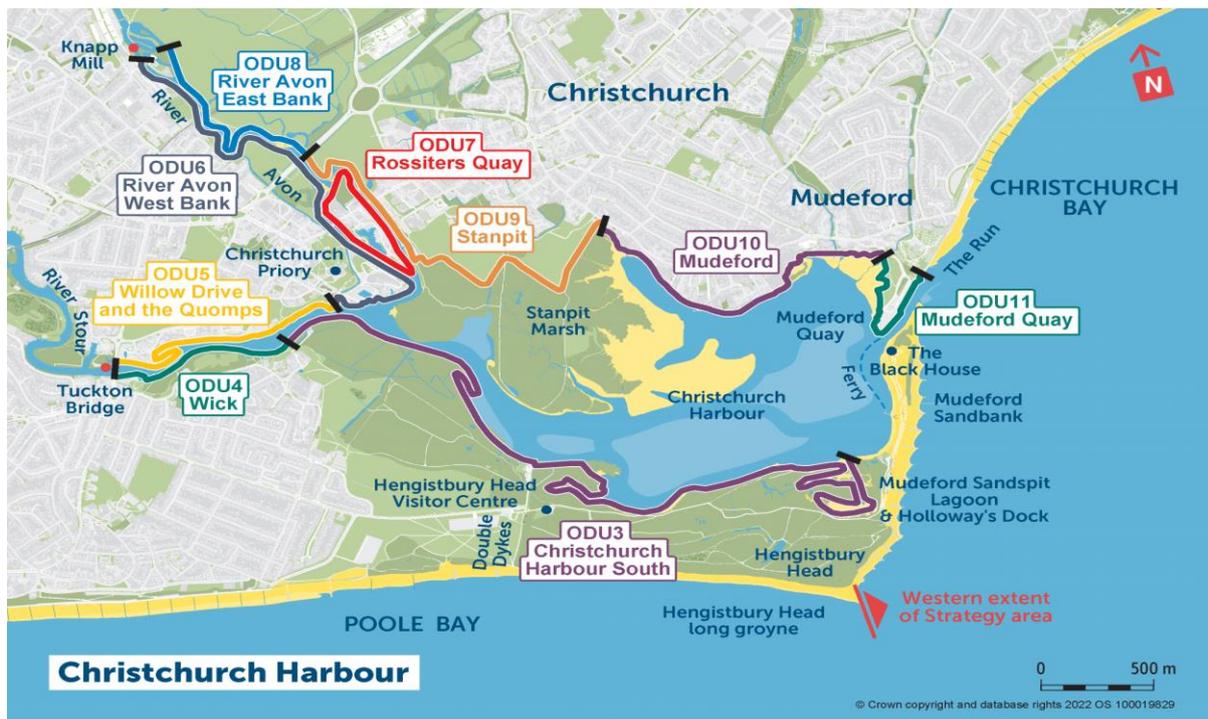
### Strategy Team's response to survey comments

Feedback has been noted and considered during this Strategy development phase.

We acknowledge that beach huts generate an income. However, the government's funding rules that we must adhere to and apply to this Strategy do not allow us to count them in the proposed National Option because they are not permanent dwellings. However, in Hengistbury Head East (ODU1), the beach huts and their ability to generate income was included in the proposed Local Aspirational Option. It is the Strategy Team's preference to deliver the Local Aspirational Option, providing a better outcome for coastal communities, where it is feasible to do so.

Beach huts have been considered in the Local Aspirational Option for maintenance of Mundeford Sandbank (ODU2). The Sandbank is also an important feature for the protection of the wider harbour. In the past, areas of the Sandbank have been topped-up with recycled beach material and sea defences have been repaired on an ad-hoc basis. When adopted, the Strategy will allow a well-defined Beach Management Plan to be developed which considers neighbouring areas. A priority order scheme of delivery will be allocated depending on the level of risk from tidal flooding or erosion.

## 4.3 Zone 2 – Christchurch Harbour



Zone 2 covers the shoreline around Christchurch Harbour up to Tuckton Bridge on the River Stour and Knapp Mill on the River Avon.

Respondents were asked to read the proposed options in the [information document](#) before responding.

### 4.3.1 Christchurch Harbour South (ODU3), Wick (ODU4), Willow Drive and the Quomps (ODU5), River Avon West Bank (ODU6), Rossiters Quay (ODU7), Stanpit (ODU9), Mundeford (ODU10) and Mundeford Quay (ODU11)

Q3&Q5. To what extent do you agree or disagree with the proposed leading options for:

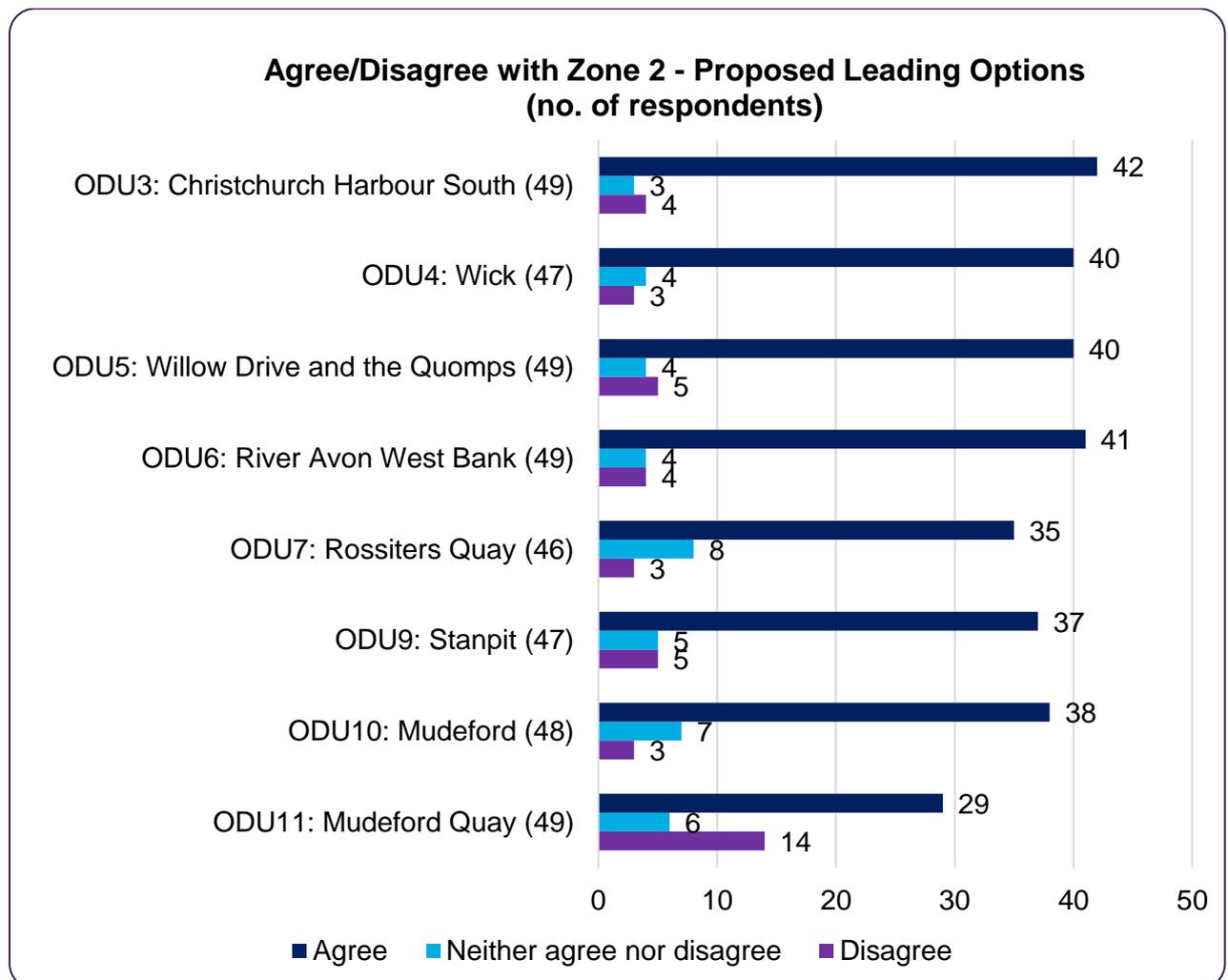
- Christchurch Harbour South (ODU3)
- Wick (ODU4)
- Willow Drive and the Quomps (ODU5)
- River Avon West Bank (ODU6)
- Rossiters Quay (ODU7)
- Stanpit (ODU9)
- Mundeford (ODU10)
- Mundeford Quay (ODU11)

Almost nine-tenths of respondents said they 'strongly agree' or 'agree' with the proposed leading options for Christchurch Harbour South (ODU3) (n=42), while four respondents said they 'strongly disagree' or 'disagree', and three respondents said they 'neither agree nor disagree'.

Two-fifths of respondents said they 'strongly agree' or 'agree' with the proposed leading options for Wick (ODU4) (n=40), Willow Drive and the Quomps (ODU5) (n=40) and River Avon West Bank (ODU6) (n=41). The highest level of disagreement for these ODUs was for Willow Drive and the Quomps (ODU5) (n=5).

Less than two-fifths of respondents said they 'strongly agree' or 'agree' with the proposed leading options for Rossiters Quay (ODU7) (n=35), Stanpit (ODU9) (n=37) and Mundeford (ODU10) (n=38). The highest level of disagreement for these ODUs was for Stanpit (ODU9) (n=5).

Respondents said they 'strongly agree' or 'agree' the least (n=29) and 'strongly disagree' or 'disagree' the most (n=14) with the proposed leading options for Mundeford Quay (ODU11).



Bases: as labelled.

**Q4&Q6. Please tell us if you have any comments on the proposed options for:**

- Christchurch Harbour South (ODU3)
- Wick (ODU4)
- Willow Drive and the Quomps (ODU5)
- River Avon West Bank (ODU6)
- Rossiters Quay (ODU7)
- Stanpit (ODU9)
- Mundeford (ODU10)
- Mundeford Quay (ODU11).



20 comments

These respondents provided additional comments that were primarily 'suggestions' (14 comments). These comments have been coded into sub-themes to make them easier to interpret. The main sub-codes to emerge are 'Saltmarsh' (6 comments), 'Flooding' (5 comments), 'Dredging' (3 comments), 'Embankment' (2 comments) and 'Funding' (2 comments):

### **Saltmarsh (6 comments)**



**[SMZ2 a]** “ODU3 - **more should be done to prevent the erosion of the marsh**, dredging the harbour to ensure better flow of water out to sea.”



**[SMZ2 b]** “ODU3 - landfill seepage monitoring would seem sensible, from both Wick and Stanpit recreation ground. **Important to work up feasibility and practicality saltmarsh** (and 'above mhw' in-harbour shingle banks) for both flood defence and ecological reasons asap. Dredging of main channel is not mentioned but **this could generate material for building up land/saltmarsh creation**, as it has in the past. You could also explore the idea of in harbour seagrass bed restoration (a habitat that has been lost locally in the last c50 years) See:<https://catchmentbasedapproach.org/learn/seagrass-restoration-handbook/>.”



**[SMZ2 c]** “ODU3 - Whilst it is important to protect the road and the former landfill site from coastal erosion, it will be important to let natural processes take their course elsewhere to ensure that coastal habitats for birds and other wildlife are maintained. **The need to protect and restore habitats such as saltmarsh is very important and should form an integral part of any approach to dealing with coastal flooding.**”



**[SMZ2 d]** “ODU 10 Giving individual property owners advice and grants to upgrade their own flood defences should be considered. Each



property has a different level of flood risk, height above sea level existing walls and banks etc. **The regeneration of the saltmarsh and the reinstatement of Grimbury bank by dredging will cut the risk of waves in the harbour over topping flood defences.**

**[SMZ2 e]** “ODU9 - **Need to make additions to sandpit marshes** which is currently sinking and disappearing this loss of land mass warrants more efforts than the current proposal.”



**[SMZ2 f]** “Protection of the various in-fill sites especially at Stanpit [is] essential. **Loss of the Saltmarsh is happening before our eyes** in this supposedly protected area! This is as much to do with water pollution creating an excess of phosphate and nitrates. **This is an urgent issue requiring action NOW.**”



### Strategy Team’s response to survey comments

Comments have been noted and considered during this Strategy development phase.

The dredging of Christchurch Harbour South (ODU3) is not necessary for managing the tidal flood risk that the Strategy is considering, instead it is more of a navigation issue. However, saltmarsh regeneration has been proposed where appropriate in the Local Aspirational Option and a future project to address this in combination with the navigation issue could be considered by others. With newly introduced legislation to increase Biodiversity Net Gain (BNG), it is likely that saltmarsh regeneration will more frequently be considered but water quality and funding for it will be challenging. The Strategy’s proposed options to deliver appropriate flood defences around Christchurch Harbour provide opportunities for the Council to work in collaboration with other organisations to improve the local habitat and navigation at the same time.

Currently, there is no national provision in the funding rules for protecting old landfill sites, so funding is not available for this. BCP’s FCERM Team along with others around the country are lobbying for a rule change. The proposals in the Local Aspirational Option for Stanpit Marsh (ODU9) would continue to protect the former landfill site from erosion and would provide certainty of the defence line. As with other harbour areas, the provision of new defences provide opportunities for multiple benefit collaborations including flood protection, habitat creation and water quality improvements. To give saltmarsh a chance to survive and thrive, a reduction in the levels of nutrients within the Harbour, from the two rivers would be vital.

On the inner harbour at Mudeford (ODU10) the proposed measures would benefit from regeneration of the saltmarsh but the Strategy is primarily focussed on ensuring that the hard flood defences are at the correct height to provide the required

standard of flood protection to protect homes and businesses. Wave action in the harbour is relatively minor but further reductions would be most effectively addressed by works to Mudeford sandbank, rather than smaller banks within the harbour.

### Flooding (5 comments)

Below is a selection of these comments:



**[SMZ2 g]** “ODU10 - Giving individual property owners advice and grants to upgrade their own flood defences should be considered. **Each property has a different level of flood risk, height above [sea] level existing walls and banks etc.** The regeneration of the salt marsh and the reinstatement of Grimbury Bank by dredging will cut the risk of waves in the harbour over topping flood defences.”



**[SMZ2 h]** “These areas all need attention to ensure their maintenance and to stop any damage to property due to flooding etc in extreme weather conditions. **If flooding is not prevented it will cost more money to ensure future damage is repaired.** More money needs to be spent on prevention to stop excessive costs in reparations.”



**[SMZ2 i]** “The information document **doesn't mention the sea level rise assumptions that the proposals are based on.** It should be noted here that the currently available scientific evidence suggests that **generally accepted projections are an extreme underestimate of the likely sea level rise to be encountered by the end of the century,** in view of exponentially increasing melting of the polar ice caps and glaciers around the world. Under the circumstances it may make more sense to abandon the most vulnerable areas and to focus resources instead on those that are easier to save.”



### Strategy Team's response to survey comments

Comments have been noted and considered during this Strategy development phase.

Providing individual flooding advice to property owners will be included as a Strategy action. BCP Council plans to engage with residents to support them in considering flood mitigation measures because it is only properties with a very high risk of flooding who qualify for nationally funded Property Level Resilience grants.

Sea level rise projections were provided in previous baseline coastal reports shared in [Phase 2](#) of the engagement. It will also be included as supporting evidence for the final strategy.

Identifying funding for flood defence works is only eligible where it is considered to be a national loss. Additionally, the on-going maintenance of old and new defences is not funded by the government and instead relies on funding from Council revenue budgets.

### Dredging (3 comments)



**[SMZ2 j]** “ODU3 - more should be done to prevent the erosion of the marsh, **dredging the harbour to ensure better flow of water out to sea.**”



**[SMZ2 k]** “ODU3 - landfill seepage monitoring would seem sensible, from both Wick and Stanpit recreation ground. Important to work up feasibility and practicality saltmarsh (and 'above mhw' in-harbour shingle banks) for both flood defence and ecological reasons asap. **Dredging of main channel is not mentioned but this could generate material for building up land/saltmarsh creation, as it has in the past.** You could also explore the idea of in harbour seagrass bed restoration (a habitat that has been lost locally in the last c50 years) See:<https://catchmentbasedapproach.org/learn/seagrass-restoration-handbook/>.”



**[SMZ2 l]** “ODU 10 Giving individual property owners advice and grants to upgrade their own flood defences should be considered. Each property has a different level of flood risk, height above [sea] level existing walls and banks etc. The regeneration of the salt marsh and the reinstatement of Grimbury bank **by dredging will cut the risk of waves in the harbour over topping flood defences.**”



### Strategy Team's response to survey comments

Comments have been noted and considered during this Strategy development phase.

Harbour dredging was considered in the FCERM Strategy's long list of options, but it would not prevent flooding on its own. The environmental implications on wildlife would also need to be considered. In the past, council activities around the harbour inlet have only included moving (and re-using) sediment from the intertidal area to top-up the Mudeford Sandbank, never for navigation purposes. Since the formation of BCP Council in April 2019, we have not extracted materials from the Run because it can destabilise it in a way which is not useful for managing coastal erosion or navigation. In 2021, local fishermen, the RNLI and other harbour users welcomed this approach. The material in the ebb-tide deltas has increased providing better erosion protection and larger beaches at Gundimore and Avon Beach.

## Embankment (2 comments)

Below is a selection of these comments:



**[SMZ2 m]** “I believe that it is **essential to lengthen the existing embankment in the Wick 'horse field' in the short term** because the 2014 flood event showed that water enters Wick [Lane] and travels to Wick Green at its eastern end/ golf driving range. The land at Wick green is lower than the embankment outside Wick Farm - so this is the weak point.”



### Strategy Team’s response to survey comments

Comments have been noted and considered during this Strategy development phase.

An embankment would be part of an adaptive approach but the challenge will be securing funding the works.

## Funding (2 comments)

Below is a selection of these comments:



**[SMZ2 n]** “These areas all need attention to ensure their maintenance and to stop any damage to property due to flooding etc in extreme weather conditions. If flooding is not prevented it will cost more money to ensure future damage is repaired. **More money needs to be spent on prevention to stop excessive costs in reparations.**”



**[SMZ2 o]** “The East Side of the river seems to be bending a lot [not] than Hengistbury Head and the west side. **Funding and works should be more evenly spread.**”

Full details of other themes to emerge from these responses and/or a full list of all the comments is available on request from the Research and Consultation Team.



### Strategy Team’s response to survey comments

Comments have been noted and considered during this Strategy development phase.

The Strategy sets out a clear direction of what we plan to achieve over the next 5,10 or 20 years. Council approval is subject to funding with the commitment to then quickly develop a funding strategy to deliver the most appropriate / preferred option for each ODU, be it the National, Local Aspirational or the Back-up option. These

options allow for flexibility according to the available funding at the time of delivery. The Strategy identifies how much they cost and the current funding shortfall but importantly it also makes clear what will happen if we do nothing. The impacts, opportunities and benefits that can be realised across neighbouring zones are also highlighted.

Without a Strategy, these appraisals would need to be repeated each time a flood defence or coastal erosion scheme is developed within the strategy area. This would make delivery slower and much more costly. An adopted Strategy also removes the funding cap that would otherwise be applied for delivering ad-hoc schemes without a Strategy.

**Q7. Coastal flood risk and erosion for ODU8 will be identified as part of the Lower River Avon Project, led by the Environment Agency. If you would like to add comments here, we will share them with the Environment Agency.**

***Note**, comments for River Avon, East bank (ODU8) have been shared with the Environment Agency for inclusion and they will consider this information in any future Lower River Avon Project.*



7 comments

The majority of these respondents made suggestions (6 comments) for ODU8 that focused primarily on the 'environment/wildlife', 'saltmarshes', and 'flooding', followed by suggestions for 'management/implementation', 'erosion', and 'defences'.

Below is a selection of these comments:



**[SMZ2 p]** *“Any work **needs to be completed urgently** to avoid coastal erosion and the expense of floods both in monetary terms but also environmental terms. **Things needs to be completed sensitively to ensure the least impact on all wildlife in the areas.**”*

*“**Better management and husbandry of the rivers is needed. Better control and protection of floodplains, i.e., don't build on them.**”*

**Answer:** River and watercourse owners must let water flow naturally. They are responsible for removing blockages, fallen trees or overhanging branches from the watercourse. Trees and shrubs on the banks should also be cut back if they could reduce the flow or cause flooding to other landowners. Flood risk management authorities will permit dredging and desilting if it clearly demonstrates a reduction in flood risk, is economically viable, and will not harm the environment



**[SMZ2 q]** *“If the habitats used by birds in Christchurch Harbour are going to be affected by coastal squeeze, then **consideration needs to be given to whether wetland habitats further inland could be***



*managed to support bird populations of species such as Black-tailed Godwit. Since most of ODU8 is undeveloped, it is not entirely clear why this area needs to be protected from flooding[?] Perhaps it could play a more positive role in dealing with the effects of coastal squeeze.”*

**Answer:** The options proposed would involve constructing defences on the east bank of the River Avon to reduce the risk of flooding to Christchurch Bypass and the connecting B3347 (Stony Lane). The defences would also defend the properties and sewage treatment works at risk in this unit. The properties at risk are located to the west of the B3347 in the north part of the unit, and to the east of the B3347 in the south part of the unit.



*“Sponge city adaptation – [Sustainable drainage systems] (SUDS) - Saltmarsh - Vegetation / trees / grasses.”*

**[SMZ2 r] “Environmental literacy for all. Bangladesh has a Climate Resilience Fund, where's ours? Trees, SUDS, beavers, rewilding, saltmarsh, sponge cities, rainwater capture, decarbonisation at speed and scale. [removed]. Atmospheric gas chambering to be reduced from 424 ppm CO2 to 280 or at least 350.”**

**Answer:** We agree that environmental improving literacy is essential. As part of this strategy, we have developed A level and GCSE resources in collaboration with Geography Southwest.

Full details of other themes to emerge from these responses and/or a full list of all the comments is available on request from the Research and Consultation Team.



### Strategy Team’s response to survey comments

This ODU is within the Christchurch Bay and Harbour Strategy area but following discussions with the local Environment Agency Flood Risk Team, it was agreed that the options for managing the flood risk in ODU 8 would be developed through their remit. As such, comments for River Avon, East bank (ODU8) have been shared with the Environment Agency for inclusion and consideration in any future Lower River Avon Project, however, responses to the comments provided have been made above.

## 4.4 Zone 3 – Christchurch Beaches and Cliffs



Zone 3 covers the coastal frontage from Gundimore beach to the eastern end of Highcliffe beach.

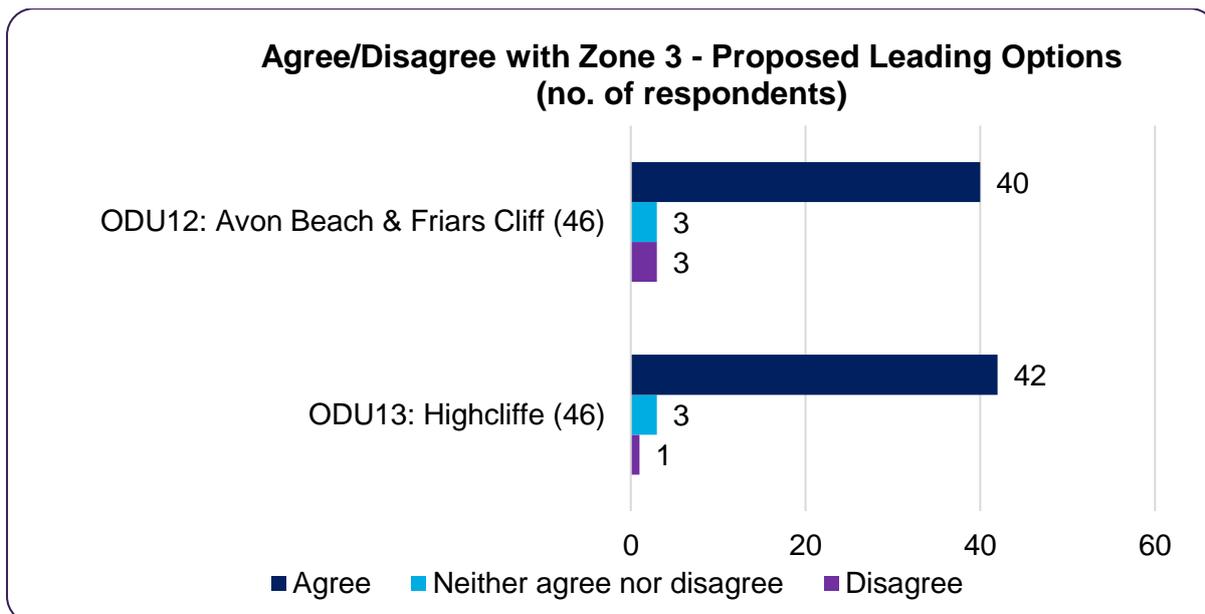
Respondents were asked to read the proposed options in the [information document](#) before responding.

### 4.4.1 Avon Beach & Friars Cliff (ODU12) and Highcliffe (ODU13)

#### Q8. To what extent do you agree or disagree with the proposed leading options for Avon Beach & Friars Cliff (ODU12) and Highcliffe (ODU13)?

Under nine-tenths of respondents said they 'strongly agree' or 'agree' with the proposed leading options for Avon Beach & Friars Cliff (ODU12) (n=40), while three respondents 'strongly disagree' or 'disagree' and three respondents said they 'neither agree nor disagree'.

Over nine-tenths of respondents said they 'strongly agree' or 'agree' with the proposed leading options for Highcliffe (ODU13) (n=42), while one respondent 'strongly disagreed' or 'disagreed' and three respondents said they 'neither agree nor disagree'.



Bases: as labelled.

**Q9. Please tell us if you have any comments on the proposed options for Avon Beach & Friars Cliff (ODU12) and Highcliffe (ODU13).**



7 comments

These respondents made suggestions (3 comments), ‘criticisms’ and ‘queries’ (both 2 comments) about ODU12 and ODU13.

Below is a selection of these comments:

### Suggestions (3 comments)



**[SMZ3 a]** “ODU 12 - **Should have considerable investment in upgrading the sea defences immediately.**”

**[SMZ3 b]** ODU12 - See comments above about **vegetated shingle plant communities**. ODU13 - See comments above about vegetated shingle plant communities. In addition, in this section, dune formation and general sand accretion at the toe of the cliff is creating a natural defence, **which should be encouraged and not flattened**. This has ecological benefits as well.”



**[SMZ3 c]** ODU12 - **Improve sooner! Climate literacy programme - prevention rather than cure!**”



## Strategy Team’s response to survey comments

Comments have been noted and considered during this Strategy development phase.

The Local Aspirational Option for Avon Beach and Friar’s Cliff (ODU12) suggests that we should invest in this area sooner, but we acknowledge that the challenge is the funding shortfall and where we can source that from. We will be able to consider other suggestions as we move forward to develop a scheme for this ODU, once the Strategy is adopted.

### Criticisms (2 comments)



**[SMZ3 d]** *“The only issue is that by dramatically improving ODU12 & ODU13, it will make ODU14 suffer more toe erosion.”*

**[SMZ3 e]** *“ODU12 - Page 13 of the Information Document fails to reassure us. “Requires further assessment” is a shocking and desperate admission. Showing the [removed] disrespect for our wellbeing and [illegible] the natural world from leaders. The Climate Genocide Act Now group requests the arrests of those complicit with the Broadmoor policies leading to extinction events.”*



## Strategy Team’s response to survey comments

Comments have been noted and considered during this Strategy development phase.

As a Strategy Team we are committed to being as open, honest and realistic about what the Strategy can deliver using the current national funding rules.

We have acknowledged the need to address the transition zone between Highcliffe (ODU13) and Naish Cliffs (ODU14). We have proposed to modify / construct outflanking defences which would enable an improved flow of sediment to afford better erosion protection on this stretch of coastline. This is a beneficial bay-wide beach management approach.

### Queries (2 comments)



**[SMZ3 f]** *“The options presented don't provide the necessary detail to be able to ascertain the amenity impact - in particular, **would 'further beach nourishments' be made with the presently-used material (quarried cobbles), or with dredged sand (as used in Poole Bay)?**”*



**Would the proposed 'new groynes' be of the same construction as those already existing, only larger? Or some other construction type?"**

**[SMZ3 g] "ODU 13 - Does the [construction] of outflanking defences at Chewton Bunny have impact on the cliff erosion further East at Naish and Barton?"**



### Strategy Team's response to survey comments

Comments have been noted and considered during this Strategy development phase.

The amenity impacts at Avon Beach & Friars Cliff (ODU12) are acknowledged but these would be considered more fully at scheme-level once the Strategy is adopted. The Strategy's bay-wide beach management approach between Highcliffe (ODU13) and Naish Cliffs & Barton on Sea (ODU14) provides benefits, especially when the transition between ODUs in this area, sediment flow and modifications to defence structures are considered.

## 4.5 Zone 4 – Naish Cliff and Barton on Sea

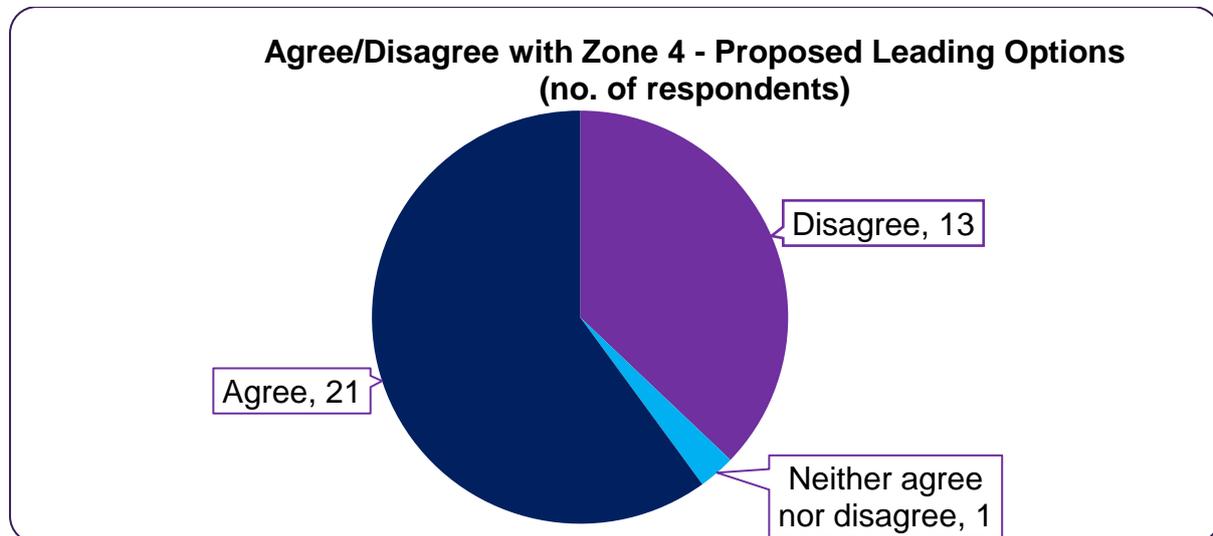


Zone 4 covers the area between Chewton Bunny to the eastern end of the Barton on Sea coastal defences.

Respondents were asked to read the proposed options in the [information document](#) before responding.

**Q10. To what extent do you agree or disagree with the proposed leading options for Naish Cliff and Barton on Sea (ODU14)?**

Over half of respondents said they ‘strongly agree’ or ‘agree’ with the proposed leading options for Naish Cliff and Barton on Sea (ODU14) (n=21), while over a third ‘strongly disagree’ or ‘disagree’ (n=13) and one respondent said they ‘neither agree nor disagree’.



Base: 35 respondents.

**Q11. Please tell us if you have any comments on the proposed options for Naish Cliff and Barton on Sea (ODU14).**



10 comments

Most of these respondents made suggestions (6 comments) about ODU14 which referred to financial considerations, drainage and the management/implementation of defences :



**[SMZ4 a]** *“Urgent action needed now.”*

**[SMZ4 b]** *“It would be good if there was some kind of footpath down in the Cliff House area down to the beach now that Hobourne have closed their land off to non-resident’s.”*



**[SMZ4 c]** *“On no account should anyone interfere any more with the cliff-slope drainage anywhere, and only limited beach nourishment should be considered. Let it go and, rightly, explain that loss will occur (perhaps give an estimate when and by how much) so that property owners have a time scale to work to. The artificial boundary of SMZ4 (ODU14/15) is currently Becton Bunny. **This should be further west to the point where the Barton on Sea cliff-top properties end adjacent to the golf course. All groynes/rock***



**armour below this section (under the Golf Course) should be left alone (ideally removed).** This will allow natural erosion at the toe of the cliff (where little or none exists presently) to provide natural beach material for protection down-drift (ie Milford).”



**[SMZ4 d] “More commitment should be placed on clifftop drainage in order to reduce the seepage and undermining of the cliff, which at Barton, seems to be the cause of most of the erosion and not due to sea erosion. Very little has been spent in the Barton area in comparison to Milford and Dorset - it looks like we have been seriously neglected by the NFC and Hampshire Council.”**



**[SMZ4 e] “Cliff erosion needs to managed carefully to make sure that slows down asap.”**

**[SMZ4 f] “Really important for local residents and local economy to undertake cliff slop[e] drainage/[stabilisation] urgently to slow loss of cliff top as much as possible. What other sources of funding can be used to support this and what fundraising options are there[?] This can’t wait.**

Full details of other themes to emerge from these responses and/or a full list of all the comments is available on request from the Research and Consultation Team.



### Strategy Team’s response to survey comments

Comments have been noted and considered during this Strategy development phase.

We acknowledge that comments are fairly evenly split between ‘Do Something’ and ‘Do Nothing’ at Naish and Barton on Sea (ODU14). These complex cliffs are environmentally designated as a Site of Special Scientific Interest (SSSI) and are notified under Earth Heritage for the geological interest of the cliffs. The policy of managed realignment means that there is the acceptance to allow coastal processes to evolve, whilst managing erosion, where possible. Once the Strategy is adopted, any scheme we deliver would require Natural England agreement (assent) and a careful balance would need to be struck to manage ground water while allowing some controlled erosion. Like the survey comments, it falls somewhere between defending and not defending the coastline.

However, the Strategy highlights that it is not possible to protect everything. New Forest District Council’s Local Plan has policies to prevent new developments in areas of erosion risk (Coastal Change Management Areas). It may be necessary to progress a scheme to plan for how this area might adapt, or transition, in the long term which may mean reducing the erosion rate to minimise future property loss.

Barton has had cliff stabilisation investment in the past. From the 1960-1980s, a drainage scheme was installed along the whole cliff section to manage groundwater and reduce instability, but the 50-year life of these works has since expired. In recent years, New Forest District Council has been investigating the physical condition of these drainage pipes and assessing potential use of new directional drilling technology to intercept water-bearing strata above shears and thus reduce instability alongside environmental restrictions. Currently, the main loss has been the footpath along the undercliff to the west, but stable slopes would be required to reinstate it.

#### 4.6 Zone 5 – Taddiford (Barton on Sea to Hordle Cliff)



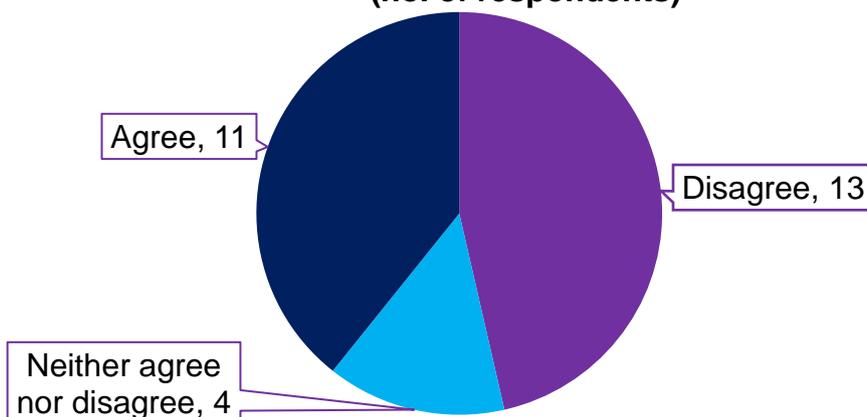
Zone 5 covers the Taddiford area between Barton on Sea and Hordle Cliff. The west boundary of the ODU is at the eastern end of the Barton on Sea defences and the east boundary is at West Road (western end of the Hordle beach huts).

Respondents were asked to read the proposed options in the [information document](#) before responding.

#### **Q12. To what extent do you agree or disagree with the proposed leading options for Barton on Sea to Hordle Cliff (Taddiford) (ODU15)?**

Over a third of respondents said they 'strongly agree' or 'agree' with the proposed leading options for Barton on Sea to Hordle Cliff (ODU15) (n=11), while almost half 'strongly disagree' or 'disagree' (n=13) and four respondents said they 'neither agree nor disagree'.

**Agree/Disagree with Zone 5 - Proposed Leading Options  
(no. of respondents)**



Base: 28 respondents.

**Q13. Please tell us if you have any comments on the proposed options for Barton on Sea to Hordle Cliff (Taddiford) (ODU15).**



10 comments

Half of these respondents made suggestions (5 comments) about ODU14 which referred to financial considerations, drainage and the management/implementation of defences:



**[SMZ5 a]** *“Let nature do its thing if no impact of flooding/erosion on properties. Play up the environmental benefits [of] this perhaps.”*

**[SMZ5 b]** *“Put effort and funding into Barton On Sea in preference to here.”*

**[SMZ5 c]** *“The cliff erosion needs to be managed to make sure that least amount possible is lost.”*

**[SMZ5 d]** *“Safety and access to King Charles III England Coastal Path will need to be available at all times.”*



**[SMZ5 e]** *“New Forest Friends of the Earth (NFFoE) would like to object to the “do-nothing” proposal. As the Information Document states, the cliffs are part of the SSSI. They have some endangered flowers and fauna growing there and also some types of birds such as Sandmartins [who] depend on the cliff face during nesting season, the view of which, benefits not only local ornithologists but members of the public [too]. Allowing this habitat to slowly erode away should not be an option just because there is minimal risk to property. No Local Aspiration Option has been proposed for ODU15. In NFFoE’s view, there should be a Local Aspiration Option of new rock revetment*



*in addition to the potential for beach nourishment mentioned, in order to slow down or even halt the erosion.”*

Full details of other themes to emerge from these responses and/or a full list of all the comments is available on request from the Research and Consultation Team.



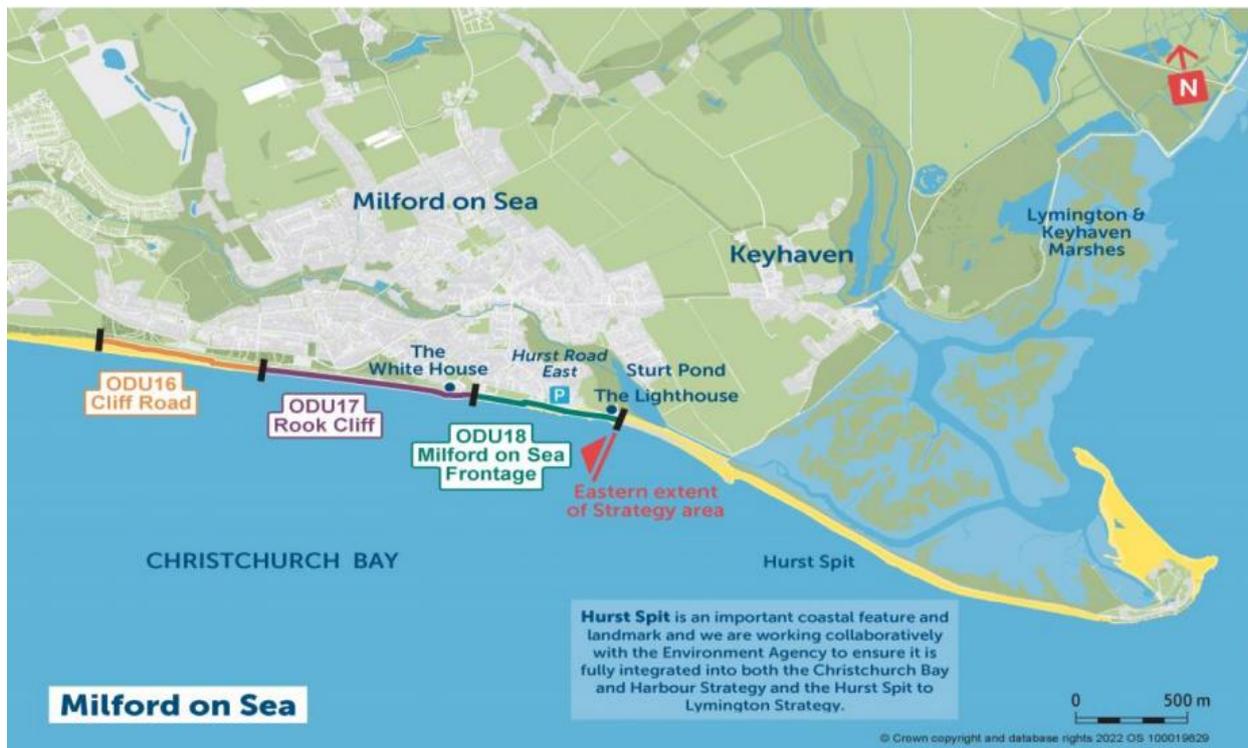
### Strategy Team’s response to survey comments

Comments have been noted and considered during this Strategy development phase.

There is no economic or environmental justification to intervene at Taddiford (ODU15). Cliff loss is expected (and accepted) here so a Local Aspirational Option is not viable. Losses to the coastal path on Barton Golf Course would be rectified by relocating it inland as required. This advice applies along the entirety of the Dorset Coast but also forms part of the golf club’s planning conditions to roll the path back. When the landowner does the works, they choose to close the path from time to time.

The Strategy’s eam response to Naish & Barton on Sea (ODU14) provides a response about managing cliff erosion as part of the SSSI and we acknowledge that erosion can impact the habitats which rely on the natural coastal processes which establish them in the first place.

## 4.7 Zone 6 - Milford on Sea



Zone 6 covers the coastal frontage between Hordle Cliff and the eastern end of Milford on Sea.

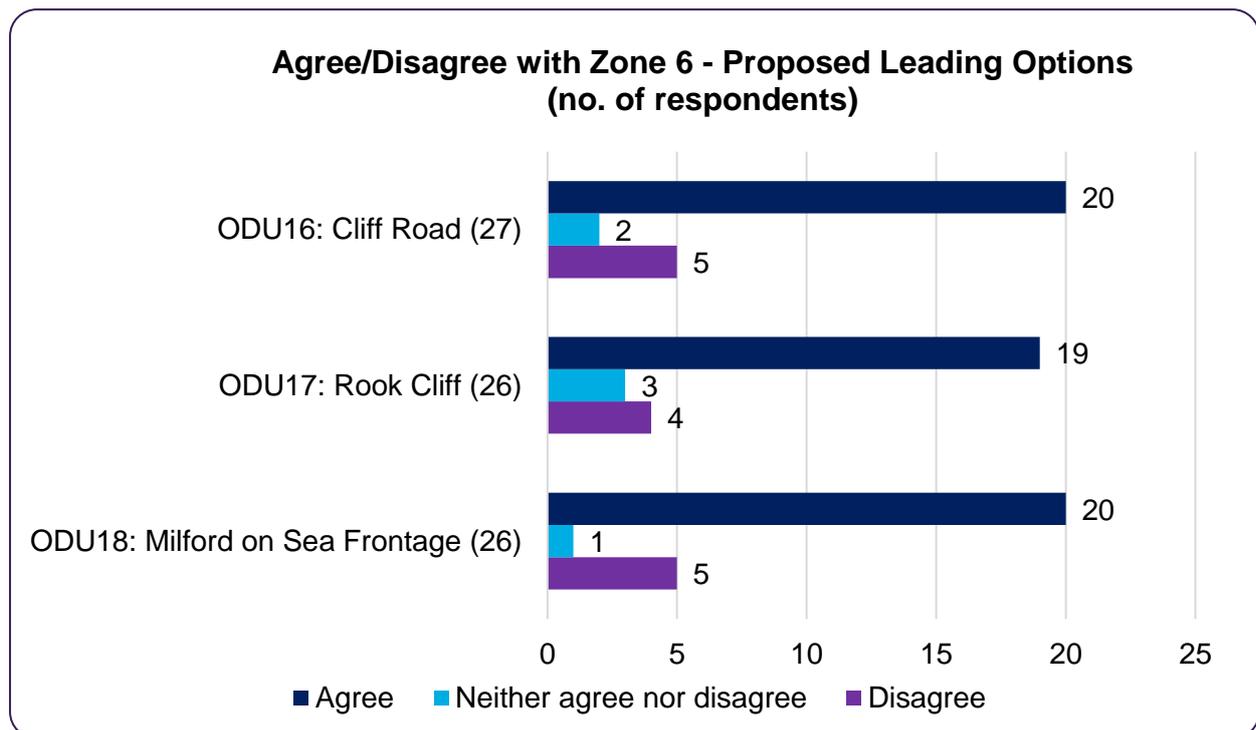
Respondents were asked to read the proposed options in the [information document](#) before responding.

#### 4.7.1 Cliff Road (ODU16), Rook Cliff (ODU17) and Milford on Sea Frontage (ODU18)

**Q14. To what extent do you agree or disagree with the proposed leading options for:**

- **Cliff Road (ODU16)**
- **Rook Cliff (ODU17)**
- **Milford on Sea Frontage (ODU18)?**

Over seven-tenths of respondents said they ‘strongly agree’ or ‘agree’ with the proposed leading options for Cliff Road (ODU16) (n=20), Rook Cliff (ODU17) (n=19) and Milford on Sea Frontage (ODU18) (n=20). The highest level of disagreement for was for Cliff Road (ODU16) and Milford on Sea Frontage (ODU18) (both n=5).



Bases: as labelled.

**Q15. Please tell us if you have any comments on the proposed options for:**

- **Cliff Road (ODU16)**
- **Rook Cliff (ODU17)**
- **Milford on Sea Frontage (ODU18).**



10 comments

Most of these respondents made suggestions (6 comments) about ODU16, ODU17, ODU18 which referred to financial considerations and the management and implementation of defences:



**[SMZ6 a]** *“Re ODU 17. I would like to comment on the proposals made for ODU 17. The majority of this frontage is protected by a combination of concrete sea walls and rock revetments. Some 200 metres of rock revetments were installed late 2020/early 2021 along the frontage going westwards from the White House to in front of Nautica Reach and Needles Point. Revetments were installed as part of emergency works following the catastrophic sea wall failures that took place early/mid 2020 along this particular frontage. However, some 50 metres of the fallen sea wall in front of Shingle Bank Drive were not subject to the same treatment due to lack of funding. This has left this 50-metre section very vulnerable to beach erosion and cliff damage. **I would suggest that rock revetments should be installed as a high priority in front of the fallen wall in order to reduce the risk of further damage and raise the standard of protection** to a level similar to the rest of the frontage. This would undoubtedly **reduce the cost of routine maintenance** required for ODU 17 over the next 20 or so years.”*



**[SMZ6 b]** *“I think urgent short term measures are needed on Milford seafront. **The black rocks in front of the White House need to be extended into the sea** to protect both the beach and the listed building. **The rock groins also need to be extended down the west end of the beach and also extended along the west end of the sea wall.** The “beach replenishment” is not suitable material (far too small) so gets washed away within 2/3 weeks. There were large cobble stones on the beach when I first purchased my hut and **they would be far more suitable, or even better more large black rocks.** There [needs] to be concrete steps built down onto the beach at western end, **preferably an extension of the steps which are at that end (put in at a late stage for the disabled beach hut owners)** however we (disabled) and the rest of the beach hut owners and beach users that end are denied a safe access to the beach and have to climb through railings and “rock climb down the sea wall”. It’s only a matter of time before there is a serious injury. Also, if we are going to be continued to be denied access to the beach from our beach huts (the whole point of having them!), **we should receive a significant discount on the rates** we pay the council to use our huts which always had access when we purchased them.”*





**[SMZ6 c]** “*ODU16: Planning for reduced clifftop area needs to happen now, not when this area has already been lost. Planning takes time - canvas local opinion now and try to gain agreement on the extra funding streams already suggested.*”

**[SMZ6 d]** “*Careful maintenance and management needs to be completed to make sure the areas are maintained so that their futures are ensured.*”



**[SMZ6 e]** “*ODU16, ODU17, ODU18 - Intervene sooner, SUDS, Sponge city implementation, plant / trees / vegetation.*”

Full details of other themes to emerge from these responses and/or a full list of all the comments is available on request from the Research and Consultation Team.



### Strategy Team’s response to the survey comments

Comments have been noted and considered during this Strategy development phase.

In 2019/20, NFDC funded the emergency works at Rook Cliff (ODU 17). That winter was particularly stormy with a succession of named storm events rolling in, one after another. The aging infrastructure was not able to sustain the storm forces causing the sea wall to fail. The resulting emergency works put pressure on Council resources but NFDC committed £2 million upfront to cover only the essential urgent stabilisation works and provide some protection to the failing section of seawall. It was recognised that from the outset works would be limited and the funding would not provide a full coastal defence scheme. However, it was delivered in the knowledge that it would protect the area in the short-term while the Strategy was being completed. Once adopted, the Strategy will have set the direction for the best approach to manage the flood and coastal erosion risk over the short, medium and long term for this and neighbouring units. Later, NFDC was successful in recovering over two-thirds of the funding from DEFRA / Local Levy funding.

Other comments will be considered as schemes are developed in the future.

## 5 Considering Equalities and Human Rights

BCP Council has a duty to consider the impact of their decisions on human rights and protected groups (age, disability, sex/gender, gender reassignment, marriage and civil partnerships, pregnancy, maternity, race religion or belief, and sexual orientation) as defined under the Equality Act 2010.

**Q16. Are there any positive or negative impacts of these proposals that you believe that BCP Council should take into account in relation to equalities or human rights? If so, are you able to provide any supporting information and suggest any ways in which the organisation could reduce or remove any potential negative impacts and increase any positive impacts?**



18 comments

These respondents gave insights into any positive or negative impacts in relation to equalities and/or human rights, while several said no/not applicable. These comments mainly related to 'accessibility', 'age', 'disability', and 'communications' (2 comments each).

Below is a selection of these comments:

### Accessibility (2 comments)



**[CBHS a]** "Cliff erosion also affects beach accessibility. **Nothing in the strategy talks about maintaining beach accessibility for either people with or without mobility issues.**"



**[CBHS b]** "The western end of Milford beach (Westover) needs to be better protected in the short term. The black rocks need to be extended into the sea in front of the White House and along the neighbouring groins and sea wall. Concrete Steps need to extend down onto the beach, **as access down is dangerous because no provision has been made for the western end of the beach for hut owners and beach users.** It is ironic that the councillors agreed to put steps from the higher prom that end for the disabled hut owners to access their huts (when threatened with legal action at a council meeting) but did not give corresponding beach access! Steps need to be put in quickly before there is a serious accident as it is a health and safety issue to try and access the beach there as many people do. [Visitors] to the beach keep asking [why] there is no access to the beach from the lower prom and cannot understand why they have to climb through the railings and try and climb down the wall to access the beach at the western end. The whole point of a beach hut is to be able to use the beach!! We should have a 70 percent discount on the amount we pay





to use our huts at the western end of the beach (backdated) if we are continued to be denied access. **Disabled people cannot walk the length of the prom to get to some steps, and even if they could, they wouldn't be able to keep an eye on the hut as you want to do when you are in the sea.** When the sea wall is rebuilt and made higher (in the [longer] plans) it should be built in front of the existing sea wall with deeper footings thus not affecting the existing prom and beach huts. Some of us have invested many thousands on our privately owned huts. We were told the existing design when they were rebuilt would ensure the huts would last for 100 years. If the council knock them down again (mine was perfect before it was flattened by the council). As a pensioner I cannot afford to keep paying for badly designed replacement huts [made] out of bits of drains."



### Age (2 comments)



**[CBHS c]** "Barton has significant properties at risk. **Majority of residents are elderly and may not be in a position to actively campaign for protection of their homes but should not be disadvantaged because of quieter voices in a noisy system.**"

**[CBHS d]** "The time intervals described are too long. Councillors and vast majority probably feeding into this consultation won't be alive to see the potentially devastating effects. **We need to plan for our kids and grandkids!!**"

### Disability (2 comments)



**[CBHS e]** "BCP should take into account disability-friendly access to the beach for Zones 3 and 4. For instance, access down the cliffs (mostly steep, easily-eroded compacted stone pathways), access to the beach (the cobbles used for beach recharge **are not easy to navigate for the less able-bodied**), and access to the rock groyne (if this is intended to be a part of the offer for the beach)."

**[CBHS f]** "Disabled and wheelchair facilities where appropriate. From Highcliffe cliff top, **[it] is virtually impossible for any disabled person to reach the beach. The steps from Beacon Drive are also impossible to use especially by the disabled.**"

### Communications (2 comments)



**[CBHS g]** "No. **This is about positive messaging in the short term. Can I suggest you erect notice boards at key tourist and local beach/dog walker positions along the coasts - and keep them up to date with this info[?]** A lot of people do not read all this stuff online,



*but like short snippets they can read regularly each day/week they visit.*  
**WIN THE NARRATIVE BCP Council.”**

**[CBHS h] “Telling the truth about (a) the system failures/designed to fail; (b) ecosystem failures and the impact on us would be a start. Then activating and mobilising our salvage and survive programmes means each human will be incentivised to help communities decarbonise at speed and scale before hitting tipping points and feedback loops.”**

Full details of other themes to emerge from these responses and/or a full list of all the comments is available on request from the Research and Consultation Team.



### Strategy Team’s response to the survey comments

All comments have been noted by the Strategy Team for consideration when future schemes are developed after the Strategy is adopted. Where comments fall outside the remit of the Strategy, they have been shared with other Council teams such as Planning, Seafront and Car Parks.

It is recognised that amenity access to some beaches is restrictive for people with disabilities or limited mobility. Others beach locations can provide better access and facilities such as accessible wheelchairs, beach hut hire, parking and toilets.

[Accessible seafront | BCP \(bcpcouncil.gov.uk\)](#). In January 2024, relevant comments from this Strategy’s consultation were also shared with New Forest District Council during the public consultation on beachfront facilities. [Have your say on beachfront facilities - New Forest District Council](#).

The Strategy process has evolved since 2021, the 5 phases of engagement, including a formal public consultation, utilised a variety of mediums to promote the Strategy, and these were continually evaluated for their effectiveness. Online and traditional (off-line) methods were used to ensure that all ages had the opportunity to share their feedback. The team used websites, social media, online meetings, e-surveys, face-to-face events, a presentation at BCP Youth Forum, adverts in community magazines, posters, flyer drops and paper surveys.

The Strategy takes a long-term view of all options available to ensure our coastal communities are more resilient to flooding, erosion and the impacts of climate change over the next 100 years.

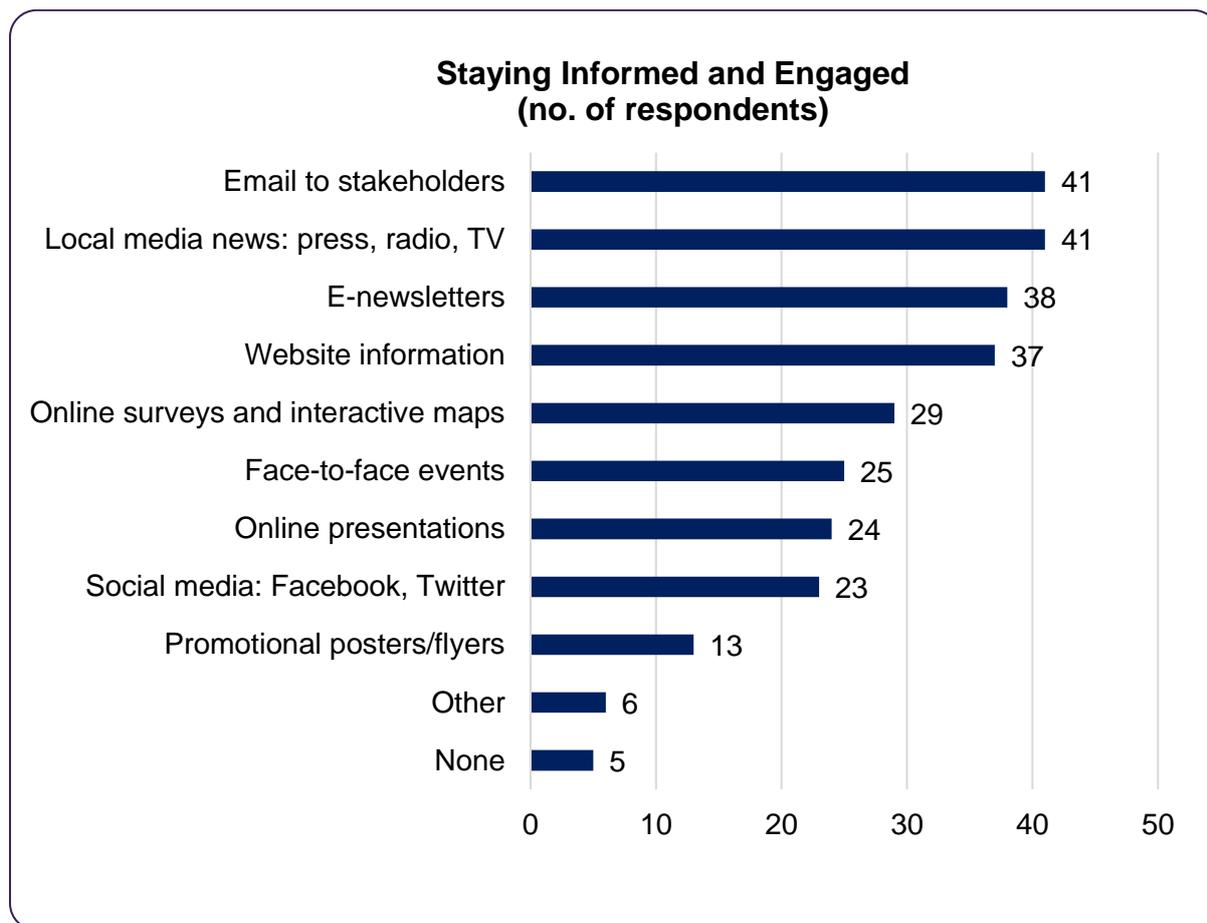
By managing these risks and making enhancements where possible, we are helping future generations continue to enjoy our coasts. To ensure we are being realistic, we have presented a range of options for each ODU, depending on the funding which would be available at the time of delivery.

The National Economic Option shows the works we are able to get funding for whereas the Local Aspirational Option shows what more we would like to do (dependant on additional funding). However, we have also identified a Back-up Option which is the minimum we could realistically do if the required levels of funding are not available for the National or Local options.

## 6 Staying Informed and Engaged

### Q17. How would you like to be kept informed about the Strategy development as we progress this work?

Respondents said they would prefer to be kept informed, and engaged with, about the FCERM Strategy through ‘email newsletters’, followed by ‘local media news: press, radio, TV’ (both n=41). They would like to be kept informed and engaged through promotional posters/flyers the least (n=13).



Base: 87 respondents.

Some respondents said they wanted to be kept informed and engaged in different ways:



**[CBHS i]** “Notice boards along beach. Where printed updates can be displayed. Nothing expensive. Just simple updates.”

**[CBHS j]** “By post through the letterbox.”

**[CBHS k]** “National awareness and campaigning.”



**[CBHS l]** *“Full consultation at every stage BEFORE [removed] decisions are made. The council should actively fund raise for [Milford] Beach defences. We have many visitors who could contribute! Local residents love their village and helped in the community centre [build].”*

**[CBHS m]** *“Government, BCP portals, webpages.”*



**[CBHS n]** *“To match up with governmental protection for us all. Climate Chief for BCP - Dr Montgomery page 15 - "we are overshooting Earth's ability to cope." "Stability is no more... conflict".”*



### Strategy Team’s response to the survey comments

Comments have been noted and considered during this Strategy development phase.

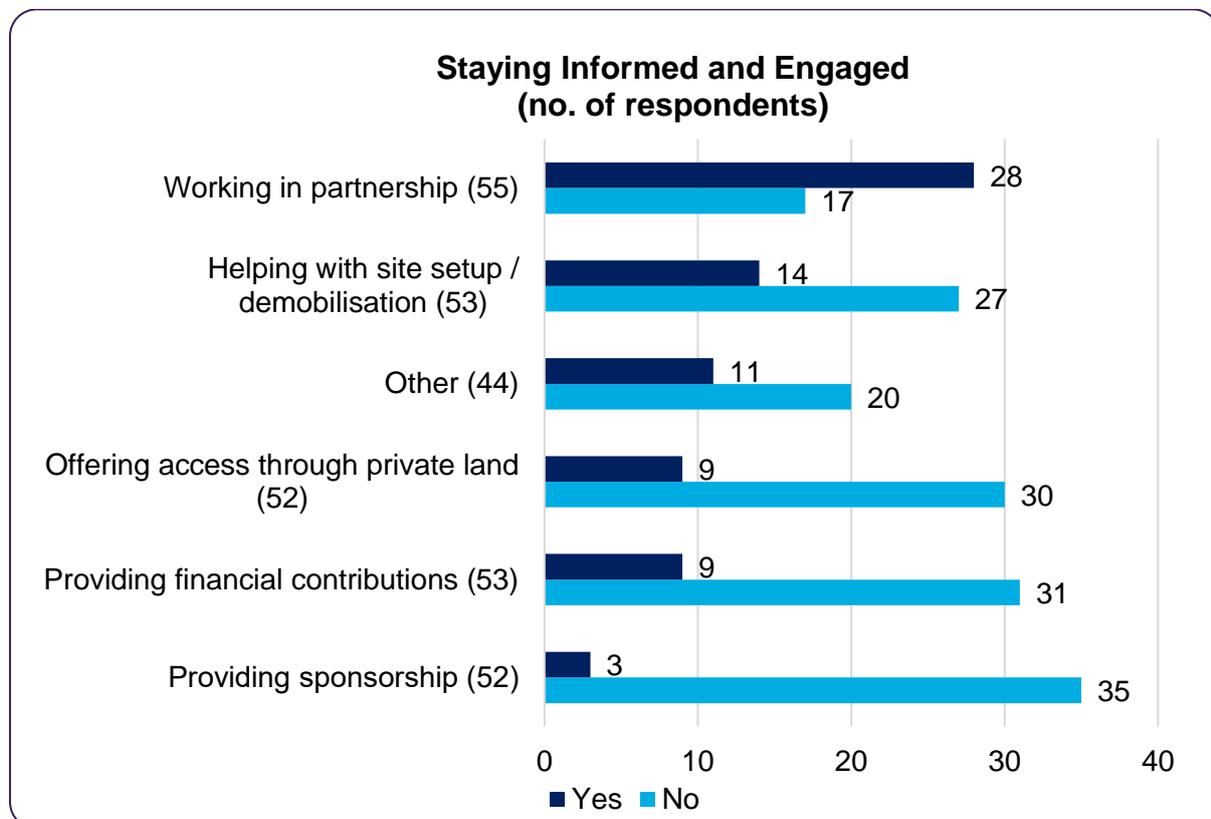
Answers to this section have also been provided in [Section 5](#) above.

## 7 Helping us to deliver the Christchurch Bay and Harbour FCERM Strategy

**Q18. Please select how you might be willing to help as we begin to deliver the Strategy in the future.**

Respondents said they would be willing to help deliver the Strategy in the future mostly by 'working in partnership' (n=28). Respondents were least interested in helping to deliver the Strategy by 'providing sponsorship' (n=3).

Name and email addresses that were submitted by respondents have been provided separately to the project team to keep respondent's personal information confidential in line with GDPR regulations.



Bases: as labelled.



### Strategy Team's response

Thanks to those who responded to this question. Once the Strategy is adopted by BCP Council, NFDC and the Environment Agency, the team will begin to develop a funding strategy to deliver the options. At this stage we may use the details you gave us to get in touch.

## 8 Other responses

### 8.1 Emails and letters

In addition to the main responses received through the online and paper surveys, 2 people sent emails to share their views on the consultation. Their responses have been anonymised and outlined below:

#### Response 1



*"Dear BCP,*

*Oh dear! Design-to- fail continues. Critical information for environmental literacy is missing.*

*A summary for residents of Head of Climate Dr Matthew Montgomery's authoritative 89 page wake-up call "Councillor's Workbook on Acting on Climate Change" September/October 2022 is strangely absent from this document.*



*Dr Montgomery tells us:*

- That Global Ecological collapse is imminent p19*
- That we are overshooting earth's ability to cope p15*
- That stability is no more ....leads to conflict p7*
- Limits to growth ...prices are going up....no easy answers...threats to biodiversity...food...the economy.*



*Planetary boundaries are being exceeded. There is currently NO GUARANTEE of a future at all p69.*

*In stark contrast we see an unaccountably LOW KEY APPROACH of your FCERM strategy to the threats we face as Mother Nature continues to be sacrificed to the fossil fuel industry.*



*Meanwhile, as ever, NO DUNKIRK leadership is evident as Rishi Sunak, while currently naturally keen to protect British Nationals on the incinerating island of Rhodes, yet incoherently tries to row back on climate protective measures for political reasons. Instead of being a proper leader and explaining why Ultra Low Emission Zones are necessary for our clean air and lungs.*



*Your FCERM document is as sadly full of holes as a Swiss cheese. There's no mention of the cruel damage to life on Earth from the deadly fuels our government still subsidises with our money:*



- *No mention of threats to collective well-being as homes are swept away or damaged, lives or livelihoods lost.*
- *No mention of likely climatic tipping points nor feed-back loops.*
- *No costed programmes. Vague hopes of funding are peppered throughout the document. And how much did this document cost us all?*



- *No programme for decarbonisation at speed and scale.*
- *"Don't mention the war on nature" it seems - as your kids' safe future, along with harvests, soils, the natural world and the economy float away or are incinerated.*



*PLEASE BCP UPDATE NOW all plans with a proper analysis and a zero-carbon plan for our survival. This is the hopeless softly, softly approach we are subjected to in this document:*

*"Climate change is putting significantly more properties, infrastructure and open spaces at risk from coastal flooding and erosion. Calculations have revealed that if we do nothing over the next 100 years, the coastal frontage will suffer around £1 billion in damages which includes erosion risk to approximately 1,600 properties and coastal flood risk to over 2,200 properties (homes and non-residential buildings). The figures are not designed to alarm but to help us evidence and justify doing something to manage the risks."*



*As Cllr Joe Salmon, swimming upstream, pointed out at Full Council WE ARE PAINFULLY SLOW at responding to desperate situations. Ex-Nasa scientist James Hansen tells us we are "damned fools" for failing to act on climate. Professor Michael Mann points out we still have our foot on the gas.*



*Broadmoor policies must stop now. We must Salvage and Survive.*

*Yours in hope*



*[name removed] - terrified constituent living in a Dorset Greener Home. Visits welcome by arrangement.*



## Strategy Team's response

**[Res-em-1]** Many of the comments made are broader than the Strategy objectives. This Strategy focuses on flood and coastal erosion risk and is just one of a number of collective efforts both BCP Council and NFDC are working on to help address the climate crisis.

As a Strategy Team we are committed to being as open, honest and realistic about what this Strategy can deliver using the current national funding rules for future works. Once adopted, we will begin to develop an approach to the funding required to deliver the options, ensuring that future generations continue to enjoy our coasts. Carbon impact will be assessed for the leading options in the final Strategy.

Analysis of our engagement stats and audience reach has been very high but communicating the complexities of climate change is challenging. We have used a variety of methods to do this within the available budget and we have also developed Science, technology, engineering, and mathematics (STEM) resources for schools.

### Response 2



*"Dear [name removed],*

*Again, my commendation for your handling of the planning update briefings for Christchurch Bay.*

*Logistically, my only comment is to please make it easier to locate the Zoom instruction and link on the event notices (these are tucked away in the bottom corner of the last page which one does not necessarily know to scroll down to).*



*Thank you for offering to relay my big-picture comments in the form of the following observations and recommendations about the Bay-wide planning approach to [name removed]. These conclude with a summary of my related credentials and expertise.*

#### ***In general***

*The apparent precision of detailed zone-by-zone planning with an estimated century-long maximum cost of £250 million, in the absence of the extra communications summarized below, may well leave audiences with a misleading level of confidence. In virtually every section of the analysed area, current and/or historic protective measures have been compromised with 'new and improved' measures now being envisioned. Recent national news coverage of ongoing cliff-top residential losses along the north Norfolk coast are stark reminders of the shock that residents express as the problem continues. Planning*





*authorities, anywhere, rarely muster the courage to confront the likely inevitability of managed retreat behind vulnerable coasts within forthcoming generations. Also, traditional thinking that low-lying coasts are the only vulnerable ones is rendered false when coastal cliffs of soft strata with no or inadequate protective measures are prone to storm wave erosion and/or groundwater outflow and subsidence.*



### Strategy Team's response

**[Res-em-2a]** Whilst we respect your view, we believe we are being very up front about the funding challenges and what that will mean if it cannot be achieved by presenting the “back-up” options, whilst also acknowledging that even if we can do something at Barton-on-Sea, some degree of cliff loss is inevitable. That is why alongside this FCERM Strategy, we also work with the Local Planning Authorities to ensure that planning policy is understanding of these risks and seeks to guide development to areas of low risk by defining Coastal Change Management Areas (CCMAs); and in the case of BCP Council, developing a new integrated cliff management strategy to better understand the risks posed to the highly urbanised cliff areas from drainage/instability related issues (not toe erosion) and how we manage them across multiple council service areas in a changing climate.

Unfortunately there is little national policy / resources yet available to us to progress pro-active adaptation – including relocation – in many areas at risk, largely due to the lack of political will to do so. Many of us in the sector have been and continue to lobby government about the need for this; indeed I sit on several regional/national bodies doing just this, as well as having written national guidance on CCMAs and advising a new Defra funded research project on the North Norfolk coast that is looking at how we do coastal transition planning and implementation.



### Looking back

*In previous briefings I have recommended that progress updates be preceded by recaps of past zone-by-zone protective measures with retro-assessments of their beneficial and/or detrimental impacts. All stakeholders should be reminded of the comparative returns-on-investments of previous efforts: doing so in event briefings would be time well spent. Ultimately, natural forces are almost always the winners over the best of human ingenuity.*



## Strategy Team's response

**[Res-em-b]** Unfortunately, we needed to balance the amount of time we asked people to attend for with the key information we need to convey. In the recent webinars it was not possible to go into so much detail as you suggest, though we did show where existing defences are present. In previous engagement rounds we have described the understanding of coastal processes and past efforts to provide defences. If we were to do as you suggest, we would also need to describe the changing nature of funding and approvals processes which has evolved over the decades, and whereas in the past schemes needed to be above unity in benefit cost terms, now we need to have a much greater ratio and that is now only part of the picture.

### **Taking stock**



*As much as climate warming and extreme weather are increasing and frequently in the news, they also defy comprehension by most people. What climate change means and entails versus what extreme weather means and entails would be time well-spent in both progress briefings and project reports. The same applies to sea level rise and storm surges and the so-called return period frequencies of surges of different scales. In the short term, periodic surges are the concern. In the medium to longer term, relentless gradual global sea-level rise is the concern. The combination of increased but unpredictable storm surge frequency and concurrent and relentless sea level rise is the nightmare planning scenario.*



## Strategy Team's response

**[Res-em-2c]:** Communicating this is a significant challenge we agree, and we get a full range of views expressed to us from stakeholders. We are always seeking new ways to do this better but find that simple visual resources are particularly useful and have been trying out different approaches as part of our face-to-face engagement events. At these, we also have a rolling wallpaper showing damage caused by past storms in the area alongside messaging that these will happen again in the future, and probably more often.

In addition, to provide context to storm events, Dr Matt Wadey in our team has led on SCOPAC Storms Analysis research to examine changing trends in storm events. This has included developing an infographic to try and convey this as simply as possible. You can view the SCOPAC Storm Analysis Study by the Southern Coastal Group and SCOPAC here: [southerncoastalgroup-scopac.org.uk](https://southerncoastalgroup-scopac.org.uk).



### **Looking forward**

*Another concern is an absence of any reference to national and/or international benchmarking in the briefing presentations (unless I missed it, in which case my apologies). Why not openly share the experience of those who have been down this proverbial road already? Christchurch Bay is close to where the world's best water management visionaries: I refer to the Dutch who had their Katrina experience in 1953, <https://www.netherlandswaterpartnership.com/>, and who are revered worldwide consultants. With all due respect to those responsible for coastal and adjacent inland planning in Christchurch Bay, their onsite briefing for an invited Dutch team with a request for critical feedback would surely be worth its proverbial weight in gold.*



### **Strategy Team's response**

**[Res-em-2d]**: The project team includes those who have worked in this sector for many decades all around the UK and overseas and have great experience of the UK framework which has led the way globally in terms of strategic coastal risk management by way of the approach we take to shoreline management planning. With respect to the Dutch they have very different legal and social drivers for what they do, and not all of that is applicable to the UK setting.

It is also worth reflecting on the UK experience of the 1953 storm surge event. Much of UK coastal risk management policy has been driven by the east coast experience of the 1953 and focussed on coastal storm surges. Whilst important to parts of the south coast, many areas are at greater risk of wave energy events rather than storm surges and this is a differential that we are also dealing with that the Dutch and our east coast colleagues are less so.



### **Relevant experience**

*I grew up in New Milton and made the study, monitoring and attempted stabilization of the Barton-on-Sea cliffs and beach a childhood hobby and school project, <https://www.cultureoncall.com/memory-lane-returning-to-the-red-house/>. Emigration to Canada led to my doctorate in geology, fieldwork in three UNESCO World Heritage Sites, and leadership of four major nature and science museums. A past president of the Geological Association of Canada and an Alumni of Excellence at the University of Ottawa, my focus is on humanity's disruption of the Earth System in the Anthropocene which is a new critical moment in the continuity of time in the Earth's 4½ billion-year-old history. Recent blogs have include <https://www.mos.org/blog/the->*





*earth-around-us/whats-different-now, <https://www.mos.org/blog/the-earth-around-us/sea-level> and <https://www.mos.org/blog/the-earth-around-us/first-photograph-earth-from-space>. Recent publications include ones co-authored with colleagues from the University of Cambridge, University of Leicester, and University College London, <https://www.mos.org/blog/the-earth-around-us/good-ancestors>. Recent media coverage includes The New York Times, <https://www.nytimes.com/2022/12/17/climate/anthropocene-age-geology.html>. Recent invitations for webinars and panel contributions have come from Leadership for Conservation in Africa, the International Association of University Presidents on World Environment Day, and the United Nations for its Life on Land conservation goal.*



*Sincerely, [name removed].”*

### **Environment Agency**

The Environment Agency also sent their comments on the proposed Leading Options in a letter on the 25<sup>th</sup> August 2023:



*“Dear Sir/Madam*

#### ***Christchurch Bay and Harbour Flood and Coastal Erosion Risk Management (FCERM) Strategy Consultation***

*Thank you for consulting the Environment Agency on the above mentioned consultation. Please find below our comments under our planning and development remit.*



*We support the approach that the document is taking to deliver strategic flood risk management options that may align with the council's Local Plan work.*

*The evidence produced should be used to underpin the development and growth agenda to help the council make decisions; specifically on potential allocations whether development can be safe over its lifetime.*



*Where there are significant funding gaps shown in the document we would recommend that if growth is being proposed through the Local Plan, that may rely on the delivery of flood risk management infrastructure, that this funding gap is aligned to potential contribution mechanisms from development.*

*We look forward to working with both the Flood Risk Management team and the Planning team as this work progresses.”*



## Strategy Team's response

The BCP and NFDC Strategy Team have regular dialogue with planning colleagues who are aware of the emerging Strategy. In the case of BCP, the Local Plan is in development and the Strategy has directly informed it. In the case of NFDC, the Strategy will inform future updates of the adopted Local Plan. Once the Strategy is adopted, we will begin to develop an approach to the funding required to deliver the options.

### 8.2 Social media comments

4 comments were left on the social media posts that were used to promote the consultation across Facebook, Twitter and Instagram:

#### Facebook:

- *"What happened to the Big ideas 💡 of the Regeneration of Boscombe Highstreet that was Promised by the Former BCP Leader...?"*
- *No point you don't listen anyway!"*

#### Twitter:

- *"Probably a waste of money. I don't see how it can possibly be done, with sea levels rising as they are."*

#### Instagram:

- *"Not the last chance, last chance for this consultation stage."*

### 8.3 BCP Youth Forum comments

Image removed for consent reasons

The BCP Youth Forum is open to all young people aged from 11 to 19 years from the Bournemouth, Christchurch and Poole area. This opportunity provides local young people with the chance to shape projects, debate, contribute to consultations, and access a range of local, regional and national opportunities.

Below is a summary of the responses from members of the Forum who took part in a session about the FCERM Phase 5 consultation in July 2023 **[CBHS-YF]**

FCERM reps > C Corbin, L Bennett, M Whiter

Youth Forum reps > 8 young people, 2 officers

Session length > 1 hour.

#### Summary of questions and feedback:

<p><b>Question 1</b></p> <p>How does / will sea level rise affect you or your family and friends?</p> 	<ul style="list-style-type: none"><li>• Loss of land / homes / less places to go / loss of green space and water pollution.</li><li>• I live around 10mins from Hengistbury Head, I wouldn't be able to live where I have my whole life. Mudeford Spit and my uncle's beach hut will disappear.</li><li>• Land, like farmland, will be lost which equals food/crops will be destroyed. Not enough food / money for the farmers.</li><li>• Companies and businesses will be shut down and won't be able to leave the house. Day to day tasks will be difficult and will prevent</li></ul>
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	<p>crops from growing and food resources will be limited.</p> <ul style="list-style-type: none"> <li>• I can't take the bus / buildings and shops will close down / I'll smell bad or have to spend more on perfume.</li> <li>• We are all autistic. We hate sand but love water. Not going to affect me but will affect my future family.</li> <li>• I'd have to move to the Midlands, god forbid Leeds.</li> </ul>
<p><b>Question 2</b></p> <p>Do you think we should do something to ensure the coastline can be enjoyed by future generations?</p> <p>Yes / No / Don't know</p> 	<ul style="list-style-type: none"> <li>• Everyone agreed, yes</li> </ul>
<p><b>Question 3</b></p> <p>Do you agree or disagree with the use of <b>hard engineering</b> to help prevent flooding and erosion in Christchurch Bay and Harbour? e.g. sea walls, groynes, rock revetments</p> <p>Agree / Disagree / Don't know</p> 	<ul style="list-style-type: none"> <li>• Everyone agreed</li> <li>• Yes, wish there was another way</li> <li>• Agree so long as it is made to fit in with the local environment like the rock groynes</li> <li>• Yes, especially the rock armour but will cause harm to kids as they will climb it and cause injury</li> </ul>
<p><b>Question 4</b></p> <p>Do you agree or disagree with the use of <b>soft engineering</b> to help prevent flooding and erosion in Christchurch Bay and Harbour? e.g. beach renourishments, dunes and saltmarsh creation</p> <p>Agree / Disagree / Don't know</p> 	<ul style="list-style-type: none"> <li>• Everyone agreed</li> <li>• Yes but pricey and lot of testing and matching sand is more hassle but can also be a solution to protect people and less likely to cause injury. Not as protective as hard engineering</li> </ul>

### Question 5

Do you agree with the Council's aim to produce a Strategy to help manage and protect the Christchurch coastline from flooding and erosion for the next 100 years?

Yes / No / Don't know



- Yes, general agreement to produce the strategy
- Yes, as our options are limited to what we can do, and this is one of the best strategies

### Breakout session

We need your help...

How can we improve the way we engage with young people and how can we get their views this type of work?

5 mins to discuss

5 mins to feedback



- The survey is quite dense with a lot of info. Use infographics to cut things down and make it more user friendly. Break the survey up, potentially using social media (including polls)
- Instagram campaigns
- Use Tik-Tok
- Social events eg food festivals
- School visits – integrate into Geography lessons?
- Hold surgery-like meetings in schools
- Posters for schools, plenty of schools would support this initiative.
- Present at Somerford Youth Centre Public outings to target locals eg Saxon Square

### Question 6

What action can you take to help us promote the Christchurch Bay & Harbour Strategy to young people before the survey closes on 27 August?

Share your idea with the group



- Reposting on social media surveys
- Promote events on social media to save costs because most people are visual learners and long presentations can lose them. Use short and fast meaningful videos to promote saving our costs.
- Most popular are Instagram and Tik-Tok

### Our ideas

Now...

- 1) Take a group photo to share on social media
- 2) Complete a survey!
- 3) Take a photo of yourself next to the sea level rise poster to show your friends / family how much it will rise in the next 100 years!



In the future...

- 1) Campaign > Climate Change
- 2) Promote STEM resources to your teacher / school / college. GCSE & A-Level.

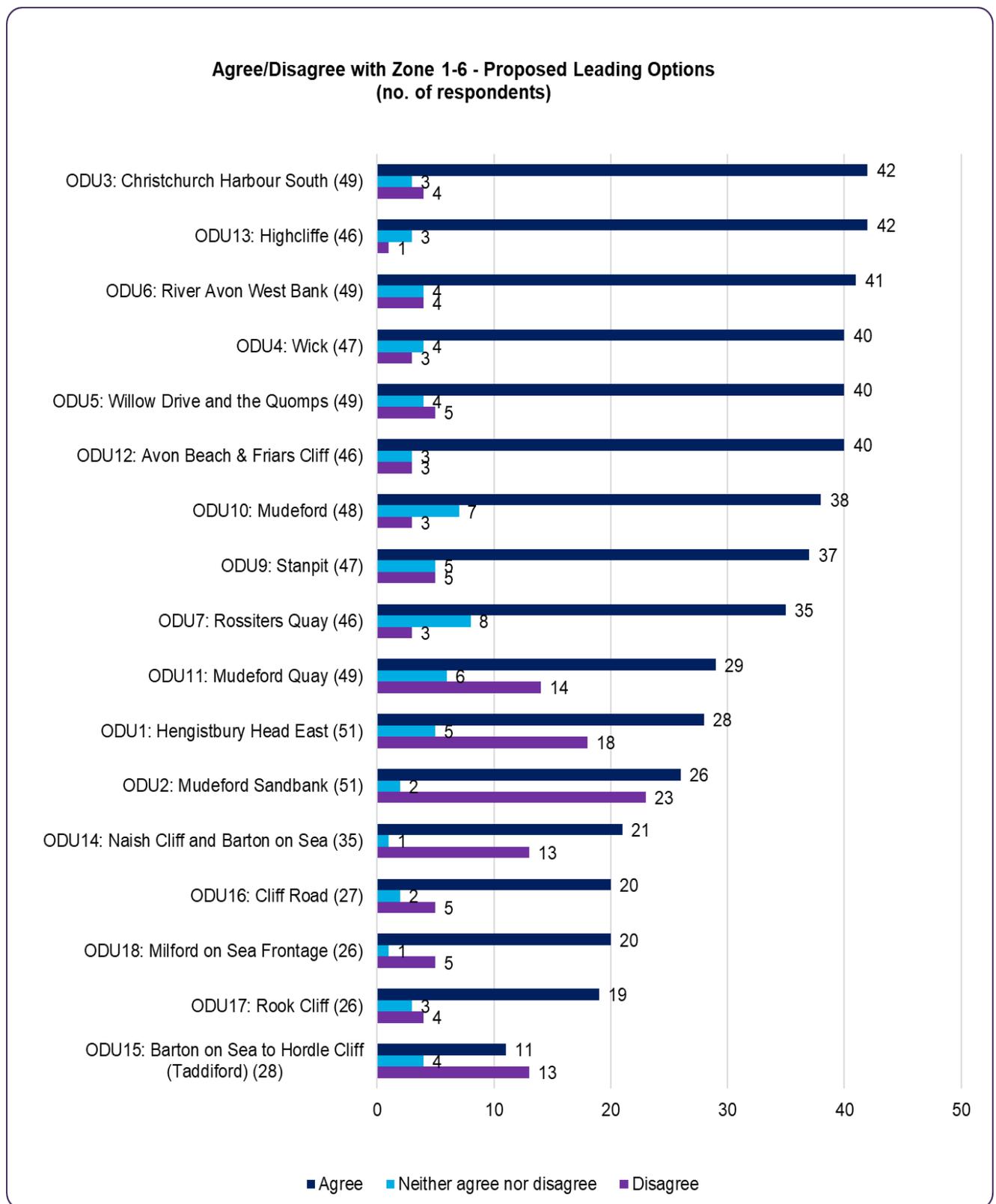
## 9 Appendix 1 - Respondent profile

The equalities profile is shown below. Counts, and not percentages, are shown due to the small sample size.

Equalities	Group	Number
Age	25 - 34 years	2
	35 - 44 years	14
	45 - 54 years	13
	55 - 64 years	17
	65 - 74 years	29
	75 - 84 years	8
	Prefer not to say	6
Gender	Female	23
	Male	52
	Prefer not to say	9
Sexual orientation	Straight / Heterosexual	66
	All other sexual orientations	1
	Prefer not to say	19
Disability	Yes - limited a little	10
	No	67
	Prefer not to say	10
Ethnic Group	White English / Welsh / Scottish / Northern Irish / British	70
	BME	3
	Other Ethnic Group	3
	Prefer not to say	12
Religion	No religion	30
	Christian	41
	All other religions	1
	Prefer not to say	16
Armed Forces	Yes, previously served in Regular or Reserve Armed Forces	8
	No	66
	Prefer not to say	12
Respondent Type	BCP resident	46
	NFDC resident	25
	Other	5
	Organisation/Group BCP	2
	Organisation/Group NFDC	2
	Prefer not to say	2

	Beach hut tenant	1
	BCP Councillor	1
	NFDC Councillor	1

# 10 Appendix 2 – Overall Agreement: Proposed Leading Options by ODU



# 11 Appendix 3 – Promotional materials

## Adverts - Print & Social

Advertised in the Milford Parish Magazine (Paper / online versions):



**Tell us what you think** of our proposals to manage coastal flood and erosion risk over the next 100 years. From Hengistbury Head Long Groyne to Hurst Spit and from Hurst Spit to Lymington.



**Come and see us at Milford on Sea Community Centre on 13th June from 10am to 4pm.**  
**We look forward to seeing you!**  
 More info at [www.twobays.net](http://www.twobays.net)



Environment Agency



New Forest DISTRICT COUNCIL



BCP Council

Photo courtesy: Dan Amos

Advertised in Community Magazines around Christchurch (22K homes):



**Tell us what you think** of our proposals to manage coastal flood and erosion risk over the next 100 years. The strategy area stretches from Hengistbury Head Long Groyne to Hurst Spit, encompassing Christchurch Harbour up to Tuckton Bridge on the River Stour and Knapp Mill on the River Avon.



**Please complete a survey at [www.twobays.net](http://www.twobays.net)** and check out our in-person and online events. We look forward to seeing you and hearing your views!



Environment Agency



New Forest DISTRICT COUNCIL



AECOM



BCP Council

Poster displayed in BCP and NFDC libraries:

# Have your say

## Christchurch Bay and Harbour Strategy Consultation 5 June – 27 August 2023



The strategy area ranges from Hengistbury Head Long Groyne to Hurst Spit, encompassing Christchurch Harbour

**Climate change** is putting many more properties, infrastructure and open spaces at risk from coastal flooding and erosion.

Complete a survey to share your views on the proposed leading options to help manage the risk and enhance our coastline for future generations to enjoy.

### Caring for our coastline

If we did nothing over the next 100 years, our coastal communities would suffer £1 billion in damages from coastal flooding and erosion. Adopting a Strategy will allow us to bid for government funding to sustainably manage the risks, including the impacts of climate change.

We have carefully considered the environmental, economic and social impacts of a full range of risk management options to identify the best ones, ensuring they have no detrimental effect on neighbouring areas.

For more information → [twobays.net](https://twobays.net)



**We want your views – please complete a survey**

The deadline for you to have your say on the proposed leading options is **Sunday 27 August 2023**.

Paper copies are available from: Christchurch, Highcliffe, Tuckton, Lymington and New Milton libraries.

You can also meet the strategy team at our face-to-face and online events. We look forward to seeing you and hearing your views.



Flyer distributed across the Strategy area:

**Have your say**

**Christchurch Bay and Harbour  
Strategy Consultation**  
5 June – 27 August 2023

**Climate change** is putting many more properties, infrastructure, open spaces and infrastructure at risk from coastal flooding and erosion.

Share your views via our survey on how we protect our coastline for future generations to enjoy.

→ [haveyoursay.bcpccouncil.gov.uk/  
christchurchstrategyphase5](https://haveyoursay.bcpccouncil.gov.uk/christchurchstrategyphase5)

Protecting Christchurch Bay and Harbour from Hengistbury Head Long Groyne to Hurst Spit.

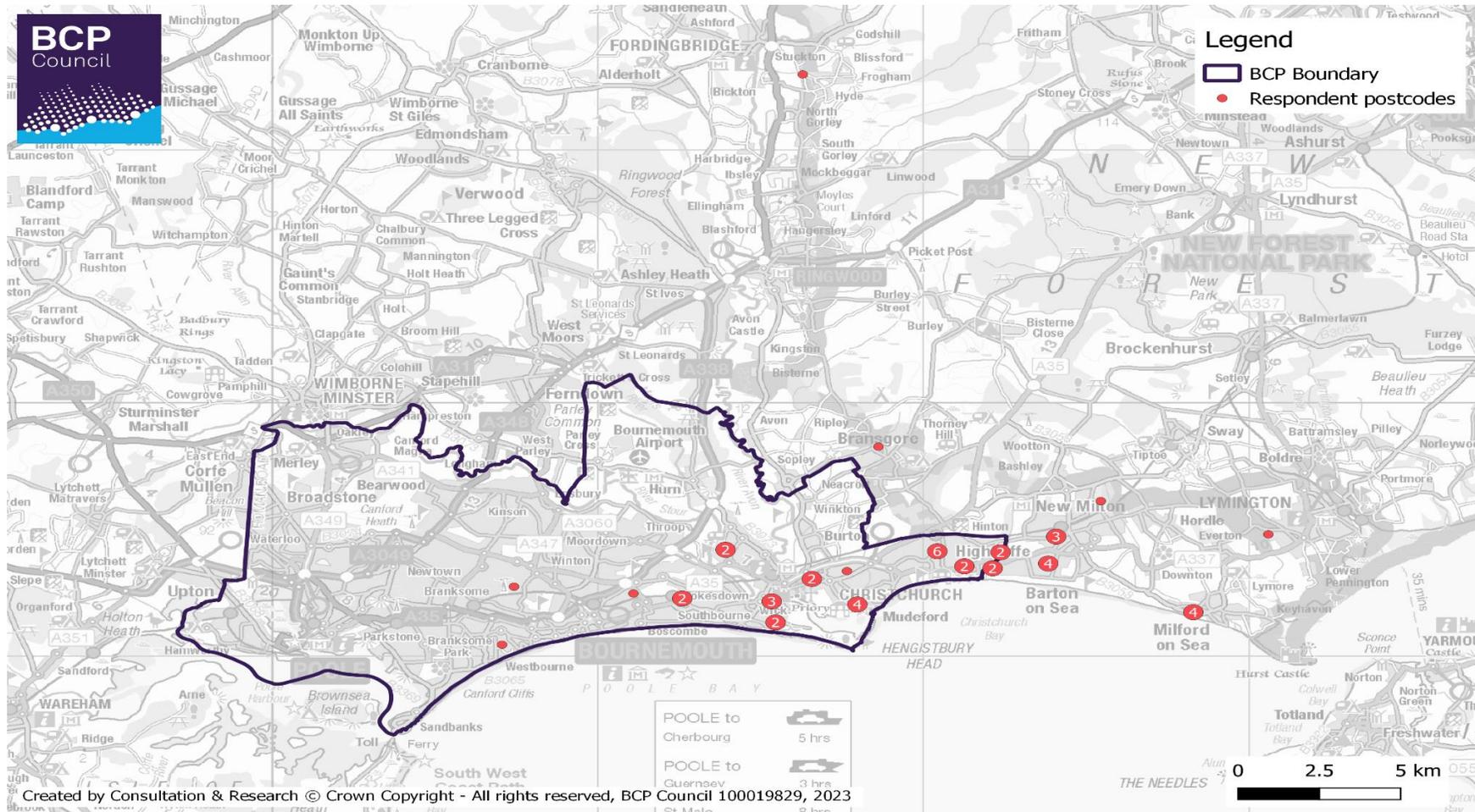
## 12 Appendix 4 – News coverage

Images removed for copyright reasons



# 13 Appendix 5 - Respondent postcodes by area

A full breakdown of respondents' postcodes by Ward/area can be found on the next page:



487

Region	Count
Bournemouth	9
Christchurch	19
Poole	0
<b>Total</b>	<b>28</b>

BCP Wards	Count
Highcliffe & Walkford	8
Mudford, Stanpit & West Highcliffe	5
East Southbourne & Tuckton	4
Christchurch Town	3
Commons	2
Boscombe East & Pokesdown	1
Burton & Grange	1
East Cliff & Springbourne	1
Littledown & Iford	1
Talbot & Branksome Woods	1
Westbourne & West Cliff	1
Outside BCP	18
Blanks*	45
<b>Total</b>	<b>91</b>

\*Please note that 'blanks' represent those respondents who did not provide a postcode or a postcode that could not be matched.

**Environment and Sustainability Portfolio Performance Dashboard**

**Quarter 3: 1st October - 31st December 2023**

**Portfolio Holder - Cllr Geoffrey Blunden**

**Key Performance Indicators**

Annual KPIs	Unit	Freq.	Last Quarter	Target	This Quarter	Desired DOT	Actual DOT	Status
Household waste sent for reuse, recycling and composting	%	Q	35.59%	55%	34.1%	Up	Down	
Coastal funding to achieve specific actions	Funding will be informed by the completion of the following two upcoming strategies: Christchurch Bay & Christchurch Harbour FCERM Strategy (September 2024), and Hurst Spit to Lymington FCERM Strategy (August 2026).							
Trees removed from NFDC land	Num	Annual	314	Monitor	Planting Season: October - March All figures expected April 2024			
Trees planted on NFDC land	Num	Annual	296	Monitor				
Quarterly KPIs	Unit	Freq.	Last Quarter	2022/23 Target	This Quarter	Desired DOT	Actual DOT	Status
Number of electric charging points	Num (Cumulative)	Q	0	10	0**	Up	-	
Total CO2 emissions saved through electric charging points***	kg (Cumulative)	Q	40,000 kg (Cumulative)	9,250 kg	45,000 kg (Cumulative)	Up	-	
Climate change action plan delivered against target	%	Q	Adopted in 2023	Monitor	Adopted in 2023	-	-	
Standard fly tipping incidents responded to	Number	Q	467	Monitor	466	Down	Down	
Specialist fly tipping**** incidents responded to	Num	Q	4	Monitor	4	Up	Up	

\* Estimated value based on previous quarters and trends.  
 \*\* The next installation will be 12 EV chargers at Ringwood in early spring but there have been no installations in Q2 and Q3.  
 \*\*\* Data (including target) reflects cumulative CO2 emissions saved through electric charging points since programme launch in January 2020. Cumulative target updated quarterly.  
 \*\*\*\* 'Specialist fly tipping' refers to the incidents that have health or other implications, and require specialists (e.g. asbestos or clinical waste).

Planning and Economy Portfolio Performance Dashboard

Quarter 4: 1st January - 31st March 2024

Portfolio Holder - Cllr Derek Tipp

Key Performance Indicators

Annual KPIs	Unit	Freq.	2022/23	Target	2023/24	Desired DOT	Actual DOT	Status
Number of houses completed each year (as set out in the Annual Authority Monitoring Report)	Num	Annual	193	400	Data expected in July 2024	Up	-	
Number of green infrastructure projects delivered each year	Num (cumulative)	Annual	5	3	3	Up	-	
Number of Biodiversity Net Gain projects delivered each year	Num	Annual	40 pp granted 15 implemented 5 occupied	Monitor	N/A*	Up	-	
Additional employment floorspace created within the district	m2	Annual	3,491 (net)	Monitor	Data expected in July 2024	Up	-	
Quarterly KPIs	Unit	Freq.	Last Quarter	Target	This Quarter	Desired DOT	Actual DOT	Status
Businesses engaged in the business engagement programme	Num (cumulative)	Q	92	100 (Annual)	159 (cumulative)	Up	Up	
Film New Forest - Value of filming in the district	£ (cumulative)	Q	£45,500	£75,000 (Annual)	£63,500 (cumulative)	Up	Up	
Subscribers to 'Helping local businesses grow' e-news	Num	Q	3,526	3,000	3,508	Up	Down	
New Forest locations available to Film & TV productions via the Film:New Forest locations database	Num	Q	111	80	112	Up	Up	
New Forest District Council building control market share	%	Q	53%	55%	57%	Up	Up	
Determination of <b>major</b> planning applications within the nationally prescribed time frames	%	Q	100%	60%	86%	Up	Up	
Determination of <b>minor</b> planning applications within the nationally prescribed time frames	%	Q	76%	70%	94%	Up	Up	
Determination of <b>other</b> planning applications within the nationally prescribed time frames	%	Q	89%	80%	97%	Up	Up	
Number of projects that New Forest District Council are involved in to deliver sustainable transport options	Num	Q	13	Monitor	13	Up	-	

\*Not available. Position reviewed for 24/25 based on National guidance.

# PLACE AND SUSTAINABILITY OVERVIEW AND SCRUTINY PANEL

## WORK PROGRAMME 2024/2025

ITEM	OBJECTIVE	METHOD	LEAD OFFICER
<b>12 SEPTEMBER 2024</b>			
Air Quality Strategy	To consider the draft Air Quality Strategy	Report	Joanne McClay
Climate and Nature Emergency Strategy 2024-2028	To consider the implementation of the strategy and the associated action plan.	Report	Roxie King
Developing a Strategy for the use of Strategic Community Infrastructure Levy	To receive a report on officer recommendations on the use of the Community Infrastructure Levy towards strategic projects prior to Cabinet consideration in October.	Report	Dean Brunton
<b>TO BE CONFIRMED</b>			
Open Space Maintenance Update	To receive an update on Open Space Maintenance (See Financial Strategy Task and Finish Group Report – 17 November 2022).	Report	Iain Park
Future Joint Working Arrangements Between HCC and Hampshire Districts on Waste/Recycling	To consider a report on the future joint working arrangements.	Report	Chris Noble
Public Realm Strategy	To consider a proposed Public Realms Strategy.	Report	Chris Noble / Iain Park
Parking Strategy	To consider a proposed Parking Strategy.	Report	Chris Noble

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