# Robin Hood's Bay Coastal Strategy Study

## Strategic Environmental Assessment
## Environmental Report Addendum

Scarborough Borough Council

September 2012
Final Report
9X3758

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## NON-TECHNICAL SUMMARY

### 1. Introduction

This addendum report presents the findings of the revised Strategic Environmental Assessment (SEA) of the Robin Hood's Bay Coastal Strategy Study (CSS). Mouchel was commissioned by Scarborough Borough Council in 2009 to develop the CSS. The Strategic Appraisal Report (StAR) and associated documents (including the SEA Environmental Report (ER)) were issued for initial consultation to the Environment Agency in February 2011, and a number of comments were received on both the technical and non-technical aspects of the documents.

Royal HaskoningDHV was subsequently commissioned by Scarborough Borough Council in May 2012 to update and enhance the StAR and associated documents in relation to the Robin Hood's Bay CSS.

This addendum report addresses the specific comments received on the ER (Mouchel, 2010, see **Appendix G2b** of the StAR, 2012) from the Environment Agency NEAS officer. It is not the intention to address the comments received by producing a revision of the ER prepared by Mouchel (2010). As such, this addendum should be read in conjunction with the ER (Mouchel, 2010) and, for this reason, the ER is included as **Appendix G2b** of the StAR, 2012.

The Strategy will play a key role in the management of coastal erosion to the local communities and natural environment of the Robin Hood's Bay coastline. It seeks to implement the policies set out in the second River Tyne to Flamborough Head Shoreline Management Plan (SMP2) and defines the approach that will be taken to manage coastal erosion risk along study area frontage for the next 100 years.

The SEA carries out a high level environmental appraisal of the Strategy's options based upon available information and professional judgement. As such, it is largely a qualitative appraisal exercise. The SEA is an iterative process which informs and appraises the developing Strategy. It identifies the potential environmental effects that could arise as a result of the implementation of the Strategy, allowing them to be taken into account during the development coastal erosion and flood risk management options and before the Strategy is approved.

### 2. Overview of the SEA process

SEAs are required for plans and programmes that fall within the requirements of EC Directive 2001/42/EC on '*the assessment of the effects of certain plans and programmes on the environment'* (the SEA Directive). The key aim of the SEA is to ensure that environmental considerations are fully integrated into high-level decision making. By addressing strategic level issues, SEA aids the selection of the preferred options, directs individual schemes towards the most appropriate solutions and locations and helps to ensure that resulting schemes comply with legislation and other environmental requirements.

Under the SEA Directive, an SEA must be undertaken for plans and programmes that are required by legislative, regulatory or administrative provisions. Although Defra's Flood Management Division (FMD) issued guidance (September 2004) that there was no legal requirement to apply the SEA Directive to flood management strategies. However they set a clear framework for future development and have much in common with the kind of plans and programmes for which the Directive is designed, therefore

Defra believes that adopting an SEA approach is appropriate and strongly encourages their production.
For each Policy Unit, the feasible management options were appraised against a set of SEA objectives, defined by Mouchel during the SEA scoping stage. The magnitude of the impact and the sensitivity of the receptor were considered to determine the likely significance of the impact. The classifications ranged from beneficial to negative impacts. Avoidance and mitigation measures were proposed where adverse effects were identified, with monitoring of the Strategy proposed where required. Potential environmental enhancement opportunities were also identified.

The original SEA and this addendum report also examined relationships with other policies, plans and strategies in order to ensure no significant conflicts of interest might occur, and to seek opportunities to achieve common goals. The Strategy aligns with policies with all the current, local plans for the relevant administrative boundary.

## 3. Summary of environmental effects of the Strategy and proposed mitigation

The main environmental impacts of the Strategy are summarised below as well as measures proposed to reduce or manage these impacts.

### Population and human health

The Strategy will continue to manage coastal erosion risk to populations and human health. The Strategy will ensure a strategic approach is taken to the management of residential and commercial properties from coastal erosion, in the face of a changing climate. Approximately 80 properties (both commercial and residential) and 150 static caravans would be lost as a result of the do nothing option along the frontage, however the adaptive management strategy would ensure that the properties are protected from coastal erosion in the long term. The properties within the southern section of Robin Hood's Village would continue to be protected through capital improvement of the existing defences.

The Strategy has potential to impact upon tourism and recreational resources, through the loss of the Cleveland Way coastal footpath and local access roads. The loss of such recreational features could impact upon human health of residents within the area and reduce visitor numbers to the area.

The village at Robin Hood's Bay is a significant tourism asset, drawing a significant number of visitors to the area; the Strategy will ensure the continued provision of these assets through the improvement of defences in the south of the village and roll back of properties and features of interest in the north of the village.

There are potential adverse impacts to tourists and recreational users of the area associated with potential cliff falls (particularly within the northern section of Robin Hood's Bay village where there is uncertainty as to the effect of drainage exfiltration on water levels at rock head). Such cliff falls have potential to result in health and safety implications to users of the foreshore during such events.

| Mitigation | Monitoring |
|---|---|
| Undertake works works outside of the peak tourism season.<br><br>Re-location of properties at risk on previously developed land where possible.<br><br>Improving access to the coast should be considered during the delivery of the strategy, wherever possible. | Continue coastal monitoring to gain further knowledge of coastal erosion rates.<br><br>Implementation of Emergency Action Plan.<br><br>Condition assessments of defences.<br><br>Monitoring of visitor numbers to the area. |

**Critical infrastructure and material assets**

The Strategy will continue to manage coastal erosion risks to critical infrastructure and material assets by ensuring a strategic approach is taken to protect assets from increased erosion risk, in the face of a changing climate. Such assets at risk over the next 100 years will be rolled back outside of the erosion zone, or protected through improvement of the existing defences at the southern section of Robin Hood's Bay Village.

Further investigation is required in order to determine ownership of utilities within the northern section of Robin Hood's Bay village, in order to allow a scheme to be commissioned to carry out repair works (if required) and diversions, to reduce coastal erosion rates and remove the potential for reductions in water quality associated with the potential impacts on the foul drainage system at Mount Pleasant.

| Mitigation | Monitoring |
|---|---|
| Undertake works outside of the peak tourism season.<br><br>Determine ownership of utilities in order to allow scheme to be commissioned to carry out repair works and diversions. | Monitoring of coastal erosion rates. |

**Biodiversity, flora and fauna**

In general, the Strategy will allow for the natural evolution of the coastline (with the exception of a small section in the south of Robin Hood's Bay village). Such natural erosion of the coastline has potential to result in the inland migration of wet woodland BAP habitat and ancient woodland adjacent to Stoupe Beck, Maritime Cliff and Slope BAP habitat and potential erosion/slumping of the SSSI's along the frontage. There is also likely to be loss of area within the Beast Cliff to Whitby SAC, however this habitat is considered likely to migrate inland as the coastline retreats. Such impacts are the result of natural coastal erosion processes however.

The improvement of defences within the southern section of Robin Hood's Bay village is also likely to result in the loss of a small section of intertidal habitat as a result of coastal squeeze as sea levels rise. The net littoral transport is understood to be in a southerly direction (Mouchel, 2010a), except during certain states of the tide when material is transported northwards. It is also considered that there is little small scale interaction between embayments, due to the isolated nature of the beaches. Sand derived from erosion of the till may provide a very small contribution to the nearshore sand belt south

of the bay. Natural coastal erosion along the majority of the frontage is also likely to maintain the instability of coastal habitats.

Natural England stated during July 2012 that geologically designated SSSIs should be allowed to erode naturally, and this is viewed by Natural England as a positive impact. Stabilisation of rock outcrops is considered to have a negative impact on the SSSIs. As such, the Strategy of adaptive management along the majority of the frontage is considered likely to have a positive impact on the geological interest features of the SSSIs. Natural erosion of the geological SSSIs can also result in the exposure of additional geological interest features.

The HRA screening (Mouchel, 2011) identified that there will no impact on any of the European designated sites and therefore it was considered that an Appropriate Assessment was not required for the Strategy. Consultation with Natural England during July 2012 confirmed that this approach was acceptable, and Appropriate Assessment was not required.

Consultation with Natural England during September 2012 identified that Natural England would provide a Letter of Support for the Strategy, based on the information provided within this addendum report. This has been included as an Appendix to the StAR (Royal HaskoningDHV, 2012).

| Mitigation | Monitoring |
|---|---|
| A more detailed assessment of the potential impacts and the identification of avoidance, mitigation or compensation measures will need to be undertaken as part of a more detailed environmental assessment or through the EIA process, should it be required. Such assessment should include a detailed investigation of the availability of suitable land uses landward of the BAP habitat.<br><br>In delivering the Strategy, opportunities for habitat enhancement should be sought, where possible.<br><br>Undertake construction works in accordance with best practice measures to minimise disturbance to floral and faunal species and geologically designated sites. | Where practical, maintain a balance sheet for protected sites and BAP habitats, accounting for scheme losses/gains.<br><br>Natural England recommended that it would be more useful to identify where BAP habitat is being 'squeezed' as sea level rises, and identify measures to address these issues, through agri-environment schemes / development management.<br><br>Condition monitoring of environmentally/geologically designated sites. |

**Soil**

The Strategy option along the majority of the frontage has potential to result in erosion of a number of former alum works and Stricklands Tip. Such features have potential to represent contamination sources which could impact upon the groundwater, surface water and coastal environment. There is potential for residual contamination to be present within the ground from existing properties and practices (e.g. farm buildings, woodworking factory, residential properties etc.), which could remain following demolition of such properties and roll back to areas which are not at risk of erosion.

| Mitigation | Monitoring |
|---|---|
| Further investigation of contamination risks along the frontage. If significant risks are identified, a suitable remediation strategy should be designed at EIA stage (if required), including removal of the contamination source, in-situ treatment of the source or removal of the pathway between the source and receptor.<br><br>Identify ownership of assets and undertake remedial works including diversion and repair of potential leaks to prevent impacts to water quality.<br><br>Opportunity to reduce the contamination risk along the frontage from potential contamination sources including Stricklands Tip and the Alum quarries.<br><br>Ensure implementation of the Strategy does not affect water quality through the use of Environment Agency guidelines and best practice. | Periodic review of Environment Agency Bathing Water Directive monitoring data against the targets for waterbodies and resources in the study area.<br><br>Review of WFD risk assessments for waterbodies in the study area. |

**Water**

The Strategy will maintain the existing coastal processes along the frontage. In the development of the CSS, it was advised by the Environment Agency that there is no modelled flood data for future scenarios. The study has therefore only considered flooding from a present day 1 in 200 year coastal flooding event. Environment Agency mapping indicates that the study area is not at risk of coastal flooding, and as such, the objective of ensuring the works do not increase the risk of flooding is met as a result of the Strategy.

The findings of the WFD assessment identified that the Strategy is not considered to result in deterioration in water body status on the coastal, groundwater or river water bodies present within the study area.

| Mitigation | Monitoring |
|---|---|
| None required. | Periodic review of flood risk. Maintenance of a flood risk register, with an approximate standard of protection indicated to include:<br><br>Residential properties;<br>Commercial properties;<br>Tourist attractions;<br>Critical infrastructure;<br>Nature conservation sites;<br>Heritage assets.<br><br>Review of climate change and sea level rise predictions. |

### Historic environment

The Strategy would result in the loss of SAMs and a listed building as the coastline retreats, however the majority of the frontage is currently undefended and as such, heritage assets would be lost naturally over time as a result of coastal erosion. The Strategy would, however, provide protection to a number of listed buildings within the southern section of Robin Hood's Bay village through improvement of the existing defences.

| Mitigation | Monitoring |
|---|---|
| No legal obligation exists to protect the SAMs as natural coastal processes will eventually erode these features.<br><br>Additional archaeological assessments of the areas affected by the Strategy's options will be required with the aim of producing site specific mitigation strategies, in accordance with national. Regional and local policies and guidelines and with all relevant national and regional archaeological research agendas.<br><br>It is possible that the remains of the alum quarries, and listed building would need to be excavated and recorded prior to their loss as a result of coastal erosion for prosperity purposes. | Monitoring plan to record the number of archaeological studies carried out for each stage of implementation.<br><br>Any new features of archaeological interest identified during monitoring must be reviewed and recorded. |

### Landscape

Overall, the Strategy is considered to have a positive effect on the landscape. The landscape within the study area is made up of sheer cliffs and steep coastal slopes, fronting rocky shore platforms and picturesque villages. No additional construction works are required other than in areas which are already defended, and as such, the Strategy would not impact on the present day management of the coast. The natural evolution of the coastline would be permitted along the majority of the frontage, which would maintain the local character of the area, however this would result in the loss of Heritage Coast; coastal habitats are however likely to migrate inland which would prevent the loss of Heritage Coast.

The degradation of property as the coastline retreats would be considered a negative impact on the existing landscape, however this could be avoided through removal of the properties and re-construction landward, prior to the properties becoming degraded as a result of coastal erosion.

| Mitigation | Monitoring |
|---|---|
| Removal of degrading man-made structures from the coastal frontage has potential to enhance the local landscape character. | Condition monitoring of existing defences within the southern section of Robin Hood's Bay village, in addition to monitoring of coastal erosion rates. |

## Conclusions

The SEA for the Strategy has identified the potential impacts of a range of coastal erosion risk management options at the strategic level and helped inform the selection of a preferred Strategy. The impacts of the preferred Strategy have been assessed as much as possible in light of the current level of knowledge and information available, and of the preferred Strategy options and how they might be implemented.

Undertaking SEA at this strategic level has ensured that the preferred Strategy is able to be implemented and will not result in impacts or issues that cannot be appropriately managed or mitigated at the project level. Nevertheless at this strategic level, some uncertainty remains over how individual projects will be implemented, the specific impacts that could arise and mitigation measures required. This will be addressed further as an integral part of a more detailed environmental assessment or of the EIA process, if required, for individual schemes (i.e. capital improvement of existing defences). Monitoring will allow a review of actual impacts against predicted impacts and will feed back into subsequent reviews of the Strategy.

**CONTENTS**

# 1 INTRODUCTION

## 1.1 The Robin Hood's Bay Coastal Strategy Study

### 1.1.1 Project background and aims / objectives

The aim of the Robin Hood's Bay Coastal Strategy Study (CSS) is to provide an up to date assessment of the risks to people and the built, natural and historic environment from coastal erosion, slope instability and sea flooding along the 24.2km shoreline frontage between Whitby and Hundale Point and to develop a strategy for the sustainable management of this coastline.

Mouchel was commissioned by Scarborough Borough Council in 2009 to develop the CSS.

The Strategic Appraisal Report (StAR) and associated documents (including the Strategic Environmental Assessment (SEA) Environmental Report (ER)) were issued for initial consultation to the Environment Agency in February 2011, and a number of comments were received on both the technical and non-technical aspects of the documents.

Royal HaskoningDHV was subsequently commissioned by Scarborough Borough Council in May 2012 to update and enhance the StAR and associated documents in relation to the Robin Hood's Bay CSS.

This addendum report addresses the specific comments received on the ER (Mouchel, 2010, see **Appendix G2b** of the StAR, 2012) from the Environment Agency NEAS officer. It is not the intention to address the comments received by producing a revision of the ER prepared by Mouchel (2010). As such, this addendum should be read in conjunction with the ER (Mouchel, 2010) and, for this reason, the ER is included as **Appendix G2b** of the StAR, 2012.

The comments received from the Environment Agency's National Environmental Assessment Service (NEAS) Officer on the ER and StAR (Mouchel, 2010, **Appendix G2b** of the StAR, 2012) are summarised in **Table 1** below. **Table 1** also indicates the section within this addendum report where the comment has been addressed.

**Table 1 Summary of Environment Agency NEAS officer comments on ER and StAR (Mouchel, 2010)**

| Comment | Reference to section within the addendum report where the comment has been addressed |
|---|---|
| **NEAS officer comments on the ER** | |
| The study area is not identified within the SEA, with regard to the landward boundary | Section 2 and Figure 2 |
| A Water Framework Directive (WFD) assessment has not been undertaken | Section 6 |
| Section 6.1 suggests that the old Project Appraisal Guidance has been used rather than the new version. | Section 4.2 |
| A number of comments were made with regard to the assessment tables in Section 5, 6 and 7 of the ER (Mouchel, 2010). Comments comprised:<br>• It would be easier to read with the objectives written out rather than cross referencing back to previous tables;<br>• There is a lack of clarity and explanation of impacts regarding environmental impacts of each option;<br>• There is a lack of information on mitigation required and what enhancements have been identified;<br>• 'Unknown' and 'neutral' impacts are currently combined, as such it is not known whether the impact is unknown or neutral;<br>• It would help if there was some text within the tables to justify the colour scheme. | Section 4; Tables 2-4<br>Section 4; Tables 2-4<br>Section 5.1, Table 7<br>Section 4.2<br>Section 4, Tables 2-4; Section 5 Table 6 |
| There is a lack of detail on how environmental factors have influenced the decision making process. | Section 1.1.1 |
| There is no detail on potential opportunities associated with the options. | Section 5, Table 7 |
| There are no objectives relating to contaminated land, and no mention of contaminated land within the assessment. The public exhibition identified a tip at Robin Hood's Bay, however no assessment of the impact has been undertaken. | Section 4.2 and Section 7.5 |
| It is unclear whether the comments within the consultation section were made during the scoping stage or more recently. | Section 5 |
| A number of comments were made in relation to the appendices, including:<br>• Appendix A1 should state that the identified plans have already been considered as the ER is the end of the process;<br>• There are few links between the plans, policies and programmes and the SEA or CSS. Most cases say that the SEA will consider the guidance, however information should be drawn out about potential synergies, cumulative impacts etc.<br>• The Shoreline Management Plan should be under the review section (this appears to be missing at present).<br>• Some of the regulations identified e.g. PPG16 are now out of date. | The plans and policies identified in Appendix A1 of Mouchel's SEA have been considered in the ER. Section 5.2<br>Compliance with SMP discussed in Section 4.3.3 and Section 5.2.<br>Section 4.2 |

| Comment | Reference to section within the addendum report where the comment has been addressed |
|---|---|
| **NEAS officer comments on the StAR** | |
| Details of the preferred option and its environmental impacts | See revised StAR (Royal HaskoningDHV, 2012) |
| Mitigation requirements (and costs of this, which should be clearly identified within the breakdown) | See revised StAR (Royal HaskoningDHV, 2012) |
| Enhancement costs – need to consider enhancements even if they may not attract GiA funding immediately. | See revised StAR (Royal HaskoningDHV, 2012) |
| A strategic indicative landscape plan is recommended but not mandatory. This should show the key constraints, opportunities and mitigation requirements associated with the plan. | See revised StAR (Royal HaskoningDHV, 2012) |
| Clarity of Habitats Regulations issues – unclear on whether Natural England concurs with the view that the plan will have no likely significant effect on the designated sites. | Section 7.4.1 |

The SEA carries out a high level environmental assessment of the Strategy's options based upon available information and professional judgement. As such, it is largely a qualitative appraisal exercise. The SEA is an iterative process which informs and appraises the developing Strategy. It identifies the potential environmental effects that could arise as a result of the implementation of the Strategy, allowing them to be taken into account during the development of coastal erosion management options and before the Strategy is approved.

Further more detailed environmental assessment will need to be carried out at project level which could involve targeted field surveys and quantitative assessment of the potential impacts.

This addendum report (in addition to the ER, Mouchel, 2010) represents Stage 3 in the SEA approach, as illustrated in **Figure 1** below.

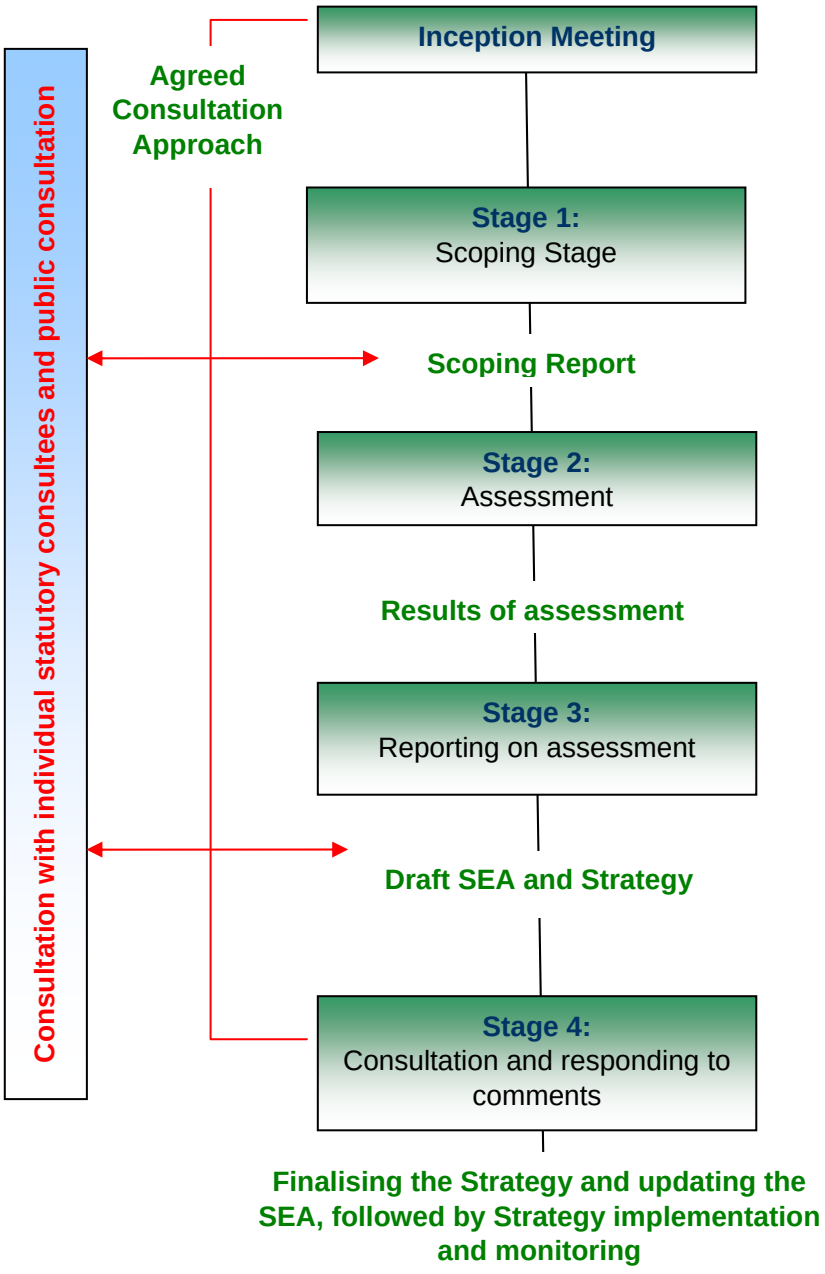



**Figure 1** **SEA approach and stages undertaken for the Strategy**

## 2 STUDY AREA

The study area boundary follows the areas set out in the North East Shoreline Management Plan 2 (SMP2) and have been referred to in the CSS as Management Areas 24 (MA24) and 25 (MA25). These MAs were further divided into Policy Units, including Policy Unit 24.1, 25.1 and 25.2. The study area extends 100m inland from the top of the eroding cliff edge. The study area for the CSS is illustrated on **Figure 2.**

## 3 STRATEGIC OPTIONS

The Strategy aims to provide a framework for sustainable coastal erosion and flood risk management within the study area for the next 100 years, in order to manage the risk to people and the developed and natural environment. The purpose of the SEA is to identify and appraise coastal erosion and flood risk management options.

The following strategic options have been considered for each of the Policy Units within the study area:

- **No active intervention** (Do nothing): let nature take its course – no work will be carried out to maintain or repair defences, leaving them to deteriorate over time.
- **Active intervention maintain** (Hold the line): defences are maintained as they are, but as sea levels rise, flood and erosion risks increase over time.
- **Active intervention sustain** (Hold the line): defences are raised and strengthened keeping the levels of flood and erosion risks the same as present day.
- **Active intervention improve** (Hold the line): defences are improved to increase the standard of protection over time, beyond the requirements of rising sea levels.
- **Managed realignment** (retreat the line): improve coastal stability by moving coastal defences to a more sustainable location further inland, allowing controlled flooding to occur.
- **Adaptive management**: managing complex areas by monitoring changes and acting on them in a planned but flexible way, increasing our understanding over time.

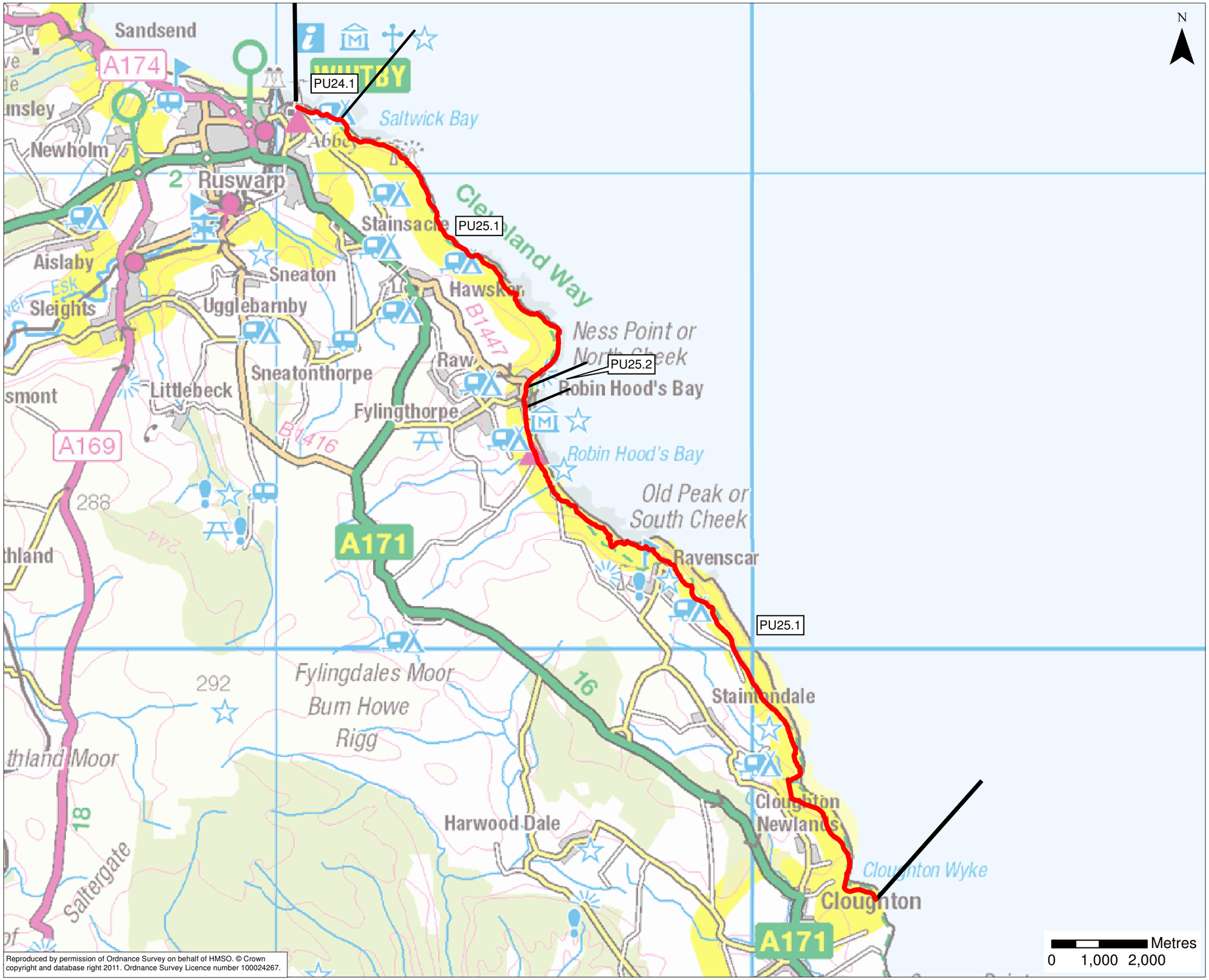
*Preferred strategic options*

The preferred strategic options were developed by Mouchel during 2009 to 2011, taking into account the information from the SEA scoping report (Mouchel, 2009), responses from consultation during the scoping stage, the results of a Habitats Regulations Assessment (HRA) screening report, a condition assessment of existing defences, a feasibility report, an economic assessment using Flood and Coastal Erosion Risk Management (FCERM) appraisal guidance (Environment Agency, 2010) and an environmental assessment of the alternative options.

The preferred option for Policy Unit 24.1 and 25.1 is Adaptive management. This option would allow the coastline to naturally erode landwards. Residential and commercial properties would be abandoned with planning provision for replacement buildings on either the property owner's land or land possibly made available by the North York Moors National Park Authority. Damaged property demolition costs may be covered by the Coastal Erosion Assistance Grant administered through the Environment Agency subject to available funding.

The preferred option within Policy Unit 25.2 is Adaptive management / active intervention maintain. This option includes a property roll back scheme within which some residential and commercial properties would be abandoned, with planning provision for replacement buildings on either the property owner's land or land possibly made available by the North York Moors National Park Authority. A drainage investigation would also be required to identify ownership of assets for the entire drainage assets lost or affected by the coastal erosion, and possible remedial works required to delay erosion. A surface water diversion scheme would also be required to divert drainage flows to outfall at a lower part of Robin Hoods Bay village; the diversion scheme would alleviate cliff saturation (and therefore subsequent cliff failure) which could delay the onset of coastal erosion to the 18 properties within the northern part of the village. A low risk of cliff failure still remains with this option in the northern part of the village where there is uncertainty as to the effect of drainage leaks on water levels at rock head.

The option for this Policy Unit (25.2) also includes capital improvement schemes to the existing coastal defences in the southern section of Robin Hood's Bay village. Should climate change increase the rate of coastal erosion and cliff failures along this section, this option will seek to ensure that the coastal communities adapt to the changing conditions. This option would require a full asset condition assessment to reduce project cost uncertainties when maintaining existing defences.






- Study Area
- Strategy Frontage Boundary
- Policy Unit Boundary
- 25.1 Policy Unit Name

Title: Study Area

Project: Robin Hood's Bay Coastal Strategy

Client: Scarborough Borough Council

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# 4 STRATEGIC ALTERNATIVES

## 4.1 Introduction

The Environment Agency's NEAS officer had a number of comments in relation to Section 6 of the ER (Mouchel, 2010) which largely related to the presentation of the assessment tables and a lack of justification behind the conclusions made in the assessment. This section of the addendum report addresses these comments, through the addition of justification, re-formatting and provision of additional detail.

The assessment of alternatives has been produced with reference to the assessment within Section 6: Task B2 of the ER (Mouchel, 2010). Tables 9, 10 and 11 of the ER (Mouchel, 2010) have been reproduced below and revised to address the comments received from the NEAS officer on the original ER (Mouchel, 2010). The assessment has been based on the environmental baseline information presented within Appendix B of the ER (Mouchel, 2010) and Figures 7.1.1 to Figure 7.4.7 within the SEA Scoping Report (Mouchel, 2009). Where necessary, the conclusions of the assessment of alternatives have been altered from those within the ER (Mouchel, 2010) where the assessment differs from that within the original assessment.

## 4.2 Options

The preferred options within the CSS were developed taking into account the information from the SEA scoping report (Mouchel, 2009), responses from consultation during the scoping stage, the results of a Habitats Regulations Assessment (HRA) screening report, a condition assessment of existing defences, a feasibility report and an economic assessment using Flood and Coastal Erosion Risk Management (FCERM) appraisal guidance (Environment Agency, 2010). Mouchel's benefit appraisal, prepared as part of the January 2010 consultation draft was re-aligned by J Chatterton Associates during November 2011, in light of the FCERM appraisal guidance to include only allowable national benefits associated with the options appraised to manage future coastal erosion risk.

**Tables 2** to **Table 4** present the predicted impacts from each of the shortlisted alternative options on each of the SEA objectives for Policy Unit 24.1, 25.1 and 25.2 respectively, highlighting whether the impact will be beneficial (green), negative (red), neutral (grey) or not applicable (white). The SEA objectives were determined by Mouchel during the SEA scoping stage, and were derived from environmental protection legislation or obtained from the objectives of relevant plans and programmes. It should be noted that some of the regulations identified within Appendix A of the original SEA (Mouchel, 2010) are now no longer relevant (e.g. Planning Policy Guidance 16: Archaeology and Planning has been replaced by Planning Policy Statement 5: Planning for the Historic Environment; The Conservation Regulations (1994) Habitats Regulations have also been replaced by The Conservation of Habitats and Species Regulations, 2010).

The key below presents the colour scheme used within assessment **Tables 2** to **4**.

| | |
|---|---|
| Beneficial | |
| Negative | |
| Neutral | |
| Not applicable | |

The ER (Mouchel, 2010, **Appendix G2b** of the StAR, 2012) used an 'unknown' category within the assessment of alternatives tables. To address comments made by NEAS, this category has been removed from the revised assessment tables, as further interpretation has been provided in order to reach a conclusion, rather than stating an unknown impact. A 'not applicable' criterion has been added into the assessment tables to account for cases where it is considered that the SEA objectives and indicators/targets do not relate to the management option. One such example is an objective relating to coastal flooding, within a policy unit which does not suffer from coastal flooding. A neutral impact has been predicted where there are both positive and negative impacts associated with the implementation of a particular option.

**Table 2 Appraisal of alternative options for Policy Unit 24.1**

| SEA Objective | Options | | | |
|---|---|---|---|---|
| | **1a. No active intervention: leave the coast to naturally retreat** | **1b. No active intervention (health and safety): leave the coast to naturally retreat with strategically positioned signs** | **2. Adaptive management: Property roll back** | **3. Active intervention improve: rock armour at the toe of the cliff where individual property requires protection, namely Abbey Farm storage buildings** |
| 1. Provide conditions for business success, economic growth and investment with specific reference to fishing and farming industries | Loss of 5 ha of agricultural land due to coastal erosion in addition to loss of the Abbey Farm storage buildings. | As option 1a. | Loss of 5 ha of agricultural land due to coastal erosion. The property roll back option would ensure business continuity at the caravan park at the south-eastern end of the unit in addition to Abbey Farm storage buildings. Likely loss of agricultural land due to construction of property further inland. | Loss of agricultural land due to coastal erosion. The protection of Abbey Farm storage buildings would help to maintain the integrity of the local community and provide conditions for business success at this location. |
| 2. Support tourism industry through provision of access to facilities and attractions | Loss of the coastal footpath and caravan park at the south-eastern end of the unit. Small access roads within the unit are also at risk. | As option 1a. | Facilities (e.g. coastal path and access roads) at risk of coastal erosion. | The static caravans within the south-eastern section of the unit would be retained. |
| 3. Maintain vibrant local communities | Approximately 150 static caravans are at risk of coastal erosion in the south-eastern section of the unit. Loss of such caravans could impact on the local population, as well as impacting on health of local residents through increased stress. | Static caravans are at risk of coastal erosion in the south-eastern section of the unit. Loss of such caravans could impact on the local population, as well as impacting on health of local residents through increased stress. | The properties at risk of coastal erosion would be moved landward, ensuring that the local community remains vibrant. | Protection of the properties at risk within the area would maintain the population within the area, in addition to reducing stress levels within local residents which could reduce the number of people not in good health. |
| 4. Ensure safety and security of people and property | Properties within the unit would be at risk of coastal erosion, therefore safety and security of people and property could be adversely affected. | Property would continue to be at risk within the unit. Signage would be used however to reduce the risk to human health associated with degrading property and the eroding coastline. Removal of damaged property for public safety is also included within this option, which would provide safety to people. | The properties at risk of coastal erosion would be moved landward, ensuring that the number of dwellings within the unit would not decrease. | The properties at risk of coastal erosion would be protected this option. However, the placement of rock armour has potential to cause health and safety issues to users. |
| 5. Maintain transport network, encouraging cycling, walking, minimising traffic and promoting access to the countryside | The coastal footpath would be at risk of coastal erosion, which would prevent recreational activities including cycling and walking. | As option 1a. | As option 1a. | The coastal footpath would be at risk of coastal erosion (with the exception of localised stretches as a result of defences), which would prevent recreational activities including cycling and walking along a continuous path. |
| 6. Maintain access to local facilities and services whilst minimising environmental impacts | The local access roads would be at risk of coastal erosion, therefore reducing access to local facilities and services. | As option 1a. | As option 1a. | As option 1a (with the exception of local areas where the coastline would be defended). |
| 7. Ensure local needs are met locally | Loss of 5ha of agricultural land reducing the ability of local produce to meet the needs of local people. | As option 1a. | As option 1a. Landward realignment of property would allow people to work from home however. | As option 1a with the exception of localised protection. |
| 8. Support creativity, innovation and appropriate use of technology | No innovative or technological works proposed. | As option 1a. | As option 1a. | As option 1a. |
| 9. Promote good health through provision of access to leisure facilities including footpaths | The coastal footpath would be at risk of coastal erosion, which would prevent recreational activities including cycling and walking. | As option 1a. | As option 1a. | As option 1a, with the exception of localised areas where the footpath would be retained as a result of coastal defences constructed to protect properties. |
| 10. Minimise impacts to human health (e.g. pollution and stress) and safeguard positive impacts | Properties within the unit would be at risk of coastal erosion, stress levels within the very few residential properties would be high which would impact upon health. | Property would continue to be at risk within the unit, however signage would be used to reduce the risk to human health associated with degrading property and the eroding coastline. | The properties at risk of coastal erosion would be moved landward, which would likely reduce long term stress levels of residents within the static caravans. | The properties at risk of coastal erosion would be protected by rock armour, which would likely reduce long term stress levels of residents within the static caravans. |

| SEA Objective | Options | | | |
|---|---|---|---|---|
| | **1a. No active intervention: leave the coast to naturally retreat** | **1b. No active intervention (health and safety): leave the coast to naturally retreat with strategically positioned signs** | **2. Adaptive management: Property roll back** | **3. Active intervention improve: rock armour at the toe of the cliff where individual property requires protection, namely Abbey Farm storage buildings** |
| 11. Conserve and enhance terrestrial, biological and geological environment, particularly designated sites and protected species | There are no designated terrestrial habitats at risk within the unit. As the coastline erodes, BAP habitat (maritime cliff and slope) is likely to migrate inland; coastal grassland and woodland have evolved on these sites over thousands of years, which are likely to have been subject to erosion and instability in the past. These changes are naturally occurring and seen as no change to present day conditions. | As option 1a. | As option 1a. | As option 1a, with the exception of potentially reduced impact on the SSSI (through reduced slumping of material within the coastal slope) due to coastal defences reducing the amount of falling debris. Rock armour is likely to have a negative impact on the coastal SSSIs. |
| 12. Conserve and seek to enhance coastal and marine biological and geological environment, particularly designated sites and protected species | There is likely to be potential erosion/slumping of the SSSI as the coastline retreats; such erosion of the SSSI could result in exposure of additional geological interest feaures. These changes are naturally occurring and seen as no change to present day conditions. Consultation with Natural England has identified that stabilising rock outcrops would have a negative impact on geologically designated SSSIs. | As option 1a. | As option 1a. | Potential direct localised loss of foreshore habitat however as a result of defence construction, and indirect loss as sea levels rise resulting in coastal squeeze. In-land migration of BAP habitat elsewhere within the unit where defences are not constructed. |
| 13. Maintain and safeguard opportunities for all to access and understand ecological and geological environment | Access to the designated SSSI would need to be restricted due to potential for falling debris as the coastline retreats. The option would also result in the loss of the coastal footpath which would reduce access to the ecological environment. Increased study potential of the geological SSSI as the coastline retreats as there is potential for increased exposure of interest features. | As option 1a. | As option 1a. | As option 1a with the exception of localised protection of the footpath allowing very localised access to the environment. |
| 14. Minimise pollution to levels which do not damage biological or geological environment | There are no identified sources of contaminated land or potential pollution which are at risk of erosion. | As option 1a. | As option 1a. | The option has potential to result in pollution of the marine environment as a result of spills or leakages or fuels etc. during construction, whilst the construction works have potential to directly damage the geological SSSI. |
| 15. Minimise pollution to levels which do not damage soil | No identified industrial or contaminated land within the unit at risk of erosion. | As option 1a. | As option 1a. | As option 1a. |
| 16. Minimise pollution to levels which do not damage the water environment including surface water and groundwater | There is potential for material within the coastal slope to become transported into the surface water as the coastline retreats, however this is a naturally occurring process. In addition, no potentially contaminated sites have been identified within the unit. | As option 1a. | As option 1a. | Potential for reductions in water quality as a result of spillages of fuels/oils used in plant during construction of defences. |

| SEA Objective | Options | | | |
|---|---|---|---|---|
| | **1a. No active intervention: leave the coast to naturally retreat** | **1b. No active intervention (health and safety): leave the coast to naturally retreat with strategically positioned signs** | **2. Adaptive management: Property roll back** | **3. Active intervention improve: rock armour at the toe of the cliff where individual property requires protection, namely Abbey Farm storage buildings** |
| 17. Ensure any potential works do not increase the risk of flooding | The unit does not suffer from coastal flooding therefore this is not applicable. | As option 1a. | As option 1a. | As option 1a. |
| 18. Manage natural resources in a way which sustain their environmental qualities as well as their productive (or economic) potential | Agricultural productivity within the unit would decrease as coastal erosion would result in the loss of 5ha of agricultural land. No known fisheries within the unit. The area available for pot fishing would increase however as the coastline retreats. | As option 1a. | As option 1a. | Defences would lead to the protection of Abbey Farm storage buildings, however defences would not stretch along the whole coastline. |
| 19. Maintain and safeguard opportunities for all to access and understand local heritage | Loss of a section of Saltwick Nab Alum Quarry Scheduled Monument. | As option 1a. | As option 1a. | Localised protection of heritage assets |
| 20. Preserve and enhance all aspects of the historic environment | Loss of a section of Saltwick Nab Alum Quarry Scheduled Monument. | As option 1a. | As option 1a. | Localised protection of heritage assets. |
| 21. Maintain and where possible enhance special landscape, local distinctiveness and settlement character, taking into the dynamic nature of the coastal landscape. | Coastal erosion is a natural process, and the area naturally has steep, high cliffs. This option would not impact upon natural processes. Loss of National Park land and Heritage Coat however. | As option 1a, however the option has potential to reduce the landscape value through the use of signs. | As option 1a. | The construction of localised defences would alter the existing landscape and visual amenity value through the addition of rock armour at the toe of the cliff. The placement of rock armour also has potential for the accumulation of litter which can impact upon the landscape value. Loss of National Park land in areas which are not to be defended. |

**Table 3 Appraisal of alternative options for Policy Unit 25.1**

| SEA Objective | Options | | | |
|---|---|---|---|---|
| | **1a. No active intervention: leave the coast to naturally retreat** | **1b. No active intervention (health and safety): leave the coast to naturally retreat with strategically positioned signs** | **2. Adaptive management: Property roll back** | **3. Active intervention improve: rock armour at the toe of the cliff where individual property requires protection, particularly Whitby Light House and Coast Guard Area** |
| 1. Provide conditions for business success, economic growth and investment with specific reference to fishing and farming industries | Loss of 189ha of grade 3 agricultural land therefore reducing agricultural productivity. | As option 1a. | Loss of 189ha of agricultural land due to coastal erosion. The property roll back option would ensure business continuity at the caravan park. Likely loss of agricultural land due to construction of property further inland. | Loss of agricultural land due to coastal erosion in areas where defences are not constructed. Protection of agricultural land locally and protection of the caravan park would maintain conditions for business success however. |
| 2. Support tourism industry through provision of access to facilities and attractions | The coastal footpaths and access roads will be severed as a result of coastal erosion. | As option 1a. | As option 1a. | As option 1a, with the exception of localised areas which would be protected. |
| 3. Maintain vibrant local communities | Loss of 14 properties as a result of coastal erosion. | As option 1a. | The properties at risk of coastal erosion would be moved landward, ensuring that the local community remains vibrant. | Protection of the properties at risk within the area would maintain the population within the area, in addition to reducing stress levels within local residents which could reduce the number of people not in good health. |
| 4. Ensure safety and security of people and property | Properties within the unit would be at risk of coastal erosion, therefore safety and security of people and property could be adversely affected. | Property would continue to be at risk within the unit. Signage would be used however to reduce the risk to human health associated with degrading property and the eroding coastline. | The properties at risk of coastal erosion would be moved landward, ensuring that the number of dwellings within the unit would not decrease. | The properties at risk of coastal erosion would be protected by this option. However, the placement of rock armour has potential to cause health and safety issues to users. |
| 5. Maintain transport network, encouraging cycling, walking, minimising traffic and promoting access to the countryside | The coastal footpath would be at risk of coastal erosion, which would prevent recreational activities including cycling and walking. | As option 1a. | As option 1a. | The coastal footpath would be at risk of coastal erosion (with the exception of localised stretches as a result of defences), which would prevent recreational activities including cycling and walking along a continuous path. |
| 6. Maintain access to local facilities and services whilst minimising environmental impacts | The relatively few minor roads along the frontage would be at risk of erosion and therefore this option would be against the target of maintaining the area of road within the study area. | As option 1a. | As option 1a. | As option 1a with the exception of localised protection. |
| 7. Ensure local needs are met locally | Loss of 189ha of agricultural land, reducing the potential for local resources to meet the needs of local people. | As option 1a. | As option 1a. Landward realignment of property would allow people to work from home however. | As option 1a with the exception of localised protection of agricultural land where defences are constructed. |
| 8. Support creativity, innovation and appropriate use of technology | The option would not use any innovative techniques to combat erosion. | As option 1a. | As option 1a. | As option 1a. |
| 9. Promote good health through provision of access to leisure facilities including footpaths | The coastal footpath would be at risk of coastal erosion, which would prevent recreational activities including cycling and walking. | As option 1a. | As option 1a. | The coastal footpath would be at risk of coastal erosion (with the exception of localised stretches as a result of defences), which would prevent recreational activities including cycling and walking along a continuous path. |
| 10. Minimise impacts to human health (e.g. pollution and stress) and safeguard positive impacts | Properties within the unit would be at risk of coastal erosion, stress levels within the very few residential properties would be high which would impact upon health. | Property would continue to be at risk within the unit, however signage would be used to reduce the risk to human health associated with degrading property and the eroding coastline. | The properties at risk of coastal erosion would be moved landward, which would likely reduce long term stress levels of residents within the static caravans. | The properties at risk of coastal erosion would be protected by rock armour, which would likely reduce long term stress levels of residents within the static caravans. |

| SEA Objective | Options | | | |
|---|---|---|---|---|
| | **1a. No active intervention: leave the coast to naturally retreat** | **1b. No active intervention (health and safety): leave the coast to naturally retreat with strategically positioned signs** | **2. Adaptive management: Property roll back** | **3. Active intervention improve: rock armour at the toe of the cliff where individual property requires protection, particularly Whitby Light House and Coast Guard Area** |
| 11. Conserve and enhance terrestrial, biological and geological environment, particularly designated sites and protected species | Inland migration of ancient woodland and wet woodland BAP habitat adjacent to watercourses as the coastline retreats. National trust land and North York Moors National Park land would however be lost. | As option 1a. | As option 1a. | As option 1a with the exception of localised protection where defences are constructed. |
| 12. Conserve and seek to enhance coastal and marine biological and geological environment, particularly designated sites and protected species | Inland migration of ancient woodland and wet woodland BAP habitat adjacent to watercourses as the coastline retreats. Potential erosion of and slumping to the Maw Wyke to beast Cliff SSSI, Iron Scar and Hundale Point to Scalby Ness SSSI, Hayburn Wyke SSSI and Maw Wyke to Beast Cliff SAC from falling debris and erosion as the coastline retreats. This is naturally occurring and seen as no change to present day coastal management. Erosion of geological SSSIs can lead to the exposure of new interest features. Consultation with Natural England has identified that stabilising rock outcrops would have a negative impact on geologically designated SSSIs. | As option 1a. | As option 1a. | Maritime habitat protected locally where defences are in place. Potential direct localised loss of foreshore habitat however as a result of defence construction, and indirect loss of intertidal habitat as sea levels rise resulting from coastal squeeze. Inland migration of maritime cliff and slope BAP habitat elsewhere within the unit where defences are not constructed. Consultation with Natural England has identified that stabilising rock outcrops would have a negative impact on geologically designated SSSIs, and generally Natural England would advise against coastal protection works to protect wildlife habitats. |
| 13. Maintain and safeguard opportunities for all to access and understand ecological and geological environment | Access to the geologically and ecologically designated sites would need to be restricted due to potential for falling debris and subsequent health and safety impacts as the coastline retreats. The option would also result in the loss of the coastal footpath which would reduce access to the environment. Increased study potential of the geological SSSI as the coastline retreats as there is potential for increased exposure of interest features. | As option 1a. | As option 1a. | As option 1a with the exception of localised protection of the footpath allowing very localised access to the environment. Increased study potential of the geological SSSI as the coastline retreats (where is it undefended) as there is potential for increased exposure of interest features. |
| 14. Minimise pollution to levels which do not damage biological or geological environment | A disused pit (potential source of contamination) is present within the study area. Other sources of contamination within the study area include a number of former alum works (namely Stoupe Brown alum works, Peak alum works and Saltwick Nab alum quarry), which have the potential to contain contaminants which could impact upon the biological environment. | As option 1a. | As option 1a. | The option has potential to result in pollution of the marine environment as a result of spills or leakages or fuels etc. during construction, whilst the construction works have potential to directly damage the geologically designated SSSIs. |

| SEA Objective | Options | | | |
|---|---|---|---|---|
| | **1a. No active intervention: leave the coast to naturally retreat** | **1b. No active intervention (health and safety): leave the coast to naturally retreat with strategically positioned signs** | **2. Adaptive management: Property roll back** | **3. Active intervention improve: rock armour at the toe of the cliff where individual property requires protection, particularly Whitby Light House and Coast Guard Area** |
| 15. Minimise pollution to levels which do not damage soil | A disused pit (potential source of contamination) is present within the study area. Other sources of contamination within the study area include a number of former alum works (namely Stoupe Brown alum works, Peak alum works and Saltwick Nab alum quarry), which have the potential to contain contaminants which could impact upon the natural environment. | As option 1a. | As option 1a. | The option has potential to result in pollution of the marine environment as a result of spills or leakages or fuels etc. during construction, whilst the construction works have potential to directly damage the geological SSSI. |
| 16. Minimise pollution to levels which do not damage the water environment including surface water and groundwater | A disused pit (potential source of contamination) is present within the study area. Other sources of contamination within the study area include a number of former alum works (namely Stoupe Brown alum works, Peak alum works and Saltwick Nab alum quarry), which have the potential to contain contaminants which could impact upon the surface water quality. | As option 1a. | As option 1a. | The option has potential to result in pollution of the marine environment as a result of spills or leakages or fuels etc. during construction. |
| 17. Ensure any potential works do not increase the risk of flooding | The entire policy unit is undefended against flooding as there is no threat from a 1 in 200 year event. | As option 1a. | As option 1a. | As option 1a. |
| 18. Manage natural resources in a way which sustain their environmental qualities as well as their productive (or economic) potential | Loss of 189ha of grade 3 agricultural land, which would reduce agricultural productivity in the area. The Bay fishery is located within the unit. The retreat of the coastline has potential to maintain the availability of fishing grounds for potting. Overall, a neutral impact has been predicted. | As option 1a. | As option 1a. | As option 1a with the exception of localised protection resulting from defences. |
| 19. Maintain and safeguard opportunities for all to access and understand local heritage | Loss of three scheduled ancient monuments, Stoupe Brown alum works, Peak alum works, Saltwick Nab alum quarry and one listed building. | As option 1a. | As option 1a. | As option 1a with the exception of localised protection resulting from defences. |
| 20. Preserve and enhance all aspects of the historic environment | Loss of three scheduled ancient monuments, Stoupe Brown alum works, Peak alum works, Saltwick Nab alum quarry and one listed building (Whitby High Light House Grade II Listed). | As option 1a. | As option 1a. | As option 1a with the exception of localised protection resulting from defences. Whitby Light House would be protected from coastal erosion. |
| 21. Maintain and where possible enhance special landscape, local distinctiveness and settlement character, taking into the dynamic nature of the coastal landscape. | Coastal erosion is a natural process, and the area naturally has steep, high cliffs. This option would not impact upon natural processes, therefore the special landscape value currently present would be maintained. Loss of National Park land and Heritage Coast. | As option 1a. | As option 1a. | The construction of localised defences would alter the existing landscape and visual amenity value through the addition of rock armour at the toe of the cliff. The placement of rock armour also has potential for the accumulation of litter which can impact upon the landscape value. |

**Table 4 Appraisal of alternative options for Policy Unit 25.2**

| SEA Objective | Options | | | | | | |
|---|---|---|---|---|---|---|---|
| | **1a. No active intervention: leave the coast to naturally retreat** | **1b. No active intervention (health and safety): leave the coast to naturally retreat with strategically positioned signs** | **2. Adaptive management/active intervention maintain. Property roll back scheme in the north, improvement of defences in the southern village** | **3. Active intervention maintain. Upper village drainage investigation and deep root vegetation slope stabilisation. Capital improvement of defences in the southern village** | **4. Active intervention maintain. Capital improvement works to current defences in the southern village** | **5. Active intervention improve. Installation of soil nails. Capital improvement works to defences in the southern village** | **6. Active intervention improve. Contiguous bored pile wall with capital improvement scheme to existing defence assets within the southern village** |
| 1. Provide conditions for business success, economic growth and investment with specific reference to fishing and farming industries | Aerial photography indicates the presence of small boats docked near the foreshore, which are likely to be used for fishing activity. Such docking facilities would be lost. Commercial properties would also be at risk of erosion including the caravan park, visitor information centre, Bayfair publications, Bulmers sweet shop and hotels (Bay Hotel, Ye Dolphin and Victoria). | As option 1a. | Protection of docking facilities within the southern section by maintaining existing defences. The property roll back option would ensure business continuity at the commercial properties within the northern section of the village. Potential for loss of agricultural land through construction of properties further inland. | Protection of the small section of agricultural land within the northern village as a result of reducing the erosion rates. Protection of the agricultural land, fishing interests and commercial property (e.g. Victoria Hotel) in the southern section of the village at present day levels. | Small section of agricultural land and local business at risk of coastal erosion within the northern section of the village. The features of interest within the southern section of the village would be protected at present day levels. | As option 3. | As option 3. |
| 2. Support tourism industry through provision of access to facilities and attractions | Tourism and recreational features within the village at risk of coastal erosion including visitor information centre, caravan park shop, caravan park reception, the old coast guard station, hotels, sweet shop etc. The coastal footpath and a small access road will be severed as a result of coastal erosion. Impacts on tourism due to cliff failure and associated visual impacts. The option would, however release beach-building material to the coastal system. | As option 1a. | Continued provision of tourism facilities by moving them further inland within the northern section of the village. Protection of the tourism industry features within the southern section of the village at present day levels. | Protection of the tourism and recreational features within the northern section of the village by reducing the coastal erosion rates. Protection of the tourism industry features within the southern section of the village at present day levels. | Tourism and recreational features within the northern section of the village continue to be at risk of coastal erosion. Short term protection of the tourism industry features within the southern section of the village. | Greater provision of coastal erosion protection to assets in the northern section of the village in comparison with options 2 and 3. Protection of the tourism industry features within the southern section of the village at present day levels. | As option 5. |
| 3. Maintain vibrant local communities | Approximately 60 properties (42 in the southern village and 18 in the northern village) would be affected by coastal erosion. Loss of community spirit within the village as a result of cliff failure and loss of property. | As option 1a. | The properties at risk of coastal erosion would be moved landward, ensuring that the local community remains vibrant. Properties in the south of the village would continue to be protected at present day levels. | The properties would be at reduced risk of coastal erosion as the option will drain the run-off water from the northern village and significantly reduce erosion rates. Properties in the south of the village would continue to be protected at present day levels. | Approximately 18 properties in the northern village would remain at risk of coastal erosion. | All properties would be protected by reducing the rate of coastal erosion and maintaining existing defences. | Protection of properties currently at risk of coastal erosion within the north. Protection of properties in the south at present day levels. |

| SEA Objective | Options | | | | | | |
|---|---|---|---|---|---|---|---|
| | **1a. No active intervention: leave the coast to naturally retreat** | **1b. No active intervention (health and safety): leave the coast to naturally retreat with strategically positioned signs** | **2. Adaptive management/active intervention maintain. Property roll back scheme in the north, improvement of defences in the southern village** | **3. Active intervention maintain. Upper village drainage investigation and deep root vegetation slope stabilisation. Capital improvement of defences in the southern village** | **4. Active intervention maintain. Capital improvement works to current defences in the southern village** | **5. Active intervention improve. Installation of soil nails. Capital improvement works to defences in the southern village** | **6. Active intervention improve. Contiguous bored pile wall with capital improvement scheme to existing defence assets within the southern village** |
| 4. Ensure safety and security of people and property | Properties within the unit would be at risk of coastal erosion, therefore safety and security of people and property could be adversely affected. Eroding coastal defences in the southern village can also result in health and safety implications to users of the foreshore. | Property would continue to be at risk within the unit. Signage would be used however to reduce the risk to human health associated with degrading property, degrading defences and the eroding coastline. | The properties at risk of coastal erosion within the northern section of the village would be moved landward, ensuring that the number of dwellings within the unit would not decrease. Property within the southern section would be protected at present day levels. | Protection of the 18 properties within the northern section of the village. Protection of the 42 properties within the southern section of the village at present day levels. | Properties within the northern section of the village would continue to be at risk. Properties within the southern section of the village protected at present day levels. | As option 3. | As option 3. |
| 5. Maintain transport network, encouraging cycling, walking, minimising traffic and promoting access to the countryside | The coastal footpath would be at risk of coastal erosion, which would prevent recreational activities including cycling and walking. | As option 1a. | The coastal footpath within the northern section of the village would remain at risk of coastal erosion. The footpath within the southern section of the village would be protected at present day levels, however would be at risk of erosion in the future as sea levels rise. | The coastal footpath and within the northern section of the village would be protected from coastal erosion by reducing erosion rates. The footpath within the southern section of the village would be protected at present day levels. | The coastal footpath within the northern section of the village would remain at risk of coastal erosion. | As option 3. | As option 3. |
| 6. Maintain access to local facilities and services whilst minimising environmental impacts | A small access road within the unit would be severed as a result of this option. Visits to indoor leisure facilities would also be reduced as a result of loss of such facilities. | As option 1a. | Indoor leisure facilities in the northern village at risk of erosion would be moved landward, therefore visits to such facilities would be maintained. Access roads within the southern section of the village would be maintained at present day levels. | There is little or no road infrastructure at risk within the northern section of the village. Access roads within the southern section of the village would be maintained at present day levels. | Local facilities and services within the northern section would continue to be at risk of coastal erosion. | As option 3. | As option 3. |
| 7. Ensure local needs are met locally | Loss of dwellings reducing the potential for people to work from home. | As option 1a. | Residential dwellings at risk of coastal erosion would be moved landward, therefore allowing people to continue to work from home. Property within the southern section of the village would be maintained at present day levels. | Property would be protected within the northern section of the village allowing people to work from home, whilst property in the southern section of the village would be maintained at present day levels. | The properties at risk of erosion within the northern section of the village would continue to be at risk. Properties in the south would be protected at present day levels, allowing people to continue to work from home. | As option 3. | As option 3. |
| 8. Support creativity, innovation and appropriate use of technology | The option would not use any innovative techniques to combat erosion. | As option 1a. | As option 1a. | The option would utilise a relatively innovative technique to combat coastal erosion in the northern section of the village. | As option 1a. | As option 3. | As option 1a. |

| SEA Objective | Options | | | | | | |
|---|---|---|---|---|---|---|---|
| | **1a. No active intervention: leave the coast to naturally retreat** | **1b. No active intervention (health and safety): leave the coast to naturally retreat with strategically positioned signs** | **2. Adaptive management/active intervention maintain. Property roll back scheme in the north, improvement of defences in the southern village** | **3. Active intervention maintain. Upper village drainage investigation and deep root vegetation slope stabilisation. Capital improvement of defences in the southern village** | **4. Active intervention maintain. Capital improvement works to current defences in the southern village** | **5. Active intervention improve. Installation of soil nails. Capital improvement works to defences in the southern village** | **6. Active intervention improve. Contiguous bored pile wall with capital improvement scheme to existing defence assets within the southern village** |
| 9. Promote good health through provision of access to leisure facilities including footpaths | The coastal footpath would be at risk of coastal erosion, which would prevent recreational activities including cycling and walking. | As option 1a. | The coastal footpath within the northern section of the village would remain at risk of coastal erosion. The footpath within the southern section of the village would be protected at present day levels, however would be at risk of erosion in the future as sea levels rise. | The coastal footpath within the northern section of the village would be protected from coastal erosion by reducing erosion rates. The footpath within the southern section of the village would be protected at present day levels. | As option 2. | As option 3. | As option 3. |
| 10. Minimise impacts to human health (e.g. pollution and stress) and safeguard positive impacts | Approximately 60 properties at risk of coastal erosion. Such erosion is likely to impact upon stress of local residents. | As option 1a, however this option would include the addition of signage which would ensure human health is maintained. | The property as risk would be moved landward, ensuring that human health is not adversely affected and stress levels do not result in ill health. Property within the southern section of the village would be maintained at present day levels. | Protection of the 18 properties within the northern section of the village. Protection of the 42 properties within the southern section of the village at present day levels. Erosion risks are likely to increase over time as sea levels rise, which is likely to affect the long term safety of people and property. | Approximately 18 properties in the northern village would remain at risk of coastal erosion. Such erosion risk could result in stress induced ill health. | As option 3. | As option 3. |
| 11. Conserve and enhance terrestrial, biological and geological environment, particularly designated sites and protected species[1] | There are no designated terrestrial habitats at risk within the unit. Inland migration of maritime cliff and slope BAP habitat. Potential to improve condition of Unit 7 of the Maw Wyke to Beast Cliff SSSI by removing the wall which covers a critical part of the cliff. | As option 1a. | As option 1a within the northern section of the village. No additional coastal protection works are proposed however, which will have a positive impact on the SSSI, geological and maritime features. | Vegetation planting to stabilise the coastal slope has the potential to enhance the local biodiversity value through the use of appropriate species. Vegetation planting would also bind the soil particles together and would maintain the existing terrestrial environment. | As option 2. | The option is likely to impact upon the biological elements of the Maw Wyke to Beast Cliff SSSI as a result of vegetation clearance and re-profiling to facilitate access to the coastal slope. | Significant disturbance to the SSSI as a result of the construction of the wall itself including direct loss of area within the SSSI from the construction footprint and disturbance to plant species from construction activities. Maritime Cliff and Slope BAP habitat could be adversely affected as a result of coastal squeeze |

[1] Reference should be made to Natural England's regarding the condition of SSSI's, particularly unit 7 of Robin Hood's Bay – Maw Wyke to Beast Cliff SSSI : http://www.naturalengland.org.uk/ourwork/conservation/designatedareas/sssi/default.aspx

| SEA Objective | Options | | | | | | |
|---|---|---|---|---|---|---|---|
| | **1a. No active intervention: leave the coast to naturally retreat** | **1b. No active intervention (health and safety): leave the coast to naturally retreat with strategically positioned signs** | **2. Adaptive management/active intervention maintain. Property roll back scheme in the north, improvement of defences in the southern village** | **3. Active intervention maintain. Upper village drainage investigation and deep root vegetation slope stabilisation. Capital improvement of defences in the southern village** | **4. Active intervention maintain. Capital improvement works to current defences in the southern village** | **5. Active intervention improve. Installation of soil nails. Capital improvement works to defences in the southern village** | **6. Active intervention improve. Contiguous bored pile wall with capital improvement scheme to existing defence assets within the southern village** |
| 12. Conserve and seek to enhance coastal and marine biological and geological environment, particularly designated sites and protected species | Whilst there will be inland migration of maritime cliff and slope BAP habitat and potential erosion/slumping of the SSSI (SSSI designated predominantly for geological purposes but also biological and maritime habitat), this is naturally occurring and seen as no change to present day conditions. Consultation with Natural England has identified that stabilising rock outcrops would have a negative impact on geologically designated SSSIs, and natural erosion can expose new geological interest features. | As option 1a. | As option 1a within the northern section of the village. Loss of intertidal habitat in the southern section of the village from coastal squeeze as sea levels rise. Adaptive management has a positive effect on geological SSSI's by allowing them to erode naturally. | Vegetation planting to stabilise the coastal slope has the potential to enhance the local biodiversity value through the use of appropriate species. Vegetation planting would also bind the soil particles together and would maintain the existing terrestrial environment. | As option 2. | The Maw Wyke to Beast Cliff SSSI could be adversely affected as a result of coastal squeeze through the implementation of this option. The option is likely to impact upon the biological elements of the Maw Wyke to Beast Cliff SSSI as a result of vegetation clearance and re-profiling to facilitate access to the coastal slope. The option could also result in loss of Maritime Cliff and Slope BAP habitat as a result of coastal squeeze. | The Maw Wyke to Beast Cliff SSSI could be adversely affected as a result of coastal squeeze through the implementation of this option. In addition, there would be significant disturbance to the SSSI as a result of the construction of the wall itself including direct loss of area within the SSSI from the construction footprint and disturbance to plant species from construction activities. |
| 13. Maintain and safeguard opportunities for all to access and understand ecological and geological environment | The access routes to the Maw Wyke to Beast Cliff SSSI and Maritime Cliff and Slope BAP (coastal path and local roads) would be severed. Increased study potential of the geological SSSI as the coastline retreats as there is potential for increased exposure of interest features. | As option 1a. | The coastal footpath within the northern section of the village would remain at risk of coastal erosion. The footpath and roads within the southern section of the village would be protected at present day levels, however would be at risk of erosion in the future as sea levels rise. Increased study potential of the geological SSSI as the coastline retreats as there is potential for increased exposure of interest features. | The option would ensure that the coastal footpath and access roads are maintained at present day levels. Access to ecological and geological features of interest would therefore be maintained. | There is little or no road infrastructure at risk within the northern section of the village, as such, the option is unlikely to impact on this objective in the northern village. Access roads and the coastal footpath would be maintained at present day levels within the southern section of the village. | Protection of footpath and access roads ensuring access to ecological and geological areas of interest is maintained. | Protection of footpath and access roads ensuring access to ecological and geological areas of interest is maintained. |

| SEA Objective | Options | | | | | | |
|---|---|---|---|---|---|---|---|
| | **1a. No active intervention: leave the coast to naturally retreat** | **1b. No active intervention (health and safety): leave the coast to naturally retreat with strategically positioned signs** | **2. Adaptive management/active intervention maintain. Property roll back scheme in the north, improvement of defences in the southern village** | **3. Active intervention maintain. Upper village drainage investigation and deep root vegetation slope stabilisation. Capital improvement of defences in the southern village** | **4. Active intervention maintain. Capital improvement works to current defences in the southern village** | **5. Active intervention improve. Installation of soil nails. Capital improvement works to defences in the southern village** | **6. Active intervention improve. Contiguous bored pile wall with capital improvement scheme to existing defence assets within the southern village** |
| 14. Minimise pollution to levels which do not damage biological or geological environment | Erosion of Stricklands Tip containing unknown contaminants. The woodworking factory would also be at risk of erosion, which could also result in contamination of the natural environment. Potential for contaminated material to be present behind coastal defences, which has potential to be released as defences fail. | As option 1a. | Any residual contamination from the woodworking factory and any as yet unidentified contaminated land would continue to be at risk of erosion. Any contamination present behind the existing defences in the southern village would be protected at present day levels. Natural England have commented during July 2012 that adaptive management has a positive effect on the interest features of geological SSSIs. | Woodworking factory would be protected from coastal erosion. Any contamination present behind the existing defences in the southern village would be protected at present day levels. Potential for spillages of fuels or construction materials (concrete) during works. | As option 2. | As option 3. | As option 3. |
| 15. Minimise pollution to levels which do not damage soil | Erosion of Stricklands Tip containing unknown contaminants. The woodworking factory would also be at risk of erosion, which could also result in contamination of the natural environment. Potential for contaminated material to be present behind coastal defences, which has potential to be released as defences fail. | As option 1a. | Any residual contamination from the woodworking factory and any as yet unidentified contaminated land would continue to be at risk of erosion. Any contamination present behind the existing defences in the southern village would be protected at present day levels. | Woodworking factory would be protected from coastal erosion. Any contamination present behind the existing defences in the southern village would be protected at present day levels. Potential for spillages of fuels or construction materials (concrete) during works. | As option 2. | As option 3. | As option 3. |
| 16. Minimise pollution to levels which do not damage the water environment including surface water and groundwater | Erosion of Stricklands Tip containing unknown contaminants. The woodworking factory would also be at risk of erosion, which could also result in contamination of the natural environment. Potential for contaminated material to be present behind coastal defences, which has potential to be released as defences fail. Potential release of foul drainage around Mount Plea | As option 1a. | Any residual contamination from the woodworking factory and any as yet unidentified contaminated land would continue to be at risk of erosion. Any contamination present behind the existing defences in the southern village would be protected at present day levels. Potential release of foul drainage around Mount Pleasant. | Woodworking factory would be protected from coastal erosion. Any contamination present behind the existing defences in the southern village would be protected at present day levels. Potential for spillages of fuels or construction materials (concrete) during works. Potential for release of foul waste in drainage system reduced. | As option 2. | As option 3. | As option 3. |

| SEA Objective | Options | | | | | | |
|---|---|---|---|---|---|---|---|
| | **1a. No active intervention: leave the coast to naturally retreat** | **1b. No active intervention (health and safety): leave the coast to naturally retreat with strategically positioned signs** | **2. Adaptive management/active intervention maintain. Property roll back scheme in the north, improvement of defences in the southern village** | **3. Active intervention maintain. Upper village drainage investigation and deep root vegetation slope stabilisation. Capital improvement of defences in the southern village** | **4. Active intervention maintain. Capital improvement works to current defences in the southern village** | **5. Active intervention improve. Installation of soil nails. Capital improvement works to defences in the southern village** | **6. Active intervention improve. Contiguous bored pile wall with capital improvement scheme to existing defence assets within the southern village** |
| 17. Ensure any potential works do not increase the risk of flooding | There is little or no risk of future flooding in this area according to the EA present day 1 in 200 year flood event. | As option 1a. | As option 1a. | As option 1a. | As option 1a. | As option 1a. | As option 1a. |
| 18. Manage natural resources in a way which sustain their environmental qualities as well as their productive (or economic) potential | No reduction in area of intertidal habitat for potting activity as the coast would naturally erode back as sea levels rise. Loss of docking facilities for fishing vessels however. | As option 1a. | Potential loss of a small section of agricultural land associated with landward construction of properties. Protection of docking facilities in the south at present day levels. | Protection of docking facilities in the southern village. Reduced area of intertidal habitat for potting resulting from coastal squeeze. | No reduction in area of intertidal habitat in the north, reduced area in the south due to coastal squeeze. Protection of docking facilities. | Reduced area of intertidal habitat along the whole frontage resulting from coastal squeeze. Protection of docking facilities however. | As option 5. |
| 19. Maintain and safeguard opportunities for all to access and understand local heritage | No SAMs within the unit. Listed buildings and North Yorkshire County Council HER records at risk of coastal erosion. Local access roads providing access to such features also at risk of erosion. | As option 1a. | Protection of access roads in the south. No access roads at risk within the northern village. | Protection of access routes allowing continued access to features. | As option 2. | As option 3. | As option 3. |
| 20. Preserve and enhance all aspects of the historic environment | 72 Listed buildings and North Yorkshire County Council HER records at risk of coastal erosion. | As option 1a. | Protection of features in the south (72 listed buildings) at present day levels. | Protection of landward historic interest features. Likely loss of feature identified in the intertidal area during the Rapid Coastal Zone Assessment from coastal squeeze. | As option 2. | As option 3. Potential for construction works to impact on currently unknown assets, for example during excavation and design of defences. | As option 5. |
| 21. Maintain and where possible enhance special landscape, local distinctiveness and settlement character, taking into the dynamic nature of the coastal landscape. | The eroding defences within the southern village and collapse of property throughout will adversely impact on the existing landscape. Loss of National Park land and Heritage Coast. | As option 1a with the addition of signage which would further reduce landscape value. | Coastal erosion is a natural process. The special landscape value would be maintained by moving property landward and allowing erosion to occur. Maintaining defences in the south would ensure that the visual amenity value of the area remains. Loss of National Park land and Heritage Coast in the northern section of the village. | This option represents a change in present day management of the coastal frontage in the northern village. The northern area currently has steep, eroding cliffs which would change the existing landscape. | As option 2. | Installation of soil nails and netting of the area would have a significant impact on the existing landscape. | Post construction, the landward section of cliff from the wall would eventually fall away and leave a facing side of piles visible, which would impact on the existing landscape. The option would also change the present day management of the unit. |

## 4.3 Summary of alternative options assessment

4.3.1 Policy Unit MA24.1

The assessment of alternative options has identified that the preferred option for management of Policy Unit 24.1 is **Option 2, adaptive management** including a property roll back scheme. Options 1a and 1b are not considered feasible as a result of loss of property including the Abbey Farm storage building and the static caravans at the southern end of the Policy Unit. The area is currently undefended, therefore the placement of localised rock armour would impact upon the local landscape value and represent a change from the present day management of the coast. The placement of rock can also result in health and safety issues, and also accumulate litter which can reduce the visual amenity value. Potential adverse impacts as a result of implementing the preferred option would include potential 'loss' of maritime cliff and slope BAP habitat as the coastline retreats (however such BAP habitat is likely to have evolved on these sites over thousands of years as a result of a number of environmental factors including periodic coastal erosion and slope instability, and as such, they will continue to evolve as long as they are given space). In addition, there is likely to be loss of agricultural land as a result of constructing properties further inland. There would also be a loss of heritage assets including the Saltwick Nab Alum Quarry and Heritage Coast, however the properties currently at risk would be protected through the Strategic approach of adaptive management.

The preferred option for Policy Unit 24.1 is in line with the option recommended within the ER (Mouchel, 2010).

4.3.2 Policy Unit MA25.1

The assessment of alternative options has indicated that the preferred option for Policy Unit 25.1 is **Option 2, adaptive management** incorporating a property roll back scheme. Options 1a and 1b are not considered feasible as a result of loss of property. The area is currently undefended, therefore the placement of localised rock armour would impact upon the local landscape value. The placement of rock can also result in health and safety issues, and also accumulate litter which can reduce the visual amenity value. Potential adverse impacts as a result of implementing the preferred option would include potential 'loss' of maritime cliff and slope BAP habitat as the coastline retreats (however such BAP habitat is likely to have evolved on these sites over thousands of years as a result of a number of environmental factors including periodic coastal erosion and slope instability, and as such, they will continue to evolve as long as they are given space). In addition, there is likely to be loss of agricultural land as a result of constructing properties further inland and realignment of the coastal footpath. There would also be a loss of heritage assets including listed buildings, a Scheduled Ancient Monument and Heritage Coast, however the properties currently at risk would be protected through adaptive management.

The preferred option for Policy Unit 25.1 is in line with the option recommended within the ER (Mouchel, 2010).

4.3.3 Policy Unit 25.2

The assessment of alternative options has indicated that the preferred option for Policy Unit 25.2 is **Option 2, adaptive management/active intervention maintain**. Option 1a and 1b are not considered feasible due to the loss of property and assets which would arise as the coastline retreats. Option 3 has a number of positive impacts with regard to the SEA objectives, through the protection of people, property and assets, however

there are also negative and neutral impacts associated with the loss of intertidal habitat as a result of coastal squeeze as sea level rises.

Natural England commented during July 2012 that stabilising rock outcrops would have a negative impact on geologically designated SSSIs, as they should be allowed to naturally erode. This therefore also applies to options 5 and 6 as these options would prevent the natural erosion of the coast. Whilst options 5 and 6 would protect people, property and infrastructure, the construction works required would result in significant direct disturbance and loss of area within the environmentally designated sites along the frontage. Option 4 is not considered feasible due to the loss of property which would occur within the northern section of the village.

In summary, the preferred option for Policy Unit 25.2 is in line with the option recommended within the ER (Mouchel, 2010).

The draft preferred Strategy options are summarised in **Table 5**. The SMP2 policy for the Strategy frontage is also presented for reference.

**Table 5 SMP2 policy and draft preferred option (NAI – No Active Intervention, HTL – Hold the Line)**

| SMP2 Policy | | Robin Hood's Bay Strategy Study | |
|---|---|---|---|
| **Policy Unit** | **Policy plan** | **Policy unit** | **Strategy option** |
| 24.1 | NAI | 24.1 | Adaptive management – property roll bank |
| 25.1 | NAI | 25.1 | Adaptive management – property roll bank |
| 25.2 | HTL | 25.2 | Active intervention / maintain in the southern village, adaptive management in the north of the village. |

The draft preferred Strategy options satisfy the SMP2 policy for all Policy Unit's. The objective for MA25 (as outlined within the SMP2) is to allow natural processes to continue, but the equally important specific objective in relation to MA25 is to sustain the existing coastal communities; this is felt to override the broader environmental objectives in this case. There are concerns that defence in this area should be based on the aim to sustain the village and its function as a single entity. This is what the existing defences aim to achieve. Therefore, the extension of defences to address the need of specific properties rather than the village would not be felt to be appropriate to the area in the context of the broader objective. There are properties to the northern end of the village which are likely to be lost during the period of the SMP2. Both in terms of economic, but more fundamentally in terms of reducing the impact of defence on the natural coastline, these properties would not specifically be protected. As such, the proposed Strategy options area considered compatible with the SMP2 policy.

# 5 PREDICTING AND EVALUATING THE PREFERRED STRATEGY OPTION

The assessment of alternative options within **Tables 2** to **4** has confirmed that the preferred option within the ER (Mouchel, 2010) is unaffected. As such, this section of the addendum report provides additional justification to the assessment provided within Section 7 of the ER (Mouchel, 2010).

In developing the draft preferred Strategy option, technical, environmental and economic appraisals were undertaken in accordance with Environment Agency Appraisal Guidance. Social aspects were incorporated based on comments received during the workshop held during the scoping stage of the SEA process (2009).

The methodology used to assess the impacts of the preferred Strategy options used within the ER (Mouchel, 2010) has been simplified within this addendum report to enhance clarity of the assessment. The assessment of the preferred Strategy options has used the same methodology as that used within the assessment of the alternative options (refer to **Section 4.2** for further detail). The assessment within the ER (Mouchel, 2010) divided the impacts into short, medium and long term epochs; in all cases, the impacts for each epoch were considered to be the same (see **Appendix G2b** of the StAR, 2012). As such, the assessment within this addendum report has grouped the three epochs together in order to provide a more streamlined and concise assessment. The assessment is presented in **Table 6**.

The key below presents the colour scheme used within assessment **Table 6**.

| | |
|---|---|
| Beneficial | |
| Negative | |
| Neutral | |
| Not applicable | |

**Table 6 Assessment of environmental effects for preferred option in Policy Units 24.1, 25.1 and 25.2.**

| SEA Objective | Policy Unit 24.1<br>Adaptive management: Property roll back | Policy Unit 25.1<br>Adaptive management: Property roll back | Policy Unit 25.2<br>Adaptive management in the north / active intervention maintain in the south |
|---|---|---|---|
| 1. Provide conditions for business success, economic growth and investment with specific reference to fishing and farming industries | Loss of 5 ha of agricultural land due to coastal erosion. The property roll back option would ensure business continuity at the caravan park at the south-eastern end of the unit in addition to Abbey Farm storage buildings. Likely loss of agricultural land due to construction of property further inland. | Loss of 189ha of agricultural land due to coastal erosion. The property roll back option would ensure business continuity at the caravan park. Likely loss of agricultural land due to construction of property further inland. | Protection of docking facilities within the southern section by maintaining existing defences. The property roll back option would ensure business continuity at the commercial properties within the northern section of the village. Potential for loss of agricultural land through construction of properties further inland. |
| 2. Support tourism industry through provision of access to facilities and attractions | Local access roads and the Cleveland Way footpath at risk of coastal erosion. | Coastal footpath and access roads will be severed as a result of coastal erosion. | Continued provision of tourism facilities by moving them further inland within the northern section of the village. Protection of the tourism industry features within the southern section of the village at present day levels. |
| 3. Maintain vibrant local communities | The properties at risk of coastal erosion would be moved landward, ensuring that the local community remains vibrant. | The properties at risk of coastal erosion would be moved landward, ensuring that the local community remains vibrant. | Properties at risk of coastal erosion would be moved landward, ensuring local community remains vibrant. Erosion risk at the southern village would likely increase in the future however as sea levels rise. |
| 4. Ensure safety and security of people and property | The properties at risk of coastal erosion would be moved landward, ensuring that the number of dwellings within the unit would not decrease. | The properties at risk of coastal erosion would be moved landward, ensuring that the number of dwellings within the unit would not decrease. | The properties at risk of coastal erosion within the northern section of the village would be moved landward, ensuring that the number of dwellings within the unit would not decrease. Property within the southern section would be protected at present day levels. |

| SEA Objective | Policy Unit 24.1<br>Adaptive management: Property roll back | Policy Unit 25.1<br>Adaptive management: Property roll back | Policy Unit 25.2<br>Adaptive management in the north / active intervention maintain in the south |
|---|---|---|---|
| 5. Maintain transport network, encouraging cycling, walking, minimising traffic and promoting access to the countryside | There are very few assets at risk within the unit, however the coastal footpath would be at risk of coastal erosion, which would prevent recreational activities including cycling and walking. | The coastal footpath would be at risk of coastal erosion, which would prevent recreational activities including cycling and walking. | Coastal footpath within the northern section of the village would remain at risk. The footpath within the southern section of the village would be protected at present day levels, however would be at risk of erosion in the future as sea levels rise. |
| 6. Maintain access to local facilities and services whilst minimising environmental impacts | The local access roads would be at risk of coastal erosion, therefore reducing access to local facilities and services | The relatively few minor roads along the frontage would be at risk of erosion and therefore this option would be against the target of maintaining the area of road within the study area. | Indoor leisure facilities in the northern village at risk of erosion would be moved landward, therefore visits to such facilities would be maintained. Access roads within the southern section of the village would be maintained at present day levels. |
| 7. Ensure local needs are met locally | Loss of 5ha of agricultural land reducing the ability of local produce to meet the needs of local people. Landward realignment of property would however allow people to work from home. | Loss of 189ha of agricultural land, reducing the potential for local resources to meet the needs of local people. Landward realignment of property would however allow people to work from home. | Residential dwellings at risk within the northern section of the village would be moved landward, therefore allowing people to continue to work from home. Property within the southern section of the village would be maintained at present day levels. |
| 8. Support creativity, innovation and appropriate use of technology | The option would not use any innovative techniques to combat erosion. | The option would not use any innovative techniques to combat erosion. | The option would not use any innovative techniques to combat erosion. |
| 9. Promote good health through provision of access to leisure facilities including footpaths | Coastal footpath would be at risk of coastal erosion, which would prevent recreational activities including cycling and walking. | Coastal footpath would be at risk of coastal erosion, which would prevent recreational activities including cycling and walking. | Coastal footpath within the northern section of the village would remain at risk of coastal erosion. The footpath within the southern section of the village would be protected at present day levels, however would be at risk of erosion in the future as sea levels rise. |

| SEA Objective | Policy Unit 24.1<br>Adaptive management: Property roll back | Policy Unit 25.1<br>Adaptive management: Property roll back | Policy Unit 25.2<br>Adaptive management in the north / active intervention maintain in the south |
|---|---|---|---|
| 10. Minimise impacts to human health (e.g. pollution and stress) and safeguard positive impacts | Properties at risk of coastal erosion would be moved landward, which would likely reduce long term stress levels of residents within the static caravans. | Properties at risk of coastal erosion would be moved landward, which would likely reduce long term stress levels of residents within the static caravans. | Property as risk would be moved landward, ensuring that human health is not adversely affected and stress levels do not result in ill health. Property within the southern section of the village would be maintained at present day levels. |
| 11. Conserve and enhance terrestrial, biological and geological environment, particularly designated sites and protected species | There are no designated terrestrial habitats at risk within the unit. As the coastline erodes, BAP habitat (maritime cliff and slope) is likely to migrate inland; coastal grassland and woodland have evolved on these sites over thousands of years, which are likely to have been subject to erosion and instability in the past. These changes are naturally occurring and seen as no change to present day conditions. | Inland migration of ancient woodland and wet woodland BAP habitat adjacent to watercourses as the coastline retreats. National trust land and North York Moors National Park land would however be lost. | Inland migration of maritime cliff and slope BAP habitat. No additional coastal protection works are proposed however, which will have a positive impact on the SSSI, geological and maritime features by allowing their natural development. Coastal erosion will maintain the instability of coastal habitats. |
| 12. Conserve and seek to enhance coastal and marine biological and geological environment, particularly designated sites and protected species | There is likely to be potential erosion/slumping of the SSSI as the coastline retreats; such erosion of the SSSI could result in exposure of additional geological interest feaures. These changes are naturally occurring and seen as no change to present day conditions. Consultation with Natural England has identified that stabilising rock outcrops would have a negative impact on geologically designated SSSIs. | Inland migration of ancient woodland and wet woodland BAP habitat adjacent to watercourses as the coastline retreats. Potential erosion of and slumping to the Maw Wyke to beast Cliff SSSI, Iron Scar and Hundale Point to Scalby Ness SSSI, Hayburn Wyke SSSI and Maw Wyke to Beast Cliff SAC from falling debris and erosion as the coastline retreats. This is naturally occurring and seen as no change to present day coastal management. Erosion of geological SSSIs can lead to the exposure of new interest features. Consultation with Natural England has identified that stabilising rock outcrops would have a negative impact on geologically designated SSSIs. | Whilst there will be inland migration of maritime cliff and slope BAP habitat and erosion/slumping of the SSSI in the northern section of village from falling debris as the coastline retreats, this is naturally occurring and seen as no change to present day conditions. Loss of intertidal habitat in the southern section of the village from coastal squeeze as sea levels rise and landward migration is prevented. Adaptive management has a positive effect on geological SSSI's by allowing them to erode naturally, which has potential to expose additional features of geological interest. |

| SEA Objective | Policy Unit 24.1<br>Adaptive management: Property roll back | Policy Unit 25.1<br>Adaptive management: Property roll back | Policy Unit 25.2<br>Adaptive management in the north / active intervention maintain in the south |
|---|---|---|---|
| 13. Maintain and safeguard opportunities for all to access and understand ecological and geological environment | Access to the designated SSSI would need to be restricted due to potential for falling debris as the coastline retreats. The option would also result in the loss of the coastal footpath which would reduce access to the ecological environment. Potential for increased studying potential of the geological SSSI however as the coastline retreats. | Access to geologically and ecologically designated sites would need to be restricted due to potential for falling debris and subsequent health and safety impacts. Loss of the coastal footpath which would reduce access to the environment. Potential for increased studying potential of the geological SSSI however as the coastline retreats. | The coastal footpath within the northern section of the village would remain at risk of coastal erosion. The footpath and roads within the southern section of the village would be protected at present day levels, however would be at risk of erosion in the future as sea levels rise. Potential for increased studying potential of the geological SSSI however as the coastline retreats. |
| 14. Minimise pollution to levels which do not damage biological or geological environment | There are no identified sources of contaminated land or potential pollution which are at risk of erosion. | A disused pit (potential source of contamination) is present within the study area. Other sources of contamination include a number of former alum works (namely Stoupe Brown alum works, Peak alum works and Saltwick Nab alum quarry), which have the potential to contain contaminants which could impact upon the biological environment. | Residual contamination from the woodworking factory and any as yet unidentified contaminated land would continue to be at risk of erosion. Any contamination present behind the existing defences in the southern village would be protected at present day levels. Natural England have commented during July 2012 that adaptive management has a positive effect on the interest features of geological SSSIs. |
| 15. Minimise pollution to levels which do not damage soil | No identified industrial or contaminated land within the unit at risk of erosion. | A disused pit (potential source of contamination) is present within the study area. Other sources of contamination include a number of former alum works (namely Stoupe Brown alum works, Peak alum works and Saltwick Nab alum quarry), which have the potential to contain contaminants which could impact upon the biological environment. | Woodworking factory and any as yet unidentified contaminated land would continue to be at risk of erosion in the north. Any contamination present behind the existing defences in the southern village would be protected at present day levels. |

| SEA Objective | Policy Unit 24.1<br>Adaptive management: Property roll back | Policy Unit 25.1<br>Adaptive management: Property roll back | Policy Unit 25.2<br>Adaptive management in the north / active intervention maintain in the south |
|---|---|---|---|
| 16. Minimise pollution to levels which do not damage the water environment including surface water and groundwater | Potential for material within the coastal slope to become transported into the surface water as the coastline retreats, however this is a naturally occurring process. In addition, no potentially contaminated sites have been identified within the unit. | A disused pit (potential source of contamination) is present within the study area. Other sources of contamination include a number of former alum works (namely Stoupe Brown alum works, Peak alum works and Saltwick Nab alum quarry), which have the potential to contain contaminants which could impact upon the water environment. Also potential for release of waste within the foul drainage system at Mount Pleasant, however the drainage investigation would reduce the risk of this occurring. | Woodworking factory and any as yet unidentified contaminated land would continue to be at risk of erosion. Any contamination present behind the existing defences in the southern village would be protected at present day levels. |
| 17. Ensure any potential works do not increase the risk of flooding | Not applicable | Not applicable | Not applicable |
| 18. Manage natural resources in a way which sustain their environmental qualities as well as their productive (or economic) potential | Agricultural productivity within the unit would decrease as coastal erosion would result in the loss of 5ha of agricultural land. No known fisheries within the unit. Loss of agricultural land through property creation further inland. The retreat of the coastline has potential to maintain the availability of fishing grounds for potting as sea level rises. Overall, a neutral impact has been predicted. | Loss of 189ha of grade 3 agricultural land. Loss of additional agricultural land through property creation further inland. The Bay fishery is located within the unit. The retreat of the coastline has potential to maintain the availability of fishing grounds for potting as sea level rises. Overall, a neutral impact has been predicted. | Potential loss of a small section of agricultural land associated with landward construction of properties. Protection of docking facilities in the south at present day levels. |
| 19. Maintain and safeguard opportunities for all to access and understand local heritage | Loss of a section of Saltwick Nab Alum Quarry Scheduled Monument. | Loss of three scheduled ancient monuments, Stoupe Brown alum works, Peak alum works, Saltwick Nab alum quarry and one listed building (Whitby High Light House Grade II Listed). | Protection of access roads in the south. No access roads at risk within the northern village. |

| SEA Objective | Policy Unit 24.1<br>Adaptive management: Property roll back | Policy Unit 25.1<br>Adaptive management: Property roll back | Policy Unit 25.2<br>Adaptive management in the north / active intervention maintain in the south |
|---|---|---|---|
| 20. Preserve and enhance all aspects of the historic environment | Loss of a section of Saltwick Nab Alum Quarry Scheduled Monument. | Loss of three scheduled ancient monuments, Stoupe Brown alum works, Peak alum works, Saltwick Nab alum quarry and one listed building. | Protection of historic features in the south at present day levels. Loss of any currently unknown features in the northern section of the village as a result of natural retreat of the coastline. |
| 21. Maintain and where possible enhance special landscape, local distinctiveness and settlement character, taking into the dynamic nature of the coastal landscape. | Coastal erosion is a natural process, and the area naturally has steep, high cliffs. This option would not impact upon natural processes. Loss of National Park land and Heritage Coast however. | Coastal erosion is a natural process, and the area naturally has steep, high cliffs. This option would not impact upon natural processes, therefore the special landscape value currently present would be maintained. Loss of National Park land and Heritage Coast however. | Coastal erosion is a natural process. The special landscape value would be maintained by moving property landward and allowing erosion to occur. Maintaining defences in the south would ensure that the visual amenity value of the area remains. Loss of National Park land and Heritage Coast in the northern section of the village. |

## 5.1 Mitigation and monitoring

Mitigation measures and monitoring to offset the potential impacts that could arise following the implementation of the draft preferred options are presented in **Table 7.**

## 5.2 Assessment of in-combination effects and synergies with other plans

The environmental effects of the Strategy in-combination with other relevant plans and programmes have also been considered. Potential in-combination effects could arise primarily from undertaking construction activities simultaneously with other Management Units within this strategy or that of other plans.

Other plans which could potentially have significant in-combination effects are primarily other flood risk management projects and strategies. These include adjacent flood and coastal risk management strategies including The Esk and Coastal Streams Catchment Flood Management Plan, the SMP2, the Whitby Coastal Strategy 2, local authority plans for coastal flood risk management and any fluvial studies. Many of these initiatives seek to manage flood and erosion risk up to 100 years into the future, resulting in a positive in-combination effect.

As previously stated, the draft preferred Strategy options satisfy the SMP2 policy for all MAs. The objective for MA25 (as outlined within the SMP2) is to allow natural processes to continue, but the equally important specific objective in relation to MA25 is to sustain the existing coastal communities; this is felt to override the broader environmental objectives in this case. There are concerns that defence in this area should be based on the aim to sustain the village and its function as a single entity. This is what the existing defences aim to achieve. Therefore, the extension of defences to address the need of specific properties rather than the village would not be felt to be appropriate to the area in the context of the broader objective. There are properties to the northern end of the village which are likely to be lost during the period of the SMP2. Both in terms of economic, but more fundamentally in terms of reducing the impact of defence on the natural coastline, these properties would not specifically be protected. As such, the proposed Strategy options area considered compatible with the SMP2 policy.

**Table 7 Mitigation and monitoring for the Robin Hood's Bay Coastal Strategy**

| Assessment criteria | Environmental effects identified | Mitigation and opportunities | Monitoring |
|---|---|---|---|
| 1. Provide conditions for business success, economic growth and investment with specific reference to fishing and farming industries | Loss of Grade 3 agricultural land as the coastline retreats, in addition to potential loss of agricultural land from construction of properties inland and realignment of the Cleveland Way footpath. | Commercial properties should be relocated within the town of Whitby, on previously developed land where possible. Opportunity to enhance the economic income to the town of Whitby. | No monitoring required. |
| 2. Support tourism industry through provision of access to facilities and attractions | Loss of Cleveland Way coastal footpath.<br>Potential disruption to tourism and recreation during implementation of the Strategy's options. | Undertake works outside of the peak tourism season.<br>Realignment of the Cleveland Way further inland, potentially linking in with rights of way in the wider area.<br>Opportunity to enhance the existing footpath network within the wider area. | Monitoring of visitor numbers to the area using the realigned footpath. |
| 3. Maintain vibrant local communities | None identified | None required | Periodic review of coastal erosion rates, and condition assessments of defences within Robin Hood's Bay village. |
| 4. Ensure safety and security of people and property | None identified. | Relocation of residential property into the protected areas of Robin Hood's Bay, on previously developed land is possible.<br><br>Implementation of Emergency Action Plan (Appendix G of the ER, Mouchel 2010). If increased risk is identified through the monitoring programme, a detailed Landslip Emergency Action Plan will be required. | Periodic review of coastal erosion rates, and condition assessments of defences within Robin Hood's Bay village.<br><br>Further investigation into land availability for construction of properties and potential for land release by Scarborough Borough Council and the National Park Authority.<br><br>Monitoring of cliffs to determine any areas which are likely to fail. |

| Assessment criteria | Environmental effects identified | Mitigation and opportunities | Monitoring |
|---|---|---|---|
| 5. Maintain transport network, encouraging cycling, walking, minimising traffic and promoting access to the countryside | Loss of Cleveland Way coastal footpath and local access roads. | Undertake works outside of the peak tourism season.<br>Realignment of the Cleveland Way further inland, potentially linking in with rights of way in the wider area. | Monitoring of visitor numbers to the area using the realigned footpath network. |
| 6. Maintain access to local facilities and services whilst minimising environmental impacts | Local access routes and minor roads at risk of erosion.<br>Foul drainage system at Mount Pleasant at risk. | Realignment of the Cleveland Way further inland, potentially linking in with rights of way in the wider area. Improving access to the coast should be considered during the delivery of the Strategy. | Monitoring of visitor numbers to the area. |
| 7. Ensure local needs are met locally | Loss of approximately 200ha of agricultural land along the frontage reducing agricultural productivity of the area.<br>Loss of income to farmers associated with Environmental Stewardship schemes. | Minimise the area of agricultural land lost as much as possible. | None required. |
| 8. Support creativity, innovation and appropriate use of technology | None identified. No innovative techniques used to combat erosion. | None required. | Periodic review of coastal erosion rates, and condition assessments of defences within Robin Hood's Bay village. |
| 9. Promote good health through provision of access to leisure facilities including footpaths | Loss of a large section of the Cleveland Way coastal footpath. | Realignment of the Cleveland Way further inland, potentially linking in with rights of way in the wider area.<br>Undertake realignment works outside of the peak tourism season. | Monitoring of visitor numbers to the area using the realigned footpath network. |
| 10. Minimise impacts to human health (e.g. pollution and stress) and safeguard positive impacts | None identified. | None required. | Periodic review of coastal erosion rates, and condition assessments of defences within Robin Hood's Bay village. |

| Assessment criteria | Environmental effects identified | Mitigation and opportunities | Monitoring |
|---|---|---|---|
| 11. Conserve and enhance terrestrial, biological and geological environment, particularly designated sites and protected species | Inland migration of maritime cliff and slope BAP habitat as coastline naturally retreats along majority of frontage.<br><br>Potential erosion and temporary smothering of the SSSI and Beast Cliff to Whitby (Robin Hood's Bay) SAC as a result of falling debris from the coastal slope. Inland migration of the SAC.<br><br>Potential erosion of a small section of Maw Wyke to Beast Cliff SSSI in the southern section of Policy Unit MA25.2 from coastal squeeze. | A more detailed assessment of the potential impacts and the identification of avoidance, mitigation or compensation measures will need to be undertaken as part of a more detailed assessment or through the EIA process, should it be required. Such assessment should include a detailed investigation of the availability of suitable land uses landward of the BAP habitat.<br><br>In delivering the strategy, opportunities for habitat enhancement should be sought, wherever possible. | Where possible, maintain a balance sheet for protected sites and BAP habitats, accounting for schemes losses / gains.<br><br>Condition monitoring and identification of where BAP habitat is being squeezed.<br><br>Localised condition monitoring of environmentally designated sites. |
| 12. Conserve and seek to enhance coastal and marine biological and geological environment, particularly designated sites and protected species | Potential temporary smothering of the marine biotopes on the rocky foreshore (May Wyke to Beast Cliff SSSI) and Beast Cliff to Whitby (Robin Hood's Bay) SAC as a result of falling debris from the coastal slope.<br><br>Potential erosion of a small section of Maw Wyke to Beast Cliff SSSI in the southern section of Policy Unit MA25.2 from coastal squeeze as sea levels rise. | A more detailed assessment of the potential impacts and the identification of avoidance, mitigation or compensation measures will need to be undertaken as part of a more detailed assessment or through the EIA process, should it be required. Such assessment should include a detailed investigation of the availability of suitable land uses, landward of the BAP habitat to identify whether the BAP habitat could migrate and development further inland as the coastline retreats.<br><br>Undertake construction in accordance with best practice measures to minimise disturbance. | Where possible, maintain a balance sheet for protected sites and BAP habitats, accounting for schemes losses / gains.<br><br>Condition monitoring and identification of where BAP habitat is being squeezed.<br><br>Localised condition monitoring of environmentally designated sites. |

| Assessment criteria | Environmental effects identified | Mitigation and opportunities | Monitoring |
|---|---|---|---|
| 13. Maintain and safeguard opportunities for all to access and understand ecological and geological environment | Loss of sections of the Cleveland Way coastal footpath.<br>Potential for reduced visibility of the geologically designated site as a result of smothering during cliff failure events. However, there is also potential for increased exposure of geological interest features as the coastline retreats which could provide increased potential for studying the SSSIs.<br>Potential health and safety impacts to users of the foreshore resulting from cliff failures. | Realignment of the Cleveland Way further inland, potentially linking in with rights of way in the wider area.<br>Natural England have stated that geological SSSIs should be allowed to erode naturally, therefore mitigation for erosion of the two SSSIs is unlikely to be required. | Monitoring of visitor numbers to the area using the realigned footpath network. Monitoring of people studying the geological SSSIs and recording of any additional geological interest features exposed.<br><br>Monitoring to determine the likelihood and potential for cliff failures. |

| Assessment criteria | Environmental effects identified | Mitigation and opportunities | Monitoring |
|---|---|---|---|
| 14. Minimise pollution to levels which do not damage biological or geological environment<br>15. Minimise pollution to levels which do not damage soil<br>16. Minimise pollution to levels which do not damage the water environment including surface water and groundwater | Erosion of potentially contaminated areas including Stricklands Tip, former alum work (including Stoupe Brown alum works, Peak alum works, Saltwick Nab alum quarry) and the land which contained the woodworking factory within the northern section of Robin Hood's Bay village, with release of contaminants into the environment.<br><br>Potential impacts on coastal water quality through leakages or spillages of fluids within underground services. | Further investigation of contamination risks along the frontage. If significant risks are identified, a suitable remediation strategy should be designed at EIA stage, including removal of the contamination source, in-situ treatment of the source or removal of the pathway between the source and receptor.<br><br>Identify ownership of assets and undertake remedial works including diversion and repair of potential leaks to prevent impacts to water quality.<br><br>Opportunity to reduce the contamination risk along the frontage from potential contamination sources including Stricklands Tip.<br><br>Ensure implementation of the Strategy does not affect water quality through the use of Environment Agency guidelines and best practice. | Periodic review of Environment Agency Bathing Water Directive monitoring data against the targets for waterbodies and resources in the study area.<br><br>Review of WFD risk assessments for waterbodies in the study area. |

| Assessment criteria | Environmental effects identified | Mitigation and opportunities | Monitoring |
|---|---|---|---|
| 17. Ensure any potential works do not increase the risk of flooding | None identified. | None required. | Periodic review of flood risk. Maintenance of a flood risk register, with an approximate standard of protection indicated to include:<br><br>Residential properties;<br>Commercial properties;<br>Tourist attractions;<br>Critical infrastructure;<br>Nature conservation sites;<br>Heritage assets.<br><br>Review of climate change and sea level rise predictions. |
| 18. Manage natural resources in a way which sustain their environmental qualities as well as their productive (or economic) potential | Loss of approximately 200ha of agricultural land reducing the agricultural productivity of the area. | Minimise the area of agricultural land lost as much as possible. | None required. |

| Assessment criteria | Environmental effects identified | Mitigation and opportunities | Monitoring |
|---|---|---|---|
| 19. Maintain and safeguard opportunities for all to access and understand local heritage<br>20. Preserve and enhance all aspects of the historic environment | Loss of Cleveland Way coastal path, small access roads.<br><br>Loss of heritage assets including Scheduled Monuments (Saltwick Nab Alum Quarry, Stoupe Brown Alum works, Peak Alum works and a listed building. | No legal obligation exists to protect the SAMs as natural coastal processes will eventually erode these features.<br><br>Additional archaeological assessments of the areas affected by the Strategy's options will be required with the aim of producing site specific mitigation strategies, in accordance with national. Regional and local policies and guidelines and with all relevant national and regional archaeological research agendas.<br><br>It is possible that the remains of the alum quarries, and listed building would need to be excavated and recorded prior to their loss as a result of coastal erosion for prosperity purposes. | Monitoring plan to record the number of archaeological studies carried out for each stage of implementation.<br><br>Any new features of archaeological interest identified during monitoring must be reviewed and recorded |
| 21. Maintain and where possible enhance special landscape, local distinctiveness and settlement character | Erosion of Heritage Coast and National Park land, however erosion is a natural on-going coastal process. Heritage Coast likely to migrate inland however. | Monitoring and removal of any artificial man-made material has potential to enhance the local landscape character. | Condition monitoring of existing defences within the southern section of Robin Hood's Bay village. |

# 6 WATER FRAMEWORK DIRECTIVE

## 6.1 Requirement for this assessment

The Water Framework Directive (WFD) requires that the status of a water body is considered when all new activities in the water environment are planned. In this context, the water environment includes rivers, lakes, estuaries, groundwater and coastal waters out to one nautical mile (more broadly classified as surface waters (including natural, artificial and heavily modified water bodies) and ground waters).

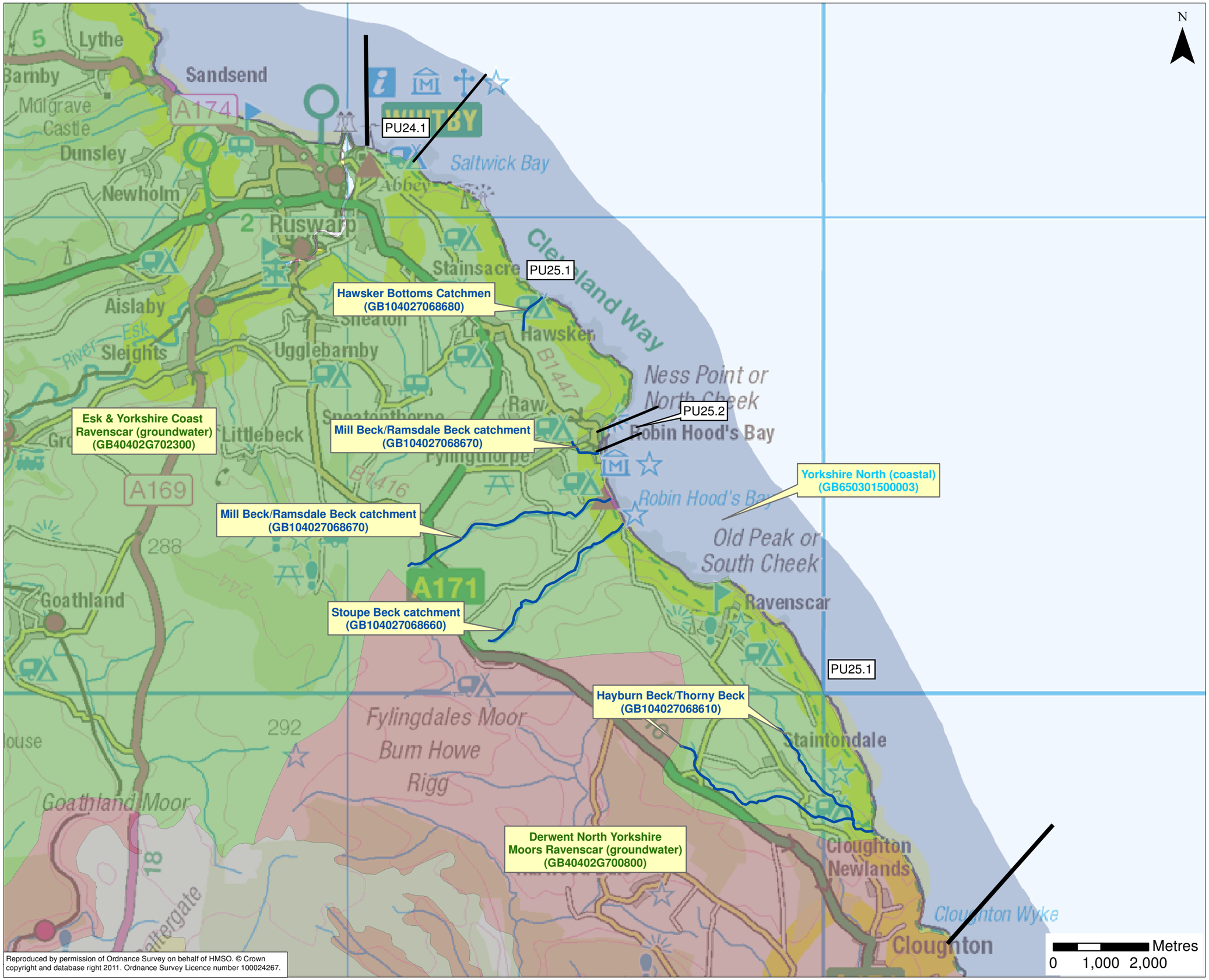
The WFD sets a target of aiming to achieve at least 'good status' (or 'good potential' in the case of an artificial water body (AWB) or Heavily Modified Water Body (HMWB)) in all water bodies by 2015. However, provided that certain conditions are satisfied, in some cases the achievement of good status/potential may be delayed until 2021 or 2027. It is, therefore, necessary to undertake a strategic level assessment of the potential impacts of the Strategy on the status of the WFD water bodies within the study area. It was agreed with NEAS that this assessment should focus on the preferred strategic option only (outlined within **Section 1.2**).

## 6.2 Baseline information

This section provides baseline information with regard to water bodies which are present within the study area, in addition to presenting the results of the WFD assessment of the preferred coastal management options.

There are seven water bodies present within the direct footprint of the study area, which are described within the Northumbria River Basin Management Plan (RBMP) and the Humber RBMP (Environment Agency, 2009). A description of the water bodies is presented in **Table 8**, with their locations presented in **Figure 3**.

Specific mitigation measures can be defined in the RBMP for water bodies that have been classified as artificial or heavily modified in order to achieve the Environmental Objectives of the WFD. However, no mitigation measures are described within the RBMPs for any of the water bodies within the study area. The Yorkshire North Coastal water body is designated as a HMWB, however no specific mitigation measures are included within the Northumbria RBMP for the water body.

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**WFD Waterbodies**

- Coastal Waterbody
- Groundwater Bodies
- Rivers

- Strategy Frontage Boundary
- Policy Unit Boundary
- 25.1 Policy Unit Name

Title:
Water bodies within the study area

Project:
Robin Hood's Bay Coastal Strategy

Client:
Scarborough Borough Council

| Date: | Scale at A3: |
|---|---|
| August 2012 | 1:75,000 |

| Figure: | Drawn: | Checked: |
|---|---|---|
| 3 | TC | SR |

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Enhancing Society Together

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**Table 8 Water bodies within the study area (AWB – Artificial Water Body; HMWB – Heavily Modified Water Body)**

| Water body category | Water body name | Water body ID | Hydromorphological designation | Current overall status / potential | Status objective |
|---|---|---|---|---|---|
| Coastal | Yorkshire North | GB650301500003 | HMWB | Good | Good by 2015 |
| River | Hawsker Bottoms Catchment (drains to North Sea) | GB104027068680 | Not Designated AWB/HMWB | Moderate<br>Ecological status: Moderate | Good by 2027. |
| River | Mill Beck/ Ramsdale Beck catchment (tributary North Sea) | GB104027068670 | Not Designated AWB/HMWB | Moderate<br>Ecological status: Moderate | Good by 2027. |
| River | Stoupe Beck catchment (tributary of North Sea) | GB104027068660 | Not Designated AWB/HMWB | Poor.<br>Chemical status: Poor<br>Fish current status: Poor (very certain); Predicted status by 2015: Poor; Justification for not achieving good status by 2015: Disproportionately expensive (P1a) (there is currently insufficient weight of evidence to confirm the need to control eutrophication risk using site specific and potentially expensive regulatory action). | Good by 2027. |
| River | Hayburn Beck/Thorny Beck catch (drains to North Sea) | GB104027068610 | Not Designated AWB/HMWB | Poor.<br>Ecological status: Poor (very certain)<br>Fish current status: Poor (very certain); Predicted status by 2015: Poor; Justification for not achieving good status by 2015: Technically infeasible (B2a) (the pressure causing the failure is unknown). | Good by 2027. |
| Groundwater | Esk & Yorkshire Coast Ravenscar | GB40402G702300 | N/A | Good | Good by 2015 |
| Groundwater | Derwent North Yorkshire Moors Ravenscar | GB40402G700800 | N/A | Good | Good by 2015 |

## 6.3 Approach to the assessment

For each of the water bodies listed in **Table 8**, the effects of the preferred strategy option on current water body status, or on ability to achieve or maintain good status, have been considered. The water bodies have been assessed as to how the proposed preferred strategic option could potentially affect the hydromorphological, chemical, physico-chemical and biological elements of the water body (for surface waters).

As noted above, for AWBs or HMWBs, mitigation measures are often identified in the RBMP which, if implemented, would assist in achieving good potential. However, as no mitigation measures have been defined, a specific assessment of the implications of the preferred option on mitigation measures cannot be undertaken.

The groundwater bodies have been assessed in terms of implications of the preferred strategy on quantitative and chemical quality elements.

## 6.4 Assessment of preferred options against objectives of the WFD

Consultation with the Environment Agency's NEAS officer during June 2012 identified that a WFD assessment on the preferred option only was required. A summary of the water bodies within the study area and the preferred option that is proposed for the stretch of coastline within which the water body is located is presented within **Table 9**.

**Table 9 Summary of water bodies within study area and the preferred strategic option**

| Water body | Strategy option (see section 1.2 for further information) | Policy unit in which the waterbody is located or adjacent to |
|---|---|---|
| Yorkshire North coastal | Predominantly Adaptive Management. Active intervention proposed alongside adaptive management for the southern section of Policy Unit 25.2. | All |
| Hawsker Bottoms Catchment (drains to North Sea) | Adaptive management | 25.1 |
| Mill Beck/Ramsdale Beck catchment (tributary North Sea) | Adaptive management | 25.2 |
| Stoupe Beck catchment (tributary of North Sea) | Adaptive management | 25.1 |
| Hayburn Beck/Thorny Beck catch (drains to North Sea) | Adaptive management | 25.1 |
| Esk & Yorkshire Coast Ravenscar groundwater | Predominantly Adaptive Management. Active intervention also proposed alongside adaptive management for the southern section of policy unit 25.2. | All |
| Derwent North Yorkshire Moors Ravenscar groundwater | Adaptive Management. | 25.1 |

## 6.5 River and groundwater bodies

### 6.5.1 River water bodies

As illustrated on Figure 3, MA24 does not contain any river water bodies; consequently, the assessment with regard to river water bodies only relates to MA25.

The proposed Strategy option within MA25 (as outlined within **Section 1.2**) is considered unlikely to have potential for deterioration in status of the biological quality

elements of the river water bodies identified within Table 2 and Table 3. Any impacts are considered likely to be highly localised as the option is only likely to impact upon the open coast. The hinterland from the crest of the cliff is formed by a generally flat plateau dissected by valleys of small streams which discharge over the cliffs as waterfalls rather than deep cut gorges (Mouchel, 2011), and as such, deposition of eroded coastal material into the river water bodies is considered unlikely.

The flow of water within the river channels is likely to prevent eroded coastal material (predominantly gravel materials from the mudstone and sandstone cliffs) becoming deposited within the river channels as the coastline retreats, which will further prevent adverse effects with regard to biological quality. The Strategy option does not represent a change in management of the coast (the frontage within this policy unit is currently largely undefended and this will continue under the Strategy; currently defended areas will continue to be defended). However, the predicted future erosion rates have the potential to provide increased sediment input into the coastal zone, although any additional input is likely to be confined to the coast with very limited potential to affect the river water bodies.

The Strategy option within MA25 has potential to impact on the present day hydromorphology of the river water bodies. The river mouths within currently undefended areas will be moved slightly further inland as the coastline retreats (with the exception of Mill Beck/Ramsdale Beck as the Strategy option within the southern section of Policy Unit 25.2 is capital improvement of existing defences). Inland migration of the river mouths has potential to result in channel instability, creation of headward erosion and morphological adjustment of the water body. However, the majority of the coastline within MA25 is undefended against coastal erosion, and as such, these changes will arise from on-going natural processes, and are likely to be relatively small in scale. As such, any changes can be considered to be within the natural variability of the system, and are not anticipated to significantly impact upon the hydromorphology of the water bodies.

The majority of the frontage within MA25 is undefended against flooding as there is no threat from a 1 in 200 year event (as shown on Environment Agency flood mapping). This is likely to be the result of the steep relief of the cliffs along the majority of the frontage. The Strategy option is likely to result in increased cliff erosion along the majority of the frontage, which is likely to increase the sediment supply to the coastal zone. This has potential knock-on effects for the morphological condition of the river water bodies, if the supply of sediment exceeds the capacity of the river to transport it. Given the majority of the study area frontage is undefended, coastal erosion is an on-going process under the present day management, and the Strategy option would not alter this process.

The natural flow of the river watercourses is likely to prevent any sediments from the eroding coastal slope becoming deposited within the river channels. As such, the proposed Strategy options within MU25 are considered unlikely to have potential for deterioration in status of the chemical and physico-chemical quality elements of the river water bodies. The Strategy options are considered unlikely to result in an improvement in the status of the water bodies however, as the Strategy is maintaining the present day management of the coast and as such is unlikely to result in significant changes to the water bodies within the area.

## 6.6 Groundwater bodies

The majority of the frontage within the study area contains near vertical cliffs, which prevents the risk of coastal flooding to the hinterland. The low flood risk within the study area is considered likely to prevent adverse impacts on the chemical quality elements of the groundwater bodies, as saline water percolation into the underlying strata during flood events is considered unlikely. The presence of steep, high cliffs along the majority of the frontage ensures that connectivity between the surface water bodies and the groundwater body is unlikely. As such the quantitative quality element of the groundwater is unlikely to be adversely impacted due to the lack of a pathway between saline water within the coastal water body and water within the groundwater bodies. Overall, the Strategy option is considered unlikely to result in adverse impacts on the groundwater body status.

## 6.7 Coastal water body

The study area frontage is bordered by the Yorkshire North coastal water body. As mentioned within **Table 9**, the Strategy option for the different policy units along the frontage is variable; however, the preferred approach is predominantly adaptive management. A small section of the coast will continue to be defended at Robin Hood's Bay Village.

The Strategy option has potential to impact upon the hydromorphological, biological and chemical/physico-chemical quality elements of the coastal water body through the addition of fine sediment and potentially contaminated material within Stricklands Tip and the numerous former alum quarries along the frontage as the coastline retreats. There is also potential for the addition of waste within the foul water sewer system around the Mount Pleasant North area. It is understood that much of Stricklands Tip (which comprises a Victorian period tip on the edge of the cliff at Robin Hood's Bay beach) has been eroded away (Mouchel, 2009); however the potential still exists for contaminants to be present within remaining areas of the tip which could impact upon the physico-chemical and biological quality elements. The impacts associated with this are considered to be localised and small scale, relative to the size of the coastal water body (the coastal waterbody is considered likely to exhibit a significant buffering capacity for, and dilution of contaminants), and as such, adverse impacts on water body status are considered unlikely.

Nevertheless, mitigation measures (e.g. investigation of contamination risk, treatment of potential contamination sources, excavation of potential contamination or removal of the pathway between the source and receptor) are likely to be required with regard to potential contamination sources along the coastline to prevent localised pollution of the water body (e.g. remediation before there is a significant risk of erosion).
The natural evolution of the coastline would continue along the entire coastal frontage (with the exception of a small section of coast at Robin Hood's Bay village) as a result of the implementation of the Strategy option. The defence of the village at Robin Hood's Bay may result in the loss of sediment from the foreshore at this location as a result of sea level rise which could impact upon the existing hydromorphological conditions, however this is considered to be a very localised impact relative to the size of the coastal water body. The beneficial impacts associated with landward retreat and natural evolution along the majority of the frontage (e.g. potential for relatively small scale creation of new intertidal habitats at the base of the cliffs, particularly within sheltered areas where coastal waters are calm enough to hold sediment (e.g. immediately north of Scalby Ness, to the south of the study area)) are considered to outweigh the negative

impacts associated with the small loss of predominantly rocky foreshore as a result of defending the village. In summary, it is considered that there is unlikely to be deterioration in coastal water body status as a result of the proposed Strategy option.

## 6.8 Summary of WFD assessment

As presented within **Section 6.5** to **6.7**, the preferred Strategy option is unlikely to cause deterioration of any of the water bodies screened into the assessment. It is considered that the Strategy option has potential to adversely impact upon the biological and physico-chemical quality elements of the coastal water body, however any impacts are considered to be relatively small scale in relation to the size of the coastal water body, and mitigation measures are likely to prevent any deterioration in status. Such mitigation measures could include investigation of the potential contamination sources present along the coastal frontage, and implementation of remediation measures (such as excavation and removal of the source, treatment of the source or removal of the pathway between source and receptor) in order to prevent pollution incidents. A summary of the assessment is presented in **Table 10** to **Table 12**.

**Table 10 Summary of river water bodies assessment**

| **Quality elements** | **Preferred strategy option** |
|---|---|
| Biological | Flow of water within the river channels likely to prevent eroded coastal material (predominantly gravel materials from the mudstone and sandstone cliffs) becoming deposited within the river channels as the coastline retreats. |
| **Impact on status** | **No deterioration in status** |
| Hydromorphological | River mouths will be moved slightly further inland as the coastline retreats, however changes considered to be within the natural variability of system as no change to present day management. |
| **Impact on status** | **No deterioration in status** |
| Chemical and physico-chemical | Flow of water within the river channels likely to prevent eroded coastal material (predominantly gravel materials from mudstone and sandstone cliffs) becoming deposited within river channels as the coastline retreats. |
| **Impact on status** | **No deterioration in status** |
| **Impact on water body status** | **No deterioration in status** |

**Table 11 Summary of ground water bodies assessment**

| **Quality elements** | **Preferred strategy option** |
|---|---|
| Chemical | Study area contains near vertical cliffs, which removes present day flood risk to hinterland. Impact on chemical element considered unlikely as saline water percolation into groundwater is not considered a risk. |
| Impact on status | **No deterioration in status** |
| Quantitative | Lack of pathway between saline water in the coastal waterbody and groundwater bodies. |
| Impact on status | **No deterioration in status** |
| Impact on water body status | **No deterioration in status** |

**Table 12 Summary of coastal water body assessment**

| Quality elements | Preferred strategy option |
|---|---|
| Biological | Supply of potentially contaminated sediment and waste within the foul drainage sewer to coastal waterbody, however the erosion of the coastline is a natural process and the impacts are considered relatively small scale in comparison to the size of the water body. |
| Impact on status | **No deterioration in status** |
| Hydromorphological | Potential loss of intertidal habitat in front of Robin Hood's Bay village as a result of coastal squeeze. Natural evolution of coastline permitted along the majority of the frontage however. |
| Impact on status | **No deterioration in status** |
| Chemical and physico-chemical | Supply of potentially contaminated sediment to coastal waterbody, however the supply is a natural process and is considered relatively small in scale in comparison to the size of the water body. |
| Impact on status | **No deterioration in status** |
| Impact on water body status | **No deterioration in status** |

# 7 CONCLUSIONS

## 7.1 Introduction

The Strategy will play a key role in the management of coastal erosion risk to the local communities and natural environment of Robin Hood's Bay. It seeks to implement the policies set out in the River Tyne to Flamborough Head SMP2 and defines the approach that will be taken to manage coastal flood and erosion risk along the Whitby to Cloughton frontage for the next 100 years. A summary of the impacts resulting from the draft preferred Strategy options and measures identified to manage or mitigate these impacts is presented below.

In order to summarise the impacts of the draft preferred Strategy with regard to impacts on receptors, the 21 objectives identified within the ER (Mouchel, 2010, **Appendix G2b** of the StAR, 2012) have been grouped together as presented within **Table 13:**

**Table 13 Environmental receptors and objectives**

| Receptor | Objective |
|---|---|
| Population and human health | 1. Provide conditions for business success, economic growth and investment with reference to fishing and farming.<br>2. To support the tourism industry through the provision of access to facilities and attractions<br>3. Maintain vibrant local communities<br>4. Ensure safety and security of people and property<br>7. Ensure local needs are met locally.<br>9. Promote good health through provision of access to leisure facilities including access to network of footpaths.<br>10. Minimise negative impacts to human health and safeguard positive impacts.<br>18. Manage natural resources in a way which sustains their environmental qualities. |
| Critical infrastructure and material assets | 5. Maintain the transport network, encouraging the use of cycling, walking, minimising traffic and promoting access to the countryside.<br>6. Maintain access to local facilities and services. |
| Biodiversity, flora and fauna | 11. Conserve and seek to enhance terrestrial and marine biological and geological environment, particularly designated sites and protected species.<br>12. Conserve and seek to enhance the coastal and marine biological and geological environment, particularly designated sites and protected species.<br>13. Maintain and safeguard opportunities for all to access and understand the ecological and geological environment. |
| Soil | 14. Minimise pollution to levels which do not damage the biological or geological environment.<br>15. Minimise pollution to levels which do not damage soil<br>16. Minimise pollution to levels which do not damage water |
| Water | 17. Ensure the works do not increase the risk of flooding |
| Historic environment | 19. Maintain and safeguard opportunities for all to access and understand local heritage.<br>20. Where practicable preserve and enhance all aspects of the historic environment. |
| Landscape | 21. Maintain and where possible enhance special landscape, local distinctiveness and settlement character. |

## 7.2 Population and human health

The Strategy will continue to manage coastal erosion risk to populations and human health by ensuring a strategic approach is taken to protect residential and commercial properties from coastal erosion, in the face of a changing climate. Approximately 80 properties (both commercial and residential) and 150 static caravans would be lost as a result of the do nothing option along the frontage, however the adaptive management strategy would ensure that the properties are protected from coastal erosion in the long term. The properties within the southern section of Robin Hood's Village would continue to be protected through capital improvement of the existing defences.

The Strategy has potential to impact upon tourism and recreational resources, through the loss of the Cleveland Way coastal footpath and local access roads. The loss of such recreational features could impact upon human health of residents within the area and reduce visitor numbers to the area. The loss the recreational footpath could be mitigated through the creation of a coastal path in a realigned position, as part of the adaptive management Strategy.

The village at Robin Hood's Bay is a significant tourism asset, drawing a significant number of visitors to the area; the Strategy will ensure the continued provision of these assets through the continued improvement of defences in the south of the village and roll back of properties and features of interest in the north of the village.

There are potential adverse impacts to tourists and recreational users of the area associated with potential cliff falls (particularly within the northern section of Robin Hood's Bay village where there is uncertainty as to the effect of drainage exfiltration on water levels at rock head). Such cliff falls have potential to result in health and safety implications to users of the foreshore during such events. Such risks should be mitigated through the continuation of the coastal monitoring programme, in order to identify the potential for cliff failure. An Outline Emergency Action Plan has been produced as part of the ER (Mouchel, 2010); it is also considered that a Detailed Landslip Emergency Action Plan will need to be created if significant risk is identified during coastal monitoring.

## 7.3 Critical infrastructure and material assets

The Strategy will continue to manage coastal erosion risks to critical infrastructure and material assets by ensuring a strategic approach is taken to protect assets from increased erosion risk, in the face of a changing climate. Such assets at risk over the next 100 years will be rolled back outside of the erosion zone, or protected through improvement of the existing defences at the southern section of Robin Hood's Bay Village.

Further investigation is required in order to determine ownership of utilities within the northern section of Robin Hood's Bay village, in order to allow a scheme to be commissioned to carry out repair works (if required) and diversions, to reduce coastal erosion rates and remove the potential for reductions in water quality associated with the potential impacts on the foul drainage system at Mount Pleasant.

## 7.4 Biodiversity, fauna and flora

In general, the Strategy will allow for the natural evolution of the coastline (with the exception of a small section in the south of Robin Hood's Bay village). Such natural

erosion of the coastline has potential to result in the inland migration of wet woodland BAP habitat and ancient woodland adjacent to Stoupe Beck, Maritime Cliff and Slope BAP habitat and potential erosion/slumping of the SSSI's along the frontage as a result of falling debris and smothering from material eroded from the coastal slopes. There is also likely to be inland migration of the Beast Cliff to Whitby SAC as the coastline naturally erodes. Erosion of the geological SSSIs is a natural process, and has potential to result in the exposure of additional geological interest features. The Strategy is also likely to maintain the natural coastal instability along the majority of the frontage.

The improvement of defences within the southern section of Robin Hood's Bay village is also likely to result in the loss of a small section of intertidal habitat as a result of coastal squeeze as sea levels rise. The net littoral transport along the wider frontage is understood to be in a southerly direction (Mouchel, 2010a), except during certain states of the tide when material is transported northwards. It is also considered that there is little small scale interaction between embayments, due to the isolated nature of the beaches. Sand derived from erosion of the till may provide a very small contribution to the nearshore sand belt south of the bay.

Natural England stated during July 2012 that geologically designated SSSIs should be allowed to erode naturally, and this is viewed by Natural England as a positive impact as there is potential to expose new geological interest features. Stabilisation of rock outcrops is considered to have a negative impact on the SSSI. As such, the Strategy of adaptive management along the majority of the frontage is considered likely to have a positive impact on the geological interest features of the SSSIs.

It would be useful to maintain a balance sheet of losses and gains of BAP habitat, although consultation with Natural England during September 2012 identified that this may be difficult in practice; Natural England recommended that it would be more useful to identify where BAP habitat is being 'squeezed' as sea level rises, and identify measures to address these issues, through agri-environment schemes / development management. Further, more detailed assessment of the potential impacts and the avoidance, mitigation or compensation measures will be required at the project level before schemes can be approved.

### 7.4.1 Habitats Regulations Assessment (HRA): Screening

The Conservation of Species and Habitats Regulations 2010 (the Habitats Regulations) implement EC Directive 92/43/EEC on the conservation of natural habitats and of wild flora and fauna (the Habitats Directive). In accordance with Section 61 of the Habitats Regulations, Appropriate Assessment (AA) is required for any plan or project, not connected with the management of a European site, which is likely to have a significant effect on the site either alone or in combination with other plans and projects. European sites comprise Special Protection Area (SPA), as designated under Council Directive 79/409/EEC (the Wild Birds Directive), or a Special Area of Conservation (SAC), as designated under the Habitats Directive. AA is also required as a matter of government policy for potential SPAs, candidate SACs and listed Ramsar sites for the purpose of considering development proposals affecting them (ODPM, 2005).

The HRA screening (Mouchel, 2011) identified that there will no impact on any of the European designated sites and therefore it was considered that an Appropriate Assessment was not required for the Strategy. Consultation with Natural England during July 2012 confirmed that this approach was acceptable, and Appropriate Assessment was not required.

Consultation with Natural England during January 2011 identified that Natural England's chief area of concern with regard to the Beast Cliff-Whitby (Robin Hood's Bay) SAC was the proposed active intervention in Policy Unit MA25.2. Natural England believed that the proposed works on the sea wall to maintain the existing defence are, however, too far from the SAC to have any impact.

With regard to the Robin Hood's Bay: May Wyke to Beast Cliff SSSI, Natural England stated that they would be keen to work with the Council in order to produce a scheme which minimises impacts on the SSSI within Policy Unit MA25.2. Natural England did not object to the option with Policy Unit MA25.2, however it was stated that until they have seen details of the proposed works, it was not possible to say whether the works will affect the SSSI.

Natural England has provided a Letter of Support with regard to the proposed Coastal Strategy at Robin Hood's Bay. This is included as an Appendix to the StAR.

## 7.5 Soil

The Strategy option along the majority of the frontage has potential to result in erosion of a number of former alum works and Stricklands Tip. Such features have potential to represent contamination sources which could impact upon the groundwater, surface water and coastal environment. There is potential for residual contamination to be present within the ground from existing properties and practices (e.g. farm buildings, woodworking factory, residential properties etc.), which could remain following demolition of such properties and roll back to areas which are not at risk of erosion. Further ground investigation with chemical laboratory analysis of such areas would be required, in order to determine the contamination risks, prior to the implementation of schemes. If contamination is encountered within the soils/groundwaters during investigation works, remedial works in the form of excavation of the source, treatment of the source or removal of the pathway between source and receptor would be required.

## 7.6 Water

The Strategy will maintain the existing coastal processes along the frontage. In the development of the CSS, it was advised by the Environment Agency that there is no modelled flood data for future scenarios. The study has therefore only considered flooding from a present day 1 in 200 year coastal flooding event. Environment Agency mapping indicates that the study area is not at risk of coastal flooding, and as such, the objective of ensuring the works do not increase the risk of flooding is met as a result of the Strategy.

The findings of the WFD assessment identified that the Strategy is not considered to result in deterioration in water body status on the coastal, groundwater or river water bodies present within the study area.

## 7.7 Historic environment

The Strategy would result in the loss of SAMs and a listed building as the coastline retreats, however the majority of the frontage is currently undefended and as such, heritage assets would be lost naturally over time as a result of coastal erosion. The Strategy would, however, provide protection to a number of listed buildings within the southern section of Robin Hood's Bay village through improvement of the existing defences.

Additional archaeological assessments of the areas affected by the Strategy's options are likely to be required with the aim of producing site specific mitigation strategies, in accordance with national, regional and local policy guidelines and with all relevant national and regional archaeological research agendas. Continued consultation with English Heritage and the County Archaeologist should be undertaken to ensure that the assessments and mitigation strategies are appropriate. It is considered that additional assessments such as full archaeological recording and potential excavation and re-construction of the listed building within a defended section of the coastline could be undertaken in order to mitigate against the loss of such features.

## 7.8 Landscape

Overall, the Strategy is considered to have a positive effect on the landscape. The landscape within the study area is made up of sheer cliffs and steep coastal slopes, fronting rocky shore platforms and picturesque villages (the frontage is classified as North Yorkshire and Cleveland Heritage Coast, while some is also classified as National Park land). No additional construction works are required other than in areas which are already defended, and as such, the Strategy would not impact on the present day management of the coast. The natural evolution of the coastline would be permitted along the majority of the frontage, which would maintain the local character of the area.

The degradation of property as the coastline retreats would be considered a negative impact on the existing landscape, however this could be avoided through removal of the properties and re-construction landward, prior to the properties becoming degraded as a result of coastal erosion.

## 7.9 Summary

The SEA for the Strategy has identified the potential impacts which could result from a range of coastal erosion risk management options at the strategic level and helped inform the selection of a preferred Strategy. The impacts of the draft preferred Strategy options have been assessed as much as possible in light of the current level of knowledge and information available, and how they might be implemented.

Undertaking SEA at this strategic level has ensured that the draft preferred Strategy options are able to be implemented and will not result in impacts or issues that cannot be appropriately managed or mitigated at the project level. Nevertheless at this strategic level, some uncertainty remains over how individual projects will be implemented, the specific impacts that could arise and mitigation measures required. This will be addressed further as an integral part of a more detailed environmental assessment or of the EIA process, if required, for individual schemes. Monitoring will also allow a review of actual impacts against predicted impacts and will feed back into subsequent reviews of the Strategy.

# 8 THE NEXT STEPS IN THE SEA PROCESS

## 8.1 Consultation

This report is provided as an addendum to the ER (Mouchel, 2010), and has been produced based on consultation responses received. It is considered that additional consultation on this addendum report is not required, as the conclusions within the original SEA Environmental Report have been amended.

# 9 REFERENCES

Environment Agency, 2009. Humber River Basin Management Plan

Environment Agency 2009. Northumbria River Basin Management Plan

Mouchel, 2009. Robin Hood's Bay Coastal Strategy Study, Strategic Environmental Assessment – Scoping Report

Mouchel, 2010. Robin Hood's Bay Coastal Strategy Study, Strategic Environmental Assessment

Mouchel, 2011. Robin Hood's Bay Coastal Strategy Study.