North Tyneside Council

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Hartley Cove to the River Tyne Coastal Strategy

Water Framework Directive Assessment

August 2016

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1.1.2 The Strategy is presented as a series of reports, each dealing with a separate component of the plan along with a number of supporting Appendices, as summarised below.

Technical Report No.	Title
1	Executive Summary
2	Background
3	Coastal Processes
4	Existing Defences and Historical Expenditure
5	Strategic Environmental Assessment - Environmental Report
6	Options Development and Economic Assessment
7	Monitoring
8	Risk Assessment and Health and Safety Assessments
9	Public Consultation and Stakeholder Involvement
10	Glossary and References
Appendices	**Title**
Appendix A	Habitat Regulations Assessment
Appendix B	**Water Framework Directive Assessment**
Appendix C	Non-Technical Summary for the Strategic Environmental Assessment

Appendix B: Water Framework Directive Assessment

1.1.3 This appendix provides information on:

- Local Water Framework Directive classification and objective information
- Expected impact of preferred options on Water Framework Directive objectives

2. Introduction

2.1 Purpose of report

2.1.1 The Coastal Strategy developed for the North Tyneside coastline, between Hartley Cove and the River Tyne, sets out the Council's defence management priorities for the coast. The aim of the strategy is to provide an appropriate level of coastal defences along the North Tyneside coastline for the next 100 years to protect lives, property, infrastructure and the environment in accordance with technical, economic, environmental and social criteria.

2.1.2 This report is an assessment of the Coastal Strategy against the requirements of the Water Framework Directive (WFD) in accordance with the Environment Agency document 'Assessing new modifications for compliance with WFD: detailed supplementary guidance'1 This document provides guidance on how to assess the impacts of new modifications in the water environment to ensure compliance with the WFD in line with 'Assessing new modifications for compliance with WFD'2.

2.1.3 As a part of the Coastal Strategy, an assessment of the implications of the Water Framework Directive (WFD) Regulations3 is required. The requirements of the WFD need to be considered at all stages of the coastal planning process, by reference to the River Basin Management Plans (RBMPs)4.

2.1.4 This report will be subject to consultation with the Environment Agency (EA) and North Tyneside Council (NTC).

2.2 The Hartley Cove to the River Tyne Coastal Strategy

2.2.1 The current Shoreline Management Plan (SMP) for North Tyneside is the Northumberland and North Tyneside Shoreline Management Plan 2: Scottish Border to River Tyne. This was produced by Royal Haskoning consultants and published in May 2009.

2.2.2 Whilst the Shoreline Management Plan (SMP) identifies what policy should be adopted for future Coastal Defence management, a Strategy examines how the policy will be implemented. The Strategy provides a more detailed understanding of the processes applying and the flood and coastal erosion risks faced by shoreline communities, the environmental impacts and the likely economic consequences of various coastal management scenarios, in order to develop the policies laid down in the SMP into preferred generic management solution(s) within each shoreline policy unit.

[1] Assessing new modifications for compliance with WFD: detailed supplementary guidance, Environment Agency, 2010

[2] Assessing new modifications for compliance with WFD, Environment Agency, 2010

[3] http://www.legislation.gov.uk/uksi/2003/3242/contents/made

[4] https://www.gov.uk/government/collections/river-basin-management-plans

2.2.3 The objective of the strategy is to provide a plan for the next 100 years to cover the appraisal system, management and economics of a sustainable and structured response to flood and coastal erosion risk management within this area. It sets out coastal flood and erosion management policies along the North Tyneside Coast based on the following generic shoreline management policies defined by Defra:

- **No active intervention (NAI):** a decision not to invest in providing or maintaining defences;
- **Hold the line (HTL):** maintain or change the level of protection provided by the defences, This would include work or operations carried out in front of the existing defences or where, while maintaining existing defences, policies involve operations to the back of defences (such as secondary flood defences) as an essential part of maintaining the current defence system;
- **Advance the line (ATL):** build new defences seaward of the existing defence line where significant land reclamation is considered;
- **Hold the Line:** Managed realignment (MR): by allowing the shoreline to move backwards or forwards with management to limit or control
- change;
- **Hold the Line on a retreated Alignment (HR):** Maintaining a defence line set back from the existing line of defence.

2.3 The Water Framework Directive

2.3.1 The Water Framework Directive (WFD)[5] was passed into UK law in 2003. The overall aim is to protect and improve the water environment.

Water Framework Directive Objectives

2.3.2 The objectives aim for all water bodies is to prevent deterioration in either the Ecological Status or, for Heavily Modified Water Bodies (HMWBs) or Artificial Water Bodies (AWBs), the Ecological Potential of the water body.

Table 2-1 WFD objectives (Environment Agency, 2009)

Objectives (taken from Article 4 of the Directive)	Reference
Member States shall implement the necessary measures to prevent deterioration of the status of all bodies of surface water.	4.1(a)(i)

[5] Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy

Objectives (taken from Article 4 of the Directive)	Reference
Member States shall protect, enhance and restore all bodies of surface water, subject to the application of subparagraph (iii) for artificial and heavily modified bodies of water, with the aim of achieving good surface water status by 2015.	4.1(a)(ii)
Member States shall protect and enhance all artificial and heavily modified Bodies of water, with the aim of achieving good ecological potential and good surface water chemical status by 2015.	4.1(a)(iii)
Progressively reduce pollution from priority substances and cease or phasing out emissions, discharges and losses of priority hazardous substances.	4.1(a)(iv)
Prevent Deterioration in Status and prevent or limit input of pollutants to groundwater	4.1(b)(i)

2.3.3 This assessment aims to determine whether the policies of the Coastal Strategy could affect the status of one or more WFD water bodies (i.e. coastal, transitional, river, lake or groundwater bodies) by:

- Causing deterioration, defined as a drop in status class of one or more of the WFD parameters at the level of the water body (whether or not this results in an overall reduction in status/potential); and / or
- Preventing the water body from improving and thus achieving its WFD target.

2.3.4 Any implications for Protected Areas or for other (e.g. adjacent) water bodies will also be considered in line with the objectives set out above, and any other potential conflicts with the proposed RBM Programme of Measures (i.e. the actions to be taken to achieve the WFD objectives) will be highlighted and resolved.

Assessment Criteria

2.3.5 The WFD sets out an assessment criteria for classifying the overall status of water bodies on the basis of their ecological and chemical condition. The classification of a water body's ecological condition is dependent on the type of water body being assessed. For natural water bodies the classification is based on a measure of quality elements including biological elements such as the presence of fish and invertebrate fauna, hydromorpholigical quality elements and physicochemical elements. The overall classification is expressed in terms of Ecological Status defined as being High, Good, Moderate, Poor or Bad and is defined by the lowest classed element.

2.3.6 For artificial or heavily modified water bodies (AWB or HMWB) the classification system is slightly different in recognition of the impact that human activity can have on the water environment. For such water bodies the classification is based predominantly on the presence or absence of mitigation measures within the water body as a whole. These mitigation measures are defined for each water body within the River Basin Management plans as set by the Environment Agency.

2.3.7 Where water bodies coincide with protected sites under other EU legislation (e.g. Shellfish Waters Directive, the Birds or Habitats Directives), more stringent targets would apply.

2.4 Northumbria River Basin District: River Basin Management Plan

2.4.1 The 2009 River Basin Management Plan was updated and published in 2015. All the water bodies within the Strategy area were identified along with their ID numbers, classification and objective classification.

2.4.2 The Hartley Cove to River Tyne Coastal Strategy (the Strategy) lies in the Tyne and Wear Coastal waterbody (North Sea GB650301500002) which lies in the Northumbria River Basin District (RBD). The Tyne and Wear Coastal unit is currently classified as having a Good overall potential, with a proposed overall objective of Good Potential by 2015.

2.4.3 Brierdene Burn from Source to Tidal Limit (GB103022076180) is located in the Northumbria River Basin District. Brierdene Burn is currently classified as having a Poor overall potential with a proposed overall objective of reaching Good Ecological Status by 2027.

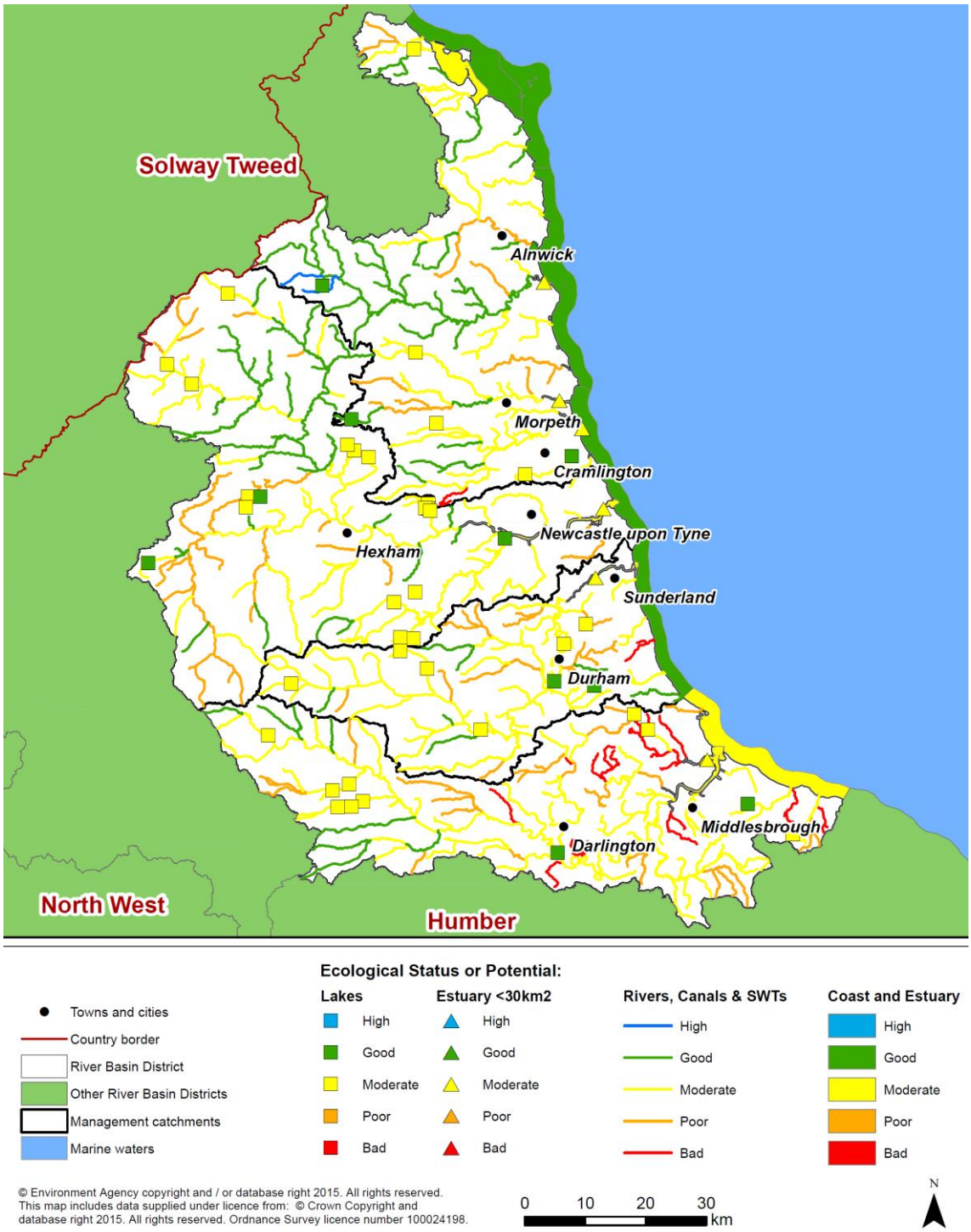
2.4.4 The “Seaton Burn from Source to Tidal Limit” (GB103022076190) lies in the Northumbria River Basin District. The Seaton Burn is currently classified as having a Poor overall potential, with a proposed overall objective of reaching good ecological potential by 2027.The Seaton Burn is considered to be a heavily modified watercourse. The Seaton Burn is located just north of Hartley Cove and therefore outside of North Tyneside Boundary. It has been therefore been scoped out from further assessment.

2.4.5 There is one Transitional waterbody in the study area, the Tyne (GB510302310200). This is currently classified as having a moderate overall potential with a proposed overall objective of reaching Good Potential Ecological and Chemical Status by 2027.

2.4.6 There is one groundwater body in the study area, the Tyne Carboniferous Limestone and Coal Measures (GB40302G701500). This is currently classified as having a Poor overall status with a proposed overall objective of Poor by 2015.

2.4.7 The WFD classifications are summarised in Figure 2-1.

Figure 2-1 WFD classifications (River Basin Management Plan, Environment Agency, 2015)



2.5 Northumberland and North Tyneside Shoreline Management Plan 2: Scottish Border to River Tyne

2.5.1 The Shoreline Management Plan 2 (SMP2) coastal frontage has been subdivided into smaller units. The Policy Development Zone (PDZ) relevant for the North Tyneside Coastline is PDZ6 *"Seaton Sluice to River Tyne".* Within the PDZ the coast has been further sub-divided into a series of 'Management Areas' and, within each of these, management policies have been selected for a series of 'Policy Units'. Table 3-3 of "Technical Report 6 Options and Development and Economic Assessment" document outlines each Management Area and respective Policy Unit. The Management Areas are for North Tyneside are MA24, MA25, MA26 and MA27. These are also outlined below. The policies, as described in section 2.2, are known as No Active Intervention (NAI), Hold the Line (HTL), Managed Realignment (MR) and Advance the Line (ATL).

Table 2-2 SMP2 polices for the North Tyneside coastline

Management Areas and Policy Units		SMP2 Policy by epoch		
		Short term 0-20 years	Medium term 20-50 years	Long term 50-100 years
MA24	PU24.2 Crag Point to Curry's Point	NAI	NAI	NAI
MA25	PU25.1 Curry's Point to Trinity Road Car Park	HTL	HTL	HTL
	PU25.2 Trinity Road Car Park to Brierdene Burn	MR	MR	MR
	PU25.3 Brierdene Burn to Brown's Point	HTL	HTL	HTL
	PU25.4 Brown's Point to Table Rocks	HTL	HTL	HTL
MA26	PU26.1 Brown's Point	NAI	NAI	NAI
	PU26.2 Cullercoats Bay	HTL	HTL	HTL
	PU26.3 Tynemouth North Point	NAI	NAI	NAI
	PU26.4 Tynemouth Longsands	HTL	HTL	MR
	PU26.5 Sharpness Point	NAI	NAI	NAI
	PU26.6 Tynemouth Shortsands (King Edward's Bay)	HTL	HTL	HTL
	PU26.7 Tynemouth Headland	HTL	HTL	HTL

Management Areas and Policy Units		SMP2 Policy by epoch		
		Short term 0-20 years	Medium term 20-50 years	Long term 50-100 years
	PU26.8 Tynemouth North Pier	HTL	HTL	HTL
MA27	PU27.1 Prior's Haven	NAI	NAI	NAI
	PU27.2 Quayside	HTL	HTL	HTL

2.5.2 The policies described within the Shoreline Management Plan represent the aspirations for each policy unit area. The technical and economic feasibility of options to achieve these policies are explored within the Coastal Strategy. 'Do nothing' is considered to represent the 'No Active Intervention' policy within the Strategy appraisal; 'Do Minimum' and 'Do Something' options represent the 'Hold the Line' policy within the Strategy appraisal and 'Managed Realignment' represents the policy of the same name. The results of the more detailed appraisal within the Strategy supersedes the recommendations made in the Shoreline Management Plan, because more detailed technical and economic considerations are taken into account in decision making.

2.6 Hartley Cove to the River Tyne Coastal Strategy

2.6.1 This appendix is part of the Hartley Cove to the River Tyne Coastal Strategy. As part of this Strategy, economic analysis was undertaken to identify the economically preferred option at each policy unit. The results of the appraisal are summarised below.

Table 2-3 Summary of preferred economic options for each benefit area

Policy Unit	Preferred Economic Option	Benefit Cost Ratio (BCR)
PU24.2 Crag Point to Curry's Point	Do Nothing	N/A
PU25.1 Curry's Point to Trinity Road Car Park	Do Nothing	N/A
PU25.2 Trinity Road Car Park to Brierdene Burn	Managed Realignment (already completed)	0
PU25.3 Brierdene Burn to Brown's Point	Do Minimum	2.4
PU25.4 Brown's Point to Table Rocks	Do Nothing	N/A
PU26.1 Brown's Point	Do Nothing	N/A
PU26.2 Cullercoats Bay	Do Nothing	N/A
PU26.3 Tynemouth North Point	Do Nothing	N/A

Policy Unit	Preferred Economic Option	Benefit Cost Ratio (BCR)
PU26.4 Tynemouth Longsands	Do Nothing	N/A
PU26.5 Sharpness Point	Do Nothing	N/A
PU26.6 Tynemouth Shortsands (King Edward's Bay)	Do Nothing	N/A
PU26.7 Tynemouth Headland	Do Nothing	N/A
PU26.8 Tynemouth North Pier	Do Nothing	N/A
PU27.1 Prior's Haven	Do Minimum	2.0
PU27.2 Quayside	Do Nothing	N/A

2.6.2 For the majority of the policy unit areas, Do Nothing is preferred (because the costs of the Do Minimum and Do Something options outweighed the benefits). In these cases, natural processes will be allowed to occur. For Policy Unit 25.2, Trinity Road Car Park to Brierdene Burn, Managed Realignment is preferred (and incidentally has already been completed). For both Policy Unit 25.3 Brierdene Burn to Brown's Point and Policy Unit 27.1 Prior's Haven Do Minimum is preferred. This option allows reactive repairs to the current defences to occur. This WFD assessment considers the impact of these options on achieving WFD objectives.

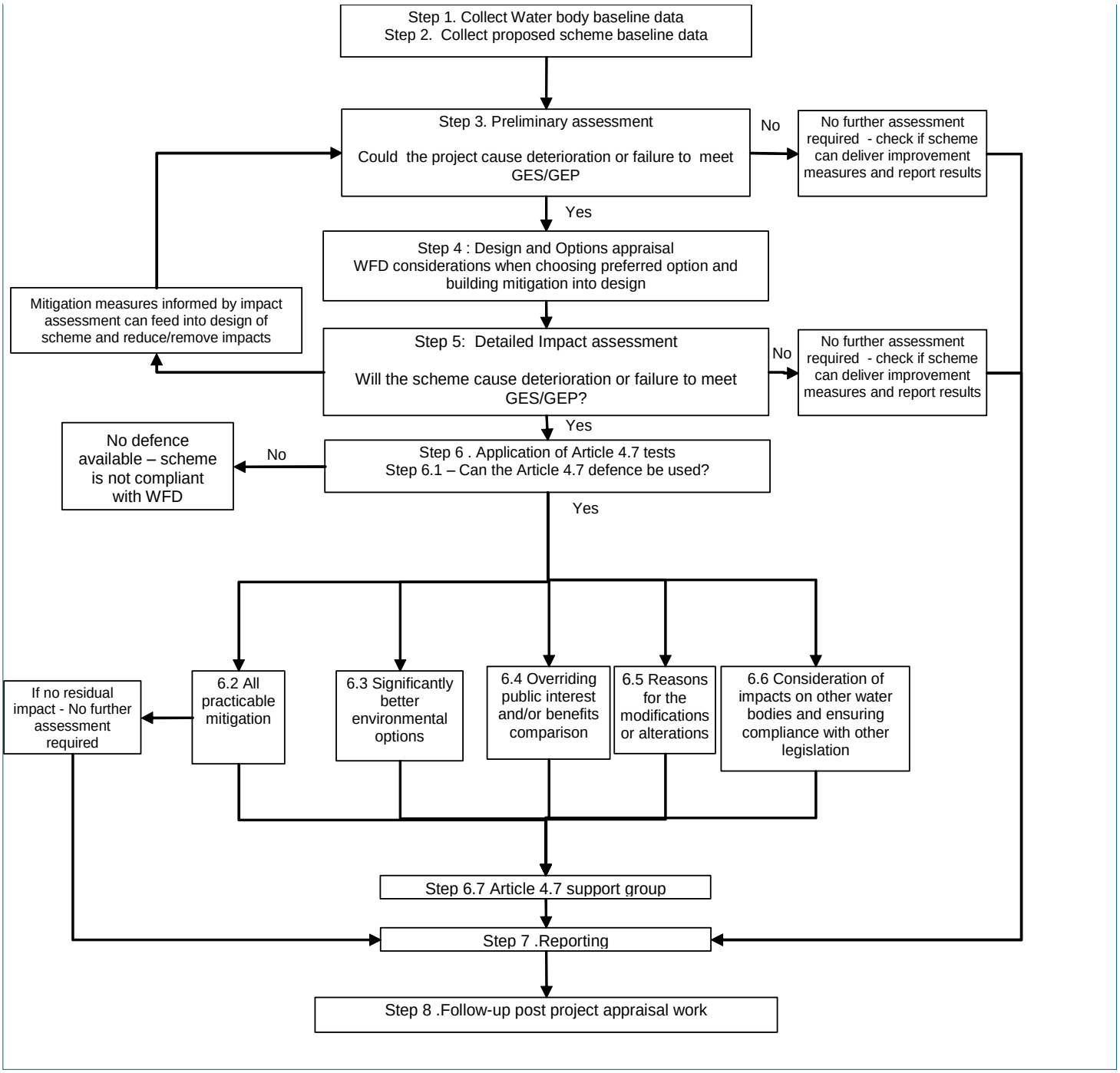
3. Assessment Methodology

3.1.1 Defra's policy statement 'Appraisal of Flood and Coastal Erosion Risk Management' (June, 2009) states that all flood and coastal erosion risk management activity is required to comply with the WFD. This includes the Coastal Strategy. This WFD compliance appraisal builds on the assessment prepared for the SMP2 taking into account the greater detail provided by Strategic options and information pertaining to the coast

3.1.2 The scope of this WFD assessment is to appraise the compatibility of the options presented in the Coastal Strategy to ensure that these are compliant with the default objectives of the WFD (i.e. prevent deterioration and prevent failure to improve), and where possible to support relevant WFD measures proposed to improve the status of a water body. Only changes that are likely to have long term effects at the water body level are significant, meaning that there is no need to appraise construction activities, despite the possibility of short term temporary degradation to Biological Quality Elements (BQEs) and their supporting substances and conditions, or local effects which are not significant at water body level. The assessment therefore focuses on identifying possible non-temporary detrimental effects on water bodies which would bring about deterioration in status class or prevent the improvement of a failing water body. The permanent environmental changes (e.g. changes in rates of erosion or accretion and subsequent consequences along the coastline) that could be brought about, for example by constructing new defences would therefore be considered by the assessment, should 'Do Something' options be preferred. However, short term, demonstrably temporary, environmental impacts (e.g. locally elevated suspended silt in coastal waters) that might occur during construction works are not.

3.1.3 The methodology used for this assessment has been taken from the Environment Agency document 'Assessing new modifications for compliance with WFD: detailed supplementary guidance', Environment Agency, 2010. This follows an eight step process which is illustrated in Figure 3-1.

Figure 3-1 Overview of eight step process



4. Proposed Scheme Baseline Data

4.1.1 The preferred option is Do Nothing for the majority of policy units, except Do Minimum for policy units 25.3 and 27.1 and Managed Realignment for policy unit 25.2. Do Nothing assumes no active intervention (where natural processes are allowed to occur). Do Minimum assumes reactive repairs of existing defences which 'holds the line' until breach occurs. Managed Realignment involves building new defences in land, which allows the creation of intertidal habitat areas.

Table 4-1 Summary of preferred economic options for each benefit area

Policy Unit	Preferred Economic Option	Detail of preferred option	Benefit Cost Ratio (BCR)
PU24.2 Crag Point to Curry's Point	Do Nothing	No further work or repairs would be undertaken and the steps would be allowed to deteriorate and the access closed once it was no longer safe to be used.	N/A
PU25.1 Curry's Point to Trinity Road Car Park	Do Nothing	No repairs would be undertaken on the existing defences and they would be allowed to deteriorate and eventually fail.	N/A
PU25.2 Trinity Road Car Park to Brierdene Burn	Managed Realignment (already completed)	Allow natural processes to continue, but manage the transitions at the northern and southern ends of the unit where hard defences exist, to minimise outflanking risks	0
PU25.3 Brierdene Burn to Brown's Point	Do Minimum	Reactive maintenance of existing defences	2.4
PU25.4 Brown's Point to Table Rocks	Do Nothing	No maintenance of existing defences which would be allowed to deteriorate and eventually fail, after which natural processes would occur	N/A
PU26.1 Brown's Point	Do Nothing	Allow natural processes to occur	N/A
PU26.2 Cullercoats Bay	Do Nothing	No maintenance of existing defences which would be allowed to deteriorate and eventually fail, after which natural processes would occur	N/A
PU26.3 Tynemouth North Point	Do Nothing	Allow natural processes to continue	N/A
PU26.4 Tynemouth Longsands	Do Nothing	No maintenance of existing defences which would be allowed to deteriorate and eventually fail, after which natural processes would occur	N/A

Policy Unit	Preferred Economic Option	Detail of preferred option	Benefit Cost Ratio (BCR)
PU26.5 Sharpness Point	Do Nothing	Allow natural processes to continue	N/A
PU26.6 Tynemouth Shortsands (King Edward's Bay)	Do Nothing	No maintenance of existing defences which would be allowed to deteriorate and eventually fail, after which natural processes would occur	N/A
PU26.7 Tynemouth Headland	Do Nothing	No maintenance of existing defences which would be allowed to deteriorate and eventually fail, after which natural processes would occur	N/A
PU26.8 Tynemouth North Pier	Do Nothing	No maintenance of existing defences which would be allowed to deteriorate and eventually fail, after which natural processes would occur	N/A
PU27.1 Prior's Haven	Do Minimum	Reactive maintenance of existing defences	2.0
PU27.2 Quayside	Do Nothing	No maintenance of existing defences which would be allowed to deteriorate and eventually fail, after which natural processes would occur	N/A

5. Waterbody Baseline Data

5.1.1 The first stage of the WFD assessment process is to collect baseline information on the current status of the water body in the study area. This involves identifying the water bodies within the study area and then identifying the Biological Quality Elements (BQEs) within the watercourses that may be affected by the strategy. It also involves identifying if there are any internationally protected sites that could be impacted by the strategy and any planned water body measures.

5.1.2 Baseline information has been taken from the River Basin Management Plan: Northumbria River Basin District (Environment Agency, 2015) and the Northumbria Shoreline Management Plan (Environment Agency, 2009)

5.2 Waterbodies present in the study area

5.2.1 Table 5-1 details whether the water body has been scoped into the assessment. The strategy is located within the Tyne and Wear Coastal Water Body and the River Tyne is considered to be a Transitional waterbody. The Seaton Burn flows through North Tyneside flows it is joined by Sandy's Letch from the north, forming part of the North Tyneside northern boundary before flowing further north into Northumberland, entering the North Sea at Seaton Sluice.

5.2.2 Brierdene Burn forms southwest of Backworth, flowing under the A19 north through rural land. It is joined by a number of small drains originating from Shiremoor and South Wellfield before flowing through Whitley Bay Golf Course and out into the North Sea.

Table 5-1 Water Bodies Assessed

Water body ID	Water Body Name	Type	Scoped into assessment?	Reason (if scoped out)
GB650301500002	Tyne and Wear (North Sea)	Sea / Coastal	Yes	-
GB510302310200	River Tyne	Transitional	Yes	-
GB40302G701500	Tyne Carboniferous Limestone and Coal Measures	Groundwater	No	Works not considered to have an impact on groundwater
GB103022076190	Seaton Burn from Source to Tidal Limit	River	No	The proposed works are not predicted to impact the Seaton Burn. The Burn's discharge point to

Water body ID	Water Body Name	Type	Scoped into assessment?	Reason (if scoped out)
				the North Sea is located outside of the strategy boundary / NTC administrative boundary
GB103022076180	Brierdene Burn from Source to North Sea	River	Yes	-

5.2.3 The Carboniferous Limestone and Coal Measures (GB40302G701500) groundwater body is currently classified as having a Poor overall status with a proposed overall objective of reaching Poor by 2015. The study area does not lie within a Groundwater Source Protection Zone (SPZ). It is unlikely that the strategy will have an impact on the groundwater in the Limestone and Coal Measures therefore groundwater has been scoped out and will not be considered further in this WFD assessment.

5.3 Current Status of Water Bodies

5.3.1 The following section presents the current status of the water bodies scoped in to this assessment. Table 5-2 overleaf presents the current status of the water bodies considered in this assessment. The 2015 designations were the same in the 2009 River Basin Management Plan, with the exception of Brierdene Burn from Source to North Sea, which has moved from poor to moderate classification. In addition, the Brierdene has been designated a 'Heavily Modified' waterbody in the 2015 update (the 2009 RBMP left this water body undesignated).

Table 5-2 Current status of water bodies included in the assessment (2015)

Water body ID, Name and Classification	Hydromorph-ological Designation	Current Ecological/ Quantitative Status	Biological Quality Elements	Supporting Elements/ Conditions	Current Chemical Quality	Predicted Ecological/Quantitative Status 2021	Predicted Chemical Quality 2021	Protected Area
Tyne and Wear (North Sea) GB650301500002, Coastal	Not Designated A/HMWB	Good	Invertebrates Macroalgae Phytoplankton	Dissolved Inorganic Nitrogen Dissolved Oxygen Copper Morphology	Good	Good	Good	Bathing Water Directive, Natura 2000 (Habitats and/or Birds Directive)
River Tyne, GB510302310200, Estuary	HMWB	Moderate	Fish Invertebrates	Dissolved Oxygen Iron Tidal regime – freshwater flow	Fail	Moderate	Fail	Freshwater Fish Directive, Natura 2000 (Habitats and/or Birds Directive) Nitrates Directive Urban Waste Water Treatment Directive
Brierdene Burn from Source to North Sea, GB103022076180, River	HMWB	Moderate	Invertebrates	Quantity and Dynamic of Flow Morphology	Good	moderate	good	Bathing Water Directive

5.4 Protected Areas

5.4.1 The proposed works will need to take into account the presence of any protected areas within the immediate vicinity. Further information on the protected areas present across the water body can be found in Annex D of the 2009 Northumbria RBMP which outlines protected area objectives within the river basin district.

5.4.2 As part of this assessment information has been gathered from Natural England. Natural England provides online maps which presents the best available information of the location of protected sites across the UK. Using the online maps a search was carried out for protected areas, conservation areas etc. within a 5km radius of the North Sea.

5.4.3 North Tyneside has 8km of open coastline. The extent of some habitats varies according to the tides, but recent surveys, referenced by the Newcastle and North Tyneside Biodiversity Action Plan[6], indicate that there are over 20ha of intertidal mud, sand and rocky foreshore habitats, 9.9ha of fragmentary sand dune habitats, 3ha of maritime cliff and 0.1ha of coastal grassland.

Freshwater Fish Directive, Natura 2000 (Habitats and/or Birds Directive)

5.4.4 Table 5-3 presents the relevant protected area for economically significant species, covering the River Tyne including the watercourse designation and compliance status. The preferred strategic flood risk option (which is Do Nothing in the majority of cases) must take into account the presence of any protected areas such as this to ensure that any potential impacts do not negatively impact upon the protected species.

Table 5-3: Results of monitoring for economically significant species (freshwater fish waters)

Freshwater fish water name (watercourse & stretch name)	Designation (cyprinid or salmonid)	Compliance status (a) (guideline pass, imperative pass, fail)
TYNE - Whittle Burn to Tidal Limit	Salmonid	Guideline fail / Imperative pass

5.4.5 Additionally, the Natural England search showed that there a number of areas designated as intertidal mudflats along the River Tyne. Intertidal mudflat is a priority habitat and constitutes a protected area.

[6] https://www.newcastle.gov.uk/sites/drupalncc.newcastle.gov.uk/files/wwwfileroot/planning-and-buildings/planning/baphap2.pdf

Nitrates Directive

5.4.6 Annex D of the Northumbria RBMP indicates that the River Tyne is protected under the Nitrates Directive. A search of the Natural England online maps indicates the nearest Nitrate Vulnerable Zone which would fall under the Nitrates Directive is located 10 km upstream from the North Sea Coast and as such is not within a 5 km radius of the site. In light of this the Nitrates Directive does not need to be considered further.

Urban Water Waste Treatment Directive

5.4.7 The general objective of the Urban Waste Water Treatment Directive (UWWTD) is to protect the environment from the adverse effects of urban waste water discharges and water discharges from certain industrial sectors. There are no UWWTD sensitive areas in close proximity to the coast therefore the Urban Waste Water Treatment Directive is not considered further in this assessment.

Bathing Water Directive, Natura 2000 (Habitats and/or Birds Directive)

5.4.8 There are a number of Bathing Waters in the study area; this includes Whitley Bay, Cullercoats Bay and King Edwards Bay. Each designated bathing water is monitored between May 15th and 30th September and assessed against standards in the directive and is then classed as either passing "Guideline", passing "Imperative", or "Fail". All the bathing waters along the study area are classified as “Guideline”.

5.4.9 The preferred Do Nothing and Managed Realignment options will allow natural processes, including erosion to occur. A raw sewage pipe may be impacted in policy Unit 25.1, Curry’s Point to Trinity Road Car Park. However, is not clear that erosion activities leading to exposed pipe work would restrict current activities; requiring repair, disconnection or alteration.

5.4.10 The preferred Do Minimum option for policy unit 25.3 and 27.1 will maintain defences. The subtidal zone can be an important area for recruitment of many sandy beach animals and therefore the impact of coastal squeeze on shorebirds should be an area of consideration when promoting the Do Minimum policies. The impact of coastal squeeze in these policy units may be offset by natural processes, namely onshore migration, occurring in the majority of other policy units in the Strategy area.

5.5 RBMP – Mitigation Measures

5.5.1 Table 5-4 sets out the mitigation measures in place along the River Tyne as set out in the 2009 Northumbria RBMP. Heavily modified water bodies are classified in term of ecological potential and not status. The assessment of ecological potential focuses predominantly on the presence/absence of water body wide mitigation measures.

5.5.2 The River Basin Management Plan has assessed the mitigation measures in place and concludes the current state for ecological potential as moderate on this basis. In order to ensure that preferred options do not have a detrimental impact on the ecological potential of the River Tyne consideration must be given as to whether the preferred options will impact negatively any of the mitigation measures as laid out in Table 5-4.

Table 5-4: Mitigation measures that have defined ecological potential for the River Tyne

Mitigation Measure	Status
Alter timing of dredging / disposal	In place
Reduce sediment re-suspension	In place
Reduce impact of dredging	In place
Prepare a dredging / disposal strategy	In place
Avoid the need to dredge (e.g. minimise under-keel clearance; use fluid mud navigation; flow manipulation or training works)	In place
Flow manipulation	In place
Modify structure or reclamation	In place
Retain marginal aquatic and riparian habitats (channel alteration)	Not In place
Manage disturbance	Not In place
Site selection (dredged material disposal) (e.g. avoid sensitive sites)	Not In place
Sediment management	Not In place
Preserve and where possible enhance ecological value of marginal aquatic habitat, banks and riparian zone	Not In place
Managed realignment of flood defence	Not In place
Bank rehabilitation / reprofiling	Not In place

Mitigation Measure	Status
Removal of hard bank reinforcement / revetment, or replacement with soft engineering solution	Not In place

5.5.3 As discussed in Section 5.2, the Brierdene Burn has recently been designated a Heavily Modified waterbody and subsequently should require an assessment of the mitigation measures currently in place. The data currently available from the 2015 RBMP suggests that the mitigation measures assessment is currently classed as Moderate or less, however, no detailed information is available as to what mitigation measures have been proposed for the waterbody and so it is not possible to assess in greater detail the impact of the SMP policies on specific measures for this watercourse.

6. WFD Assessment

6.1.1 The following section considers the proposed coastal erosion management options associated with the Hartley Cove to the River Tyne Strategy area in respect to the objectives of the WFD. In order to provide a proportionate assessment, the following criteria, set out in the WFD must be demonstrated:

- WFD 1: The proposed works will not result in a deterioration of current surface water ecological status or potential
- WFD 2: The proposed works will not cause failure to meet the surface water GES/GEP by the target timeframe
- WFD 3: The proposed works will not permanently prevent or compromise the relevant environmental objectives being met in other water bodies.

6.1.2 Each aspect of the proposed works will be compared against the three objectives outlined above.

6.1.3 The Environment Agency has considered the general hydromorphological changes which come from a range of engineering activities[7]. They note that the following engineering activities are likely to result in a loss of intertidal habitat area:

- '**Shoreline structures:** (seawalls, embankments and revetments): These activities can directly encroach on the intertidal zone from a landward direction, leading to a physical reduction in intertidal area. In addition, these structures can prevent the intertidal zone moving landward in response to wider coastal changes, causing coastal squeeze and a reduction in intertidal area.
- **Beach management:** (nourishment, recycling, recharge, reprofiling, bypassing): These activities either re-introduce or remove sediment from the coastal system, which could potentially encourage increased erosion and/or deposition via sediment transport process which are driven by a combination of external forcing parameters and the morphological changes initiated via the management activity.
- **Flood structure:** (embankments, flood walls): This activity can directly encroach on the intertidal zone from a landward direction, leading to a physical reduction in the intertidal area. In addition, these structures can prevent the intertidal zone moving landward in response to wider coastal changes, causing coastal squeeze and a reduction in intertidal area.' (Environment Agency, 2010)

6.1.4 Conversely, they note that the mitigation measures, which can improve habitat, include the following:

- **'Foreshore or intertidal recharge:** Where off-shore, shoreline or cross-shore structures result in the loss of intertidal area; it may be possible to mitigate the effects by creating compensatory habitat, if deemed necessary. Alternatively, the intertidal loss may be offset by introducing additional sediment into the foreshore or intertidal zone,

[7] http://evidence.environment-agency.gov.uk/FCERM/en/SC060065/Decisiontree/Hydromorphologicalchanges/H19.aspx

either directly or indirectly and facilitating its redistribution under the prevailing hydrodynamic regime into intertidal areas to create intertidal areas similar to those lost. Materials may range from intertidal mud to large cobbles dependent upon the desired objective of the recharge activity. Whichever material is applied shall alter the structure and condition of the intertidal zone, the scale of which shall vary temporally and spatially in relation to the nature of the substrate and the volume and nature of the recharged material.

- **Manage foreshore / intertidal erosion:** Where engineering activities result in a shift towards an erosion dominated sedimentary regime and a corresponding change in the nature of the intertidal zone (with or without a corresponding loss of intertidal area), it may be possible to mitigate this effect by controlling erosion. Various techniques can be used depending upon the cause of the erosion which needs to be carefully identified. Techniques include installation of structures to encourage sedimentation by altering localised hydrodynamic and sedimentary processes or a combination of both.

- **Managed realignment (bank):** Where engineering activities restrict the intertidal area and prevent its landward migration, existing seawalls or embankments can be removed in their entirety and realigned either to higher ground (optimal solution) or a new defence line to create new intertidal area and partially to totally offset the loss of intertidal.

- **Managed realignment (breach):** Where complete removal of structures which limit the progressive and natural landward migration of the intertidal zone is not possible (e.g. where a degree of wave protection is required) or where a more gradual change of land use is needed (e.g. where elevations landward of the defence are lower and flooding through preferential pathways could assist in raising hinterland elevations via induced coastal sedimentation) structures can instead be strategically breached to encourage the development of new intertidal area with associated landforms and habitats.

- **Tidal exchange systems**: Where structures which limit the spatial extent of the intertidal area cannot be removed or breached, or where a process of warping up (raising land elevations via induced sedimentation) is needed prior to later realignment, a tidal exchange system can be installed to aid in the creation of intertidal area. The flood defence structure is retained in place, and pipes, sluices, tide gates or culverts are inserted to allow and control regulated tidal flushing by seawater to create saline habitats. ' (Environment Agency, 2010)

6.1.5 The preferred option for the majority of policy units is Do Nothing. Here, natural processes are allowed to occur. It is expected that Do Nothing shall encourage more rapid sedimentation rates (compared to realignment), and encourage mudflat formation.

6.1.6 The preferred option for policy unit 25.2 is to allow natural processes to continue, but manage the transitions at the northern and southern ends of the unit where hard defences exist, to minimise outflanking risks. This, again, will encourage natural processes to continue, and cause little environmental detriment.

6.1.7 The preferred option for policy units 25.3 and 27.1 is Do Minimum. This involves reactive maintenance of existing defences. This action only maintains the revetments and leaves the bays. Rising sea levels as a result of climate change can increase the risk of coastal squeeze. Onshore migration is the natural ecosystem response to rising sea levels, however, this is prevented by fixed defences. The subtidal zone can be an important area for recruitment of many sandy beach animals and therefore the impact of coastal squeeze on fish should be an area of consideration when promoting the Do Minimum policies.

6.1.8 However, the impact of coastal squeeze in these policy units may be offset by natural processes, namely onshore migration, occurring in the majority of other policy units in the Strategy area. Dredging and flow manipulation is not relevant in the area of the Tyne considered within the Strategy, as all Do Minimum options considered only include defence maintenance and enhancement. Habitat will be improved in all policy units where Do Nothing and Managed Realignment is preferred. In policy units 25.3 and 27.1, where Do Minimum is preferred, coastal squeeze may reduce subtidal habitat where onshore migration of the subtidal zone due to sea level rise is obstructed by defences. However, adjacent to these policy units, natural processes will be occurring (where the Do Nothing or Managed Alignment policies will occur) and improvements in these areas could offset coastal squeeze in policy units 25.3 and 27.1.

6.1.9 Based on the scope of the preferred options, the environmental impacts are expected to be positive for the Do Nothing and Managed Realignment options. This is because the Do Nothing options are realignment options whereby natural processes are encouraged, as opposed to structural options which can encroach the on the intertidal zone.

6.1.10 Table 6-1 assesses each proposed flood and coastal erosion risk management (FCERM) intervention option against the WFD objectives in more detail.

Table 6-1 WFD Assessment

Proposed FCERM intervention	Policy Unit	Potential Impacts	Proposed Mitigation Measures	WFD 1: *The proposed works will not result in a deterioration of current surface water ecological status or potential*	WFD 2: *The proposed works will not cause failure to meet the surface water GES/GEP by the target timeframe*	WFD 3: *The proposed works will not permanently prevent or compromise the relevant environmental objectives being met in other water bodies*
Do Nothing	24.2; 25.1; 25.4; 26.1; 26.2; 26.3; 26.4; 26.5; 26.6; 26.7; 26.8; 27.2	Creation of new intertidal habitat areas in the long term, once breaching of existing defences occur.	No mitigation required as is likely to provide WFD improvement	The proposed works are likely to result in improvement of current ecological status and potential.	The proposed works are likely to result in improvement of current ecological status and potential.	The proposed works are likely to result in improvement of current ecological status and potential.
Managed realignment	25.2;	Creation of new intertidal habitat areas	No mitigation required as is likely to provide WFD improvement	The proposed works are likely to result in improvement of current ecological status in policy unit 25.2.	The proposed works are likely to result in improvement of current ecological status in policy unit 25.2.	The proposed works are likely to result in improvement of current ecological status in policy unit 25.2.
Maintenance of existing defences	25.3; 27.1;	The scale and scope of these repairs is not yet known and will depend upon the results of further inspection on site. As such, it is difficult to assess the potential impacts that could result from the works.	Mitigation measures are to be defined by the contractor upon appointment. It is noted that an emphasis on minimising the potential for debris and contaminants to enter the watercourse is outlined in the tender.	The scale of the works is at present ill defined, but considered minor in comparison to the size of the Tyne Estuary. The contractor will be required to carry out any works with appropriate mitigation measures such that any potential impacts upon the water environment are minimised. It is therefore considered that any of	The works are ill defined at present; however, they are aimed at maintaining the existing structures, rather than creating any new structure. Longer term, there is a risk of coastal squeeze if onshore migration due to sea level rise is prevented by defences. However, the Do Minimum preferred option at Policy Unit 25.3 and 27.1 is not expected	Again, the works are ill defined at present; however, they are aimed at maintaining the existing structures, rather than creating any new structure. The WFD mitigation measure of managed realignment or removal of hard bank reinforcement / revetment, or replacement with soft engineering solution

Proposed FCERM intervention	Policy Unit	Potential Impacts	Proposed Mitigation Measures	WFD 1: *The proposed works will not result in a deterioration of current surface water ecological status or potential*	WFD 2: *The proposed works will not cause failure to meet the surface water GES/GEP by the target timeframe*	WFD 3: *The proposed works will not permanently prevent or compromise the relevant environmental objectives being met in other water bodies*
		It is thought that a key concern from a water environment point of view is the potential release of debris and contaminants to the watercourse and disturbance of the intertidal zone. Longer time impacts include the potential of coastal squeeze related to sea level rise.		the repairs outlined in this activity are unlikely to result in the deterioration of the current surface water ecological potential.	to cause failure to meet GEP, as the works are considered small scale when compared to the size of the Tyne.	may be at odds with the Do Minimum preferred option at Policy Unit 27.1. However, this is not expected to cause failure to meet GEP as the works are considered small scale when compared to the size of the Tyne.

6.1.11 The analysis above suggests that the flood and coastal erosion risk management options in the Strategy area could either improve the WFD status (in the case where the preferred intervention option is Do Nothing or Managed Realignment) or change would be marginal (very small) in the case of Do Minimum, considering the length of the waterbodies affected. This is summarised in the for each Policy Unit area within the Strategy.

Table 6-2 Expected contribution to WFD status by preferred flood and coastal erosion risk management option

Policy Unit	Preferred Intervention Option	Relevant Waterbodies	Current Ecological/ Quantitative Status	Current Chemical Quality	Predicted Ecological/ Quantitative Status 2021	Predicted Chemical Quality 2021	Expected contribution to WFD status by preferred FCERM option
PU24.2 Crag Point to Curry's Point	Do Nothing	Tyne and Wear (North Sea) GB650301500002, Coastal	Good	Good	Good	Good	Improvement
PU25.1 Curry's Point to Trinity Road Car Park	Do Nothing	Tyne and Wear (North Sea) GB650301500002, Coastal	Good	Good	Good	Good	Improvement
PU25.2 Trinity Road Car Park to Brierdene Burn	Managed Realignment (already completed)	Tyne and Wear (North Sea) GB650301500002, Coastal.	Good	Good	Good	Good	Improvement
		Brierdene Burn from Source to North Sea, GB103022076180, River	Moderate	Good	Moderate	Good	Improvement
PU25.3 Brierdene Burn to Brown's Point	Do Minimum	Tyne and Wear (North Sea) GB650301500002, Coastal.	Good	Good	Good	Good	Marginal change
		Brierdene Burn from Source to North Sea, GB103022076180, River	Moderate	Good	Moderate	Good	Marginal change
PU25.4 Brown's Point to Table Rocks	Do Nothing	Tyne and Wear (North Sea) GB650301500002, Coastal	Good	Good	Good	Good	Improvement
PU26.1 Brown's Point	Do Nothing	Tyne and Wear (North Sea) GB650301500002, Coastal	Good	Good	Good	Good	Improvement
PU26.2 Cullercoats Bay	Do Nothing	Tyne and Wear (North Sea) GB650301500002, Coastal	Good	Good	Good	Good	Improvement

Policy Unit	Preferred Intervention Option	Relevant Waterbodies	Current Ecological/ Quantitative Status	Current Chemical Quality	Predicted Ecological/ Quantitative Status 2021	Predicted Chemical Quality 2021	Expected contribution to WFD status by preferred FCERM option
PU26.3 Tynemouth North Point	Do Nothing	Tyne and Wear (North Sea) GB650301500002, Coastal	Good	Good	Good	Good	Improvement
PU26.4 Tynemouth Longsands	Do Nothing	Tyne and Wear (North Sea) GB650301500002, Coastal	Good	Good	Good	Good	Improvement
PU26.5 Sharpness Point	Do Nothing	Tyne and Wear (North Sea) GB650301500002, Coastal	Good	Good	Good	Good	Improvement
PU26.6 Tynemouth Shortsands (King Edward's Bay)	Do Nothing	Tyne and Wear (North Sea) GB650301500002, Coastal	Good	Good	Good	Good	Improvement
PU26.7 Tynemouth Headland	Do Nothing	Tyne and Wear (North Sea) GB650301500002, Coastal.	Good	Good	Good	Good	Improvement
		River Tyne, GB510302310200, Estuary.	Moderate	Fail	Moderate	Fail	Improvement
PU26.8 Tynemouth North Pier	Do Nothing	Tyne and Wear (North Sea) GB650301500002, Coastal.	Good	Good	Good	Good	Improvement
		River Tyne, GB510302310200, Estuary.	Moderate	Fail	Moderate	Fail	Improvement
PU27.1 Prior's Haven	Do Minimum	Tyne and Wear (North Sea) GB650301500002, Coastal.	Good	Good	Good	Good	Marginal change

Policy Unit	Preferred Intervention Option	Relevant Waterbodies	Current Ecological/ Quantitative Status	Current Chemical Quality	Predicted Ecological/ Quantitative Status 2021	Predicted Chemical Quality 2021	Expected contribution to WFD status by preferred FCERM option
		River Tyne, GB510302310200, Estuary.	Moderate	Fail	Moderate	Fail	Marginal change
PU27.2 Quayside	Do Nothing	Tyne and Wear (North Sea) GB650301500002, Coastal.	Good	Good	Good	Good	Improvement
		River Tyne, GB510302310200, Estuary.	Moderate	Fail	Moderate	Fail	Improvement

7. Summary and Conclusions

7.1.1 The preferred options proposed in the Hartley Cove to the River Tyne Strategy area have been assessed in relation to the objectives of the WFD.

7.1.2 The WFD assessment presented in chapter 6 this report has shown that the proposed works along the Hartley Cove to River Tyne Strategy area will satisfy the relevant criteria for compliance with the WFD. The proposed works can be said to satisfy the following, at the water body level:

- The proposed works will not result in a deterioration of current surface water ecological status or potential.
- The proposed works will not cause failure to meet surface water GES /GEP by the target timeframe.
- The proposed works will not permanently prevent or compromise the relevant environmental objectives being met in other water bodies.

7.1.3 The Do Nothing and Managed Realignment options can result in the improvement of current ecological status and potential in the following water bodies; Tyne and Wear (North Sea) (GB650301500002), River Tyne Estuary, (GB510302310200), and the Brierdene Burn from Source to North Sea. This is because the coast will be allowed to develop through natural processes and the area of intertidal and subtidal habitat will not be subject to coastal squeeze as a result of sea level rise.

7.1.4 Although the scope of proposed maintenance works to carry out the Do Minimum option at policy units 25.3 and 27.1 are currently unknown, they are not expected to cause failure to meet GEP, as the works are considered small scale when compared to the size of the Tyne. However, we recommend that the contractor will be required to carry out any works with appropriate mitigation measures such that any potential impacts upon the water environment are minimised.

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