

Fife Shoreline Management Plan

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Produced for
Fife Council



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1 Introduction

1.1 The Shoreline Management Plan

The Fife Shoreline Management Plan (SMP) provides an assessment of the risks associated with shoreline evolution, coastal flooding and erosion and presents a framework for policy to address risks to people and the developed, historic and natural environment for a sustainable future. SMP's provide a large scale assessment of the coastal flooding and erosion risks and provide guidance and advice to operating authorities and private landowners on the management of their defences.

The aim of the SMP is to:

- Reduce the threat of flooding and coastal erosion to people and their property; and
- Deliver the greatest environmental, social and economic benefit, consistent with the Government's sustainable development principles.

This plan has been developed on behalf of Fife Council Transportation & Environmental Services. The plan development has benefited from regular contributions from the Fife Coast & Countryside Trust and Scottish Natural Heritage which has been greatly appreciated. We are grateful to the comments received by the public and other regional organisations who participated in the consultation exercise. This plan provides the first revision to the Shoreline Management Plan of Fife, which was adopted in 1998 and shall be referred to from herein as the Fife SMP2.

The SMP has been developed at a time of significant change in legislation covering marine and coastal zone planning in Scotland. Guidance that has been published since the SMP Review commenced include:

- Marine (Scotland) Act 2010,
- Marine Strategy Framework Directive 2010,
- Flood Risk Management Act (Scotland) 2009 and forthcoming flood risk hazard and maps,
- Water Quality Classifications 2009.

The SMP has been divided into six sections; section one provides an introduction to the SMP defining its aims, objectives and boundaries. Section 2 summarises the environmental considerations and explains how EU directives have been met, whilst section 3 defines how policies have been developed and the constraints and limitations at certain areas along the coast. Section 4 summaries those policies selected and section 5 provides details of implementing the policies and implications on features affected. Then an action plan programming current and future activities throughout the study area has been included as section 6.

1.1.1 The Project area

The boundaries of the first Fife SMP, completed in 1998, are defined by the western limit of the reclaimed area west of Kincardine in the River Forth and is approximately 1km west of Newburgh in the River Tay. These boundaries coincide with the boundaries of the 'Kingdom of Fife' and thus are determined by administrative borders rather than being based on coastal processes or shoreline evolution characteristics.

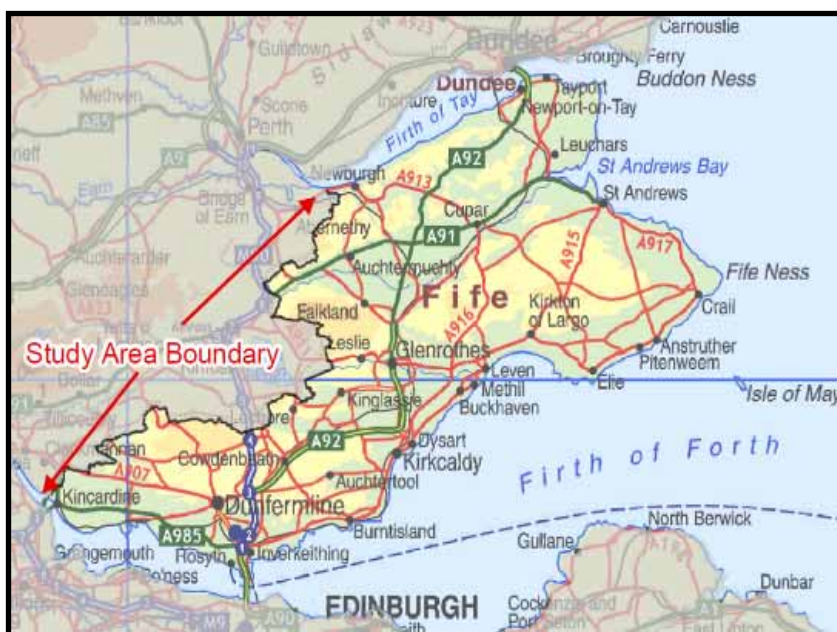


Figure 1. Overview of Study Area. Contains Ordnance Survey data 100023385. With the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office © Crown Copyright and database right 2011.

Research, funded by Scottish Natural Heritage (SNH), the Scottish Office Agriculture, Environment and Fisheries Department (SOAEFD) and Historic Scotland, has identified 7 principal Coastal Process cells around the Scottish mainland, divisible into 24 sub-cells.

The boundaries of two of these cells coincide with the Fife coastline and Figure 2 identifies the sub-cells within this section. Each cell has been defined in terms of sediment movement (i.e. sediment supply and transport along the shores of each embayment are unrelated to sediment movement along shores in neighbouring bays or lochs). The main purpose of the definition of these sediment cells and sub-cells is as a management tool.

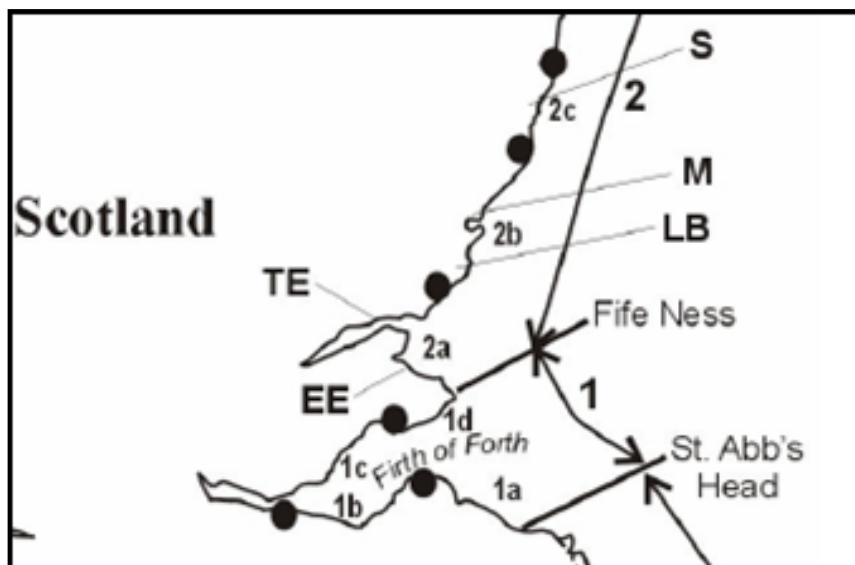


Figure 2. The coastal cell boundaries around Fife, showing Eden Estuary (EE) and Tay Estuary (TE) Source: Hansom et al, 2004.

1.1.2 Setting the SMP2 Southern Boundary

It is intended to set the southern boundary of the SMP2 at the same location as the original SMP just north of the bridge at Kincardine (see Figure 3). This corresponds with the administrative boundary with Clackmannanshire.

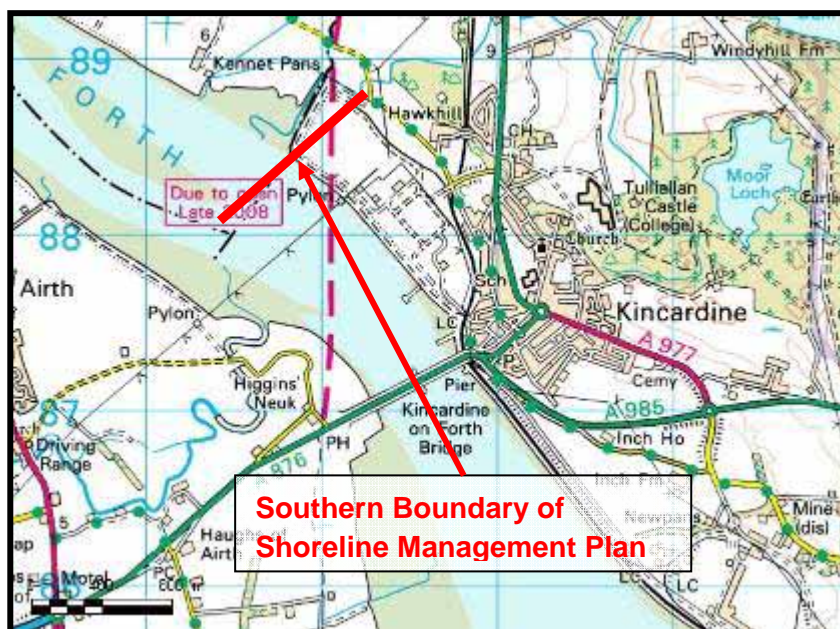


Figure 3: Kincardine: southern extent of the SMP. Contains Ordnance Survey data 100023385. With the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office © Crown Copyright and database right 2011.

1.1.3 Setting the SMP2 Northern Boundary

The existing SMP1 northern boundary lies within the Tay Estuary and within coastal sub-cell 2a at Newburgh. The northern limit of the SMP also remains at the same location for the SMP2.

Similar to the Forth Estuary, coastal processes are dominated by river and tidal flow rather than waves due to its semi enclosed nature.

The boundary does not correspond to the tidal limit or indicate a change in geomorphology or process interaction; however the estuary can also be considered in a Catchment Flood Management Plan which would geographically overlap the SMP boundary (see section 5.1).

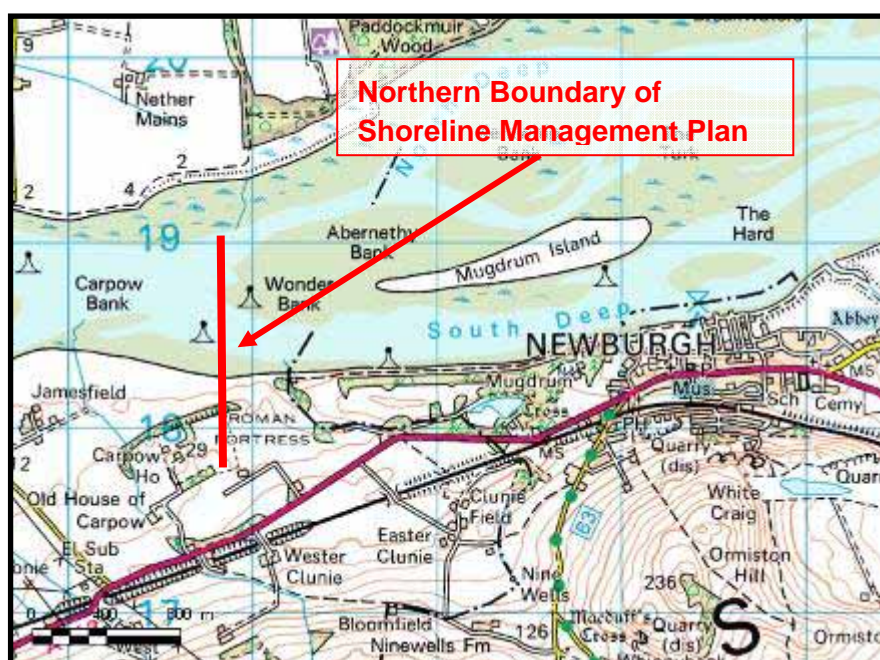


Figure 4: Newburgh at the northern extent of the Shoreline Management Plan. Contains Ordnance Survey data 100023385. With the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office © Crown Copyright and database right 2011.

1.1.4 *The Guiding Principles of the SMP*

The preparation of an SMP is seen as good practice as it sets the policy for coastal flood and erosion risk management. While this is a non-statutory document it takes account of legislative requirements and other existing planning initiatives and is intended to inform wider strategic planning. Details of the procedure followed in development of this SMP are set out in Volume 2, Appendix A.

The Fife SMP2 aims to provide realistic and achievable policies that are in accordance with current legislation and constraints. The policies set in the SMP must be:

- Technically sustainable,
- Environmentally acceptable; and
- Economically viable.

It is considered that there is little value in a long-term plan which has policies driven only by short-term politics or works that prove to be too detrimental in the longer-term. Nevertheless, the plan must be sufficiently flexible to adapt to changes in legislation, politics and social attitudes. The plan, therefore, considers objectives, policy setting and management requirements for 3 main epochs:

- 0 – 20 years (short-term)
- 20 – 50 years (medium-term)
- 50 – 100 years (long-term)

The Fife SMP2 policies were developed between June 2009 and April 2011. There is no guidance specifically tailored for Local Authorities undertaking SMPs in Scotland, instead reference was made to the Procedural Guidance (Defra, 2006) available for the second generation of SMPs in England & Wales.

The SMP2 is an important document for raising awareness to the public, landowners, other land managers and operating authorities of the increasing risk and implications of climate change and sea level rise on the existing defences and management practices. It provides an effective tool for decision makers to assist in moving from the present situation towards a sustainable future.

The Fife SMP2 identifies sites and options for continuing to maintain defences to provide long-term benefits to a wide community. It also identifies further work and research at sites where the type and timing of change is currently unknown, where change in the management of the defences is likely or will be necessary.

It is important to understand that flood and erosion defences only aim to reduce risk to the assets they protect, however, they do not remove the risk completely. All new development of residences or infrastructure in flood and erosion risk

areas should be appropriately adaptable, resilient and resistant to be suitably adaptable to future change and future risks. Decisions on the land use within flood and erosion risk areas should fully consider the risk and be adaptable to change.

The policies that are set in this Plan have been defined through the development and review of shoreline management objectives, representing both the immediate and longer-term requirements of stakeholders, for all aspects of the coastal environment. Together with a detailed understanding of the coastal processes operating on the shoreline, these objectives provide a thorough basis upon which to appraise the benefits and impacts of alternative policies, both locally and SMP wide. In this way, the selection of policy takes equal account of all relevant features in identifying the best sustainable management solutions.

Considerable effort has been applied to the identification of inter-tidal habitat creation opportunities and the requirements for transitional freshwater habitats arising from potential managed realignments, which were not addressed in sufficient detail within the SMP guidance.

Local planning authorities take account of SMPs and their policies both during the preparation of their Local Development Documents and in the determination of planning applications. In addition, the statutory planning process also considers Regional Spatial Strategies and other planning documents such as Scottish Planning Policy SPP.

1.1.5 Objectives

This project will deliver the SMP2 with sustainable policies to guide coastal management over the next 20, 50 and 100 years.

The policy options considered and adopted for this SMP2 along with the respective definitions are in line with the Defra guidance (2006) as stated below: -

- **Hold The Line (HTL)** - maintain the existing defence line;
- **Advance The Line (ATL)** - build new defences seaward of the existing defence line;
- **Managed Realignment (MR)** - allow the shoreline to change with management to control or limit movement;
- **No Active Intervention (NAI)** - a decision not to invest in providing or maintaining defence.

The positive and negative effects of the alternative policy options for both people and the environment have been considered in the policy analysis.

1.2 Structure of the SMP2

The Fife SMP2 is presented in three volumes. This document is Volume 1. All information used to support the SMP2 is contained within the Appendices in Volumes 2 and 3. They are provided to ensure that there is clarity in the decision-making process and that the rationale behind the policies being promoted is both transparent and auditable.

1.2.1 *The Plan*

The SMP2 sets out the policies for managing the risks of coastal flood and erosion risks and shoreline evolution over the next century. It is intended for general readership and is the main tool for communicating intentions. Whilst the justification for decisions is presented, it does not provide all of the information behind the recommendations, this being contained in the supporting documents. The plan is presented in six parts:

Section 1 Introduction (this part) provides details on the guiding principles, structure and background to the Fife SMP development.

Section 2 Environmental Assessment presents the basis for meeting the requirements of the EU Council Directive 2001/42/EC and EC Habitats Directive 92/43/EEC (Habitats Regulation Assessment) on the assessment of the effects of certain plans and programmes on the environment (the Strategic Environmental Assessment Directive).

Section 3 Basis for Development of the Plan describes the concepts of sustainable policy and an appreciation of the constraints and limitations on adopting certain policies.

Section 4 The Plan presents a broad overview of the policies, discussing their rationale, implications and the requirements to implement and manage them.

Section 5 Policy Statements gives details of how the policies might be implemented in practice and the local implications of these policies in terms of management activities, property, built assets and land use, landscape, nature conservation, historic environment, amenity and recreational use.

Section 6 Action Plan provides a programme for future activities required to progress the plan between now and its next review. Therefore, statements must be read in the context of the wider-scale issues and policy implications, as reported in Sections 2, 3 and 4 and the appendices to the Plan.

1.2.2 The Supporting Documents

All information used to support the SMP2 is contained in a series of Appendices. They are provided to ensure that there is clarity in the decision-making process and that the rationale behind the policies being promoted is both transparent and auditable. The appendices, which are largely technical in nature, are:

Table 1: Supporting documents

Document	Volume	Title	Detail
The Plan	Volume 1	Fife Shoreline Management Plan	Summary document containing policies and maps.
Appendix A	Volume 2	SMP2 Development	Reports the history of development of the SMP2, describing fully the plan and policy decision-making process
Appendix B	Volume 2	Stakeholder Engagement	Outcomes from the stakeholder process are provided here, together with information arising from the consultation process
Appendix C	Volume 2	Baseline Process Understanding	Includes a baseline process report, defence assessment, No Active Intervention and With Present Management assessments and summarises data used in assessments
Appendix D	Volume 2	Theme Review	This report identifies and evaluates the environmental features (human, natural, historical and landscape)
Appendix E	Volume 2	Issues & Objective Evaluation	Provides information on the issues and objectives identified as part of the Plan development, including appraisal of their importance

Document	Volume	Title	Detail
Appendix F	Volume 2	Initial Policy Appraisal & Scenario Development	Presents the consideration of generic policy options for each frontage, identifying possible acceptable policies, and their combination into 'scenarios' for testing
Appendix G	Volume 2	Scenario Testing	Presents the policy assessment and appraisal of objective achievement towards definition of the Preferred Plan
Appendix H	Volume 2	Economic Appraisal & Sensitivity Testing	Presents the economic analysis undertaken in support of the Preferred Plan
Appendix I	Volume 3	Habitat Regulations Appropriate Assessment	Presents an assessment of the effect the plan will have on European sites
Appendix J	Volume 3	Strategic Environmental Assessment	Presents the various items undertaken in developing the Plan specifically related to the requirements of the EU Council Directive 2001/42/EC (Strategic Environmental Assessment Directive)
Appendix K	Volume 3	Adoption Strategy	Presents changes made to the SEA following the consultation process and outlines the proposed mitigation measures.

1.3 The Plan Development

1.3.1 Revision of the first Fife SMP

Since the first round of SMPs, there have been a number of initiatives which have led to improved understanding of how the coast functions and evolves. Part of the

SMP process is to regularly review and update the SMP, as necessary, taking account of new information and knowledge gained in the interim. The Fife SMP2 has been developed using the *best available data and information*.

Further reviews will be carried out in future years by Operating authorities (Local Coast Protection Authorities and SEPA), when deemed necessary, and will include changes to policies, particularly in light of more detailed studies of the coastline, climate change, legislative requirements and future developments and pressures. It must also be noted that the SMP2 does not account for potential proposed developments, only those that were constructed or were being progressed during the time that the SMP2 was being developed.

1.3.2 *Production of the Fife SMP2*

The SMP2 has been led by a project management group comprising technical officers and representatives from Fife Council and their framework consultant, Mouchel Ltd.

The SMP process has involved interest groups and individuals who were informed of the SMP review and their views sought throughout the process.

Meetings with key stakeholders have been held to help identify and understand the issues, review the objectives and set direction for appropriate management scenarios and to review and comment upon the plan policies.

The SMP is based upon information gathered between June 2009 and November 2011. The information in the original Shoreline Management Plan has also been reviewed. The main tasks have included:

- Analysis of coastal processes and shoreline evolution for baseline cases of (1) not defending and (2) continuing to defend the coastline as at present;
- Analysis of future shoreline evolution accounting for climate change, based on UKCP (United Kingdom Climate Projection) data.
- Analysis and production of *indicative erosion risk maps* for open coast and harbour frontages;
- Review and assessment of coastal defence assets data and information;
- Development and analysis of issues and objectives for various locations and assets;
- Theme reviews, reporting upon human, historic and natural environmental features and issues, evaluating these to determine the relative importance of objectives;
- Agreement of objectives with interest groups, heritage community and stakeholders, to determine possible policy scenarios;
- Development of policy scenarios based on key objectives and primary drivers for sections of the frontage;

- Examination of the coastal evolution in response to these scenarios and assessment of the implications for the human, historic and natural environment
- Determination of the plan and policies prior to compiling the SMP document;
- Consultation on the plan and policies.

Following the public consultation period, consultation responses have been considered and final policies determined. An Action Plan has been prepared which identifies necessary works and studies arising from the SMP review process.

1.4 The SMP Policies

The SMP does not set policy for anything other than coastal defence management. It does not aim to provide specific detail for the implementation of the defence or management works. It focuses on the intent of the policies rather than specific definitions of management activities (see below), that have driven the assessments and determination of the policies for future management of the Fife shoreline. The SMP2 policies are those that aim to result in sustainable and improved management of the shoreline, when considered at the broad system scale, and need to assess the flood risk implications to wider areas and communities if defences failed or were not maintained.

An SMP policy alone will not prejudice future planning applications for defences; each application will need to be considered individually.

Defra provide the following policy options as a guide:

- **Hold The Line (HTL)** - maintain the existing defence line
- **Advance The Line (ATL)** - build new defences seaward of the existing defence line
- **Managed Realignment (MR)** - allow the shoreline to change with management to control or limit movement
- **No Active Intervention (NAI)** - a decision not to invest in providing or maintaining defence

For frontages where defences are realigned and then maintained this has been defined as Managed Realignment in the relevant epoch followed by Hold The Line (Hold the Realigned Line). This is to prevent multiple variations of the policy options and keep it manageable.

Hold the Line (HTL)

A policy of HTL proposes that defences and/or beach management activities are maintained to provide protection from coastal flood and erosion to assets or features at the coast. Such assets may include areas of development and/or

redevelopment, industry and commerce, agriculture, etc. The method of maintaining or improving the line of defence may consider local adjustments to the alignment of defences or that existing structures are replaced or new defences constructed, depending on the local conditions and requirements identified.



Figure 5: Dysart Coast Protection Scheme constructed following the original SMP under a policy of Hold the Line.

In the cases where privately owned coastal defences are present, it is proposed in this SMP2 that they remain privately funded. There are frontages where HTL has been proposed but the works identified to manage the coastal flood and erosion risks are considered economically marginal or not economically viable.

Privately funded works may still be permissible, although there may be conditions associated with this such that private works do not result in negative impacts on other interests. Where applicable, the Draft SMP states that no public funding would be available for maintenance of privately-owned defences, although private owners may deem the works affordable.

Although the general economic viability of the policies has been assessed in this SMP, a policy of Hold the Line or Managed Realignment does not guarantee public funding for maintenance or capital works. It is also the case that policy options that are considered economically viable may not achieve priority funding.

Advance the Line (ATL)

An ATL policy may be considered where aligning the defence line seaward of existing shoreline position would provide a more sustainable and effective opportunity for land reclamation or increased shoreline width; this may be achieved through the construction of structures seaward of the existing shoreline, such as offshore breakwaters. Alternatively, introducing or modifying the alignment of the shoreline may encourage sediment accretion, thereby promoting sustainable management of down-drift beach widths.



Figure 6: Renewable Energy Fabrication Works on Reclaimed Land at Fife Energy Park, Methil (Former site of Wellesley Colliery).

However, discussions within the Client Steering Group indicated that this policy was not applicable within the entire Fife SMP2 area due to the complexity of the coastal processes, the number and extent of nature conservation designations and the use of the nearshore zone for navigation, transport and recreation. Accordingly, ATL has not been proposed for any of the Fife shoreline.

Managed Realignment (MR)

The intention of a policy of MR is to either create or allow the conditions for the coast to realign and retreat. For example, this policy may be considered for issues relating to flood storage capacity, sediment transport, economic viability (i.e. shorter lengths of secondary defences), or for environmental reasons to meet the legal obligation to maintain the extent of coastal wildlife habitat in the

face of sea level rise, such as inter-tidal habitat creation for offsetting coastal squeeze.

However, it may not be technically feasible or sustainable to maintain existing defences on the current defence line, and despite secondary defences being proposed, the implementation of MR policies may adversely affect or result in the loss of property, agricultural land, heritage or other assets, depending on the location of secondary defences.



Figure 7: Storm Damage and Flooding in March 2010 at the South Bank of the Eden Estuary (Former Railway Embankment). Managed Realignment is the preferred policy, recognising the aims of the Eden Estuary SPA, SAC, Ramsar and SSSI designations.

Along the Fife coast, there are some sites where managed realignment could be considered as a feasible option. These are discussed further in the 'Policy Unit Statements' (Section 5).

No Active Intervention (NAI)

A policy of NAI has been proposed for lengths of the Fife coast which are allowed to change and evolve naturally. It has been predicted that increased erosion of these frontages may provide sediment to the foreshore of other sections of the coast and act as a natural means of protecting property, land use within the hinterland and environmentally important sites and features from coastal flooding.



Figure 8: No Active Intervention is the Policy at Sauchar Point, Elie with the Category C listed Lady's Tower on the Rock Headland

Localised Policy Options

A number of locations were identified within defined Policy Unit frontages that required a localised management approach for relatively short sections within the Policy Unit. For example; a Policy Unit may have an overall requirement for a HTL policy, but there may also be potential opportunities on a short stretch of shoreline for localised managed realignment or NAI.

Private Defences

Private landowners along the Fife coastline have a key role in the way the shoreline is managed. Third party funded ownership and maintenance of defences have been acknowledged during the appraisal and development of policies. The Fife SMP recognises that there are private individuals and organisations that have rights or powers to protect their own property and to continue to maintain existing defences on a like-for-like basis without the need for planning permission. The right's of private land owners to maintain their defences have been acknowledged throughout the development of the SMP and apply and remain regardless of the SMP policies proposed at public consultation and in the Final SMP.

There may be the requirement for new or additional defences on currently undefended frontages in response to sea level rise or flood risk increases; this could be applicable to undefended frontages within a frontage with 'HTL' or 'NAI' policy. Planning permission would be required for new or additional defences and each application would be considered individually on its merits, looking at the relevant planning policies for the area.

The SMP policies relating to currently undefended frontages would therefore not prevent an application from being approved, as the SMP is only one of the material considerations taken into account in reaching a decision by the planning authority along with any formal views from the statutory agencies involved in coastal issues.

Defences maintained by Ministry of Defence

The Ministry of Defence (MOD) advised that they will continue to operate from their existing sites, which includes a number of coastal frontages, and they will manage their flood defence assets accordingly in order to maintain the required operational capabilities of their facilities. Therefore, funding through MOD budgets will need to be secured to undertake the necessary maintenance and improvements works that have been identified.

2 Environmental Assessment

Environmental, social (population and human health), technical and economic issues have all been considered in developing the draft Fife SMP. Accordingly, it is important to understand the relationship and interaction between the requirements for coastal defences and the built and natural environment, landscape, amenity open space, heritage and recreation, in order to provide a high level of protection to the environment in its broadest sense.

This chapter summarises the conclusions of the strategic process undertaken for the environmental appraisal of the Fife SMP. This has been based on the key requirements of EC Habitats Directive (92/43/EEC) and European SEA Directive (2001/42/EC) and is covered in Volume 3 Appendices I & J respectively.

2.1 Strategic Environmental Assessment

Shoreline management plans are subject to Strategic Environmental Assessment (SEA) in accordance with the Strategic Environmental Assessment Directive (2001/EC/42) (SEA Directive) under the Environmental Assessment (Scotland) Act 2005.

The SEA directive is intended to ensure that environmental considerations are incorporated into decision making, alongside other economic and social considerations, in an integrated way, during the development of plans and programmes. The Directive requires that the assessment process identifies, describes and evaluates the likely significant effects on the environment of implementing the plan and reasonable alternatives taking into account the objectives and the geological scope of the plan (Article 5.1).

The objectives of the SEA Directive are to provide for a high level of protection to the environment and to contribute to integration of environmental considerations into the preparation and adoption of plans and programmes with a view to promoting sustainable development, by ensuring an environmental assessment is carried out for certain plans and programmes.

A SEA Scoping Report was prepared. Views on the content of the Scoping Report, including the approach to the appraisal, were taken into account through a formal consultation with statutory and non-statutory consultees.

A series of SEA objectives were developed at the scoping stage using existing plans and programmes, including: Fife Structure Plan 2006-2026 and Fife Council SEA toolkit. As a result, 14 objectives were developed. These underpin the assessment of impacts of the management options.

A suite of indicators and targets were developed which provide the basis for the assessment and also future monitoring of the impacts following implementation of the strategy.

The options were tested for compatibility with the SEA objectives. The appraisal methodology considered whether the impacts, would be direct, secondary, synergistic, cumulative, short term or long term and whether these impacts will be local, regional or national.

A number of potential adverse impacts were identified in relation to the SMP2. This information has been used to inform the development of the Preferred Strategy.

In addition, a number of mitigation measures have been identified as follows:

- Where possible Fife coastal footpath should be moved to compensate for coastal flooding. This will maintain the accessibility of the coast;
- Where possible protect the railway link;
- Reduce impacts on ecologically designated sites;
- Where possible access to Charlestown Dock should be protected/provided;
- Charlestown, Limekilns & associated features Scheduled Ancient Monument should be protected;
- Dysart House and Ravenscraig Park designated landscape should be protected where possible through the use of sympathetic defence;
- Where possible agricultural land should be protected;
- Ardross Castle and Newark Castle Scheduled Ancient Monuments should be protected from coastal erosion;
- Ballinbreich Castle Scheduled Ancient Monument should be protected.

The SEA Report includes monitoring recommendations. These have been updated following consultation and are included in the SEA Adoption Statement.

2.2 Habitats Directive Requirements

The EC Habitats Directive establishes the requirement for a Habitats Regulation Assessment (Appendix I). This assessment conforms to legal parameters prescribed by national legislation.

The coastline covered by this SMP has a rich diversity in its physical form, human usage and natural environment including cliffs of both habitat and geological interest, low-lying plains fronted by dunes and beaches, towns and villages along the coastal fringe and areas of agricultural land. This combination of assets creates a coastline of great value, with a tourism economy of regional importance.

The assessment identifies the qualifying features for the Firth of Forth SPA and Ramsar, Forth Islands SPA, Firth of Tay & Eden Estuary SPA, Ramsar and SAC and River Tay SAC using the Natura 2000 data forms for the sites, against which the impacts identified in the screening report have been assessed.

Conclusion

Modelling of the habitat loss as a result of the SMP2 policies, taking into account the likely impacts resulting from the natural process of sea level rise, has shown that there will be some loss of intertidal and supratidal/coastal habitats including those that fall within the Firth of Forth SPA and Ramsar and Firth of Tay & Eden Estuary SPA, SAC and Ramsar.

Within the Firth of Forth SPA and Ramsar and the Firth of Tay & Eden Estuary SPA and Ramsar, the intertidal habitat loss attributable to the SMP2 identified would not adversely affect the integrity of either site. The policies would be responsible for only a small proportion of the intertidal habitat loss expected in the absence of the SMP2, within each Natura 2000 site and throughout the intertidal habitat of the whole SMP2 area. The impact of implementation of the SMP2 on the bird species and assemblages that are qualifying features of the Natura 2000 sites has also been evaluated. Implementation of the SMP2 would not give rise to significant adverse effects on these resources, and would not affect the status of these species as qualifying features of the sites. Losses of intertidal and coastal habitat areas attributable to the SMP2 would not affect the distribution or abundance of important bird species or assemblages.

Bird species forming the qualifying features of the Forth Islands SPA would not be affected by implementation of the SMP2.

Implementation of the SMP2 would not affect the integrity of the Firth of Tay & Eden Estuary SAC. The preferred policies will not constrict the estuary but will allow it to adjust naturally to a new form. The SMP2 would not adversely affect intertidal mudflat and sandflat habitat, but would result in a relative gain in habitat compared to that of the baseline scenario.

The qualifying features of the River Tay SAC would not be impacted by implementation of the SMP. Oligotrophic to mesotrophic standing waters and brook lamprey occur outside the potential influence of the plan as they are entirely freshwater features. Migratory species (Atlantic salmon, sea lamprey and river lamprey) would not be significantly impacted by the SMP2 because their use of the estuarine habitat would not be impeded. Otter populations would not be affected by the proposals.

Consideration has been given to the in-combination effects of the SMP2 and other plans and proposals. Insufficient detail is available of major development proposals to enable this to be fully investigated at this stage, and it is therefore recommended that this assessment is made for individual proposals at the project level when more detail is available. No significant in-combination effects of implementation of the SMP2 can be determined at this time.

Recommendations

Although the HRA of the SMP2 has identified that significant effects upon qualifying features of the Natura 2000 sites are unlikely, it is recommended that subsequent plans and projects associated with the SMP2, for example Coastal Strategies and project schemes, should be examined by the HRA process to ensure that in-combination effects of implementation of individual schemes do not give rise to adverse impacts on the Natura 2000 sites.¹

Post Consultation

Habitats Creation and Enhancement

Past development and land-use change has resulted in extensive loss of natural habitat along the Fife coastline. Future development pressure and sea level rise are likely to cause further losses, with the latter in particular expected to affect intertidal and coastal habitats. Strategic Environmental Assessment (SEA) and Habitats Regulations Assessment of the Fife SMP2 recognises that future development which conforms to the SMP2 will be likely to result in some losses of intertidal and coastal habitat. Recognising the intrinsic and supporting value of these habitats for certain protected species, the Fife SMP2 aims to facilitate future proposals and measures which will promote the protection and enhancement of existing, and the creation of new, intertidal and coastal habitats.

Following consultation with statutory bodies during development of the plan, the need for habitat creation and enhancement projects that address intertidal and coastal habitat loss was clear. The Fife SMP2 supports the implementation of

¹ Fife Shoreline Management Plan Habitats Regulations Assessment July 2011

such projects, and seeks to promote proposals which facilitate these. Accordingly, habitat creation initiatives should be explored within the forthcoming Coastal Strategies and individual projects so as to conform to the plans. Coastal Strategies should identify opportunity areas within Inner and Outer Forth such as the Kennet Pans beside the new Clackmanshire Bridge (considered by the Scottish Executive in 2003 as potential mitigation for the Bridge scheme) as well as areas surrounding St Margaret's Marsh at North Queensbury (along with other potentially suitable sites subsequently identified). Feasibility studies for intertidal and coastal habitat creation are recommended to be carried out for each Coastal Strategy alongside continued consultation with statutory bodies.

Areas of newly created habitat will not only benefit the natural environment, but are also a valuable means of engaging people with nature, encouraging access to the environment, delivering environmental education, and improving general

2.3 The Environmental Effects of the Plan

Based upon the output from the testing of policy scenarios, 58 Policy Units have been defined and a Policy Statement has been developed for each Policy Unit, and presented in Section 5.2. The Policy Statements present the policy scenario for each Policy Unit, identifying its justification and how it will be achieved over the 100 year period. They also present the detailed implications of the policies and identify any mitigation measures that would be required in order to implement the policy.

This document includes the 'Plan for Balanced Sustainability' (Section 4.1), defining the broad environmental impacts of the plan. This Section also presents the 'Possible Implications of the Shoreline Management Plan' (Section 4.2) under thematic headings.

2.4 SEA Adoption Statement

The SEA Adoption Statement forms the final stage in the SEA process which has assisted in guiding the development of the Fife Shoreline Management Plan 2. It should be read in combination with the SEA Report.

The function of the Adoption Statement (Stages D and E in the SEA process) is to assess any significant changes as a result of the consultation of the Environmental Report and identify the monitoring arrangements to be carried out when the SMP is adopted.

The Adoption Statement concludes that no significant changes occurred to the SMP2 following consultation and therefore no additional appraisal work was required.

The Adoption Statement also identifies mitigation that needs to be addressed through any future coastal strategies or projects, which arise following the adoption of the SMP2.

2.5 Water Quality

SEPA have been involved throughout the development of the SMP2 and following the selection of the preferred policy options responded with the following in relation to the environmental report:

“The preferred options assessed are largely based on “hold the line” or “no active intervention” and therefore the potential for significant environmental effects on the ecological status of the transitional and coastal water bodies has been minimised.”

In England and Wales the Water Framework Directive (WFD) applies to assess ecological impact from flood and coastal erosion risk management in line with EC legislation, though in Scotland it was transposed by the Water Environment and Water Services Act 2003 that has been referred to in the baseline studies.

The WFD has not been directly applied to the SMP2 as it mainly applies when developing schemes and assessing ecological impact associated with engineering works and further planning, which would come as a result of further works following adoption of the preferred policies set out in the SMP2 and as such is beyond the scope of the SMP document.

For the final SMP2 a retrospective WFD assessment could be undertaken. It is generally accepted practise for an SMP in England and Wales, to follow Environment Agency Guidance – Assessing shoreline management plans against the requirements of the Water Framework Directive (ref:GEHO0309BPTH). The assessment would be useful for making us aware of the potential for particular SMP policies to deliver or compromise the Directive’s environmental objectives. It will identify issues that we will need to consider during strategy or scheme development, as well as in future cycles of Shoreline Management Planning. Undertaking a WFD assessment has been identified in Section 6 (Action Plan).

3 Basis for Development of the Plan

The full detail of the coastal processes and assessment of coastal and flood defences for the Fife SMP region is provided in the Baseline Understanding (Appendix C).

3.1 Historical Perspective

Fife falls within the centrally classified Midland Valley which consists mainly of Carboniferous and Devonian sedimentary rock. The infilled land mass of Fife as it is today was formed by the influx of silts, sands and mud due to erosion of the mountains to the north and south of the Midland Valley. The Holocene period marked the end of the last ice age and a significant change in sea level; this can be seen in the Forth valley through a sequence of buried beaches and carse deposits and in the lowlands of Fife raised shorelines and development of carselands.

The Fife region is still experiencing isostatic rebound post glaciation, with the land mass still rising and sea levels having risen by 35cm. UKCP09 indicates that by 2095 sea level will have risen by 30.5cm based on 50%tile projection for medium emissions. The precautionary approach of the 95%tile projection for medium emissions + 15% additional water level (to account for uncertainties) has been used to identify future areas at risk for this SMP; this is further explained in **Appendix C1**. It has been identified in this SMP that the continuing sea level rise will result in ongoing change to the shoreline and coastal systems around the Fife coast over the next 100 years.

The Fife SMP2 has been significantly influenced and defined by human activity over a long period of history evidenced through archaeology sites, historic buildings and current usage. Land reclamation, coastal defences and mining activity have taken place on a regular basis for many years. This in turn has led to a decrease in tidal prism, loss of habitat and change in coastal processes. Future geomorphologic change around the Fife coastline will be dependent on different driving forces such as sea level rise, storminess, increases in fresh water flows and the adaptability of the system to respond to any changes.

In the northeast of Fife, the landscape varies from the gentle hills in the rural hinterland to the windswept cliffs, rocky bays and sandy beaches. Fishing still has a role with small stone harbours of the East Neuk - Anstruther, Crail, St Monans and Pittenweem, but ultimately it is to St Andrews, Scotland's oldest university town and the home of the world-famous Royal and Ancient golf club, that most visitors are drawn. The town itself and the hills and hamlets of the surrounding area retain an appealing and old-fashioned feel.

Home to Scotland's capital for four centuries, Fife has always been at the heart of the nation's history, evidence of which can still be found in its wealth of castles, cathedrals, and places of historic interest.

3.2 Sustainable Policy

3.2.1 *Coastal Processes and Coastal Defence*

Climate Change

The Scottish coast is undergoing change due to long-term and large scale impacts of climate change, namely sea level rise, through to the day-to-day effects of waves and tidal currents. It is the implications of climate change that will determine sustainable shoreline management into the future.

The Department for Food and Rural Affairs (Defra) have published sea level rise allowances, in response to research and improved predictive climate modelling, and advice from the Intergovernmental Panel on Climate Change (IPCC). Global mean sea level rise projections for the 2110s were extrapolated from the 2020s, 2050s and 2080s. The baseline for calculating sea level rise for a given year was 1990.

Defra have now produced UKCP09 (United Kingdom Climate Projections 2009) which is the fifth generation of climate change information for the UK, and its projections are based on a new methodology designed by the Met Office. Further information is available at www.ukclimateprojections.defra.gov.uk.

Climate science and computer modelling have advanced significantly – UKCP09 reflects scientists' best understanding of how the climate system operates, how it might change in the future, and allows a measure of the uncertainty in future climate projections to be included. No climate model can give a single definite answer to what the future will look like.

This SMP uses UKCP09 Marine & Coastal Projections for sea level rise, storm surge, sea surface and sub-surface temperature, salinity, currents, and waves. It is extremely important that the long-term plan in the SMP recognises changes in the marine and coastal behaviour and reflects likely future constraints to management planning. The projection for this SMP has been based on UKCP09 Relative Sea Level Rise 95%tile medium emissions scenario plus a 15% added water level to account for uncertainties in marine and coastal processes on the scale of the study area. The conservative approach acts as an early warning and management tool to those other plans and initiatives that are vital to the communities and infrastructure within the coastal and estuary zones.

UKCP Marine & Coastal Projections for relative sea level rise along the Fife coast have been detailed in **Appendix C1**.

Coastal change

The Fife SMP shoreline has been and will continue to be shaped by human influences, the antecedent geology, natural forces and coastal vegetation. Fife is recognised for its importance for the natural environment, rich in biodiversity and habitats. It boasts extensive recreational and tourism facilities and the beautiful landscape make it popular with tourists. The usage of the coastline varies from residential to industrial and agricultural along its length with varying amounts of management depending on the use.



Figure 9: Seafeld Harbour Pier fronting the former site of Seafeld Colliery, redeveloped for Housing in the 1990's. The black sand is evidence of ongoing erosion of coal bings north east of Kirkcaldy.

The reclamation of land of former coastal lowland for residential, industrial or agricultural use has produced a few areas where the shoreline is now artificially seaward of its natural position. However much of the Fife coastline operates under natural circumstances with extensive areas of sand and mud flats, sand dunes, saltmarsh, reedbeds and coastal lagoons all of which contribute to the areas natural beauty.

The ability of the Fife system to respond to future conditions imposed on it either by humans or nature is limited by a number of interdependent factors such as; the underlying geology, sediment supply and location, position and standard of sea defences. Another constraint that could influence the adaptability of the shoreline is future development. There is potential along large parts of the

shoreline to develop residential, commercial, industrial and agricultural use beyond the current levels. The large number of sites that fall under RAMSAR, SSSI and nature reserves will influence what can be done along the coast and will need to be maintained.

Coastal defences

The Council undertakes coastal monitoring as part of their annual maintenance regime. The condition of existing defences was catalogued as part of the work undertaken for the first SMP. This produced a database of over 400 natural and man-made defences. Recent work which is ongoing has involved the reassessment of the defences, creating a GIS (Geographic Information System) line model of over 750 defences at MHWS. This process has included a photographic record of each section and is summarised in Appendix C2, Coastal Assessment.

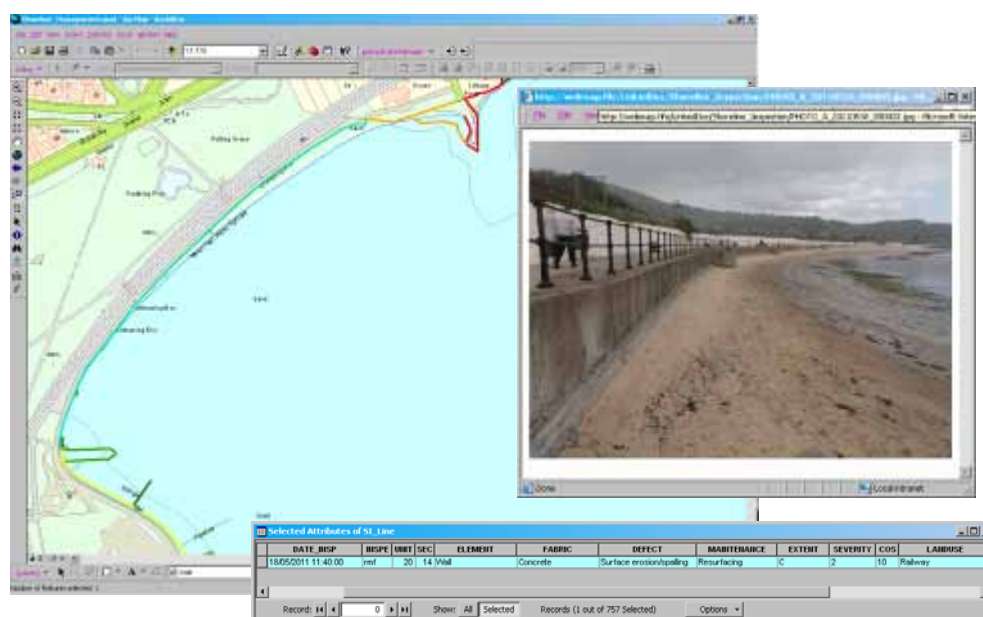


Figure 10: Extract from Coastal Defence GIS Map, Photo & Assessment at Burntisland

Appendix C3 'No Active Intervention Scenario' and **Appendix C4** 'With Present Management Scenario', provide detailed analysis of coastal impact should the defences be left as they are without further maintenance or the anticipated deterioration of defences under current maintenance conditions.

The public view of the necessity to protect an area from erosion, often clashes with their view on the importance of maintaining the natural landscape of the area. Coastal Defences often cause coastal squeeze around the immediate area of construction which can affect the landscape and beach levels. The impacts of climate change often exacerbate the problem.

Further consideration should also be given to flood plains, local habitats and wildlife when developing coastal defences. The expectation to appease all of these concerns and features is often unrealistic due to the necessary costs involved with the works when compared to the benefits.

One example along the Fife coastline is that of West Sands at St Andrews which is greatly susceptible to flooding and sea level rise as shown on the flood map provided with the Policy Statement in Section 5. Cultural and economic significance of the St Andrews Golf Links is such that the management of the site has been enacted in the St Andrews Links Order Confirmation Act 1974. Maintaining and enhancing the links courses is a key objective identified by the SMP throughout each of the 3 epochs. Achieving this, in balance with the competing interests of the designated habitat, will be a challenge over the life of the SMP. In order to rationalise the coastal defence process and make it as effective as possible, this detailed Shoreline Management Plan has been established to take all aspects of the coastline into consideration and assess defences and coastal processes accordingly.

Areas suggested for Managed Realignment have been identified following consideration of the following:

- Extent of the predicted floodlines;
- Areas suitable to provide additional Inter-tidal habitat;
- Prevention of alignment from impacting upon key infrastructure, habitat and other coastal features.

Sediment movement

The Fife coastline is widely varied along its length between Kinkardine and Newburgh with both coastal and estuarine conditions. The degree of exposure along this complex region changes immensely which in turn affects the rate at which sediment is moved along the coastline. The Fife coast has been considered in 7 discrete coastal process units all of which vary greatly in terms of coastal morphology, coastal orientation, exposure sheltering, elevation and geology.

The different conditions found within each coastal process unit erode in different ways. A natural shoreline sediment system is one that is allowed to behave dynamically without any disruption; it may therefore be eroding, stable or accreting. There must be a source of sediment to replenish what has been moved further along the coast; within the Fife area this is predominantly estuarine. The Forth estuary is the largest source of sediment and is characterised by fine sediments with coarser grained sand and gravels around constrictions.

Beaches, saltmarshes, mudflats and low lying coastal floodplains provide a natural form of defence that react to storm waves. They help to limit and control the rate at which erosion takes place by dissipating wave energy across their surface. Flood and coastal defence structures which have been constructed to protect property and assets limit the amount of shoreline that is free to erode through natural processes and provides little sediment into the system. If these defences were to fail or be removed it is likely that there would be considerable tidal flooding and erosion of the hinterland. In some cases this is done deliberately to create a new shoreline and habitat where land has been reclaimed or is no longer used.

3.2.2 *Economic Sustainability*

There is a cost associated with maintaining shoreline protection to the extent and alignment that currently exists and as an island nation this is a national issue. A large proportion of the defences that are in place today have been installed without consideration to the long term implications, including financial commitment.

The future financial commitment required to maintain existing shoreline defences will increase significantly compared to what is presently spent. The subsequent options are to either prioritise areas where money is spent or increase the amount of money available to spend. The costs for installation/replacement of defences can cost between £2.7 million and £5.1 million per kilometre for linear defences such as revetments, seawalls and beach recharge. All of these defences also have associated annual maintenance costs ranging from £10,000/km for revetments, seawalls and groyne fields, to £20,000/km for beach management schemes.

As costs for defences increase and sea level rise threaten more coastal assets there could be a move to be more selective about the areas that are defended at the expense of the Scottish taxpayer. Realistically it is not justifiable to defend all locations or in some cases even at all, this could result in a change to the threshold about when an area ceases to be considered nationally viable to continue to be defended. It is not known if or how attitudes relating to coastal defences will change; however it is not unreasonable to expect policy makers to look at other lower cost options before investing money protecting property and assets in high risk areas along the coast. These lower cost options could be locating new properties inland, away from the coast thus eliminating the risk. The implications are that any investment would be made in areas where the highest level of benefit could be achieved, such as areas with a high number of properties at risk of flooding or erosion. The consequence of this approach is that rural communities and private landowners are more likely to be affected.

The SMP should consider future issues and likely future constraints which should be reflected in the long term policies recommended. This is necessary to ensure future protection and give a shoreline management scenario that is justified and can be implemented when funding is sought.

To ensure that the Fife SMP has given due consideration to long term policy a broad assessment of economic suitability was carried out for each policy unit. This gives consideration to coastal erosion, flooding and social impact for the preferred plan. This was done by creating flood maps for each epoch, historical and predicted erosion maps, which were then superimposed over the shoreline to assess the impact. The Modelling and Decision Support Framework tool was not used for this SMP as there is less information available than for England and Wales. Due to the nature of coastal flooding if property was inundated under a given preferred policy assessment then the property was written off in damage terms.

The economic viability of each policy unit was determined based on the damages averted or deferred by the preferred plan (only considering residential and commercial property). This compares the difference in losses between implementing the preferred plan and No Active Intervention. Additional benefits to other assets such as public infrastructure, recreation ground and positive impacts on the environment are always considered to provide added value and support economic viability. This is also compared to the overall cost of maintaining existing structures. The assessment helps to provide a cost benefit ratio for each preferred policy.

A broad economic assessment was carried out for each policy unit and summary sheets of scoring is presented in **Appendix H**.

The economic summary sheets detail the: -

- Broad cost it would take to implement a scheme to put in place the policies suggested for appraisal e.g. Hold the Line or Active Intervention. The Summary sheet provides
- Present Value benefits i.e. property or infrastructure benefiting from a high level of flood and/or erosion protection
- Present Value Damages i.e. total damages in £ caused by flood and erosion over the 100 year period
- Average cost/benefit ratio i.e. a score to indicate the economic viability of a coast protection scheme.

Where a river mouth is present within a Policy Unit, the damages in relation to flooding and erosion have only been considered up to the point of the first

upstream structure (i.e. a road bridge). Any flooding or erosion that occurs upstream of this point is then considered to be fluvial flooding or erosion and not the focus of a Shoreline Management Plan.

Table 3 in Section 4 provides a breakdown of flooded properties within the various policy units.

3.2.3 *Environmental Sustainability*

Environmental sustainability is difficult to define as it depends upon social attitudes, which are constantly changing. Historically, communities at risk from coastal erosion relocated, recognising that they were unable to resist change. However, in more recent times, many coastal defences have been built without regard for the impacts upon the natural environment. Today, because we have better technology, we are less prepared to accept change, in the belief that we can resist nature. Inevitably, attitudes will continue to alter; analyses of possible 'futures' are already taking place (e.g. Foresight Future Flooding, 2004 and 'Making Space for Water'), considering the implications for many aspects of life, including approaches to flooding and erosion under different scenarios. It is not possible to predict how attitudes will change in the future; therefore the SMP is based upon existing criteria and constraints, whilst recognising that these may alter over time to accommodate changing social attitudes.

Natural Environment

The Fife SMP shoreline is unique and varied which contains a range of landforms and habitats. The quality of the natural habitats, ecology diversity and geomorphological features is recognised by the application of international, European, national and local designations. These areas are protected under statutory international and national legislation, along with regional and local planning policies.

The Fife coastline is a very special environment which has distinctive rock formations, delicate flora and a varied wildlife. For nature lovers, the path is a real walk on the wild side. Look out for grey seals and, in summer, basking sharks and dolphins. The offshore islands of Inchcolm and Inchkeith are home to thousands of seabirds, with vast numbers of puffins found on the Isle of May.

There is a legal requirement to consider the implications of any 'plan or project' that may impact on a Special Protection Area (SPA) or Special Area of Conservation (SAC), through the European Union Habitats Directive (Council Directive 92/43/EEC) and Birds Directive (Council Directive 79/409/EEC).



Figure 11: Saltmarsh Formation at Tentsmuir, South of Tayport, part of the Firth of Tay & Eden Estuary SAC, SPA, Ramsar & SSSI designated site.

The Scottish Biodiversity Strategy requires all Local Authorities to develop biodiversity action and put it into action, in this case it falls within the Marine and coastal ecosystem group with the aim to;

- Halt the loss of biodiversity
- Reverse previous losses through targeted action for species and habitats
- To restore and enhance biodiversity in all our urban, rural and marine environment through better planning, design and practice

The Nature Conservation (Scotland) Act, 2004 requires the government to report on progress with the strategy and highlight how public bodies have complied with their duty to further biodiversity.

The EU Water Framework Directive also requires that water bodies such as estuaries reach at least 'good status' by 2015. A key requirement for the SMP is to work to further biodiversity by identifying enhancement opportunities.

Coastal management can have a significant impact both directly and indirectly on habitats and landforms. For example defence structures may cause coastal squeeze which causes loss of intertidal habitat within internationally designated sites. They can however sustain the present interests of the site such as coastal

grazing marshes or high tide roost sites. Due to the underlying geomorphology along substantial areas of the coastline being rock outcrops or platforms the defences tie into the existing geology and have a limited impact.

It should be recognised that the preservation of freshwater habitat, coastal grazing marshes and saline lagoons may be at the 'expense' of alternative habitats i.e. saltmarsh, which are considered to be more dynamic and able to respond to changes in coastal conditions and processes. Coastal habitats may also form the primary means of coastal defence e.g. Torry Bay, Hawkraig Point, Guardbridge and Pettycur Bay. Consideration should be given to nature conservation and coastal flood and erosion risk when making coastal management decisions.

Scottish Natural Heritage seek to ensure that where proposals relating to coastal flooding and erosion are designed that due consideration is given to the protection and, where appropriate, enhancement of internationally, nationally and locally designated areas and sites (including SPAs and SACs). Scottish Planning Policy draws attention to the importance of safeguarding and enhancing natural heritage beyond the confines of designated areas. This requires policy documents to have a certain degree of flexibility in the assessment of their impact to provide for the conservation of biodiversity and protection and enhancement of the natural heritage outside designated areas.

Future management of the coast needs to allow habitats and features to respond and adjust to change in a dynamic nature to ensure the functionality of any habitat.

Land Use and Planning

Historically, development of the coast has taken place unconstrained. Scottish Planning Policy (SPP) is the statement of the Scottish Government's policy on nationally important land use planning matters and contains a specific section on coastal planning.

Statutory planning control under the Town and Country Planning (Scotland) Act 1997 and associated legislation extends to the mean low water mark of ordinary spring tides, and to marine fish farming. The marine planning system that was introduced through the Marine (Scotland) Act 2010 has been applied to this SMP through its development.

The purpose of the marine planning system is to provide a framework for the sustainable development of the Scottish marine area, setting economic, social and marine ecosystem objectives and providing a framework for decision making.

The powers of the marine planning system will extend up to the mean high water mark. The terrestrial planning system and the marine planning system are legally and functionally separate but overlap in the inter-tidal area.

The SPP states that 'planning authorities should work closely with Marine Planning Partnerships and neighbouring authorities to ensure that development plans and regional marine plans are complementary, particularly with regard to the inter-tidal area but also for the 'wider coastal zone'. The landward limit of the coastal zone will vary based on the geographical effects of coastal processes and coastal-related human activity'.

Integrated Coastal Zone Management (ICZM) is a strategic management process which aims to facilitate an integrated approach to the use, development and protection of resources in the coastal area or across the interface between land and sea, and may be of use in addressing the areas and issues in which regional marine plans and development plans have a common interest.

Heritage

Heritage features are valuable to society for a number of reasons as they:

- Are evidence of past human activity
- Provide a sense of place and cultural identity
- Contribute to the aesthetics and quality of the landscape
- May represent an economic asset due to their tourism interest
- Are unique and if destroyed cannot be replaced.

Natural processes such as erosion and coastal flooding constantly erode, change or even destroy the historic environment, conversely these processes can also uncover sites of historic interest that have previously been hidden. Many sites are recognised as being of high importance but only a few are protected by statutory law.

Government advice in SPP sets out the national planning policy for the historic environment and indicates how the planning system will contribute towards the delivery of Scottish Ministers policies as set out in the current Scottish Historic Environment Policy (SHEP). These policies promote the preservation of important heritage sites, wherever practicable. This means that each site must be considered individually and balanced against other objectives in that area.

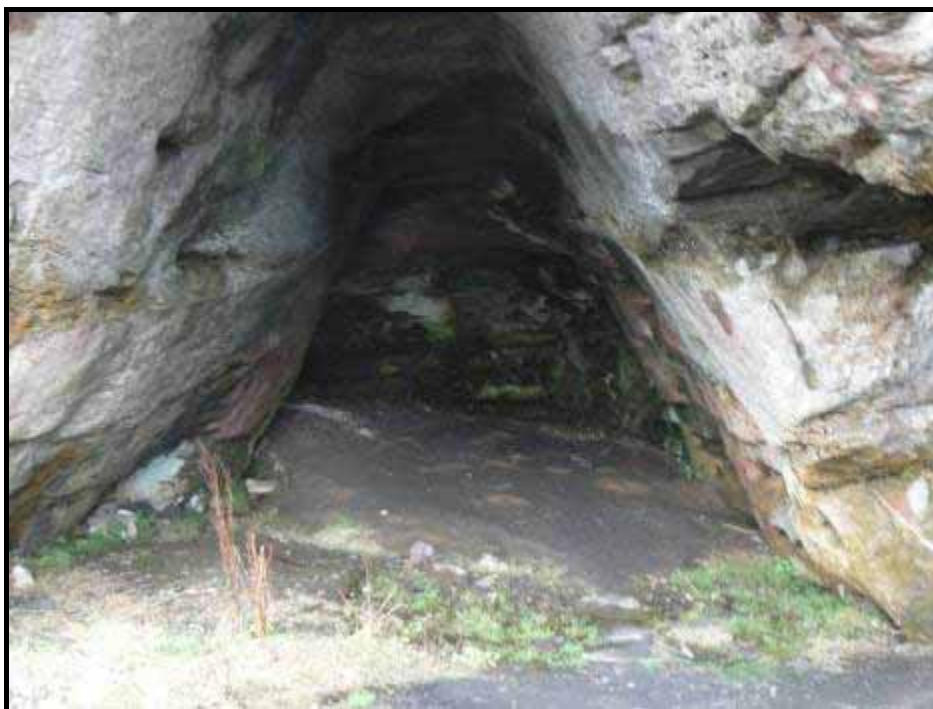


Figure 12: Doo Cave (East), part of the Wemyss Caves SAM, East Wemyss. The Wemyss caves contain many Pictish and later markings, the Doo Cave contains many pigeon holes from the Middle Ages.

The Fife coastline has a rich historic environment which includes evidence of past environments, archaeological sites, historic buildings and the historic aspects of the wider landscape. Major features along the Fife coast include historic fortifications, harbours and dockyards, military installations, wreck sites, coastal settlements and industry. Such sites include Torry Bay which has a restored archaeological site, and the ruins of one of Scotland's earliest industrial estates; Culross which has a selection of historical important monuments, buildings and gardens.; Aberdour where there are 2 wreck sites; and St Andrews town (golf course) are but a few of the areas of historic importance along the Fife coastline. Details of heritage features covered by statutory and local planning designations and non designated assets are listed in the Theme Review Appendix D.

3.3 Flood Mapping Methodology

In England and Wales, Defra and the EA recommend using guidance for 'Evaluating Joint Probability Methods in flood management – R&D Technical Report FD2308/TR2'. However in this instance with a large study area the guidance states:

"There is an additional complication in applying joint probability methods to assess flood risks across an area, as opposed to a single site. This is the issue of spatial consistency across a large area, or in an area protected by multiple

defence lengths / types, or in an area where there is more than one flood mechanism.”

Joint Probability involves using data from a variety of sources and is based around two variables interacting. At a specific point this process is effective, but over a large area such as the Fife coastline which also incorporates three estuaries this process becomes a great deal more complicated considering the number of variables that would be involved. Greater analysis of these conditions falls outside of the scope for works required by the SMP2.

Flood maps produced for the SMP2 utilise one variable of sea level rise and provide a detailed over view of predicted flooding throughout the study area. The flood plans provide significant information to allow for the effective development of policy options along the Fife coastline, though these plans should not be used for the purpose of individual planning considerations.

SEPA have also produced an indicative river and coastal flood map for Scotland, though this was not best suited to the requirements of the SMP2. The SEPA Flood Map takes no specific account of the latest UKCP09 data and was derived by interpolating a smooth trend line between 39 sites plotted on a map.

There are clear limitations associated with the data and methodology used to achieve the national dataset. In particular there are limitations with the DTM used to represent the topography of Scotland, which has a vertical accuracy of 0.7m to 1.0m on a grid spacing of 5m, and represents the ground levels less accurately for dense urban areas. The improved accuracy of LiDAR data was used where available.

The Technical Methodology states that ‘as a result, if more accurate flood risk information is required for a local area or an indication of flood risk is required for a specific location or a property, then a more detailed local study may be required’. For the purpose of the SMP2, the coastline has been broken down into 58 Policy Units, it was deemed that a more accurate model, accounting for climate change to allow for future predictions and risk calculations was required.

For a quantified assessment of climate change impact on the Fife inter-tidal habitat, height data and information on sea level change was collected and modelled using a Geographic Information System (GIS). This information can be found in Appendix C5 – Supporting information, including technical explanation of the Digital Terrain Model.

Appendix C5 details the baseline data used in the modelling process and the extents for future predictions utilising the UKCP data in relation to climate change.

3.4 Predicting Coastal Evolution

Open coast

The response of the coast depends upon a number of factors, but at a basic level depends upon resistance of the coastal feature and the energy or forcing acting on it. In general terms, rising sea level results in high tide water levels reaching further up the beach profile and therefore increased wave energy at the shoreline. Response of the coast to changes in forcing factors is also often complex with a number of feedbacks, such as sediment inputs from cliff erosion, affecting the net change.

Estuaries

Predicting the future evolution of estuaries is still subject to significant uncertainties, especially where there are limited data for the estuaries relating to sedimentary infilling and historical trends of accretion and erosion.

In this SMP Review the assessments of future estuary evolution have therefore been based on existing studies which suggest that, in general, estuaries in this region will continue to infill with sediments from open coast bays resulting in stable areas of mudflats and saltmarsh.

At present, insufficient data exists to establish the applicability of the 'Estuary Rollover Model', as developed by Pethick (2000), which assumes that under rising sea levels an estuary will transgress landwards and vertically upwards, thereby maintaining its position within the tidal frame (further discussion of this model is provided in the Review and Formalisation of Geomorphological Concepts and Approaches for Estuaries; HR Wallingford et al., 2006).

The creation of new intertidal areas may lead to changes in flows, water levels and morphology both locally and throughout the wider estuary, particularly where land levels in presently defended flood plains have lowered due to sediment compaction and shrinkage.

Predicting shoreline position

Geomorphological studies undertaken on the Fife coastline have not generally considered sea level rise and also only considered trends of change by year 100, rather than the three time periods required by the Defra guidance. Predictions of future advance or retreat of the coastline have therefore been based upon extrapolation of historical trend data, where available, with consideration of how these rates may be affected by feedback mechanisms, such as sediment inputs from cliffs. There is a range of predictive methods available which can be used to incorporate sea level rise in extrapolation of a shoreline response, but each is constrained by assumptions and limitations which affect their application to cliffs.

The aim of the coastal erosion analysis was to demonstrate the coastal areas along the Fife Coast that are at risk from erosion now and in 100 years time assuming that there were no defences.

The Historical Ordnance Survey Map depicts the shoreline as it was in 1855, this was entered into a GIS programme and compared to layers of the current coastline with present sea defences. This was used to identify the sections of coastline where erosion had taken place and where land reclamation had been undertaken.

From this information the rate of coastal erosion at affected areas could be determined for the past 150 and interpolated to predict the extent of coastal erosion over the next 100 years. Using this data and the recent coastal asset assessment the extent of shoreline erosion and the structures and amenities affected up to the next 100 years could be established.

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4 The Plan

This section of the SMP presents a broad overview of the policies, discussing their rationale, implications and the requirements to implement and manage them.

4.1 **A Shoreline Management Plan for Balanced Sustainability**

The Fife SMP2 seeks to achieve a balanced sustainability where throughout the considerations people, historic features, the natural environment and economic realities have been included. The policies for the present-day provide compliance with objectives to protect existing communities against flooding and erosion. The long-term policies promote greater sustainability for parts of the shoreline where natural process and evolution provide a practical means of managing the shoreline.

However, the protection of the significant assets present along sections of the shoreline remains a strong focus for the long-term sustainability of the economy and communities of Fife.

The rationale behind the preferred plan is explained in the following sections of text, which consider the SMP area as a whole. Details of the preferred policies for individual locations to achieve this Plan are provided by the individual 'Policy Unit Statements' in Section 5.

4.2 **Possible Implications of the Shoreline Management Plan**

A direct comparison is made between the preferred plan/policies and a scenario of No Active Intervention in the following sub sections. This scenario considers that there is no expenditure on maintaining or improving defences and that defences will therefore fail at a time dependent upon their engineering design or residual life.

This approach defines the benefits of implementing the plan, as it highlights what would be lost under No Active Intervention against what would be gained if the preferred policy was implemented. Where No Active Intervention is the preferred policy then obviously this methodology is not required.

4.2.1 *Implications for property and land use*

For urban and industrial areas of the SMP shoreline, the recommended plan in the long-term is to maintain and improve existing defences where it is economically viable to do so. This is to minimise risk to property and assets along the developed sections of the coast.

However, for some sections of the shoreline, a change in management policy has been proposed in the medium to longer term where a Hold the Line policy will not

be economically viable, technically sustainable, or environmentally acceptable for the next 100 years. Therefore, in these locations policies of No Active Intervention or Managed Realignment need to be considered. The SMP has identified areas where a more naturally functioning coastline would be to the benefit of the natural environment and to estuarine processes. However, there would be potential changes to land and environmental assets should these policies be implemented.

4.2.2 *Implications associated with coastal erosion*

Along the Fife coastline, erosion risk has more localised effects than the widespread risk from coastal flooding.

No properties are expected to be lost in the first epoch to coastal erosion under a 'With Present Management' scenario along the Fife coast when the policies are considered.

This compares to the No Active Intervention baseline where erosion losses throughout the SMP frontage are estimated at 5 properties. This is the number of properties affected by erosion only.

Further properties are affected by both flooding and erosion. These properties have been included under flooding. Consequently the plan provides for protection from erosion to properties over the next 100 years under the guise of flooding.

4.2.3 *Implications associated with coastal flooding*

Future coastal flood models indicate significant numbers of assets that could potentially be at risk from tidal inundation under the No Active Intervention baseline.

For a 'No Active Intervention' scenario, this plan indicates that: -

- in the first epoch (up to 20 years) 1206 residential and commercial properties would be at risk – a total of 1206 properties; and
- in the medium to long-term (20 to 100 years), the figures would increase by 1616 residential and commercial properties at risk – a total of 2822 properties.

Table 2 details the number and type of properties per policy unit, potentially within the tidal floodplain and affected by coastal flooding, assuming no defences, for 2025, 2055 and 2105.

Table 2: Identified properties at risk of tidal inundation per Policy Unit

Number of properties (residential and commercial) affected by tidal flooding assuming a 'No Active Intervention' scenario								
Policy Unit	0-20 years	20-50 years	50-100 years		Policy Unit	0-20 years	20-50 years	50-100 years
01	103	97	177		30	0	0	0
02	6	51	13		31	1	0	0
03	15	22	64		32	0	0	0
04	0	1	5		33	10	6	5
05	0	0	0		34	26	18	36
06	5	20	11		35	2	1	2
07	12	50	40		36	43	35	23
08	1	0	0		37	0	0	0
09	4	1	14		38	45	29	27
10	33	17	54		39	0	0	0
11	35	9	26		40	31	15	16
12	0	0	0		41	0	0	0
13	2	0	18		42	49	11	16
14	0	0	0		43	0	0	0
15	0	0	0		44	87	55	81
16	10	5	5		45	0	1	0
17	0	0	0		46	1	1	0
18	0	0	0		47	2	0	1
19	0	0	0		48	61	32	45
20	14	8	13		49	8	10	2
21	17	8	7		50	3	1	0
22	0	0	0		51	11	2	14
23	32	6	77		52	0	0	0
24	0	0	3		53	97	28	69
25	3	1	2		54	187	27	36
26	0	0	4		55	5	0	2
27	5	3	12		56	34	10	54
28	0	1	11		57	25	0	5
29	0	3	0		58	181	6	35

4.2.4 Environmental Implications

The conclusion of the HRA screening assessment, carried out in April 2010, was that the SMP2 had the potential to lead to significant adverse effects upon the qualifying features of a number of Natura 2000 sites. Seven European designated sites (five Natura 2000 and two Ramsar sites) relevant to the plan

were identified, all of which were considered likely to be significantly adversely affected by the plan. These are the Firth of Forth SPA/Ramsar, Forth Islands SPA, Firth of Tay and Eden Estuary SPA/SAC/Ramsar, and River Tay SAC. These areas of nature conservation comprise a number of priority species that are identified within the Habitat Regulations Assessment (HRA) - Section 4.

The second stage of the HRA process, i.e. the appropriate assessment, has been completed following EC (2001) and Scottish Executive (2006) guidance documents and it conforms to legal parameters prescribed by national legislation (Appendix I to this document).

Appendix I, tables 3.1 and 3.2 in the HRA provide details of any potential impacts on habitats and species that the varieties of policy options can have together with Policy Unit specific comments on those adopted.

4.2.5 *Implications for the historic environment*

Protection, enhancement and restoration of the historic environment, preserving historic buildings, archaeological sites and other culturally important features are some of the focuses of the SEA.

There are a number of Scheduled Ancient Monuments (SAM) and other historical features that are at risk from flooding and coastal erosion along the Fife coastline. The Development of the SMP2 has proceeded iteratively with the SEA. A number of potential adverse impacts were identified in relation to the SMP2. This information has been used to inform the development of the Preferred Plan. Specifically, a number of mitigation measures have been identified as follows:

- Where possible access to Charlestown Dock should be protected/provided;
- Charlestown, Limekilns & associated features Scheduled Ancient Monument should be protected;
- Dysart House and Ravensraig Park designated landscape should be protected where possible through the use of sympathetic defence;
- Where possible agricultural land should be protected;
- Ardris Castle and Newark Castle Scheduled Ancient Monuments should be protected from coastal erosion;
- Ballinbreich Castle Scheduled Ancient Monument where possible should be protected.

There is also some expected erosion to impact Wemyss Caves scheduled monuments and the SMP, although providing a 'No Active Intervention' Policy for this Unit, has stated the provision for Historic Scotland to protect the SAM.

The policy of 'No Active Intervention' will also result in the long term erosion of the SAM known as St Monans windmill and saltpans. Although the Environmental Assessment indicates that a 'Hold the Line' policy would protect these nationally important heritage assets, further appraisal through the SMP has indicated that such a policy would not be sustainable and justified due to the lack of significant coastal settlements and infrastructure affected. In view of this, the SMP has stated that the St Monans windmill and saltpans should have provisions to be protected by Historic Scotland.

4.2.6 *Implications for nature conservation*

The SEA aims to conserve and enhance the integrity of ecosystems and biodiversity and avoid irreversible losses. Species and geological sites will aim to be conserved and enhanced whilst preventing any damage occurring. There is a range of international, European, national and local sites of nature conservation importance. The majority of which are directly associated with the Fife coastline and as a result will be impacted by adopted policy.

Within the Firth of Forth SPA and Ramsar and the Firth of Tay & Eden Estuary SPA and Ramsar, the impact of bird species attributable to the SMP2 identified is not considered likely to be significant, despite the declining nature of the site.

Bird species forming the qualifying features of the Forth Islands SPA are not likely to be significantly impacted by the preferred policies of the SMP2 as the plan does not cover the islands and likely nesting habitats are therefore unlikely to be impacted. Furthermore, the bird species identified do not use intertidal habitats for foraging.

4.2.7 *Implications for amenity and recreational use*

It is possible that recreational facilities may be affected by the policies set out in the SMP. Sections of footpaths will be lost at varying times along frontages where No Active Intervention or Managed Realignment are proposed. Where these policies are proposed, adaptation studies are either in progress or planned to determine the longer-term management and provision of access to and along the shore; there may be potential for footpaths to be realigned as the shoreline realigns and/or incorporated into defence design when defences are realigned.

4.3 Recommendations of the Shoreline Management Plan

It is vital for the sustainable development of the Fife Coast that regional planning needs to consider the messages being delivered by the Fife Shoreline Management Plan, and ensure that future proposals for regional development and investment are made accordingly and appropriately. The planning authority

needs to look to the long term to provide a sustainable future for the Fife coastline. Local Development Planning should consider the risks identified in this plan and avoid approving development in areas at risk of flooding and erosion. Local Development Planning also needs to consider 'property roll back schemes' that allow relocation of displaced people and property in land to be made available within the same settlements, in order to maintain the same level of community and it may well need to become increasingly flexible to enable this. It is also important that locations for new developments need to be identified on the coast to enable growth where it is required.

Those policies that have resulted or may result in an increased risk to property and assets, whether from coastal erosion or flooding, the effect on property owners should be managed through exit strategies for publicly funded and maintained defences, and through landowner management plans for privately owned and maintained defences. These will need to provide guidance on the removal or relocation of buildings and other facilities well in advance of any loss. The plans for relocation of people also need to be established as does the basis on which mitigation should be funded. However, it is important to maintain that this plan does not point towards mitigation measures that fall solely upon Scottish national and local government.

Commerce and Industry on the Fife coast will need to establish the measures that they need to take to address the changes that will take place over the next 100 years. This includes providers of services and utilities, which will need to make provision for the long term change when upgrading or replacing existing facilities in the shorter term. They will also need to consider how they will relocate facilities that will become lost to erosion or flooding, and the need to provide for relocated communities. Other organisations affected by coastal flooding and erosion that need to consider mitigation measures are: -

- Religious facilities
- Leisure centres
- Golf clubs
- Local highways authorities
- Harbours
- Museums
- Visitor centres

Owners of private assets will need to consider how they will manage changes to the shorelines that directly affect their property. Currently, maritime authorities have 'permissive powers' to undertake coastal flood and erosion works, but there is no obligation for the operating authorities or national government to assure protection against flooding or erosion. It is unlikely that this will change in the future or that individual losses will attract public funds. However, the Plan provides a long lead-in time for the changes that may take place at some point in

the future, as advised by the Action Plan. This will allow those parties that are affected by the plan to adjust accordingly. To manage these changes effectively and appropriately, the approach put forward in the SMP needs to be considered now, not in several decades time. The findings of the Appropriate Assessment will be fundamental to the implementation of the SMP. In order for long-term solutions to be sought, public and local communities should be involved.

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5 Policy Statements

This section of the plan contains a set of statements covering the study area and presenting the preferred policy and implications for each Policy Unit. These provide visual and textual information of local detail to support the SMP wide preferred plan which are presented in Chapter 4. The Policy Statements consider locally-specific issues and objectives, which are presented in the supporting appendices to this document. Consequently, these policy statements must be read in conjunction with the appendices and in the context of the wider-scale issues and policy implications as reported therein.

5.1 Information Contained Within Policy Statements

Policy Units are identified representing frontages for which a discrete shoreline management policy applies. Policy Units have been primarily defined by coastal processes, with considerations to: -

- geomorphology,
- environmental designations (local, national and international); and
- manmade defences.

Each Policy Unit is assigned a reference code identifier which is sequential along the shoreline from west to east or in an anticlockwise direction (01 starts at Kincardine; and 58 ends the study area in Newburgh. Figure 13 presents the policies for the Fife SMP study area for epoch 1, 0-20 years; Figure 14 presents the policies for 20-50 years; and Figure 15 presents the policies 50-100 years.

The main variations between the three epochs are caused by the Managed Realignment policies and the most cost effective or environmentally beneficial epoch to adopt the policy.

5.2 Summary Table of Policy Units

Table 3: Summary Table of Policy Units

No.	Name	Epoch		
		2030	2060	2110
01	Alloa Tower, Kincardine to Preston Island	HTL	HTL	HTL
02	Preston Island	HTL	HTL	MR
03	Preston Island to Torryburn	HTL	HTL	HTL
04	Torryburn to Crombie Pier	NAI	NAI	NAI
05	Crombie Pier to Charlestown	HTL	HTL	HTL
06	Charlestown	NAI	NAI	MR
07	Charlestown to Limekilns	HTL	HTL	HTL
08	Limekilns to Rosyth	NAI	NAI	NAI
09	Rosyth to North Queensferry	HTL	HTL	HTL
10	North Queensferry	HTL	HTL	HTL
11	Inner Bay	HTL	HTL	HTL
12	Inverkeithing to St Davids Bay	NAI	NAI	NAI
13	St David's Bay to Braefoot Point	HTL	HTL	HTL
14	Braefoot Point	NAI	NAI	NAI
15	Braefoot Point to Aberdour	NAI	NAI	NAI
16	Aberdour	NAI	NAI	NAI
17	Aberdour to Silversands	NAI	NAI	NAI
18	Silversands to Burntisland	HTL	HTL	HTL
19	Burntisland to Ross Point	HTL	HTL	HTL
20	Ross Point to Pettycur Bay	HTL	HTL	HTL
21	Pettycur Bay to Kinghorn Beach	NAI	NAI	NAI
22	Kinghorn Beach to Seafeld (Kirkcaldy)	NAI	NAI	NAI
23	Craigfoot Walk to Kirkcaldy Harbour	HTL	HTL	HTL
24	Pathhead Sands to Dysart Harbour	NAI	NAI	NAI
25	Dysart	HTL	HTL	HTL
26	Dysart to West Wemyss Harbour	MR	MR	MR
27	West Wemyss	HTL	HTL	HTL
28	West Wemyss to East Wemyss	NAI	NAI	NAI

No.	Name	Epoch		
		2030	2060	2110
29	East Wemyss	HTL	HTL	HTL
30	East Wemyss to Buckhaven	NAI	NAI	NAI
31	Buckhaven	HTL	HTL	HTL
32	Fife Energy Park	HTL	HTL	HTL
33	Methil	HTL	HTL	HTL
34	Leven	HTL	HTL	HTL
35	Leven to Lundin Links	NAI	NAI	NAI
36	Lower Largo	HTL	HTL	HTL
37	Lower Largo to Chapel Ness	NAI	NAI	NAI
38	Earlsferry to Elie	HTL	HTL	HTL
39	Elie to St Monans	NAI	NAI	NAI
40	St Monans	HTL	HTL	HTL
41	St Monans to Pittenweem	NAI	NAI	NAI
42	Pittenweem	HTL	HTL	HTL
43	East of Pittenweem to Anstruther Wester	NAI	NAI	NAI
44	Anstruther	HTL	HTL	HTL
45	Anstruther Easter to Crail	NAI	NAI	NAI
46	Crail	HTL	HTL	HTL
47	Crail to St Andrews	NAI	NAI	NAI
48	St Andrews	HTL	HTL	HTL
49	St Andrews to St Andrews Golf Links	HTL	HTL	HTL
50	St Andrews Golf Links to Guardbridge	MR	HTL	HTL
51	Guardbridge to Eden Mouth	HTL	HTL	HTL
52	Tentsmuir	NAI	NAI	NAI
53	Shanwell Farm to Tayport	MR	HTL	HTL
54	Tayport	HTL	HTL	HTL
55	Tayport to Newport -on -Tay	NAI	NAI	NAI
56	Newport-on-Tay to Wormit Bay	HTL	HTL	HTL
57	Wormit Bay to Newburgh East	NAI	NAI	NAI
58	Newburgh	MR	HTL	HTL

The maps of the shoreline and coastal zone within each Policy Unit are presented, along with a summary of the policies. It is important to note that coastal and flood defences can only reduce and manage the risk of coastal flooding, not eliminate the risk. Therefore, these maps indicate the residual flood risk that remains even if existing defences are maintained. The indicative erosion risk zones are also shown for frontages where there are no defences or management practices, or where a policy of No Active Intervention is proposed. For sites where a policy of Managed Realignment is proposed, an indicative area that may be affected is presented; such sites are dependent on landowner's consent and if to be considered further, more-detailed, site-specific studies to determine secondary defence requirements and alignment should be undertaken.

Summary Description of Policy Unit

This part of the statement contains a summary that describes the characteristics and important features taken from the appendices or supporting documents which define each Policy Unit.

SMP2 Policy

The policies (along with existing SMP1 policy for comparison) and activities that will be undertaken in the short (present to 2025), medium (2025 to 2055) and long term (2055 to 2105) to implement the preferred plan. These timescales should not be taken as definitive, but should instead be considered as phases in the management of a location.

Summary of Justification of SMP2 Policy

A summary of the rationale behind the policy option decisions as determined through the policy appraisal process, which reflects the requirement for changes in policy over time; for example, caused by changes in extent and implications of potential increase in coastal flood or erosion risk to pertinent features within each coastal frontage, or implications for defence works or feasibility of implementation.

5.3 Individual Policy Statements

This section comprises the 58 Policy Statements complete with Policy Unit plans. The plan depicts coastal flooding in 20, 50 and 100 years, current and 100 year predicted erosion lines, coastal accretion and areas of reclaimed land, along with a summary of the policies.

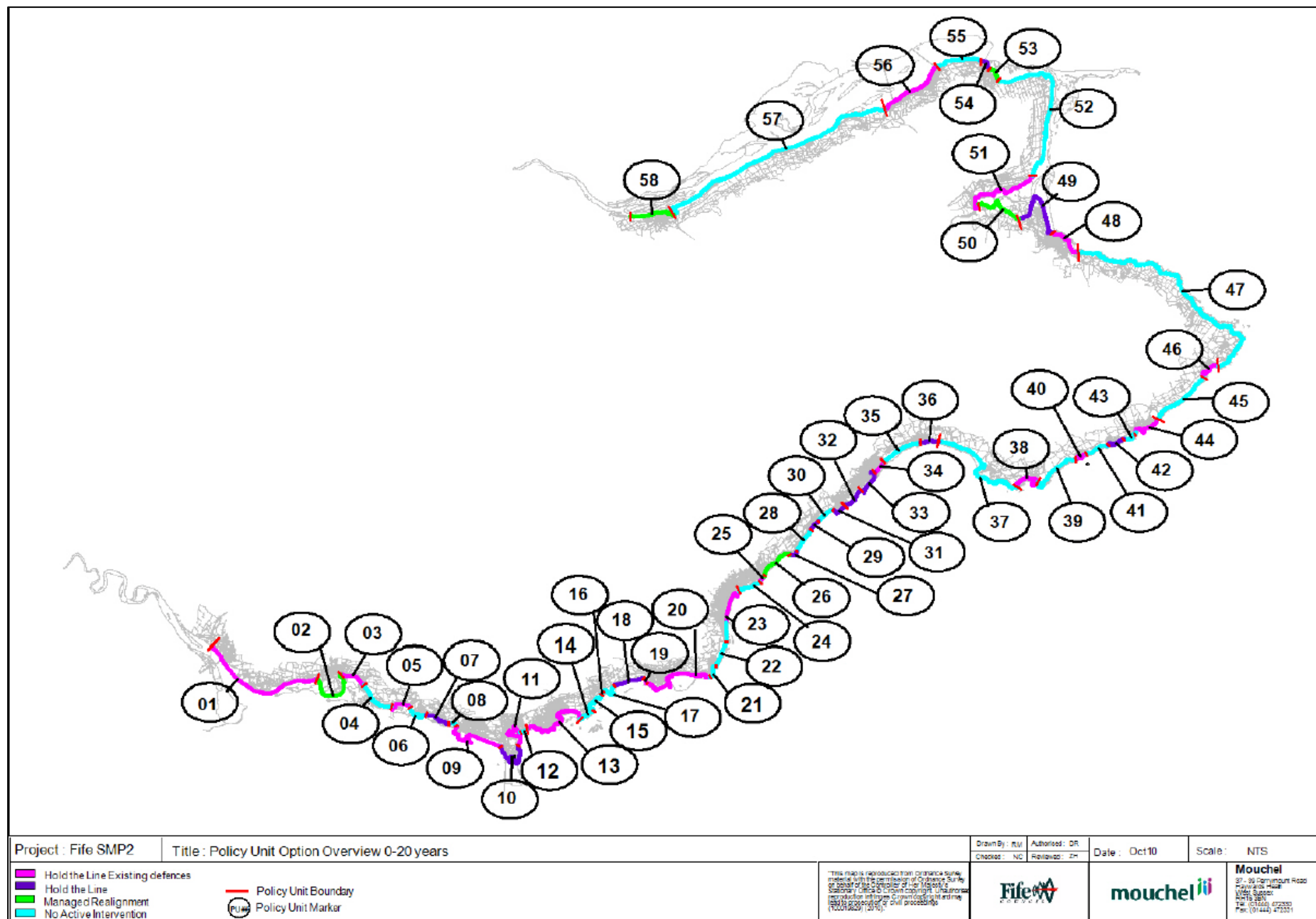


Figure 13. Fife Coastal Policies during 0-20 year epoch

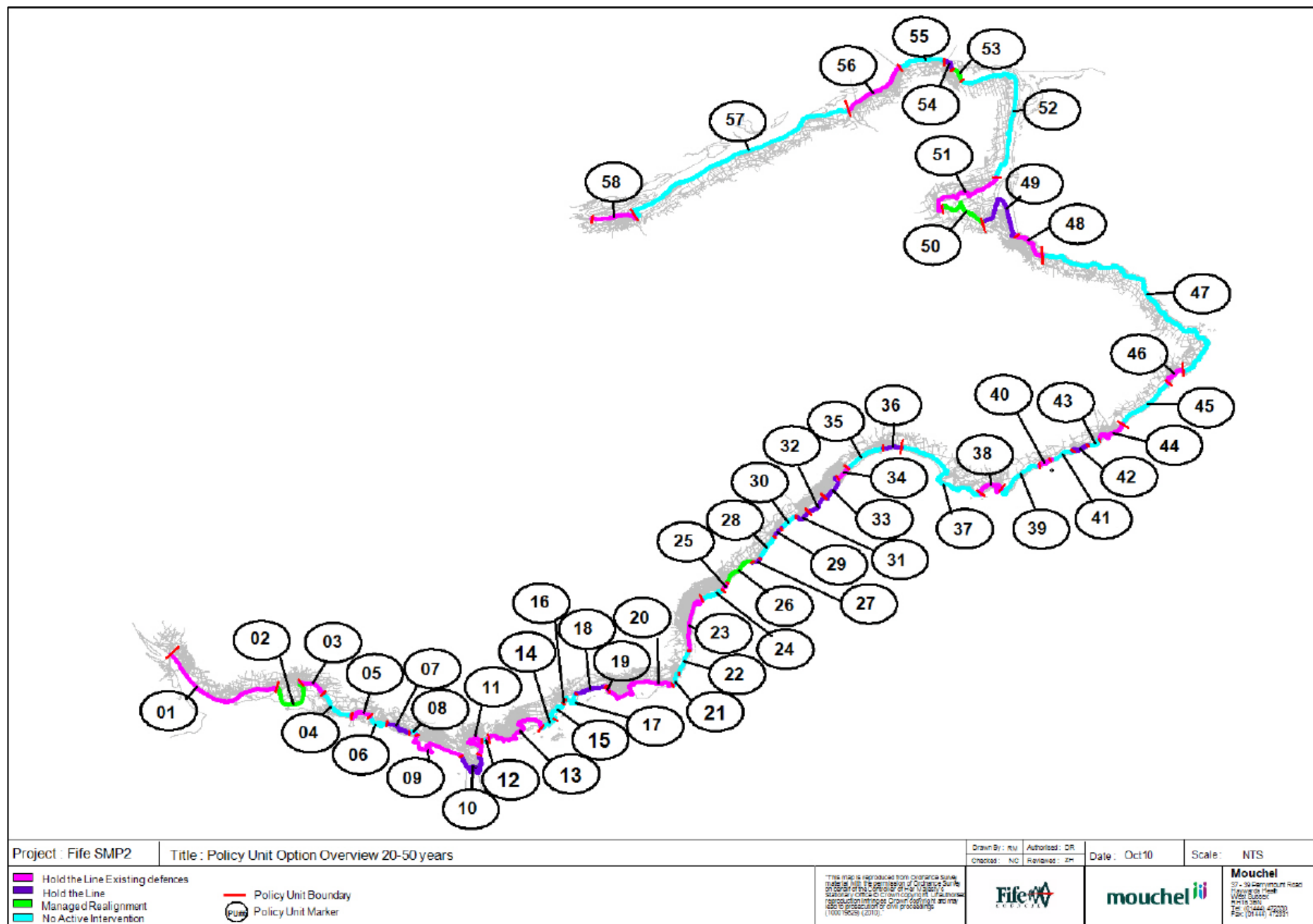


Figure 14. Fife Coastal Policies during 20-50 year epoch.

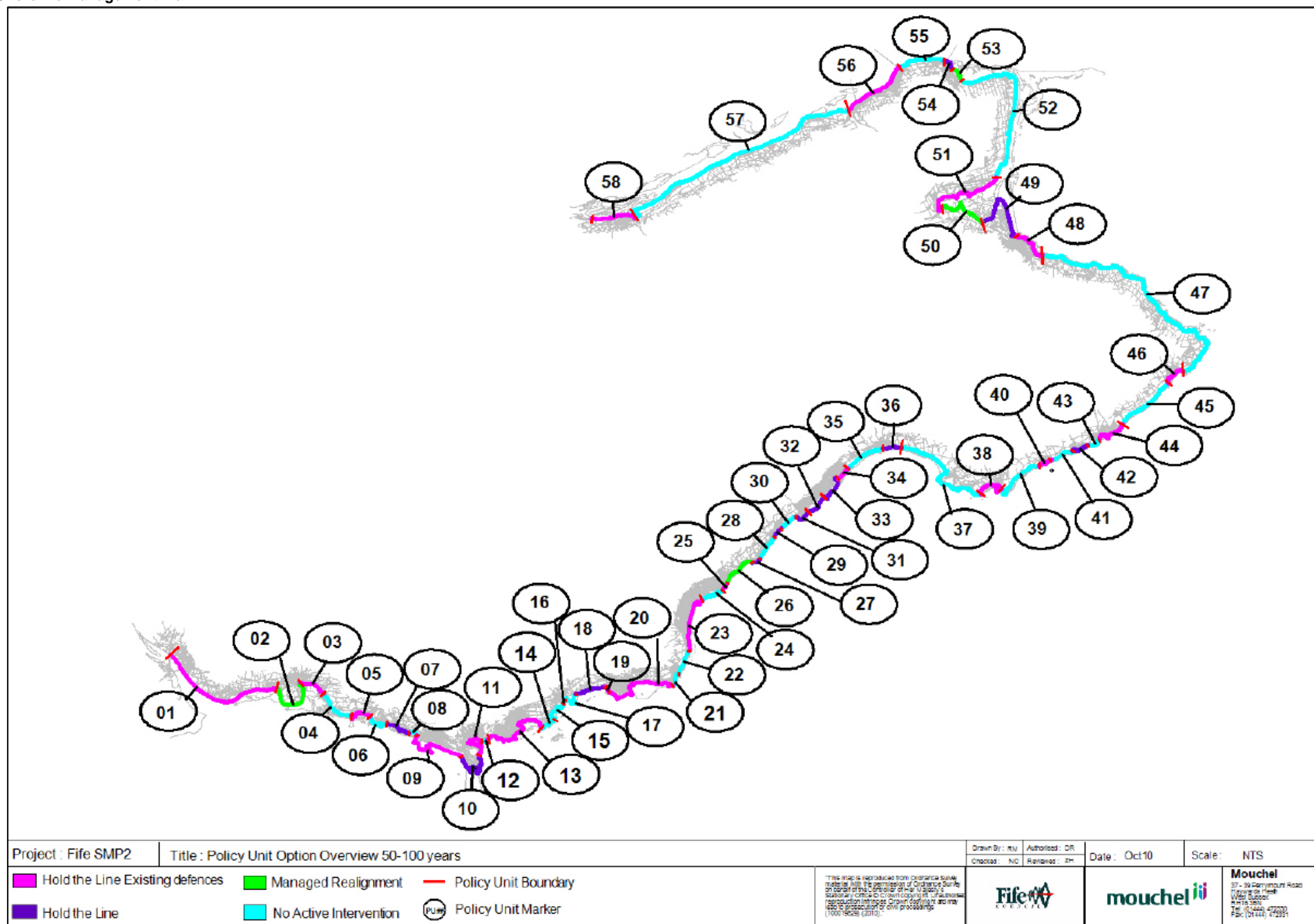


Figure 15. Fife Coastal Policies during 50-100 year epoch.

Policy Unit 01 Alloa Tower, Kincardine to Preston Island

Description of Policy Unit

The shoreline comprises mainly mudflats with hard defences protecting rail infrastructure and large areas of reclaimed land. There are residential areas at Kincardine and Culross with road and bridge infrastructure connecting other routes. There are also a number of Listed Buildings, Scheduled Ancient Monuments (SAMs) and other archaeological features such as Preston Island Salt works. This section of coast also has a number of environmental designated sites such as Torry Bay Local Nature Reserve (LNR) and the Firth of Forth Site of Specific Scientific Interest (SSSI), Special Protected Area and Ramsar site.

Almost the entire frontage at PU01 has manmade coastal defences, where much of the structures are in place to protect the rail infrastructure. There are also significant manmade coastal defences protecting the Longannet Power Station. The power station is situated on reclaimed land which comprises pulverised fuel ash.

SMP1 Policy (MU1) – Hold the Line

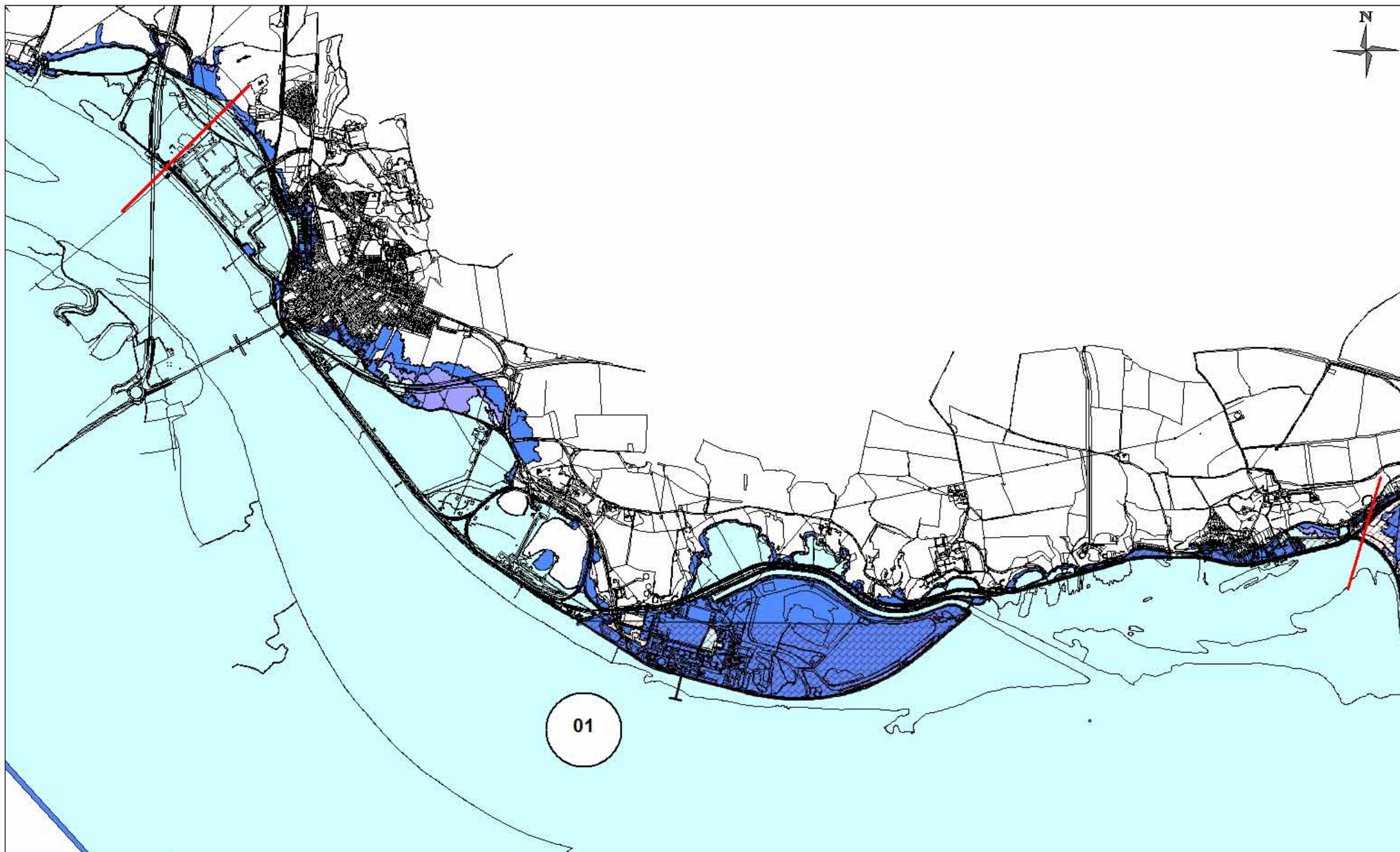
SMP2 Policy (01)












Years 0-20	Years 20-50	Years 50-100
Hold the Line (Protecting rail link and power station)	Hold the Line (Protecting rail link and power station)	Hold the Line (Protecting rail link and power station)

Justification of SMP2 Policy

Projected flooding and coastal erosion would only appear to be affecting the rail link that runs almost the entire length of this unit. The benefit cost ratio does not justify that any public funds could be used for coast protection in this area, however planning policy should allow for the rail link infrastructure to continue to be protected along with the future management of the Longannet Power Station by Scottish Power. For the properties at Culross, a part funded scheme with Network Rail could be proposed to protect the property in this area.

Should the defences be breached resulting in the leaking of pulverised fuel ash into the Forth then discussions would need to be held between Fife council and Scottish Power on how best to proceed.



Project : Fife SMP2		Title : Policy Unit 01 - Alloa Tower, Kincardine to Preston Island											
Policy	0 - 20 Years :	Hold The Line	20 - 50 years :	Hold The Line	50 - 100 years :	Hold The Line	Drawn By : RM	Authorised : DR	Date : Dec 11		Scale : NTS		
							Checked : NC	Reviewed : ZH					
	Shoreline Erosion over the past 150 years		Coastal Accretion		20yr Projected Sea Level	 Policy Unit Boundary  Policy Unit Marker	<div>This map is reproduced from Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationary Office. Crown copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings. (100023355) (2010).</div> <div></div>			<div></div> <div>Mouchel 37 - 39 Pennyknow Road Haywards Heath West Sussex RH16 3BN Tel: (01444) 472330 Fax: (01444) 472331</div>			
	Predicted Erosion, Next 100 Years		Reclaimed Land		50yr Projected Sea Level								100yr Projected Sea Level

Policy Unit 02 Preston Island

Description of Policy Unit

Preston Island is a former artificial island where the reclaimed land was once used for salt production, using local coal. The island was once surrounded by water until the Longannet Power Station began to provide ash to further reclaim land to connect to the main land. The old mine works and workers housing on Preston Island is classified as a SAM. Some areas of Preston Island will be covered by the Firth of Forth SSSI, SPA and Ramsar site and Torry Bay Local Nature Reserve.

SMP1 Policy (MU1) – Hold the Line

SMP2 Policy (02)

Years 0-20	Years 20-50	Years 50-100
Hold the Line	Hold the Line	Managed Realignment (Hold the realigned line to protect rail infrastructure & the landfill site)

Justification of SMP2 Policy

Projected flooding appears to inundate the western and eastern corners of Preston Island along with some of the rail line in the long term. Allowing areas to flood would provide a more natural estuarine frontage possibly reverting back to an island. However the site comprises landfill deposits of fuel ash from fuel generation which could impact on the coastal environment. The ash could perhaps be excavated at some point within the design epochs. Therefore the site should be re-assessed prior to the end of the 20-50year epoch to determine its condition.

Preston Island is currently owned by Scottish Power and measures to protect the island must be adopted for the foreseeable future to prevent the landfill deposits impacting on the coastal environment. The salt works SAM would require protection from flood inundation under the long term Managed Realignment.

Any works to protect the rail infrastructure that runs to the north of the island would be funded by Network Rail. Provision for protecting the coastal infrastructure and properties has been accounted for with the Managed Realignment policy in the third epoch.

Policy Unit 03 Preston Island to Torryburn

Summary description of Policy Unit

Immediately east of Preston Island is Low Torry, which is a former mining village. The village is fronted by the rail link and its various forms of defences running along the coast. Further east where the rail link crosses the B9037 is the former mining settlement of Torryburn. Fronting Torryburn is Torry Bay where there are intertidal mudflats of high environmental importance.

Torry Bay is a Local Nature Reserve and designated nationally under the Firth or Forth SSSI, SPA and Ramsar site.

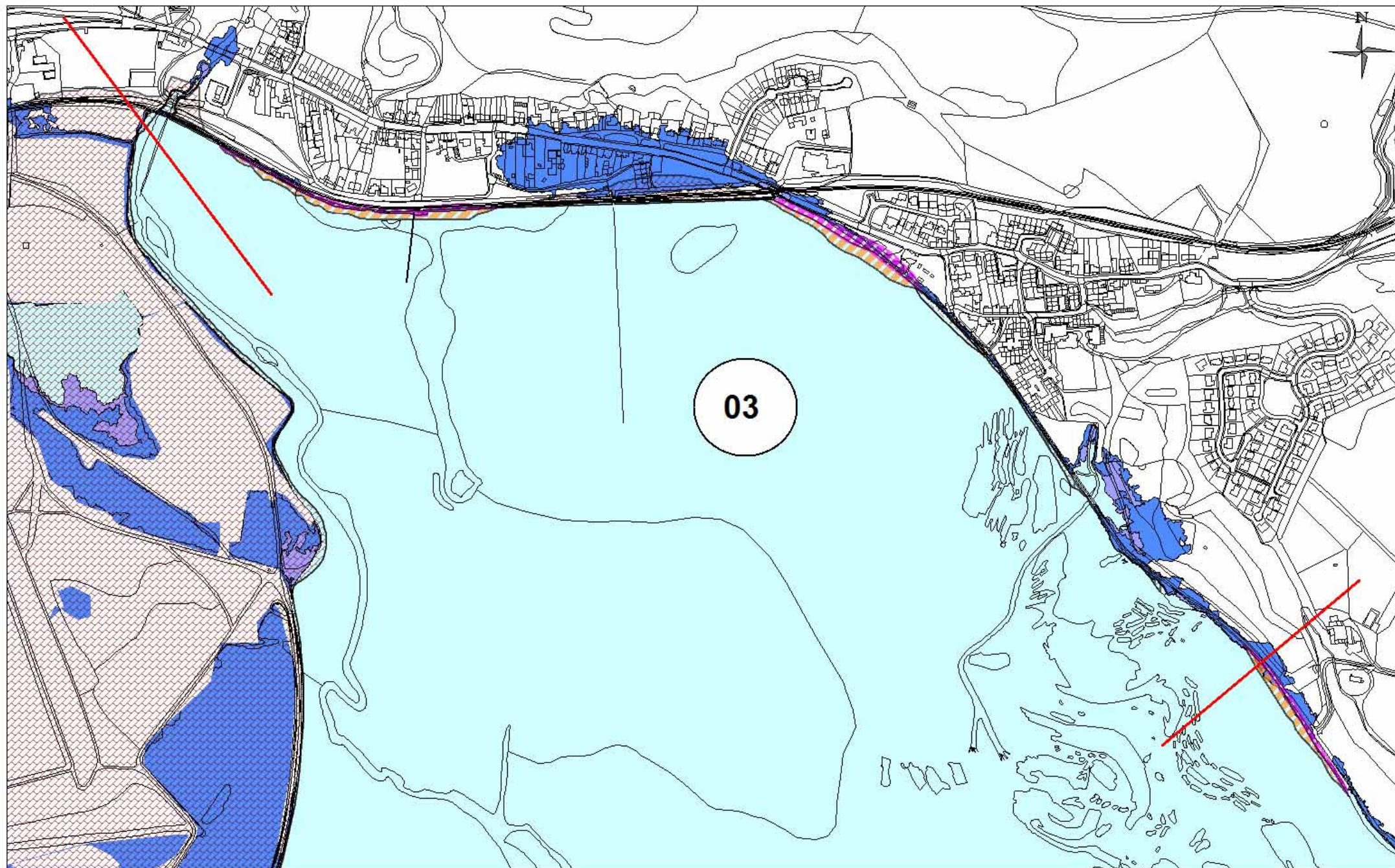
SMP1 Policy (MU1) – Hold the Line












SMP2 Policy (03)

Years 0-20	Years 20-50	Years 50-100
Hold the Line (Hold the line to protect road and rail infrastructure)	Hold the Line (Hold the line to protect road and rail infrastructure)	Hold the Line (Hold the line to protect road and rail infrastructure)

Justification of SMP2 Policy

Projected flooding and coastal erosion affecting the rail link that runs approximately half the length of the policy unit from Preston Island. Some flooding occurs in Torryburn. This is privately owned land and the cost benefit ratio does not justify that public funds could be used to protect the coast in this area. The recommended policy is to 'Hold the Line' of existing coastal defences to allow the road and rail link infrastructure to continue to be protected. Collaboration between the road and rail transport authorities would be advisable to provide suitable defences within this Policy Unit. Areas of residential and commercial property that benefit from the Network Rail coast protection structures could possibly part fund schemes for further protect from coastal flooding and erosion.



Project : Fife SMP2		Title : Policy Unit 03 - Preston Island to Torryburn								
Policy	0 - 20 Years :	Hold The Line	20 - 50 years :	Hold The Line	50 - 100 years :	Hold The Line	Drawn By : RM	Authorised : DR	Date : Dec 11	Scale : NTS
							Checked : NC	Reviewed : ZH		
 Shoreline Erosion over the past 150 years	 Coastal Accretion	 20yr Projected Sea Level	 Policy Unit Boundary	 Policy Unit Marker			<small>*This map is reproduced from Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationary Office © Crown copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings (100023385) (2010).</small>			Mouchel 37 - 39 Perrymount Road Haywards Heath West Sussex RH16 3BN Tel: (01444) 472330 Fax: (01444) 472351
 Predicted Erosion, Next 100 Years	 Reclaimed Land	 50yr Projected Sea Level	 100yr Projected Sea Level							

Policy Unit 04 Torryburn to Crombie Pier

Summary description of Policy Unit

The foreshore in this Policy Unit comprises intertidal rock platform and shingle beaches. The coast to the east of Torryburn is predominantly backed by prime agricultural land. This Unit comprises mostly natural coastal defences which continue to face Torry Bay LNR and the Firth of Forth Ramsar, SPA and SSSI site. There are manmade defence structures towards the eastern end of this unit frontage protecting access roads to the Crombie military base.

There are individual properties at various locations along the unit with Crombie Old Parish Church SAM located close to the shoreline. There are a number of other archaeological interests along this unit including the old disused pier at Crombie Point.

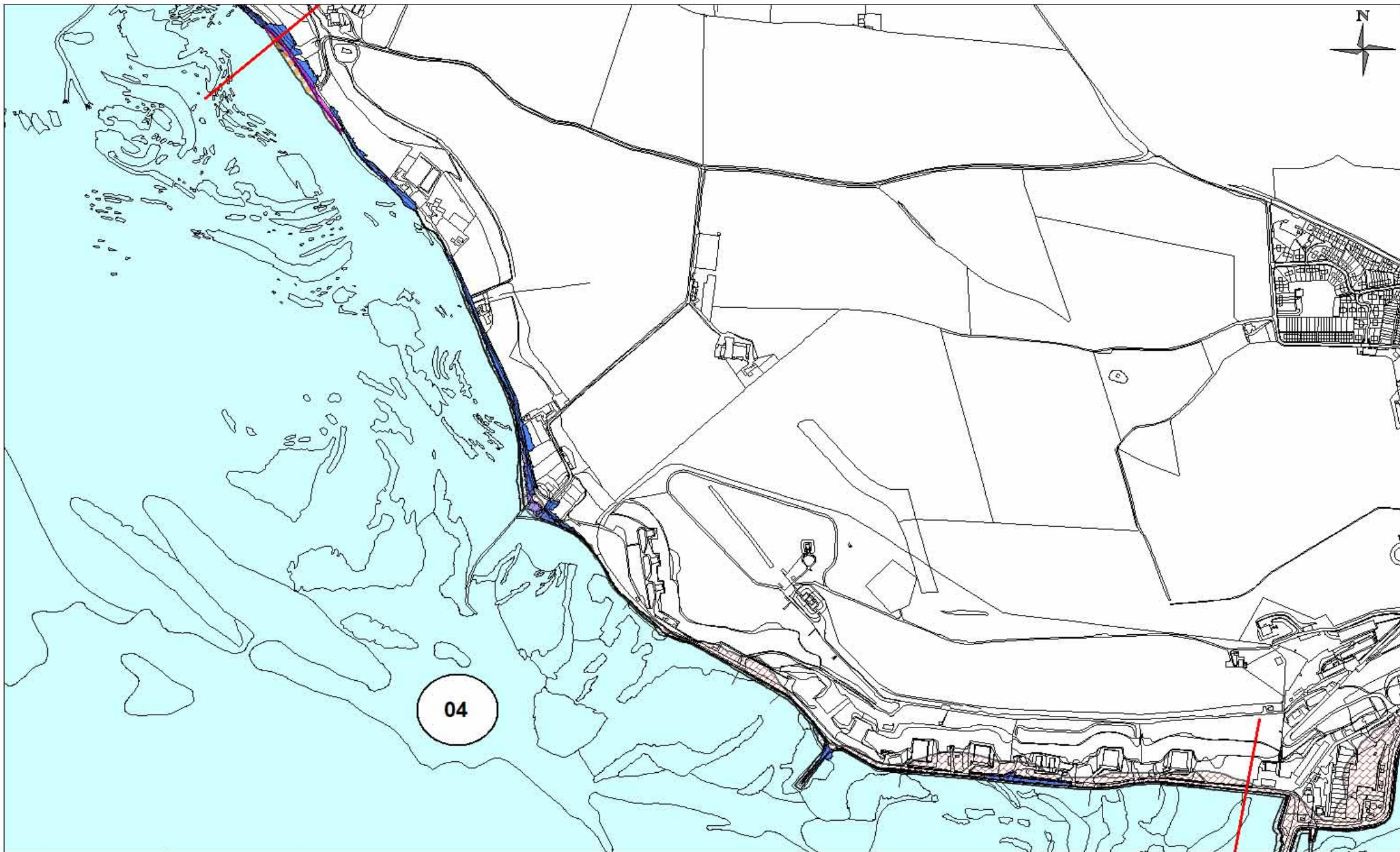
SMP1 Policy (MU2) – Do Nothing












SMP2 Policy (04)

Years 0-20	Years 20-50	Years 50-100
No Active Intervention	No Active Intervention	No Active Intervention

Justification of SMP2 Policy

There is little or no erosion that is of any concern to the few properties and archaeological sites along this frontage; however there is some flooding likely to cause damage and loss in the medium to long term to the structures close to the shoreline. There is unlikely to be priority in terms of obtaining public funds to protect this Policy Unit from coastal flooding. Allowing Torry Bay to retreat naturally through flood inundation and minimal erosion will provide a natural estuarine shore contour in the medium to long term. The defences relating to the Crombie military base will be expected to continue for the next 100 years with funding directly from the governments defence budget.



Project : Fife SMP2		Title : Policy Unit 04 - Torryburn to Crombie Pier												
Policy	0 - 20 Years :	No Active Intervention	20 - 50 years :	No Active Intervention	50 - 100 years :	No Active Intervention	Drawn By : RM		Authorised : DR	Date : DEC 11	Scale : NTS			
							Checked : NC	Reviewed : ZH						
	Shoreline Erosion over the past 150 years		Coastal Accretion		20yr Projected Sea Level	 Policy Unit Boundary  Policy Unit Marker	<small>*This map is reproduced from Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationary Office © Crown copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings (100023355) (2010).</small>					Mouchel 37 - 39 Perrymount Road Haywards Heath West Sussex RH16 3BN Tel: (01444) 472330 Fax: (01444) 472331		
	Predicted Erosion, Next 100 Years		Reclaimed Land		50yr Projected Sea Level									100yr Projected Sea Level

Policy Unit 05 Crombie Pier to Charlestown

Summary description of Policy Unit

This Unit comprises shingle foreshores with small areas of rock outcrops and intertidal mudflats. The Unit is predominantly backed by agricultural land, with the entire frontage protected with manmade coastal defences. The coastal defences are owned and maintained by the Crombie military (naval) facility.

The western edge of this unit still falls within the Torry Bay LNR and is part of the Firth of Forth SSSI, SPA and Ramsar site.

SMP1 Policy (MU3) – Hold the Line












SMP2 Policy (05)

Years 0-20	Years 20-50	Years 50-100
Hold the Line (To protect military base only)	Hold the Line (To protect military base only)	Hold the Line (To protect military base only)

Justification of SMP2 Policy

Coastal erosion and rising sea levels are not likely to affect any residential, commercial or public infrastructure whilst the military base continues to maintain the current coastal defences. The policy recommendation here is to hold the line at a cost to the military facility. Should the facility cease activities within the medium to long term there would be no justification to obtain public funds to continue to defend this policy unit against flooding or coastal erosion.



Project : Fife SMP2		Title : Policy Unit 05 - Crombie Pier to Charlestown									
Policy	0 - 20 Years :	Hold The line	20 - 50 years :	Hold The Line	50 - 100 years :	Hold The Line	Drawn By : RM Checked : NC	Authorised : DR Reviewed : ZH	Date : DEC 11	Scale : NTS	
 Shoreline Erosion over the past 150 years	 Coastal Accretion	 20yr Projected Sea Level	 Policy Unit Boundary	 Policy Unit Marker			<small>*This map is reproduced from Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationary Office & Crown copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings (100025385) (2010).</small>			Mouchel 37 - 39 Perrymount Road Haywards Heath West Sussex RH16 3BN Tel: (01444) 472330 Fax: (01444) 472331	
 Predicted Erosion, Next 100 Years	 Reclaimed Land	 50yr Projected Sea Level	 100yr Projected Sea Level								

Policy Unit 06 Charlestown

Description of Policy Unit

The foreshore in this Unit is dominated by areas of intertidal mudflats. Policy Unit 06 comprises the village of Charlestown. There is approximately 15ha of broad leaved woodland backing this Policy Unit. Charlestown was a planned village created in the 1750s and was once one of the biggest industrial centres in Scotland due to the limekilns and harbour. The limekilns are now a SAM; however the harbour is not of significant archaeological importance, hence the current poor state of the structure. Coastal defences are a mix of natural and manmade structures which are mostly associated with the harbour activities.

This Policy Unit falls within the Firth of Forth SSSI, SPA and Ramsar site.

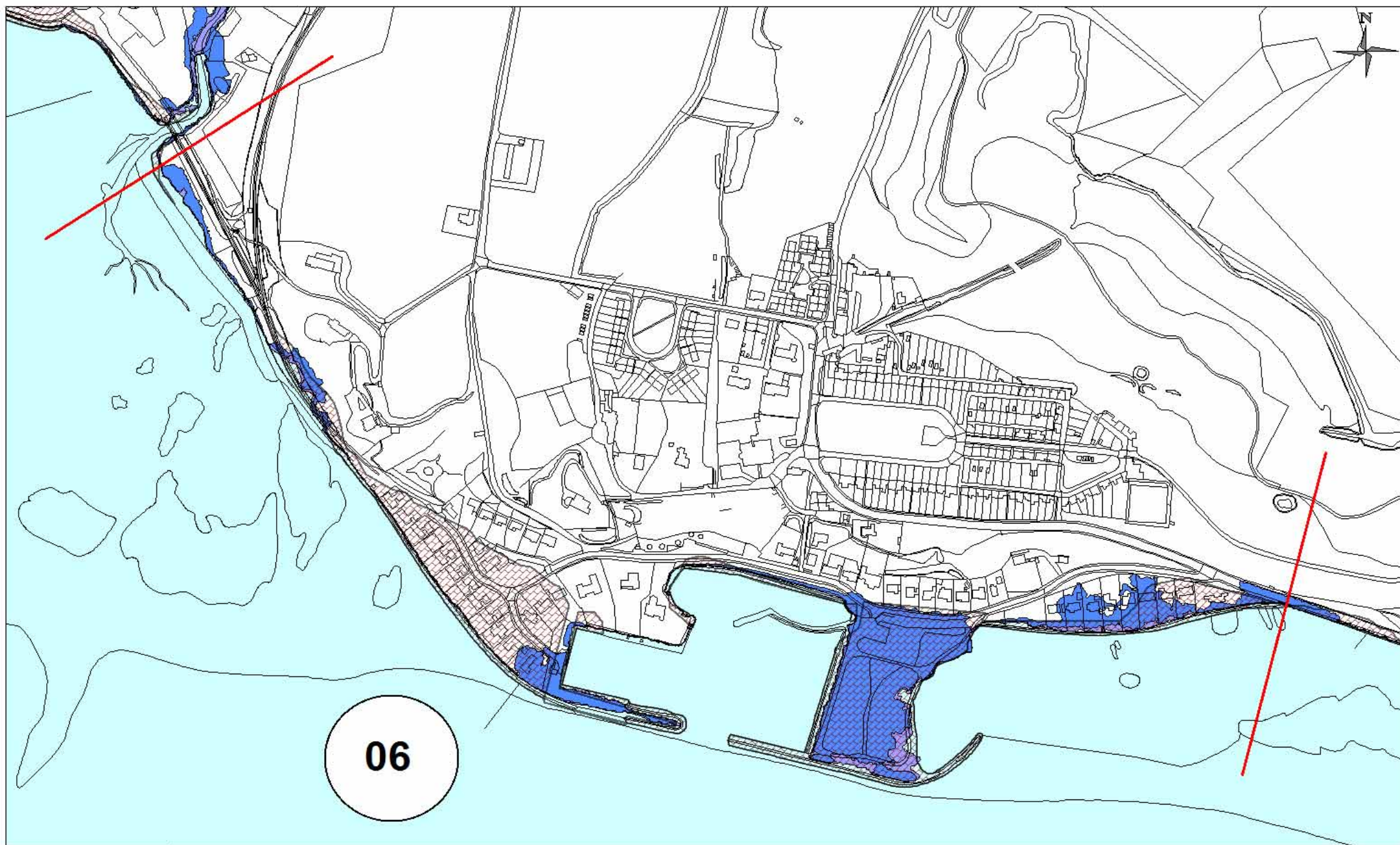
SMP1 Policy (MU4) – Selectively Hold the Line












SMP2 Policy (06)

Years 0-20	Years 20-50	Years 50-100
No Active Intervention	No Active Intervention	Managed Realignment

Justification of SMP2 Policy

There is little or no erosion that is of any concern to the properties within the policy unit; however there is an indication that flooding is likely to cause damage to properties to the east of the harbour in the long term. The benefit cost ratio indicates that a policy of no active intervention should be adopted as there is no justification for the use of public funds to protect the coast in this Policy Unit. However provision for residents to provide private defences will be given. This would allow for the land east of the harbour to flood and provide additional intertidal habitat. There is some potential for contaminated land to be present within the site that is subject to flooding. Contact with the land owner's Estate Manager and undertaking further ground investigation works will be required. The provision for Managed Realignment in the third epoch allows for provision of private defences to the east when the eastern harbour arm becomes inundated.



Project : Fife SMP2		Title : Policy Unit 06 - Charlestown										
Policy	0 - 20 Years :	No Active Intervention	20 - 50 years :	No Active Intervention	50 - 100 years :	Managed Realignment	Drawn By : RM Checked : NC	Authorised : DR Reviewed : ZH	Date : DEC 11	Scale : NTS		
 Shoreline Erosion over the past 150 years	 Coastal Accretion	 20yr Projected Sea Level	 Policy Unit Boundary	 50yr Projected Sea Level	 100yr Projected Sea Level	 Policy Unit Marker	<small>*This map is reproduced from Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationary Office & Crown copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings (100025388) (2010).</small>					Mouchel 37 - 39 Perrymount Road Haywards Heath West Sussex RH16 3BN Tel: (01444) 472330 Fax: (01444) 472331
 Predicted Erosion, Next 100 Years	 Reclaimed Land											

Policy Unit 07 Charlestown to Limekilns

Summary description of Policy Unit

The foreshore and coastal geomorphology in this Policy Unit comprises areas of mudflats and rock extrusions

Limekilns is an old settlement dating back to the 14th century. There are currently manmade coastal defences protecting the promenade and coast road that runs from Charlestown to Church Street in Limekilns. Between Charlestown and Limekilns there the shore is backed by approximately 15ha of woodland

Further east there are significant coast protection structures up to Limekilns Harbour. The harbour is mainly used for recreational boating and forms a focal point for the village along with the ruins of Rosyth Church which is a SAM.

This Policy Unit is covered by the Firth of Forth SSSI, SPA and Ramsar Site.

SMP1 Policy (MU4) – Selectively Hold the Line











SMP2 Policy (07)

Years 0-20	Years 20-50	Years 50-100
Hold the Line	Hold the Line	Hold the Line

Justification of SMP2 Policy

Coastal erosion and flooding has an impact on a number of properties along the length of the Policy Unit, particularly to the east of the harbour in the long term. A policy of 'Hold the Line' is recommended for this Policy Unit as providing the best cost benefit ratio due to the extent of the existing coastal defence structures and areas defended. Maintenance of the Seawall is the responsibility of Fife council whilst the pier and gabions to the east of the Policy Unit are owned and maintained by Elgin Estates. HTL will allow for the continued maintenance of these defences, with public funds being used on Fife council owned defences. This policy will also allow continued use of the harbour.



Project : Fife SMP2		Title : Policy Unit 07 - Charlestown to Limekilns									
Policy	0 - 20 Years :	Hold the Line	20 - 50 years :	Hold the Line	50 - 100 years :	Hold the Line	Drawn By : RM Checked : NC	Authorised : DR Reviewed : ZH	Date : DEC 11	Scale : NTS	
 Shoreline Erosion over the past 150 years	 Coastal Accretion	 20yr Projected Sea Level	 Policy Unit Boundary	 Reclaimed Land	 50yr Projected Sea Level	 100yr Projected Sea Level	 Policy Unit Marker	<div><div><p>*This map is reproduced from Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationary Office & Crown copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings (100023355) (2010).</p></div><div></div></div>			<div><div></div><div><p>Mouchel 37 - 39 Perrymount Road Haywards Heath West Sussex RH16 3BN Tel: (01444) 472330 Fax: (01444) 472331</p></div></div>

Policy Unit 08 Limekilns to Rosyth

Summary description of Policy Unit

The shore is dominated by the intertidal mudflats along this Unit with a small amount of sand and shingle on the backshore. This Policy Unit is completely undefended and has no residential or commercial property within its boundary.

The coastline is backed by trees and agricultural land and appears to have a stable beach, although some trees have fallen in to the sea due to undermining. There is also no road or rail transport infrastructure in this Policy Unit.

There Firth of Forth SSSI, SPA and Ramsar sites cover this Policy Unit.

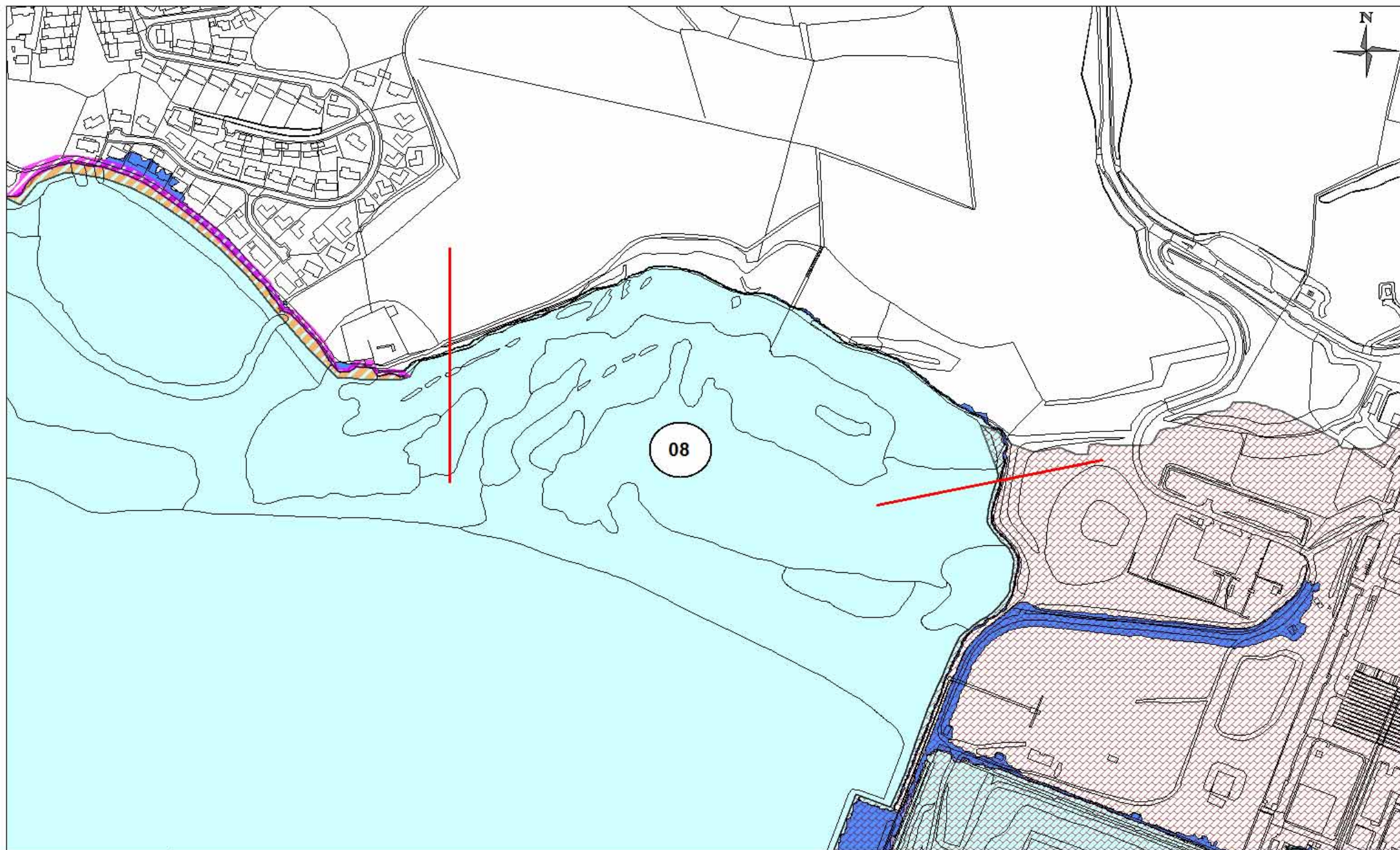
SMP1 Policy (MU4) – Selectively Hold the Line












SMP2 Policy (08)

Years 0-20	Years 20-50	Years 50-100
No Active Intervention	No Active Intervention	No Active Intervention

Justification of SMP2 Policy

There is no road/rail infrastructure or residential/commercial property at risk here therefore there would be no requirement for any type of engineering solution for this unit. The only justifiable policy for this unit would be 'No Active Intervention' which would see the natural retreat of this frontage.



Project : Fife SMP2		Title : Policy Unit 08 - Limekilns to Rosyth									
Policy	0 - 20 Years :	No Active Intervention	20 - 50 years :	No Active Intervention	50 - 100 years :	No Active Intervention	Drawn By: RM	Authorised: DR	Date : DEC 11	Scale : NTS	
							Checked : NC	Reviewed : ZH			
 Shoreline Erosion over the past 150 years	 Coastal Accretion	 20yr Projected Sea Level		 Policy Unit Boundary			<div>This map is reproduced from Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationary Office & Crown copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings (100020585) (2010).</div> <div></div>				
 Predicted Erosion, Next 100 Years	 Reclaimed Land	 50yr Projected Sea Level		 Policy Unit Marker							
		 100yr Projected Sea Level					<div></div> <div>Mouchel 37 - 39 Barrymount Road Haywards Heath West Sussex RH16 3BN Tel: (01444) 472330 Fax: (01444) 472331</div>				

Policy Unit 09 Rosyth to North Queensferry

Summary description of Policy Unit

This Policy Unit is approximately 3.5 km long and is dominated by the Rosyth naval dock yard. There is an accumulation of fine sediment around the dock yard walls which surrounds the reclaimed land and this continues to the eastern extent of the Unit. The foreshore is almost continuously defended for 2 km, where it stops immediately in the east. A further 1.5 km is entirely natural with no manmade coastal defence structures present.

Backing the undefended stretch of shore is a large unmanaged hinterland along with a storage facility and a sewage treatment works.

There are three SAMs in this Unit: -

- Rosyth Church
- Rosyth Castle
- Rosyth Castle Dovecot

There is also one ASRI at St James Chapel.

The eastern extent of this Policy Unit is within the St Margaret's Marsh SSSI and forms part of the Ferry Hills SSSI and Firth of Forth SSSI, SPA and Ramsar site.

SMP1 Policy (MU4) – Selectively Hold the Line

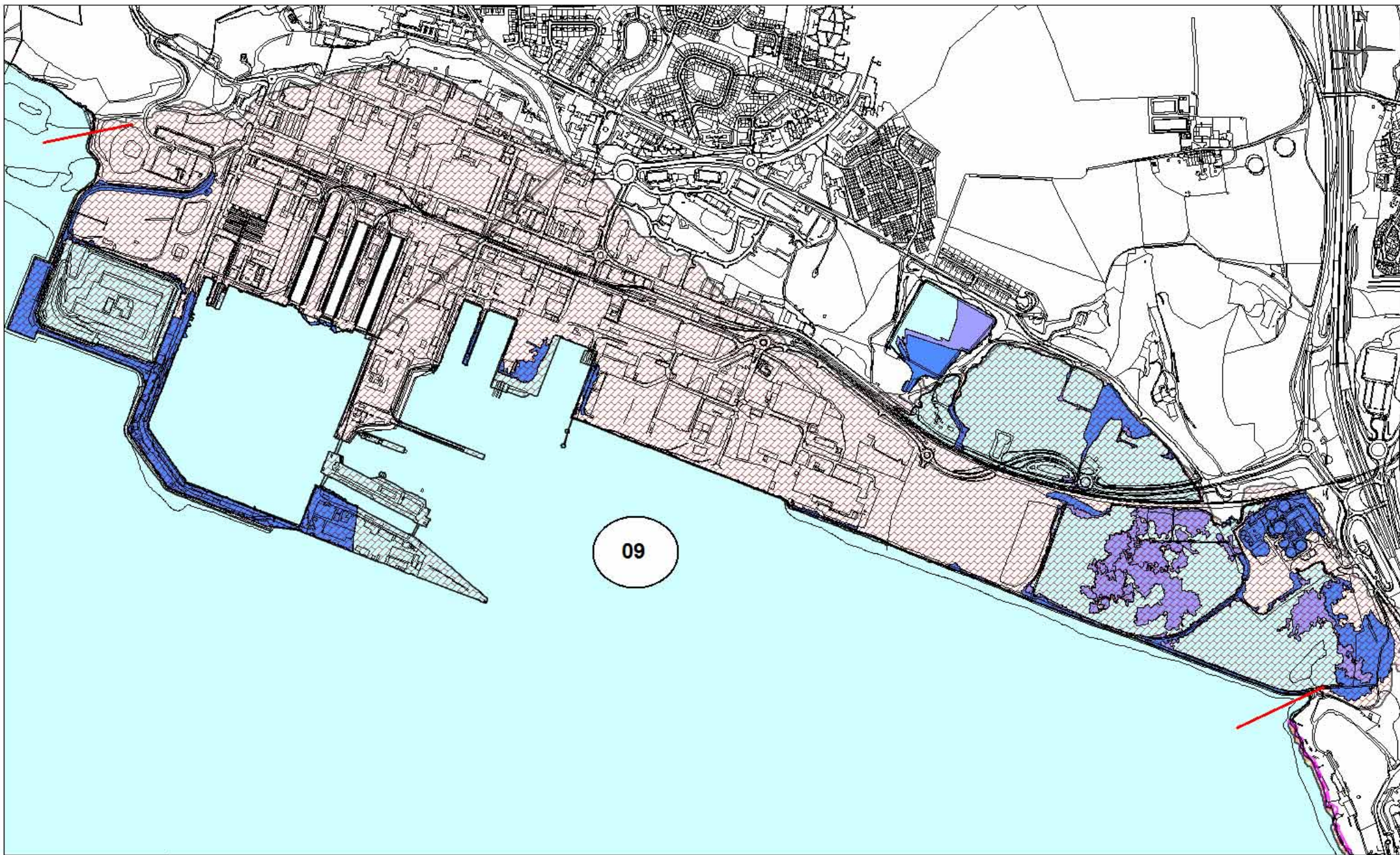
SMP2 Policy (09)

Years 0-20	Years 20-50	Years 50-100
Hold the Line	Hold the Line	Hold the Line

Justification of SMP2 Policy

Coastal erosion and flooding does not appear to affect any residential properties though the sewage treatment facility becomes affected during the second epoch and the majority of the flooding mainly affects the naval base. A policy of Hold the Line is recommended throughout this Policy Unit. The defences around the Navy Base will be funded by the Ministry of Defence and the additional defences to the east will safeguard the sewage treatment works, infrastructure and SSSI. Sections of the treatment works are affected from flooding during each epoch. The area was considered for a gain in inter-tidal habitat though there is an area of contaminated land which should be protected to avoid impacting on the coastal environment.

There is a proposal for a new Forth Road bridge within this Policy Unit, however the SMP does not cover all proposals within the Local Plan. However Major Projects in MFP2 have been included as part of the SMP process.



Project : Fife SMP2		Title : Policy Unit 09 - Rosyth to North Queensferry											
Policy	0 - 20 years :	Hold the Line		20 - 50 years :	Hold the Line		50 - 100 years :	Hold the Line		Drawn By : RM Checked : NC	Authorised : DR Reviewed : ZH	Date : DEC 11	Scale : NTS
Shoreline Erosion over the past 150 years	Coastal Accretion	20yr Projected Sea Level		Policy Unit Boundary		Policy Unit Marker		<small>"This map is reproduced from Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationary Office & Crown copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings (100022200) (2010)."</small>				Mouchel 37 - 39 Penny Mount Road Haywards Heath West Sussex RH12 5TN Tel: (01444) 472330 Fax: (01444) 472331	
Predicted Erosion, Next 100 Years	Reclaimed Land	50yr Projected Sea Level		100yr Projected Sea Level									

Policy Unit 10 North Queensferry

Summary description of Policy Unit

The geomorphology comprises mainly a low coastal edge with raised shingle beaches with areas of steep sided bedrock promontory. The village of North Queensferry is situated between the Forth Rail Bridge and the A90 Forth Road Bridge. The western edge of the unit comprises steep rising ground with a covering of trees and two properties leading up to the A90. The coast then continues under the A90 where the old disused railway pier and also the old town form the main features. There are ad-hoc manmade coastal defences along this section of coast with residential properties on the backshore. The coastline then rises steeply under the Forth Rail Bridge and forms cliff edges. On the western side of North Queensferry there is a relatively new housing complex which has a rock revetment as exclusive coastal protection.

Carlingnose, Ferry Hills and St Margrets Marsh SSSI's are situated within this Policy Unit, and it also forms part of the Firth of Forth SSSI, SPA and Ramsar site.

SMP1 Policy (MU5/6) – Selectively Hold the Line

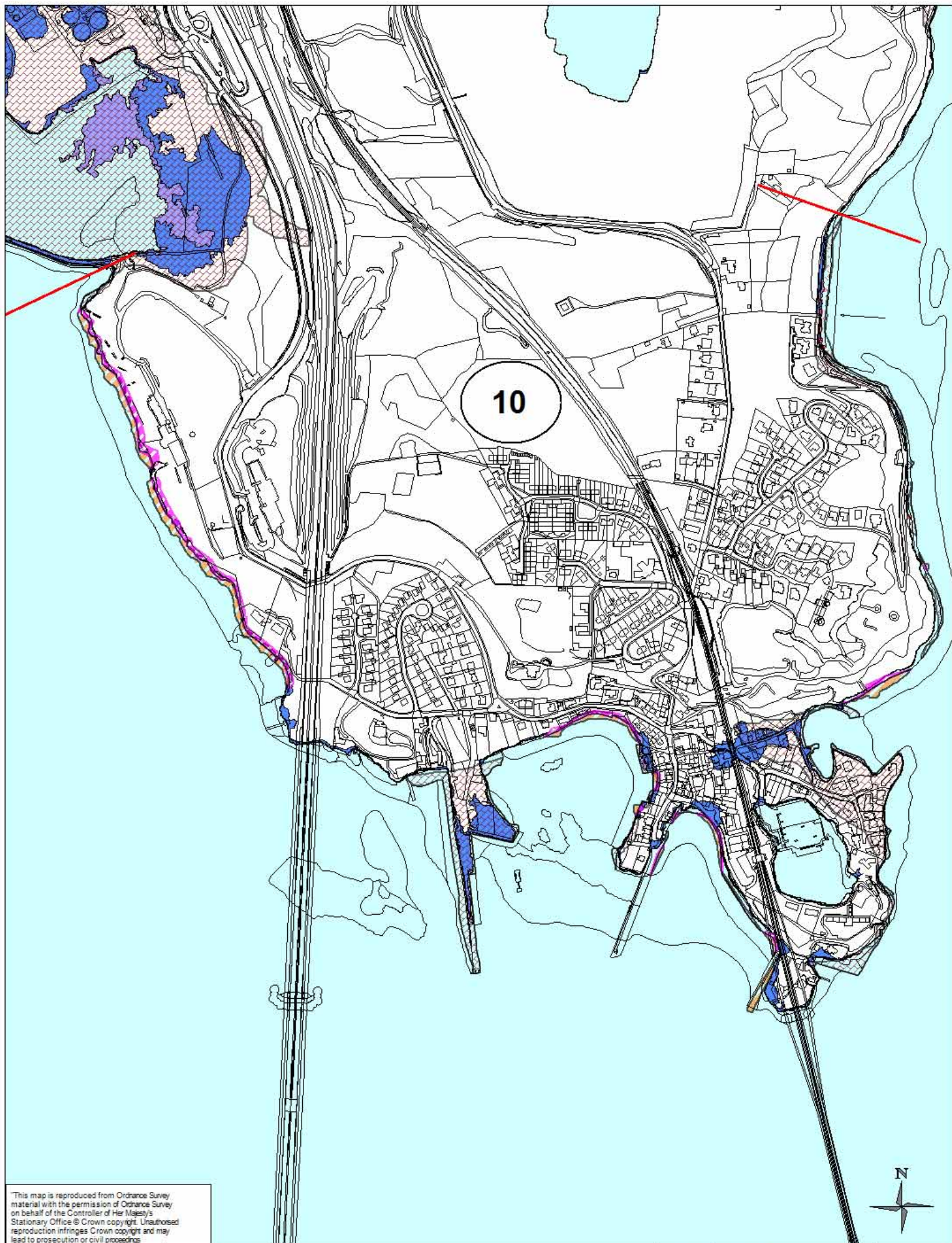
SMP2 Policy (10)

Years 0-20	Years 20-50	Years 50-100
Hold the Line	Hold the Line	Hold the Line












Justification of SMP2 Policy

Coastal flooding and erosion impacts on a number of coastal properties and also affects public infrastructure preventing access to areas of North Queensferry and to tourist features within this Policy Unit. The policy recommendation here is 'Hold the Line'. The condition of the existing pier is deteriorating and currently in a poor state, the integrity of the structure should be monitored.

Along with properties, a Hold the Line policy maintains the current stability and structural condition of the Forth Road Bridge abutments. Flooding within this policy unit could present a risk to the bridge as standing water flood levels are shown within close proximity of the abutments.



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Project : Fife SMP2		Title : Policy Unit 10 - North Queensferry		Drawn By : RM	Authorised : DR	Date : DEC 11	Scale : NTS
				Checked : NC	Reviewed : ZH		
Policy	0 - 20 Years :	Hold the Line	20 - 50 years :	Hold the Line	50 - 100 years :		Hold the Line
 Shoreline Erosion over the past 150 years	 Coastal Accretion	 20yr Projected Sea Level	 50yr Projected Sea Level	 100yr Projected Sea Level	 Policy Unit Boundary	 Policy Unit Marker	 Fife
 Predicted Erosion, Next 100 Years	 Reclaimed Land				 mouchel	Mouchel 37 - 39 Perrymount Road Raywards Heath West Sussex RH16 3BN Tel: (01444) 472330 Fax: (01444) 472331	

Policy Unit 11 Inner Bay

Description of Policy Unit

The coastline in Policy Unit 11 is largely fronted by shingle with some areas of intertidal mudflat. The Unit is a semi enclosed bay and comprises mostly industrial units operating on and around the coastline. The manmade coastal defences along this frontage are associated with the industrial and commercial activities. There is a small water course entering the bay in the north (the Keithing Burn) and immediately east is the Ballast Bank sports field and recreational area with a revetment protecting the area. There are no residential properties located near the shore within this unit; however there are a number of properties located along the watercourse entering the bay.

There are no specific national environmental designations in this Policy Unit, however, it forms part of the Firth of Forth SSSI, SPA and Ramsar site together with the Ferry Hills SSSI. Offshore is also located the Forth Islands SPA.

SMP1 Policy (MU5/6) – Selectively Hold the Line

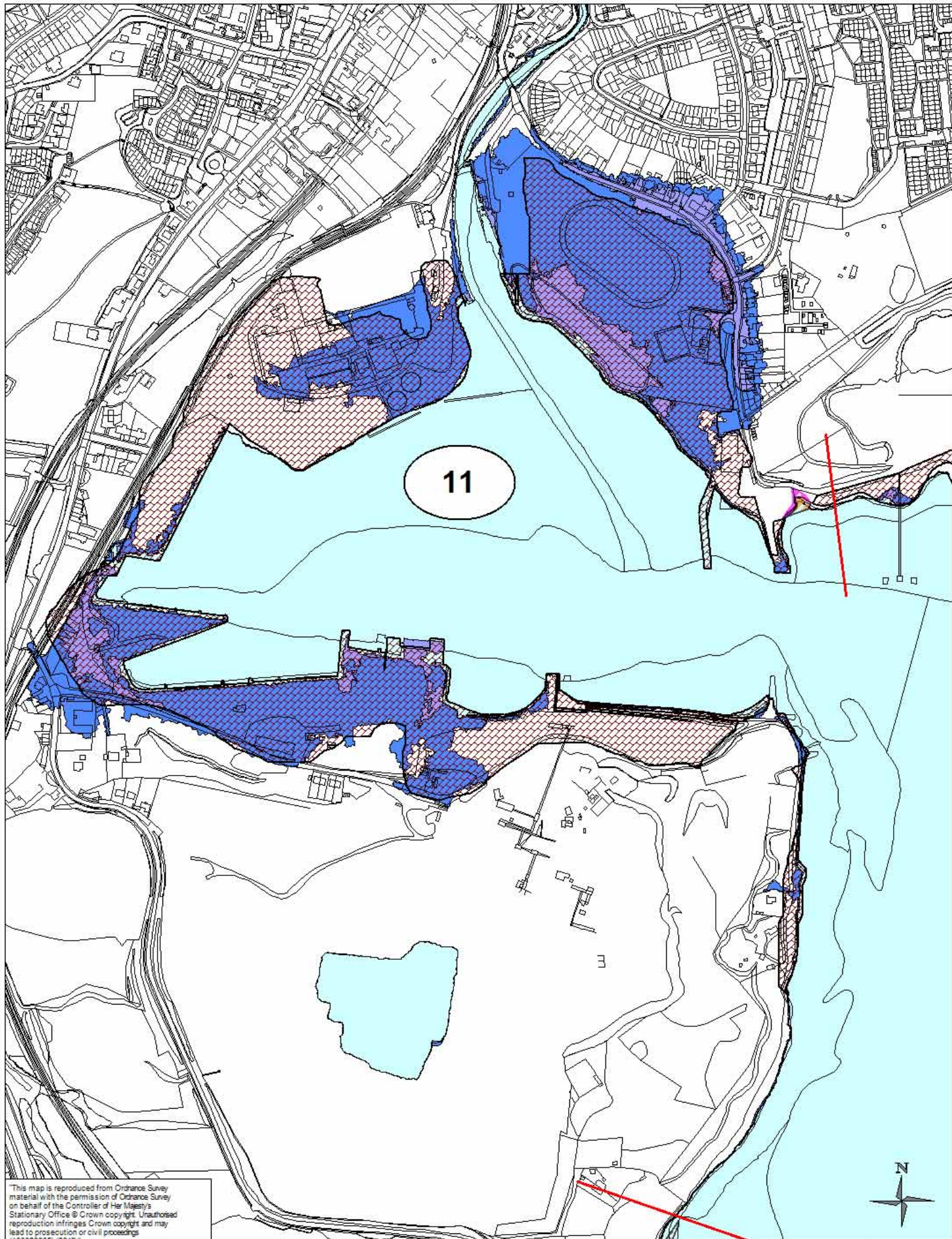
SMP2 Policy (11)

Years 0-20	Years 20-50	Years 50-100
Hold the Line (Localised protection for industrial areas)	Hold the Line East of the Burn (& Localised protection for industrial areas)	Hold the Line East of the Burn (& Localised protection for industrial areas)

Justification of SMP2 Policy

Coastal erosion and flooding are shown to impact industrial units operating along the coast line. Hold the Line does not offer a favourable cost benefit ratio in this Policy Unit to protect the affected commercial properties. However, it would be expected that the industrial activities would fund their own coast protection scheme as there are no residential properties affected to attract public funding.

An area of landfill / made ground associated with the industrial history of the site has been identified to the north east of the Policy Unit forming the Ballast Bank which is subject to flooding after 20 years. To prevent any risk to the coastline or water quality a policy of Hold the Line is proposed east of the burn. This policy would also ensure protection of the running track which would benefit the local community.



Project : Fife SMP2 Title : Policy Unit 11 - Inner Bay Drawn By : RM Authorised : DR Date : DEC 11 Scale : NTS
 Checked : NC Reviewed : ZH

Policy 0 - 20 Years : Hold the Line 20 - 50 years : Hold the Line 50 - 100 years : Managed Realignment

Shoreline Erosion over the past 150 years Predicted Erosion, Next 100 Years	Coastal Accretion Reclaimed Land	20yr Projected Sea Level 50yr Projected Sea Level 100yr Projected Sea Level	Policy Unit Boundary Policy Unit Marker	Fife mouchel Mouchel 37 - 39 Perrymount Road Haywards Heath West Sussex RH18 3BN Tel: (01244) 472030 Fax: (01244) 472031
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Policy Unit 12 Inverkeithing to St David's Bay

Summary description of Policy Unit

Policy Unit 12 is a small stretch of low lying coastline approximately 0.6 km long. The foreshore is largely fronted by shingle with some areas of intertidal mudflat and no manmade coastal defences.

The land backing the coast here is unused. It is the site of the former Preston Hill Quarry. Further landwards there are some agricultural activities.

There is very little archaeological interest in this short stretch of coast with no designated SAMs present. The coastline of this Policy Unit also falls within the Firth of Forth SSSI, SPA and Ramsar site.

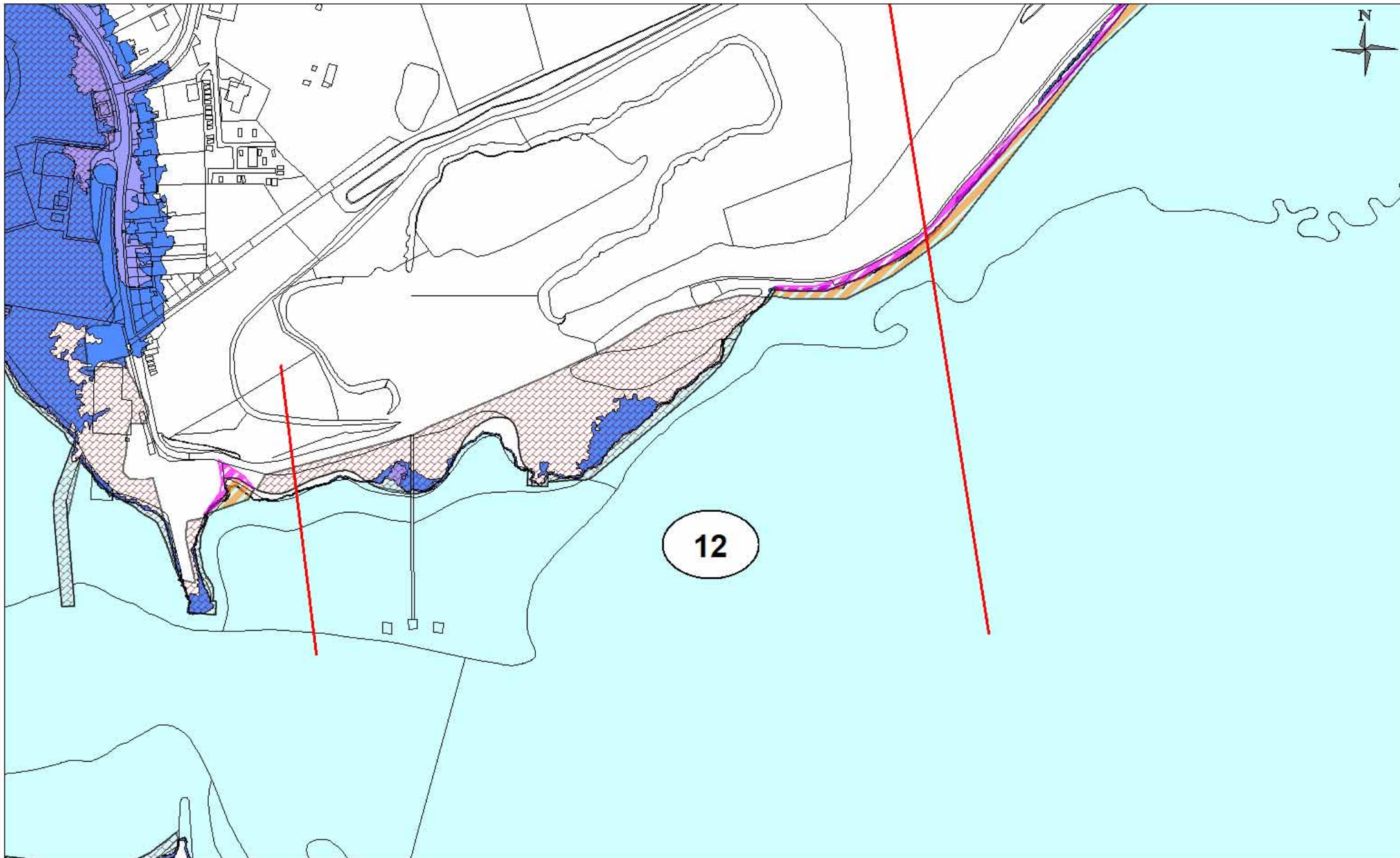
SMP1 Policy (MU6) – Selectively Hold the Line

SMP2 Policy (12)

Years 0-20	Years 20-50	Years 50-100
No Active Intervention	No Active Intervention	No Active Intervention

Justification of SMP2 Policy

Coastal erosion and flooding has no impact on any commercial or residential properties or any public infrastructure. A policy of 'No Active Intervention' has been advised as there is no reason to justify the use of public funds to defend unused land. Some coastal flooding occurs during the 100 year epoch creating some intertidal habitat, though some further study would be required to ascertain if the site contains any residual contaminants from its previous uses.



Project : Fife SMP2		Title : Policy Unit 12 - Inverkeithing to St David's Bay									
Policy	0 - 20 Years :	No Active Intervention	20 - 50 years :	No Active Intervention	50 - 100 years :	No Active Intervention	Drawn By : RM Checked : NC	Authorised : DR Reviewed : ZH	Date : DEC 11	Scale : NTS	
Shoreline Erosion over the past 150 years	Coastal Accretion	20yr Projected Sea Level		Policy Unit Boundary		<small>*This map is reproduced from Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationary Office © Crown copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings (100023558) (2010).</small>					
Predicted Erosion, Next 100 Years	Reclaimed Land	50yr Projected Sea Level		Policy Unit Marker							
		100yr Projected Sea Level									

Policy Unit 13 St David's Bay to Braefoot Point

Summary description of Policy Unit

The coastal frontage here comprises shingle with some areas of intertidal mudflat. The Policy Unit is dominated by the coastal town of Dalgety Bay. The modern town, which was built in 1962, takes its name from the main bay it adjoins in the eastern extent, but the town stretches over numerous coves and bays including Donibristle Bay and St David's Bay.

The coastal defences comprise various rock and masonry revetments between natural rocky headlands. Hopeward Point forms the statutory limit of the Coast Protection Act 1949.

There are two SAMs within Dalgety Bay – the 12th Century St. Bridges Kirk and Aberdour Lodge Standing Stone. There are also two further ASRIs in this area.

SMP1 Policy (MU6/7/8) – Do Nothing

SMP2 Policy (13)

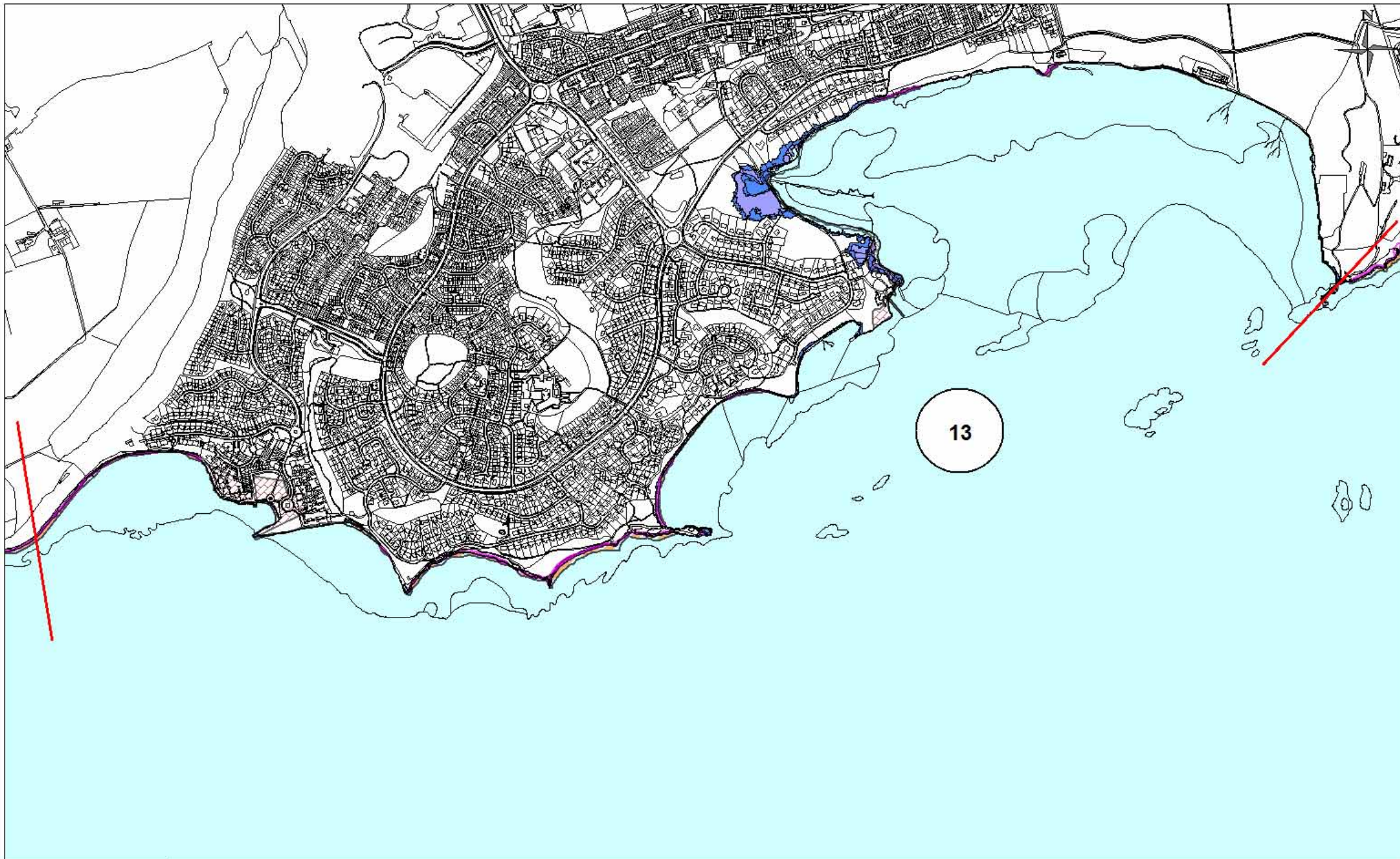
Years 0-20	Years 20-50	Years 50-100
Hold the Line (for currently defended sections)	Hold the Line (for currently defended sections)	Hold the Line (for currently defended sections)












Justification of SMP2 Policy

There is little coastal erosion or flooding that is of concern to the properties and historic buildings of Dalgety or further along the coast to the east. Though this is likely because of the existing defences throughout this Policy Unit. Holding the line for existing defences would prevent the heavily built up areas from being inundated. The natural protection within the bay will maintain the undefended sections.

Flooding is predicted within the centre of the Policy Unit where there are currently no defences. This has minimal impact upon residences and is proposed to be allowed to flood allowing for some gain in inter-tidal habitat within this area.

Dalgety Bay has a history of uncovering small radioactive particles. SEPA regularly monitor the area and are in discussions with the MOD in removal of further buried small radioactive particles to minimise any risk to the local community. SEPA are also in the process of developing a long term remediation plan for the area, provision of which will be incorporated into the adopted policy for the Policy Unit.



Project : Fife SMP2		Title : Policy Unit 13 - St David's Bay to Braefoot Point																
Policy	0 - 20 Years :	Hold the Line		20 - 50 years :	Hold the Line		50 - 100 years :	Hold the Line		Drawn By : RM	Authorised : DR	Date : DEC 11	Scale : NTS					
										Checked : NC	Reviewed : ZH							
	Shoreline Erosion over the past 150 years		Coastal Accretion		20yr Projected Sea Level		 Policy Unit Boundary  Policy Unit Marker	<small>*This map is reproduced from Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationary Office © Crown copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings (100029388) (2010).</small>							Mouchel 37 - 39 Perry Mount Road Haywards Heath West Sussex RH16 3BN Tel: (01444) 472330 Fax: (01444) 472331			
	Predicted Erosion, Next 100 Years		Reclaimed Land		50yr Projected Sea Level												100yr Projected Sea Level	

Policy Unit 14 Braefoot Point

Summary description of Policy Unit

The coastline here is dominated by rock platforms with sand and shingle in places. The Policy Unit incorporates the Braefoot Oil Terminal which is mostly surrounded by the broad leaved woodland and recreational areas on the hinterland. The Fife Coastal Path forms part of this unit also. There is some archaeological interest in this area with the 15th Century Monks Cave which is a registered SAM.

There are manmade defences in this unit which are mostly associated with the oil terminal with the rest of the coast having a stable and natural coastal defence.

The foreshore is included in the Firth of Forth SSSI, SPA and Ramsar designated area.

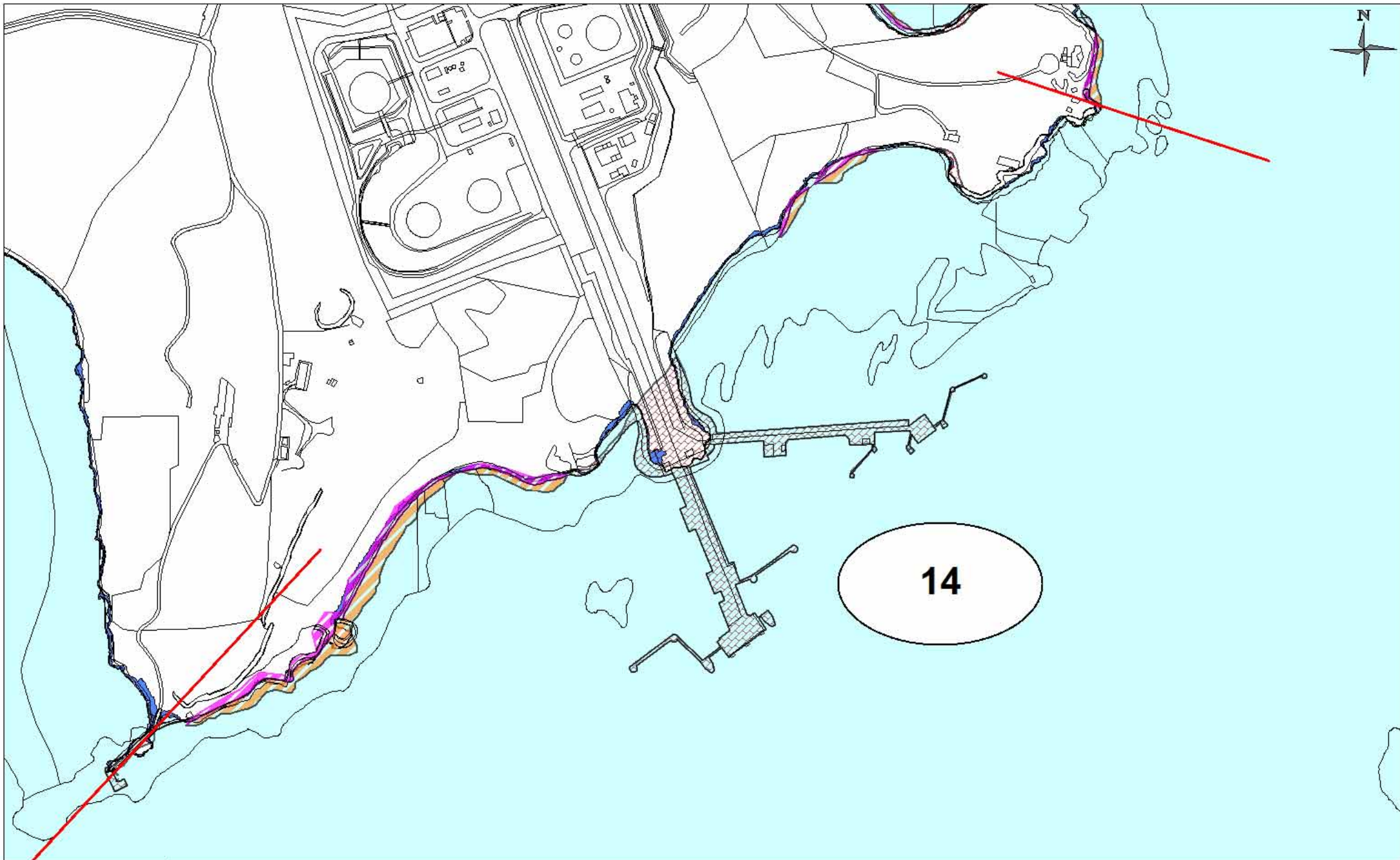
SMP1 Policy (MU8) – Do Nothing

SMP2 Policy (14)

Years 0-20	Years 20-50	Years 50-100
No Active Intervention (exception: localised maintenance of commercial defences)	No Active Intervention (exception: localised maintenance of commercial defences)	No Active Intervention (exception: localised maintenance of commercial defences)

Justification of SMP2 Policy

There is minimal coastal erosion and flooding to the frontage of this policy unit with no impact on residential, commercial or public infrastructure. A policy of no active intervention is advised for this policy unit as no assets are at risk and area has natural defences. However the existing oil terminal comprises a section of rock armour which can be maintained at the expense of the owner.



Project : Fife SMP2		Title : Policy Unit 14 - Braefoot Point									
Policy	0 - 20 Years :	No Active Intervention	20 - 50 years :	No Active Intervention	50 - 100 years :	No Active Intervention	Drawn By : RM Checked : NC	Authorised : DR Reviewed : ZH	Date : DEC 11	Scale : NTS	
Shoreline Erosion over the past 150 years	Coastal Accretion	20yr Projected Sea Level	Policy Unit Boundary	Policy Unit Marker			<small>*This map is reproduced from Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationary Office. Crown copyright and may be reproduced in any form without the permission of the Controller of Her Majesty's Stationary Office. (100023385) (2010).</small>			Mouchel 37 - 39 Penny Mount Road Havant PO6 1HJ Wiltshire Tel: (01444) 472330 Fax: (01444) 472331	
Predicted Erosion, Next 100 Years	Reclaimed Land	50yr Projected Sea Level	100yr Projected Sea Level								

Policy Unit 15 Braefoot Point to Aberdour

Summary description of Policy Unit

This Policy Unit is dominated by the rocky headlands forming two semi enclosed sand and shingle beaches. The coastline is backed by a golf course with no residential or commercial properties currently in the coastal zone. There two areas of woodland which are likely to be under the management of the golf course.

The foreshore is included in the Firth of Forth SPA, Ramsar & SSSI designated area.

There is one SAM at the Monks Cave in Charles Hill and also some World War II archaeological interest too.

There are no significant manmade coastal defences within this unit.

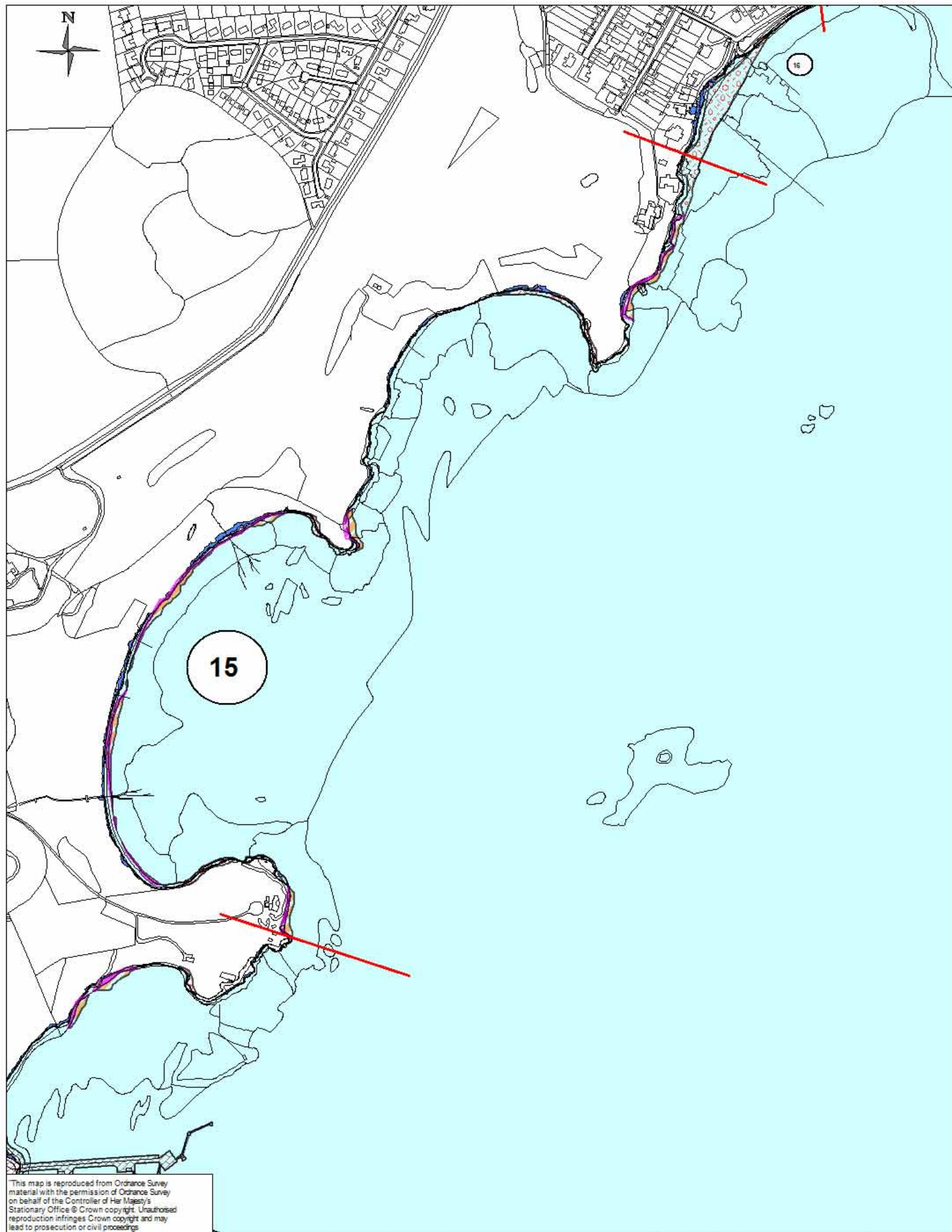
SMP1 Policy (MU10) – Do Nothing

SMP2 Policy (15)

Years 0-20	Years 20-50	Years 50-100
No Active Intervention (localised defences for commercial property)	No Active Intervention (localised defences for commercial property)	No Active Intervention (localised defences for commercial property)

Justification of SMP2 Policy

There are no residential properties along this coastline that would attract public funding for any coastal defence scheme; however the golf course would be expected to continue to operate. As a commercial business that operates on or near the coast, the golf course would be required to fund its own coastal protection.



Project : Fife SMP2		Title : Policy Unit 15 - Braefoot Point to Aberdour				Drawn By : RM	Authorised : DR	Date : DEC 11	Scale : NTS
						Checked : NC	Reviewed : ZH		
Policy	0 - 20 Years :	No Active Intervention		20 - 50 years :	No Active Intervention		50 - 100 years :	No Active Intervention	
	Shoreline Erosion over the past 150 years			Coastal Accretion			20yr Projected Sea Level		
	Predicted Erosion, Next 100 Years			Reclaimed Land			50yr Projected Sea Level		
							100yr Projected Sea Level		
							Policy Unit Boundary		
							Policy Unit Marker		
									Mouchel 37 - 39 Perrymount Road Haywards Heath West Sussex RH16 3SN Tel: (01444) 472330 Fax: (01444) 472331

Policy Unit 16 Aberdour

Summary description of Policy Unit

This Policy Unit covers the village of Aberdour where the coastline forms a gentle curved bay comprising rocky headlands with sand and shingle. The frontage is backed by access roads and residential properties on ground that rises steeply from the shore. The bay is relatively small at just over 0.3 km and ends at the Aberdour Harbour arm.

There is one SAM at the Monks Cave in Charles Hill with some World War II archaeological interest and the foreshore is included within the Firth of Forth SSSI, SPA and Ramsar designated area.

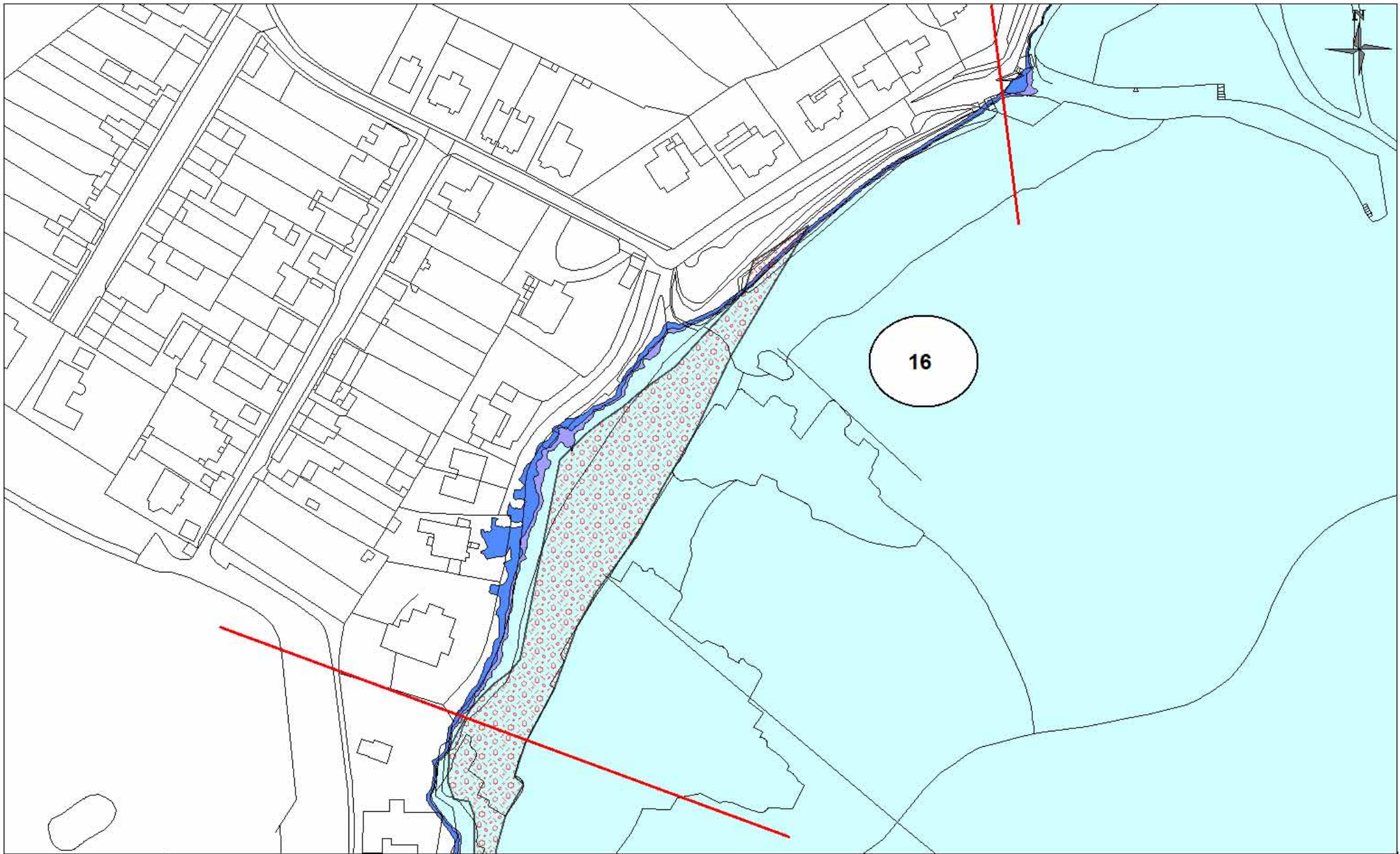
SMP1 Policy (MU10) – Do Nothing












SMP2 Policy (16)

Years 0-20	Years 20-50	Years 50-100
No Active Intervention	No Active Intervention	No Active Intervention

Justification of SMP2 Policy

Coastal erosion and flooding only affects two properties within the Policy Unit. These properties may be at risk from erosion at their toe as the land is quite steep in this area but the bay is shown to be accreting sediment so erosion should not be an issue. A policy of No Active Intervention is recommended which allows natural protection of the site as the benefits will not be substantial enough to secure public funding in this instance.



Project : Fife SMP2		Title : Policy Unit 16 - Aberdour											
Policy	0 - 20 Years :	No Active Intervention	20 - 50 years :	No Active Intervention	50 - 100 years :	No Active Intervention	Drawn By : RM Checked : NC		Authorised : DR Reviewed : ZH		Date : DEC 11	Scale : NTS	
 Shoreline Erosion over the past 150 years	 Coastal Accretion	 20yr Projected Sea Level		 Policy Unit Boundary			 Policy Unit Marker		<small>*This map is reproduced from Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationary Office & Crown copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings (100023385) (2010).</small>				Mouchel 37 - 39 Perrymount Road Haywards Heath West Sussex RH16 3BN Tel: (01444) 472330 Fax: (01444) 472331
 Predicted Erosion, Next 100 Years	 Reclaimed Land	 50yr Projected Sea Level		 100yr Projected Sea Level									

Policy Unit 17 Aberdour to Silversands

Description of Policy Unit

The Policy Unit's western extent is the Aberdour Harbour which comprises the harbour arm hard manmade structure. The unit continues east to the boundary of the Firth of Forth SPA, Ramsar and SSSI designated area at the rocky headland of Hawkraig Point where there are parts of the Fife Coastal Path.

This frontage also includes the Silversands beach towards the eastern extent of the Policy Unit where there are embryo dunes forming.

Aberdour Castle is within this Policy Unit and is a registered SAM.

There is a mix of manmade and natural coastal defences within this Unit, with most of the built structures associated with Aberdour Harbour in the West and the old Aberdour Pier.

SMP1 Policy (MU11) – Selectively Hold the Line










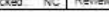
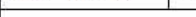
SMP2 Policy (17)

Years 0-20	Years 20-50	Years 50-100
No Active Intervention	No Active Intervention	No Active Intervention

Justification of SMP2 Policy

Coastal flooding impacts upon the Silversands Boathouse at the south eastern point of the Policy Unit, whilst some properties near the old Aberdour Pier are also affected by the projected 100 yr sea level. The area where coastal erosion is indicated along the beach to the north on the flood maps identifies a restaurant that will be lost and the access road will need to be re-aligned. The policy unit recommendation is No Active Intervention as the benefits from providing protection for these sparse structures are minimal. The local road may need to be realigned to maintain access to the area.



Project : Fife SMP2		Title : Policy Unit 17 - Aberdour to Silversands										
Policy	0 - 20 Years :	No Active Intervention	20 - 50 years :	No Active Intervention	50 - 100 years :	No Active Intervention	Drawn By : RM Checked : NC		Authorised : DR Reviewed : ZH		Date : DEC 11	Scale : NTS
 Shoreline Erosion over the past 150 years	 Coastal Accretion	 20yr Projected Sea Level		 Policy Unit Boundary		 Policy Unit Marker		<small>*This map is reproduced from Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationary Office & Crown copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings (10002088) (2010).</small>				
 Predicted Erosion, Next 100 Years	 Reclaimed Land	 50yr Projected Sea Level		 100yr Projected Sea Level								
												Mouchel 37 - 39 Perrymount Road Haywards Heath West Sussex RH16 3BN Tel: (01444) 472330 Fax: (01444) 472331

Policy Unit 18 Silversands to Burntisland

Summary description of Policy Unit

The geomorphology of this Unit comprises sand and shingle with some rocky outcrops in places. The entire backshore is dominated by a vegetated bank with manmade coastal defences between outcrops.

The rail link also forms part of the frontage which runs the entire length of this Policy Unit. The hinterland comprises broad leaved woodland and some agricultural activities. The A921 also runs through the entire length of this Unit.

There is a mix of manmade and natural coastal defences with much of the built structures being associated with protecting the rail link. There is also a designated Wreck offshore C.1600s post medieval, the Blessing of Burntisland thought to be a ferry.

SMP1 Policy (MU11) – Selectively Hold The Line

SMP2 Policy (18)

Years 0-20	Years 20-50	Years 50-100
Hold the Line (protecting rail infrastructure)	Hold the Line (protecting rail infrastructure)	Hold the Line (protecting rail infrastructure)

Justification of SMP2 Policy

Coastal erosion and flooding does not affect any residential or commercial property along the length of the Policy Unit however flooding levels could pose a risk to the railway line that runs the full length of the unit. A policy of 'Hold the Line' of existing coastal defences is recommended to allow Network Rail to continue protection of the railway. The local harbour is privately owned and private defences can be maintained to protect the harbour.

Policy Unit 19 Burntisland to Ross Point

Summary description of Policy Unit

This Policy Unit comprises the recreation ground between the rail link next to Bendameer House at the western extent and Ross Point in the east. The foreshore comprises rock with some sand and shingle fronting the built structures.

The majority of the Policy Unit here is defended using a hard manmade structure in the form of a rock revetment with the recreation ground backing this frontage.

There is little or no archaeological interest in this Policy Unit at present.

SMP1 Policy (MU11) – Selectively Hold The Line

SMP2 Policy (19)

Years 0-20	Years 20-50	Years 50-100
Hold the Line	Hold the Line	Hold the Line

Justification of SMP2 Policy

Coastal erosion has no impact on the frontage of this Policy Unit, and there is evidence of some flooding inland that affects a small number of properties in the long term. The policy recommendation for this unit is Hold the Line of the existing defences. Originally it was proposed to allow for a gain in inter-tidal habitat and to allow Network Rail to maintain the existing embankment through Managed Realignment for the railway. However the reclaimed land conceals a former Aluminium Plant Settling Pond. As a result this land could not be used for inter-tidal habitat and it therefore becomes most cost effective to Hold the Line in this instance. No Active Intervention would lead to pollutant leeching into the sea as the flood maps show this area being susceptible to flooding.

Policy Unit 20 Ross Point to Pettycur Bay

Description of Policy Unit

The geomorphology here comprises large accumulations of sand particularly at Burntisland. This Policy Unit includes the town of Burntisland at the western extent where the dockyard dominates this coastline for approximately 2.2 km. Immediately to the east of the docks is a length of sand and shingle beach backed by the rail link and some residential property. There are hard manmade coastal defence structures, some under Council maintenance whilst others are owned or maintained by Network Rail, there are also individual properties with associated private coastal defences.

The eastern extent of the Policy Unit comprises a small residential area in Pettycur Bay and the caravan park with natural sand and shingle coastal defences. Pettycur Bay has approximately 230 m of seawall protecting the access road and which also joins the harbour arm where the unit ends.

The foreshore between Burntisland and Pettycur Bay is included in the Firth of Forth SSSI, SPA and Ramsar designated site.

There is one SAM at the Old Parish Church in Burntisland with a further nine ASRIs. There is also some World War II archaeological interest in this area.

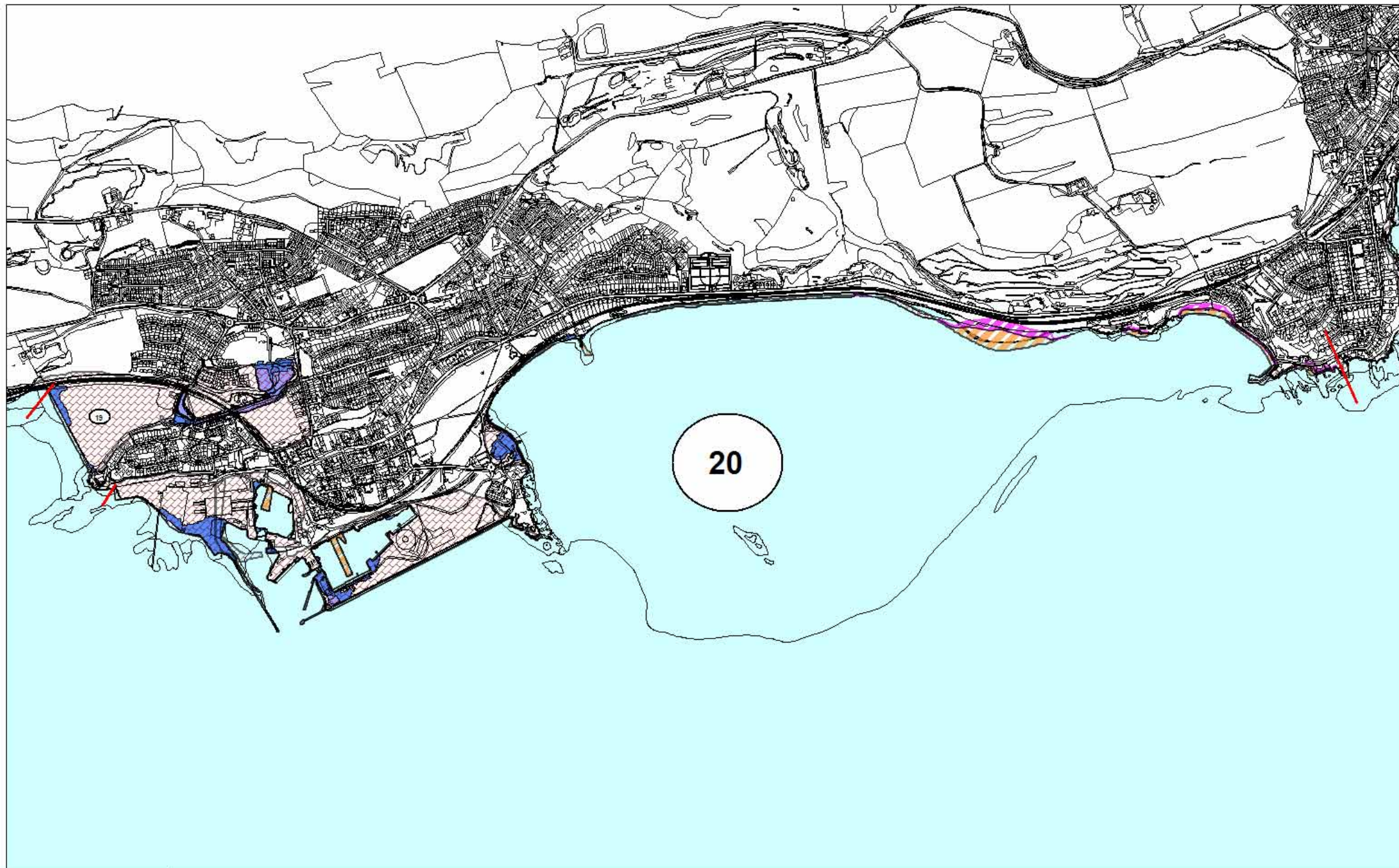
SMP1 Policy (MU11) – Selectively Hold The Line

SMP2 Policy (20)

Years 0-20	Years 20-50	Years 50-100
Hold the Line	Hold the Line	Hold the Line

Justification of SMP2 Policy

Coastal erosion and flooding does not have an impact on residential or commercial properties, only a small section of public infrastructure. A policy of hold the line is recommended for this Policy Unit with funding for defences that protect the railway line provided by Network Rail. Landowners in the eastern bay are to maintain private defences at their own expense.



Project : Fife SMP2

Title : Policy Unit 20 - Ross Point to Pettycur Bay

Policy 0 - 20 Years : Hold the Line 20 - 50 years : Hold the Line 50 - 100 years : Hold the Line

Drawn By : RM
Checked : NC

Authorised : DR
Reviewed : ZH

Date : DEC 11

Scale : NTS

Shoreline Erosion over the past 150 years

Coastal Accretion

20yr Projected Sea Level

Predicted Erosion, Next 100 Years

Reclaimed Land

50yr Projected Sea Level

100yr Projected Sea Level

Policy Unit Boundary

Policy Unit Marker

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Policy Unit 21 Pettycur Bay to Kinghorn Beach

Summary description of Policy Unit

The entire unit fronts the villages of Kinghorn and Pettycur. This Policy Unit's western extent is at the harbour arm adjacent to Pettycur Bay. The eastern extent is fronted by the sandy shores of Kinghorn Beach.

There are a number of ad-hoc private coastal defences comprising of old masonry walls sometimes well integrated with the rock frontage. The entire unit fronts the village of Pettycur. The coastal geomorphology comprises stable rock with pockets of sand and shingle where the coastal residential property appears to be mostly situated on rising ground.

The Unit contains one registered SAM at Kinghorn Old Parish Church and a further two ASRIs.

The entire Policy Unit is within the Firth of Forth SSSI, SPA and Ramsar Site.

SMP1 Policy (MU12) – Selectively Hold The Line

SMP2 Policy (21)

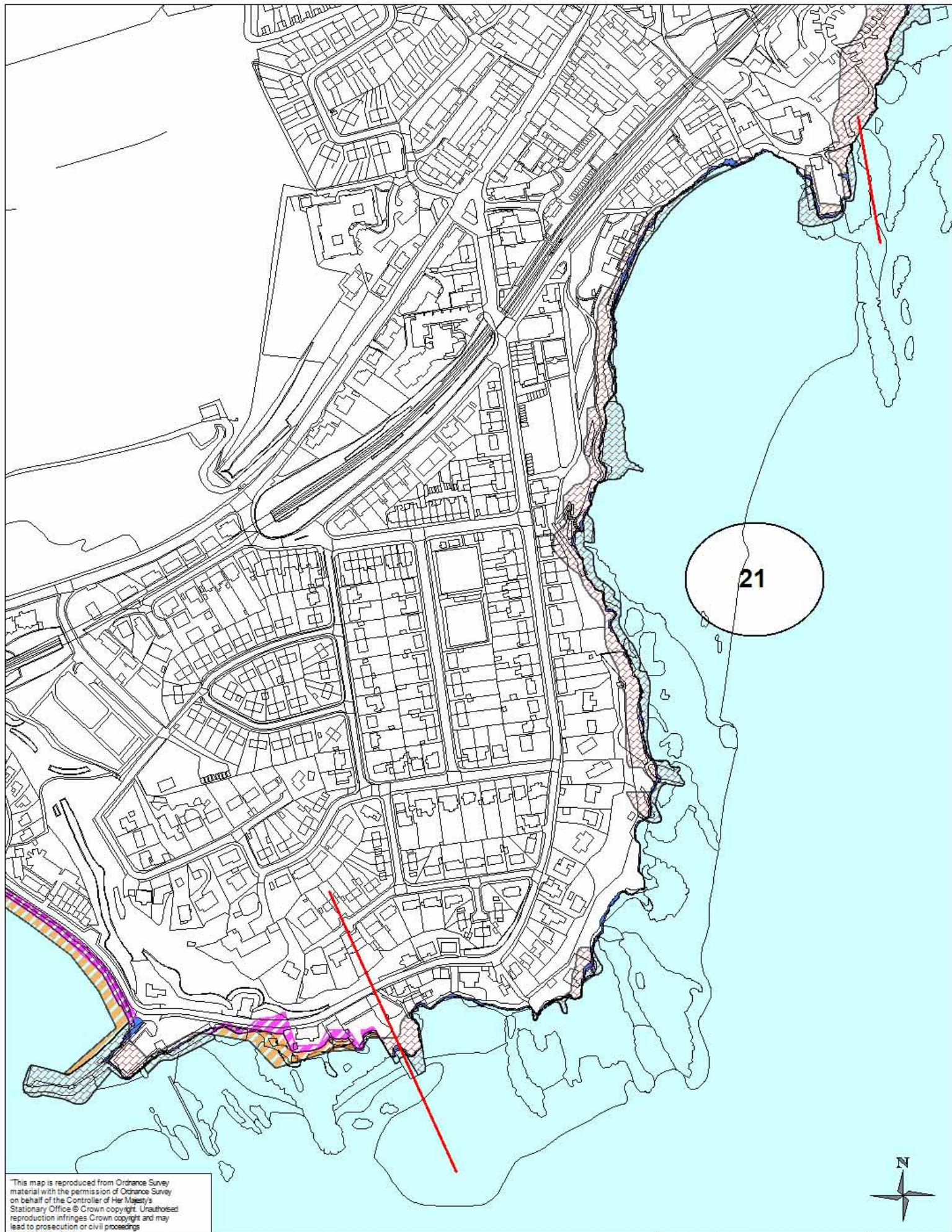
Years 0-20	Years 20-50	Years 50-100
No Active Intervention	No Active Intervention	No Active Intervention

Justification of SMP2 Policy

Coastal flooding affects a few of the coastal properties in Kinghorn Bay whilst the remainder within the policy unit are protected from natural rock outcrops.

Hold the Line has not been adopted as the preferred policy for this unit as there is only minor impact through coastal flooding during the 100yr epoch. Whilst coastal erosion is isolated to the south of the Policy Unit impacting on a single property and some infrastructure.

A policy of No Active Intervention is recommended as existing defences appear to be locally maintained and only a few properties are affected by flooding. This provides the best cost benefit ratio.



Project : Fife SMP2		Title : Policy Unit 21 - Pettycur Bay to Kinghorn Beach				Drawn By : RM	Authorised : DR	Date : DEC 11	Scale : NTS
Policy		0 - 20 Years : No Active Intervention		20 - 50 years : No Active Intervention		Checked : NC	Reviewed : ZH		
 Shoreline Erosion over the past 150 years		 Coastal Accretion		 20yr Projected Sea Level		 Policy Unit Boundary			
 Predicted Erosion, Next 100 Years		 Reclaimed Land		 50yr Projected Sea Level		 Policy Unit Marker			
				 100yr Projected Sea Level					
									
								Mouchel 37 - 39 Rainmount Road Haywards Heath West Sussex RH16 3SN Tel: (01444) 472330 Fax: (01444) 472331	

Policy Unit 22 Kinghorn Beach to Seafield (Kirkcaldy)

Description of Policy Unit

This section of coast is located between Kinghorn Beach in the west and Seafield Beach in the east. The coastline here is dominated by rock platforms for almost the entire length with very little residential or commercial property in close proximity to the foreshore.

The hinterland is mainly rural with some agricultural activities and the Network Rail line is in close proximity.

There is one SAM within this Policy Unit at Seafield Tower.

The entire Policy Unit is within the Firth of Forth SSSI, SPA and Ramsar site and also the Abden – Seafield RIGS (Regionally Important Geological and geomorphological Site).

There are frequent ad-hoc man-made defences throughout the north of this unit predominantly associated with the former Seafield Colliery. Much of this site has since been redeveloped for housing on the elevated ground behind the coastal strip.

A caravan site previously stood within this Policy Unit which was lost to the sea. The area is now formed from reclaimed land.

SMP1 Policy (MU13) – Selectively Hold The Line

SMP2 Policy (22)

Years 0-20	Years 20-50	Years 50-100
No Active Intervention	No Active Intervention	No Active Intervention

Justification of SMP2 Policy

No residential or commercial properties or public infrastructure is affected by coastal flooding. However the railway line has been subject to landslips. This section of coastline is to be maintained by Network Rail at their own expense to ensure stabilisation of the railway line. The policy recommended for this Unit is 'No Active Intervention', though an action plan should be outlined for this Policy Unit to account for monitoring of the railway line to determine the possibility of future land slips.

Policy Unit 23 Craigfoot Walk to Kirkcaldy Harbour

Summary description of Policy Unit

The southern extent of this Unit is marked by the bus depot buildings and brownfield land at Invertiel. The coast then becomes heavily defended with the manmade seawall stretching for 1.7 km. The seawall fronts the town of Kirkcaldy where there is a mix of commercial and residential property with large areas of hard standing. A promenade accompanies the seawall the whole length.

Low tide exposes the rock platform in front of the seawall. Kirkcaldy Harbour is located within this unit and is almost entirely enclosed with the western and eastern harbour arms. The Sewage Treatment Works at Pathhead Sands forms the eastern extent of this unit.

This Unit includes two SAMs at Saint Serfs Kirk and the Old Dysart Harbour.

The entire Unit is within the Firth of Forth SSSI, SPA and Ramsar site.

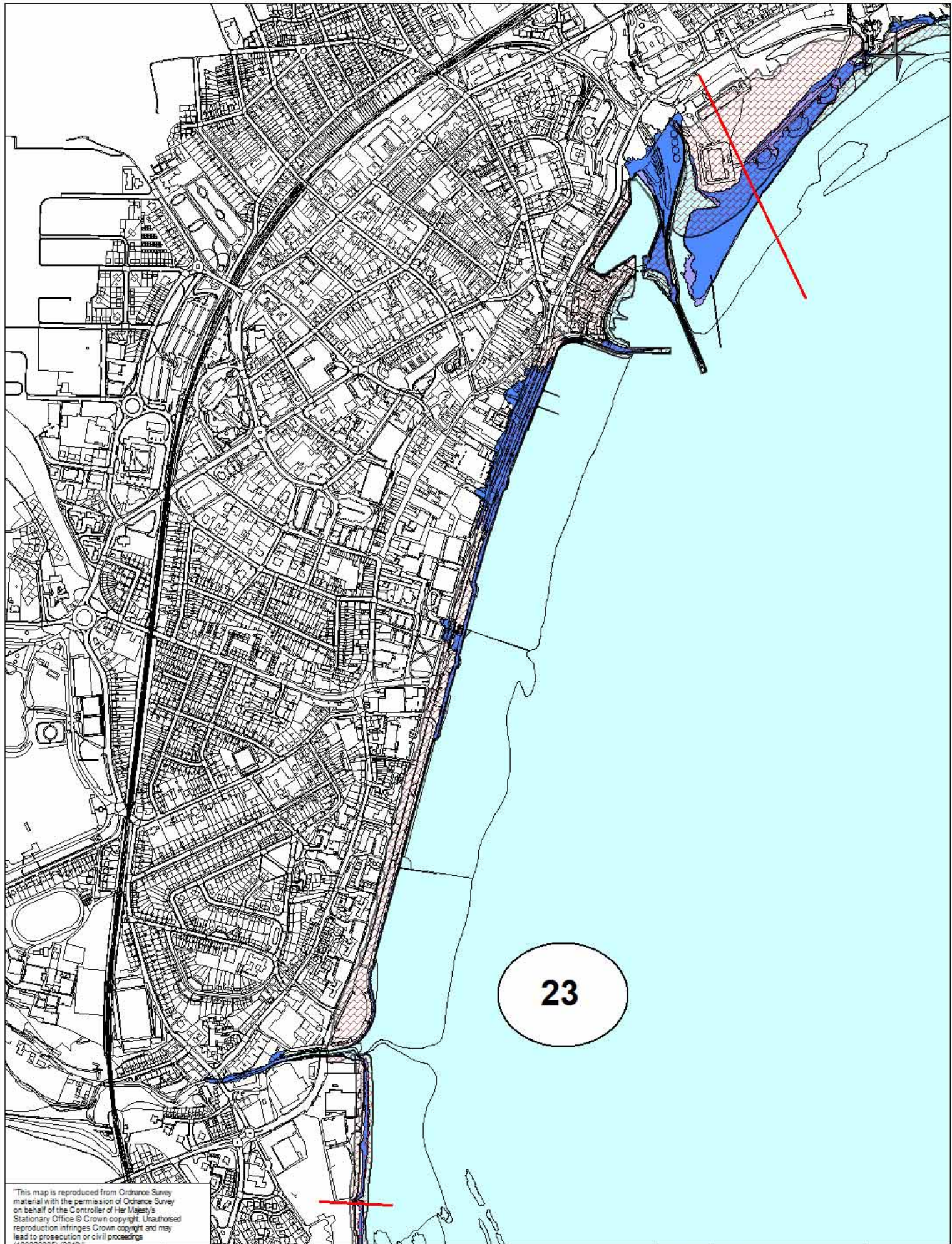
SMP1 Policy (MU13/MU14) – Selectively Hold The Line

SMP2 Policy (23)

Years 0-20	Years 20-50	Years 50-100
Hold the line	Hold the line	Hold the line

Justification of SMP2 Policy

Coastal flooding and erosion does affect a significant length of the Policy Unit, and as such impacts on residential or commercial properties. At the eastern extent there is evidence of severe coastal flooding in the long term that affects residential and commercial properties. Also the Waste Water treatment Works need to be protected east of the harbour. A policy recommendation of Hold the Line for the existing coastal defences offers a favourable cost benefit ratio while ensuring protection of residential and commercial property. Further works are being undertaken on the Kirkcaldy frontage, a major capital project to rebuild and refurbish the seawall as part of the regeneration works is being undertaken.



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Project : Fife SMP2

Title : Policy Unit 23 - Craigfoot Walk to Kirkcaldy Harbour

Drawn By : RM

Authorised : DR

Date : DEC 11

Scale : NTS

Policy 0 - 20 Years : Hold the Line

20 - 50 years : Hold the Line

50 - 100 years : Hold the Line

Shoreline Erosion over the past 150 years

Coastal Accretion

20yr Projected Sea Level

Policy Unit Boundary

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Predicted Erosion, Next 100 Years

Reclaimed Land

50yr Projected Sea Level

Policy Unit Marker

Fife

mouchel

Mouchel
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Haywards Heath
West Sussex
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Fax: (01444) 472331

Policy Unit 24 Pathhead Sands to Dysart Harbour

Summary description of Policy Unit

The geomorphology of this Unit comprises deep sand beaches at Ravenscraig with rock outcrops in places. Pathhead Sands marks the western point of this policy unit where a gentle curving sand bay has formed. This bay fronts the SAM of Ravenscraig Castle which is protected on the South, East and West by steep rocky cliffs and original masonry wall.

Further east there are rock extrusions with masonry walls built upon them which are part of Ravenscraig Park. This part of the policy unit fronts a bowling green and small woodland area. The eastern extent is marked by Dysart Harbour.

This Unit forms part of the Firth of Forth SSSI, SPA and Ramsar site.

SMP1 Policy (MU14) – Selectively Hold the Line

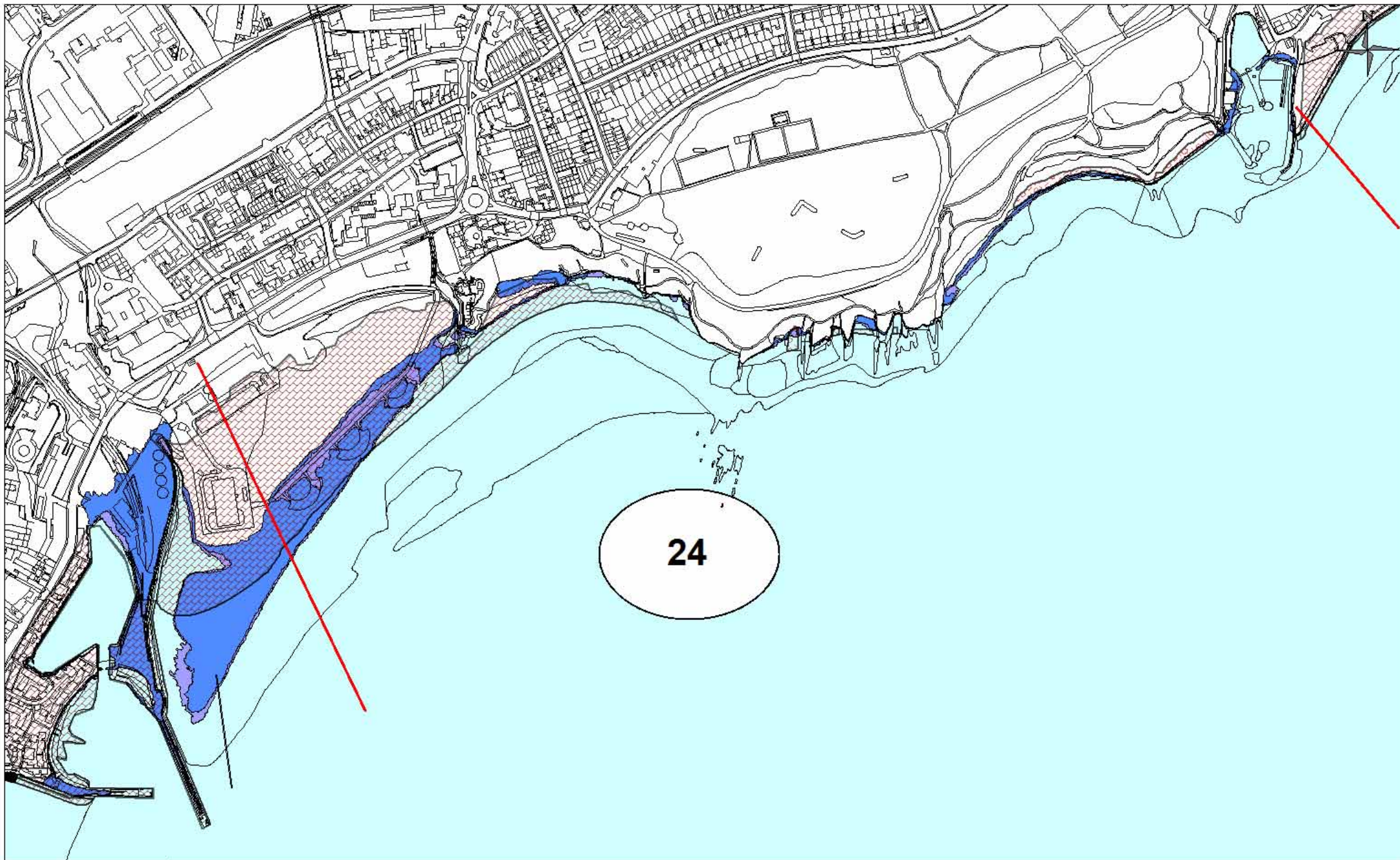
SMP2 Policy (24)












Years 0-20	Years 20-50	Years 50-100
No Active Intervention	No Active Intervention	No Active Intervention

Justification of SMP2 Policy

Coastal erosion and flooding will not affect any residential or commercial properties within the Policy Unit over the next 100 years. The existing coastal frontage protects the SAM through natural processes. A policy of 'No Active Intervention' is proposed for this Policy Unit. No Active Intervention also allows some additional intertidal habitat to be reclaimed within this Policy Unit.

An area of landfill has been identified on the boundary of the 100year standing water flood level. At the time of this report Fife Environmental Services had inspected the area and determined that coastal erosion and flooding does not encroach upon this area. As such the area could be accepted as additional inter-tidal habitat. It is advised that predicted sea level rise through climate change be re-assessed following the 50year epoch, this would ensure the security of new intertidal-habitat.



Project : Fife SMP2		Title : Policy Unit 24 - Pathhead Sands to Dysart Harbour														
Policy	0 - 20 Years :	No Active Intervention		20 - 50 years :		No Active Intervention		50 - 100 years :		No Active Intervention		Drawn By : RM	Authorised : DR	Date : DEC 11	Scale : NTS	
												Checked : NC	Reviewed : ZH			
	Shoreline Erosion over the past 150 years		Coastal Accretion		20yr Projected Sea Level		50yr Projected Sea Level		100yr Projected Sea Level		Policy Unit Boundary					Mouchel 37 - 39 Perrymount Road Haywards Heath West Sussex RH16 3BN Tel: (01444) 472330 Fax: (01444) 472331
	Predicted Erosion, Next 100 Years		Reclaimed Land	 Policy Unit Marker												
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Policy Unit 25 Dysart

Summary description of Policy Unit

Immediately east of Dysart Harbour are sand and shingle beaches with occasional rock extrusions. Backing the shore along this unit are mostly access roads and residential property with some historic buildings such as the St Serfs Church.

The buildings are mostly situated on rising ground progressively getting steeper landwards. The lower lying houses of Pan Ha' are protected by a Coast Protection Scheme built in 2001 comprising a rock revetment and masonry faced concrete crest wall.

This Unit is included in Firth of Forth SSSI, SPA and Ramsar site.

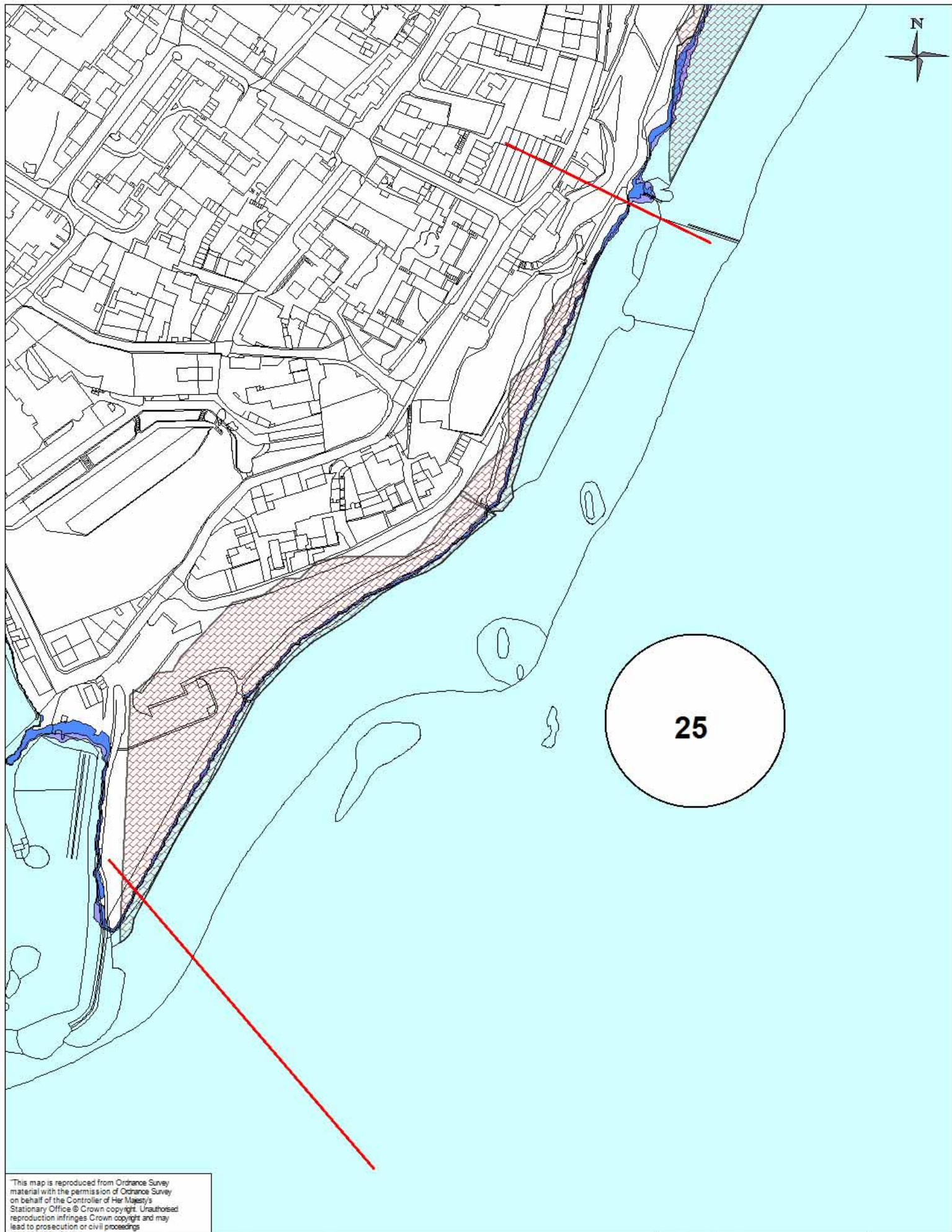
SMP1 Policy (MU15) – Selectively Hold the Line

SMP2 Policy (25)

Years 0-20	Years 20-50	Years 50-100
Hold the Line	Hold the Line	Hold the Line

Justification of SMP2 Policy

Coastal erosion and flooding is not projected to have a significant impact on any residential or commercial property within the policy unit, though this is likely due to the existing rock armour defences within this Policy Unit. The naturally occurring defences and position of property landwards provides additional protection. A policy of 'Hold the Line' is recommended to maintain the same level of protection and prevent inland flooding towards Dysart.



Project : Fife SMP2

Title : Policy Unit 25 - Dysart

Drawn By : RM

Authorised : DR

Date : DEC 11

Scale : NTS

Policy 0 - 20 Years : Hold the Line

20 - 50 years : Hold the Line

50 - 100 years : Hold the Line

Shoreline Erosion over the past 150 years

Coastal Accretion

20yr Projected Sea Level

Policy Unit Boundary

Predicted Erosion, Next 100 Years

Reclaimed Land

50yr Projected Sea Level

Policy Unit Marker

100yr Projected Sea Level



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Policy Unit 26 Dysart to West Wemyss Harbour

Summary description of Policy Unit

This Policy Unit comprises a frontage of mostly sand and shingle beaches with a grass backshore for approximately 1 km. This is further backed by residential houses in Dysart and the former Frances Colliery and industrial estate. Further east the foreshore continues as sand and shingle beaches with the backshore having progressively more woodland vegetation. The eastern extent of this unit is marked by the West Wemyss Harbour with sand and shingle beaches surrounding the hard structures at the entrance.

There is a mix of natural and manmade coastal defences along this coast with much of the built structures forming the protection to the access road and harbour to the east. The Fife Coastal Path runs through parts of this Unit which is within the Firth of Forth SSSI, SPA and Ramsar site.

There is some archaeological importance in this Unit with two ASRIs included here.

SMP1 Policy (MU15) – Selectively Hold the Line

SMP2 Policy (26)

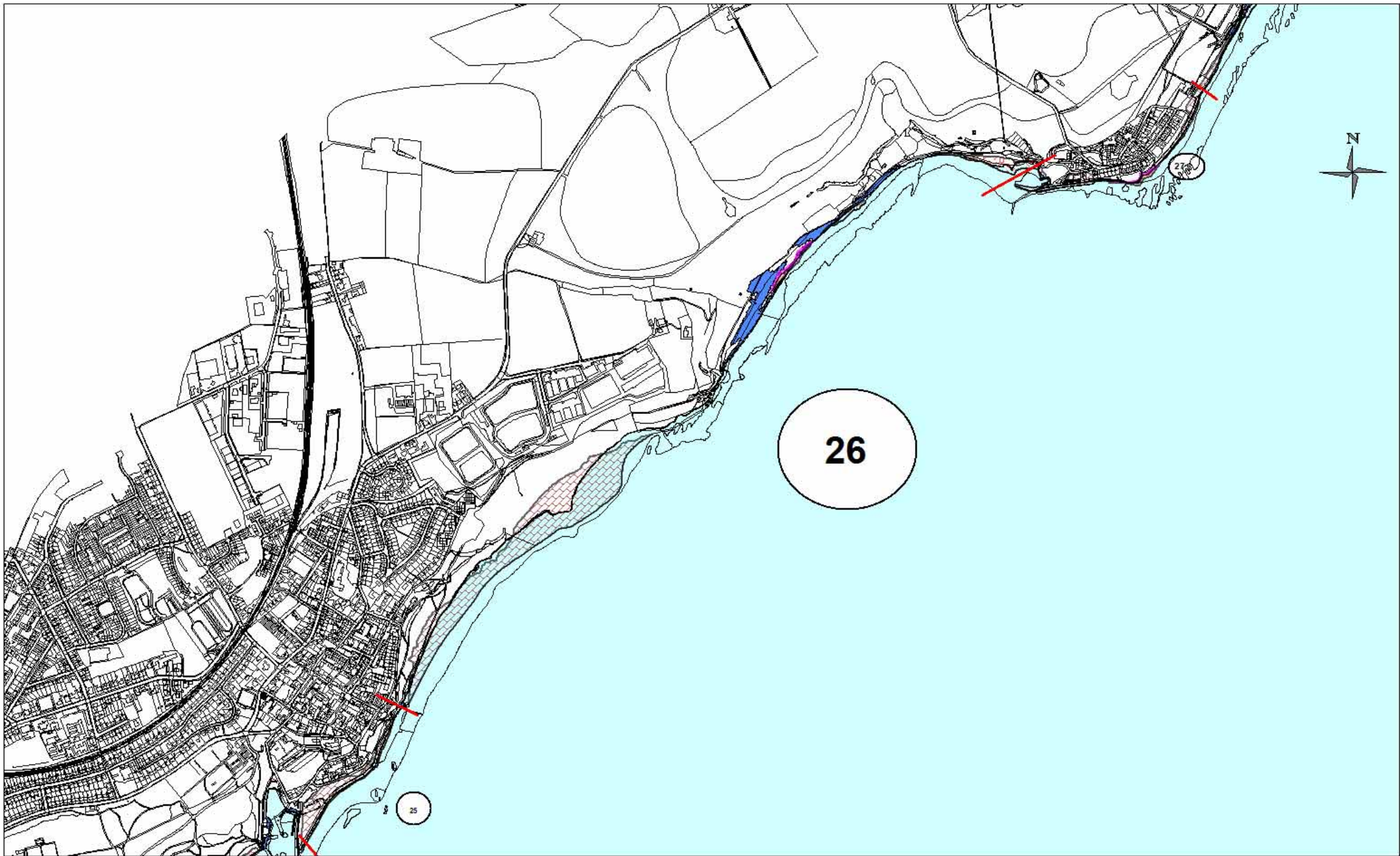
Years 0-20	Years 20-50	Years 50-100
Managed Realignment	Managed Realignment	Managed Realignment












Justification of SMP2 Policy

This Policy Unit has recently experienced severe rates of erosion during storm events, in one instance 2m of shoreline eroded in one night. Although the visual impact of coastal erosion on the reclaimed land (coal bings) within the south western section of this policy unit is significant, neither it nor flooding affects any residential or commercial property. Flooding and coastal erosion also impacts on the access road and land to the west of West Wemyss harbour, to the east of the unit.

A policy of Managed Realignment has been proposed throughout this Policy Unit.

This allows for appropriate control measures and further stabilisation of the slope and cliff edges in the vicinity of the coal bings identified on the Policy Unit plan as the area of reclaimed land.



Project : Fife SMP2		Title : Policy Unit 26 - Dysart to West Weymss Harbour										
Policy	0 - 20 Years :	No Active Intervention	20 - 50 years :	No Active Intervention	50 - 100 years :	No Active Intervention	Drawn By : RM Checked : NC		Authorised : DR Reviewed : ZH		Date : DEC 11	Scale : NTS
 Shoreline Erosion over the past 150 years	 Coastal Accretion	 20yr Projected Sea Level		 Policy Unit Boundary			 Policy Unit Marker			<small>*This map is reproduced from Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationary Office & Crown copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings (100022000) (2010).</small>		
 Predicted Erosion, Next 100 Years	 Reclaimed Land	 50yr Projected Sea Level		 100yr Projected Sea Level								
											Mouchel 37 - 39 Perrymount Road Haywards Heath West Sussex RH16 3BN Tel: (01444) 472330 Fax: (01444) 472331	

Policy Unit 27 West Wemyss

Summary description of Policy Unit

This Policy Unit covers the coastal village of West Wemyss. The Coast Protection Scheme constructed in 2001 predominates, with a rock revetement constructed in two sections either side of a vertical concrete sea wall dating from 1996. The defences protect a backshore comprising access roads, residential and commercial property and car parks. The eastern extent is marked by St. Adrians Church.

The geomorphology comprises superficial boulder clay overlain with marine deposits which are mainly sands. There are also agricultural activities within this unit, mainly between West Wemyss and East Wemyss.

The eastern extent of this Unit forms part of the Firth of Forth SSSI, SPA and Ramsar site.

SMP1 Policy (MU16) – Selectively Hold the Line

SMP2 Policy (27)

Years 0-20	Years 20-50	Years 50-100
Hold the line	Hold the line	Hold the line

Justification of SMP2 Policy

A policy of 'Hold the Line' is recommended to maintain the existing defences that protect at risk properties.

The Policy Unit extends to include the harbour walls at the western edge of the Unit. West Wemyss harbour to continue to be defended at own cost.

Policy Unit 28 West Wemyss to East Wemyss

Summary description of Policy Unit

This Policy Unit stretches for approximately 2 km and comprises sand and shingle beaches with occasional rock extrusions. There are little or no manmade defences of any significance in this unit and the backshore mostly comprises woodland and grassland used mostly for recreation.

With the demolition of the remaining structures of the Michael Colliery in 2001, there are now very few properties along this frontage with no associated access roads close to the coast. There is evidence of colliery land fill mostly where the works were located; however there is further evidence of colliery spoil across the Unit. There are also agricultural activities in the hinterland of this Unit.

There is also some archaeological interest in this Policy Unit including the East Wemyss Tollbooth which is a SAM. There are also ASRIs in this area.

The Policy Unit also forms part of the Firth of Forth SSSI, SPA and Ramsar site.

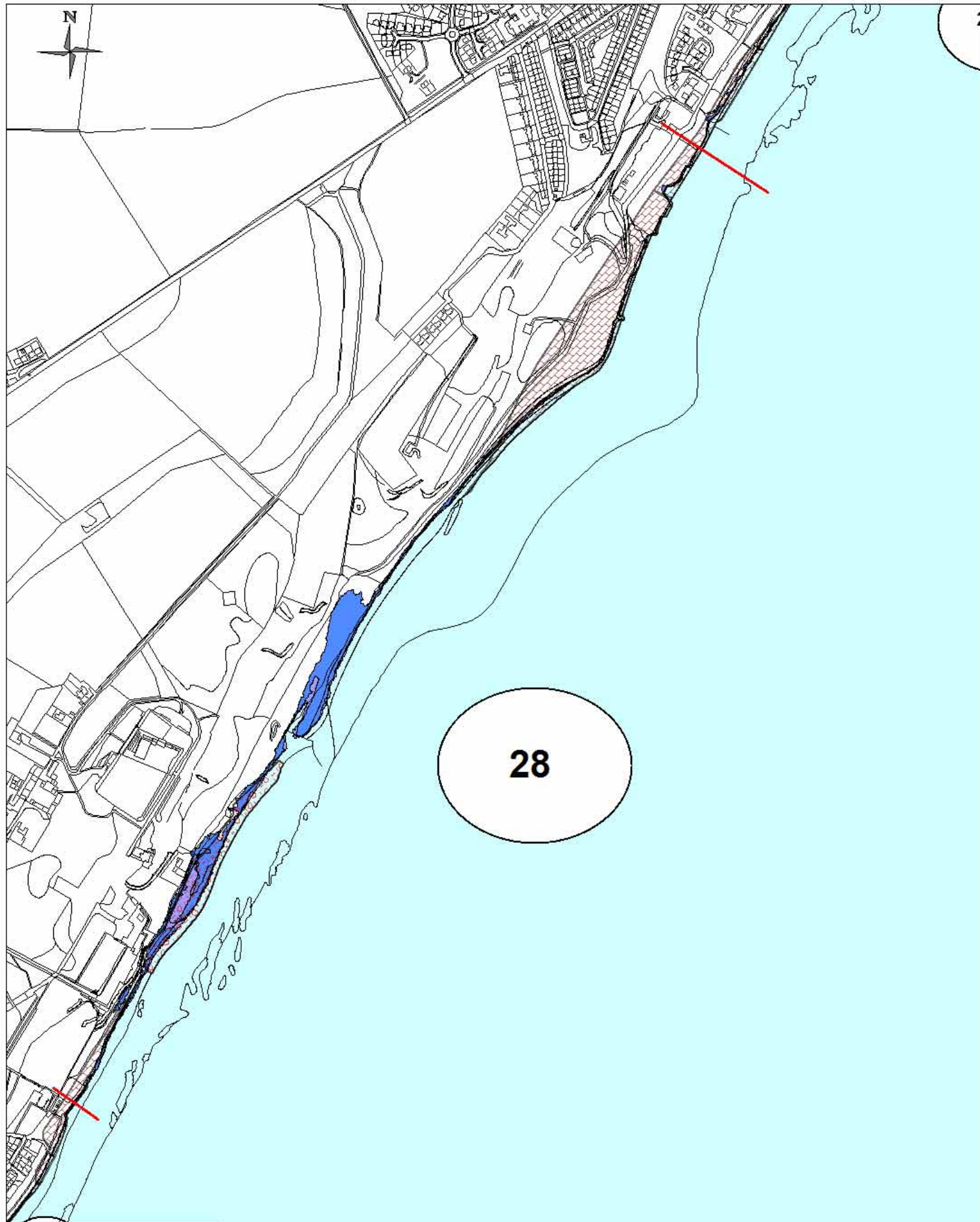
SMP1 Policy (MU16) – Selectively Hold the Line

SMP2 Policy (28)













Years 0-20	Years 20-50	Years 50-100
No Active Intervention	No Active Intervention	No Active Intervention

Justification of SMP2 Policy

Coastal flooding and erosion does not affect any commercial or residential properties within this area. The Fife coastal path is subject to areas of erosion with a 800m section currently at risk of erosion. A 'No Active Intervention' policy has been recommended for this policy unit as providing the most favourable cost benefit ratio. Natural processes will be allowed to continue along the coast. As a result of historical mining activity there are a few remains of old sea walls and some cliffing of coal bings occurs at the former Michael Colliery.



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Project : Fife SMP2		Title : Policy Unit 28 West Weymss to East Weymss			Drawn By : RM	Authorised : DR	Date : DEC 11	Scale : NTS
Policy	0 - 20 Years :	No Active Intervention	20 - 50 years :	No Active Intervention	50 - 100 years :	No Active Intervention		
 Shoreline Erosion over the past 150 years	 Coastal Accretion	 20yr Projected Sea Level	 Policy Unit Boundary					Mouchel 37 - 39 Rannymount Road Westerlough Westerlough R116 3BN Tel: 01444 472330 Fax: 01444 472331
 Predicted Erosion, Next 100 Years	 Reclaimed Land	 50yr Projected Sea Level	 Policy Unit Marker					
		 100yr Projected Sea Level						

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Policy Unit 29 East Wemyss

Summary description of Policy Unit

This Policy Unit covers the entire village of East Wemyss where the foreshore comprises extensive hard manmade coastal defences (Coast Protection Scheme, 2001). There is a rock revetment backed by a masonry faced concrete wall extending almost the length of the coast fronting the village (approximately 600 m). The village comprises residential property with associated access roads.

The geomorphology comprises superficial boulder clay overlain with marine deposits. There is evidence of colliery land fill across the Unit.

This Policy Unit also include some Scheduled Ancient Monument sites comprising Macduff's Castle and Dovecot and Wemyss Caves.

The Policy Unit is included in the Firth of Forth SSSI, SPA and Ramsar site.

SMP1 Policy (MU16) – Selectively Hold the Line

SMP2 Policy (29)

Years 0-20	Years 20-50	Years 50-100
Hold the Line	Hold the Line	Hold the Line

Justification of SMP2 Policy

The policy of 'Hold the Line' for existing defences is recommended as this offers a favourable cost benefit ratio protecting residential housing.

Policy Unit 30 East Wemyss to Buckhaven

Description of Policy Unit

Policy Unit 30 is dominated by superficial boulder clay overlain with marine sediment deposits. There are little or no manmade coastal defences along this section of coast, probably due to the amount of residential or commercial property situated along this coastline.

The shore is backed by unmanaged vegetation, including grassland and woodland. Further back in the hinterland there are fields primarily used for agricultural activities. Towards the eastern extent of the unit, the shoreline sweeps southward forming a small bay where there is a slipway and a boating storage area. The Fife Coastal Path runs through this Unit.

The Policy Unit is also part of the Firth of Forth SSSI, SPA and Ramsar site.

SMP1 Policy (MU16/MU17) – Selectively Hold the Line

SMP2 Policy (30)

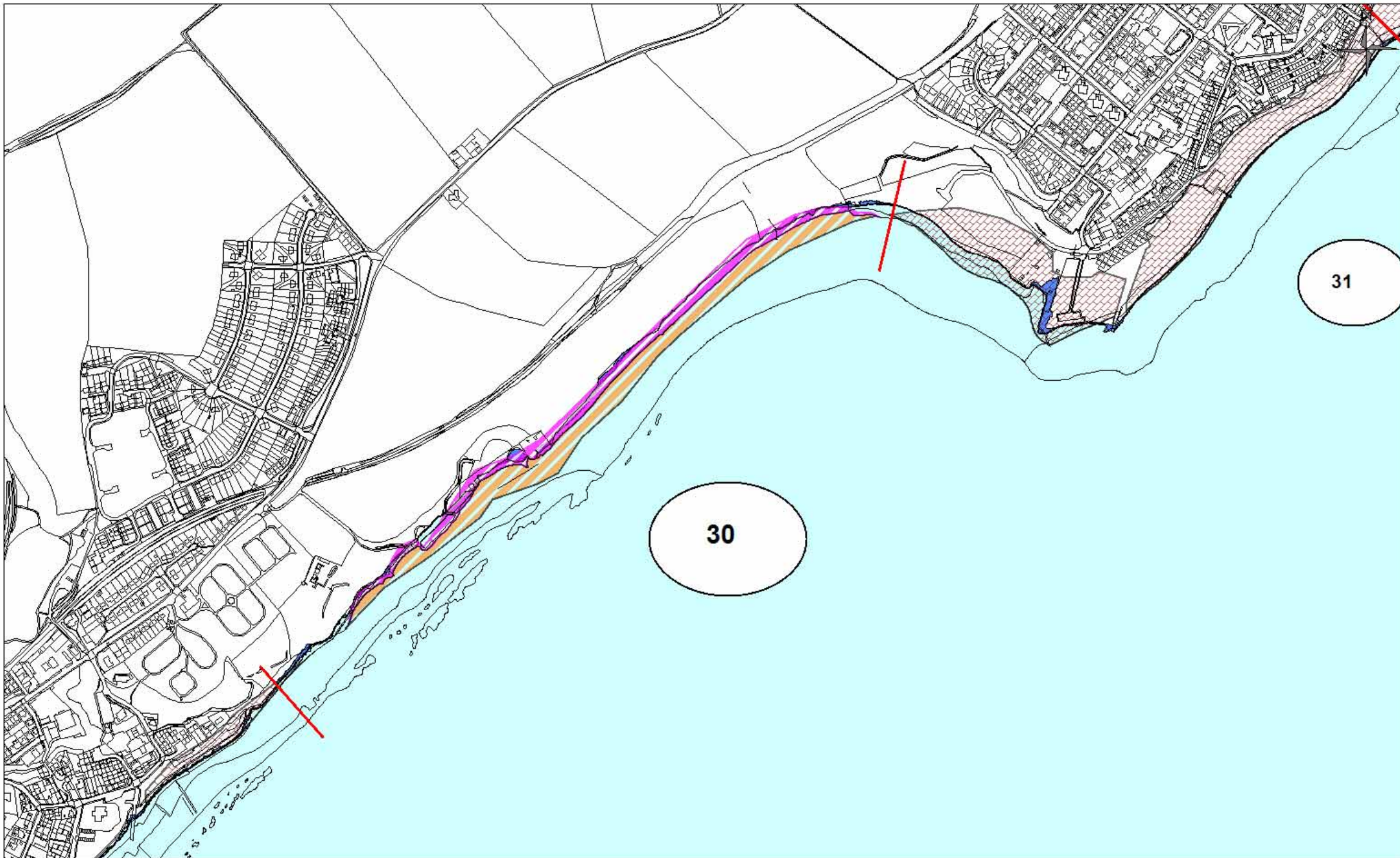
Years 0-20	Years 20-50	Years 50-100
No Active Intervention	No Active Intervention	No Active Intervention

Justification of SMP2 Policy

Within this Policy Unit there is substantial erosion along the western edge of the coast and only moderate coastal flooding. The erosion only impacts upon Greenfield areas and some agricultural land, though a study may be required to determine the impact upon an old gasworks structure. Some areas within this Policy Unit have been subject to settlement as a result of old mine workings in the area collapsing.

There are areas of rock armour along the foreshore, though these do not appear to be protecting any particular assets. As a result a 'No Active Intervention' policy has been recommended for this stretch of coastline. The shape of the bay to the east also allows for some sheltered intertidal habitat to be gained as a result of the coastal flooding.

It is accepted that Wemyss Caves will be subject to coastal flooding and erosion and as such provision will be given for Historic Scotland to defend the historic site as required.



Project : Fife SMP2		Title : Policy Unit 30 - East Wemyss to Buckhaven									
Policy	0 - 20 Years :	No Active Intervention	20 - 50 years :	No Active Intervention	50 - 100 years :	No Active Intervention	Drawn By : RM Checked : NC	Authorised : DR Reviewed : ZH	Date : DEC 11	Scale : NTS	
Shoreline Erosion over the past 150 years	Coastal Accretion	20yr Projected Sea Level		Policy Unit Boundary		Policy Unit Marker	<small>*This map is reproduced from Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationary Office & Crown copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings (100022555) (2010).</small>				Mouchel 37 - 39 Perrymount Road Haywards Heath West Sussex RH16 3BN Tel: (01444) 472330 Fax: (01444) 472331
Predicted Erosion, Next 100 Years	Reclaimed Land	50yr Projected Sea Level		100yr Projected Sea Level							

Policy Unit 31 Buckhaven (West)

Summary description of Policy Unit

This Policy Unit is protected by two rock armour Coast Protection Schemes. The first dates from 1978 and protects the reclaimed land (colliery waste) on the east facing shoreline. A second scheme was taken forward in 2006 to protect the landfill site to the west of the infilled harbour.

Immediately backing the defences is a section of managed grassland and access road. This is further backed by a residential housing area.

The geomorphology of the coast here comprises superficial boulder clay overlain with marine deposits.

This small section of coast is part of the Firth of Forth SSSI, SPA and Ramsar site.

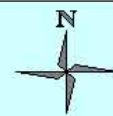
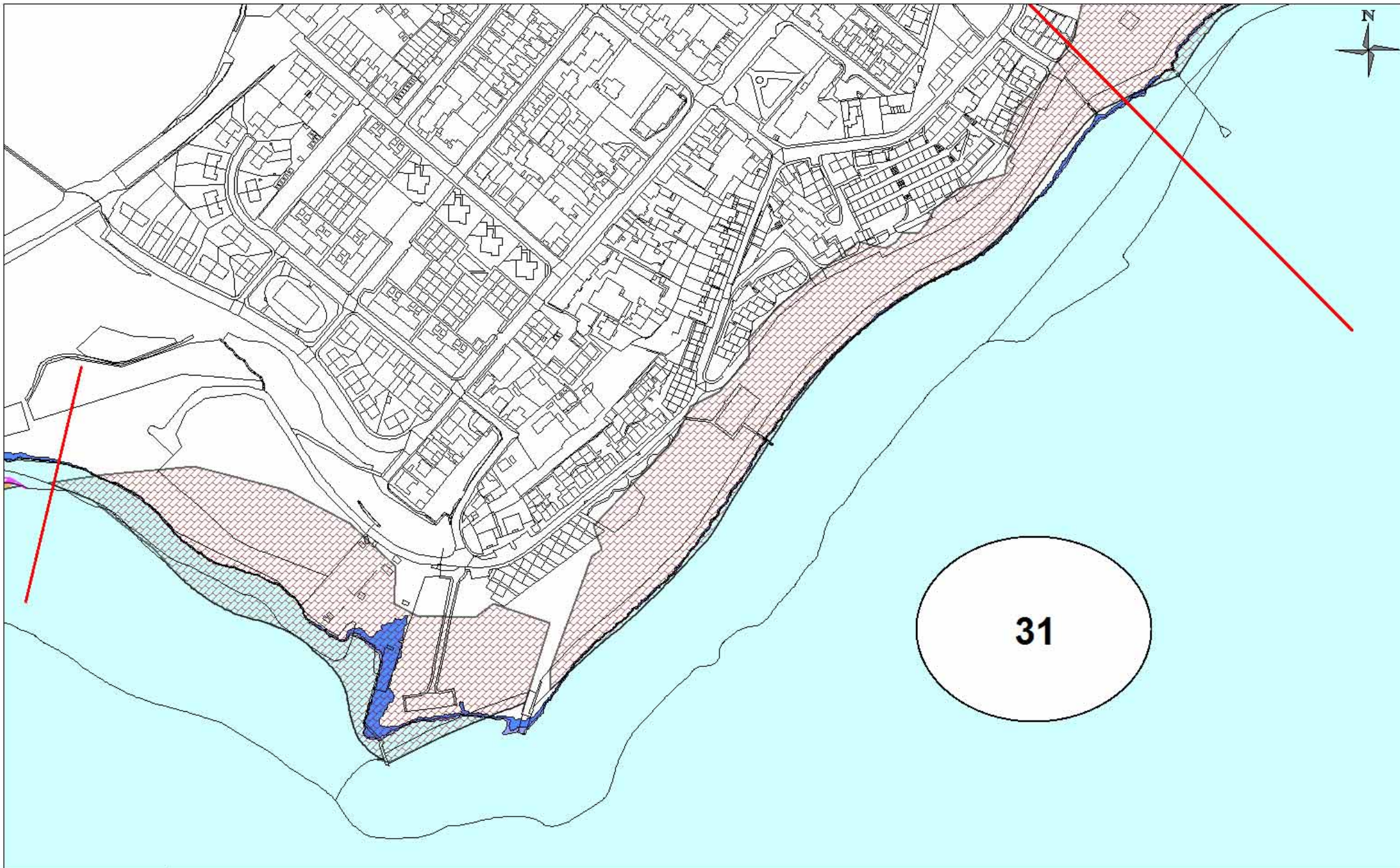
SMP1 Policy (MU17) – Selectively Hold the Line












SMP2 Policy (31)

Years 0-20	Years 20-50	Years 50-100
Hold the Line	Hold the Line	Hold the Line

Justification of SMP2 Policy

This Policy Unit is mostly residential; however though no properties back directly onto the coastline there is a risk from flooding and erosion of the made ground should the current defences be breached. Therefore a 'Hold the Line' policy is advised within this Policy Unit to maintain the rock revetment defences.



Project : Fife SMP2		Title : Policy Unit 31 - Buckhaven (West)								
Policy	0 - 20 Years :	Hold the Line	20 - 50 years :	Hold the Line	50 - 100 years :	Hold the Line	Drawn By : RM	Authorised : DR	Date : DEC 11	Scale : NTS
							Checked : NC	Reviewed : ZH		
 Shoreline Erosion over the past 150 years	 Coastal Accretion	 20yr Projected Sea Level	 Policy Unit Boundary			<small>*This map is reproduced from Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office & Crown copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings (10002355) (2010).</small>				
 Predicted Erosion, Next 100 Years	 Reclaimed Land	 50yr Projected Sea Level	 100yr Projected Sea Level	 Policy Unit Marker						
									Mouchel 37 - 39 Parrymount Road Haywards Heath West Sussex RH16 3BN Tel: (01444) 472330 Fax: (01444) 472331	

Policy Unit 32 Fife Energy Park

Description of Policy Unit

This Policy Unit covers the reclaimed area of land fronting Methil and Buckhaven. This section of coast has been used as a fabrication yard since the 1970's serving firstly the North Sea oil boom and now the renewable power sector. Large industrial factory units and heavy cranes are situated on the reclaimed land which comprises colliery waste associated with the former Wellesley Colliery and railway sidings. Further back in the hinterland there are the residential areas of Methil and Buckhaven.

The geomorphology of this Unit comprises superficial boulder clay overlain with marine deposits which consists of mainly sand. Further back in the hinterland there are the residential areas of Buckhaven. This section of coast is part of the Firth of Forth SSSI, SPA and Ramsar site either side of the load out quay.

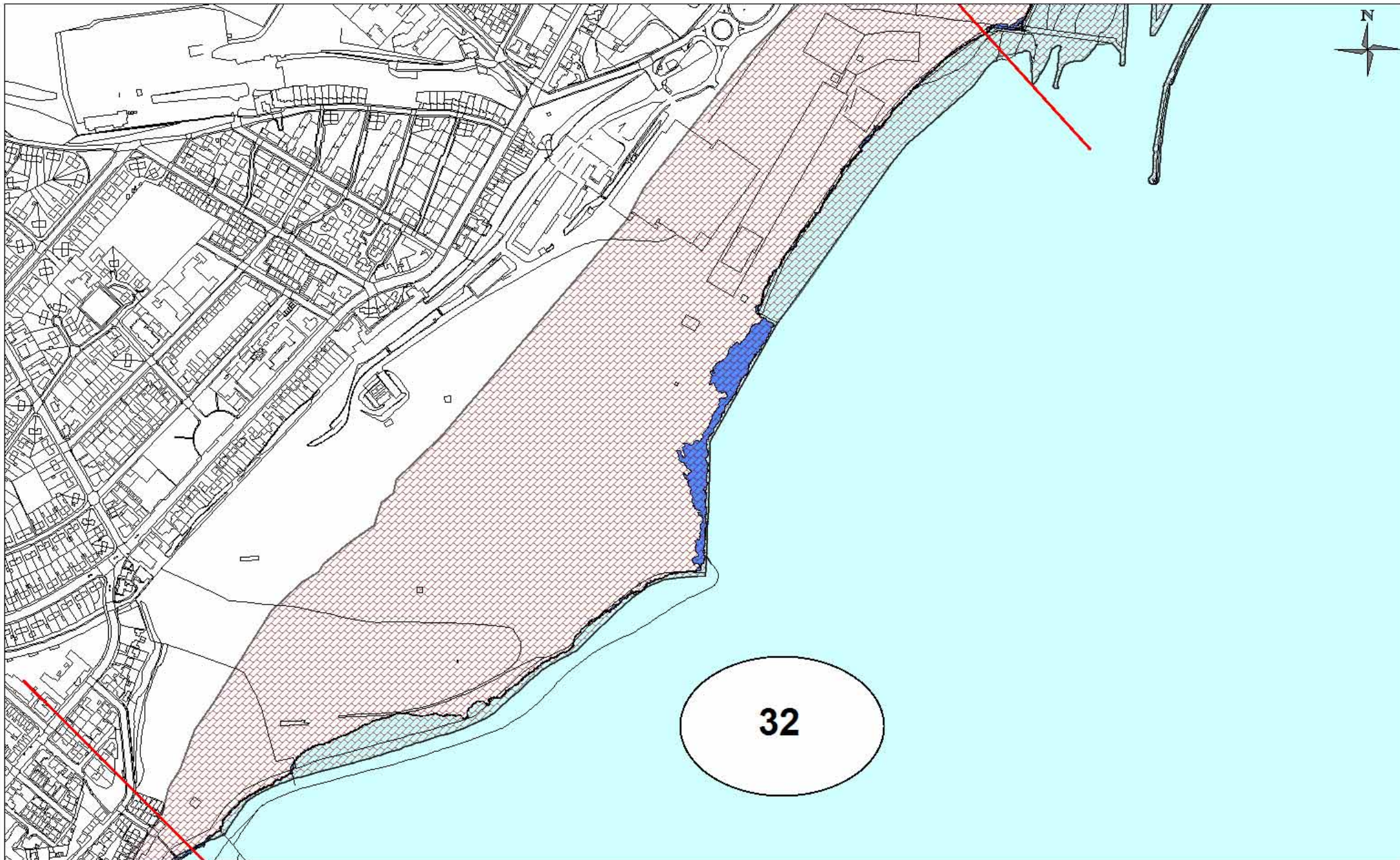
SMP1 Policy (MU17) – Selectively Hold the Line

SMP2 Policy (32)

Years 0-20	Years 20-50	Years 50-100
Hold the Line	Hold the Line	Hold the Line

Justification of SMP2 Policy

This Unit comprises partially defended sections of industrial land primarily used as a fabrication yard. Development in this area is being promoted through Scottish Enterprise in partnership with Fife Council. The rock armour revetment has performed well however should be re-profiled to extend its lifespan. Similarly, the sheet pile load out quay has been partly renewed. 'Hold the Line' is the recommended policy for this Unit as the land here is of significant commercial value.



Project : Fife SMP2		Title : Policy Unit 32 - Fife Energy Park							
Policy	0 - 20 Years :	Hold the Line	20 - 50 years :	Hold the Line	50 - 100 years :	Hold the Line	Drawn By : RM	Authorised : DR	Date : DEC 11
							Checked : NC	Reviewed : ZH	Scale : NTS
Shoreline Erosion over the past 150 years		Coastal Accretion		20yr Projected Sea Level		50yr Projected Sea Level		100yr Projected Sea Level	
Predicted Erosion, Next 100 Years		Reclaimed Land		Policy Unit Boundary		Policy Unit Marker		<small>*This map is reproduced from Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationary Office to Crown copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings (100023558) (2010).</small>	
Fife		Mouchel		Mouchel		Mouchel <small>37 - 39 Perrymount Road Haywards Heath West Sussex RH16 3BN Tel: (01444) 472330 Fax: (01444) 472331</small>			

Policy Unit 33 Methil

Description of Policy Unit

The town of Methil is dominated by the heavy industry centred on the coastal activities. The entire frontage of Methil is defended against marine processes with a mix of seawalls, piling and rock revetment. The eastern extent is marked by the redundant power station with its associated coastal defences which include extensive seawalls and rock installations.

The geomorphology of the Policy Unit is dominated by sand fronting the built defences associated with the harbour structures.

This Unit is included in the Firth of Forth SSSI, SPA and Ramsar site.

SMP1 Policy (MU18) – Hold the Line

SMP2 Policy (33)

Years 0-20	Years 20-50	Years 50-100
Hold the Line	Hold the Line	Hold the Line

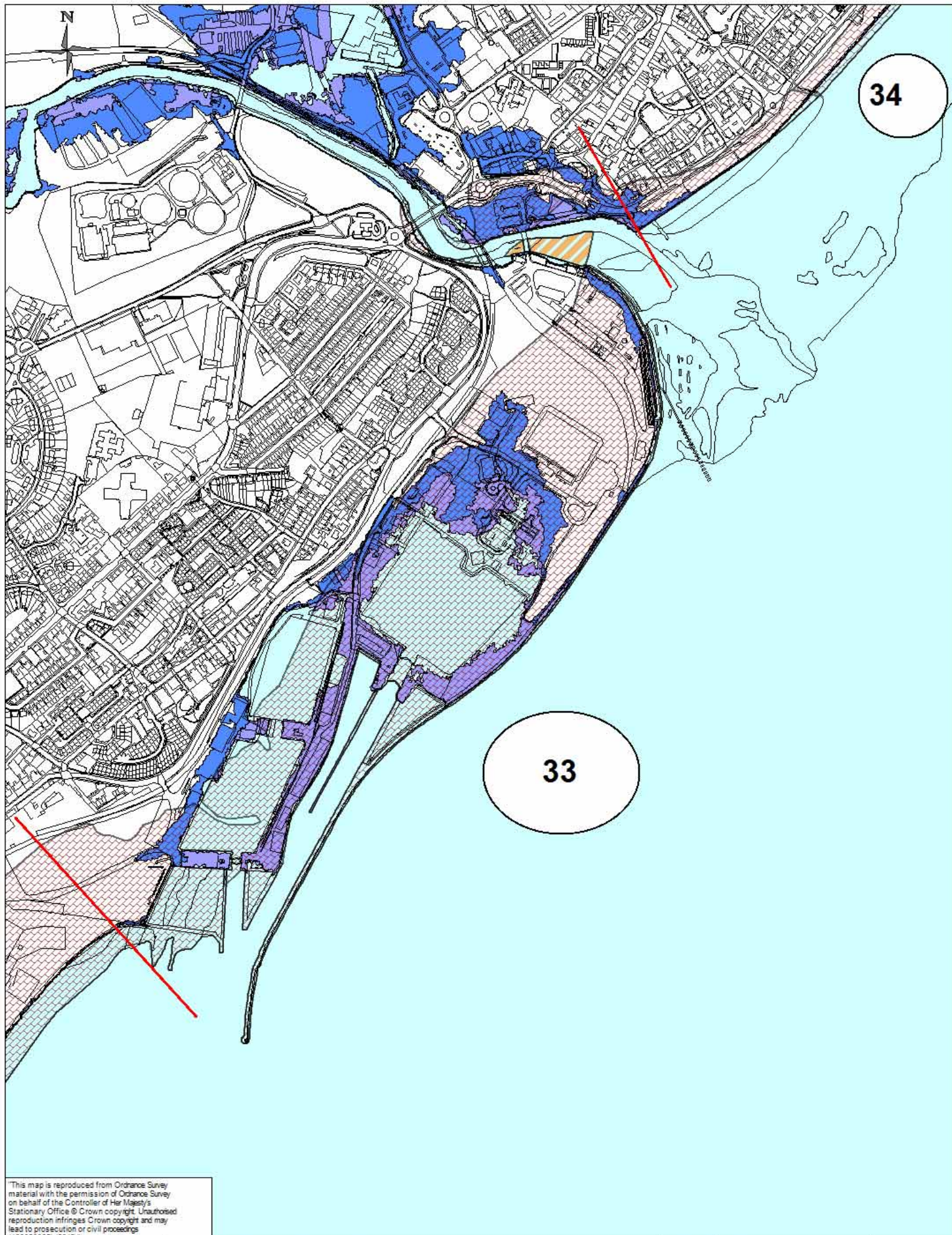
Justification of SMP2 Policy

This Policy Unit comprises the Methil Dock Yards, the demolished power plant site and river mouth, all of which are currently defended by concrete and masonry sea walls. A 'Hold the Line' policy has been recommended for this Unit.













Flooding to the extent shown on the flood maps will impact heavily upon the economy of the area which now includes the redevelopment of the dockside. Consequently, the existing sea defences should be maintained and enhanced in response to sea level rise. Defences protecting the dock yards are the responsibility of the landowner and as such will not require public funds to maintain.

Improving the defences at the mouth of the river will not overcome the risk from flooding further up river. Flood waters have potential to breach the banks and flood behind the initial defences.

Flood risk along watercourses will be assessed and managed by the Scottish Government, SEPA and Fife Council under the recent Flood Risk Management (Scotland) Act 2009. The management process is currently under development.



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Project : Fife SMP2		Title : Policy Unit 33 - Methil			Drawn By : RM	Authorised : DR	Date : DEC 11	Scale : NTS
Policy	0 - 20 Years :	Hold the Line	20 - 50 years :	Hold the Line	50 - 100 years :	Hold the Line		
	Shoreline Erosion over the past 150 years		Coastal Accretion		20yr Projected Sea Level	 Policy Unit Boundary  Policy Unit Marker		
	Predicted Erosion, Next 100 Years		Reclaimed Land		50yr Projected Sea Level			
					100yr Projected Sea Level			
								
						Mouchel 37 - 39 Perrymount Road Haywards Heath West Sussex RH16 3SA Tel: (01444) 472330 Fax: (01444) 472331		

Policy Unit 34 Leven

Description of Policy Unit

This Policy Unit covers the town of Leven where the foreshore comprises a seawall and sand beach and forms the west of Largo Bay. The geomorphology comprises sand beaches backed by dunes and built defences. The shore is also backed by a large car park and a strip of managed grassland.

The hinterland comprises the access road (A955) and a mix of residential and commercial property. Further to the east there are recreation areas close to the foreshore. Leven market cross is a designated SAM.

The Policy Unit is included in the Firth of Forth SSSI, SPA and Ramsar site.

SMP1 Policy (MU18) – Hold the Line

SMP2 Policy (34)

Years 0-20	Years 20-50	Years 50-100
Hold the Line (currently defended coastal sections)	Hold the Line (currently defended coastal sections)	Hold the Line (currently defended coastal sections)

Justification of SMP2 Policy

The preferred policy option of 'Hold the Line' for currently defended sections has been adopted for this Policy Unit. The 20 and 50yr flood lines only encroach upon the coast behind the current defences. Leven is mainly residential and once the defences fail then flood waters would spread through the town causing wide scale damages.

Tidal flooding affects the Scoonie Burn. After 50 years the flood lines to the east of the Policy Unit spread east with further flooding around the defended section, though this only impacts upon recreational areas and public infrastructure.

Flood risk along watercourses will be assessed and managed by the Scottish Government, SEPA and Fife Council under the recent Flood Risk Management (Scotland) Act 2009. The management process is currently under development.



Project : Fife SMP2

Title : Policy Unit 34 - Leven

Policy	0 - 20 Years :	20 - 50 years :	50 - 100 years :
	Hold the Line	Hold the Line	Hold the Line

Drawn By : RM	Authorised : DR	Date : DEC 11	Scale : NTS
Checked : NC	Reviewed : ZH		

Shoreline Erosion over the past 150 years	Coastal Accretion	20yr Projected Sea Level
Predicted Erosion, Next 100 Years	Reclaimed Land	50yr Projected Sea Level
		100yr Projected Sea Level

Policy Unit Boundary
 Policy Unit Marker

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Environment

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environment

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Policy Unit 35 Leven to Lundin Links

Description of Policy Unit

This section of coast comprises of sand dunes and wind blown sand pockets for the entire length (approximately 2.8 km). The foreshore is backed by managed grassland under ownership of the Lundin Golf Club. Towards the eastern extent of the Policy Unit there are rock extrusions in places on the foreshore.

There is a caravan site (Leven Beach Holiday Park) located in the western extent of the policy unit. Lundin Links marks the eastern extent of this unit where sand dunes and residential houses back this part of the shore.

This Unit falls under Firth of Forth SSSI, SPA and Ramsar site and contains the Standing Stones of Lundin, a designated SAM site.

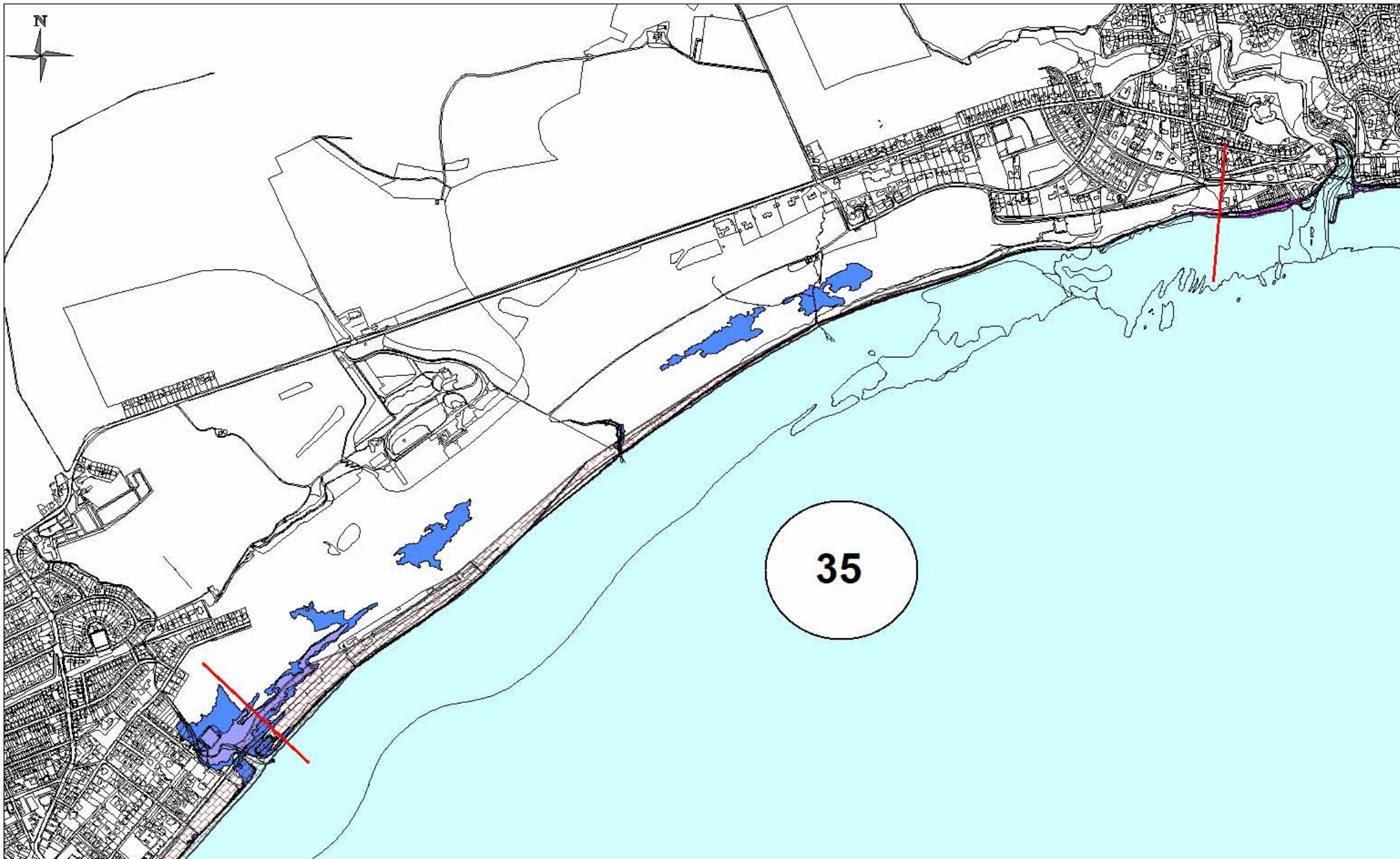
SMP1 Policy (MU19) – Selectively Hold the Line

SMP2 Policy (35)

Years 0-20	Years 20-50	Years 50-100
No Active Intervention	No Active Intervention	No Active Intervention

Justification of SMP2 Policy

The golf course, caravan park and Fife coastal pathway are the only assets being impacted on by flooding within this Policy Unit and a 'No Active Intervention' Policy has been recommended. Both the Leven and Lundin golf courses experience flooding at low points within their boundaries though it is likely that flooding occurs from the small streams flowing through the Lundin Golf Course. The caravan park is protected by a gabion basket/reno mattress embankment. There are natural dunes to the east of the Policy Unit which have had some timber works at their toe to prevent blow outs leading to flooding though these are in poor condition. Flooding of Leven golf course also occurs from the mouth of Scoonie Burn flowing out of the eastern most edge of Leven town in Policy Unit 34. Low areas on both golf courses are likely to create lagoons within their grounds with substantially more during the 50-100 year epoch. These will be of great environmental benefit to the area.



Project : Fife SMP2 Title : Policy Unit 35 - Leven to Lundin Links

Policy 0 - 20 Years : No Active Intervention 20 - 50 years : No Active Intervention 50 - 100 years : No Active Intervention

Drawn By : RM Authorised : DR
Checked : NC Reviewed : ZH Date : DEC 11 Scale : NTS

Shoreline Erosion over the past 150 years
Coastal Accretion
20yr Projected Sea Level
50yr Projected Sea Level
100yr Projected Sea Level
Predicted Erosion, Next 100 Years
Reclaimed Land

Policy Unit Boundary
Policy Unit Marker

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Policy Unit 36 Lower Largo

Summary description of Policy Unit

The coastline of this Unit is mainly sand with localised dunes on the foreshore. Backing the sandy shore is the town of Lower Largo where a harbour and viaduct dominate the Policy Unit. The geomorphology is mainly sand interspersed with rock platforms extruding through the thinner sand areas.

The Fife Coastal Path continues through this unit and the area falls under the Firth of Forth SSSI, SPA and Ramsar site. It also has important geological exposures and geomorphology. There is a mix of manmade and natural coastal defences in this policy unit.

Sir Andrew Wood's Tower at Largo House is a SAM with several other ASRIs in this Unit.

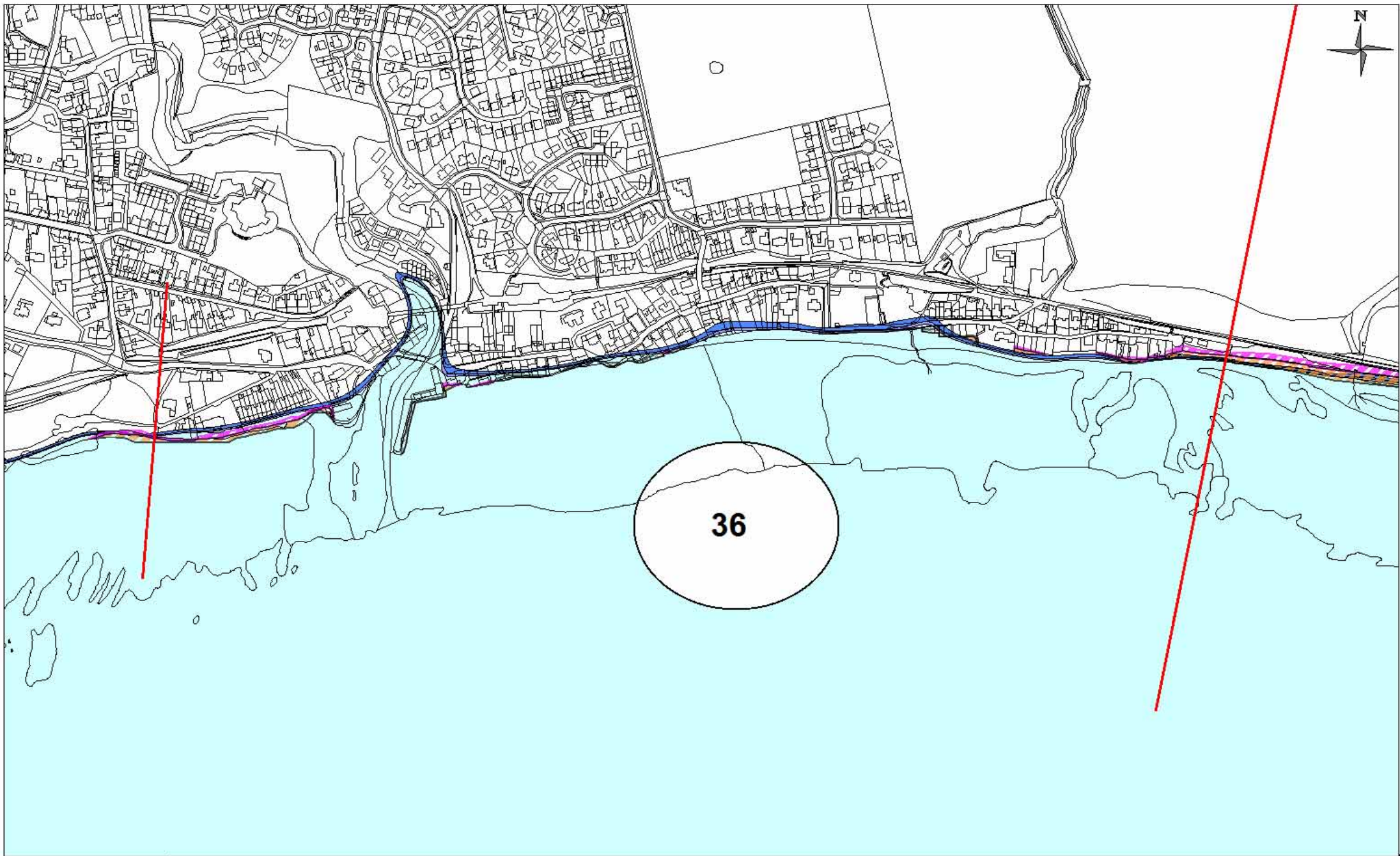
SMP1 Policy (MU20) – Selectively Hold the Line












SMP2 Policy (36)

Years 0-20	Years 20-50	Years 50-100
Hold the Line	Hold the Line	Hold the Line

Justification of SMP2 Policy

Residential, commercial and public infrastructures are all at risk of flooding and erosion within this Policy Unit. A large number of properties back onto the coastal frontage and experience flooding and/or erosion. The mouth of the Keil Burn at the mid point in the Policy Unit is at risk of flooding along its banks. This area is currently defended using concrete and masonry walls and rock revetments. The recommended policy is 'Hold the Line' to prevent spread of the flood waters further inland and to protect the coastal properties succumbing to erosion.



Project : Fife SMP2		Title : Policy Unit 36 - Lower Largo										
Policy	0 - 20 Years :	Hold the Line	20 - 50 years :	Hold the Line	50 - 100 years :	Hold the Line	Drawn By: RM Authorised: DR		Date : DEC 11	Scale : NTS		
							Checked: NC Reviewed: ZH					
	Shoreline Erosion over the past 150 years		Coastal Accretion		20yr Projected Sea Level		Policy Unit Boundary		<small>"This map is reproduced from Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationary Office & Crown copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings (10002588) (2010)." data-bbox="618 925 725 975"/></small>			Mouchel 37 - 39 Perrymount Road Haywards Heath West Sussex RH16 3BN Tel: (01444) 472330 Fax: (01444) 472331
	Predicted Erosion, Next 100 Years		Reclaimed Land		50yr Projected Sea Level		100yr Projected Sea Level					

Policy Unit 37 Lower Largo to Chapel Ness

Description of Policy Unit

This coastal area comprises mainly a wide sand foreshore increasing in width at Ruddons Point. The shoreline is characterised by large areas of intertidal sand flats and beaches. The foreshore is backed by extensive sand dunes and towards the eastern extent of the unit, the foreshore displays rock extrusions. The hinterland is almost entirely rural with agriculture being the main activity that takes place in this policy unit.

There is some archaeological interest in this Policy Unit with two ASRIs included.

This unit is part of the Firth of Forth SSSI, SPA and Ramsar site.

SMP1 Policy (MU21/MU22) – Do Nothing/Do Nothing

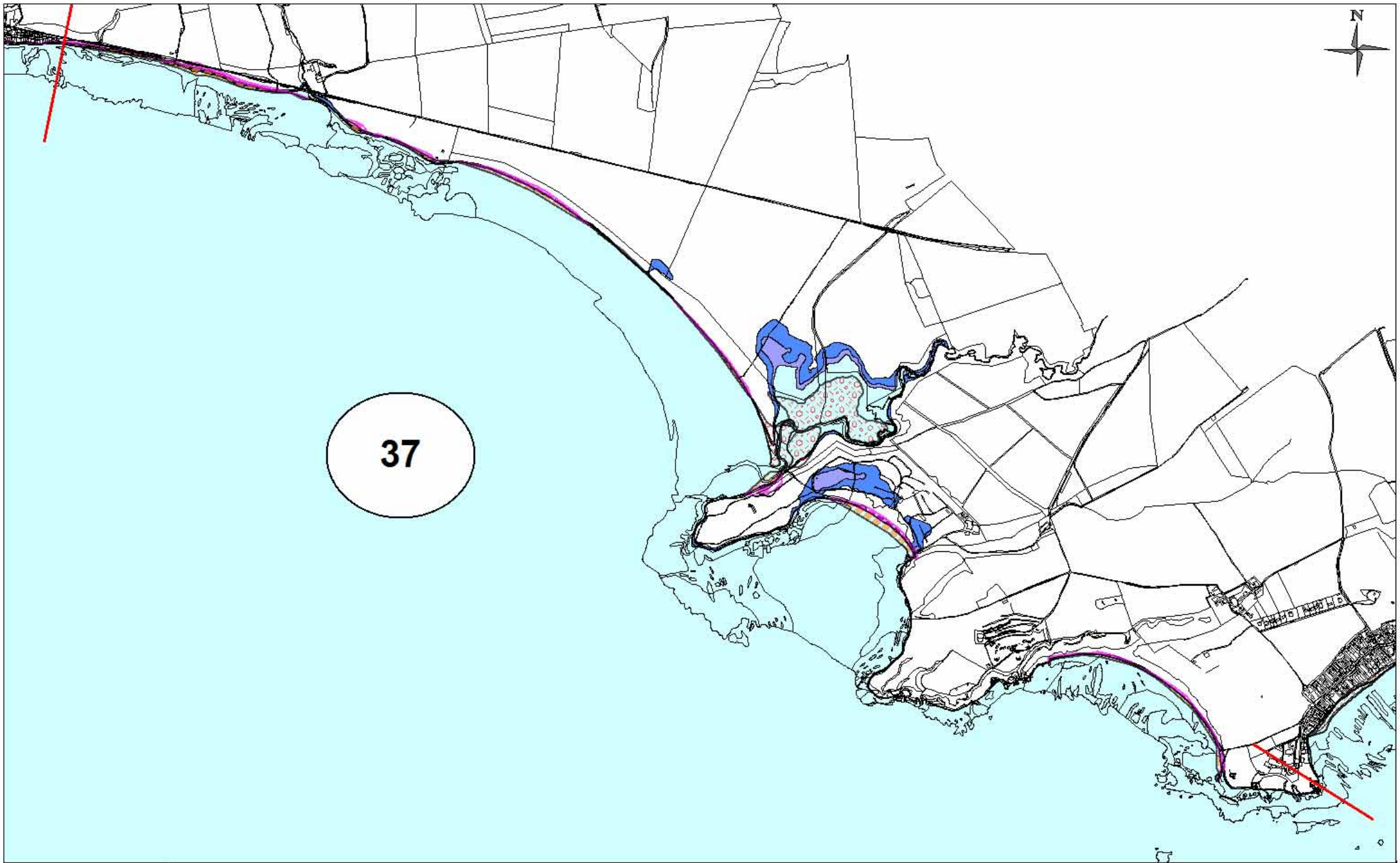
SMP2 Policy (37)






Years 0-20	Years 20-50	Years 50-100
No Active Intervention	No Active Intervention	No Active Intervention

Justification of SMP2 Policy

Appendix E in the SMP2 only identifies a golf course, campsite, beaches and the Fife coastal footpath within this Unit. There is a significant amount of erosion along this stretch of coastline, mainly within the few bays that exist. Flooding is limited to the mouth of the Cocklemill Burn and the nearby Shell Bay caravan and campsite.

The golf course experiences minimal erosion on the holes adjacent to the sea and some effects from erosion after 100 years will impact upon the heritage sites scattered along the coast. None of this coastline is currently defended and the remainder is covered with agricultural land and green fields, as such a 'No Active Intervention' policy has been advised for this Policy Unit. A gain in intertidal habitat can be attributed to this Policy Unit as a result of the coastal flooding around the eastern bays.



Project : Fife SMP2		Title : Policy Unit 37 - Lower Largo to Chapel Ness										
Policy	0 - 20 Years :	No Active Intervention	20 - 50 years :	No Active Intervention	50 - 100 years :	No Active Intervention	Drawn By : RM Checked : NC		Authorised : DR Reviewed : ZH		Date : DEC 11	Scale : NTS
 Shoreline Erosion over the past 150 years	 Coastal Accretion	 20yr Projected Sea Level		 Policy Unit Boundary		 Policy Unit Marker		<small>*This map is reproduced from Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationary Office & Crown copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings (100025585) (2010).</small>				Mouchel 37 - 39 Parrymount Road Haywards Heath West Sussex RH16 3SN Tel: (01444) 472330 Fax: (01444) 472331
 Predicted Erosion, Next 100 Years	 Reclaimed Land	 50yr Projected Sea Level		 100yr Projected Sea Level								

Policy Unit 38 Earlsferry to Elie

Description of Policy Unit

This Policy Unit comprises the rocky headland at Chapel Ness and the harbour at Elie which forms a sheltered bay. The coastline is backed by the large residential areas of Earlsferry and Elie with agricultural hinterland further. There are a number of water based recreational activities that occur within this Unit with golf and tourism being important to the area.

The Chapel at Earlsferry is a SAM with a further three ASRIs in this policy unit.

The Unit falls within the Firth of Forth SSSI, Ramsar site and SPA.

There are a number of manmade coastal defence structures, some of which are integrated in to the rock platform. Elie Harbour has been identified as a Blue Flag Beach meeting European standards for cleanliness.

SMP1 Policy (MU23) – Selectively Hold the Line

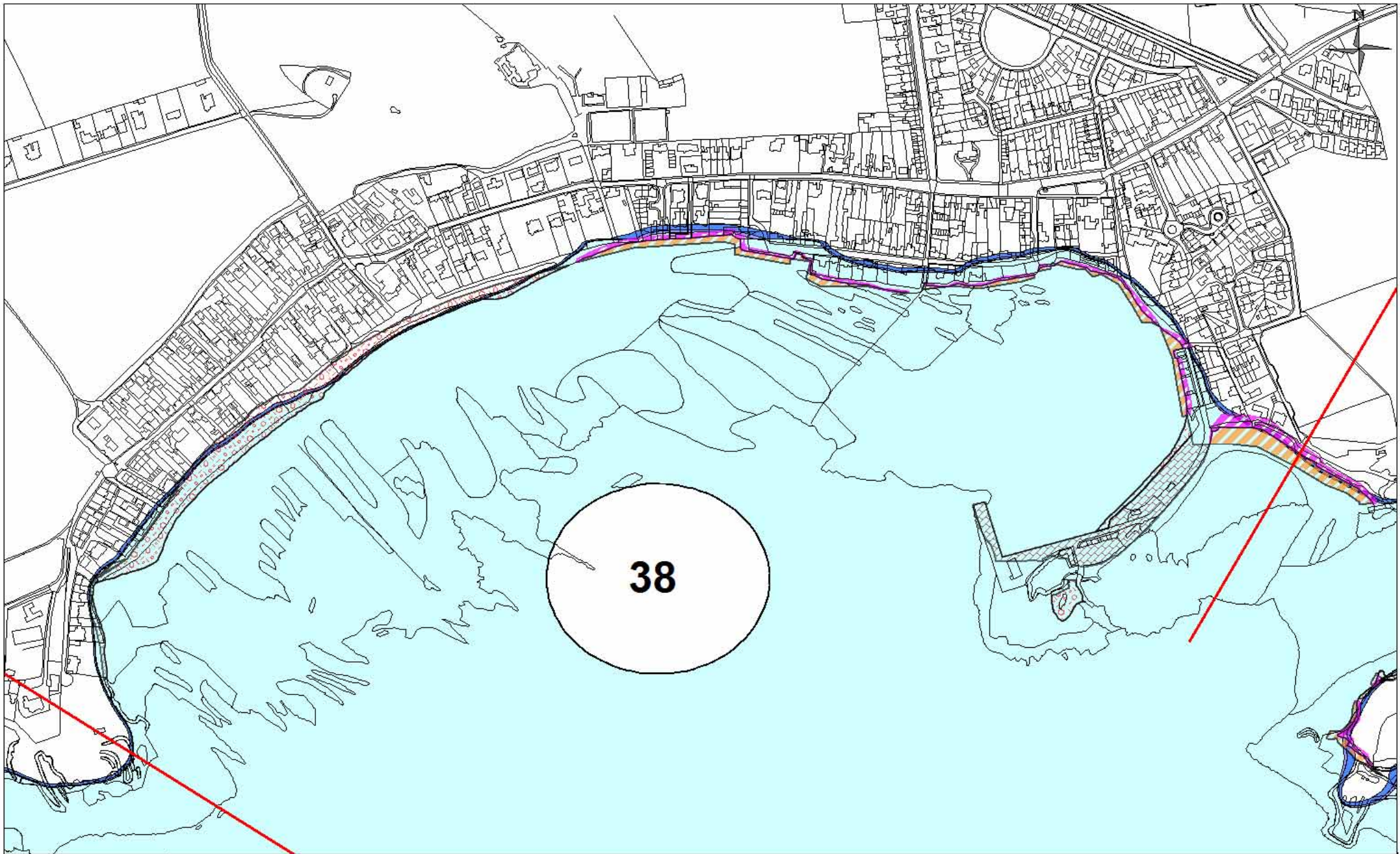
SMP2 Policy (38)












Years 0-20	Years 20-50	Years 50-100
Hold the Line (currently defended areas)	Hold the Line (currently defended areas)	Hold the Line (currently defended areas)

Justification of SMP2 Policy

The recommended policy option for this Unit is to Hold the Line for the currently defended areas. This is because there are a large number of properties backing onto the coastline, the eastern half are affected by both flooding and erosion where as the western side of the bay is accreting and therefore the properties are only at risk of flooding.

The majority of the coastline is currently defended though many of the defences are likely to be privately owned. The harbour and pier are likely to provide some additional protection to the bay, though the causeway and access road will need to be maintained as there are high rates of erosion to the eastern side.



Project : Fife SMP2		Title : Policy Unit 38 - Earlsferry to Elie									
Policy	0 - 20 Years :	Hold the Line	20 - 50 years :	Hold the Line	50 - 100 years :	Hold the Line	Drawn By : RM	Authorised : DR	Date : DEC 11	Scale : NTS	
							Checked : NC	Reviewed : ZH			
 Shoreline Erosion over the past 150 years	 Coastal Accretion	 20yr Projected Sea Level	 Policy Unit Boundary			 Policy Unit Marker	<small>*This map is reproduced from Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationary Office & Crown copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings (10002588) (2010).</small>				Mouchel 37 - 39 Perry Mount Road Haywards Heath West Sussex RH16 3BN Tel: (01444) 472330 Fax: (01444) 472331
 Predicted Erosion, Next 100 Years	 Reclaimed Land	 50yr Projected Sea Level  100yr Projected Sea Level									

Policy Unit 39 Elie to St Monans

Summary description of Policy Unit

This Policy Unit comprises mainly rock platforms with accumulations of sand and shingle in pockets. There are no manmade coastal defences in this unit and the hinterland is entirely rural with the primary use being agriculture.

There are residential properties scattered throughout this unit mostly associated with the agricultural activities with a farm store also located here. The beaches are a popular for recreation, with some boating activities being carried out from either ends of the Unit. The Fife Coastal Path also runs through this Unit.

There are two SAMs located along this frontage, the Ardross and Newark castle. There are a further five ASRIs located in this Unit.

This unit falls within the Firth of Forth SSSI, SPA and Ramsar site.

SMP1 Policy (MU24) – Do Nothing

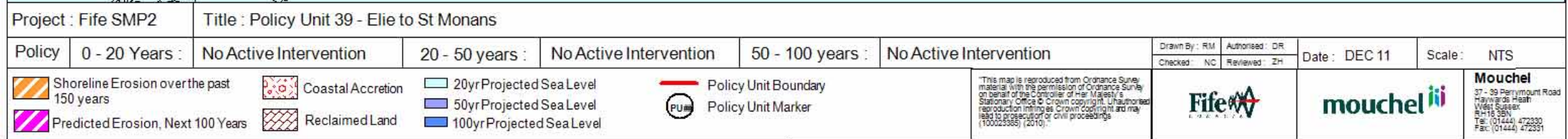
SMP2 Policy (39)

Years 0-20	Years 20-50	Years 50-100
No Active Intervention	No Active Intervention	No Active Intervention

Justification of SMP2 Policy

The coastline within this Policy Unit comprises of beaches rock outcrops and natural cliffs, with no defended sections along its length at any point. A Policy of 'No Active Intervention' has been recommended for this Policy Unit as flooding and erosion does not have any impact on residential, commercial or infrastructure other than the Fife coastal path.

Erosion plays a main part in shaping this section of coastline and will eventually impact upon 2 scheduled ancient monument sites around the 100yr mark (Ardross and Newark Castles). Elie lighthouse is situated on a rock outcrop and erosion rates are gradually forming an island feature. The coastal flooding within this Policy Unit allows for steady growth in intertidal area throughout this Policy Unit.



Policy Unit 40 St Monans

Summary description of Policy Unit

The coastline along this Unit consists of rock platform with sand and shingle deposits mostly around the harbour at St Monans. There are manmade coastal defences along this frontage with many of them being part of the original buildings. Many of the defences have been integrated in to the rock platform. The village of St Monans main feature is the harbour which is mostly used for mainly recreational activities with some commercial fishing still continuing.

The Harbour is an ASRI.

The Unit is within the Firth of Forth SSSI, SPA and Ramsar site and east of the harbour is also under the St Monans Shore (East) Regionally Important Geological and geomorphological Site (RIGS).

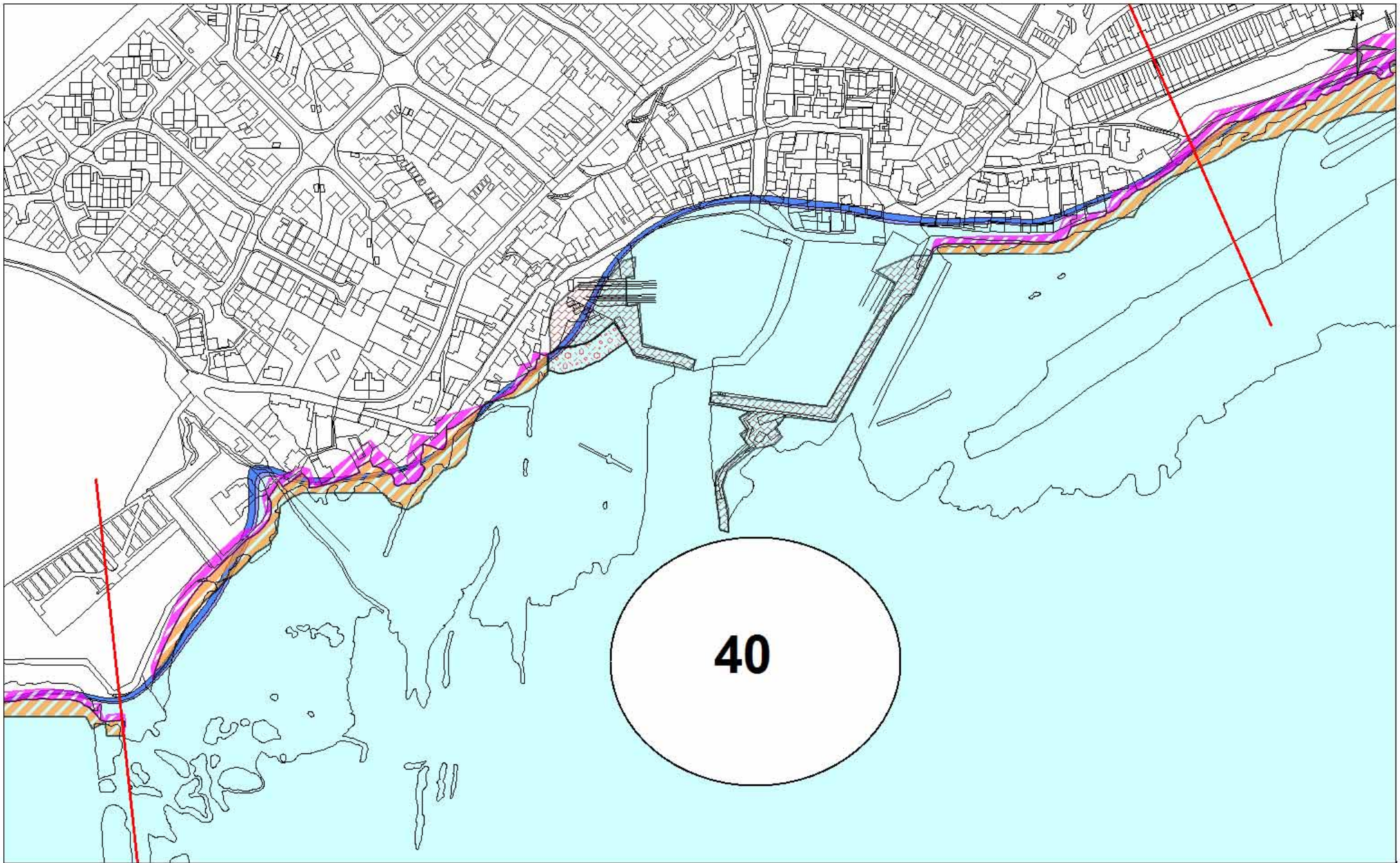
SMP1 Policy (MU25) – Selectively Hold the Line












SMP2 Policy (40)

Years 0-20	Years 20-50	Years 50-100
Hold the Line (currently defended sections)	Hold the Line (currently defended sections)	Hold the Line (currently defended sections)

Justification of SMP2 Policy

St Monans is affected along its coast from flood and sea level rise and also from erosion either side of the harbour. The assets impacted on are residential, commercial and also includes some infrastructure. There are existing defences within this policy unit and the flood lines tie back into the coastline at the extremities of these. Therefore the policy recommended for this unit is to Hold the Line with the currently defended sections.



Project : Fife SMP2		Title : Policy Unit 40 - St Monans								
Policy	0 - 20 Years :	Hold the Line	20 - 50 years :	Hold the Line	50 - 100 years :	Hold the Line	Drawn By : RM	Authorised : DR	Date : DEC 11	Scale : NTS
							Checked : NC	Reviewed : ZH		
 Shoreline Erosion over the past 150 years	 Coastal Accretion	 20yr Projected Sea Level	 Policy Unit Boundary			<small>*This map is reproduced from Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office & Crown copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings (100020000) (2010).</small>			Mouchel 37 - 39 Parrymount Road Haywards Heath West Sussex RH16 3BN Tel: (01444) 472330 Fax: (01444) 472331	
 Predicted Erosion, Next 100 Years	 Reclaimed Land	 50yr Projected Sea Level	 100yr Projected Sea Level	 Policy Unit Marker						

Policy Unit 41 St Monans to Pittenweem

Summary description of Policy Unit

This Policy Unit comprises mostly rock platform and cliffs with deposits of sand and shingle in places. The hinterland is mainly used for agricultural activities with recreational walking occurring along the Fife Coastal Path which runs through this unit. There are also Balcaskie Registered parks and gardens.

There is some archaeological interest in this area with a SAM at the Coal Farms Salt Pans and approximately ten ASRIs located within this unit.

The unit falls within the Firth of Forth SSSI, SPA and Ramsar site and the St Monans Shore (East) Regionally Important Geological and geomorphological Site (RIGS).

There are no significant manmade coastal defences within this unit, although there are some hard coastal structures at the old outdoor swimming pools.

SMP1 Policy (MU26) – Selectively Hold the Line

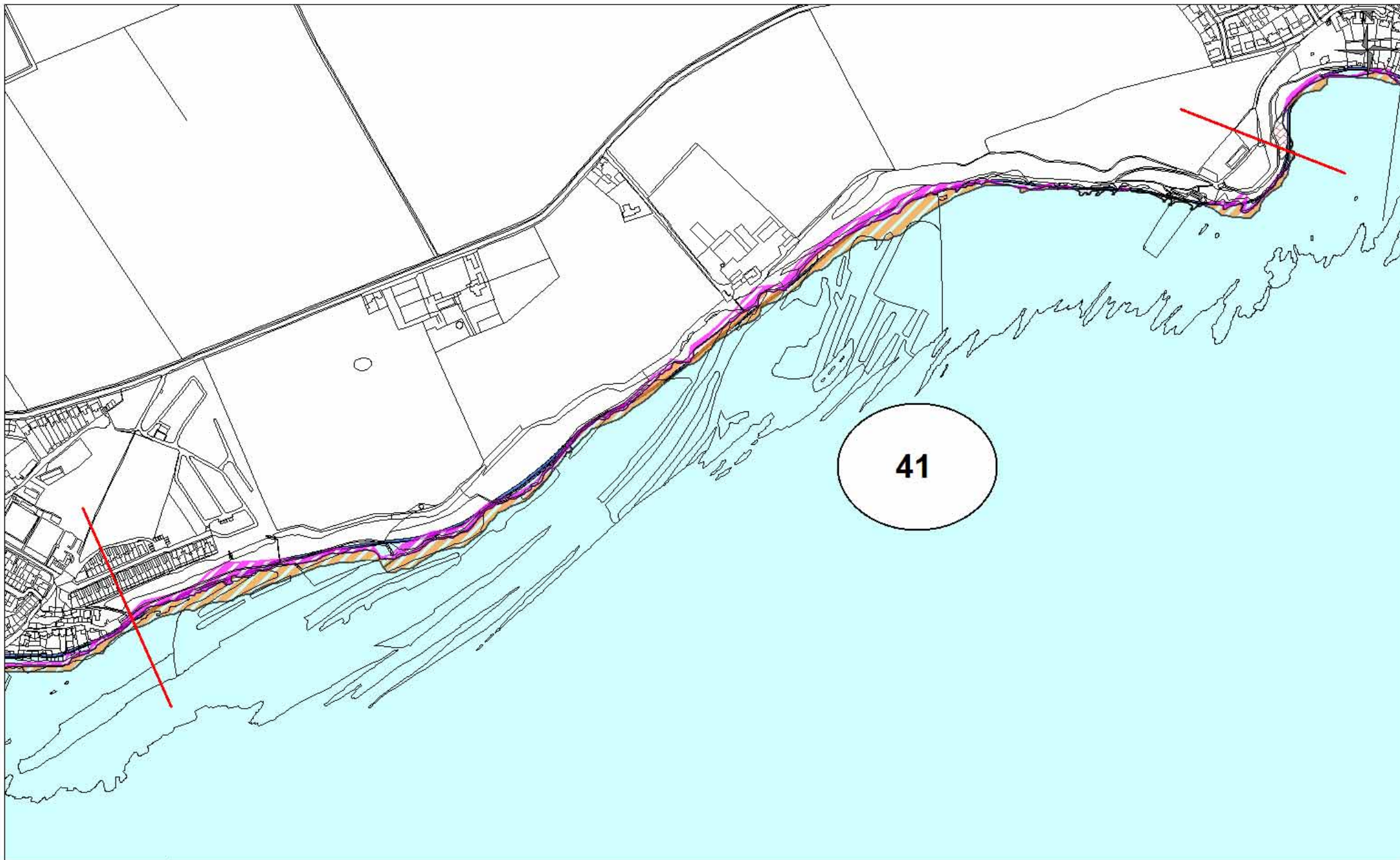
SMP2 Policy (PU41)

Years 0-20	Years 20-50	Years 50-100
No Active Intervention	No Active Intervention	No Active Intervention

Justification of SMP2 Policy

No Active Intervention is the recommended policy within this unit. The entire coastline comprises agricultural land with one farm (a horticultural nursery) situated near the coastline. Throughout this section flooding and sea level rise pose minimal threat to the area, whilst erosion occurs on the east facing front. The main eroded area is in front of the nursery though it only just infringes on the property boundary after 100 years.

The policy of 'No Active Intervention' will result in the long term erosion of the SAM known as St Monans windmill and saltpans. Although the Environmental Assessment indicates that a 'Hold the Line' policy would protect these nationally important heritage assets, further appraisal through the SMP has indicated that such a policy would not be sustainable and justified with little evidence of significant coastal settlements or infrastructure. In view of this, the SMP states that the St Monans windmill and saltpans should have provisions to be protected by Historic Scotland.



Project : Fife SMP2		Title : Policy Unit 41 - St Monans to Pittenweem										
Policy	0 - 20 Years :	No Active Intervention	20 - 50 years :	No Active Intervention	50 - 100 years :	No Active Intervention	Drawn By : RM Checked : NC		Authorised : DR Reviewed : ZH	Date : DEC 11	Scale : NTS	
Shoreline Erosion over the past 150 years	Coastal Accretion	20yr Projected Sea Level		50yr Projected Sea Level		100yr Projected Sea Level		Policy Unit Boundary Policy Unit Marker		<p><small>*This map is reproduced from Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationary Office © Crown copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings (100023558) (2010).</small></p>		<p>Mouchel 37 - 39 Perrymount Road Haywards Heath West Sussex RH16 3BN Tel: (01444) 472330 Fax: (01444) 472331</p>
Predicted Erosion, Next 100 Years	Reclaimed Land											

Policy Unit 42 Pittenweem

Description of Policy Unit

This Policy Unit comprises the village of Pittenweem and is fronted by a foreshore of mainly rock platform with areas of sand and shingle. There is a mix of natural and manmade coastal defences with most of the hard structures centred on the harbour. Other coastal defences are associated with private residential houses and are mostly masonry walls well integrated in to the rock platforms and extrusions. The harbour at Pittenweem is owned by Fife Council and is the main trading harbour for the area where commercial fishing continues.

Pittenweem Market Cross is designated as a SAM.

The area is covered by the Firth of Forth SSSI, SPA and Ramsar site and to the west of the harbour is also part of the St Monans Shore (East) RIGS Site.

SMP1 Policy (MU27) – Selectively Hold the Line

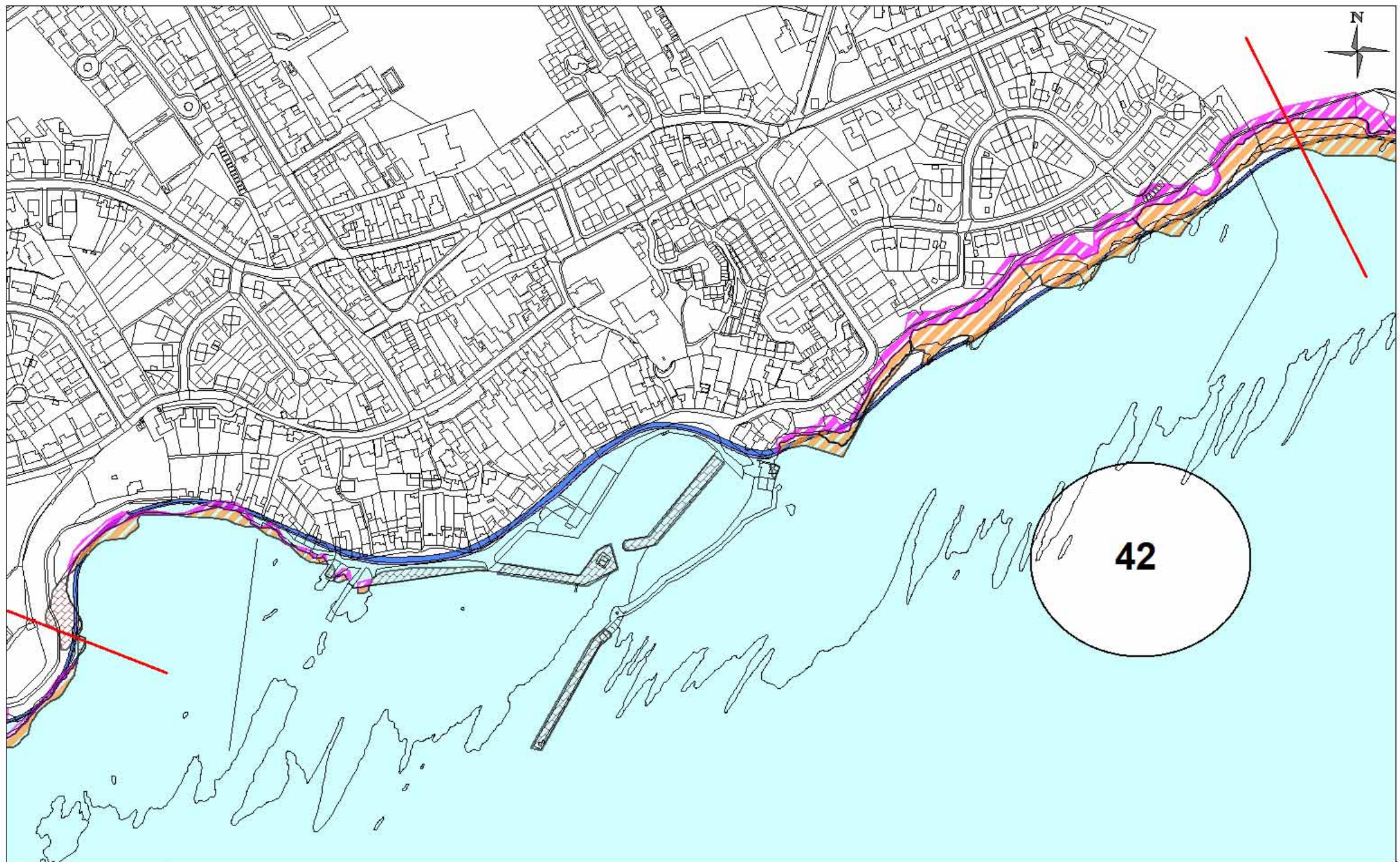
SMP2 Policy (PU42)

Years 0-20	Years 20-50	Years 50-100
Hold the Line	Hold the Line	Hold the Line

Justification of SMP2 Policy

The south west of the PU contains a number of properties backing onto the bay protected by private defences; this area is subject to flooding and erosion over time. The harbour is the responsibility of Fife Council and also becomes liable to flooding, this can be assumed to spread inland if the existing defences are not maintained. Therefore the recommended policy option for this PU is to Hold the Line throughout the harbour. By adopting a HTL Policy it allows for future planning to adapt to climate change. Private defences for residences can then also be maintained at the owner's expense.

The remainder of the policy unit to the north east is not currently defended as there are substantial cliffs providing a natural defence. The land is quite high so this section is not subject to flooding effects. However over time the properties facing the coastline are likely to be subject to damage through erosion.



Project : Fife SMP2		Title : Policy Unit 42 - Pittenweem							
Policy	0 - 20 Years :	Hold the Line	20 - 50 years :	Hold the Line	50 - 100 years :	Hold the Line	Drawn By : RM	Authorised : DR	Date : DEC 11
							Checked : NC	Reviewed : ZH	Scale : NTS
<div> <div> Shoreline Erosion over the past 150 years </div> <div> Predicted Erosion, Next 100 Years </div> <div> 20yr Projected Sea Level </div> <div> 50yr Projected Sea Level </div> <div> 100yr Projected Sea Level </div> <div> Coastal Accretion </div> <div> Reclaimed Land </div> <div> Policy Unit Boundary </div> <div> Policy Unit Marker </div> </div>									
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Policy Unit 43 East of Pittenweem to Anstruther Wester

Summary description of Policy Unit

This unit comprises the section of recreational and agricultural land between the village of Pittenweem and Anstruther Wester and is fronted by a foreshore of mainly rock platform with areas of sand and shingle. The western section of this Policy unit is undefended however several manmade coastal defences exist in the eastern part of this small section of coast. A Scottish Water pumping station is landward of the disused outdoor swimming pool at Billow Ness. The pumped sewer runs beneath the single track roadway around Billow Ness beach. The hinterland consists of Anstruther Golf Course and is further backed by agricultural land.

This section of coast is part of the Firth of Forth SSSI, SPA and Ramsar site.

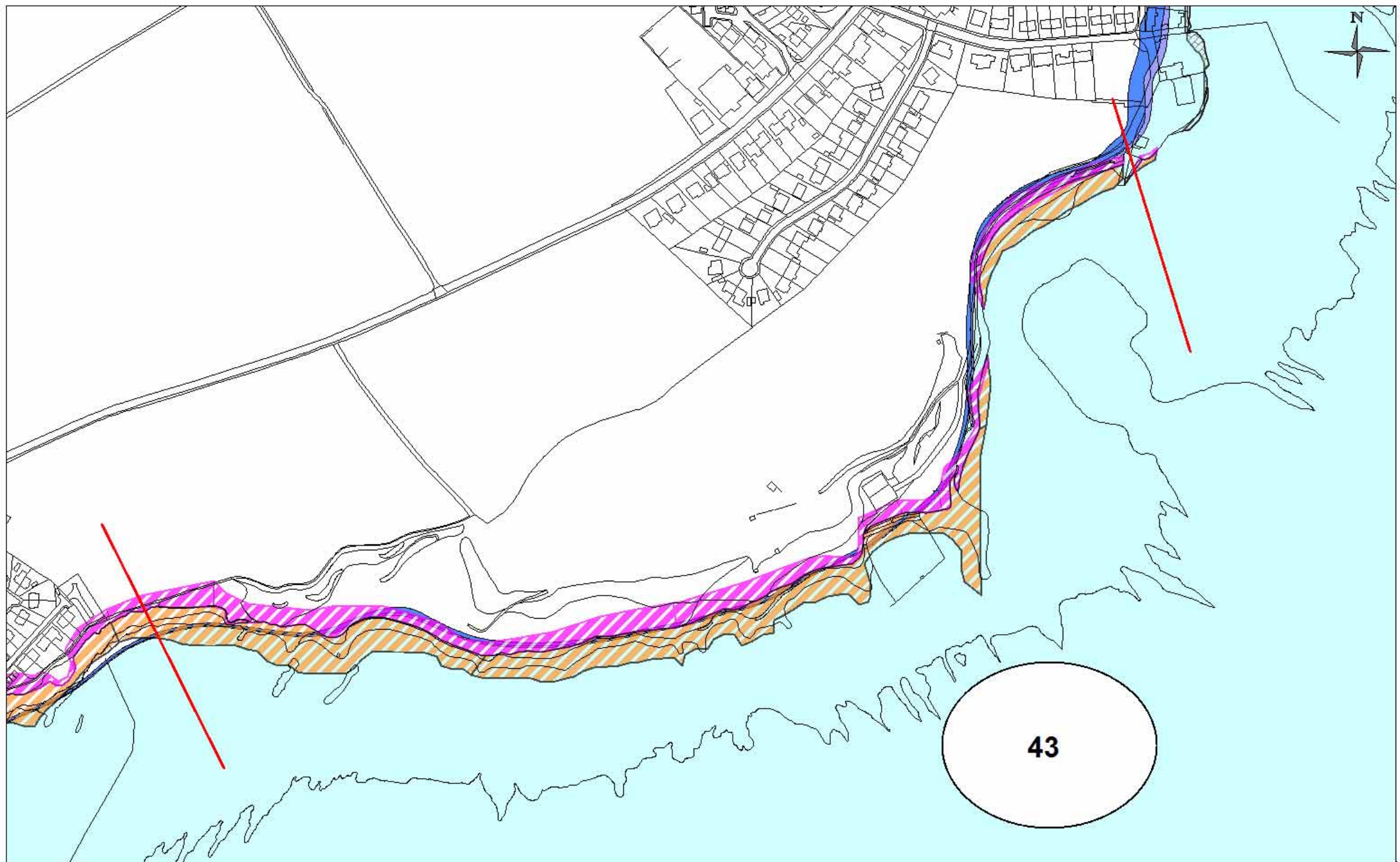
SMP1 Policy (MU27) – Selectively Hold the Line












SMP2 Policy (PU43)

Years 0-20	Years 20-50	Years 50-100
No Active Intervention	No Active Intervention	No Active Intervention

Justification of SMP2 Policy

Anstruther Golf Course is subject to minimal coastal flooding and minimal risk through rising sea levels. However this section of coastline is subject to heavy erosion which has caused damage to the existing defences and is likely to affect some holes on the golf course and the maintenance building. The features at risk within this Policy Unit are the golf course, the coastal path and the Scottish Water pipeline. All of these could adapt to accommodate changes to the coastline. Maintenance of the existing defences around Billow Ness beach may be continued subject to available funding however a No Active Intervention Policy is preferred in this situation.



Project : Fife SMP2		Title : Policy Unit 43- East of Pittenweem to Anstruther Wester								
Policy	0 - 20 Years :	No Active Intervention	20 - 50 years :	No Active Intervention	50 - 100 years :	No Active Intervention	Drawn By : RM Checked : NC	Authorised : DR Reviewed : ZH	Date : DEC 11	Scale : NTS
 Shoreline Erosion over the past 150 years	 Coastal Accretion	 20yr Projected Sea Level		 Policy Unit Boundary		<small>"This map is reproduced from Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationary Office © Crown copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings (100020389) (2010)".</small>			Mouchel 37 - 39 Parrymount Road Haywards Heath West Sussex Tel: (01444) 472330 Fax: (01444) 472331	
 Predicted Erosion, Next 100 Years	 Reclaimed Land	 50yr Projected Sea Level		 100yr Projected Sea Level						 Policy Unit Marker

Policy Unit 44 Anstruther

Summary description of Policy Unit

The geomorphology of this Unit comprises the rock platform with sand and shingle deposits that front Anstruther. There are a combination of manmade coastal defences and natural rock defences. The manmade defences including the historic harbour piers and ad-hoc masonry sea walls integrated in to the rock extrusions. The harbour is predominantly used for recreational activities, although there is some light commercial fishing taking place. There is also a harbour further west at Cellardyke which is mainly used for recreational activities.

There is some archaeological interest in the area with SAMs at Anstruther Easter Market Cross, Cellardyke Market Cross and Skeith Stone.

This coast is covered by Firth of Forth SSSI, SPA and Ramsar site.

SMP1 Policy (MU27) – Selectively Hold the Line

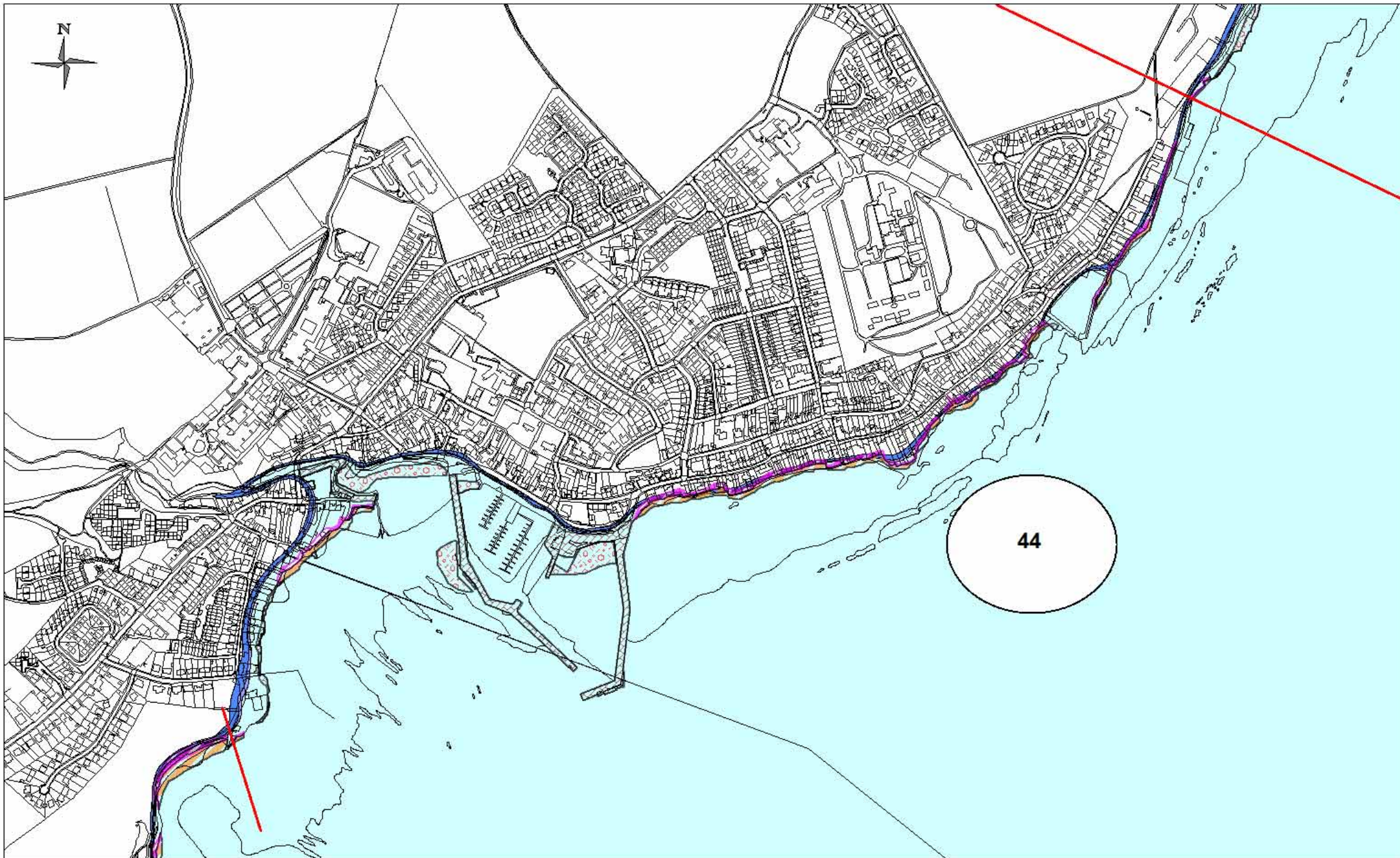
SMP2 Policy (PU44)






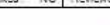





Years 0-20	Years 20-50	Years 50-100
Hold the Line (Currently defended sections)	Hold the Line (Currently defended sections)	Hold the Line (Currently defended sections)

Justification of SMP2 Policy

The policy recommended for this Policy Unit is Hold the Line for the currently defended sections. Anstruther is mainly residential with the majority of the coastline being backed onto by residential properties, the only exception being the church and cemetery at the mouth of the Dreel Burn and a few commercial properties near the harbour. Sea level rise and flooding affects nearly all of these coastal structures and large extents of road infrastructure. Erosion will impact upon all those properties east of the harbour and a few south of the cemetery.

Hold the Line would prevent these areas from flooding and the whole length of the coast is currently defended though some sections are likely to be privately owned.



Project : Fife SMP2		Title : Policy Unit 44 - Anstruther												
Policy	0 - 20 Years :	Hold the Line	20 - 50 years :	Hold the Line	50 - 100 years :	Hold the Line	Drawn By : RM	Authorised : DR	Date : DEC 11	Scale : NTS				
							Checked : NC	Reviewed : ZH						
	Shoreline Erosion over the past 150 years		Coastal Accretion		20yr Projected Sea Level	 Policy Unit Boundary  Policy Unit Marker	<small>This map is reproduced from Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationary Office & Crown copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings (100022000) (2010).</small>					Mouchel 37 - 39 Perrymount Road Haywards Heath West Sussex RH16 3BN Tel: (01444) 472330 Fax: (01444) 472331		
	Predicted Erosion, Next 100 Years		Reclaimed Land		50yr Projected Sea Level									100yr Projected Sea Level

Policy Unit 45 Anstruther Easter to Crail

Summary description of Policy Unit

This unit comprises the rock platform that is characteristic of this part of the Fife coastline. The hinterland is entirely rural with a few residential properties scattered along the frontage with a caravan park marking the eastern extent of this Unit. The primary land use in this Policy Unit is agricultural. The Fife Coastal Path also runs the entire length of this unit. The coast is defended entirely by natural coastal defences with no significant manmade structures to mention. There are a few Scheduled Ancient Monument Sites within the Policy Unit.

The unit is part of the Barnsmuir Coast SSSI with the Forth Islands SPA and Isle of Mac SAC located offshore.

SMP1 Policy (MU28) – Do Nothing

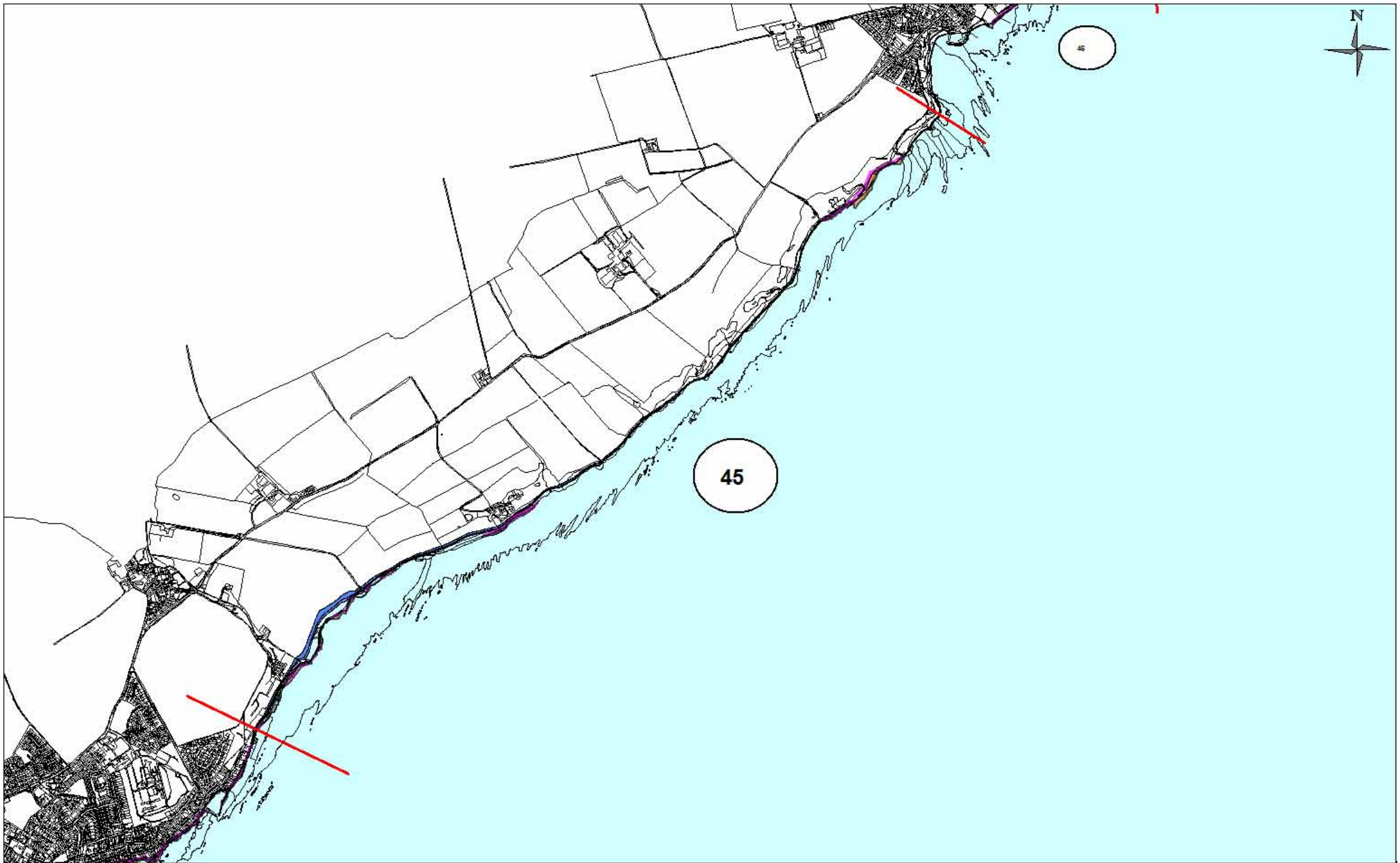
SMP2 Policy (PU45)

Years 0-20	Years 20-50	Years 50-100
No Active Intervention	No Active Intervention	No Active Intervention

Justification of SMP2 Policy

Coastal erosion and rising sea levels are only likely to impact upon the Fife coastal path and one caravan park within this PU. There are no significant sections of coastal flooding and only isolated areas of erosion and accretion. The preferred policy for this unit would be No Active Intervention and let natural processes take their course.

The minor flooding will allow for a slight increase throughout this Policy Unit in intertidal habitat.



Project : Fife SMP2		Title : Policy Unit 45 - Anstruther Easter to Crail							
Policy	0 - 20 Years :	No Active Intervention	20 - 50 years :	No Active Intervention	50 - 100 years :	No Active Intervention	Drawn By : RM Authorised : DR Checked : NC Reviewed : ZH	Date : DEC 11	Scale : NTS
Shoreline Erosion over the past 150 years Predicted Erosion, Next 100 Years	Coastal Accretion Reclaimed Land	20yr Projected Sea Level 50yr Projected Sea Level 100yr Projected Sea Level	Policy Unit Boundary Policy Unit Marker	<small> "This map is reproduced from Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office & Crown copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings (100020388) (2010)." </small>					Mouchel 37 - 39 Parrymount Road Haywards Heath West Sussex RH16 3SN Tel: (01444) 472330 Fax: (01444) 472331

Policy Unit 46 Crail

Summary description of Policy Unit

This Policy Unit is dominated by cliffs fronted by a raised beach consisting of marine deposits. There is sand build up around Crail Harbour which is used for mainly recreational activities with some small fishing vessels using the facilities. There are large residential areas near to the shore in this unit with many of them located directly on the backshore.

There is also a high level of archaeological interest in this unit with three SAMs (Crail Market Cross, Cross Slab at Victoria Gardens and the Guideplate) with a further seven ASRIs. The Fife Coastal Path runs the entire length of this unit and part of this unit is within the Firth of Forth SSI, SPA and Ramsar Site, along with the Fife Ness Coast SSSI.

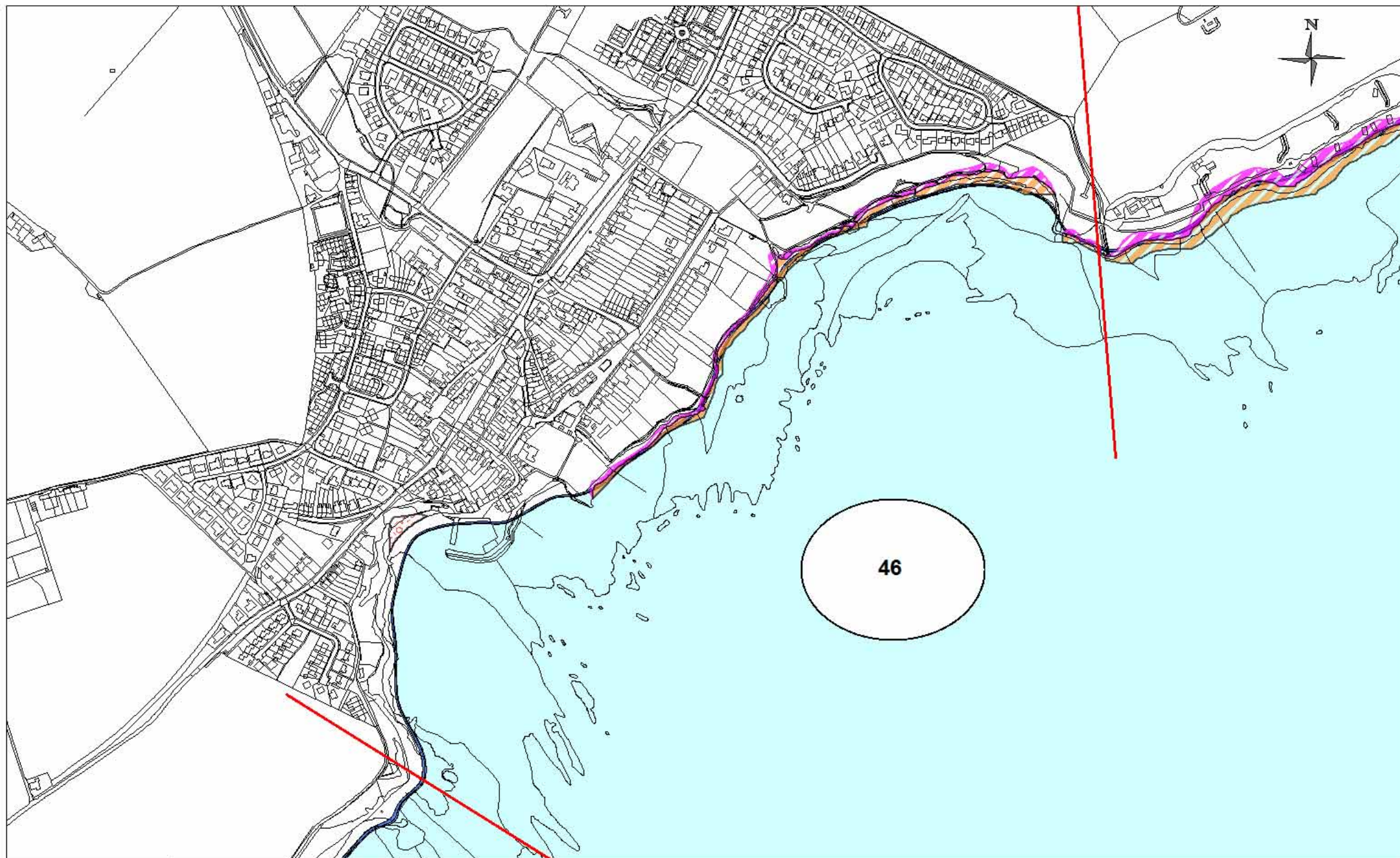
SMP1 Policy (MU29) – Selectively Hold the Line

SMP2 Policy (PU46)

Years 0-20	Years 20-50	Years 50-100
Hold the Line (on currently defended sections of coast)	Hold the Line (on currently defended sections of coast)	Hold the Line (on currently defended sections of coast)

Justification of SMP2 Policy

The coastline around Crail is formed from steep rock outcrops and cliffs with a number of sandy bays. There is a combination of man made and natural defences, the steeply sloping ground generally protects against coastal flooding. The northern section of the Policy Unit experiences substantial erosion within the bays though this also has minimal impact upon the cliffs and rock outcrops. There are a number of defended sections from the harbour North, therefore Hold the Line to maintain the minimal level of flood risk and prevent erosion infringing on the rear of properties is the recommended choice of policy. The cliffs provide suitable natural protection throughout the remainder of the Policy Unit and can be left as No Active Intervention.



Project : Fife SMP2		Title : Policy Unit 46 - Crail									
Policy	0 - 20 Years :	Hold the Line	20 - 50 years :	Hold the Line	50 - 100 years :	Hold the Line	Drawn By: RM Checked: NC	Authorised: DR Reviewed: ZH	Date : DEC 11	Scale : NTS	
Shoreline Erosion over the past 150 years	Coastal Accretion	20yr Projected Sea Level	Policy Unit Boundary	50yr Projected Sea Level	Policy Unit Marker	100yr Projected Sea Level	<div><div>This map is reproduced from Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationary Office & Crown copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings (100022088) (2010).</div><div></div></div>			<div><div>Mouchel</div><div>37 - 39 Perrymount Road Haywards Heath West Sussex RH16 3BN Tel: (01444) 472330 Fax: (01444) 472331</div></div>	
Predicted Erosion, Next 100 Years	Reclaimed Land										

Policy Unit 47 Crail to St Andrews

Description of Policy Unit

This Policy Unit comprises the characteristic rock platform foreshore with intermittent localised accumulations of shingle and boulders. The hinterland consists of mostly agricultural land with no significant settlements of residential property. There is also a large disused airfield within this policy unit with some associated buildings now used as an industrial estate towards the eastern extent. At Fife Ness the coast turns toward a north west where the rock platform continues with exposed lengths of cliff and small coves where some display areas of sand and shingle.

There are 14 SAMs located along this policy unit, with a further 16 ASRIs.

The Northern part of the Unit is covered by the St Andrews to Craig Hartle SSSI with southern part of the unit from Cambo Ness falling under the Fife Ness Coast SSSI. The Policy Unit also falls under the Firth of Forth SSSI, SPA and Ramsar Site.

SMP1 Policy (MU30/MU31) – Do Nothing

SMP2 Policy (PU47)

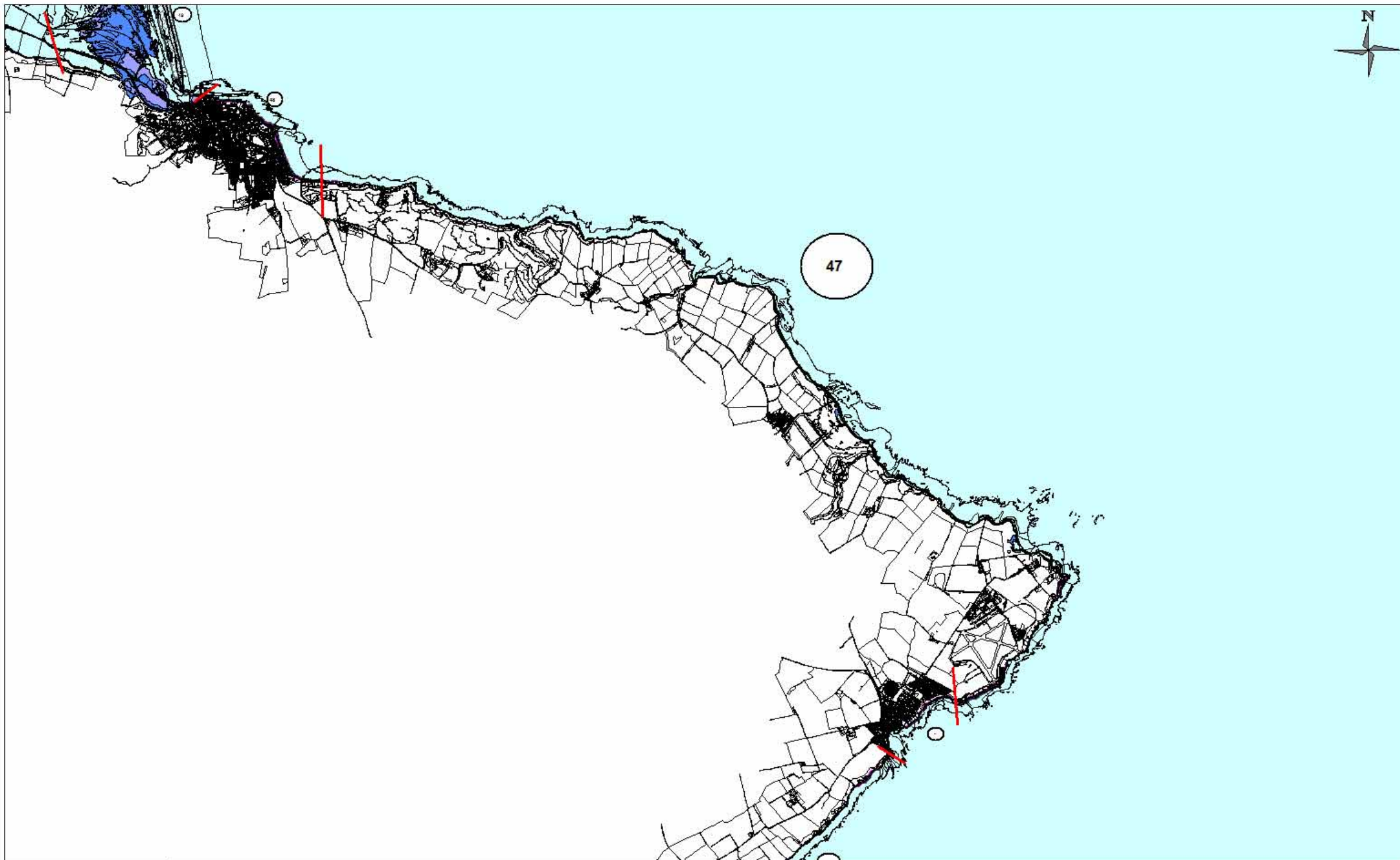
Years 0-20	Years 20-50	Years 50-100
No Active Intervention	No Active Intervention	No Active Intervention

Justification of SMP2 Policy

Coastal erosion and rising sea levels will not affect any residential or industrial sites, though commercial and public infrastructure will be slightly impacted upon. There are some caravan parks within this Policy unit which will be affected along with sections of the Fife coastal footpath. There is however scope for the owners to relocate the lost pitches further inland and for the coastal path to be re-aligned.

At the point of Fife Ness there is a coastguard station / lighthouse which will become very tenuously placed as the flood and erosion lines come very close after 100 years.

The remainder of the coast will be left to natural processes extending the natural bays along the coastline and eroding the rock outcrops and cliffs. The bays provide sheltered beaches for tourists and recreation and would therefore require some degree of management to maintain their standards. Some minor areas will experience isolated flooding increasing the intertidal area though these are limited within this Policy Unit.



Project : Fife SMP2		Title : Policy Unit 47 - Crail to St Andrews								
Policy	0 - 20 Years :	No Active Intervention	20 - 50 years :	No Active Intervention	50 - 100 years :	No Active Intervention	Drawn By : RM	Authorised : DR	Date : DEC 11	Scale : NTS
							Checked : NC	Reviewed : ZH		
Shoreline Erosion over the past 150 years	Coastal Accretion	20yr Projected Sea Level		Policy Unit Boundary		<div>This map is reproduced from Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationary Office & Crown Copyright. Unauthorised reproduction infringes Crown Copyright and may lead to prosecution or civil proceedings (100022588) (2010).</div> <div></div> <div></div> <div>Mouchel 37 - 39 Perrymount Road Haywards Heath West Sussex RH16 3BN Tel: (01444) 472330 Fax: (01444) 472331</div>				
Predicted Erosion, Next 100 Years	Reclaimed Land	50yr Projected Sea Level		100yr Projected Sea Level						

Policy Unit 48 St Andrews

Summary description of Policy Unit

This Policy Unit is dominated by the town of St Andrews where the coast comprises an exposed rock platform fronting sandstone cliffs and a relatively sheltered bay at East Sands. Coastal defences are a mix of natural and manmade structures with some walls integrated into the rock platform. The town also has a harbour where there is light commercial and recreational fishing.

In terms of archaeology, St Andrews is very important and has nine SAMs with a further fourteen ASRIs. There are no designated natural conservation sites within this Policy Unit.

SMP1 Policy (MU32) – Selectively Hold the Line

SMP2 Policy (PU48)

Years 0-20	Years 20-50	Years 50-100
Hold the Line (for currently defended sections)	Hold the Line (for currently defended sections)	Hold the Line (for currently defended sections)

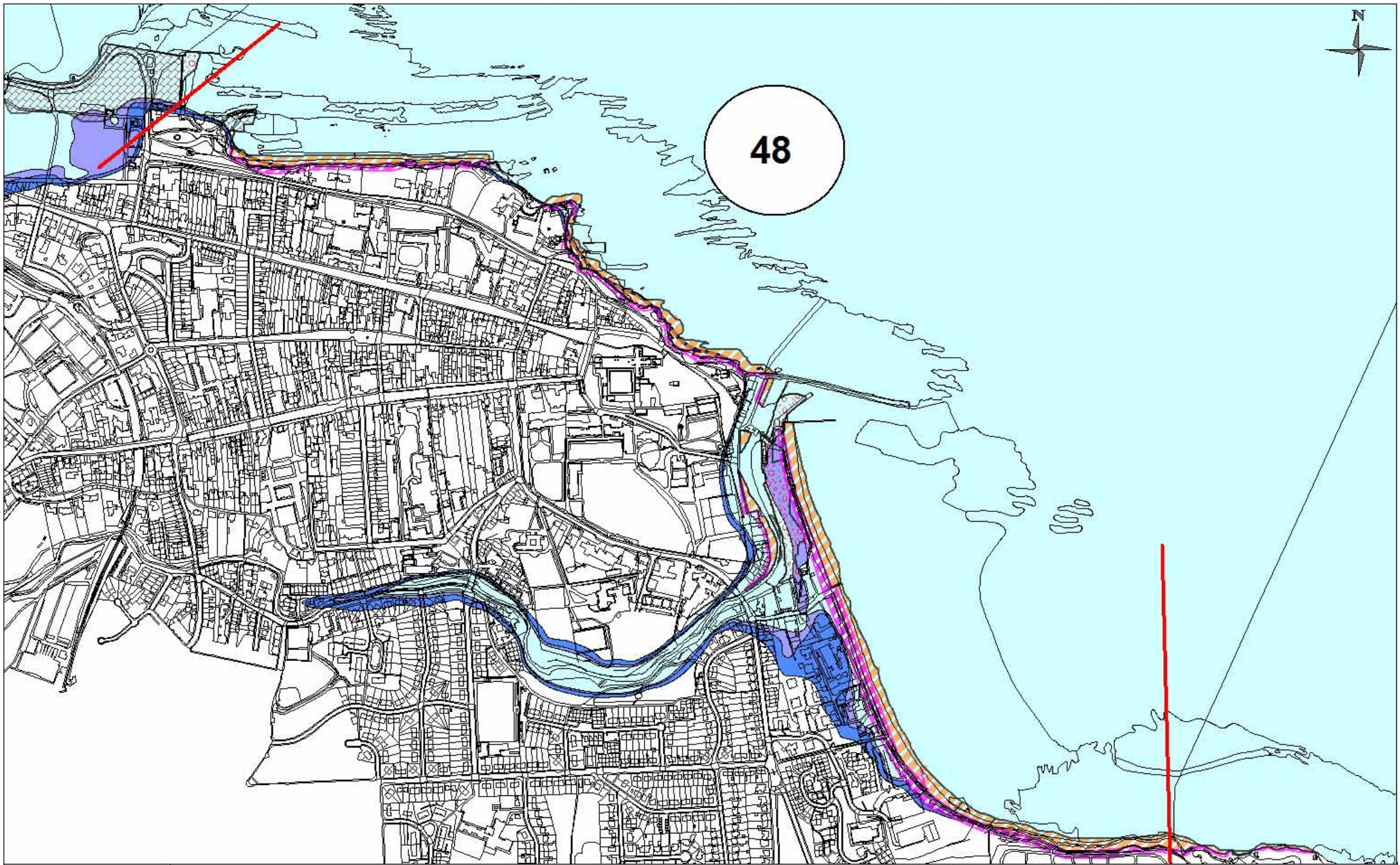
Justification of SMP2 Policy










The frontage of Policy Unit 48 is very built up and along with the residential buildings it also contains a number of historically important and commercially important sites. As a result a 'No Active Intervention' scenario becomes an un-realistic solution.

'Managed Realignment' would involve relocation of a large number of structures and as stated in Appendix D of the SMP2 (Theme Report), the East Sands Beach is in a relatively stable condition so re-alignment would not realistically be undertaken.

'Advance The Line' has been considered due to East Sands being sheltered and the accretion taking place within the mouth of the tidal stream. This would extend the beach further offshore making it more exposed and any works around the tidal channel could result in further flooding within the town.

'Hold the Line' is the most appropriate solution as it eliminates the need for relocation and maintains the current protection of coastal assets. Protection would be undertaken along those areas of coastline currently defended, whilst elsewhere the natural rock outcrops and cliffs provide adequate defence to the remainder of the coastline. There is scope for future works to upgrade the level of defence provided in these areas.



Project : Fife SMP2		Title : Policy Unit 48 - St Andrews										
Policy	0 - 20 Years :	Hold the Line	20 - 50 years :	Hold the Line	50 - 100 years :	Hold the Line	Drawn By : RM	Authorised : DR	Date : DEC 11	Scale : NTS		
							Checked : NC	Reviewed : ZH				
 Shoreline Erosion over the past 150 years	 Coastal Accretion	 20yr Projected Sea Level	 Policy Unit Boundary	 50yr Projected Sea Level	 100yr Projected Sea Level	 Policy Unit Marker	<p>"This map is reproduced from Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationary Office & Crown copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings (10002555) (2010)."</p> 					<p>Mouchel 37 - 39 Perry Mount Road Haywards Heath West Sussex RH16 3BN Tel: (01444) 472330 Fax: (01444) 472331</p>

Policy Unit 49 St Andrews to St Andrews Golf Links

Summary description of Policy Unit

This Policy Unit is dominated by the St Andrews Golf Links and sand dunes of the West Sands beach. A large sand spit and mudflats form part of the Eden Estuary entrance. The foreshore within the estuary comprises thick alluvial mud which is backed by the spit and relic dunes found within the golf course.

There is one SAM within this Unit (The Milestone at the A91, St Andrews to Dairsie Road).

The mouth of the estuary is part of the Eden Estuary SSSI and LNR. It is also part of the Firth of Tay SAC, SPA and Ramsar site. There is a combination of natural and manmade coastal defences in this Policy Unit.

SMP1 Policy (MU33) – Selectively Hold the Line

SMP2 Policy (PU49)

Years 0-20	Years 20-50	Years 50-100
Hold the Line	Hold the Line	Hold the Line

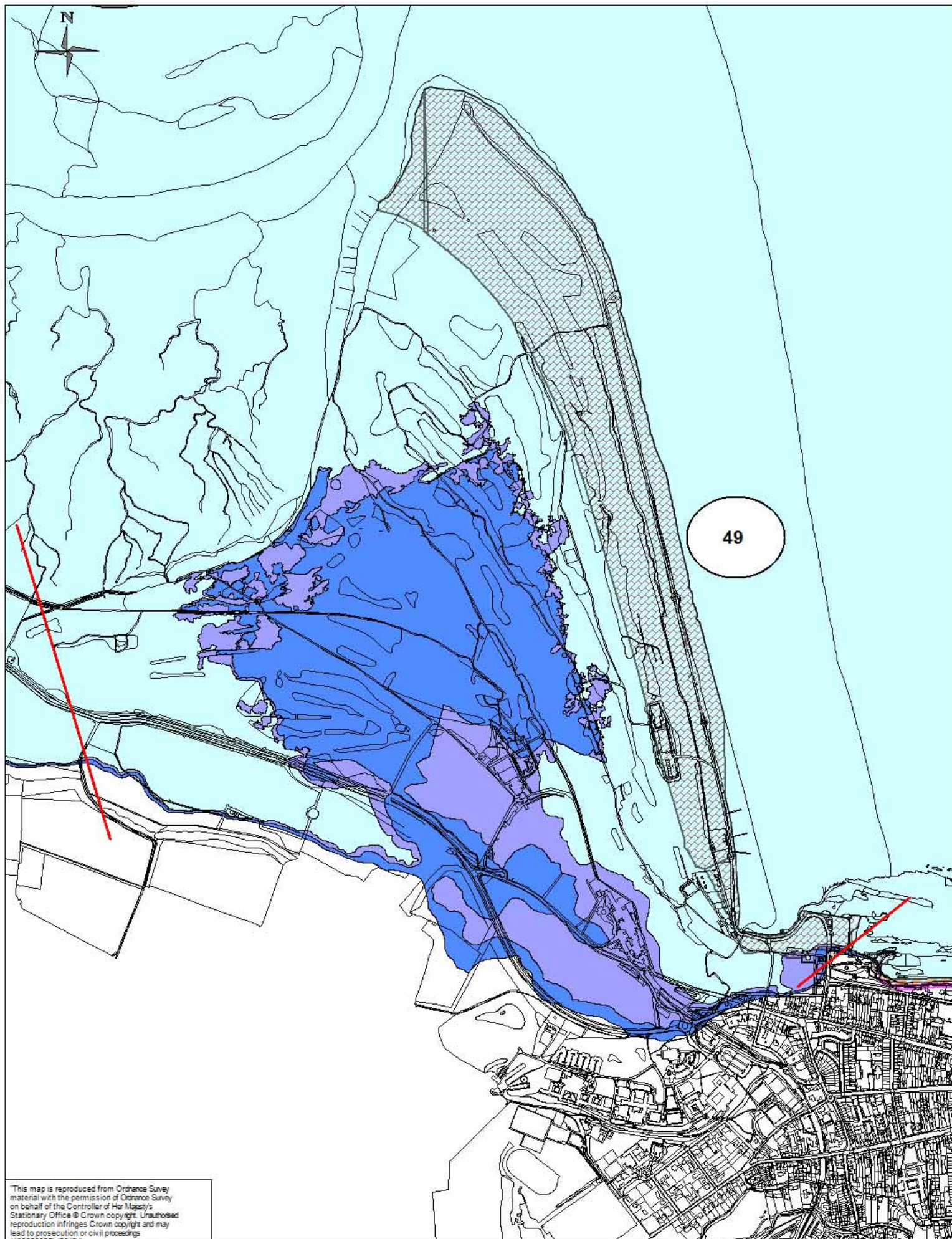
Justification of SMP2 Policy

By 20 years large areas of the golf course and west sands beach are lost through flooding. The mouth of the Eden Estuary is accreting but it is likely that this will not be enough to compensate for sea level rise. Although 'No Active Intervention' would increase the intertidal zone benefiting the protected area this is overridden by the cultural and economic impacts of the loss of St Andrews Golf Course.

'Advance the Line' has also been dismissed. The Policy Unit map identifies the area of land which has already been reclaimed. This would create areas of coastal squeeze affecting the International Ramsar site (intertidal) and is not likely to be cost effective for protecting the asset.

'Managed Realignment' has been considered as there is scope to relocate St Andrews Golf Course south of the A91, adopting a realigned line of defence along the road protecting access to St Andrews. However, this would result in the total loss of the original golf course, the sand dunes forming the 'Specially Protected Area' and West Sands beach. The impacts of this are undesirable.

'Hold the Line' is the preferred option through a dune enhancement scheme and new defences at flood breach points on the east and west coasts of the golf course. New defences should be sustainable and not hard defences that would impact upon the natural environment. Appendix C4 to the SMP details the 'Scenario Assessment With present Management', this outlines the existing defences and a guide to further work that would be required to maintain the defences. Further study of the sand dunes will be required as part of the 20yr plan to determine whether they are rolling back, affecting more of the golf course, or being built up and causing coastal squeeze impacting upon the Ramsar site.



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Project : Fife SMP2 Title : Policy Unit 49 - St Andrews to St Andrews Golf Links

Drawn By : RM Authorised : DR Date : DEC 11 Scale : NTS

Checked : NC Reviewed : ZH

Policy 0 - 20 Years : Hold the Line 20 - 50 years : Hold the Line 50 - 100 years : Hold the Line

Shoreline Erosion over the past 150 years
Predicted Erosion, Next 100 Years
Coastal Accretion
Reclaimed Land
20yr Projected Sea Level
50yr Projected Sea Level
100yr Projected Sea Level

Policy Unit Boundary
Policy Unit Marker



Mouchel
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Haywards Heath
West Sussex
RH16 3SV
Tel: (01444) 472330
Fax: (01444) 472331

Policy Unit 50 St Andrews Golf Links to Guardbridge

Summary description of Policy Unit

Characteristic mudflats extend along the estuary towards Guardbridge where the foreshore is stabilised with reed marsh. The hinterland is rural with some agricultural activities. There are some residential properties along this frontage towards Edenside.

The mouth of the estuary is part of the Eden Estuary SSSI and LNR. It is also part of the Firth of Tay SAC, SPA and Ramsar site. There is a combination of natural and manmade coastal defences in this Policy Unit.

SMP1 Policy (MU34) – Selectively Hold the Line

SMP2 Policy (PU50)

Years 0-20	Years 20-50	Years 50-100
Managed Realignment (in conjunction with PU49)	Hold the Line (Realigned section and A91 in conjunction with PU49)	Hold the Line (Realigned section and A91 in conjunction with PU49)

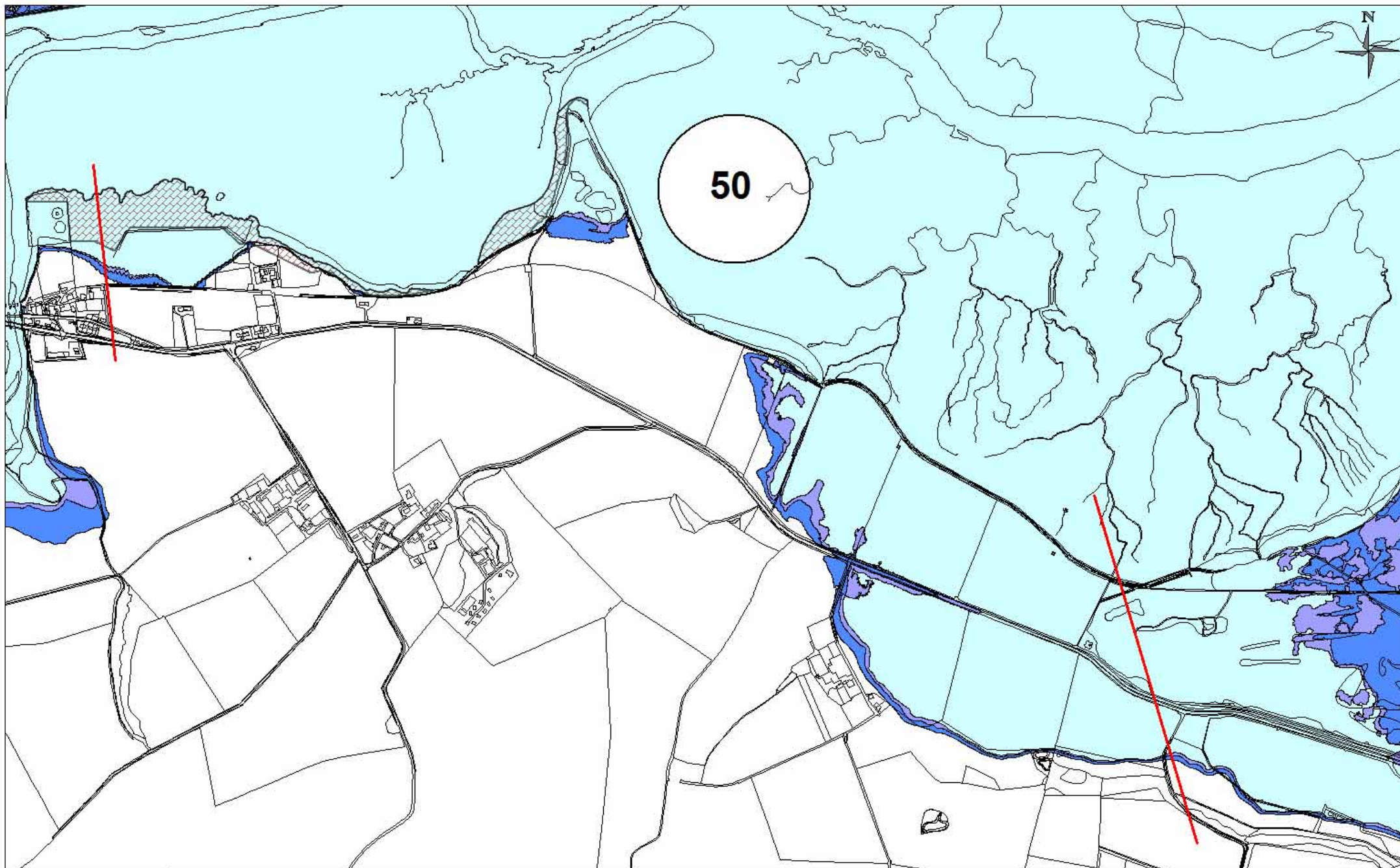
Justification of SMP2 Policy












‘Advance the Line’ was considered in the east at the base of the spit which forms the golf course. Costs, environmental impact and the minimal benefit from such works prevent this policy being taken any further.

‘No Active Intervention’ was considered firstly because erosion rates are minimal and secondly the existing defences are exceptionally old (embankment likely to pre-date railway) and have been subject to breaches in the past. Coastal flooding is a concern throughout this Policy Unit hence this option was dismissed because a breach point resulting in large scale flooding inland and of the St Andrews Golf Course was identified.

‘Managed realignment’ has been adopted in the first epoch to maintain the A91 through to St Andrews. A scheme to protect the adjacent policy unit 49 should be completed in conjunction with PU50 as there is a large flood breach point between the units. This would allow for a large area of inter-tidal habitat to be gained to the eastern end of the policy unit and two smaller areas in the west. This would be of great benefit within the Eden Estuary. In order to accommodate managed realignment the scheme would require co-operation from associated landowners and obtain their consent. Hold the Line for the Managed realignment will then be adopted for the following epochs to maintain the A91 and allow the rest of the coastline to be subjected to natural processes.

‘Hold the Line’ was not adopted as the preferred option for all epochs because the old embankment is vulnerable and would require major upgrading. There is scope to realign the A91 or build up the existing embankment to provide additional protection to the road. If the main road is realigned then there is more scope for creating additional inter-tidal habitat.



Project : Fife SMP2		Title : Policy Unit 50 - St Andrews Golf Links to Guardbridge								
Policy	0 - 20 Years :	Managed Realignment	20 - 50 years :	Hold the Line	50 - 100 years :	Hold the Line	Drawn By : RM	Authorised : DR	Date : DEC 11	Scale : NTS
							Checked : NC	Reviewed : ZH		
 Shoreline Erosion over the past 150 years	 Coastal Accretion	 20yr Projected Sea Level	 Policy Unit Boundary			<small>*This map is reproduced from Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office © Crown copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings (100020589) (2010).</small>				Mouchel 37 - 39 Barrymount Road Haywards Heath West Sussex RH16 3SN Tel: (01444) 472330 Fax: (01444) 472331
 Predicted Erosion, Next 100 Years	 Reclaimed Land	 50yr Projected Sea Level	 100yr Projected Sea Level	 Policy Unit Marker						

Policy Unit 51 Guardbridge to Eden Mouth

Summary description of Policy Unit

This Policy Unit is dominated by the characteristic mudflats and reed marsh towards the western extent of this section of coast. Alluvial deposits are visible on the banks of the estuary and further towards the Eden Mouth the sand dunes dominate the foreshore. The shore is backed by RAF Leuchars with some industrial activities such as the paper mill, although this is likely to become a different activity as the paper mill is no longer trading.

There is some archaeological interest in this Unit with the 15th Century bridge at Guardbridge registered as a SAM along with two further ASRIs.

The mouth of the estuary is part of the Eden Estuary SSSI and LNR. It is also part of the Firth of Tay and Eden Estuary SAC, SPA and Ramsar site. There is a combination of natural and manmade coastal defences in this Policy Unit.

SMP1 Policy (MU34) – Selectively Hold the Line

SMP2 Policy (PU51)

Years 0-20	Years 20-50	Years 50-100
Hold the Line (for currently defended sections)	Hold the Line (for currently defended sections)	Hold the Line (for currently defended sections)

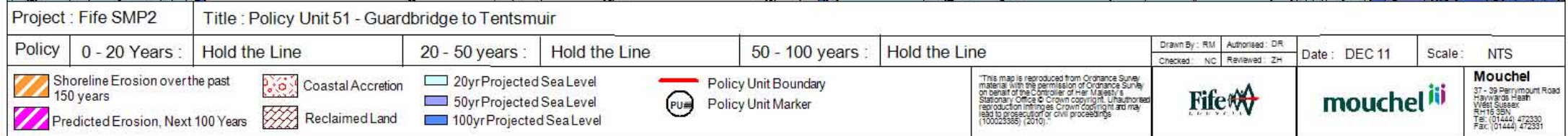
Justification of SMP2 Policy

No Active Intervention was not considered feasible within this PU because of the presence of the MOD RAF base and the industrial and residential properties along the Guardbridge coastline. Managed realignment was considered possible along the coast of the airbase but this would require the relocation of a number of RAF buildings further to the north as the estuary was re-aligned to form the coastline along the northern edge. The flood maps show where erosion is naturally occurring.

Advance the line was considered after 20 years before key military buildings were lost. This entailed artificially shaping the coastline by filling in the bays between control points, rather than using managed realignment. However the land to the north of PU51 is likely to be MoD. Any advancement of the coastline would also subject the estuary to more coastal squeeze impacting upon the protected areas outlined in the Appendices D & E of the SMP2.

Hold The Line has been adopted to ensure that the features under threat through Guardbridge where existing defences are in place, are maintained, along with structures on the extremities of the RAF Base. The undefended sections, especially to the east of the PU, could remain naturally controlled due to the impact upon the coastline being minimal. This would then lead to some gain in intertidal habitat at the eastern end of the Policy unit.

There are two river mouths within this Policy Unit and the boundary of the coastal zone ends at the first structure crossing these rivers. Any flooding experienced beyond these points can still be classified as tidal.



Policy Unit 52 Tentsmuir

Summary description of Policy Unit

This Policy Unit is dominated by an extensive sand dune system at Tentsmuir which provides an effective coastal defence, however there is some undermining of the trees within the Tentsmuir forest but this is thought to be a forest management issue. The hinterland is mostly coniferous woodland with areas of sand dune elsewhere. There is currently some archaeological interest in this area with three ASRIs. The area is very important for recreational activities including walking, horse riding and bird watching.

The estuary is part of the Eden Estuary SSSI and LNR. It is also part of the Firth of Tay and Ednen Estuary SAC, SPA and Ramsar site. This Policy Unit also includes the Earls Hall Muir SSSI and extends up to Tayport – Tentsmuir Coast SSSI. The area is also designated as Tentsmuir National Nature Reserve.

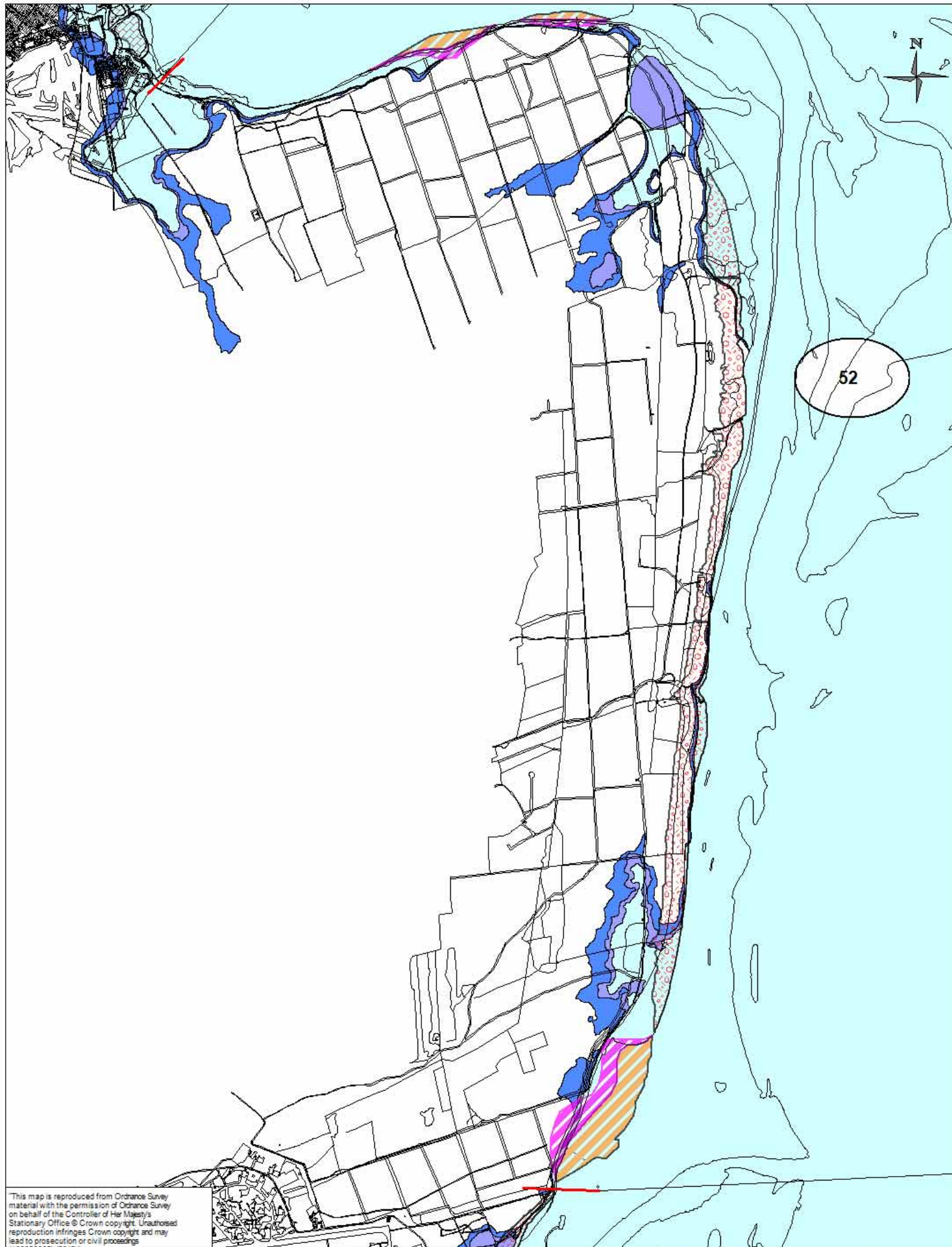
SMP1 Policy (MU36) – Do Nothing

SMP2 Policy (PU52)

Years 0-20	Years 20-50	Years 50-100
No Active Intervention	No Active Intervention	No Active Intervention

Justification of SMP2 Policy

There are no properties or features of major significance within this Policy Unit other than those of environmental merit both nationally and internationally. No Active Intervention will allow the natural roll back and accretion of the coast to occur unimpeded. This will benefit the Ramsar site of the Firth of Tay and Eden Estuary by generating large areas of intertidal zone. Farm land in the north west of the Policy Unit will also become inundated creating more intertidal habitat though impacting upon one farm. There is also an area for additional intertidal habitat towards the south of the Policy Unit where flooding spreads inland at an isolated section of coast.



Project : Fife SMP2

Title : Policy Unit 52 - Tentsmuir

Drawn By : RM Authorised : DR

Checked : NC Reviewed : ZH Date : DEC 11 Scale : NTS

Policy 0 - 20 Years : No Active Intervention 20 - 50 years : No Active Intervention 50 - 100 years : No Active Intervention

Shoreline Erosion over the past 150 years
 Coastal Accretion
 20yr Projected Sea Level
 Predicted Erosion, Next 100 Years
 Reclaimed Land
 50yr Projected Sea Level
 100yr Projected Sea Level

Policy Unit Boundary
 Policy Unit Marker

Fife
COUNCIL

mouchel

Mouchel
 37 - 39 Perry Mount Road
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 Tel: (01444) 472330
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Policy Unit 53 Shanwell Farm to Tayport

Summary description of Policy Unit

This short Policy Unit is dominated by the characteristic mudflats of the area with the backshore comprising some loose sand deposits. The flat and low lying hinterland comprises mostly recreational land with a park and a football pitch located either side of a caravan park. There are manmade coastal defences protecting the Links Road North in this Policy Unit, of which the 'Tentsmuir Coastal Defences' are designated as a Scheduled Ancient Monument.

The estuary is part of the Tayport – Tentsmuir SSSI and Firth of Tay and Eden Estuary SAC, SPA and Ramsar site.

SMP1 Policy (MU37) – Hold the Line

SMP2 Policy (PU53)

Years 0-20	Years 20-50	Years 50-100
Managed Realignment	Hold the Line (Managed realigned defences)	Hold the Line (Managed realigned defences)

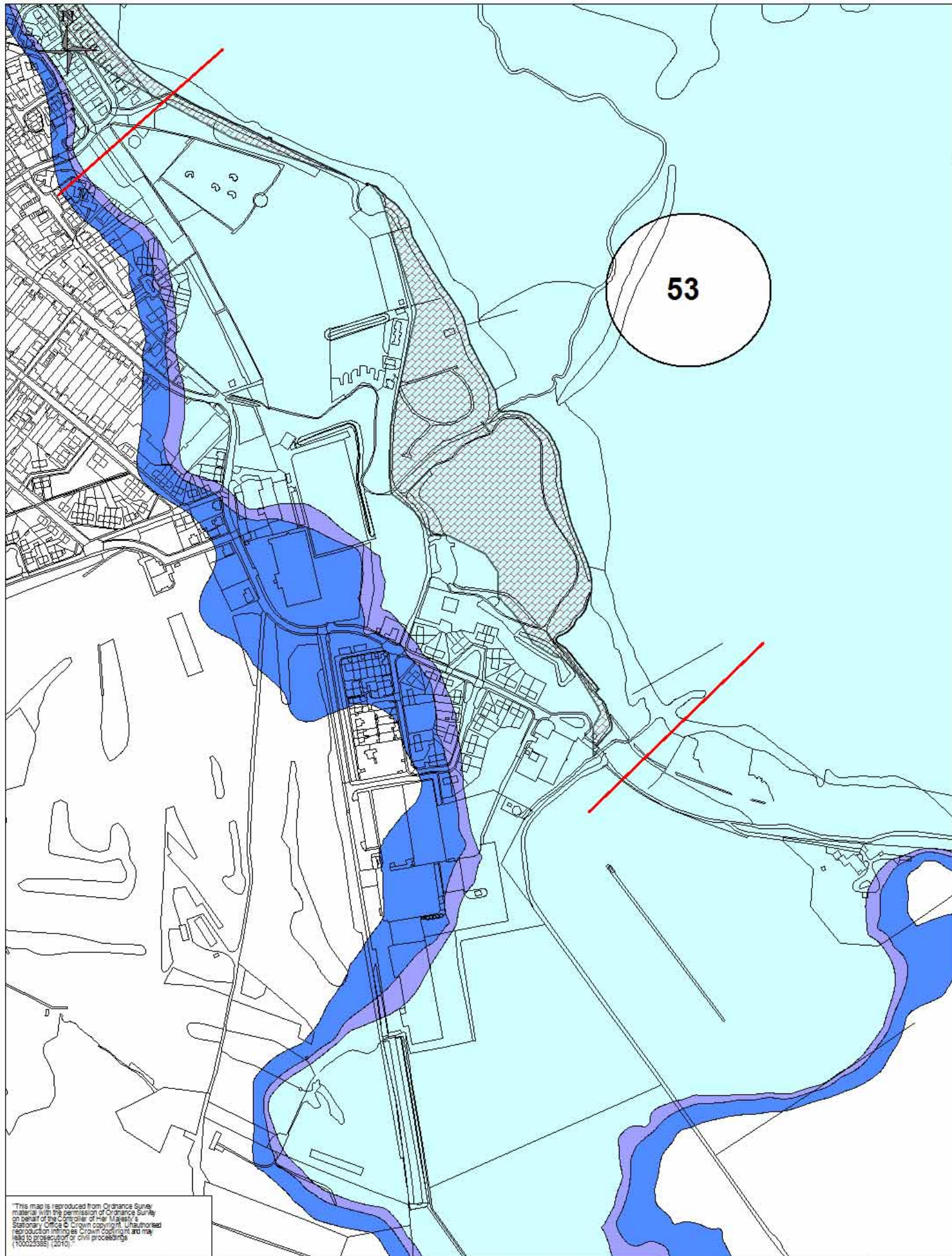
Justification of SMP2 Policy

Managed Realignment is the recommended policy throughout this Policy Unit. Hold the Line policy was adopted north of this Policy Unit and plans should be considered along side those of PU54 to tie in with realignment works in the northern section.

The managed realignment is recommended to follow the line of Tayport Town west of the recreational ground and then encompass the industrial unit and houses to the south of the Policy Unit. Defences will also be provided south past the last industrial unit to enable the defences to tie in with the No Active Intervention Policy for Policy Unit 52 adjacent. This prevents flood waters from the agricultural land spilling round the area of managed realignment and spreading back towards Tayport.

Managed Realignment allows the recreational areas to flood which will be of great benefit to the intertidal habitat within the area whilst still protecting the residential areas and local community links within the Policy Unit. Once Managed Realignment has been undertaken a Hold the line policy should be adopted to maintain the new alignment and prevent flooding inland.

The reclaimed land comprises fill from uncertain sources which could pose a risk to the environment. Should it prove necessary to undertake remediation works, costs for removal and relocation should be assessed against those for providing an adequate level of protection to the area within this Policy Unit. Consideration should also be given to the high rates of erosion experienced in areas of reclaimed land. Should protection be required the route of managed realignment will need to be addressed.



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Project : Fife SMP2

Title : Policy Unit 53- Shanwell Farm to Tayport Common

Drawn By : RM

Authorised : DR

Date : DEC 11

Scale : NTS

Policy 0 - 20 Years : Managed Realignment

20 - 50 years : Hold the Line

50 - 100 years : Hold the Line

Shoreline Erosion over the past 150 years
Predicted Erosion, Next 100 Years

Coastal Accretion
Reclaimed Land

20yr Projected Sea Level
50yr Projected Sea Level
100yr Projected Sea Level

Policy Unit Boundary
Policy Unit Marker

Fife

mouchel

Mouchel
37 - 39 Penny Mount Road
Haverhill Heath
Widley Sussex
PO16 3SN
Tel: (01444) 472330
Fax: (01444) 472331

Policy Unit 54 Tayport

Summary description of Policy Unit

This Policy Unit is dominated by mudflats with the back shore area comprising loosely consolidated sand. The entire unit is backed by Tayport and is predominantly residential with recreational and leisure activities centred on the harbour. There are extensive manmade coastal defences in this unit mostly associated with the harbour structures and the low lying residential areas. The east pier of Tayport Harbour forms the statutory limit of the Coast Protection Act 1949.

There are no designated archaeological sites within this Policy Unit

The unit is part of the Tayport to Tentsmuir Coast SSSI. It is also part of the Firth of Tay and Eden Estuary SAC, SPA and Ramsar site.

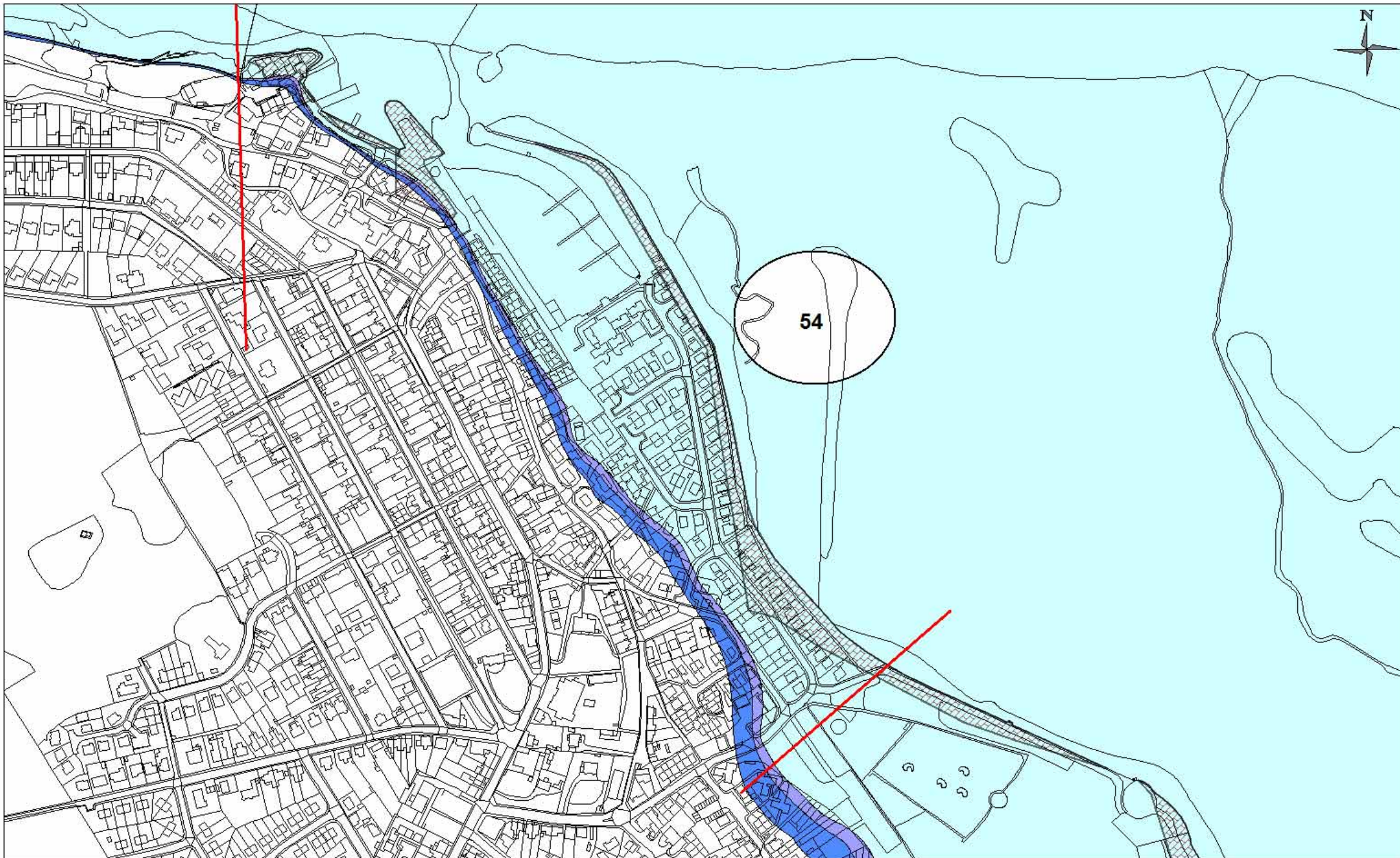
SMP1 Policy (MU37) – Hold the Line



SMP2 Policy (PU54)

Years 0-20	Years 20-50	Years 50-100
Hold the Line	Hold the Line	Hold the Line

Justification of SMP2 Policy

Tayport is quite large and heavily built up with a number of residential properties backing straight onto the coastline. Sea level rise and coastal flooding heavily affects the town of Tayport, which is currently already defended by seawalls and rock revetment. Tayport also includes a large marina which attracts a number of tourists to the area. A Hold the Line policy has been adopted along this stretch of coastline to protect and reduce the scale of flooding throughout this Policy Unit.



Project : Fife SMP2		Title : Policy Unit 54 - Tayport									
Policy	0 - 20 Years :	Hold the Line	20 - 50 years :	Hold the Line	50 - 100 years :	Hold the Line	Drawn By: RM	Authorised: DR	Date : DEC 11	Scale : NTS	
							Checked: NC	Reviewed: ZH			
Shoreline Erosion over the past 150 years	Coastal Accretion	20yr Projected Sea Level	Policy Unit Boundary	Policy Unit Marker			<small>"This map is reproduced from Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationary Office & Crown copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings (100020585) (2010)." </small>		Mouchel 37 - 39 Perrymount Road Haywards Heath West Sussex RH16 3BN Tel: (01444) 472330 Fax: (01444) 472331		
Predicted Erosion, Next 100 Years	Reclaimed Land	50yr Projected Sea Level	100yr Projected Sea Level								

Policy Unit 55 Tayport to Newport-on-Tay

Summary description of Policy Unit

The coastal geomorphology in this Policy Unit comprises mostly stable cliffs with wave cut rock platforms in places. The foreshore also consists of mudflats in areas with the backshore containing steep shingle beaches. The hinterland comprises mostly agricultural land classified as good quality (3.0 or higher). The B946 link road runs through the entire length of this unit. There are no manmade coastal defences in this Policy Unit.

In terms of archaeological sites within this Policy Unit, there are no SAMs or ASRIs.

This Unit includes part of the Tayport – Tentsmuir Coast SSSI and is within the Firth of Tay & Eden Estuary SAC.

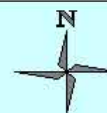
SMP1 Policy (MU38) – Selectively Hold the Line

SMP2 Policy (PU55)

Years 0-20	Years 20-50	Years 50-100
No Active Intervention	No Active Intervention	No Active Intervention










Justification of SMP2 Policy

Sea level rise and coastal flooding and to a lesser extent coastal erosion impact upon an isolated number of coastal properties within this Policy Unit. Erosion and flooding elsewhere within the PU only impacts on woodland and agricultural land. These properties are already protruding out past the existing shoreline and are currently defended with seawalls. The No Active Intervention policy would result in these properties being lost through a combination of erosion and flooding in the future as the benefits of protecting them are outweighed by the costs. This enables the natural coastal processes to continue along the coastline with the beaches and natural rock outcrops.



55



Project : Fife SMP2		Title : Policy Unit 55 - Tayport to Newport-on-Tay										
Policy	0 - 20 Years :	No Active Intervention	20 - 50 years :	No Active Intervention	50 - 100 years :	No Active Intervention	Drawn By : RM Checked : NC	Authorised : DR Reviewed : ZH	Date : DEC 11	Scale : NTS		
 Shoreline Erosion over the past 150 years	 Coastal Accretion	 20yr Projected Sea Level	 50yr Projected Sea Level	 100yr Projected Sea Level	 Policy Unit Boundary	 Policy Unit Marker	<small>"This map is reproduced from Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationary Office & Crown copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings (100020585) (2010)." data-bbox="611 925 718 975"/></small>			 Fife	 mouchel	Mouchel 37 - 39 Perry Mount Road Haywards Heath West Sussex BN16 3BA Tel: (01444) 472330 Fax: (01444) 472331

Policy Unit 56 Newport-on-Tay to Wormit Bay

Description of Policy Unit

The foreshore is dominated by the stable cliffs with the wave cut rock platform with sand and shingle steep beaches continuing throughout the unit. The Unit is backed by mostly residential areas within the villages of Newport-on-Tay, Woodhaven and Wormit.

There are some manmade coastal defences mainly defending access and link roads with some private residential defences in places.

In terms of archaeological sites within this Policy Unit, there are no SAMs and four ASRIs.

The unit is part of the Inner Tay Estuary and Flisk Wood SSSI's. It also forms part of the Firth of Tay and Eden Estuary SAC, SPA and Ramsar Site.

SMP1 Policy (MU38) – Selectively Hold the Line

SMP2 Policy (PU56)

Years 0-20	Years 20-50	Years 50-100
Hold the Line	Hold the Line	Hold the Line

Justification of SMP2 Policy

The entirety of this coastline is built up with residential properties, many of which are situated directly on the coastline with sea walls defending their boundaries. It is likely that a number of these defences are privately owned and that Fife council only maintains a small amount. One such location is to the very west of the Policy Unit where the residential zone ends.

Hold the Line policy is recommended within this Policy Unit. Privately owned defences can be maintained at the owners cost. Only a small proportion of the coastal properties are affected by coastal flooding, this is likely because of the height of the land in many places. Also erosion is not a main concern throughout this Policy Unit therefore it is suitable to just maintain those defences under council ownership.

Policy Unit 57 Wormit Bay to Newburgh East

Summary description of Policy Unit

This Policy Unit is dominated by the alluvial mudflats with the steep fringing beaches extending up to Birkhill. Between Logie and Ballinbreach Castle the deep tidal channels flow close to coastal edge making the foreshore very narrow. Mudflats also dominate areas of the foreshore with some reed marsh on upper sections of this unit. The hinterland is predominantly centred around agriculture with much of it being high quality (Grade 3 or higher). There are also areas of woodland backing areas of this unit. The Fife Coastal Path runs through part of this Policy Unit.

There are some manmade coastal defences mainly defending access and link roads with some private residential defences in places at Kirkton and Balmerino.

In terms of archaeological sites within this Policy Unit, there are two SAMs located at Balmerino (Abbey) and Ballinbreich (Castle) with a further sixteen ASRIs.

This Policy Unit is part of the Inner Tay Estuary SSSI. The Policy Unit is also part of the Firth of Tay and Eden Estuary SAC, SPA and Ramsar site.

SMP1 Policy (MU38) – Selectively Hold the Line

SMP2 Policy (PU57)

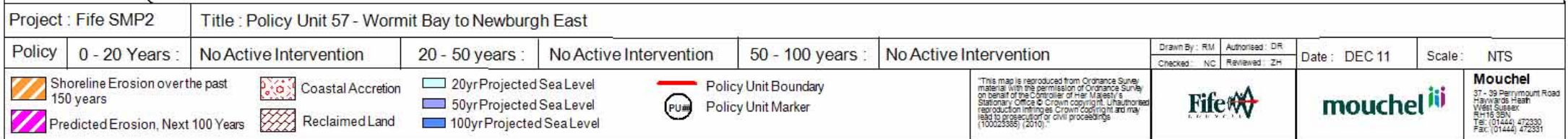
Years 0-20	Years 20-50	Years 50-100
No Active Intervention	No Active Intervention	No Active Intervention

Justification of SMP2 Policy

With the exception of a farm and 8 properties to the west there are only a handful of properties affected by flooding or erosion within this PU, the remainder is farm and woodland. Erosion occurs at a few locations, one of which is Balmerino Bay impacting on 2 properties. However flooding affects the remainder of properties on this section of the coast. Though defences are in place at a number of these properties they are privately owned.

Opportunities for relocating or protecting the Scottish Water sewage treatment works to the west of this Unit should be assessed.

A large section of agricultural land is lost to the west which will become part of the intertidal zone benefiting the SPA and Ramsar site.



Policy Unit 58 Newburgh

Description of Policy Unit

This Policy Unit is dominated by the intertidal mudflats in the east and salt marsh towards the western extent. The hinterland is mainly reclaimed at Newburgh with land use on the former site of the linoleum works being mostly residential housing. There are private piers and slipways and recreational interest is mainly boating and yachting. The Fife Coastal Path runs throughout the entire length of this Policy Unit. There is a mix of manmade and natural coastal defences along this frontage, mostly associated with the boating and yachting activities.

In terms of archaeological sites within this Policy Unit, there are two SAMs located at Lindores (Abbey) and Mugdrum House (The Cross Shaft) with a further five ASRIs.

This entire Policy Unit is within the Inner Tay Estuary SSSI. The Policy Unit is also part of the Firth of Tay and Eden Estuary SAC, SPA and Ramsar site.

SMP1 Policy (MU38) – Selectively Hold the Line

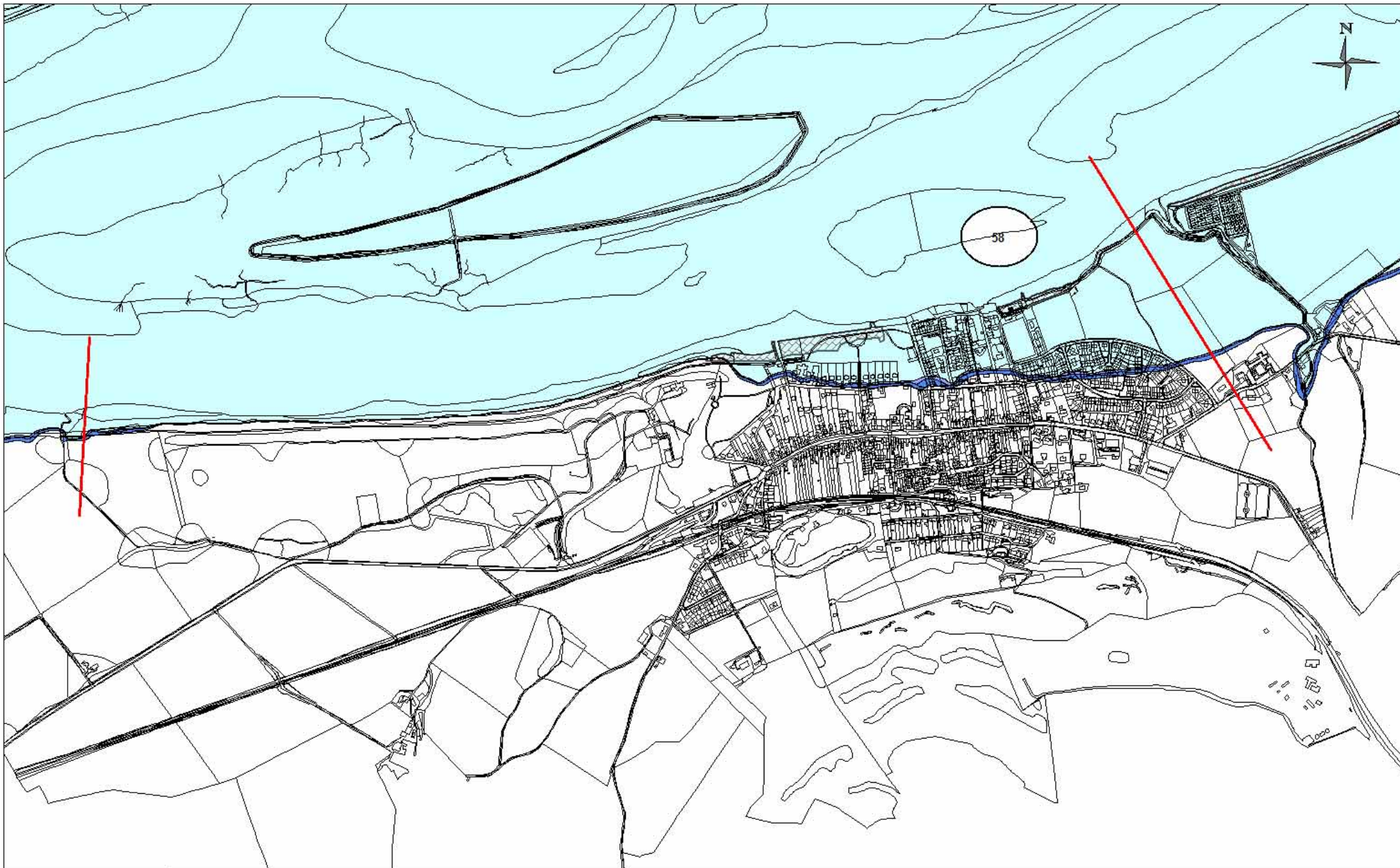
SMP2 Policy (PU58)












Years 0-20	Years 20-50	Years 50-100
Managed Realignment	Hold the Line	Hold the Line

Justification of SMP2 Policy

Newburgh is a heavily built up residential area with a number of properties fronting the coastline. There are also a number of recreational areas on the waterfront and some farm land to the east. Flood maps and projected sea level rise are shown to heavily impact upon the northern section of the town spreading inland to the adjacent Policy Unit 57. PU57 has been recommended as No Active Intervention, as a result Managed Realignment is the most appropriate policy for this unit (58) defending the line of the properties from the eastern boundary north of the Abbey (as identified in Appendix E of the SMP2), preventing flooding through from the adjacent Policy Unit. The realignment then ties in with the existing coastline at the currently defended section.

Policy from 20 + years has been adopted as Hold the Line for all Fife owned defences. Existing privately owned defences can be maintained at the owners expense. The western section of the Policy Unit is undefended; however the natural rock outcrops prevent flooding inland and protect this side of the town without the need for additional defences.



Project : Fife SMP2		Title : Policy Unit 58 - Newburgh								
Policy	0 - 20 Years :	Managed Realignment	20 - 50 years :	Hold the Line	50 - 100 years :	Hold the Line	Drawn By : RM Checked : NC	Authorised : DR Reviewed : ZH	Date : DEC 11	Scale : NTS
 Shoreline Erosion over the past 150 years	 Coastal Accretion	 20yr Projected Sea Level	 Policy Unit Boundary	<p>*This map is reproduced from Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office & Crown copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings (10002355) (2010).</p>   Mouchel 37 - 39 Parrymount Road Haywards Heath West Sussex BN18 3BN Tel: (01444) 472330 Fax: (01444) 472331						
 Predicted Erosion, Next 100 Years	 Reclaimed Land	 50yr Projected Sea Level	 Policy Unit Marker				 100yr Projected Sea Level			

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6 Action Plan

6.1 Approach

The purpose of the Action Plan is to outline those steps required to implement the policies adopted within this SMP2 Review and to develop the policies at each point along the Fife coastline. These steps should be used to ensure that the policy requirements are taken forward at the short term and also on through to the long term with more detailed studies and plans for managing and / or improving coastal management.

These actions should be disseminated to those bodies responsible for the management of the Fife coastline and also to the local and regional planning authorities to ensure swift and effective scheme and policy implementation. To ensure long term policy is taken forward the following actions should be included;

- Undertake more detailed local studies where required,
- Identify further studies required to implement the adopted policy options,
- Spatial planning of land use should take into account the policies adopted within the SMP2;
- Providing stakeholders with information relating to the progress in implementing the policies;
- Further studies should aim to identify those schemes that would enhance the environment as scheme producing a gain in intertidal habitat can often open up additional government funding making it an incentive to be taken forward for development.

The following table summarises the further work that has been outlined earlier within this report and also within the Policy Statements to develop the adopted policies. This table establishes the further work, corresponding Policy Unit, time frame and rough cost estimate of the further works.

6.2 Monitoring

A monitoring programme should be established to maintain a close eye on the impact of climate change on the coastal processes and also to justify expenditure and ensure that the areas identified within this report are still of key significance and have been broken up accordingly.

Due to the nature of the defended and undefended sections of the Fife coastline and the variety of different ownerships it may be necessary to adopt a number of monitoring strategies that are therefore best suited in this instance. For Example:

- Regional Level – to monitor the coastline as a whole and ensure the appropriate split between Policy Units and the requirement to consider neighbouring adopted policies.
- Strategy Level – to monitor the selected policies and how the shoreline reacts in relation to the policies chosen for them.
- Defence Monitoring – This would determine the condition of structures and defences to determine whether the selected policies need to be amended and whether further direct works need to be undertaken.

6.3 Action Plan

Table 4 outlines the action plan with monitoring, schemes and further studies. The action plan also outlines the responsible party for each action and where joint co-ordination is required this has been identified. Each action has also been assessed in terms of timescale and priority with an indicative cost.

Overview

The Fife coastline can be considered in two main sections, the defended comprising seawalls, revetments and harbours etc. and the undefended with natural cliffs and sand dunes.

The following tables outline an action plan based on policy defined within this SMP. The items have been prioritised based on when they have been recommended for being undertaken, followed by the estimated impact of coastal processes or the benefits they provide.

Table 4: Action Plan

Epoch	Subject	Policy Unit	Responsibility
Current	Annual maintenance - ongoing	All	Fife Council/Third parties
	Coastal inspections – ongoing	All	Fife Council
	GIS model of the coast - ongoing	All	Fife Council
	Refurbishment of Kirkcaldy Seawall - ongoing	23	Fife Council
	Manage and maintain Fife Council owned harbours	10, 17, 20, 24, 40, 42, 44, 46, 56	Fife Council/Third parties
	Manage and maintain Fife Coastal Path - ongoing	All	Fife Coast & Countryside Trust
0-20 years	WFD Assessment	All	Fife Council
	Integration with Flood Risk Management Act (Scotland) 2010	All	Fife Council/SEPA
	Coastal Zone Strategy Plans	All	Fife Council
	Renewal/upgrading of sea defences	1, 2, 3, 5, 7, 9, 10, 11, 13, 18, 19, 20, 23, 25, 27, 29, 21, 32, 33, 34, 36, 38, 40, 42, , 46, 48, 49, 51, 54	Fife Council/third parties
	Managed Realignment	26, 50, 53, 58	Fife Council
	Environmental monitoring	All	Fife Council/Fife Coast & Countryside Trust/Scottish Natural Heritage
	Further study and ground investigation of vulnerable landfill sites	As required	Fife Council/third parties
20-50 years	Renewal/upgrading of sea defences	1, 2, 3, 5, 7, 9, 10, 11, 13, 18, 19, 20, 23, 25, 27, 29, 21, 32, 33, 34, 36, 38, 40, 42, 44, 46, 48, 49, 50, 51, 53, 54, 56, 58	Fife Council/third parties
	Managed Realignment	26	Fife Council
	Renewal/upgrading of Fife's harbours	10, 17, 20, 24, 40, 42, 44, 46, 56	Fife Council/Third parties

The following monitoring requirements in Table 5 are associated with the previous activities.

Table 5: Monitoring requirements

Issues Manage the Current coastal defence structures Coastal erosion occurring in areas of No Active Intervention Risk of Coastal flooding to properties in areas of No Active Intervention Regular coastal erosion impacting on Fife coastal path Potential removal of contaminated site resulting in change in adopted policy				
Objectives Monitor the condition of the existing defences Establish plan for Property Roll back in these areas Reduce flood risk to properties Relocate Fife coastal path (ensure public aware of risks) Confirm presence of contaminated material				
Monitoring	Scope	Frequency	Scale	Estimated Costs (£k)
Coastal erosion	Visual inspection and record photos of condition	Monthly (sites identified in Policy Statements)	Co-ordinated by council	12(per year)
Coastal Flooding	Visual inspection and record photos of condition	Following periods of heavy rain / storm surges	Co-ordinated by council	12(per year)
Condition of Contaminated sites	Monitor usage of spoil	Every 10 years	Council to contact land owner	0.5(every 10 yrs)
Existing Defences	Visual Inspection	Every 5 years and Major Storm Event	Co-ordinated by council	20 (every 5 years, storm inspection included)