Managing Coastal Change

Document: 1 Version: 1

Coastal Risk Planning Guidance for West Dorset, Weymouth & Portland

West Dorset District Council
Weymouth & Portland Borough Council

March 2013

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March 2013

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Document history

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West Dorset District Council and Weymouth & Portland Borough Council

This document has been issued and amended as follows:

Version	Date	Description	Created by	Verified by	Approved by
1.0	21/08/2012	Initial draft for discussion	Alan Frampton	Alan Frampton	Alan Frampton
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1.0	22/11/2012	Final	Alan Frampton	Alan Frampton	Alan Frampton
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Contents

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Executive Summary

This document identifies the nature of the risks posed to coastal areas from future coastal change along each section of coast within the West Dorset District Council and Weymouth & Portland Borough Council areas, and provides guidance for planners and engineers in West Dorset District Council and Weymouth & Portland Borough Council for managing these risks in the future. In doing so, 'risk' is defined as the adverse impact and consequences of a hazard, which may be coastal erosion, landsliding or flooding. 'Coastal risk zones' are therefore areas of projected adverse impact and consequences where particular consideration should be given during the planning process.

This guidance will be used to:

1. Provide consistent advice on planning application requirements along the West Dorset, Weymouth and Portland coast.
2. Provide the basis for consistent planning application decisions along the West Dorset, Weymouth and Portland coast.
3. Inform the future development of Coastal Change Management Areas (CCMAs) along the West Dorset, Weymouth and Portland coast.

The coastal change risks are identified for 33 separate sections of coast. For each of these sections, a map is provided showing the coastal risk zones within the section, be it from erosion, landsliding, flooding or a managed realignment policy along with a description of the section of coast; a summary of the relevant Shoreline Management Plan (SMP) policy; a description of the nature of the coastal change risks including the nature of the hazards and timing and frequency of the risk occurring based upon a desk-study review and expert assessment of all available data; the assets likely to be affected by future coastal change; and recommendations for development management including:

- development restrictions setting out where different types of appropriate development should or should not occur based on the risk zones
- the evidence required to support planning applications for different types of development within different risk zones
- future planning policy recommendations.

The concluding section of this document provides recommendations for future updates of this document and further studies that could be undertaken to improve the predictions of coastal change risks given the current uncertainties identified in this report. It also identifies the following twelve recommendations that could be implemented (either as standalone studies or within the context of FCERM strategies/scheme appraisals) to support future coastal risk planning and management along the West Dorset, Weymouth and Portland coast:

1. Ensure that policies are integrated across all sectors in line with the Integrated Coastal Zone Management principles published by Defra (2009), including those policies developed for CCMAs.
2. When CCMAs are being developed, reference should be made to other relevant guidance, including the national *Coastal Change Adaptation Planning Guidance*

currently being developed for Defra in a project led by East Riding of Yorkshire Council and Halcrow (due to be published in 2013); the *Guidance on the management of landfill sites and land contamination on eroding and low-lying coasts* (CIRIA, 2012); and the *Beach Management Manual (second edition)* (CIRIA, 2010).

3. Alongside development of CCMAs, develop community partnerships in areas at risk of coastal change utilising the *Community Adaptation Planning and Engagement (CAPE) on the Coast Guidance* (Scott Wilson, 2009) and, where appropriate, building upon the work undertaken as part of the *Jurassic Coast Pathfinder Project* (Dorset County Council, 2011). This is to prepare community led coastal change adaptation plans with clear objectives and steps that will be taken to respond to coastal change in the future. This could include regeneration plans, emergency response plans and recovery plans.

4. Undertake an assessment of the areas benefitting from flood and/or coastal protection measures (or structures that also serve to reduce flood and erosion risk such as harbour walls, breakwaters, and piers). Use this information to aid identification of potential future funding partners.

5. Develop partnerships and funding mechanisms to enable future flood and erosion risk management measures to be implemented at a time when they are required and not when they are able to achieve the criteria for receiving 100% grant-in-aid from central government.

6. Assess the potential impacts of sea level rise on the beaches of the area to provide information to improve understanding of the risks posed by coastal squeeze to local communities and economies that rely on beaches for tourism and recreation.

7. Provide land charges information to raise awareness of coastal change issues in the area to potential property buyers.

8. Provide advice to land/property/business owners about actions they can take in areas at risk of coastal change as set out in Section 1.3.4 to improve individuals' resiliency.

9. Undertake education activities to raise awareness of coastal change risks and to increase the capability of communities to participate in future coastal change planning decisions and definition of CCMAs.

10. Appoint a dedicated officer to provide a single contact/focus point for communities, partner organisations and internal departments on coastal management issues to ensure there is a co-ordinated and integrated approach to complex coastal issues that cut across sectors. This could not only deal with coastal change but all coastal management issues.

11. Appoint a local coastal change 'champion' (e.g. elected member) within the local planning authority to lead on coastal change issues and planning. Consider also seeking more local 'champions' at parish/town council level.

12. Review the structure, organisation, operations, policies and procedures of West Dorset District Council and Weymouth & Portland Borough Council to ensure

that coastal matters along the coast of both authorities are dealt with in a co-ordinated and integrated way (i.e. avoiding 'silo' working on coastal matters).

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1 Introduction

1.1 Study background

Halcrow was commissioned in July 2012 to develop guidance for planners and engineers in West Dorset District Council and Weymouth & Portland Borough Council on the nature of risks posed to coastal areas from future coastal change.

This guidance will be used to:

1. Provide consistent advice on planning application requirements along the West Dorset, Weymouth and Portland coast.
2. Provide the basis for consistent planning application decisions along the West Dorset, Weymouth and Portland coast.
3. Inform the future development of Coastal Change Management Areas (CCMAs) along the West Dorset, Weymouth and Portland coast.

1.2 About this document

This document identifies the nature of the coastal change risks to each section of coast within the West Dorset District Council and Weymouth & Portland Borough Council areas. In doing so, 'risk' is defined as the adverse impact and consequences of a hazard, which may be coastal erosion, landsliding or flooding. 'Coastal risk zones' are therefore areas of projected adverse impact and consequences where particular consideration should be given during the planning process.

The risks are identified for 33 separate sections of coast (see Figure 1-1) within this report (Sections 2 to 34). Each section provides:

- A map showing the coastal risk zones within the section, be it from erosion, landsliding, flooding or a managed realignment policy (refer also to Sections 1.3.1 and 1.3.5).
- A description of the section of coast.
- A summary of the relevant Shoreline Management Plan (SMP) policy (refer also to Section 1.3.1).
- A description of the nature of the coastal change risks including the nature of the hazards and timing and frequency of the risk occurring; based upon a desk-study review and expert assessment of all available data.

  This is based primarily on information contained in the SMP (Halcrow, 2011a); National Coastal Erosion Risk Mapping (NCERM; Environment Agency, 2012a) and recent studies completed post-SMP. In addition, expert assessment of complex cliff and managed realignment areas has been completed as part of this project using available data.
- The assets likely to be affected by future coastal change. This is based on:
  - areas of existing development
  - areas of planned development, as set out in the Draft Local Plan (West Dorset District Council *et al.*, 2012).

- Recommendations for development management, giving due regard to current guidance such as the National Planning Policy Framework (Department for Communities and Local Government, 2012a); the results of the Jurassic Coast Coastal Change Pathfinder project (Dorset County Council, 2011; Land Use Consultants, 2011) and published guidance (Halcrow, 2011b). This includes:
  - development restrictions setting out where different types of appropriate development should or should not occur based on the risk zones
  - the evidence required to support planning applications for different types of development within different risk zones
  - future planning policy recommendations.

The concluding section of this document (Section 35) provides recommendations for future updates of this document, including further studies to improve the predictions of coastal change risks given the current uncertainties identified in this report.

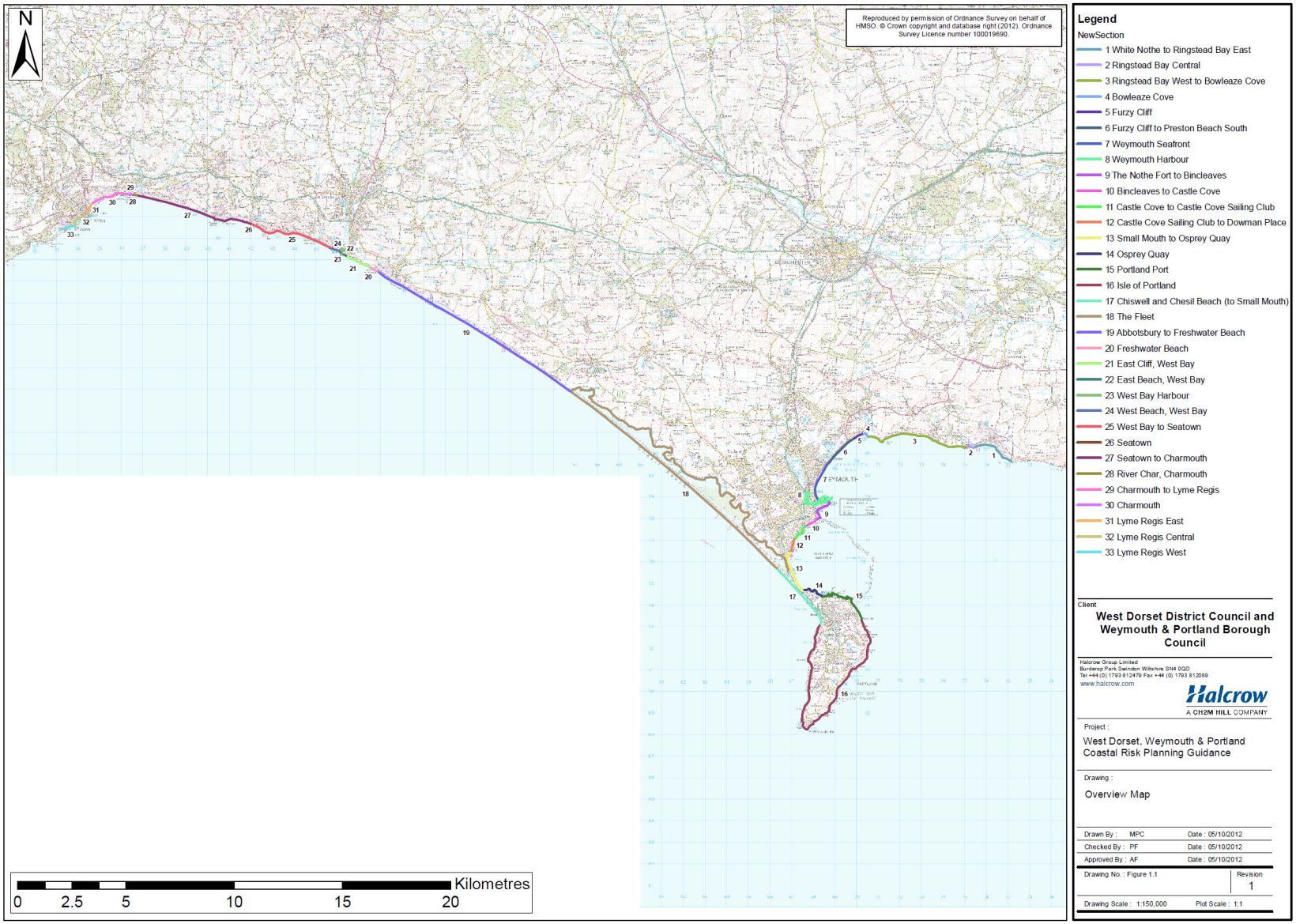


Figure 1-1 Overview map showing the 33 sections for which coastal risks are presented in this document

1.3 Discussion of key issues

This section provides a brief discussion of the key issues associated with coastal risk planning along the West Dorset, Weymouth and Portland coast that are referred to within Sections 2 to 34 of this document. This also describes briefly how these issues have been considered, analysed and mapped as part of developing this coastal risk planning guidance.

1.3.1 Shoreline Management Plan policies

The SMP defines policy for future flood and coastal erosion risk management measures only. The policies defined by the SMP are either:

- **No Active Intervention (NAI):** a policy that assumes that existing defences are no longer maintained and will fail over time, or undefended frontages will be allowed to evolve naturally.
- **Hold the Line (HTL):** a policy to maintain or change the level of protection provided by defences in their present location.
- **Managed Realignment (MR):** a policy that allows the shoreline position to move backwards (or forwards) with management to control or limit movement.
- **Advance the Line (ATL):** a policy to build new defences on the seaward side of the existing defence line to reclaim land *(NB: no areas of the West Dorset, Weymouth and Portland Coast have an ATL policy)*.

The SMP policy is defined for each section of coast for three time-periods – short term (to 2025); medium term (2025 to 2055); and long term (2055 to 2105). The policy can change over time.

The SMP policies for the West Dorset, Weymouth and Portland coast were adopted in 2011 following appraisal of a range of policy scenarios against technical, economic, environmental and social criteria (Halcrow, 2011a).

The adoption of an SMP policy does not guarantee funding for implementing the recommendations. It merely identifies where future flood and coastal erosion spending should be targeted if funding is available and more detailed studies demonstrate a robust case to provide defences following the requirements of the Environment Agency's *Flood and Coastal Erosion Risk Management Appraisal Guidance* (Environment Agency, 2010). As such, although an area may have a policy of continued intervention and defence (i.e. HTL or MR policy), delivery of the policy will remain uncertain until more detailed studies are completed and funding support is committed from external parties (refer to Section 1.3.2).

In developing this coastal risk planning guidance, the mapping of the risk zones has typically assumed defences will remain where the SMP policy is for HTL over the long term. In these areas, only residual risk of flooding (refer to Section 1.3.8) or landslides that are active despite toe protection (refer to Section 1.3.3), or risk of coastal change from adjacent undefended areas, is indicated on the risk zone maps.

In areas where the SMP policy is to change over the next 100 years, or where there is significant uncertainty about the viability of the SMP policy being implemented, then the risk zone mapping in these areas shows the worst case scenario of no active intervention occurring.

1.3.2 Future funding of coastal defences

The way in which flood and coastal erosion risk management schemes are funded in England changed in April 2012. The previous system of funding, whereby only the highest priority schemes received 100% grant-in-aid from central government has been replaced by a new graduated funding system. Whilst some schemes will still be eligible for the full 100% grant-in-aid from central government, the new approach will allow more schemes to be delivered with a lower percentage grant-in-aid contribution from central government, with the shortfall in funding to be made up from other funding sources – this is referred to as 'Partnership Funding' (Defra, 2011a; Defra, 2011b; and Environment Agency 2012).

This partnership funding approach will allow schemes that would have historically been deferred, due to failure to meet the 100% grant-in-aid qualifying criteria, to proceed earlier than would be expected if they were solely dependent on receiving central government funding.

This change in approach reflects the fact that flood and coastal erosion risk management schemes provide multiple benefits to communities, not just protection against flood and erosion risks. For example, a defence may reduce risks to transport and services infrastructure that is critical to an area's economy and development potential. A defence may also provide public space or, where a beach is recharged, an important tourism and recreational resource.

The different, multiple beneficiaries from flood and coastal erosion risk management funded schemes presents the potential to access the various funding sources that are used by those beneficiaries, and this may be one way of achieving partnership funding. Given this possibility, the following are potential partnership funding routes that could be explored to deliver future flood and coastal erosion risk management along the West Dorset, Weymouth and Portland coast (from McNally, Johns and Pygott, 2012; Department of Communities and Local Government, 2012c):

- Private investment (e.g. developer/landowner pays)
- Water company investment
- Community Infrastructure Levy
- Section 106 Agreements (Town & Country Planning Act, 1990)
- Council Tax
- Public Works Loan Board
- Business Rate Supplements
- Business Improvement Districts
- Asset Backed Securities
- General Drainage Charge/Special Drainage Charge
- Local Authority fees and charges
- Trusts
- Regional Growth Fund

- Business Rate Retention
- Tax Increment Finance
- Local Government Bonds
- Coastal Communities Fund.

In order to deliver partnership funding when it is needed in the future, it is vital to begin to develop partnerships and mechanisms for raising funds as early as possible. The Environment Agency's *Principles for implementing flood and coastal resilience funding partnerships* (Environment Agency, 2012b) provides guidance on how this may be achieved.

1.3.3 Coastal erosion and coastal landsliding

Cliff recession is driven by one or other, or a combination of:

- **Coastal erosion:** a wave and tidal-driven process at the coast. Where coastal hinterlands and backshores are elevated relative to sea level, the action of waves and tides will erode and undercut the base of cliffs which will develop a characteristic morphology and profile reflecting their geological composition, structural form and evolution. Erosion events are episodic and associated with particularly high tides and/or storm events. However, as these events are relatively frequent through the year, erosion is typically described as an average annual rate.
- **Coastal landsliding (or cliff instability):** a process that involves slope failure and mass movement of material on a coastal slope or cliff that may result in disruption of the foreshore and/or deposition of debris on the beach. Some landslides are very large and extend a considerable distance inland, offshore, with basal shear surfaces potentially below beach level. Particular care must be taken to ensure their true extent is recognised. Cliff instability and erosion is a four stage process involving: detachment of particles or blocks of material, transport of this material through the cliff system, its deposition on the foreshore and its removal by wave and tidal action. As such, coastal erosion by wave and tidal action at the toe of the coastal slope is an important factor in ongoing instability within the coastal slope. Landsliding is an episodic process associated with the combined effects of coastal erosion removing toe support and elevated groundwater levels that raise pore water pressure. Each recession event may be separated by many tens to hundreds of years. The distinction between coastal landsliding and coastal erosion is an important one, not only because of their different magnitudes and frequencies. Whilst ongoing coastal landsliding is aided by coastal erosion at the toe of the coastal slope, groundwater is a significant additional driver. Therefore coastal landsliding can occur even if coastal erosion at the toe of the coastal slope is prevented by coastal defences.

Given the above distinction, coastal cliffs and slopes can be categorised in one of the following four Cliff Behaviour Unit (CBU) types, depending upon the mechanisms of cliff recession:

- **Simple cliff (systems):** a single sequence of inputs from falls or slides leading almost directly to foreshore deposition. There is usually a steep cliff face,

narrow degradation zone and rapid response to toe erosion. This type of cliff will fail as a result of toe erosion and undercutting, so relative sea level rise is the main forcing parameter.

- **Simple landslide (systems):** a single sequence of inputs and outputs with variable amounts of storage along the shoreline (i.e. beach). A marked degradation and storage zone is usually apparent affording limited buffering against toe erosion. This system will be affected by erosion of the landslide toe and excess groundwater in the slide zone; therefore both sea level and rainfall are key forcing parameters of equal importance.
- **Composite cliff (systems):** Partly coupled sequences of contrasting simple sub-systems, typically comprising inter-bedded hard and soft rocks. Around the coast of England and Wales composite cliffs are formed where hard cap rocks are underlain by clayey strata giving a distinct steep upper cliff face and a tendency for high magnitude, low frequency failures. Composite cliffs are sensitive to changes in toe erosion and groundwater where soft rock occurs above hard rock.
- **Complex cliff (systems):** Strongly coupled sequences of scarp and bench sub-systems, each with their own inputs, storage and outputs of sediment. The output from one system forms a cascading input to the next resulting in close adjustment of process and form with complex feedbacks. The sub-system storage results in significant buffering against the immediate effects of toe erosion, although elevated groundwater levels can trigger major events that can transform the behaviour of the whole system (e.g. major mudsliding episodes), therefore groundwater is the main forcing parameter in the short-term. The impact of toe erosion occurs over much longer timescales of 100s or 1000s of years and consequently toe protection measures alone will not prevent headscarp recession due to sub-aerial slope degradation.

For the purposes of projection of coastal change, simple cliffs, simple landslides and composite cliffs can be considered in the same way and a long-term average erosion rate can be used. However, due to the potentially long time between episodic recession events and the complex spatial pattern of change, complex cliffs have to be treated separately.

In developing this coastal risk planning guidance, the cliffs and coastal slopes along the West Dorset, Weymouth and Portland coast have been categorised as 'erodible' (simple cliffs, simple landslides and composite cliffs) or 'complex cliffs' CBUs. For each CBU, assessment of available data has been used to predict the potential future cliff recession in each area over the next 20, 50 and 100 years.

If the SMP policy is for HTL over the next 100 years the coastal erosion rate is generally assumed to be zero except in exceptional areas where there is significant uncertainty about the likelihood that the HTL policy will be implementable; in these areas the erosion risk is shown assuming the NAI policy. However, for complex cliffs, the headscarp recession is assumed to be 50% of the central erosion projection. This recognises that despite toe erosion being halted by defence of the toe, other effects, such as system lags or elevated groundwater levels, may continue to promote instability and cliff recession.

Appendix A provides further details on the approach taken to defining cliff recession potential in each area and how this is reflected on the risk zone maps contained in this guidance.

The assessment of headscarp recession potential presented in the risk maps contained in this guidance should be used alongside detailed zonal mapping of land instability, where this data is available, to inform geotechnical appraisals and vulnerability assessments where these are recommended to support planning applications (refer also to Appendix B). *Note*, at the present time, zonal mapping of land instability is only available for the Lyme Regis to Charmouth section of the West Dorset, Weymouth and Portland coast (refer to Appendix C).

1.3.4 Localised land and property management

In some areas modification of land and/or property by individual owners can have adverse effects on land stability in particular. In this regards, the following general advice should be conveyed to land/property owners in areas prone to landsliding events (adapted from Halcrow, 2011b):

- Clear drainage ditches and check them frequently, before and during the winter. Don't block or alter ditches. If you think a highway drain is blocked, contact the local highway authority.
- Don't allow water to collect or pond on your land.
- Don't shift water or soil problems down-slope to your neighbour.
- Don't excavate into cliffs or slopes without seeking professional advice and discussing proposed works in advance with the Local Authority. You may create a wider instability problem.
- Don't fell trees or landscape cliffs and slopes as this may increase soil erosion and instability.
- Regularly inspect swimming pools and ponds for leaking and overflowing. Seek professional advice on emptying. Regularly clear gutters, downpipes and water butts. Empty septic tanks regularly.
- For driveways and hard surfaces, consider using free-draining surface materials such as block paving or gravel rather than tarmac.
- Consult with the Local Authority if cliff falls, land slippage, cracks or land settlement occur.
- Regularly inspect/photograph slopes and cliff lines in the vicinity of your property for signs of change. Cliffs and slopes can be dangerous, please take care at all times.

1.3.5 Managed realignment

As defined in Section 1.3.1, managed realignment involves intervention to control or limit change in the position of the coastline. This can be applied in areas at risk of either flooding or erosion.

Along the West Dorset, Weymouth and Portland coast, the SMP policy of managed realignment is primarily defined in areas at risk of flooding, namely at:

- Bowleaze Cove
- Overcombe/Preston Beach, Weymouth
- Chesil Beach (between Chiswell and Small Mouth)
- Freshwater Beach, Burton Bradstock
- East Beach, West Bay
- River Char, Charmouth
- Lyme Regis West.

The coastal risk planning guidance for these areas has been developed based upon expert judgement of the anticipated maximum extent within which managed realignment would occur, and an anticipate more likely (smaller) extent within the bounds of the maximum extent.

There are also a number of areas where the SMP policy of managed realignment is applied to areas at risk of coastal erosion and landsliding, namely at:

- Bincleaves to Castle Cove, Weymouth
- Castle Cove Sailing Club to Dowman Place, Weymouth
- Lyme Regis East.

In these areas the coastal risk planning guidance has been developed based upon the worst case assumption of no active intervention occurring, as it is uncertain if any intervention in line with the SMP policy will be achievable on technical, economic or environmental grounds. It is this worst case scenario that is shown on the risk zone maps contained in this guidance.

1.3.6 Climate change and sea level rise

Information on the impacts of climate change is available from 'Advice for Flood and Coastal Erosion Risk Management Authorities' (Environment Agency, 2011). This is the latest guidance and highlights that the main risk of climate change in relation to coastal development is from sea level rise.

It must be noted that while attempts have been made to relate rates of climate change and sea-level rise to rates of coastal erosion and landsliding (e.g. Bray and Hooke, 1997; Moore *et al.*, 2010; Lee, 2005; Lee, 2011) the science is in its infancy and no reliable predictive tool exists. This is primarily due to a lack of long-term empirical datasets that link historical cliff recession rates with projected climate change and sea level rise

The guidance suggests that predictions of the future rate of sea level rise for the UK coastline should be taken from UKCP09. Data downloaded from the UKCP09 website provides sea level rise projections for a 100 year period from 1990. Anticipated rates of relative sea level rise and surge estimates over three time periods are presented for Weymouth, West Bay and Lyme Regis in Tables 1-1, 1-2 and 1-3 respectively. The following estimates are presented in the tables:

- Lower End Estimate: this is the low emissions scenario, 50% frequency, taken from the UKCP09 User Interface

- Change Factor: this is the medium emissions scenario, 95% frequency, taken from the UKCP09 User Interface
- Upper End Estimate: these are generic values of sea level rise provided in the climate change guidance; they are 4mm (up to 2025), 7mm (2026 to 2050), 11mm (2051 to 2080), and 15mm (2081 to 2115)
- H++ Scenario: these are generic values of sea level rise provided in the climate change guidance; they are 6mm (up to 2025), 12.5mm (2026 to 2050), 24mm (2051 to 2080), and 33mm (2081 to 2115)
- Upper End Estimate + Surge Estimate: This is the upper end estimate plus the upper end surge estimate. The surge estimate are generic values provided in the climate change guidance; they are 20cm (up to the year 2020's), 35cm (up to the year 2050's), and 70cm (up to the year 2080's). With regard to the surge increase, the uncertainty with surge increase is even greater than for sea level rise

The climate change guidance (Environment Agency, 2011) recommends that in planning future coastal management options, the Change Factor (medium 95% frequency scenario) be used as the preferred scenario. All other scenarios are included to demonstrate the sensitivity of decision making through time.

A graph showing the predicted change in relative sea level over the next 100 years for the 5, 50 and 95% confidence levels, for a medium emissions scenario, is presented in Figure 1-2.

*Table 1-1 Relative sea level rise estimates for Weymouth (UKCP09, 2012). *See text above for an explanation of the terms used in this table.*

Time period	Various estimates of relative sea level rise and surge (mm/year)				
	Lower End Estimate	**Change Factor**	**Upper End Estimate**	**H++ Scenario**	**Upper End Estimate + Surge Estimate**
2012 to 2025	0.04	**0.07**	0.05	0.08	0.25
2012 to 2055	0.15	**0.27**	0.28	0.51	0.63
2012 to 2105	0.42	**0.77**	1.08	2.27	1.78

*Table 1-2 Relative sea level rise estimates for West Bay (UKCP09, 2012). *See text above for an explanation of the terms used in this table.*

Time period	Various estimates of relative sea level rise and surge (mm/year)				
	Lower End Estimate	Change Factor	Upper End Estimate	H++ Scenario	Upper End Estimate + Surge Estimate
2012 to 2025	0.04	**0.08**	0.06	0.08	0.26
2012 to 2055	0.15	**0.27**	0.29	0.52	0.64
2012 to 2105	0.42	**0.77**	1.09	2.27	1.79

Table 1-3 Relative sea level rise estimates for Lyme Regis (UKCP09, 2012).See text above for an explanation of the terms used in this table.

Time period	Various estimates of relative sea level rise and surge (mm/year)				
	Lower End Estimate	Change Factor	Upper End Estimate	H++ Scenario	Upper End Estimate + Surge Estimate
2012 to 2025	0.04	**0.08**	0.06	0.08	0.26
2012 to 2055	0.15	**0.27**	0.29	0.52	0.64
2012 to 2105	0.43	**0.78**	1.09	2.27	1.79

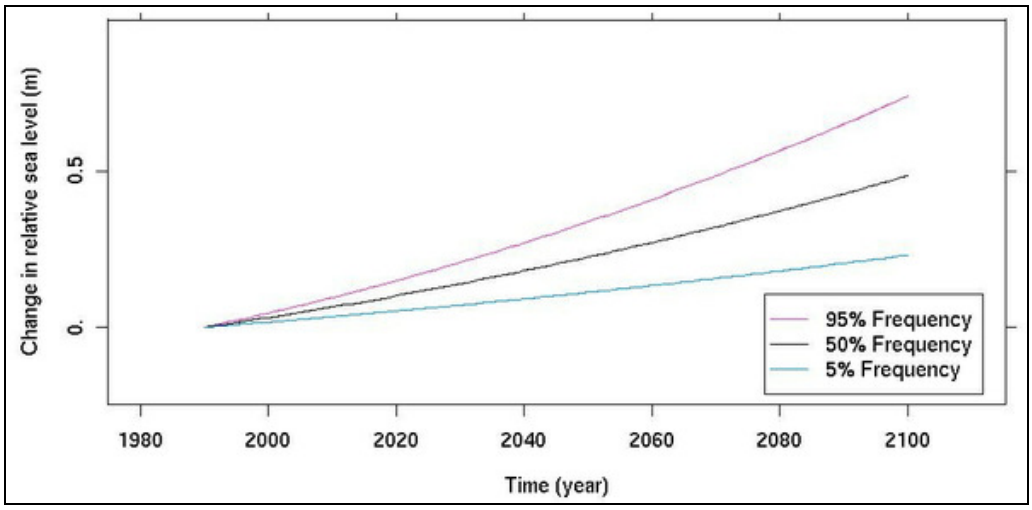


Figure 1-2 Projected change to relative sea level over the next 100 years for a medium emissions scenario (source: UKCP09, 2012).

1.3.7 Beach roll back

Beach roll-back, also sometimes called beach roll-over, is a process that occurs along barrier beaches like Chesil Beach, whereby beach material is moved from the front of the beach, over the crest and to the rear of the ridge and thus over time the whole beach is moved landward.

The mechanism by which this process occurs differs depending upon the type of wave event:

- Annual storms where swash just reaches the crest can cause berm deposition on the crest and have the potential to build its width and elevation (overtopping)
- Strong locally generated waves can saturate the beach face and cause seaward drawdown of shingle resulting in cause cut-back of the beach crest, causing the narrowing of the crest that eventually can cut through the width of the crest and allow waves to overwash the beach
- Large swell waves cause direct overwashing of the crest (i.e. the waves simply run-up over the beach crest) and thereafter transport shingle landward and lowers the crest.

These different mechanisms of barrier beach evolution are illustrated in Figure 1-3.

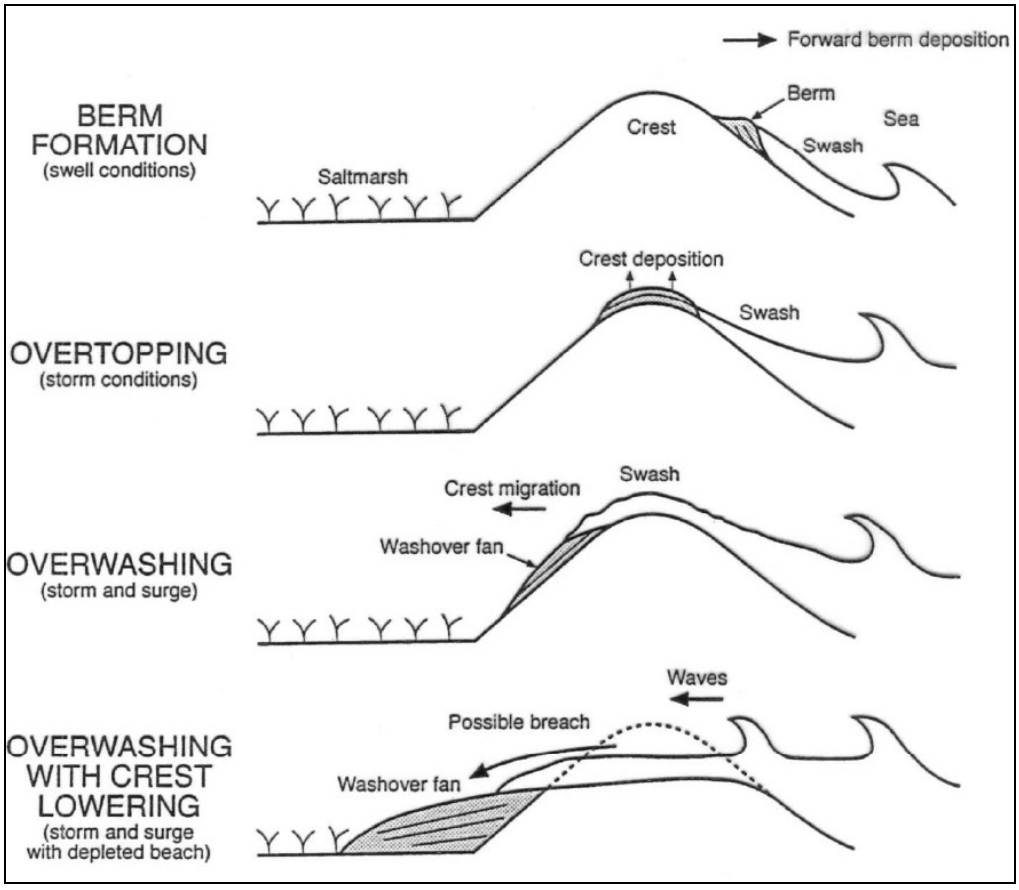


Figure 1-3 Diagram showing the mechanisms by which barrier beaches evolve (from Bray & Sandercock, 2007).

1.3.8 Coastal squeeze

Coastal squeeze is the term given to the narrowing of the intertidal zone as sea level rises and natural retreat is prevented by natural or man-made barriers such as resistant cliffs or a seawall, and where there is insufficient input of new sediment (i.e. from cliff erosion or beach recharge) to counter the effect of rising sea levels.

Along the West Dorset, Weymouth and Portland coast there is a risk that as sea levels rise coastal squeeze will result in the narrowing, or even loss, of beaches along the coast.

A critical implication of coastal squeeze is therefore the potential reduction in the amount of available beach resource that is vital to the tourism economy of the area. Areas susceptible to narrowing or loss of beach as a result of coastal squeeze as a result of beach evolution being constrained by backing seawalls along the West Dorset, Weymouth and Portland coast include:

- Weymouth Bay (including Bowleaze Cove, Preston Beach, Greenhill Beach and Weymouth Beach)
- Newton's Cove, Weymouth
- Chesil Beach at Chiswell, Portland
- West Beach, West Bay
- Lyme Regis Beach

By way of example, Figure 1-4 demonstrates the potential implications of coastal squeeze upon the position of the Mean High Water Springs level along the southern part of Weymouth Beach assuming sea level rise of 0.77m over the next 100 years (refer to Section 1.3.6).

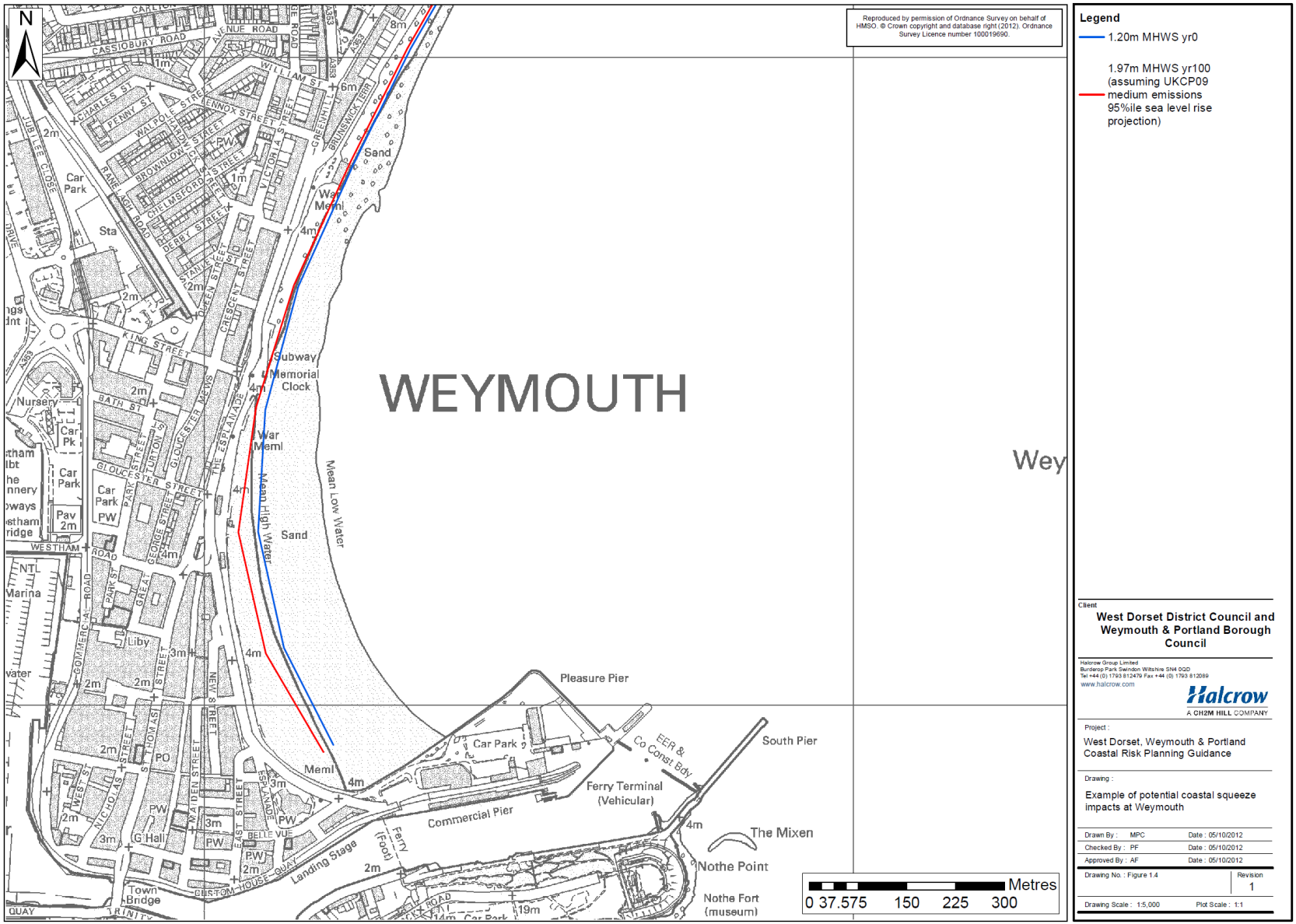


Figure 1-4 Example of potential coastal squeeze impacts at Weymouth

1.3.9 Flood risk

There are many areas along the West Dorset, Weymouth and Portland coast that are vulnerable to coastal flooding, as demonstrated by the Environment Agency flood zone maps. However, the most significant areas at risk of flooding are:

- Preston Beach/Lodmoor
- Weymouth Town Centre
- Chiswell/Osprey Quay and the Portland Beach Road
- Freshwater Bay/Burton Bradstock
- West Bay.

Many of these areas are planned to be protected over the next 100 years with SMP policies to HTL. However, it is important to note that even where the SMP policy is for HTL, these areas will remain at risk of flooding and this risk could increase in the future if the size (height/width) of defences is not increased as sea levels rise.

In developing this coastal risk planning guidance, flood risk has been assessed using a combination of the Environment Agency's flood zone mapping and the West Dorset and Weymouth and Portland Strategic Flood Risk Assessments. However, only the present day flood risk zones for tidal and combined tidal-fluvial sources of flooding, as provided by the Environment Agency, are shown on the risk zone maps contained in this guidance.

1.4 Overview of coastal change risks

Table 1-4 provides an overview of the coastal change risks posed in each of the 33 sections of coast along the West Dorset, Weymouth and Portland coast.

Table 1-4 Overview of coastal change risks along the West Dorset, Weymouth & Portland coast

Coastal Section	Coastal Change Risk							
	Flooding	Coastal Erosion	Coastal Landsliding/ Instability	Withdrawal of existing defences	Managed Realignment	Funding shortfall for continued defence	Other	Describe Other
White Nothe to Ringstead Bay East		✓	✓					
Ringstead Bay Central		✓	✓	✓			✓	Small local pocket beach susceptible to coastal squeeze.
Ringstead Bay West to Bowleaze Cove		✓	✓					
Bowleaze Cove	✓	✓	✓		✓		✓	Potential economic impact due to loss of beach through coastal squeeze (particularly in areas where realignment does not occur).
Furzy Cliff		✓	✓					
Furzy Cliff to Preston Beach South	✓	✓	✓		✓		✓	Potential economic impact due to loss of beach through coastal squeeze (particularly in areas where realignment does not occur).
Weymouth Seafront	✓					✓	✓	Potential economic impact due to loss of beach through coastal squeeze.
Weymouth Harbour	✓					✓		
The Nothe Fort to Bincleaves	✓		✓			✓	✓	Small local pocket beaches susceptible to coastal squeeze.

Coastal Section	Coastal Change Risk							
	Flooding	Coastal Erosion	Coastal Landsliding/ Instability	Withdrawal of existing defences	Managed Realignment	Funding shortfall for continued defence	Other	Describe Other
Bincleaves to Castle Cove		✓	✓					
Castle Cove to Castle Cove Sailing Club		✓	✓			✓	✓	Small local pocket beaches susceptible to coastal squeeze.
Castle Cove Sailing Club to Dowman Place		✓	✓			✓		
Small Mouth to Osprey Quay	✓	✓				✓	✓	Area also at risk from future evolution of Chesil Beach as it rolls-back towards Portland Harbour.
Osprey Quay	✓					✓	✓	Area also at risk from future evolution of Chesil Beach as it rolls-back towards Portland Harbour.
Portland Port	✓							
Isle of Portland		✓	✓				✓	Small local pocket beaches susceptible to coastal squeeze.
Chiswell and Chesil Beach (to Small Mouth)	✓					✓	✓	Area also at risk from future evolution of Chesil Beach as it rolls-back towards Portland Harbour.
The Fleet	✓	✓	✓				✓	Area also at risk from future evolution of Chesil Beach as it rolls-back into The Fleet.

Coastal Section	Coastal Change Risk							
	Flooding	Coastal Erosion	Coastal Landsliding/ Instability	Withdrawal of existing defences	Managed Realignment	Funding shortfall for continued defence	Other	Describe Other
Abbotsbury to Freshwater Beach		✓	✓				✓	Narrowing of Chesil Beach could lead to re-activation of coastal slopes.
Freshwater Beach	✓				✓			
East Cliff, West Bay		✓						
East Beach, West Bay	✓				✓		✓	Potential economic impact due to loss of beach through coastal squeeze, particularly if beach constrained by future realigned defence structure.
West Bay Harbour	✓					✓		
West Beach, West Bay	✓	✓	✓			✓	✓	Potential economic impact due to loss of beach through coastal squeeze.
West Bay to Seatown		✓	✓					
Seatown		✓	✓	✓				
Seatown to Charmouth		✓	✓					
River Char, Charmouth	✓				✓			
Charmouth		✓	✓	✓				
Charmouth to Lyme Regis		✓	✓	✓				

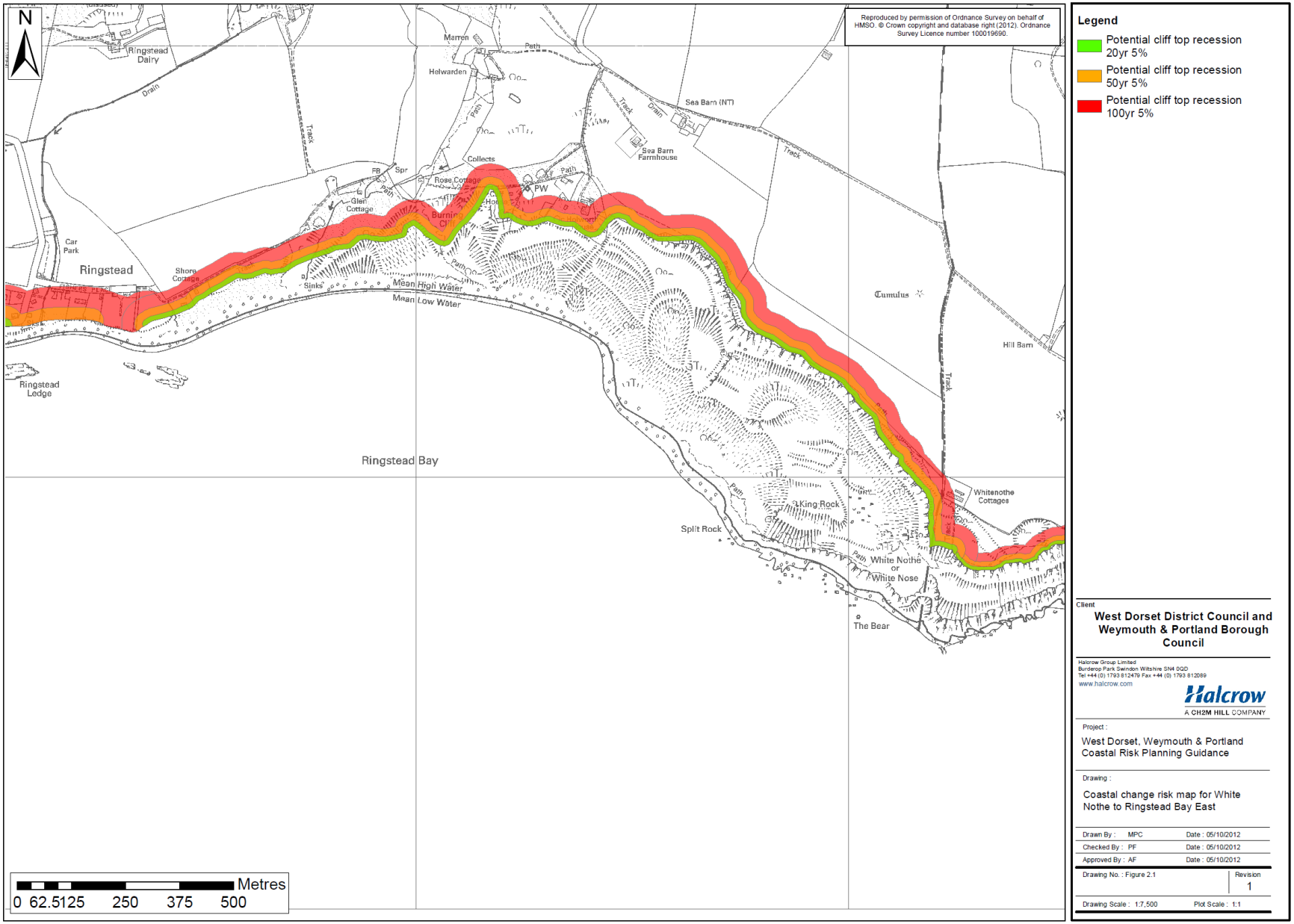
Coastal Section	Coastal Change Risk							
	Flooding	Coastal Erosion	Coastal Landsliding/ Instability	Withdrawal of existing defences	Managed Realignment	Funding shortfall for continued defence	Other	Describe Other
Lyme Regis East		✓	✓			✓		
Lyme Regis Central			✓			✓	✓	Potential economic impact due to loss of beach through coastal squeeze.
Lyme Regis West	✓	✓	✓		✓	✓	✓	Potential economic impact due to loss of beach through coastal squeeze, particularly if beach constrained by future realigned defence structure.

2 White Nothe to Ringstead Bay East

2.1 Risk zone mapping

The risk zone map for this section shows the following:

- 5% probability potential cliff top recession zones for 20, 50 and 100 years into the future (i.e. in any of the three periods, there is a 5% chance that some parts of the frontage will reach the landward limit of the defined zone).


N
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Ringstead Dairy
Drain
Track
Marren
Helwarden
Path
Sea Barn (NT)
Sea Barn Farmhouse
Collects
FB
Spr
Rose Cottage
PW
Glen Cottage
Burning Cliff
Car Park
Ringstead
Shore Cottage
Sinks
Mean High Water
Mean Low Water
Ringstead Ledge
Tumulus
Hill Barn
Ringstead Bay
Whitenothe Cottages
King Rock
Split Rock
White Nothe or White Nose
The Bear
Metres
0 62.5125 250 375 500
Legend
Potential cliff top recession 20yr 5%
Potential cliff top recession 50yr 5%
Potential cliff top recession 100yr 5%
Client
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Project :
West Dorset, Weymouth & Portland Coastal Risk Planning Guidance
Drawing :
Coastal change risk map for White Nothe to Ringstead Bay East
Drawn By : MPC Date : 05/10/2012
Checked By : PF Date : 05/10/2012
Approved By : AF Date : 05/10/2012
Drawing No. : Figure 2.1
Revision 1
Drawing Scale : 1:7,500
Plot Scale : 1:1

2.2 Description of coastal area

This section extends from the West Dorset District Council/Purbeck District Council boundary at White Nothe in the east, to the eastern side of existing coastal defences located within Ringstead Bay, giving a frontage length of approximately 2.1km.

This is a natural, undefended section of coast comprised of chalk cliffs in the eastern part towards White Nothe and complex, clay-rich cliffs in the western part, including Burning Cliff. These complex cliffs taper to low, simple, clay cliffs at the very western end of this section. These cliffs are fronted by shingle and boulder beaches that overlay rocky shore platforms.

This area is designated for its geological and geomorphological features as part of the UNESCO Dorset and East Devon World Heritage Site. It is also within, or in very close proximity to, the South Dorset AONB; the Isle of Portland to Studland Cliffs SAC; and the Studland to Portland Inshore SAC.

The South West Coastal Path runs along the cliff top within this section.

There are approximately eight properties located along the cliff top area above Burning Cliff in Ringstead Bay, with four of these being within 100m or so of the cliff edge. Other properties are set between 150 and 300m back from the cliff edge.

At the very western end of this section, the area above the low clay cliffs is occupied by Ringstead Caravan Park and a single property (Shore Cottage) that is within 20m of the cliff edge.

2.3 Shoreline Management Plan policy

This section is covered by SMP policy unit 5g09.

The SMP policy for this section is for **no active intervention** over the next 100 years.

This means that there is no expectation for constructing any flood or coastal protection measures along this section of coast over this period. As such, this section will be allowed to continue to evolve naturally.

2.4 Coastal change risks

2.4.1 Nature of the risks

The majority of the clay-rich cliffs within Ringstead Bay are subject to complex landsliding related primarily to groundwater levels, although ongoing coastal erosion at the cliff toe is important factor in the continuing cliff instability. However, the lower clay cliffs at the very western end of this section are simpler and erode more as a result of marine action at the cliff toe.

The beach within Ringstead Bay plays an important part in reducing the rate of erosion of the cliff toe, and so the instability of the clay-rich cliffs. Erosion of the cliffs supplies some sediment to the beach. However this is transported both alongshore to the west and cross-shore. The rate of sediment supply is unlikely to keep pace with sea level rise and so the beach will become narrower in the future and provide reduced protection to the cliff toe. This raises the likelihood of accelerated recession of the cliff toe and so greater instability in the cliff slope, particularly within the simple clay cliffs at the very western end of this section.

The chalk cliffs towards White Nothe fail as a result of wave undercutting at the cliff toe. The beaches fronting these cliffs will also narrow as sea levels rise. However, this is unlikely to have an impact upon the rate of recession in these more resistant chalk cliffs.

2.4.2 Potential extent of risk

The complex clay-rich cliffs within the eastern part of Ringstead Bay covered by this section are subject to episodic land-slip events that can cause recession of between 10-50m of cliff top in a single event along a long length of frontage. However, the mean recession rate is about 0.5m/year.

The chalk cliffs towards White Nothe experience smaller scale recession as a result of rock falls that may cause localised recession of up to 10m in a single event.

The assessment of cliff recession potential over the next 100 years defines a risk zone of 65m for this area (refer to Section 1.3.3 and Appendix A).

2.4.3 Timing/frequency of risk occurrence

The main risk along this frontage is from mudflows and large-scale rotational land slip events within the clay rich cliffs within Ringstead Bay. These events are episodic in nature and difficult to predict. Such events have historically occurred every 10-100 years within the clay rich cliffs in Ringstead Bay (Halcrow, 2011a).

The chalk cliffs towards White Nothe are much more resistant to erosion and fail as a result of wave action at the cliff toe causing undercutting and small scale rock falls. These events also occur with a frequency of between 10-100 years (Halcrow, 2011a).

2.4.4 Existing assets at risk

The cliff top properties above Burning Cliff are within about 100m or so of the cliff edge. These will all be at risk of coastal landsliding within the next 100 years. The properties situated further back from the cliff edge are less likely to be affected by coastal landsliding in this time frame.

The properties located atop the low cliffs at the very western end of this section are likely to be lost to erosion within the next 20-50 years, particularly Shore Cottage. The seaward part of the Caravan Park will also be affected in this time frame and so measures to facilitate its roll-back landwards are likely to be required within the next 20 years before any assets are lost and in accordance with Draft Local Plan policy ECON 7 CARAVAN AND CAMPING SITES.

The coast path will also need to be adapted landwards as the cliff top erodes in the future.

2.4.5 Future planned developments at risk

There are no planned developments in this area within the Draft Local Plan.

2.5 Recommendations for development management

2.5.1 Development constraints

Based upon the available data assessed in developing this coastal risk planning guidance, the following constraints on development are recommended along this section of coast:

- No permanent development should occur in the area at risk of erosion along the cliff top or the coastal slope seawards of the defined erosion bands.
- Time-limited planning consent for a limited range of developments is most appropriate within the risk zone.
- Any development that does occur will need to be appropriate for the area given the expected timing of future risks, and should be limited in its size and extent. Any development should also demonstrate how it will adapt to future coastal change risks, including how it can be safely removed in advance of its loss to coastal change. It should also consider the general advice provided in Section 1.3.4.
- The types of development likely to be appropriate in this area are short term holiday lets or camping/caravan sites or facilities associated with tourism and leisure (e.g. cafes, access provision etc.). Extensions to existing properties may also be appropriate.
- Any time-limited planning consent should include re-appraisal periods to enable the consent period to be extended or reduced, depending upon the actual rate of coastal change experienced in the future.

Should an applicant be able to robustly demonstrate that the data underpinning this coastal risk planning guidance is inaccurate in an area of proposed development, then approval of planning applications could be granted.

2.5.2 Planning application requirements

In addition to complying with all other relevant West Dorset Planning Application Requirements (West Dorset District Council, 2011), planning applications along this section will also need to provide the following evidence in relation to demonstrating consideration of coastal risks associated with development:

- Geotechnical Appraisal will be required for any development that proposes to construct any form of structure or proposes to discharge water (e.g. via soakaways) within, or in close proximity to, the risk zones identified for this section. All proposed developments that meet these criteria should submit a geotechnical appraisal to demonstrate that the development would not have an adverse effect on the stability of the coastal slope and so the safety and serviceability of the development itself or surrounding area/properties.

  The Geotechnical Appraisal Report advice and template provided in Appendix B should be used to ensure that the required information is provided by developers.
- Vulnerability Assessment to demonstrate that the development is unlikely to be at risk from coastal change within the period for which time-limited

planning consent is being sought. This should relate to the evidence provided in the Geotechnical Appraisal.

2.5.3 Planning policy recommendations

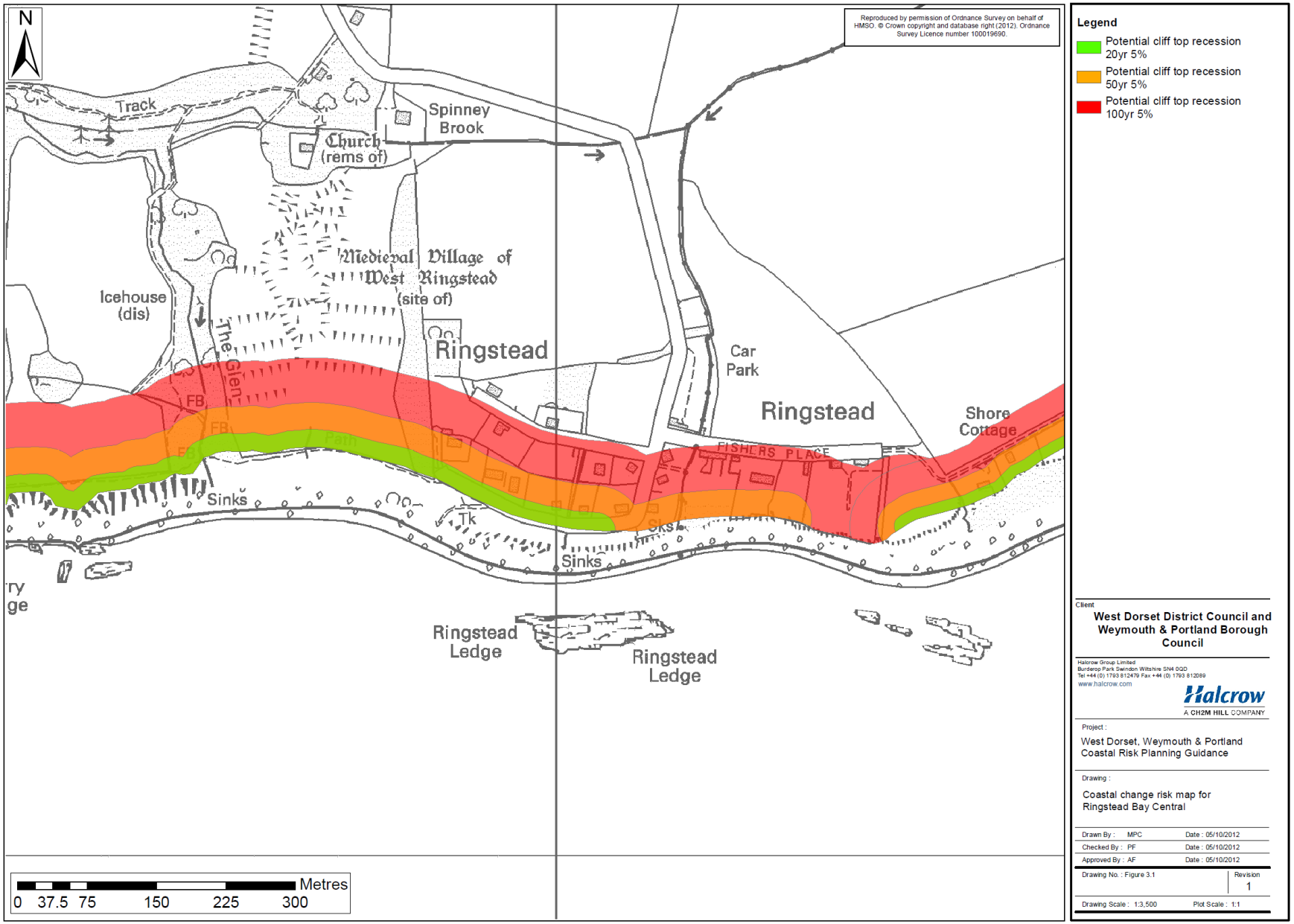
This section of coast should be included within any future CCMA developed for the area. The CCMA should consider the development constraints defined in Section 2.5.1 as well as options to facilitate the relocation of existing properties and other assets within the defined erosion risk zones. This includes caravans at Ringstead as discussed in Section 2.4.4. Reference should also be made to the national *Coastal Change Adaptation Planning Guidance* currently being developed for Defra in a project led by East Riding of Yorkshire Council and Halcrow (due to be published in 2013).

3 Ringstead Bay Central

3.1 Risk zone mapping

The risk zone map for this section shows the following:

- 5% probability potential cliff top recession zones for 20, 50 and 100 years into the future (i.e. in any of the three periods, there is a 5% chance that some parts of the frontage will reach the landward limit of the defined zone).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Track
Spinney Brook
Church (rems of)
Medieval Village of West Ringstead (site of)
Icehouse (dis)
The Glen
Ringstead
Car Park
Ringstead
Shore Cottage
FISHERS PLACE
FB
Sinks
Tk
Ringstead Ledge
Ringstead Ledge
Metres
0 37.5 75 150 225 300
Legend
Potential cliff top recession 20yr 5%
Potential cliff top recession 50yr 5%
Potential cliff top recession 100yr 5%
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Drawn By : MPC Date : 05/10/2012
Checked By : PF Date : 05/10/2012
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Drawing No. : Figure 3.1
Revision 1
Drawing Scale : 1:3,500
Plot Scale : 1:1

3.2 Description of coastal area

This section extends for approximately 0.3km along the central part of Ringstead Bay. This section is currently defended by a rock groyne constructed in 1996 with a design life of 50 years. This construction also included a small amount (approximately 25,000m^3) of beach recharge.

The rock groyne and beach front low, simple clay cliffs and serve to reduce the risk of erosion to approximately 15 properties, Ringstead Caravan Park and a car park used by visitors to the beach. The beach in Ringstead Bay is also currently protected to some extent by the offshore Ringstead Ledge.

Road access to this part of the coast is via a road that runs perpendicular to the coast from inland.

Access to the beach is currently via a concrete slipway from the top of the low cliffs to the beach, and via steps over the rock groyne to the beach to the east.

The South West Coastal Path runs along the cliff top within this section.

This area is designated for its geological and geomorphological features as part of the UNESCO Dorset and East Devon World Heritage Site. It is also within or in very close proximity to the South Dorset AONB; the Isle of Portland to Studland Cliffs SAC; and the Studland to Portland Inshore SAC.

3.3 Shoreline Management Plan policy

This section is covered by SMP policy unit 5g10.

The SMP policy for this section is for the current defences to continue to be maintained for as long as is economically viable to do so, under a policy of **hold the line**. However, it is not planned to replace or upgrade these defences once they become uneconomical to maintain. As such, the SMP policy is to move towards **no active intervention** over the next 100 years. This change in policy is expected to occur within the next 20 to 50 years, as the 1996 scheme reaches the end of its design life.

Once the defences become uneconomical to maintain they will gradually deteriorate and their effectiveness at reducing risk of coastal erosion to the currently protected land will diminish over time. These defences may need to be removed for public health and safety reasons and so the residual effect of the defences would be removed much more rapidly if this occurs. Eventually the coast will revert to a naturally functioning section of coast with ongoing erosion driven by wave action at the cliff toe.

3.4 Coastal change risks

3.4.1 Nature of the risks

The beach within this central part of Ringstead Bay plays an important part in reducing the rate of erosion of the low, simple clay cliffs. Erosion of the cliffs to the east of this section within Ringstead Bay supplies some sediment to the beach. However this is only transported alongshore as far as the rock groyne which, significantly, prevents the transport of beach sediment further west. Some beach sediment is also transported offshore by cross-shore transport processes; these are influenced at the current time by the Ringstead Ledges though this effect will reduce

as sea levels rise. The size of the beach along this section will also reduce in size as sea levels rise at a greater rate than sediment can be supplied to the beach from cliff erosion.

As a result of the combined effects of the withdrawal of defences, narrowing of the beach and reduced effect of the ledges, there will be reduced protection of the low clay cliffs along this section in the future. This raises the likelihood of accelerated recession of the cliff along this section.

3.4.2 Potential extent of risk

The assessment of cliff recession potential over the next 100 years defines a risk zone of 100m for this area (refer to Section 1.3.3 and Appendix A).

3.4.3 Timing/frequency of risk occurrence

The risk of cliff erosion will continue to be reduced in the next 20-30 years provided that the defences at Ringstead remain economical to maintain (Halcrow, 2011a).

Once these defences become uneconomical and maintenance is withdrawn, likely to be in the next 20-50 years, then they will continue to have some influence on cliff erosion rates for a period. This effect will gradually reduce as the defences deteriorate and fail. As this happens, the rate of cliff erosion will increase. This may well involve a period of accelerated erosion as the coast 'catches up' with adjacent, natural sections of coast, before erosion rates reduce to a more natural rate within the next 50-100 years (Halcrow, 2011a).

3.4.4 Existing assets at risk

As a result of the change in SMP policy that is expected to occur within the next 20-50 years, the 15 or so currently defended properties, the caravan park and the visitor car park will be at increased risk of erosion in this time frame and beyond. Relocation of affected assets should be considered in advance of the maintenance of the existing defences being withdrawn.

Road access to this part of the coast will not be as affected because the road extends inland perpendicular to the coast, so only the seaward end would be affected in the longer term as the coast erodes. Road access to properties would likely be less of a concern as most properties would be affected by erosion before the access road that serves them.

The car park used by visitors to the beach may be affected in the longer term, and provision may be required to relocate car parking provision. Measures to facilitate access to the beach for beach visitors (e.g. steps) may be required as part of any adaptation measures, although the requirement for this may reduce if the reduced size of beach leads to reduced visitor numbers in the long-term.

The coast path will need to be adapted as the coast erodes in the future.

3.4.5 Future planned developments at risk

There are no planned developments in this area within the Draft Local Plan.

3.5 Recommendations for development management

3.5.1 Development constraints

Based upon the available data assessed in developing this coastal risk planning guidance, the following constraints on development are recommended along this section of coast:

- No permanent development should occur in the area at risk of erosion along the cliff top or the coastal slope seawards of the defined erosion bands.
- Time-limited planning consent for a limited range of developments is most appropriate within the risk zone.
- Any development that does occur will need to be appropriate for the area given the expected timing of future risks, and should be limited in its size and extent. Any development should also demonstrate how it will adapt to future coastal change risks, including how it can be safely removed in advance of its loss to coastal change. It should also consider the general advice provided in Section 1.3.4.
- The types of development likely to be appropriate in this area are short term holiday lets or camping/caravan sites or facilities associated with tourism and leisure (e.g. cafes, car parks, access provision etc.). Extensions to existing properties may also be appropriate.
- Any time-limited planning consent should include re-appraisal periods to enable the consent period to be extended or reduced, depending upon the actual rate of coastal change experienced in the future.

Should an applicant be able to robustly demonstrate that the data underpinning this coastal risk planning guidance is inaccurate in an area of proposed development, then approval of planning applications could be granted.

3.5.2 Planning application requirements

In addition to complying with all other relevant West Dorset Planning Application Requirements (West Dorset District Council, 2011), planning applications along this section will also need to provide the following evidence in relation to demonstrating consideration of coastal risks associated with development:

- Geotechnical Appraisal will be required for any development that proposes to construct any form of structure or proposes to discharge water (e.g. via soakaways) within, or in close proximity to, the risk zones identified for this section. All proposed developments that meet these criteria should submit a geotechnical appraisal to demonstrate that the development would not have an adverse effect on the stability of the coastal slope and so the safety and serviceability of the development itself or surrounding area/properties.

  The Geotechnical Appraisal Report advice and template provided in Appendix B should be used to ensure that the required information is provided by developers.
- Vulnerability Assessment to demonstrate that the development is unlikely to be at risk from coastal change within the period for which time-limited

planning consent is being sought. This should relate to the evidence provided in the Geotechnical Appraisal.

3.5.3 Planning policy recommendations

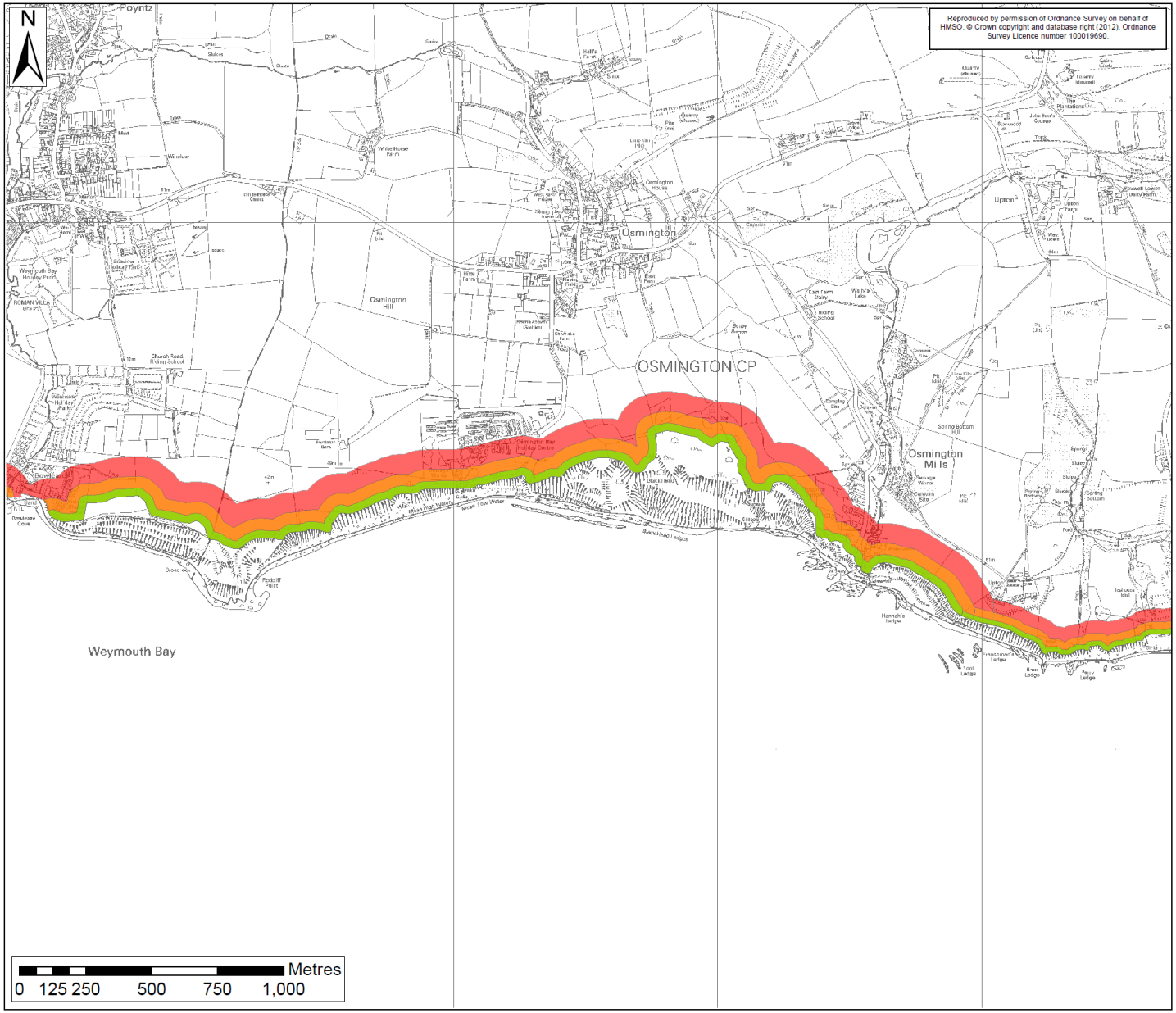
This section of coast should be included within any future CCMA developed for the area. The CCMA should consider the development constraints defined in Section 3.5.1 as well as options to facilitate the relocation of existing properties and other assets within the defined erosion risk zones. Reference should also be made to the national *Coastal Change Adaptation Planning Guidance* currently being developed for Defra in a project led by East Riding of Yorkshire Council and Halcrow (due to be published in 2013).

4 Ringstead Bay West to Bowleaze Cove

4.1 Risk zone mapping

The risk zone map for this section shows the following:

- 5% probability potential cliff top recession zones for 20, 50 and 100 years into the future (i.e. in any of the three periods, there is a 5% chance that some parts of the frontage will reach the landward limit of the defined zone).



Legend

- Potential cliff top recession 20yr 5%
- Potential cliff top recession 50yr 5%
- Potential cliff top recession 100yr 5%

Client

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Project :

West Dorset, Weymouth & Portland Coastal Risk Planning Guidance

Drawing :

Coastal change risk map for Ringstead Bay West to Bowleaze Cove

Drawn By :	MPC	Date : 05/10/2012
Checked By :	PF	Date : 05/10/2012
Approved By :	AF	Date : 05/10/2012

Drawing No. : Figure 4.1 | Revision 1

Drawing Scale : 1:13,500 | Plot Scale : 1:1

4.2 Description of coastal area

This section extends from the western side of the defended section within Ringstead Bay in the east, to the eastern side of existing gabion defences at Bowleaze Cove located at the northern end of Weymouth Bay. This frontage is approximately 4.8km in length and encompasses Osmington Bay and the emergent headland at Redcliff Point that serves to inhibit sediment transport into Weymouth Bay from further east.

This is a natural, undefended section of coast comprised of complex clay-rich cliffs that are fronted by a combination of shingle beach and rocky shore platforms, the latter serving to limit the alongshore transport of beach sediment.

This area is designated for its geological and geomorphological features as part of the UNESCO Dorset and East Devon World Heritage Site. It is also within or in very close proximity to the South Dorset AONB; the Isle of Portland to Studland Cliffs SAC; and the Studland to Portland Inshore SAC.

The South West Coastal Path runs along the cliff top within this section.

There are approximately 10 properties located along the cliff top at Ringstead accessed by short lengths of road that extend parallel to the shore from the main access road to Ringstead that runs perpendicular to the shore from further inland.

At Osmington and Osmington Mills there are properties, both residential and commercial, in close proximity to the cliff top including the Smugglers Inn public house and car park, the Osmington Bay Holiday Centre and a sewage works. All of these are accessed by roads that run perpendicular to the coast from further inland.

At Osmington Mills access to the shoreline is provided by a small slipway. Access is also provided by steps extending along a narrow valley cut through the cliffs in the vicinity of the Osmington Bay Holiday Centre.

4.3 Shoreline Management Plan policy

This section is covered by SMP policy units 5g11 and 5g12.

The SMP policy for this section is for **no active intervention** over the next 100 years.

This means that there is no expectation for constructing any flood or coastal protection measures along this section of coast over this period. As such, this section will be allowed to continue to evolve naturally.

4.4 Coastal change risks

4.4.1 Nature of the risks

The clay-rich cliffs along this section are subject to complex landsliding related primarily to groundwater levels, although ongoing coastal erosion at the cliff toe is important factor in the continuing cliff instability.

The beaches and rocky shore platforms play an important part in reducing the rate of erosion of the cliff toe by limiting the amount of wave action that reaches the cliff toe, and so reduces the instability of the clay-rich cliffs. However, as sea levels rise in the future, this effect is likely to reduce over time. This raises the likelihood of accelerated recession of the cliff toe and so greater instability in the cliff slope in the future.

4.4.2 Potential extent of risk

The complex clay-rich cliffs along this section are subject to episodic land-slip events that can cause recession of between 10-50m of cliff top in a single event along a long length of frontage.

The assessment of cliff recession potential over the next 100 years defines a risk zone of 150m for this area (refer to Section 1.3.3 and Appendix A).

4.4.3 Timing/frequency of risk occurrence

The main risk along this frontage is from mudflows and large-scale rotational land slip events within the clay rich cliffs along this section. These events are episodic in nature and difficult to predict. Such events have historically occurred every 10-100 years (Halcrow, 2011a).

4.4.4 Existing assets at risk

Road access to properties at Ringstead could be affected by erosion prior to the properties themselves. There may be a need to provide temporary access should this occur, however ultimately the properties themselves will be affected by erosion.

Properties and infrastructure at Osmington Mills could well be affected by coastal erosion and landsliding within the next 20 years. Road access to this part of the coast will not be as affected because the road access extends inland perpendicular to the coast, so only the seaward end would be affected as the coast erodes. Road access to properties would likely be less of a concern as most properties would be affected by erosion before the access road that serves them.

The sewage works and more seaward parts of Osmington Bay Holiday Centre are likely to be risk in the next 50-100 years.

The coast path will also need to be adapted as the coast erodes in the future.

4.4.5 Future planned developments at risk

There are no planned developments in this area within the Draft Local Plan.

4.5 Recommendations for development management

4.5.1 Development constraints

Based upon the available data assessed in developing this coastal risk planning guidance, the following constraints on development are recommended along this section of coast:

- No permanent development should occur in the area at risk of erosion along the cliff top or the coastal slope seawards of the defined erosion bands.
- Time-limited planning consent for a limited range of developments is most appropriate within the risk zone.
- Any development that does occur will need to be appropriate for the area given the expected timing of future risks, and should be limited in its size and extent. Any development should also demonstrate how it will adapt to future coastal change risks, including how it can be safely removed in advance of its

loss to coastal change. It should also consider the general advice provided in Section 1.3.4.

- The types of development likely to be appropriate in this area are short term holiday lets or camping/caravan sites or facilities associated with tourism and leisure (e.g. cafes, car parks, access provision etc.). Extensions to existing properties may also be appropriate.
- Any time-limited planning consent should include re-appraisal periods to enable the consent period to be extended or reduced, depending upon the actual rate of coastal change experienced in the future.

Should an applicant be able to robustly demonstrate that the data underpinning this coastal risk planning guidance is inaccurate in an area of proposed development, then approval of planning applications could be granted.

4.5.2 Planning application requirements

In addition to complying with all other relevant West Dorset or Weymouth & Portland Planning Application Requirements (West Dorset District Council, 2011; Weymouth & Portland Borough Council, 2008), planning applications along this section will also need to provide the following evidence in relation to demonstrating consideration of coastal risks associated with development:

- Geotechnical Appraisal will be required for any development that proposes to construct any form of structure or proposes to discharge water (e.g. via soakaways) within, or in close proximity to, the risk zones identified for this section. All proposed developments that meet these criteria should submit a geotechnical appraisal to demonstrate that the development would not have an adverse effect on the stability of the coastal slope and so the safety and serviceability of the development itself or surrounding area/properties.

  The Geotechnical Appraisal Report advice and template provided in Appendix B should be used to ensure that the required information is provided by developers.
- Vulnerability Assessment to demonstrate that the development is unlikely to be at risk from coastal change within the period for which time-limited planning consent is being sought. This should relate to the evidence provided in the Geotechnical Appraisal.

4.5.3 Planning policy recommendations

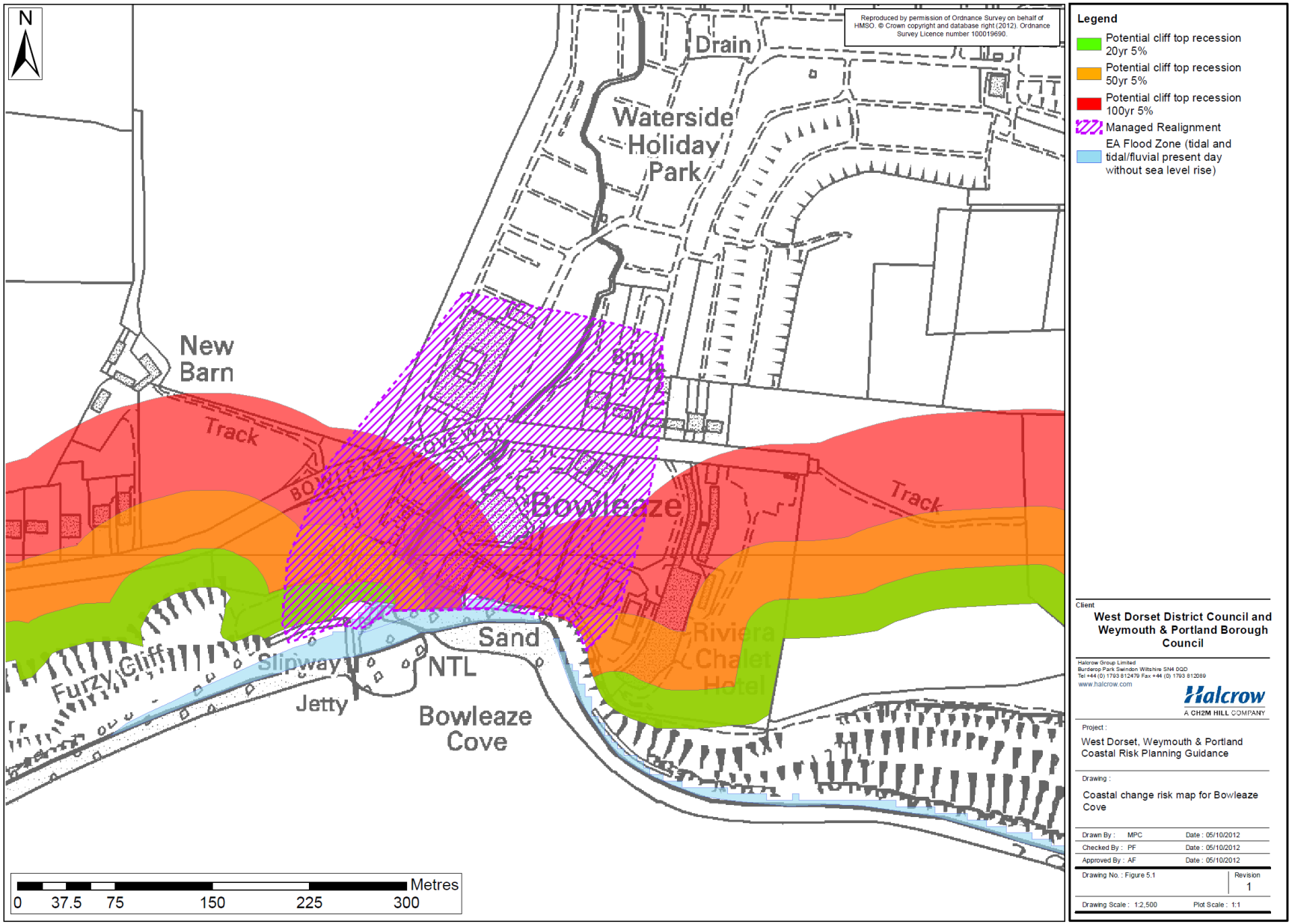
This section of coast should be included within any future CCMA developed for the area. The CCMA should consider the development constraints defined in Section 4.5.1 as well as options to facilitate the relocation of existing properties and other assets within the defined erosion risk zones. Reference should also be made to the national *Coastal Change Adaptation Planning Guidance* currently being developed for Defra in a project led by East Riding of Yorkshire Council and Halcrow (due to be published in 2013).

5 Bowleaze Cove

5.1 Risk zone mapping

The risk zone map for this section shows the following:

- 5% probability potential cliff top recession zones for 20, 50 and 100 years into the future (i.e. in any of the three periods, there is a 5% chance that some parts of the frontage will reach the landward limit of the defined zone).
- Managed realignment zone indicating the maximum extent within which managed realignment is anticipated to occur at some point over the next 100 years.
- Environment Agency flood zone mapping for the present day (i.e. no sea level rise effects shown) from tidal and combined tidal-fluvial sources of flooding.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Drain
Waterside Holiday Park
New Barn
Track
Bowleaze
Track
Riviera Chalet Hotel
Sand
Slipway
NTL
Furzy Cliff
Jetty
Bowleaze Cove
0 37.5 75 150 225 300 Metres
Legend
Potential cliff top recession 20yr 5%
Potential cliff top recession 50yr 5%
Potential cliff top recession 100yr 5%
Managed Realignment
EA Flood Zone (tidal and tidal/fluvial present day without sea level rise)
Client
West Dorset District Council and Weymouth & Portland Borough Council
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West Dorset, Weymouth & Portland Coastal Risk Planning Guidance
Drawing :
Coastal change risk map for Bowleaze Cove
Drawn By : MPC Date : 05/10/2012
Checked By : PF Date : 05/10/2012
Approved By : AF Date : 05/10/2012
Drawing No. : Figure 5.1
Revision 1
Drawing Scale : 1:2,500
Plot Scale : 1:1

5.2 Description of coastal area

This section extends along the defended frontage of Bowleaze Cove at the northern end of Weymouth Bay between Redcliff to the east and Furzy Cliff to the west. This frontage is approximately 0.4km in length and also encompasses the mouth of the River Jordan that flows to the sea from Sutton Poyntz inland.

This is a defended section of coast with a range of structures located along the shoreline including gabions at the eastern end along the base of Redcliff, seawalls and a slipway used for launching jet skis and other small personal water craft. There is also a jetty that extends seawards from the shoreline. The defences are fronted by a small shingle beach.

The land immediately behind the defences is used for tourism and leisure facilities including a fun park, the Riviera Hotel, an entertainment complex and car parking. Landward of these facilities is the Weymouth Bay Caravan Park.

Access to this area is via Bowleaze Coveway, a public highway and footpath that runs along the top of Furzy Cliff to the west.

The South West Coastal Path runs along the cliff top in the eastern part of this section before it crosses inland to Bowleaze Coveway.

This area is designated for its geological and geomorphological features as part of the UNESCO Dorset and East Devon World Heritage Site. It is also within or in very close proximity to the South Dorset AONB and the Isle of Portland to Studland Cliffs SAC.

5.3 Shoreline Management Plan policy

This section is covered by SMP policy unit 5g13.

The SMP policy for this section is for the current defences to be maintained in the immediate future in their current location under a policy to **hold the line**. However, as the adjacent undefended Redcliff and Furzy Cliffs erode landwards this section will become increasingly exposed to wave action and the beach will become narrower as sea levels rise, making continued defence along the existing alignment increasingly unsustainable. The SMP policy is to therefore transition to one of **managed realignment** to enable the defence line to also be moved landwards at some point in the next 20 to 100 years, should funding be available to do so, in order to reduce this exposure and enable defence to be maintained in a more sustainable position.

The realigned defences would need to be larger and more substantial than the existing defences in order to account for predicted sea level rise and climate change impacts. These would also need to allow for continued discharge of the River Jordan to the sea in order to minimise adverse impacts of fluvial flooding upstream of the new defence line.

Once constructed, the new defence line would be maintained by a policy reverting to one of **hold the line**. The realigned defence position also offers the potential for retaining a small pocket beach in this area in front of the realigned defences, particularly in the medium term following realignment if the rate of future sediment supply to this area is not exceeded by the rate of sea level rise. However, the

probability of the beach being retained in the longer term is considered to be low as sea level rise accelerates.

5.4 Coastal change risks

5.4.1 Nature of the risks

The main risk to this defended section at Bowleaze Cove is the recession of the adjacent undefended Redcliff and Furzy Cliff. As these two cliffs retreat landwards in the future, the current defences will become increasingly exposed. Combined with a narrowing beach as sea levels rise, the defences will become unsustainable in their current position and so will need to be realigned at some point in the future in line with the SMP policy.

This area is also at risk of combined fluvial/tidal flooding via the River Jordan.

5.4.2 Potential extent of risk

In order to facilitate future realignment of defences, an area of land immediately behind the existing defence line will need to be allocated to this future purpose.

Further detailed study is required to determine the exact position of any future defence line. This will ultimately be guided by the extent and rate of retreat of Redcliff and Furzy Cliff (refer also to Sections 4 and 6).

Until further detailed studies are undertaken, the area of land currently seaward of Bowleaze Coveway should be set-aside for this purpose as a minimum. Depending upon the actual rate of recession of the adjacent undefended cliffs, this set-aside area may need to extend further landwards in the future.

The area at risk of flooding around the River Jordan is defined by the Environment Agency's flood zone maps for the present day.

5.4.3 Timing/frequency of risk occurrence

The SMP predicts that realignment of the defences in this area may be required in 20-50 years time as the existing defences reach the end of their serviceable life and need replacing and the adjacent cliffs are predicted to have receded by about 75m or so in that period.

The retreat of Furzy Cliff also poses a risk to the access to Bowleaze Cove via Bowleaze Coveway, which could potentially be cut-off by erosion within 20-50 years.

Flooding of this section around the River Jordan could occur at any time. The probability of a large event causing significant overtopping of the defences is currently low, although this will increase as sea levels rise.

5.4.4 Existing assets at risk

In order to facilitate future realignment of defences, as a minimum the area of land between the existing defence line and Bowleaze Coveway should be considered for being set-aside for this purpose. This area currently includes many tourism and leisure facilities such as Bowleaze Cove leisure ranch.

The future recession of Redcliff could also impact on the Riviera Hotel and this may not be sustainable in its current position in the medium to long term, depending upon the location and extent of future recession along Redcliff.

The future recession of Furzy Cliff could also impact upon Bowleaze Coveway, cutting off access to Bowleaze Cove. Therefore alternative access will need to be provided if Bowleaze Cove is to continue to be utilised in a similar way as it is at present in the medium to long term.

The coast path will also need to be adapted as the coast erodes in the future.

5.4.5 Future planned developments at risk

The Draft Local Plan policy WEY 15 BOWLEAZE COVE promotes development of leisure and tourism in this area so long as it does not exacerbate coastal erosion and flooding.

In order to achieve these policies, and the policy of the SMP, there is a need to consider adapting the land area behind the current defences to provide space to move the defence line back at some point in the future with sufficient accommodation for future recession of the adjacent undefended cliffs, whilst at the same time providing for relocation of assets that will be affected by realignment.

The 2005 Adopted Local Plan (Weymouth & Portland Borough Council, 2005) also identifies this area as being within a DDB. This DDB has been saved in the Draft Local Plan and therefore future development within this area could be affected by future coastal change.

5.5 Recommendations for development management

5.5.1 Development constraints

Based upon the available data assessed in developing this coastal risk planning guidance, the following constraints on development are recommended along this section of coast:

- No permanent development should occur in the areas at risk of erosion along the cliff top or the coastal slope seawards of the defined erosion bands at either end of this section; nor should it occur within the zone identified for accommodating future realignment.
- Time-limited planning consent for a limited range of developments is most appropriate within these zones.
- Any development that does occur will need to be appropriate for the area given the expected timing of future risks, and should be limited in its size and extent. Any development should also demonstrate how it will be adapted for future coastal risks such as increased risk of flooding in line with the requirements of Draft Local Plan policy ENV 5 FLOOD RISK. In this area any development should also include plans for its safe removal as part of future implementation of the managed realignment policy.
- The types of development likely to be appropriate in this area are short term holiday lets or camping/caravan sites or facilities associated with tourism and leisure (e.g. cafes, entertainment, access provision etc.).

- Any time-limited planning consent should include re-appraisal periods to enable the consent period to be extended or reduced, depending upon the actual rate of coastal change experienced in the future at either end of this section, or based upon the outcomes of any detailed studies of managed realignment options.

Should an applicant be able to robustly demonstrate that the data underpinning this coastal risk planning guidance is inaccurate in an area of proposed development, then approval of planning applications could be granted.

5.5.2 Planning application requirements

In addition to complying with all other relevant Weymouth & Portland Planning Application Requirements (Weymouth & Portland Borough Council, 2008), planning applications along this section will also need to provide the following evidence in relation to demonstrating consideration of coastal risks associated with development:

- Geotechnical Appraisal will be required for any development that proposes to construct any form of structure or proposes to discharge water (e.g. via soakaways) within, or in close proximity to, the risk zones identified for this section. All proposed developments that meet these criteria should submit a geotechnical appraisal to demonstrate that the development would not have an adverse effect on the stability of the coastal slope and so the safety and serviceability of the development itself or surrounding area/properties.

  The Geotechnical Appraisal Report advice and template provided in Appendix B should be used to ensure that the required information is provided by developers.

- Vulnerability Assessment to demonstrate that the development is unlikely to be at risk from coastal change within the period for which time-limited planning consent is being sought. This should relate to the evidence provided in the Geotechnical Appraisal.

- Flood Risk Assessment in line with the requirements of the National Planning Policy Framework Technical Guidance (Department for Communities & Local Government, 2012b) if proposed development is within or close to a defined flood zone.

  As part of this, it should be demonstrated that for developments within a defined flood zone that measures have been considered to ensure the resiliency of the development to flooding in line with best practice guidance provided by CIRIA at www.ciria.org/flooding/flood_performance.html and/or www.ciria.org/flooding/advice_sheets.html.

5.5.3 Planning policy recommendations

This section of coast should be included within any future CCMA developed for the area. The CCMA should consider the development constraints defined in Section 5.5.1 as well as options to facilitate the relocation of existing properties and other assets within the defined potential managed realignment and/or erosion risk zones. Reference should also be made to the national *Coastal Change Adaptation Planning Guidance* currently being developed for Defra in a project led by East Riding of Yorkshire Council and Halcrow (due to be published in 2013).

In addition, future defence provision here should consider integration with public space requirements for the area in line with Draft Local Plan policy ECON 5 TOURISM ATTRACTIONS AND FACILITIES.

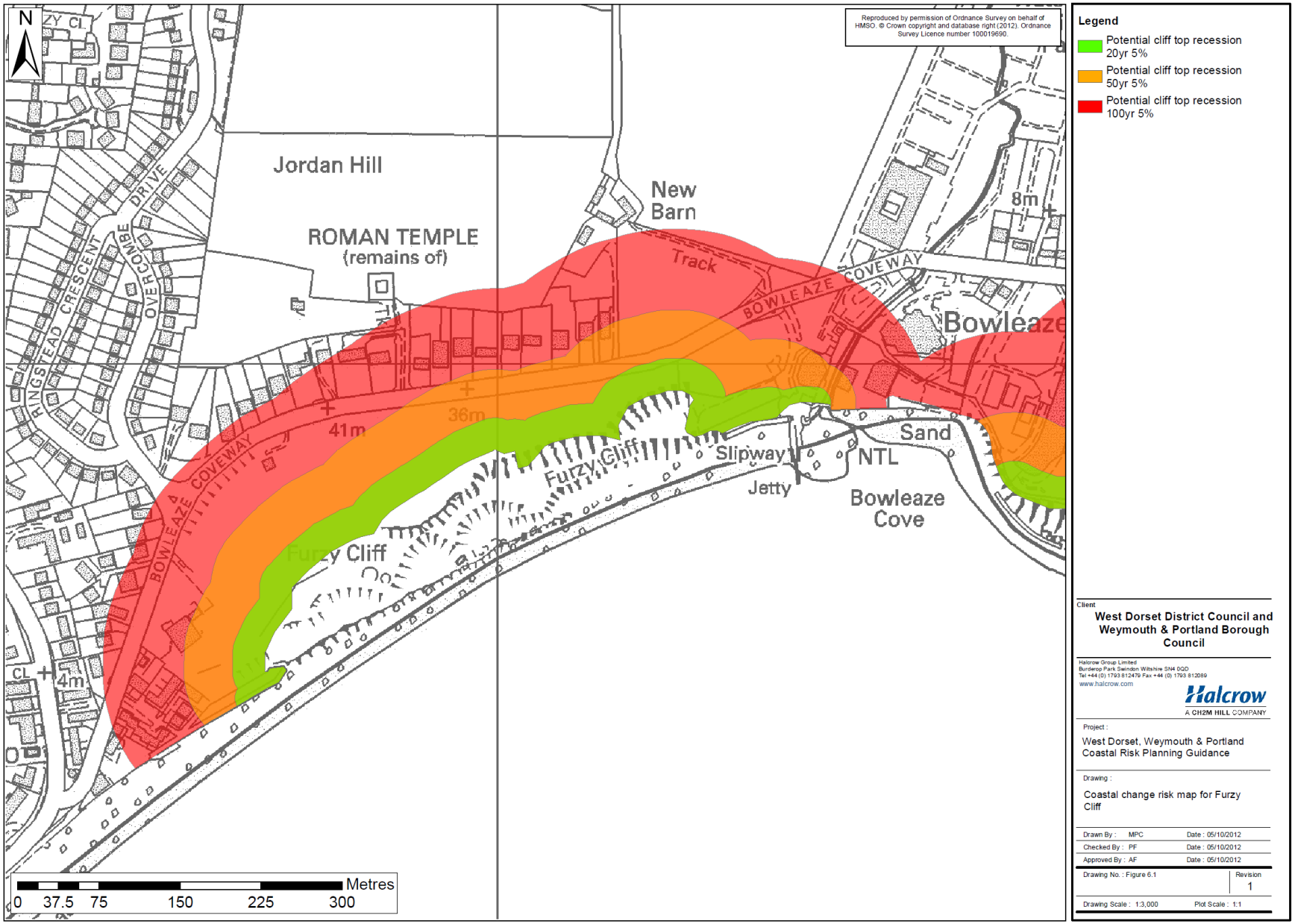
The availability of funding for continued defence along all of this section is uncertain. Therefore to continue to defend this area and so reduce coastal flood and erosion risk in the future, it is very likely that partnership funding will be required. This should be reflected in future policies for this area (refer to Section 1.3.2).

6 Furzy Cliff

6.1 Risk zone mapping

The risk zone map for this section shows the following:

- 5% probability potential cliff top recession zones for 20, 50 and 100 years into the future (i.e. in any of the three periods, there is a 5% chance that some parts of the frontage will reach the landward limit of the defined zone).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Jordan Hill
ROMAN TEMPLE
(remains of)
New Barn
Track
BOWLEAZE COVEWAY
Bowleaze
8m
41m
36m
Furzy Cliff
Slipway
Jetty
Sand
NTL
Bowleaze Cove
RINGSTEAD CRESCENT
OVERCOMBE DRIVE
4m
Metres
0 37.5 75 150 225 300
Legend
Potential cliff top recession 20yr 5%
Potential cliff top recession 50yr 5%
Potential cliff top recession 100yr 5%
Client
West Dorset District Council and Weymouth & Portland Borough Council
Halcrow Group Limited
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Tel +44 (0) 1793 812475 Fax +44 (0) 1793 812089
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West Dorset, Weymouth & Portland Coastal Risk Planning Guidance
Drawing :
Coastal change risk map for Furzy Cliff
Drawn By : MPC Date : 05/10/2012
Checked By : PF Date : 05/10/2012
Approved By : AF Date : 05/10/2012
Drawing No. : Figure 6.1
Revision 1
Drawing Scale : 1:3,000
Plot Scale : 1:1

6.2 Description of coastal area

This section extends from the defences at Bowleaze Cove to the defences towards Overcombe Corner at the southern end of Furzy Cliff, covering a frontage approximately 0.5km in length.

This is a natural, undefended section of coast comprised of a complex clay-rich cliff that is fronted by a shingle beach.

This area is designated for its geological and geomorphological features as part of the UNESCO Dorset and East Devon World Heritage Site. It is also within or in very close proximity to the South Dorset AONB and the Isle of Portland to Studland Cliffs SAC.

The immediate cliff top area is used as a public space. At the back of this area is located a café. Landwards of this is a public footpath and public highway – Bowleaze Coveway – that provides access for many properties both along the road and to inland areas that can only be accessed via this road. Bowleaze Coveway also provides the only access route to Bowleaze Cove.

The South West Coastal Path runs along Bowleaze Coveway within this section.

6.3 Shoreline Management Plan policy

This section is covered by SMP policy unit 5g14.

The SMP policy for this section is for **no active intervention** over the next 100 years.

This means that there is no expectation for constructing any coastal protection measures along this section of coast over this period. As such, this section will be allowed to continue to evolve naturally.

6.4 Coastal change risks

6.4.1 Nature of the risks

Furzy Cliff is subject to complex landsliding related primarily to groundwater levels, although ongoing coastal erosion at the cliff toe is important factor in the continuing cliff instability.

The beach along this section plays an important part in reducing the rate of erosion of the cliff toe by limiting the amount of wave action that reaches the cliff toe, and so reduces the instability of the clay-rich cliffs. However, as sea levels rise in the future, this effect is likely to reduce over time. This raises the likelihood of accelerated recession of the cliff toe and so greater instability in the cliff slope in the future.

6.4.2 Potential extent of risk

Furzy Cliff is subject to episodic land-slip events that can cause recession of between 10-50m of cliff top in a single event along a long length of frontage.

The assessment of cliff recession potential over the next 100 years defines a risk zone of 150m for this area (refer to Section 1.3.3 and Appendix A).

6.4.3 Timing/frequency of risk occurrence

The main risk along this frontage is from mudflows and large-scale rotational land slip events along Furzy Cliff. These events are episodic in nature and difficult to predict. Such events have historically occurred every 10-100 years (Halcrow, 2011a).

6.4.4 Existing assets at risk

The most significant asset at risk of future coastal erosion and landsliding along Furzy Cliff is Bowleaze Coveway. Loss of parts of this road would cut-off access to Bowleaze Cove. Depending upon where future cliff recession effects, road access to any number of properties may be affects. Properties and the café along Bowleaze Coveway, as well as the public footpath may also be affected.

The coast path will also be likely need to adapting as the coast erodes in the future.

6.4.5 Future planned developments at risk

The 2005 Adopted Local Plan (Weymouth & Portland Borough Council, 2005) identifies part of this area as being within a DDB. This DDB has been saved in the Draft Local Plan and therefore future development within this area could be affected by future coastal change.

The potential loss of access to Bowleaze Cove via Bowleaze Coveway as a result of recession of Furzy Cliff would impact upon the Draft Local Plan policies WEY 15 BOWLEAZE COVE, which aims to promote development of leisure and tourism at Bowleaze Cove.

6.5 Recommendations for development management

6.5.1 Development constraints

Based upon the available data assessed in developing this coastal risk planning guidance, the following constraints on development are recommended along this section of coast:

- No permanent development should occur in the area at risk of erosion along the cliff top or the coastal slope seawards of the defined erosion bands.
- Time-limited planning consent for a limited range of developments is most appropriate within the risk zone.
- Any development that does occur will need to be appropriate for the area given the expected timing of future risks, and should be limited in its size and extent. Any development should also demonstrate how it will adapt to future coastal change risks, including how it can be safely removed in advance of its loss to coastal change. Consideration will also need to be given to future access should Bowleaze Coveway be affected by future recession of Furzy Cliff. It should also consider the general advice provided in Section 1.3.4.
- The types of development likely to be appropriate in this area are short term holiday lets or camping/caravan sites or facilities associated with tourism and leisure (e.g. cafes etc.). Extensions to existing properties may also be appropriate.

- Any time-limited planning consent should include re-appraisal periods to enable the consent period to be extended or reduced, depending upon the actual rate of coastal change experienced in the future.

Should an applicant be able to robustly demonstrate that the data underpinning this coastal risk planning guidance is inaccurate in an area of proposed development, then approval of planning applications could be granted.

6.5.2 Planning application requirements

In addition to complying with all other relevant Weymouth & Portland Planning Application Requirements (Weymouth & Portland Borough Council, 2008), planning applications along this section will also need to provide the following evidence in relation to demonstrating consideration of coastal risks associated with development:

- Geotechnical Appraisal will be required for any development that proposes to construct any form of structure or proposes to discharge water (e.g. via soakaways) within, or in close proximity to, the risk zones identified for this section. All proposed developments that meet these criteria should submit a geotechnical appraisal to demonstrate that the development would not have an adverse effect on the stability of the coastal slope and so the safety and serviceability of the development itself or surrounding area/properties.

  The Geotechnical Appraisal Report advice and template provided in Appendix B should be used to ensure that the required information is provided by developers.

- Vulnerability Assessment to demonstrate that the development is unlikely to be at risk from coastal change within the period for which time-limited planning consent is being sought. This should relate to the evidence provided in the Geotechnical Appraisal.

6.5.3 Planning policy recommendations

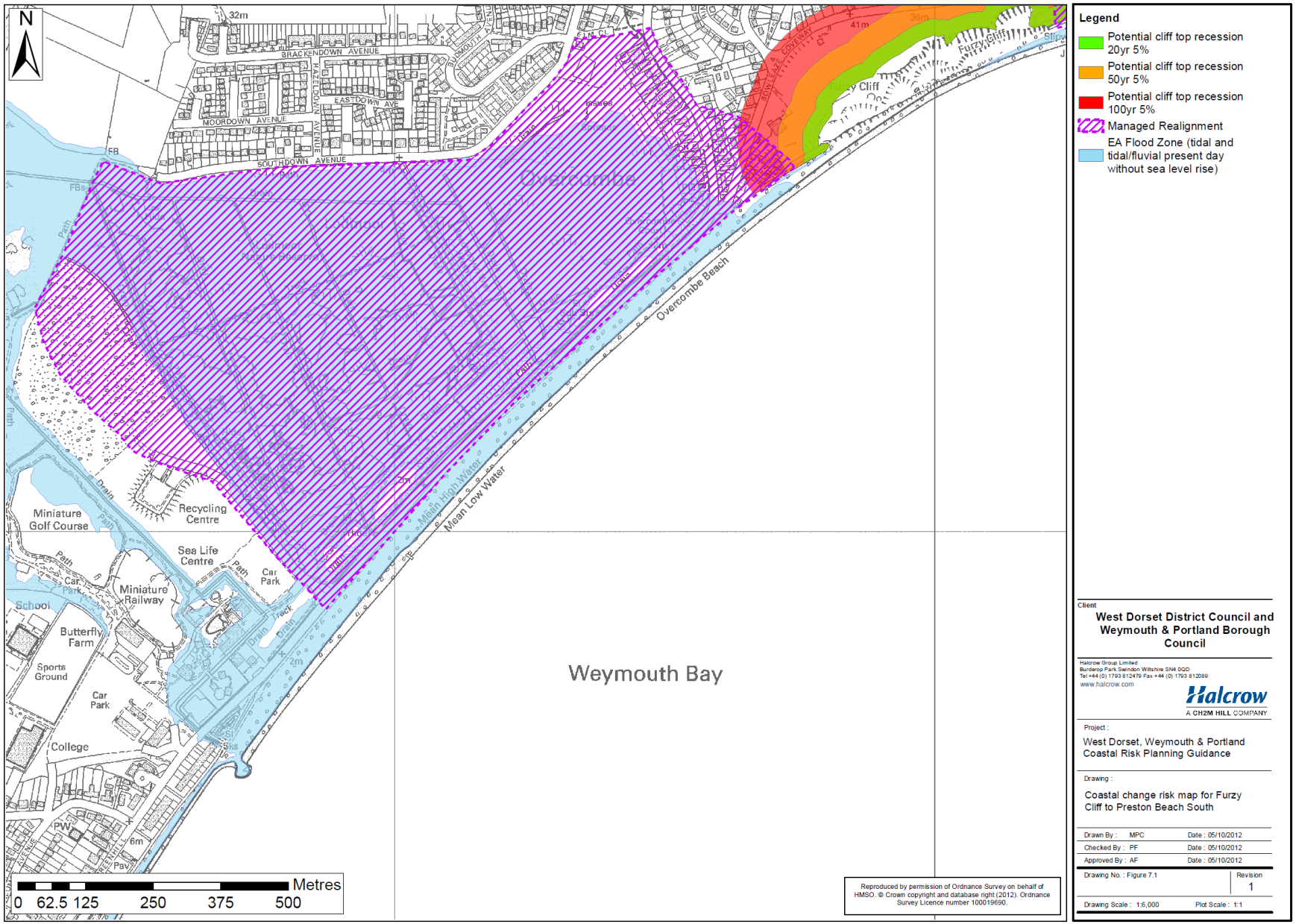
This section of coast should be included within any future CCMA developed for the area. The CCMA should consider the development constraints defined in Section 6.5.1 as well as options to facilitate the relocation of existing properties and other assets within the defined erosion risk zones. Reference should also be made to the national *Coastal Change Adaptation Planning Guidance* currently being developed for Defra in a project led by East Riding of Yorkshire Council and Halcrow (due to be published in 2013).

7 Furzy Cliff to Preston Beach South

7.1 Risk zone mapping

The risk zone map for this section shows the following:

- 5% probability potential cliff top recession zones for 20, 50 and 100 years into the future (i.e. in any of the three periods, there is a 5% chance that some parts of the frontage will reach the landward limit of the defined zone).
- Managed realignment zone indicating the maximum extent within which managed realignment is anticipated to occur at some point over the next 100 years.
- Environment Agency flood zone mapping for the present day (i.e. no sea level rise effects shown) from tidal and combined tidal-fluvial sources of flooding.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Legend
Potential cliff top recession 20yr 5%
Potential cliff top recession 50yr 5%
Potential cliff top recession 100yr 5%
Managed Realignment
EA Flood Zone (tidal and tidal/fluvial present day without sea level rise)
Overcombe
Weymouth Bay
Overcombe Beach
Mean High Water
Mean Low Water
Furzy Cliff
Furzy Cliff
Recycling Centre
Miniature Golf Course
Sea Life Centre
Miniature Railway
Butterfly Farm
Sports Ground
Car Park
College
School
BRACKENDOWN AVENUE
MOORDOWN AVENUE
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SOUTHDOWN AVENUE
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Drawing :
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Drawing No. : Figure 7.1
Revision 1
Drawing Scale : 1:6,000
Plot Scale : 1:1

7.2 Description of coastal area

This section extends from the defended southern end of Furzy Cliff to the rock groyne located at the southern end of Preston Beach, covering a frontage approximately 1.6km in length.

This frontage is defended along its length by a range of defences. Along the southern end of Furzy Cliff, Weymouth & Portland Borough Council constructed slope stabilisation measures c.1984 in the form of slope drainage supported by the construction of a wave return wall at the toe of the cliff.

Extending south from the wave return wall is the Preston Beach sea wall. This was constructed between 1995/6 as part of the Environment Agency's sea defence scheme which also included 214,000m^3 of beach recharge and construction of a terminal groyne at the southern end towards Greenhill. The seawall includes a promenade that runs along the top of the beach for its entire length that is used for walking and cycling.

The land at the southern end of Furzy Cliff has been extensively developed since it was stabilised, with a number of residential and commercial properties present here, including some immediately behind and/or atop the coastal defence line. The defences in this area also protect the southern end of Bowleaze Coveway against the risk of coastal erosion.

Preston Beach itself provides protection against the risk of flooding to one of the main public highways into Weymouth – the A353 Preston Beach Road – as well as the RSPB Lodmoor Nature Reserve (also a SSSI), a former landfill site, tourism and leisure facilities such as "The Front" skate park and the Sealife Centre, and a number of residential properties.

The South West Coastal Path runs along the seawall promenade.

This northern part of this area (at Furzy Cliff) is designated for its geological and geomorphological features as part of the UNESCO Dorset and East Devon World Heritage Site. This area is also within the Isle of Portland to Studland Cliffs SAC.

7.3 Shoreline Management Plan policy

This section is covered by SMP policy unit 5g15.

The SMP policy for this section in the next 50 years or so is to continue to **hold the line** of the existing defences for as long as it is technically and economically possible to do so.

However, within the next 50 to 100 years it is likely that the undefended Furzy Cliff to the north of this section will erode to the extent that the existing defence line along this section is outflanked at its northern end. When this occurs, property and infrastructure will be at risk. At this time, the SMP policy will transition to one of **managed realignment** to enable a new defence line to be established landwards of the existing one provided funding is available to do so. A key assumption in the SMP is that the A353 will be realigned as part of the realignment of the defence line, thus retaining the public highway along this section.

7.4 Coastal change risks

7.4.1 Nature of the risks

From the wave wall at Overcombe Corner, and southwards along Preston Beach, the main risk is coastal flooding resulting from overtopping and/or breach of the Preston Beach seawall. This risk will increase in the future as sea levels rise and cause coastal squeeze and narrowing/loss of the beach along this frontage. Ongoing beach recharge would reduce the coastal squeeze impact, but this will likely become increasingly difficult to achieve as sea level rise accelerates (Royal Haskoning, 2006; Halcrow, 2009).

It is likely that the form of the defences along this section would have to become more armoured hard defence with little (if any beach) in front of the defence in the longer term to continue to provide adequate protection against flood risk.

The northern end of this section is at risk from being outflanked by future recession of the undefended Furzy Cliff to the north. As this outflanking occurs, the defences in this area will become increasingly exposed and unsustainable to maintain.

7.4.2 Potential extent of risk

The area at risk of erosion of Furzy Cliff could be as much as 150m from the current cliff top position by 2105 (refer to Section 6).

The area at risk of flooding encompasses the majority of this section and is defined by the Environment Agency's flood zone maps for the present day. The SFRA (Royal Haskoning, 2006) shows the potential impacts of climate change and sea level rise on these flood risk zones.

In order to facilitate future realignment of defences along this section in response to the retreat of Furzy Cliff and to manage the flood risk in the longer term, an area of land immediately behind the existing defence line will need to be allocated to this future purpose.

Further detailed study is required to determine the exact position of any future defence line. This will ultimately be guided by the extent and rate of retreat of Furzy Cliff and the sustainability of achieving the required beach volume along Preston Beach to manage the risk of coastal flooding.

Assuming that the form of defences along Preston Beach becomes hardened (for example, the beach is replaced with rock armour or a large seawall), it is likely that a much smaller extent of realignment at the northern end of this section would be required to adequately manage flood and erosion risks in the longer term.

Therefore, until further detailed studies are undertaken, the area of land at the north-eastern corner of Preston Beach Road/Lodmoor Nature Reserve should be set-aside for this purpose as a minimum.

7.4.3 Timing/frequency of risk occurrence

The SMP predicts that realignment of the defences in this area may be required in 50-100 years. This depends upon the rate of retreat of Furzy Cliff and the rate of sea level rise and associated beach loss (Halcrow, 2011a).

Flooding of the low-lying part of this section could occur at any time. The probability of a large event causing significant overtopping of the seawall promenade is currently low, although this will increase as sea levels rise and therefore a higher seawall will be required to counter the effects of rising sea levels (Royal Haskoning, 2006).

7.4.4 Existing assets at risk

The retreat of Furzy Cliff at the northern end of this section poses a risk to properties on the seaward side of Bowleaze Coveway in 50-100 years.

In order to facilitate future realignment of defences along the northern part of this section, the area of land between the existing defence line and Bowleaze Coveway and extending to the properties at the northern end of Preston Beach Road should be set-aside for this purpose as a minimum. This area currently includes many residential and commercial properties including those at Overcombe Corner.

The armouring of the frontage with harder defences instead of beach material may also impact the amenity and tourism value of Preston Beach, although this would continue to protect much of the existing land use against flood risk.

The coast path will also need to be adapted as the coast erodes in the future.

7.4.5 Future planned developments at risk

Realignment along the northern part of this frontage could impact upon the Draft Local Plan policy WEY 17 LORTON VALLEY NATURE PARK. This policy will also be at risk of increased flooding if defences are not improved in response to rising sea levels in 50-100 years.

The loss of beach resource and realignment along the northern part of this frontage in the longer term could also impact upon the local economy.

7.5 Recommendations for development management

7.5.1 Development constraints

Based upon the available data assessed in developing this coastal risk planning guidance, the following constraints on development are recommended along this section of coast:

- No permanent development should occur in the areas at risk of erosion along the cliff top or the coastal slope seawards of the defined erosion bands at the southern end of Furzy Cliff within this section; nor should it occur within the zone identified for accommodating future realignment.
- Time-limited planning consent for a limited range of developments is most appropriate within these zones.
- Any development that does occur will need to be appropriate for the area given the expected timing of future risks, and should be limited in its size and extent. It should also consider the general advice provided in Section 1.3.4.
- Any development should also demonstrate how it will be adapted for future coastal risks such as increased risk of flooding in line with the requirements of Draft Local Plan policy ENV 5 FLOOD RISK. In this area any development will

should also include plans for its safe removal as part of future implementation of the managed realignment policy.

- The types of development likely to be appropriate in this area are those that require a coastal location and/or provide substantial social and economic benefits to the community (e.g. hotels, shops, offices, leisure activities etc.). Extensions to existing properties may also be appropriate.
- Any time-limited planning consent should include re-appraisal periods to enable the consent period to be extended or reduced, depending upon the actual rate of coastal change experienced at Furzy Cliff, or based upon the outcomes of any detailed studies of managed realignment options.

Should an applicant be able to robustly demonstrate that the data underpinning this coastal risk planning guidance is inaccurate in an area of proposed development, then approval of planning applications could be granted.

7.5.2 Planning application requirements

In addition to complying with all other relevant Weymouth & Portland Planning Application Requirements (Weymouth & Portland Borough Council, 2008), planning applications along this section will also need to provide the following evidence in relation to demonstrating consideration of coastal risks associated with development:

- Geotechnical Appraisal will be required for any development that proposes to construct any form of structure or proposes to discharge water (e.g. via soakaways) within, or in close proximity to, the risk zones identified for this section. All proposed developments that meet these criteria should submit a geotechnical appraisal to demonstrate that the development would not have an adverse effect on the stability of the coastal slope and so the safety and serviceability of the development itself or surrounding area/properties.

  The Geotechnical Appraisal Report advice and template provided in Appendix B should be used to ensure that the required information is provided by developers.

- Vulnerability Assessment to demonstrate that the development is unlikely to be at risk from coastal change within the period for which time-limited planning consent is being sought. This should relate to the evidence provided in the Geotechnical Appraisal.

- Flood Risk Assessment in line with the requirements of the National Planning Policy Framework Technical Guidance (Department for Communities & Local Government, 2012b) if proposed development is within or close to a defined flood zone.

  As part of this, it should be demonstrated that for developments within a defined flood zone that measures have been considered to ensure the resiliency of the development to flooding in line with best practice guidance provided by CIRIA at www.ciria.org/flooding/flood_performance.html and/or www.ciria.org/flooding/advice_sheets.html.

7.5.3 Planning policy recommendations

This section of coast should be included within any future CCMA developed for the area. The CCMA should consider the development constraints defined in Section 7.5.1 as well as options to facilitate the relocation of existing properties and other assets within the defined potential managed realignment and/or erosion risk zones. Reference should also be made to the national *Coastal Change Adaptation Planning Guidance* currently being developed for Defra in a project led by East Riding of Yorkshire Council and Halcrow (due to be published in 2013).

In addition, future defence provision here should consider integration with the wider transportation, nature conservation and public space requirements of the area. In doing so, reference should also be made to both (a) the *Guidance on the management of landfill sites and land contamination on eroding and low-lying coasts* (CIRIA, 2012) in respect of the former landfill site at Lodmoor and (b) the *Beach Management Manual (second edition)* (CIRIA, 2010) which includes guidance on how to consider the range of coastal issues in an integrated way as part of adaptive beach management approaches.

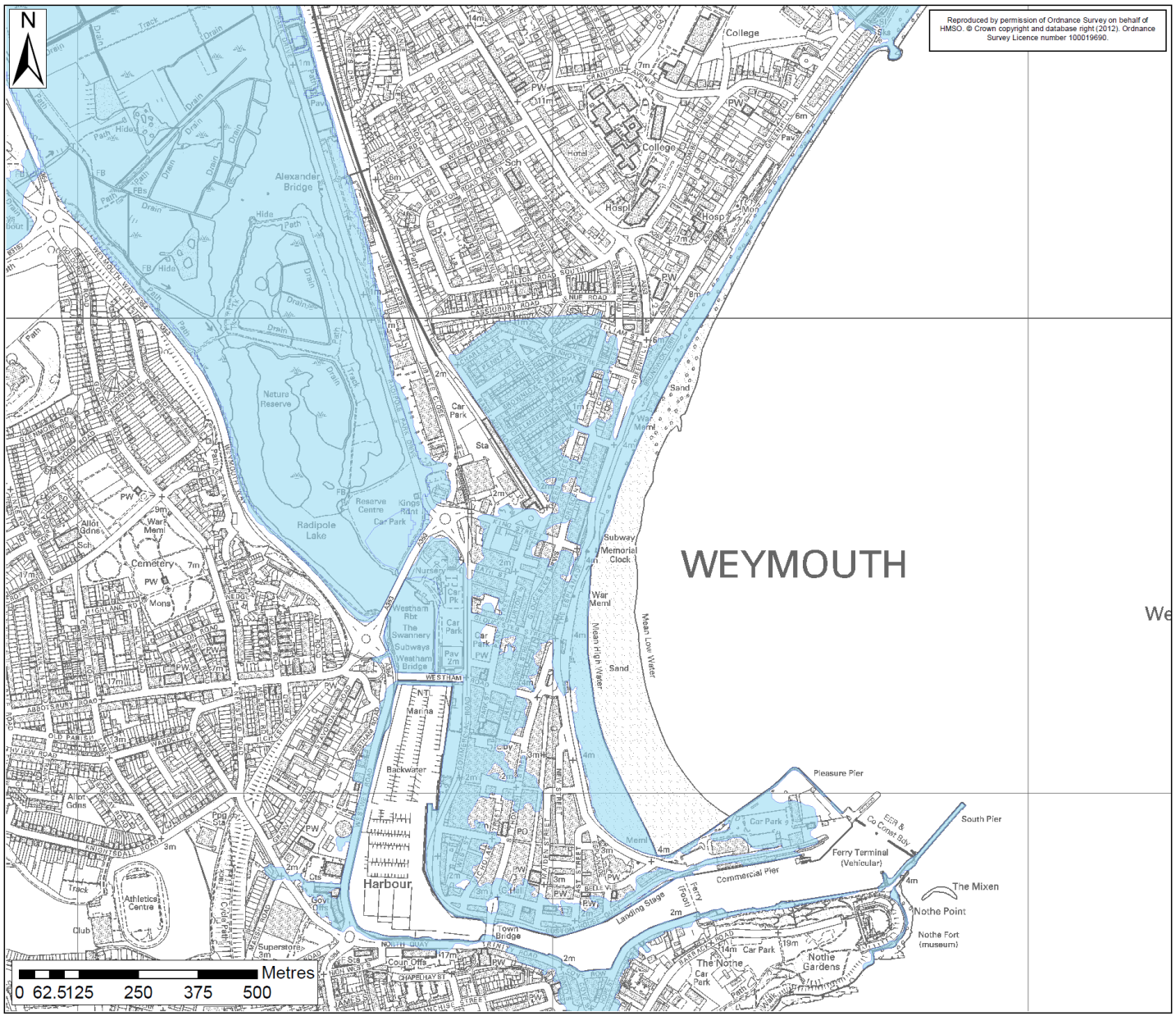
The availability of funding for continued defence along all of this section is uncertain. Therefore to continue to defend this area and so reduce coastal flood and erosion risk in the future, it is very likely that partnership funding will be required. This should be reflected in future policies for this area (refer to Section 1.3.2).

8 Weymouth Seafront

8.1 Risk zone mapping

The risk zone map for this section shows the following:

- Environment Agency flood zone mapping for the present day (i.e. no sea level rise effects shown) from tidal and combined tidal-fluvial sources of flooding.



Legend

EA Flood Zone (tidal and tidal/fluvial present day without sea level rise)

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Project :
West Dorset, Weymouth & Portland Coastal Risk Planning Guidance

Drawing :
Coastal change risk map for Weymouth Seafront

Drawn By :	MPC	Date : 05/10/2012
Checked By :	PF	Date : 05/10/2012
Approved By :	AF	Date : 05/10/2012

Drawing No. : Figure 8.1 | Revision 1

Drawing Scale : 1:7,500 | Plot Scale : 1:1

8.2 Description of coastal area

This section extends from the Preston Beach rock groyne in the north to the Ferry Pier at the southern end of Weymouth Bay, covering a frontage approximately 1.9km in length.

The frontage is defended along its length by a seawall and promenade. At Greenhill, along the northern part of this section, the seawall is fronted by a shingle beach and is backed by high ground that has been extensively developed. Beach sediment is generally transported from north to south along the frontage. This has resulted in the shingle beach at Greenhill being progressively replaced by a mixed sand-shingle and then a much wider sand beach towards the Ferry Pier at the southern end of this section. The land is also much lower to the south of Greenhill and at risk of flooding.

Both the beach and promenade are important assets for tourism, which is an important source of income for the local economy.

Landwards of the beach and seawall/promenade is an important public highway and landwards of this are many hotels, residential properties and commercial properties, including Weymouth Town centre.

The South West Coastal Path also runs along the seawall promenade.

8.3 Shoreline Management Plan policy

This section is covered by SMP policy unit 5g16.

The SMP policy for this section is to **hold the line** for the next 100 years.

This means that defence against flooding and erosion could continue to be provided should funding be available to do so.

Continued defence will require the construction of a higher seawall in the next 20 years to replace the existing structure as it nears the end of its serviceable life and allowing for future predicted sea level rise.

The SMP policy also identified Weymouth Bay as having the potential to retain a sizeable beach by artificial means in the future as sea levels rise. This potential could increase the tourism value of the beach as other beaches in the wider region become reduced in size as sea levels rise and have less potential to be artificially retained compared to Weymouth. Achievement of a future defence that includes artificial maintenance of the beach will very likely require funding from multiple sources.

8.4 Coastal change risks

8.4.1 Nature of the risks

Assuming that the area of higher ground along the northern part of this section at Greenhill continues to be protected along its toe by the seawall and promenade in line with the SMP policy, this area will not be vulnerable to erosion over the next 100 years. There is, however, a risk of flooding of the promenade in this area from wave overtopping of the seawall in its current form.

The lower-lying southern part of this section is at risk of coastal flooding from both tidal overflow and wave overtopping of the seawall and promenade. Flood water overtopping the open coast defences flows via Weymouth town centre and the Park

District towards Radipole Lake and the inner harbour. The risk of flooding will increase in the future (Royal Haskoning, 2007, 2009 and 2010).

The beach along this section is supplied by sediment from the north, although it is thought that this is a limited supply that will not be able to keep pace with the rate of sea level rise in the future. The beach along this frontage is therefore expected to experience coastal squeeze in the future and become much narrower as a result (refer to Section 1.3.7). In places the beach could become completely submerged at nearly all states of the tide.

8.4.2 Potential extent of risk

The area currently at risk of flooding encompasses most of Weymouth town centre from Weymouth Harbour in the south to the Park District in the north, and is defined in the Environment Agency's flood zone maps. The extent of future flood risk is demonstrated in both the SFRA (Royal Haskoning, 2009) and the *Weymouth Flood Risk Management Strategy* (Royal Haskoning, 2010).

The area of higher ground at Greenhill will not be at risk of erosion assuming that the SMP policy is implemented.

8.4.3 Timing/frequency of risk occurrence

Flooding of the low-lying part of this section could occur at any time. The probability of a large event causing significant overtopping of the seawall promenade is currently low, although this will increase as sea levels rise and therefore a higher seawall will be required to counter the effects of rising sea levels (Royal Haskoning, 2009).

The potential erosion of the higher ground along the northern part of this section would only occur if defences fail. The existing defences are thought to have a residual life of 20-30 years and so protection against erosion should be provided by the current seawall and promenade in the immediate future, and by any future replacement structure in the longer term assuming that the SMP policy is implemented.

The narrowing and loss of the beach will be a gradual occurrence and accelerate over time as sea level rise accelerates in 50-100 years.

8.4.4 Existing assets at risk

Assuming that future defences are provided in line with the SMP policy, the risk of flooding to Weymouth Town Centre and the Park District by waves overtopping the seawall promenade will continue to be reduced. Similarly, the risk of erosion of the higher ground at Greenhill will also be reduced in the future.

However, the continued provision of hard defences at the back of the beach along this frontage will result in coastal squeeze as sea levels rise. This will lead to a much narrower beach along the frontage and may require the form of future defences to be both higher and harder than the current defences (e.g. rock revetment instead of a beach fronting the parts of the seawall).

The loss of beach area as sea levels rise, if not countered with beach recharge, will also denude this vital tourism asset. This will adversely affect beach based businesses and impact upon the local economy.

8.4.5 Future planned developments at risk

The vision for Weymouth in the Draft Local Plan includes for "a regenerated town centre and seafront with improved flood defences, a mix of uses to make it more interesting and viable, and accessible and attractive public spaces".

The potential loss of beach resource could impact upon this vision and therefore ways to either ensure long-term management of beach resource through a programme of beach recharge, or altering the form of the seafront to provide different public space if there is to be less available beach for amenity purposes, will need to be considered in developing any future plans such as those under draft policy WEY 1 WEYMOUTH TOWN CENTRE STRATEGY.

Any such plans will also need to consider the findings of the *Weymouth Flood Risk Management Strategy* (Royal Haskoning, 2010) that identifies raising the Esplanade seawall along this section as part of the preferred approach to managing long-term flood risk to Weymouth town centre.

The 2005 Adopted Local Plan (Weymouth & Portland Borough Council, 2005) also identifies this area as being within a DDB. This DDB has been saved in the Draft Local Plan.

8.5 Recommendations for development management

8.5.1 Development constraints

Assuming that the SMP policy is implemented, there is no significant risk to development from coastal change in this area over the next 100 years.

There will, however, remain a risk of flooding and this risk could increase in the future (refer to Section 1.3.8). As such any new developments should comply with the requirements of Draft Local Plan policy ENV 5 FLOOD RISK.

To achieve the SMP policy and so enable continued development, it is anticipated that developer contributions will be required. These may arise through a Community Infrastructure Levy, Section 106 contributions or other mechanisms.

8.5.2 Planning application requirements

In addition to complying with all other relevant Weymouth & Portland Planning Application Requirements (Weymouth & Portland Borough Council, 2008), planning applications along this section will also need to provide the following evidence in relation to demonstrating consideration of coastal risks associated with development:

- Flood Risk Assessment in line with the requirements of the National Planning Policy Framework Technical Guidance (Department for Communities & Local Government, 2012b) if proposed development is within or close to a defined flood zone.

  As part of this, it should be demonstrated that for developments within a defined flood zone that measures have been considered to ensure the resiliency of the development to flooding in line with best practice guidance provided by CIRIA at www.ciria.org/flooding/flood_performance.html and/or www.ciria.org/flooding/advice_sheets.html.

8.5.3 Planning policy recommendations

Future defence provision along this section should consider integration with public space requirements for the area in line with Draft Local Plan policy ECON 5 TOURISM ATTRACTIONS AND FACILITIES. This should also consider the implications of future coastal squeeze, especially if future defence provision does not include for beach recharge to counter the effects of sea level rise; in doing so reference should be made to the *Beach Management Manual (second edition)* (CIRIA, 2010) which includes guidance on how to consider the range of coastal issues in an integrated way as part of adaptive beach management approaches.

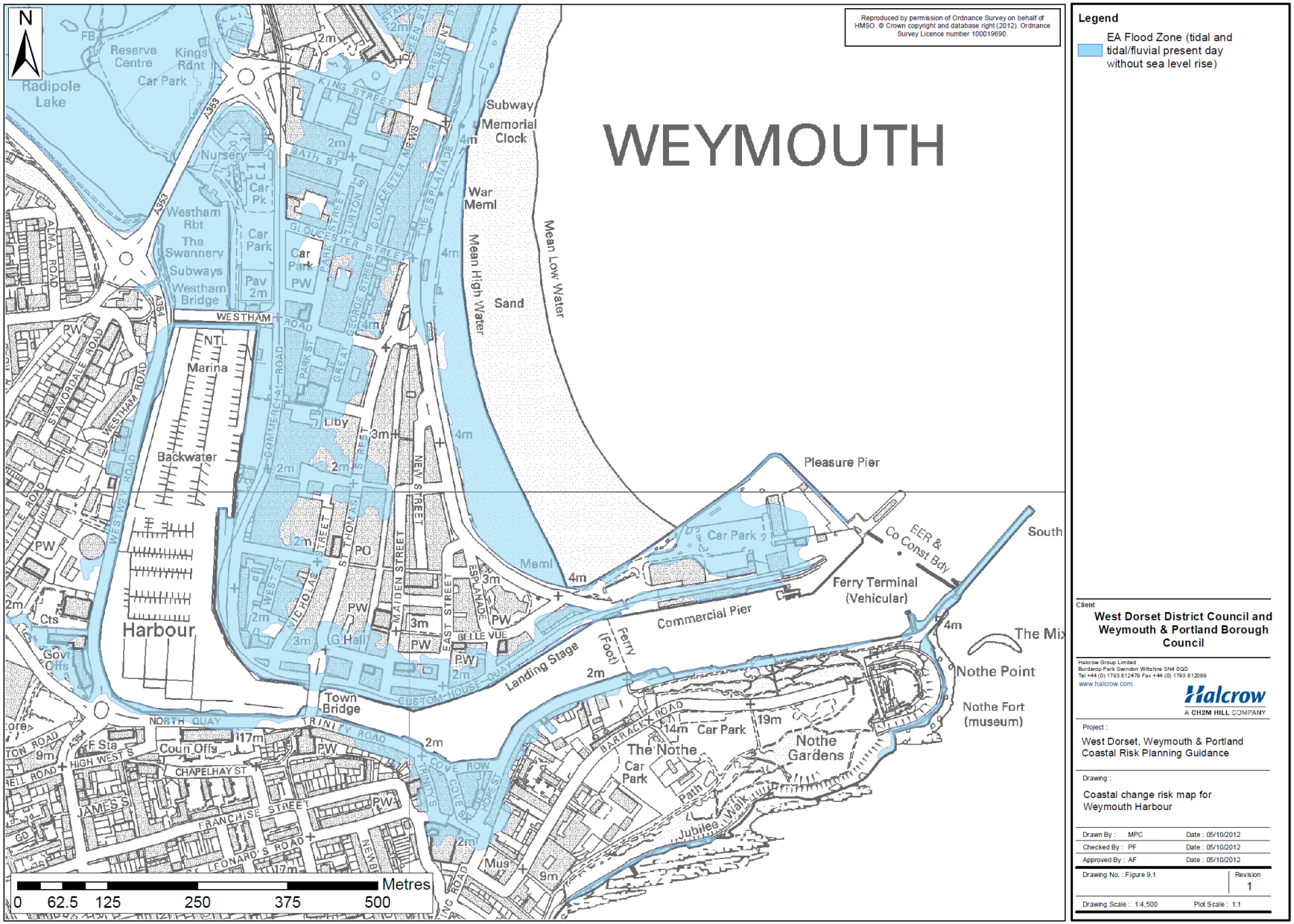
The availability of funding for continued defence along all of this section is uncertain. Therefore to continue to defend this area and so reduce coastal flood and erosion risk in the future, it is very likely that partnership funding will be required. This should be reflected in future policies for this area (refer to Section 1.3.2).

9 Weymouth Harbour

9.1 Risk zone mapping

The risk zone map for this section shows the following:

- Environment Agency flood zone mapping for the present day (i.e. no sea level rise effects shown) from tidal and combined tidal-fluvial sources of flooding.



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Project :
West Dorset, Weymouth & Portland Coastal Risk Planning Guidance

Drawing :
Coastal change risk map for Weymouth Harbour

Drawn By :	MPC	Date : 05/10/2012
Checked By :	PF	Date : 05/10/2012
Approved By :	AF	Date : 05/10/2012

Drawing No. : Figure 9.1 | Revision 1

Drawing Scale : 1:4,500 | Plot Scale : 1:1

9.2 Description of coastal area

This section encompasses Weymouth Harbour from the Ferry Pier on the north side of the harbour entrance to the Stone Pier on the south side, giving a frontage length of approximately 4.4km.

Weymouth Harbour marks the mouth of the River Wey and is completely artificial, having been subject to many periods of reclamation and development over the centuries. There are many residential and commercial properties and assorted highway and service infrastructure situated in the areas behind the defence line provided by the harbour walls which serve to protect these assets against the risk of tidal flooding from the harbour.

The tidal limit of the harbour is at Westham Bridge that was constructed in 1921, with discharge from the upstream River Wey to the sea being controlled by a series of sluices within Westham Bridge that also serves to provide a degree of control against the risk of fluvial flooding to the parts of Weymouth town centre that are downstream of Westham Bridge.

The South West Coastal Path runs along the some parts of the harbour.

9.3 Shoreline Management Plan policy

This section is covered by SMP policy unit 5g16.

The SMP policy for this section is to **hold the line** for the next 100 years.

This means that defence against flooding and erosion could continue to be provided should funding be available to do so.

The SMP identified that the harbour walls are in varying degrees of poor condition and most will need to be replaced and upgraded in the next 15-20 years to ensure that these structures continue to reduce the risk of flooding and serve the functional requirements of the various harbour users.

9.4 Coastal change risks

9.4.1 Nature of the risks

The primary risk along this section is tidal flooding of the low-lying areas of land located around Weymouth Harbour. The risk of flooding will increase in the future (Royal Haskoning, 2009 and 2010).

Along the outer southern part of the harbour, prior to construction of the harbour walls in this area in the later 19th century, the Nothe headland was largely undefended and able to erode naturally. Assuming that this area continues to be defended in line with the SMP policy, this area will not be vulnerable to erosion over the next 100 years.

If the Stone Pier on the south side of the harbour entrance were to not be maintained, and eventually failed, then this would increase wave disturbance within the outer harbour, particularly in the area of the berths along the Ferry Pier.

9.4.2 Potential extent of risk

The area currently at risk of flooding around Weymouth Harbour encompasses most of the harbourside area. This includes from the Ferry Pier to Weymouth Town Centre and Westham Bridge on the north side of the harbour, along Westwey Road on the west side of the harbour, and from North Quay to Nothe Parade and the Stone Pier on the south side of the harbour. This current flood risk extent is defined by the Environment Agency's flood zone maps. The extent of future flood risk is demonstrated in both the SFRA (Royal Haskoning, 2009) and the *Weymouth Flood Risk Management Strategy* (Royal Haskoning, 2010).

The area of higher ground at Greenhill will not be at risk of erosion assuming that the SMP policy is implemented.

The area at potential risk of erosion along the higher ground of the Nothe headland on the south side of the outer harbour will not be at risk of erosion assuming that the SMP policy is implemented.

9.4.3 Timing/frequency of risk occurrence

Flooding of the low-lying part of this section could occur at any time. The probability of a large event causing significant overtopping of the seawall promenade is currently low, although this will increase as sea levels rise and therefore a higher harbour walls or alternative flood control measures (e.g. a tidal barrier) will be required to counter the effects of rising sea levels (Royal Haskoning, 2010).

The potential erosion of the Nothe headland on the south side of the outer harbour would only occur if defences fail. The existing defences are expected to be retained in line with the SMP policy and so protection against erosion should continue to be provided by the current harbour wall, and by any future replacement structure in the longer term assuming that the SMP policy is implemented.

9.4.4 Existing assets at risk

Assets at risk of flooding include:

- numerous residential and commercial properties located all around the harbourside, including those within Weymouth town centre and Hope Square;
- public highways including the main A354 Westwey Road, Commercial Road and North Quay;
- the Gasometer on Westwey Road; and
- public car parks that are a source of income to the local council.

9.4.5 Future planned developments at risk

The Draft Local Plan contains a number of policies aimed at redeveloping Weymouth Town Centre in order to achieve the vision for Weymouth that includes for "a regenerated town centre and seafront with improved flood defences, a mix of uses to make it more interesting and viable, and accessible and attractive public spaces".

Relevant policies in this regards include:

- WEY 1 WEYMOUTH TOWN CENTRE STRATEGY;

- WEY 2 TOWN CENTRE CORE AND COMMERCIAL ROAD AREA;
- WEY 4 CUSTOM HOUSE QUAY AND BREWERY WATERFRONT;
- WEY 6 FERRY PENINSULA; and
- WEY 7 WESTWEY ROAD AND NORTH QUAY AREA.

All of these plans require improvements to the flood defences around the harbour area as identified in the *Weymouth Harbour Flood Risk Management Strategy* (Royal Haskoning, 2010). Therefore if funding of flood defences is not obtained either from public funds or private developers (or a combination of funding partners – refer to Section 1.3.2), then the policies in the Draft Local Plan will be less likely to succeed.

The 2005 Adopted Local Plan (Weymouth & Portland Borough Council, 2005) also identifies this area as being within a DDB. This DDB has been saved in the Draft Local Plan.

9.5 Recommendations for development management

9.5.1 Development constraints

Assuming that the SMP policy is implemented, there is no significant risk to development from coastal change in this area over the next 100 years.

There will, however, remain a risk of flooding and this risk could increase in the future (refer to Section 1.3.8). As such any new developments should comply with the requirements of Draft Local Plan policy ENV 5 FLOOD RISK.

To achieve the SMP policy and so enable continued development, it is anticipated that developer contributions will be required. These may arise through a Community Infrastructure Levy, Section 106 contributions or other mechanisms.

9.5.2 Planning application requirements

In addition to complying with all other relevant Weymouth & Portland Planning Application Requirements (Weymouth & Portland Borough Council, 2008), planning applications along this section will also need to provide the following evidence in relation to demonstrating consideration of coastal risks associated with development:

- Flood Risk Assessment in line with the requirements of the National Planning Policy Framework Technical Guidance (Department for Communities & Local Government, 2012b) if proposed development is within or close to a defined flood zone.

  As part of this, it should be demonstrated that for developments within a defined flood zone that measures have been considered to ensure the resiliency of the development to flooding in line with best practice guidance provided by CIRIA at www.ciria.org/flooding/flood_performance.html and/or www.ciria.org/flooding/advice_sheets.html.

9.5.3 Planning policy recommendations

Future defence provision along this section should consider integration with both commercial port and public space requirements for the area.

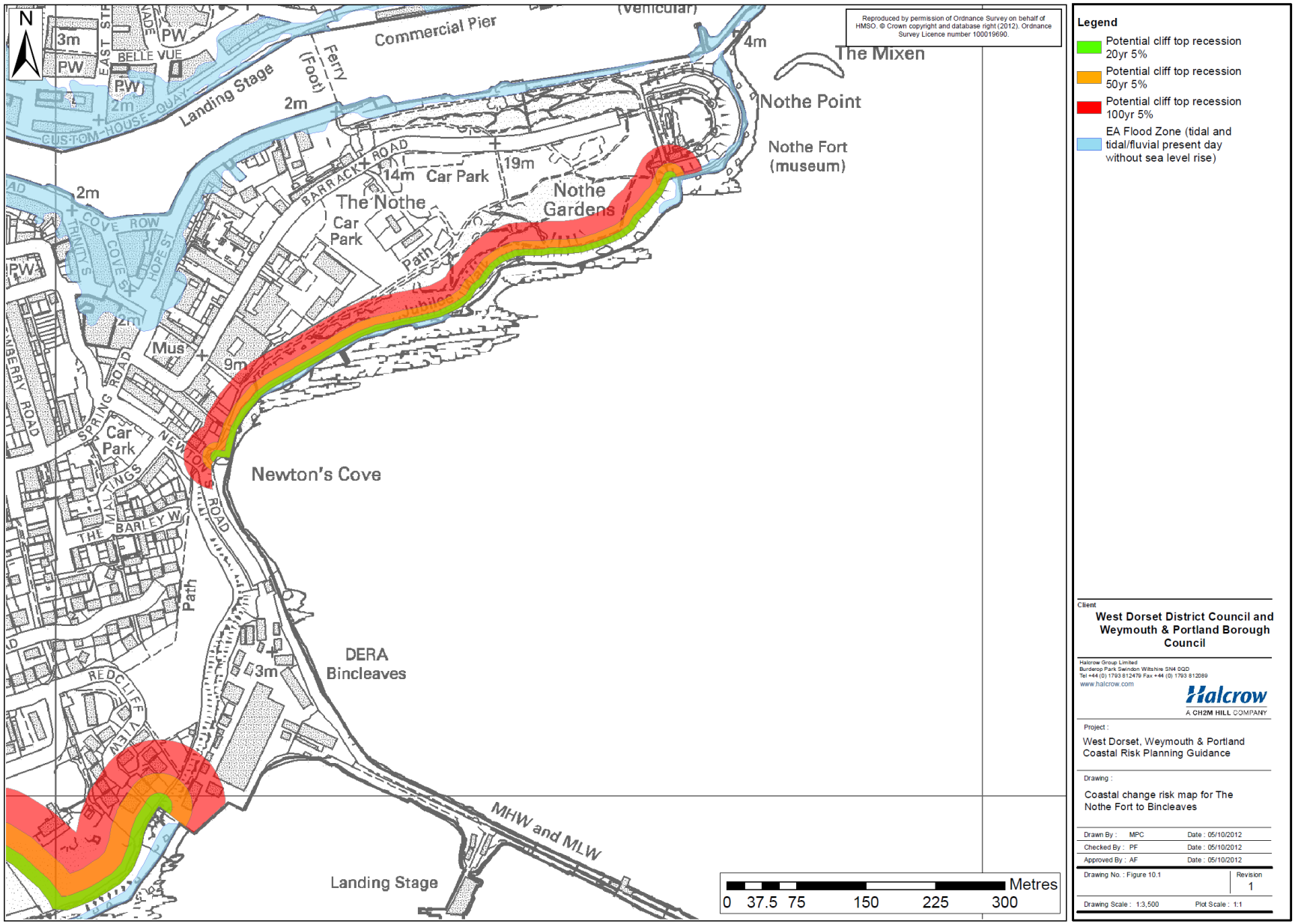
The availability of funding for continued defence along all of this section is uncertain. Therefore to continue to defend this area and so reduce coastal flood risk in the future, it is very likely that partnership funding will be required. This should be reflected in future policies for this area (refer to Section 1.3.2).

10 The Nothe Fort to Bincleaves

10.1 Risk zone mapping

The risk zone map for this section shows the following:

- 5% probability potential cliff top recession zones for 20, 50 and 100 years into the future (i.e. in any of the three periods, there is a 5% chance that some parts of the frontage will reach the landward limit of the defined zone).
- Environment Agency flood zone mapping for the present day (i.e. no sea level rise effects shown) from tidal and combined tidal-fluvial sources of flooding.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Commercial Pier
(Vehicular)
Landing Stage
Ferry (Foot)
The Mixen
Nothe Point
Nothe Fort (museum)
Nothe Gardens
The Nothe Car Park
Car Park
BARRACK ROAD
CUSTOM HOUSE QUAY
BELLE VUE
EAST ST
COVE ROW
TRINITY ST
COVE ST
HOPE ST
SPRING ROAD
Car Park
MALTINGS
BARLEY W
NEW ROW
Path
Jubilee Path
Newton's Cove
DERA Bincleaves
REDCLIFF VIEW
MHW and MLW
Landing Stage
3m
PW
2m
4m
14m
19m
9m
Metres
0 37.5 75 150 225 300
Legend
Potential cliff top recession 20yr 5%
Potential cliff top recession 50yr 5%
Potential cliff top recession 100yr 5%
EA Flood Zone (tidal and tidal/fluvial present day without sea level rise)
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Project :
West Dorset, Weymouth & Portland Coastal Risk Planning Guidance
Drawing :
Coastal change risk map for The Nothe Fort to Bincleaves
Drawn By : MPC Date : 05/10/2012
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Drawing No. : Figure 10.1
Revision 1
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Plot Scale : 1:1

10.2 Description of coastal area

This section encompasses the southern side of the Nothe Headland and extends for approximately 1.4km between the Nothe Fort in the east and Bincleaves in the west.

The entire frontage is defended by a range of seawalls and rock revetments. In places, the defences are fronted by rocky foreshore platform or small shingle pocket beaches.

This area is designated for its geological and geomorphological features as part of the UNESCO Dorset and East Devon World Heritage Site. It is also within the Isle of Portland to Studland Cliffs SAC.

The defences at the eastern end of this section protect public space, footpaths and car parks at the Nothe, but not the Nothe Fort itself whose massive stone walls are directly exposed to marine action with no other fronting defences present. The area of footpaths is also prone to land slip events driven by groundwater. The rock revetment along the shoreline of this section protects the toe of the coastal slope against erosion.

Weymouth & Portland Borough Council constructed a new seawall along the central part of this section in 2001/2. This seawall replaced the old Victorian era structure and extends eastwards from Newton's Cove. This scheme included significant slope stabilisation works and serves to protect a large number of residential properties and the CEFAS laboratory against the risk of coastal erosion and land instability.

The western part of this section at Bincleaves an area of reclaimed land located on the inner side of the northern Portland Harbour Breakwater. This area is backed by a high cliff, atop of which is located part of the South West Coastal Path. The defences in this area protect both the cliff, coast path, Bincleaves site and the only access road to it from the risk of flooding and erosion. Protection to the Bincleaves site is also in part provided by Portland Harbour breakwaters.

10.3 Shoreline Management Plan policy

This section is covered by SMP policy unit 5g17.

The SMP policy for this section is to **hold the line** for the next 100 years.

This means that defence against flooding and erosion could continue to be provided should funding be available to do so.

This policy assumes that the Portland Harbour breakwaters will continue to be maintained in their current form and so continue to provide protection at Bincleaves.

10.4 Coastal change risks

10.4.1 Nature of the risks

The coastal slope along the Nothe headland remains at risk of land instability due to groundwater levels, particularly towards the Nothe Fort where slope stabilisation measures were not installed as part of the 2001/2 scheme. However, this risk would be increased if defences along the toe of the coastal slope were not to be maintained. If defences were to fail, it is estimated that an annual average recession of 0.5m/year could be experienced along the Nothe headland.

The defences along this section are considered to be mostly in very good to fair condition and expected to remain effective for much of the next 100 years if they are adequately maintained. There is, however, one section of old seawall not replaced in 2001/2 and not protected by rock revetment that is considered to be in poor condition. If not improved in the next 20 years this section could fail and pose a risk to the adjacent sections of coast.

Even though the toe of the coastal slope will continue to be protected along this section, there will remain the risk of small scale, localised land slip events occurring due to groundwater levels within the coastal slope along The Nothe headland.

The lower-lying western part of this section at Bincleaves will remain at risk of coastal flooding by wave overtopping of the defences. The defences here will need to be improved at some point in the future as sea levels rise in order to ensure the risk of flooding continues to be managed to an appropriate level.

The continued defence of this area will also result in the narrowing, and very likely loss, of small pocket beaches that front defences along this section as a result of coastal squeeze.

10.4.2 Potential extent of risk

Assuming that the defences are maintained along the toe of the coastal slope of the Nothe headland, then the area most at risk of erosion along the Nothe is in the eastern end towards the Nothe Fort where slope stabilisation measures were not installed during the 2001/2 Newton's Cove scheme. The risk in this area is from small scale land slip events as a result of groundwater levels. The assessment of recession potential over the next 100 years defines a risk zone of 35m for this area as a result of this mechanism (refer to Section 1.3.3 and Appendix A).

If the small section of seawall that is in poor condition is not improved in the next 20 years, then there will be an increasing risk of this wall failing. If this were to occur, then the toe of the coastal slope would be exposed to wave and tide action and this would likely trigger larger scale erosion that could outflank the adjacent areas of the Nothe that are protected by defences in much better condition.

The area at risk of flooding at Bincleaves is shown on the Environment Agency's flood zone maps.

10.4.3 Timing/frequency of risk occurrence

Assuming that the defences along the toe of the coastal slope along the Nothe headland are maintained, the small scale land slip events driven by groundwater levels will occur as infrequent episodic events. The frequency of these events could increase in the future depending upon the effects of climate change, particularly if rainfall amounts increase.

Flooding of the low-lying part of this section at Bincleaves could occur at any time. The probability of a large event causing significant overtopping of the seawall promenade is currently low, although this will increase as sea levels rise and therefore higher defences will be required to counter the effects of rising sea levels.

10.4.4 Existing assets at risk

Assuming that the coastal defences are maintained, the public space and footpaths along the eastern part of the Nothe headland towards the Nothe Fort are most at risk of occasional small scale land slip events over the next 100 years. The public car parks at the Nothe are not likely to be at risk from these processes.

Properties and footpaths at the western part of the Nothe headland towards Newton's Cove are at less risk of occasional small scale land slip events over the next 100 years, as this area is protected by slope stabilisation measures and seawall at the toe of the coastal slope constructed in 2001/2.

The Bincleaves site and access road at the very western end of this section is at risk of flooding.

10.4.5 Future planned developments at risk

The Draft Local Plan policy WEY 9 BINCLEAVES COVE, which promotes the development of the Bincleaves site at the western end of this section, is at risk of flooding. This risk could increase in the future as sea levels rise if defences are not improved. This area could also be at risk of erosion in the longer term if coastal defences are not maintained.

The 2005 Adopted Local Plan (Weymouth & Portland Borough Council, 2005) also identifies parts of this area as being within a DDB. This DDB has been saved in the Draft Local Plan and therefore future development within this area could be affected by future coastal change.

10.5 Recommendations for development management

10.5.1 Development constraints

Assuming that the SMP policy is implemented, there is no significant risk to development from coastal change in this area over the next 100 years, although along The Nothe headland there will remain the risk of small scale, infrequent land slip events. In this area, property owners/developers should be made aware of the general advice provided in Section 1.3.4.

At the Bincleaves site there could be an increased risk of flooding in the future (refer to Section 1.3.8). As such any new developments should comply with the requirements of Draft Local Plan policy ENV 5 FLOOD RISK.

To achieve the SMP policy and so enable continued development, it is anticipated that developer contributions will be required. These may arise through a Community Infrastructure Levy, Section 106 contributions or other mechanisms.

10.5.2 Planning application requirements

In addition to complying with all other relevant Weymouth & Portland Planning Application Requirements (Weymouth & Portland Borough Council, 2008), planning applications along this section will also need to provide the following evidence in relation to demonstrating consideration of coastal risks associated with development:

- Geotechnical Appraisal will be required for any development that proposes to construct any form of structure or proposes to discharge water (e.g. via

soakaways) within, or in close proximity to, the risk zones identified for this section. All proposed developments that meet these criteria should submit a geotechnical appraisal to demonstrate that the development would not have an adverse effect on the stability of the coastal slope and so the safety and serviceability of the development itself or surrounding area/properties.

The Geotechnical Appraisal Report advice and template provided in Appendix B should be used to ensure that the required information is provided by developers.

- Vulnerability Assessment to demonstrate that the development is unlikely to be at risk from coastal change within the period for which time-limited planning consent is being sought. This should relate to the evidence provided in the Geotechnical Appraisal.
- Flood Risk Assessment in line with the requirements of the National Planning Policy Framework Technical Guidance (Department for Communities & Local Government, 2012b) if proposed development is within or close to a defined flood zone (e.g. Bincleaves).

  As part of this, it should be demonstrated that for developments within a defined flood zone that measures have been considered to ensure the resiliency of the development to flooding in line with best practice guidance provided by CIRIA at www.ciria.org/flooding/flood_performance.html and/or www.ciria.org/flooding/advice_sheets.html.

10.5.3 Planning policy recommendations

The part of this section along the Nothe headland, where there will remain the risk of small scale, infrequent land slip events even with continued defence of the toe of the coastal slope, should be included within any future CCMA developed for the area. Reference should also be made to the national *Coastal Change Adaptation Planning Guidance* currently being developed for Defra in a project led by East Riding of Yorkshire Council and Halcrow (due to be published in 2013).

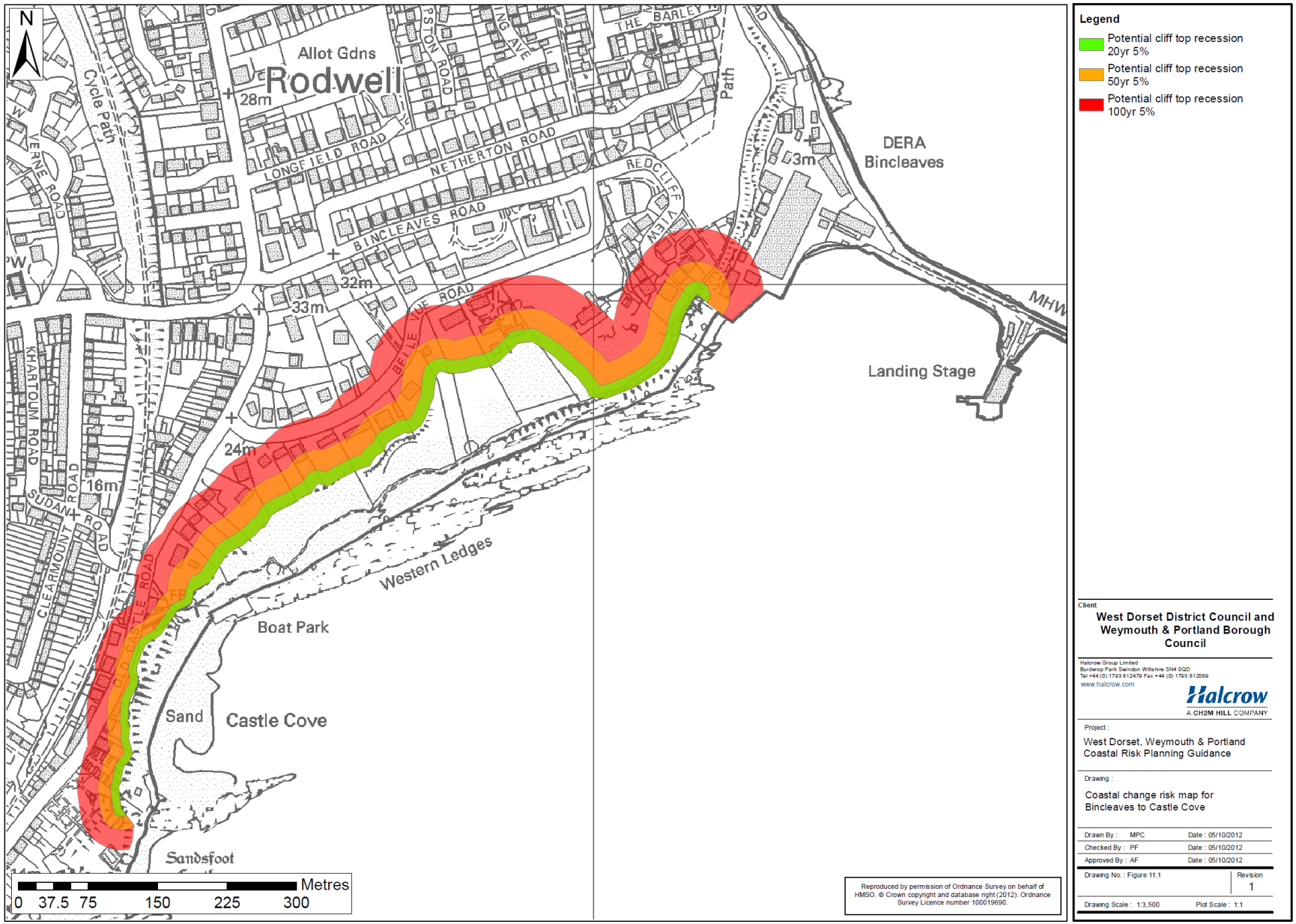
The availability of funding for continued defence along all of this section is uncertain. Therefore to continue to defend this area and so reduce coastal flood and erosion risk in the future, it is very likely that partnership funding will be required. This should be reflected in future policies for this area (refer to Section 1.3.2).

11 Bincleaves to Castle Cove

11.1 Risk zone mapping

The risk zone map for this section shows the following:

- 5% probability potential cliff top recession zones for 20, 50 and 100 years into the future (i.e. in any of the three periods, there is a 5% chance that some parts of the frontage will reach the landward limit of the defined zone).


N
Allot Gdns
Rodwell
28m
Cycle Path
VERNE ROAD
LONGFIELD ROAD
NETHERTON ROAD
PISTON ROAD
THE BARLEY
Path
DERA
Bincleaves
3m
REDCLIFF
BINCLEAVES ROAD
32m
33m
BELLE VUE ROAD
MHW
Landing Stage
KHARTOUM ROAD
SUDAN ROAD
CLEARMOUNT ROAD
16m
24m
Western Ledges
Boat Park
Sand
Castle Cove
Sandsfoot
Metres
0 37.5 75 150 225 300
Legend
Potential cliff top recession 20yr 5%
Potential cliff top recession 50yr 5%
Potential cliff top recession 100yr 5%
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Project :
West Dorset, Weymouth & Portland Coastal Risk Planning Guidance
Drawing :
Coastal change risk map for Bincleaves to Castle Cove
Drawn By : MPC Date : 05/10/2012
Checked By : PF Date : 05/10/2012
Approved By : AF Date : 05/10/2012
Drawing No. : Figure 11.1
Revision 1
Drawing Scale : 1:3,500
Plot Scale : 1:1

11.2 Description of coastal area

This section encompasses the eastern part of the north-west shore of Portland Harbour and is comprised of complex clay-rich cliffs along a length of approximately 0.6km.

The cliffs are fronted by a mix of narrow beach and rocky shore platform along the base of the cliff.

This area is designated for its geological and geomorphological features as part of the UNESCO Dorset and East Devon World Heritage Site. It is also within the Isle of Portland to Studland Cliffs SAC.

The cliff top area is occupied by approximately 25 properties within 100m of the cliff edge. These properties are mainly accessed by Old Castle Road, Belle Vue Road and Redcliff View.

Access to the shoreline from the cliff top is currently via steps in Castle Cove to the west of this section.

The South West Coastal Path runs along the Belle Vue Road within this section, having been diverted from its original Undercliff Walk route some years ago following a land slip that destroyed that pathway.

11.3 Shoreline Management Plan policy

This section is covered by SMP policy unit 5g18.

The SMP policy for this section of coast is for **managed realignment** over the next 100 years.

This policy enables private landowners to undertake slope stabilisation works in the upper part of the coastal slope along this section if they are able to fund such works. No public funds (e.g. flood risk management grant-in-aid) are expected to be available for this purpose. Works are only permitted in the upper part of the coastal slope to delay the risk of cliff recession causing loss of property. No works are allowed in the lower part as this area is designated for its geological interests as part of the UNESCO Dorset and East Devon World Heritage Site.

The SMP policy does not allow for large scale coastal protection measures to be constructed along the base of the cliff.

This policy assumes that the Portland Harbour breakwaters will continue to be maintained in their current form and so reduce wave action at the cliff toe. There is, however, some uncertainty about the future management of the breakwaters and if this assumption were not to be correct, then there is the potential for greater wave action along the toe of these cliffs, and therefore greater cliff recession, in the medium to long term.

11.4 Coastal change risks

11.4.1 Nature of the risks

The cliffs along this section are subject to complex landsliding related primarily to groundwater levels, although ongoing coastal erosion at the cliff toe is important factor in the continuing cliff instability.

The beach and rocky shore platform along this section plays an important part in reducing the rate of erosion of the cliff toe by limiting the amount of wave action that reaches the cliff toe, and so reduces the instability of the clay-rich cliffs. However, as sea levels rise in the future, this effect is likely to reduce over time (i.e. coastal squeeze). This raises the likelihood of accelerated recession of the cliff toe and so greater instability in the cliff slope in the future.

Wave action at the cliff toe is also reduced by the presence of Portland Harbour breakwaters.

11.4.2 Potential extent of risk

The cliffs along this section are subject to episodic land-slip events that can cause recession of between 10-50m of cliff top in a single event along a long length of frontage.

The assessment of recession potential over the next 100 years defines a risk zone of 70-80m for this area (refer to Section 1.3.3 and Appendix A).

11.4.3 Timing/frequency of risk occurrence

The main risk along this frontage is from large-scale rotational land slip events along this cliffed frontage. These events are episodic in nature and difficult to predict. Such events have historically occurred every 10-100 years (Halcrow, 2011a).

It is thought that if private landowners are able to implement localised slope stabilisation works, then this approach could delay cliff recession causing loss of property for perhaps 50 years or so. However, it is not certain if all (or any) private landowners along this section will be able (or willing) to implement such measures. If this is the case, then the cliff recession could occur much sooner.

11.4.4 Existing assets at risk

If private landowners are not able or willing to fund localised measures, then this section of coast will continue to erode and result in the gradual loss of residential properties located on the seaward side of Belle Vue Road, and then Belle Vue Road itself.

If parts of the Belle Vue Road are lost to erosion, then this would impact upon access to properties along this section not affected by erosion and so alternative access would need to be provided. If this occurs, then the coastal path will also need to be adapted.

11.4.5 Future planned developments at risk

There are no planned developments in this area within the Draft Local Plan.

11.5 Recommendations for development management

11.5.1 Development constraints

Based upon the available data assessed in developing this coastal risk planning guidance, the following constraints on development are recommended along this section of coast:

- No permanent development should occur in the area at risk of erosion along the cliff top or the coastal slope seawards of the defined erosion bands.
- Time-limited planning consent for a limited range of developments is most appropriate within the risk zone.
- Any development that does occur will need to be appropriate for the area given the expected timing of future risks, and should be limited in its size and extent. Any development should also demonstrate how it will adapt to future coastal change risks, including how it can be safely removed in advance of its loss to coastal change. Consideration will also need to be given to future access should parts of Belle Vue Road be affected by cliff top recession. It should also consider the general advice provided in Section 1.3.4.
- The types of development likely to be appropriate in this area are short term holiday lets or camping/caravan sites or facilities associated with tourism and leisure (e.g. cafes etc.). Extensions to existing properties may also be appropriate.
- Any time-limited planning consent should include re-appraisal periods to enable the consent period to be extended or reduced, depending upon the actual rate of coastal change experienced in the future.

Should an applicant be able to robustly demonstrate that the data underpinning this coastal risk planning guidance is inaccurate in an area of proposed development, then approval of planning applications could be granted.

11.5.2 Planning application requirements

In addition to complying with all other relevant Weymouth & Portland Planning Application Requirements (Weymouth & Portland Borough Council, 2008), planning applications along this section will also need to provide the following evidence in relation to demonstrating consideration of coastal risks associated with development:

- Geotechnical Appraisal will be required for any development that proposes to construct any form of structure or proposes to discharge water (e.g. via soakaways) within, or in close proximity to, the risk zones identified for this section. All proposed developments that meet these criteria should submit a geotechnical appraisal to demonstrate that the development would not have an adverse effect on the stability of the coastal slope and so the safety and serviceability of the development itself or surrounding area/properties.

  The Geotechnical Appraisal Report advice and template provided in Appendix B should be used to ensure that the required information is provided by developers.
- Vulnerability Assessment to demonstrate that the development is unlikely to be at risk from coastal change within the period for which time-limited planning consent is being sought. This should relate to the evidence provided in the Geotechnical Appraisal.

11.5.3 Planning policy recommendations

This section of coast should be included within any future CCMA developed for the area. The CCMA should consider the development constraints defined in Section

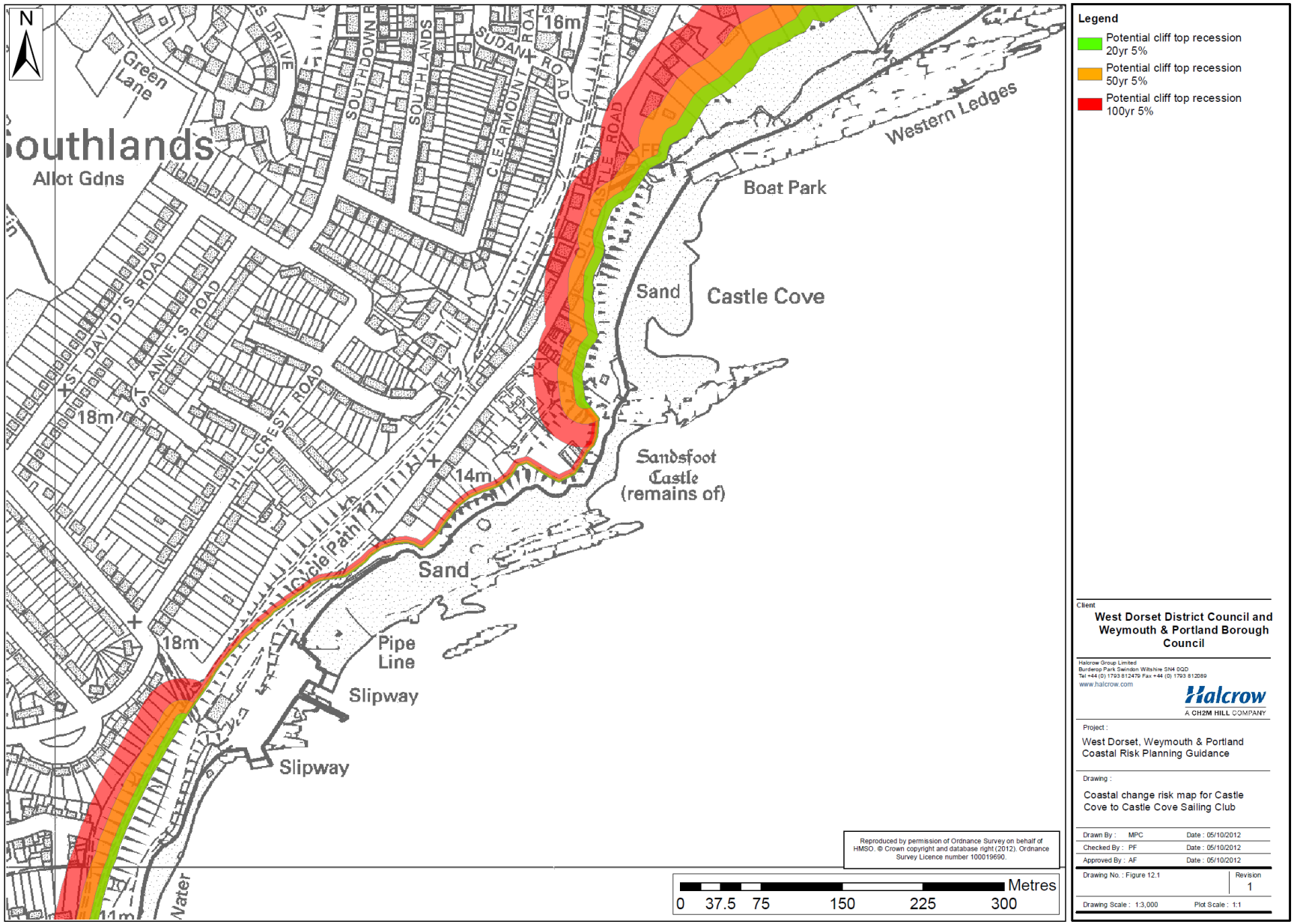
11.5.1 as well as options to facilitate the relocation of existing properties and other assets within the defined erosion risk zones. Reference should also be made to the national *Coastal Change Adaptation Planning Guidance* currently being developed for Defra in a project led by East Riding of Yorkshire Council and Halcrow (due to be published in 2013).

12 Castle Cove to Castle Cove Sailing Club

12.1 Risk zone mapping

The risk zone map for this section shows the following:

- 5% probability potential cliff top recession zones for 20, 50 and 100 years into the future (i.e. in any of the three periods, there is a 5% chance that some parts of the frontage will reach the landward limit of the defined zone).


N
Green Lane
Southlands
Allot Gdns
SOUTHDOWN DRIVE
SOUTHLANDS
SUDAN ROAD
CLEARMOUNT ROAD
16m
ST DAVID'S ROAD
ST ANNE'S ROAD
HILLCREST ROAD
18m
14m
18m
Cycle Path
Pipe Line
Slipway
Slipway
Water
11m
Western Ledges
Boat Park
Sand
Castle Cove
Sandsfoot Castle (remains of)
Sand
Legend
Potential cliff top recession 20yr 5%
Potential cliff top recession 50yr 5%
Potential cliff top recession 100yr 5%
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Project :
West Dorset, Weymouth & Portland Coastal Risk Planning Guidance
Drawing :
Coastal change risk map for Castle Cove to Castle Cove Sailing Club
Drawn By : MPC Date : 05/10/2012
Checked By : PF Date : 05/10/2012
Approved By : AF Date : 05/10/2012
Drawing No. : Figure 12.1
Revision 1
Drawing Scale : 1:3,000
Plot Scale : 1:1

12.2 Description of coastal area

This section encompasses the central part of the north-west shore of Portland Harbour and is approximately 0.8km in length.

The eastern part of this section is comprised of complex clay-rich cliffs that are fronted by a small sandy pocket beach at Castle Cove. The land above this section is occupied by a number of properties. These are all accessed by Old Castle Road which is located close to the cliff top in places and beneath which are all the major services and utilities to the properties located to the south-west of Castle Cove.

Access to Castle Cove beach is provided by a footpath and steps from Old Castle Road.

The middle part of this section is comprised of harder sandstone cliffs that form a headland along the frontage. These cliffs are fronted by rocky shore platforms. The Castle Cove Caravan Park is located at the eastern side of this headland, overlapping the sandstone and clay cliffs. The headland is occupied the 16th century Scheduled Monument of Sandsfoot Castle and gardens. The seaward part of the castle has been gradually lost to erosion over the years.

To the south-west of the Sandsfoot Castle headland the cliffs taper down to the shoreline towards Castle Cove Sailing Centre. There are approximately 9 residential properties within 50m or less of the cliff edge in this part. These are all accessed by Old Castle Road which is situated immediately landwards of the properties.

The westernmost part of this section is comprised of man-made ground. This was first constructed as part of the old railway embankment in the late 19th century – now the popular Rodwell Trail foot and cycle path. The Castle Cove Sailing Centre was constructed in front of the railway embankment in 2002. This construction involved reclamation over part of the rocky shore platform which is protected by rock revetment.

The sailing centre is accessed by Old Castle Road. This also provides access to a small sandy beach immediately to the north-west of the sailing club.

This area is designated for its geological and geomorphological features as part of the UNESCO Dorset and East Devon World Heritage Site. It is also within the Isle of Portland to Studland Cliffs SAC.

The South West Coastal Path runs along the Old Castle Road and then the Rodwell Trail within this area.

12.3 Shoreline Management Plan policy

This section is covered by SMP policy unit 5g19.

The SMP policy for this section of coast is to **hold the line** over the next 100 years where it is technically, environmentally and economically viable to do so.

This policy enables cliff stabilisation works to be introduced to protect critical infrastructure along Old Castle Road and the Rodwell Trail, and private properties, so long as the measures introduced do not impact upon the designated features of the UNESCO Dorset and East Devon World Heritage Site.

This policy also allows for the defences at the Castle Cove Sailing Centre to be maintained and improved in the future as sea levels rise.

This policy assumes that the Portland Harbour breakwaters will continue to be maintained in their current form and so reduce wave action at the cliff toe. There is, however, some uncertainty about the future management of the breakwaters and if this assumption were not to be correct, then there is the potential for greater wave action along the toe of these cliffs, and therefore greater cliff recession, in the medium to long term.

12.4 Coastal change risks

12.4.1 Nature of the risks

Almost all of this section is potentially at risk of coastal change as it is uncertain along which (if any) parts of this section that it will be possible to implement the SMP policy.

The greatest risk is within the clay-rich cliffs along the Old Castle Road section which is subject to complex landsliding related primarily to groundwater levels, although ongoing coastal erosion at the cliff toe is important factor in the continuing cliff instability. The beach along this section at Castle Cove plays an important part in reducing the rate of erosion of the cliff toe by limiting the amount of wave action that reaches the cliff toe, and so reduces the instability of the clay-rich cliffs.

The sandstone cliffs along the south-western part of this section are more resistant to erosion and fail as a result of wave undercutting of the cliff toe leading to rock falls.

The rocky shore platform and beaches that front the cliffs along this section will become submerged as sea levels rise (i.e. coastal squeeze) and so these effects will be reduced in the future.

The continued defence of the Castle Cove Sailing Club will prevent erosion in this area. However, as sea levels rise there could be an increased risk of flooding of the lower-lying boat park section of the sailing club platform in the longer term.

12.4.2 Potential extent of risk

The cliffs along this section are subject to episodic land-slip or rock fall events that can cause recession of between 5-10m of cliff top in a single event along the frontage.

The assessment of recession potential over the next 100 years defines a risk zone of 45m for this area (refer to Section 1.3.3 and Appendix A) if it is not possible to implement the SMP policy along all parts of this section.

12.4.3 Timing/frequency of risk occurrence

The main risk along this frontage is from land slip events along the clay-rich cliffs. These events are episodic in nature and difficult to predict. Such events have historically occurred every 1-10 years in more active areas, and between 10-100 years in other parts. However, as sea levels rise in the future there is an increased likelihood of accelerated recession of the cliff toe and so greater instability in the cliff slope in the future as the fronting beach and rocky shore platform becomes submerged and greater wave action affects the toe of the cliff (Halcrow, 2011a).

The sandstone cliffs along this section fail as a result of infrequent small scale rock falls, with events occurring between 10-100 years. This frequency is unlikely to change as sea levels rise despite the submergence of the fronting beach and rocky shore platform (Halcrow, 2011a).

12.4.4 Existing assets at risk

The most immediate asset at risk along this section, if the SMP policy is not implemented in a timely manner, is the section of Old Castle Road at the back of Castle Cove. The road is within 10m or so of the cliff edge and a single land slip in this area could cause the loss of the road. If this occurs then both access to properties and services/utilities that run to these properties beneath the road would be lost. Alternative access and service/utility routes would need to be provided in this situation as the properties cut-off by the loss of Old Castle Road are not as vulnerable to coastal change.

A number of properties on the seaward side of Old Castle Road, parts of Castle Cove Caravan Park and Sandsfoot Castle could all be affected by coastal erosion, depending upon where cliff falls occur in the future.

12.4.5 Future planned developments at risk

The 2005 Adopted Local Plan (Weymouth & Portland Borough Council, 2005) identifies this area as being within a DDB. This DDB has been saved in the Draft Local Plan and therefore future development within this area could be affected by future coastal change.

There are no other planned developments in this area within the Draft Local Plan.

12.5 Recommendations for development management

12.5.1 Development constraints

Based upon the available data assessed in developing this coastal risk planning guidance, the following constraints on development are recommended along this section of coast:

- No permanent development should occur in the area at risk of erosion along the cliff top or the coastal slope seawards of the defined erosion bands.
- Time-limited planning consent for a limited range of developments is most appropriate within the risk zone.
- Any development that does occur will need to be appropriate for the area given the expected timing of future risks, and should be limited in its size and extent. Any development should also demonstrate how it will adapt to future coastal change risks, including how it can be safely removed in advance of its loss to coastal change. Consideration will also need to be given to future access should access via Old Castle Road be affected by cliff top recession. It should also consider the general advice provided in Section 1.3.4.
- The types of development likely to be appropriate in this area are short term holiday lets or camping/caravan sites or facilities associated with tourism and leisure (e.g. cafes etc.). Extensions to existing properties may also be appropriate.

- Any time-limited planning consent should include re-appraisal periods to enable the consent period to be extended or reduced, depending upon the actual rate of coastal change experienced in the future.
- To achieve the SMP policy and so enable continued development along the parts of this frontage unlikely to be at risk of erosion in the next 100 years, it is anticipated that developer contributions will be required. These may arise through a Community Infrastructure Levy, Section 106 contributions or other mechanisms.

Should an applicant be able to robustly demonstrate that the data underpinning this coastal risk planning guidance is inaccurate in an area of proposed development, then approval of planning applications could be granted.

12.5.2 Planning application requirements

In addition to complying with all other relevant Weymouth & Portland Planning Application Requirements (Weymouth & Portland Borough Council, 2008), planning applications along this section will also need to provide the following evidence in relation to demonstrating consideration of coastal risks associated with development:

- Geotechnical Appraisal will be required for any development that proposes to construct any form of structure or proposes to discharge water (e.g. via soakaways) within, or in close proximity to, the risk zones identified for this section. All proposed developments that meet these criteria should submit a geotechnical appraisal to demonstrate that the development would not have an adverse effect on the stability of the coastal slope and so the safety and serviceability of the development itself or surrounding area/properties.

  The Geotechnical Appraisal Report advice and template provided in Appendix B should be used to ensure that the required information is provided by developers.
- Vulnerability Assessment to demonstrate that the development is unlikely to be at risk from coastal change within the period for which time-limited planning consent is being sought. This should relate to the evidence provided in the Geotechnical Appraisal.

12.5.3 Planning policy recommendations

This section of coast should be included within any future CCMA developed for the area as funding to implement the SMP policy for this section is uncertain. The CCMA should consider the development constraints defined in Section 12.5.1 as well as options to facilitate the relocation of existing properties and other assets within the defined erosion risk zones. Reference should also be made to the national *Coastal Change Adaptation Planning Guidance* currently being developed for Defra in a project led by East Riding of Yorkshire Council and Halcrow (due to be published in 2013).

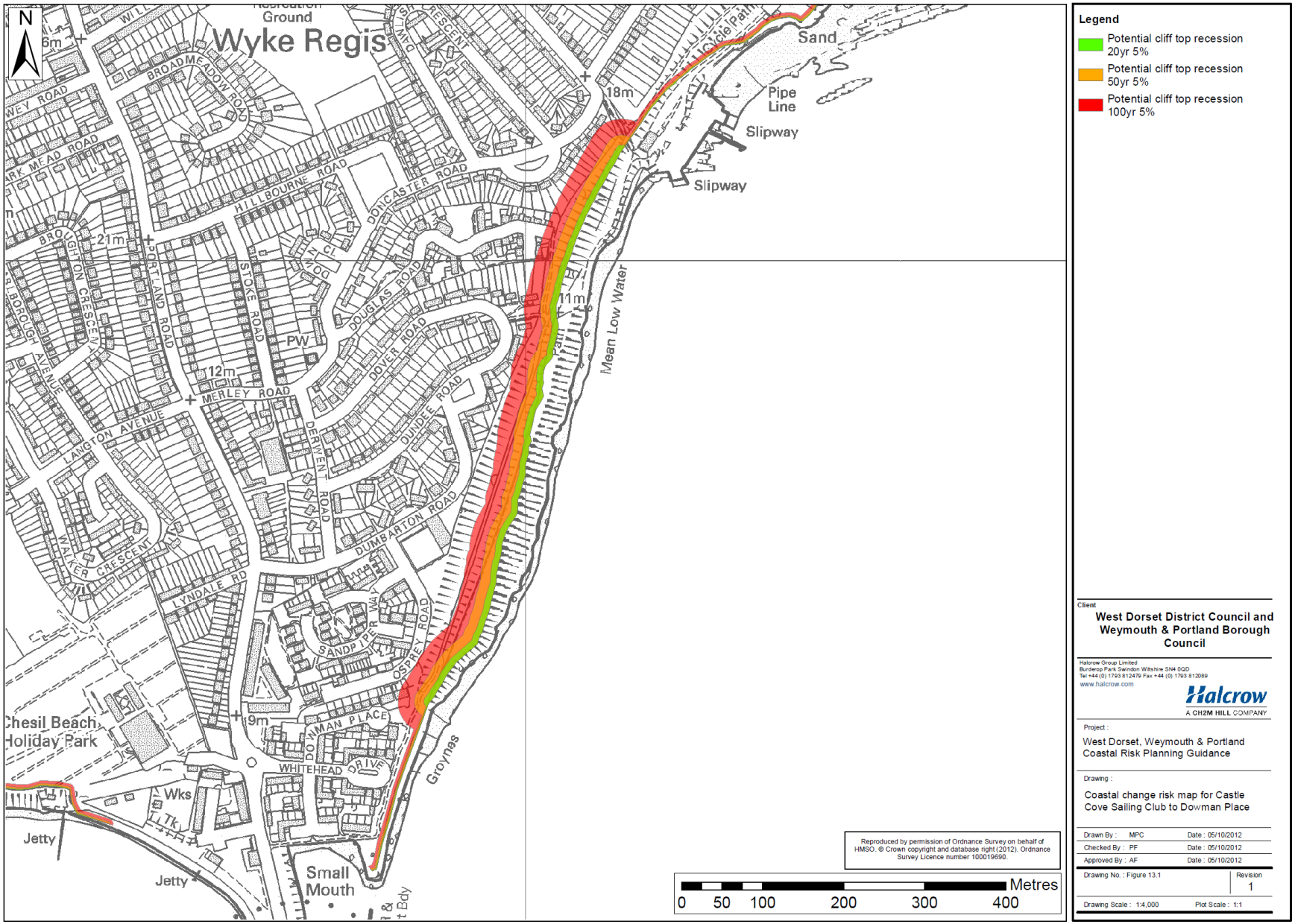
The availability of funding for continued defence along all of this section is uncertain. Therefore to continue to defend this area and so reduce coastal erosion risk in the future, it is very likely that partnership funding will be required. This should be reflected in future policies for this area (refer to Section 1.3.2).

13 Castle Cove Sailing Club to Dowman Place

13.1 Risk zone mapping

The risk zone map for this section shows the following:

- 5% probability potential cliff top recession zones for 20, 50 and 100 years into the future (i.e. in any of the three periods, there is a 5% chance that some parts of the frontage will reach the landward limit of the defined zone).


N
Wyke Regis
Sand
Pipe Line
Slipway
Slipway
Mean Low Water
Groynes
Chesil Beach Holiday Park
Jetty
Jetty
Small Mouth
Wks
Tk
PW
6m
18m
21m
12m
11m
9m
BROADMEADOW ROAD
HILLBOURNE ROAD
DONCASTER ROAD
DOUGLAS ROAD
DOVER ROAD
DUNDEE ROAD
DUMBARTON ROAD
MERLEY ROAD
LANGTON AVENUE
WALKER CRESCENT
LYNDALE RD
SANDPIPER WAY
OSPREY ROAD
DOWMAN PLACE
WHITEHEAD DRIVE
STOKE ROAD
PORTLAND ROAD
DERWENT ROAD
Legend
Potential cliff top recession 20yr 5%
Potential cliff top recession 50yr 5%
Potential cliff top recession 100yr 5%
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Approved By : AF Date : 05/10/2012
Drawing No. : Figure 13.1
Revision 1
Drawing Scale : 1:4,000
Plot Scale : 1:1

13.2 Description of coastal area

This section encompasses the western part of the north-west shore of Portland Harbour and is approximately 0.7km in length.

This section is comprised of actively landsliding simple clay-rich cliffs. Atop the cliffs is the Rodwell Trail. This was first constructed as part of the old railway embankment in the late 19th century but is now a popular foot and cycle path. Beneath the Rodwell Trail is critical service and utility infrastructure that serves the large area of development located immediately landwards of the trail at Wyke Regis.

The toe of the cliff is fronted by a muddy foreshore that is occupied by a variety of scattered rock and building rubble. This is not a formal defence structure and does not serve to protect the toe of the cliff against wave action, as demonstrated by the cliff toe having been eroded back several metres or more from the line of this rubble. Wave action at the cliff toe is, however, reduced by the presence of Portland Harbour breakwaters.

This cliff face along this section is designated for its geological and geomorphological features as part of the UNESCO Dorset and East Devon World Heritage Site. It is also within the Isle of Portland to Studland Cliffs SAC.

The South West Coastal Path runs along the Rodwell Trail within this area.

13.3 Shoreline Management Plan policy

This section is covered by SMP policy unit 5g20.

The SMP policy for this section of coast is initially for **managed realignment** but transitioning towards a policy of **hold the line** over the next 100 years.

This policy enables cliff stabilisation works to be introduced at any point in the next 100 years when monitoring shows that there is an imminent risk to the Rodwell Trail from coastal erosion.

The purpose of this policy is to ultimately protect the Rodwell Trail and the service and utility infrastructure that runs beneath it, as well as the large area of residential property located landwards of the Rodwell Trail. If implemented, this policy will eventually hold the coastline along the line of the Rodwell Trail in this area.

This policy assumes that the Portland Harbour breakwaters will continue to be maintained in their current form and so reduce wave action at the cliff toe. There is, however, some uncertainty about the future management of the breakwaters and if this assumption were not to be correct, then there is the potential for greater wave action along the toe of these cliffs, and therefore greater cliff recession, in the medium to long term.

13.4 Coastal change risks

13.4.1 Nature of the risks

The cliffs along this section are subject to simple landsliding related to ongoing coastal erosion at the cliff toe that is a key factor in the continuing cliff instability.

The muddy foreshore and scattered rubble that lies on top of it along this section plays no part in reducing the rate of erosion of the cliff toe by limiting the amount of

wave action that reaches the cliff toe, and so reduces the instability of the clay-rich cliffs. As sea levels rise in the future, it is likely that the rate of erosion at the toe of the cliff will accelerate and so result in greater instability in the cliff slope in the future.

13.4.2 Potential extent of risk

The cliffs along this section are subject to episodic land-slip events that can cause recession of between 5-10m of cliff top in a single event along a long length of frontage.

Assuming the SMP policy is implemented along this section, the risk of future cliff top recession is expected to be limited and ultimately prevented landwards of the current route of the Rodwell Trail. However, there is some uncertainty about whether the SMP policy will be implemented and so there remains a risk of coastal change in this area.

13.4.3 Timing/frequency of risk occurrence

The main risk along this frontage is from land slip events along this cliffed frontage. These events are episodic in nature and difficult to predict. Such events have historically occurred every 1-10 years (Halcrow, 2011a).

It is likely that some localised cliff stabilisation measures will need to be introduced within 10-20 years in order to implement the SMP policy. It is expected that much of the cliff will have eroded back to the Rodwell Trail within the next 50-100 years where it would be held if the SMP policy is implemented (Halcrow, 2011a).

13.4.4 Existing assets at risk

The main asset at risk of erosion along this section, if the SMP policy is not implemented in a timely manner, is the Rodwell Trail and the coastal path that runs along it and the critical infrastructure located beneath it.

If the SMP policy is not implemented then the Rodwell Trail is likely to become affected within 20 years or so, meaning that the coastal path and critical infrastructure that runs beneath it would need to be redirected. If left unchecked, erosion would gradually begin to effect residential properties located landwards of the Rodwell Trail within 50-100 years.

13.4.5 Future planned developments at risk

There are no planned developments in this area within the Draft Local Plan.

13.5 Recommendations for development management

13.5.1 Development constraints

Based upon the available data assessed in developing this coastal risk planning guidance, the following constraints on development are recommended along this section of coast:

- No permanent development should occur in the area at risk of erosion seawards of the Rodwell Trail.

- Time-limited planning consent for a limited range of developments is most appropriate within the risk zone.
- Any development that does occur will need to be appropriate for the area given the expected timing of future risks, and should be limited in its size and extent. Any development should also demonstrate how it will adapt to future coastal change risks, including how it can be safely removed in advance of its loss to coastal change. Consideration will also need to be given to future access should access via Old Castle Road be affected by cliff top recession. It should also consider the general advice provided in Section 1.3.4.
- The types of development likely to be appropriate in this area are short term holiday lets or camping/caravan sites or facilities associated with tourism and leisure (e.g. cafes etc.). Extensions to existing properties may also be appropriate.
- Any time-limited planning consent should include re-appraisal periods to enable the consent period to be extended or reduced, depending upon the actual rate of coastal change experienced in the future.
- To achieve the SMP policy and so enable continued development along the parts of this frontage unlikely to be at risk of erosion in the next 100 years, it is anticipated that developer contributions will be required. These may arise through a Community Infrastructure Levy, Section 106 contributions or other mechanisms.

Should an applicant be able to robustly demonstrate that the data underpinning this coastal risk planning guidance is inaccurate in an area of proposed development, then approval of planning applications could be granted.

13.5.2 Planning application requirements

In addition to complying with all other relevant Weymouth & Portland Planning Application Requirements (Weymouth & Portland Borough Council, 2008), planning applications along this section will also need to provide the following evidence in relation to demonstrating consideration of coastal risks associated with development:

- Geotechnical Appraisal will be required for any development that proposes to construct any form of structure or proposes to discharge water (e.g. via soakaways) within, or in close proximity to, the risk zones identified for this section. All proposed developments that meet these criteria should submit a geotechnical appraisal to demonstrate that the development would not have an adverse effect on the stability of the coastal slope and so the safety and serviceability of the development itself or surrounding area/properties.

  The Geotechnical Appraisal Report advice and template provided in Appendix B should be used to ensure that the required information is provided by developers.
- Vulnerability Assessment to demonstrate that the development is unlikely to be at risk from coastal change within the period for which time-limited planning consent is being sought. This should relate to the evidence provided in the Geotechnical Appraisal.

13.5.3 Planning policy recommendations

This section of coast should be included within any future CCMA developed for the area as funding to implement the SMP policy for this section is uncertain. The CCMA should consider the development constraints defined in Section 13.5.1 as well as options to facilitate the relocation of existing properties and other assets within the defined erosion risk zones. Reference should also be made to the national *Coastal Change Adaptation Planning Guidance* currently being developed for Defra in a project led by East Riding of Yorkshire Council and Halcrow (due to be published in 2013).

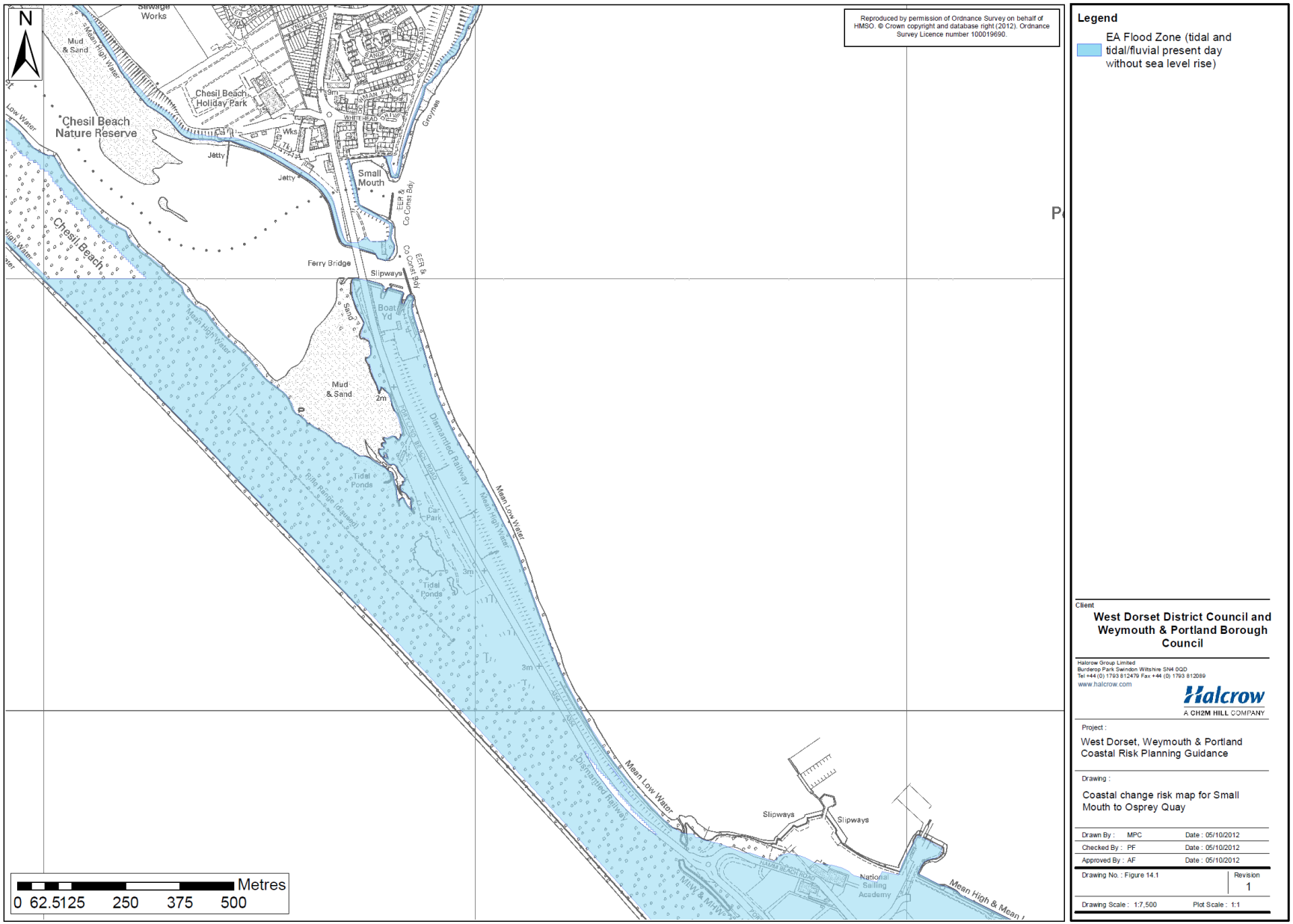
The availability of funding for continued defence along all of this section is uncertain. Therefore to continue to defend this area and so reduce coastal erosion risk in the future, it is very likely that partnership funding will be required. This should be reflected in future policies for this area (refer to Section 1.3.2).

14 Small Mouth to Osprey Quay

14.1 Risk zone mapping

The risk zone map for this section shows the following:

- Environment Agency flood zone mapping for the present day (i.e. no sea level rise effects shown) from tidal and combined tidal-fluvial sources of flooding.


N
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Sewage Works
Mud & Sand
Mean High Water
Chesil Beach Holiday Park
Chesil Beach Nature Reserve
Low Water
Jetty
Groynes
Small Mouth
Ferry Bridge
Slipways
Boat Yd
Sand
Mud & Sand
2m
Tidal Ponds
Car Park
Dismantled Railway
Mean Low Water
Mean High Water
3m
Slipways
National Sailing Academy
Mean High & Mean
Metres
0 62.5125 250 375 500
Legend
EA Flood Zone (tidal and tidal/fluvial present day without sea level rise)
Client
West Dorset District Council and Weymouth & Portland Borough Council
Halcrow Group Limited
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Project :
West Dorset, Weymouth & Portland Coastal Risk Planning Guidance
Drawing :
Coastal change risk map for Small Mouth to Osprey Quay
Drawn By : MPC Date : 05/10/2012
Checked By : PF Date : 05/10/2012
Approved By : AF Date : 05/10/2012
Drawing No. : Figure 14.1
Revision 1
Drawing Scale : 1:7,500
Plot Scale : 1:1

14.2 Description of coastal area

This section extends from the former entrance to the Fleet at Small Mouth, along the western shore of Portland Harbour to the outfall of the Chiswell interceptor drain located at northern end of Osprey Quay, covering a frontage approximately 2.0km in length.

The extensively developed northern part of this section at Wyke Regis is defended against flooding and erosion by rock revetment that is in varying condition. These defences also protect the northern part of the A354 Portland Beach Road and commercial properties and a boat park.

The southern part of this section is only protected by a narrow shingle beach – Ham Beach – which is backed by undeveloped grass land (once the former railway line to Portland). This section protects part of the A354 Portland Beach Road against the risk of flooding and is also part of the UNESCO Dorset and East Devon World Heritage Site. This area is also within or in very close proximity to the Isle of Portland to Studland Cliffs SAC; the Chesil Beach and The Fleet SAC; the Chesil Beach and The Fleet SPA; and the Chesil Beach and The Fleet Ramsar site.

The very southern end of this section is occupied by the outfall from the Chiswell flood alleviation channel that discharges water into Portland Harbour to protect Chiswell against the risk of flooding. This outfall is protected by gabions and rock revetment and is operated and maintained by the Environment Agency. This is a key asset for managing flood risk at Chiswell on the Isle of Portland.

The South West Coastal Path runs along the A354 Portland Beach Road within this area.

The Portland Harbour breakwaters also provide protection against larger waves reaching this section of coast from the east. Chesil Beach is located on the western side of the A354 Portland Beach Road, along with the Chesil Beach Visitor Centre and car park.

14.3 Shoreline Management Plan policy

This section is covered by SMP policy unit 5g21.

The SMP policy for this section is to **hold the line** for the next 100 years.

This means that defence against flooding and erosion could continue to be provided should funding be available to do so.

As part of this policy, the SMP assumes that a secondary defence may be required along the section fronted by Ham Beach in order to manage the risk of flooding from Portland Harbour to the A354 Portland Beach Road as sea levels rise. Such a secondary defence is likely to be required in 50-100 years.

The SMP policy also identifies that there will likely be an increasing risk of Chesil Beach rolling-back towards Portland Harbour during storm or swell wave events at a rate greater has occurred historically. This roll back may result in temporary breaching of Chesil Beach, although a permanent breach is not anticipated to occur in the next 100 years (refer also to Section 18).

This policy also assumes that the Portland Harbour breakwaters will continue to be maintained in their current form and so reduce wave action along this section of coast.

14.4 Coastal change risks

14.4.1 Nature of the risks

The primary risk along this section is coastal flooding of the low-lying areas of land located south of Small Mouth and along the A354 Portland Beach Road. This risk will increase in the future as sea level rise, particularly along the Ham Beach part of the frontage unless a secondary defence is constructed.

There is also a risk to much of this section from flooding from the Chesil Beach side of the A354 Portland Beach Road, which could occur as a result of overtopping or breaching of the beach, or percolation through, the beach at any time.

In the longer term as Chesil Beach rolls-back towards Portland Harbour, the A354 Portland Beach Road will be increasingly at risk from the encroachment of Chesil Beach onto the area occupied by the road.

The northern part of this section towards Small Mouth is at risk of erosion if the defences along it are not maintained in accordance with the SMP policy.

14.4.2 Potential extent of risk

The area at risk of flooding from both the Portland Harbour and Chesil Beach sides of this frontage encompasses most this section. This extent is in the Environment Agency's flood zone maps.

The roll-back of Chesil Beach towards Portland Harbour is predicted to result in the eastward migration of the beach by between 50-120m over the next 100 years (Halcrow, 2010).

Assuming that the SMP policy is implemented along this section, there is little risk of coastal erosion affecting development in this area.

14.4.3 Timing/frequency of risk occurrence

Flooding of the low-lying part of this section could occur at any time. The probability of a large event causing significant overtopping of the Portland Harbour side of this frontage is currently low, although this will increase as sea levels rise.

The probability of flooding from the Chesil Beach side is uncertain as the processes that result in flooding from this area are not fully understood. A flood event from this side of the frontage could occur at anytime.

The future roll-back of Chesil Beach towards Portland Harbour could begin to impact the A354 Portland Beach Road, Chesil Beach Visitor Centre and car park within the next 50-100 years, although there is currently significant uncertainty about the rate of roll-back. There is also uncertainty about how sustainable measures to manage the roll-back of Chesil Beach will be as and when the SMP policy for managed realignment along the part of Chesil Beach that backs this section is implemented.

The very northern part of this section is at risk of erosion if the defences along it are not upgraded in the next 20 years. If the defences in this area fail, then the end of the

Rodwell Trail could be lost within 20-50 years and properties immediately behind the Rodwell Trail at Wyke Regis could be affected within 50-100 years (Halcrow, 2011a).

14.4.4 Existing assets at risk

Along the northern most part of this section, if erosion were to occur as a result of defences not being maintained, then the southern end of the Rodwell Trail and a number of properties immediately landwards of the trail would be at risk from erosion.

A key asset at risk of flooding is the A354 Portland Beach Road. This could be affected by flooding from either the Portland Harbour or Chesil Beach side of this frontage. Other assets at risk of flooding include the boat park and commercial properties at the northern end of Ham Beach, commercial and residential properties at Wyke Regis, and the Chesil Beach Visitor Centre and car park.

Future roll-back of Chesil Beach could impact upon the route of the A354 Portland Beach Road and alternative transportation solutions between Weymouth and Portland may be required in the longer-term as a result. Such roll-back of Chesil Beach could also impact upon the Chesil Beach Visitor Centre and car park, and the Chiswell flood alleviation channel.

14.4.5 Future planned developments at risk

The Draft Local Plan does not identify areas within the flood zone as locations for residential property development. However, areas to the south of this section at Osprey Quay and Portland Port are identified as key economic development areas within the Draft Local Plan. Any adverse impacts of flooding to the A354 Portland Beach Road could impact upon the delivery of the local plan policies in those areas.

The 2005 Adopted Local Plan (Weymouth & Portland Borough Council, 2005) also identifies the northern part of this area at Small Mouth and Ferry Bridge as being within a DDB. This DDB has been saved in the Draft Local Plan and therefore future development within this area could be affected by future coastal change.

14.5 Recommendations for development management

14.5.1 Development constraints

Assuming that the SMP policy is implemented, there is no significant risk to development from coastal change along the currently defended northern part of this section over the next 100 years. However, to achieve the SMP policy and so enable continued development in this area, it is anticipated that developer contributions will be required. These may arise through a Community Infrastructure Levy, Section 106 contributions or other mechanisms.

There will be an increased risk of flooding in the future. As such any new developments along this section should comply with the requirements of Draft Local Plan policy ENV 5 FLOOD RISK.

Along the currently undefended Ham Beach part of this section, no development should occur in order to retain the area behind the beach for future construction of a secondary defence to protect the A354 Portland Beach Road.

This limitation on development will also minimise the risk of flooding posed from the future evolution of Chesil Beach (refer also to Section 18).

14.5.2 Planning application requirements

In addition to complying with all other relevant Weymouth & Portland Planning Application Requirements (Weymouth & Portland Borough Council, 2008), planning applications along this section will also need to provide the following evidence in relation to demonstrating consideration of coastal risks associated with development:

- Flood Risk Assessment in line with the requirements of the National Planning Policy Framework Technical Guidance (Department for Communities & Local Government, 2012b) if proposed development is within or close to a defined flood zone.

  As part of this, it should be demonstrated that for developments within a defined flood zone that measures have been considered to ensure the resiliency of the development to flooding in line with best practice guidance provided by CIRIA at www.ciria.org/flooding/flood_performance.html and/or www.ciria.org/flooding/advice_sheets.html.

14.5.3 Planning policy recommendations

This section of coast should be included within any future CCMA developed for the area due to the potential future evolution and roll-back of Chesil Beach towards this section. Reference should also be made to the national *Coastal Change Adaptation Planning Guidance* currently being developed for Defra in a project led by East Riding of Yorkshire Council and Halcrow (due to be published in 2013).

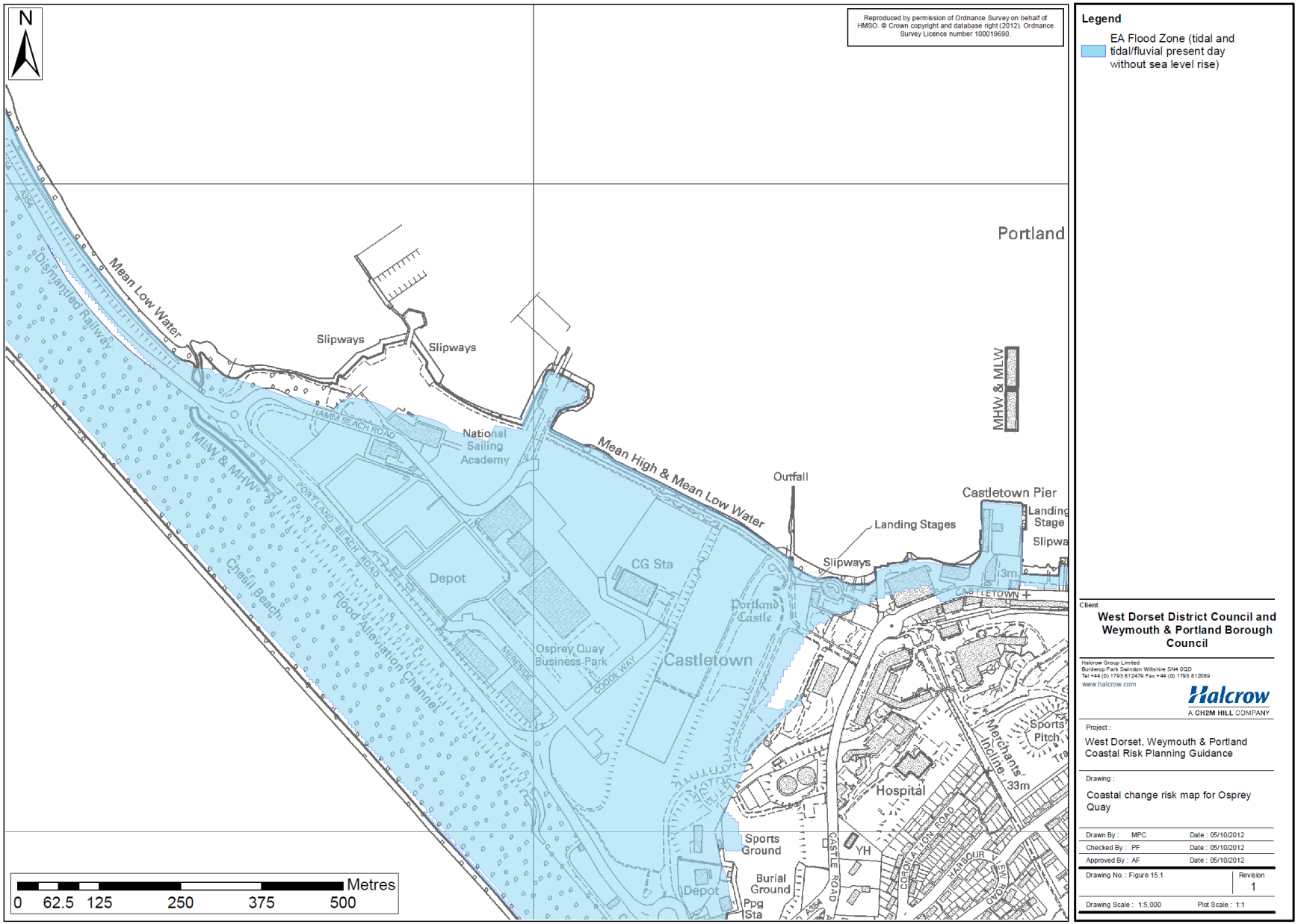
The availability of funding for continued defence along all of this section is uncertain. Therefore to continue to defend this area and so reduce coastal flood and erosion risk in the future, it is very likely that partnership funding will be required. This should be reflected in future policies for this area (refer to Section 1.3.2).

15 Osprey Quay

15.1 Risk zone mapping

The risk zone map for this section shows the following:

- Environment Agency flood zone mapping for the present day (i.e. no sea level rise effects shown) from tidal and combined tidal-fluvial sources of flooding.



Legend

EA Flood Zone (tidal and tidal/fluvial present day without sea level rise)

Client
West Dorset District Council and Weymouth & Portland Borough Council

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Project :
West Dorset, Weymouth & Portland Coastal Risk Planning Guidance

Drawing :
Coastal change risk map for Osprey Quay

Drawn By :	MPC	Date : 05/10/2012
Checked By :	PF	Date : 05/10/2012
Approved By :	AF	Date : 05/10/2012

Drawing No. : Figure 15.1 — Revision 1

Drawing Scale : 1:5,000 — Plot Scale : 1:1

15.2 Description of coastal area

This section extends from the outfall of the Chiswell flood alleviation channel at the northern end of Osprey Quay to the eastern side Portland Castle, covering a frontage approximately 1.2km in length.

This area is extensively developed and includes many marine related industries, the Portland search & rescue helicopter base, the National Sailing Academy and the 16th century Portland Castle that is designated as a Scheduled Monument.

For much of the Osprey Quay frontage, the Portland Harbour marina breakwaters provide protection against wave action. The Portland Harbour breakwaters also provide protection against larger waves reaching this entire section of coast from the east.

Immediately to the west of this section is first the A354 Portland Beach Road and Chesil Beach.

The South West Coastal Path runs along the A354 Portland Beach Road within this area.

Between Osprey Quay and the A354 Portland Beach Road, and within the Osprey Quay area, a series of armoured flood embankments are maintained by the Environment Agency. These serve to manage the pathway of any flood waters from the Chesil Beach side. These aim to divert any flood waters away from buildings and provide a clear route for flood water to drain to Portland Harbour.

15.3 Shoreline Management Plan policy

This section is covered by SMP policy unit 5g22.

The SMP policy for this section is to **hold the line** for the next 100 years.

This means that defence against flooding could continue to be provided should funding be available to do so.

The SMP policy also identifies the future risk of Chesil Beach rolling-back towards Portland Harbour.

This policy also assumes that the Portland Harbour breakwaters will continue to be maintained in their current form and so reduce wave action along this section of coast.

15.4 Coastal change risks

15.4.1 Nature of the risks

The primary risk along this section is coastal flooding of the entire area, including development at Osprey Quay, Portland Castle and the A354 Portland Beach Road.

Flooding from the Portland Harbour side could occur as a result of wave overtopping in parts, or from tidal overflow of the defences.

There is also a risk to this section from flooding from the Chesil Beach side, which could occur as a result of overtopping of the beach or percolation through the beach at any time.

In the longer term, as Chesil Beach rolls-back towards Portland Harbour, the A354 Portland Beach Road and then Osprey Quay will be increasingly at risk (refer to Section 18). This is most likely to be an issue towards the western end of Osprey Quay where the SMP policy for Chesil Beach is for managed realignment but only to artificially rebuild the beach if required following storm events; this policy could allow some control over the rate of roll-back of the beach although it is uncertain how sustainable this will be or where the position of the beach will be following any such intervention.

15.4.2 Potential extent of risk

The area at risk of flooding from both the Portland Harbour and Chesil Beach sides of this frontage encompasses all of this section. This extent is in the Environment Agency's flood zone maps.

The roll-back of Chesil Beach towards Portland Harbour is predicted to result in the eastward migration of the beach by between 50-120m over the next 100 years (Halcrow, 2010).

15.4.3 Timing/frequency of risk occurrence

Flooding of the low-lying part of this section could occur at any time. The probability of a large event causing significant flooding from the Portland Harbour side of this frontage is currently low, although this will increase as sea levels rise.

The probability of flooding from the Chesil Beach side is uncertain as the processes that result in flooding from this area are not fully understood. A flood event from this side of the frontage could occur at anytime.

The future roll-back of Chesil Beach towards Portland Harbour could begin to impact the A354 Portland Beach Road and then Osprey Quay within the next 50-100 years, although there is currently significant uncertainty about the rate of roll-back. There is also uncertainty about how sustainable measures to manage the roll-back of Chesil Beach will be as and when the SMP policy for managed realignment along the part of Chesil Beach that backs Osprey Quay is implemented.

15.4.4 Existing assets at risk

The entire area of Osprey Quay and all the development contained therein is at risk of flooding from either the Portland Harbour or Chesil Beach side of this frontage in the future as sea levels rise.

15.4.5 Future planned developments at risk

The Draft Local Plan policy PORT 2 OSPREY QUAY, which promotes the development of this area as a mixed use site with housing, tourism and tourist and leisure related uses, is at risk of flooding. This risk could increase in the future as sea levels rise if defences are not improved.

This policy could also be at risk if the future roll-back of Chesil Beach towards Portland Harbour either directly impacts this area, or impacts access from the A354 Portland Beach Road.

The risk of flooding from the Chesil Beach side would continue to be managed by maintenance of the Environment Agency's flood embankments to manage the flow of

any flood water through the site. These areas should not be developed as part of the Draft Local Plan policy.

The potential impacts of beach roll-back could lead to alternative transport links being required.

15.5 Recommendations for development management

15.5.1 Development constraints

Assuming that the SMP policy is implemented, there is no significant risk to development from coastal change in this area over the next 100 years.

There will, however, remain a risk of flooding and this risk could increase in the future (refer to Section 1.3.8). As such any new developments should comply with the requirements of Draft Local Plan policy ENV 5 FLOOD RISK.

To achieve the SMP policy and so enable continued development, it is anticipated that developer contributions will be required. These may arise through a Community Infrastructure Levy, Section 106 contributions or other mechanisms.

15.5.2 Planning application requirements

In addition to complying with all other relevant Weymouth & Portland Planning Application Requirements (Weymouth & Portland Borough Council, 2008), planning applications along this section will also need to provide the following evidence in relation to demonstrating consideration of coastal risks associated with development:

- Flood Risk Assessment in line with the requirements of the National Planning Policy Framework Technical Guidance (Department for Communities & Local Government, 2012b) if proposed development is within or close to a defined flood zone.

  As part of this, it should be demonstrated that for developments within a defined flood zone that measures have been considered to ensure the resiliency of the development to flooding in line with best practice guidance provided by CIRIA at www.ciria.org/flooding/flood_performance.html and/or www.ciria.org/flooding/advice_sheets.html.

15.5.3 Planning policy recommendations

This section of coast should be included within any future CCMA developed for the area due to the potential future evolution and roll-back of Chesil Beach towards this section. Reference should also be made to the national *Coastal Change Adaptation Planning Guidance* currently being developed for Defra in a project led by East Riding of Yorkshire Council and Halcrow (due to be published in 2013).

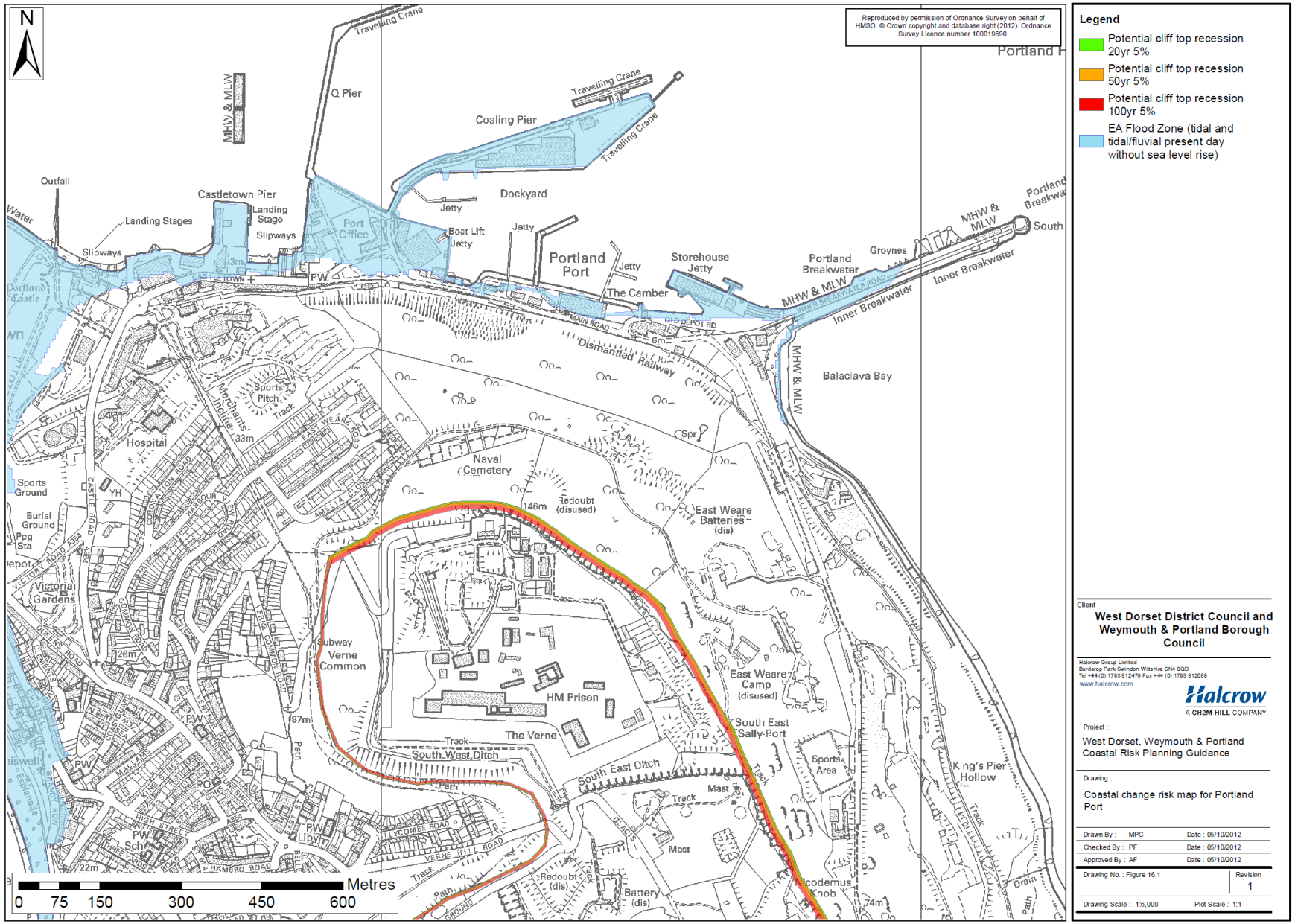
The availability of funding for continued defence along all of this section is uncertain. Therefore to continue to defend this area and so reduce coastal flood and erosion risk in the future, it is very likely that partnership funding will be required. This should be reflected in future policies for this area (refer to Section 1.3.2).

16 Portland Port

16.1 Risk zone mapping

The risk zone map for this section shows the following:

- 5% probability potential cliff top recession zones for 20, 50 and 100 years into the future (i.e. in any of the three periods, there is a 5% chance that some parts of the frontage will reach the landward limit of the defined zone).
- Environment Agency flood zone mapping for the present day (i.e. no sea level rise effects shown) from tidal and combined tidal-fluvial sources of flooding.


N
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Legend
Potential cliff top recession 20yr 5%
Potential cliff top recession 50yr 5%
Potential cliff top recession 100yr 5%
EA Flood Zone (tidal and tidal/fluvial present day without sea level rise)
Metres
0 75 150 300 450 600
Client
West Dorset District Council and Weymouth & Portland Borough Council
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Drawing :
Coastal change risk map for Portland Port
Drawn By : MPC Date : 05/10/2012
Checked By : PF Date : 05/10/2012
Approved By : AF Date : 05/10/2012
Drawing No. : Figure 16.1
Revision 1
Drawing Scale : 1:6,000
Plot Scale : 1:1
Travelling Crane
Q Pier
Coaling Pier
Dockyard
Jetty
Boat Lift Jetty
Port Office
Castletown Pier
Landing Stages
Landing Stage
Slipways
Outfall
Portland Port
Storehouse Jetty
The Camber
Portland Breakwater
Groynes
Inner Breakwater
MHW & MLW
Dismantled Railway
Balaclava Bay
Naval Cemetery
Redoubt (disused)
East Weare Batteries (dis)
East Weare Camp (disused)
HM Prison
South East Sally-Port
The Verne
South West Ditch
South East Ditch
Subway
Verne Common
Hospital
Sports Ground
Burial Ground
Victoria Gardens
Sports Pitch
Sports Area
King's Pier Hollow
Mast
Battery (dis)
Redoubt (dis)
Icodemus Knob
Drain
Path
Track

16.2 Description of coastal area

This section extends from the eastern side Portland Castle to Kings Pier on the north-eastern side of the Isle of Portland, covering the area occupied by Portland Port along a frontage approximately 2.9km in length.

This area is occupied by the commercial Port of Portland. The port area is located on lower-lying land in front of the steeply rising East Weare cliffs. These cliffs have been largely inactive since the construction of the port and Portland Harbour breakwaters in the latter half of the 19th century as the cliff toe has been protected against erosion by wave action leading to stability in the cliff slope. These cliffs are also within the Isle of Portland to Studland Cliffs SAC.

The western part of this section located within Portland Harbour is protected by the Portland Harbour breakwaters. The eastern part of this section is outside of the breakwaters and so exposed to much more wave action.

Road access to the port area is via the A354 Portland Beach Road.

16.3 Shoreline Management Plan policy

This section is covered by SMP policy unit 5g22.

The SMP policy for this section is to **hold the line** for the next 100 years.

This means that defence against flooding and erosion could continue to be provided should funding be available to do so.

16.4 Coastal change risks

16.4.1 Nature of the risks

The main risk along this section is from potential flooding of the lower-lying parts of the port area as a result of overtopping of the defences/port structures from Portland Harbour.

Assuming that the port area is maintained and continues to protect the cliff toe along this section, then the risk of erosion to both the land behind the defences and of the backing cliffs at East Weare, including the developed coastal slope, will remain very low. There will, however, remain the potential for small scale, localised areas of instability due to groundwater effects.

16.4.2 Potential extent of risk

The area at risk of flooding is primarily the area of Portland Port located within Portland Harbour. This extent is shown on the Environment Agency's flood zone maps.

There is very little, if any, risk of significant erosion of the cliff top area assuming that the defence of the cliff toe continues. Small scale, localised areas of instability could, however, occur in places along cliffs at East Weare cliffs as a result of groundwater levels. The assessment of recession potential over the next 100 years for East Weare defines a risk zone of 30m for this area as a result of this mechanism (refer to Section 1.3.3 and Appendix A).

16.4.3 Timing/frequency of risk occurrence

Flooding of the low-lying parts of this section could occur at any time. The probability of a large event causing significant flooding is currently low, although this will increase as sea levels rise.

The coastal slope and cliff top area along East Weare cliffs will remain vulnerable to small scale, localised instability due to groundwater effects that occur as infrequent episodic events. The frequency of these events could increase in the future depending upon the effects of climate change, particularly if rainfall amounts increase.

16.4.4 Existing assets at risk

The assets at risk of flooding are all commercial properties and other features associated with the operation of Portland Port.

Assuming that protection of the cliff toe continues in line with the SMP policy, then the risk of coastal erosion affecting existing development along the coastal slope and above the cliff top area of East Weare will continue to be very low, although some small scale, localised instability could still occur due to groundwater effects.

16.4.5 Future planned developments at risk

The Draft Local Plan policy PORT 1 PORTLAND PORT, which safeguards land within the jurisdiction of the port for potential port operational and related uses, along with the Key Employment Site at Portland Port also defined in the Draft Local Plan, is at risk of flooding. This risk could increase in the future as sea levels rise if defences are not improved.

The wider area around Portland Port is also identified in the Draft Local Plan as lying within a DDB.

Assuming that future development continues to include protection of the cliff toe, then the risk of erosion affecting new development will continue to be very low.

16.5 Recommendations for development management

16.5.1 Development constraints

Assuming that the SMP policy is implemented, there is no significant risk to development from coastal change in this area over the next 100 years, although some small scale, localised instability could still occur along the coastal slope and cliff top area of East Weare due to groundwater effects. In this area, property owners/developers should be made aware of the general advice provided in Section 1.3.4.

There will, however, remain a risk of flooding and this risk could increase in the future (refer to Section 1.3.8). As such any new developments should comply with the requirements of Draft Local Plan policy ENV 5 FLOOD RISK.

To achieve the SMP policy and so enable continued development, it is anticipated that development in this area will primarily be funded by Portland Port.

However, in some areas developer contributions could be required. In such cases contributions could be achieved through a Community Infrastructure Levy, Section 106 contributions or other mechanisms.

16.5.2 Planning application requirements

In addition to complying with all other relevant Weymouth & Portland Planning Application Requirements (Weymouth & Portland Borough Council, 2008), planning applications along this section will also need to provide the following evidence in relation to demonstrating consideration of coastal risks associated with development:

- Flood Risk Assessment in line with the requirements of the National Planning Policy Framework Technical Guidance (Department for Communities & Local Government, 2012b) if proposed development is within or close to a defined flood zone.

  As part of this, it should be demonstrated that for developments within a defined flood zone that measures have been considered to ensure the resiliency of the development to flooding in line with best practice guidance provided by CIRIA at www.ciria.org/flooding/flood_performance.html and/or www.ciria.org/flooding/advice_sheets.html.

- For development on the coastal slope and/or above the cliff top at East Weare, a Geotechnical Appraisal will be required for any development that proposes to construct any form of structure or proposes to discharge water (e.g. via soakaways) within, or in close proximity to, the risk zones identified for this section. All proposed developments that meet these criteria should submit a geotechnical appraisal to demonstrate that the development would not have an adverse effect on the stability of the coastal slope and so the safety and serviceability of the development itself or surrounding area/properties.

  The Geotechnical Appraisal Report advice and template provided in Appendix B should be used to ensure that the required information is provided by developers.

- For development on or above the cliff top at East Weare, a Geotechnical Appraisal, a Vulnerability Assessment will be required to demonstrate that the development is unlikely to be at risk from coastal change within the period for which time-limited planning consent is being sought. This should relate to the evidence provided in the Geotechnical Appraisal.

16.5.3 Planning policy recommendations

The area along the cliffs at East Weare, where there will remain the risk of small scale, infrequent land slip events even with continued defence of the toe of the coastal slope, should be included within any future CCMA developed for the area. Reference should also be made to the national *Coastal Change Adaptation Planning Guidance* currently being developed for Defra in a project led by East Riding of Yorkshire Council and Halcrow (due to be published in 2013).

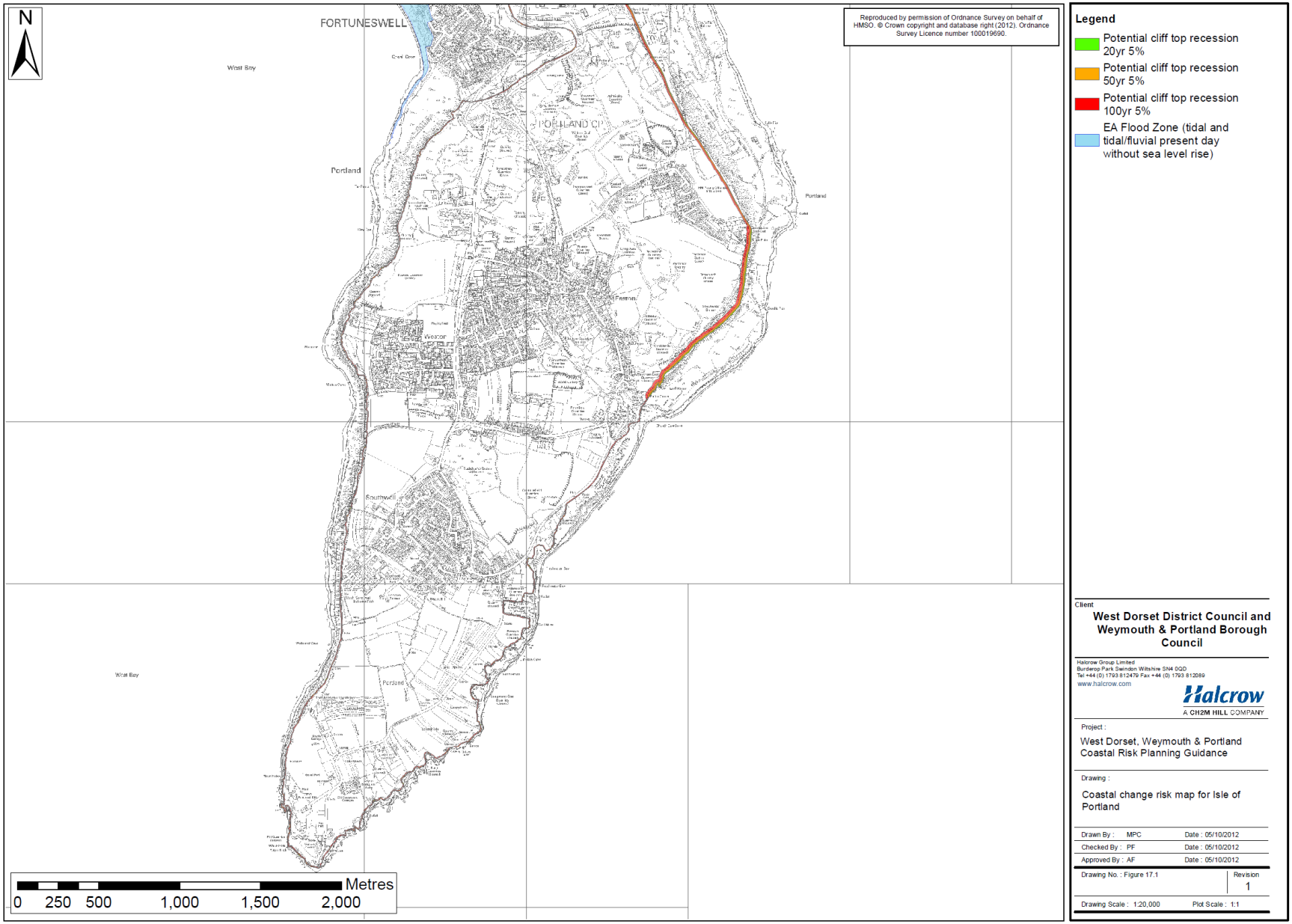
The availability of funding for continued defence along all of this section is uncertain. Therefore to continue to defend this area and so reduce coastal flood and erosion risk in the future, it is very likely that partnership funding will be required. This should be reflected in future policies for this area (refer to Section 1.3.2).

17 Isle of Portland

17.1 Risk zone mapping

The risk zone map for this section shows the following:

- 5% probability potential cliff top recession zones for 20, 50 and 100 years into the future (i.e. in any of the three periods, there is a 5% chance that some parts of the frontage will reach the landward limit of the defined zone).
- Environment Agency flood zone mapping for the present day (i.e. no sea level rise effects shown) from tidal and combined tidal-fluvial sources of flooding.


N
FORTUNESWELL
West Bay
PORTLAND CP
Portland
Weston
Southwell
Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown copyright and database right (2012). Ordnance Survey Licence number 100019690.
Legend
Potential cliff top recession 20yr 5%
Potential cliff top recession 50yr 5%
Potential cliff top recession 100yr 5%
EA Flood Zone (tidal and tidal/fluvial present day without sea level rise)
Metres
0 250 500 1,000 1,500 2,000
Client
West Dorset District Council and Weymouth & Portland Borough Council
Halcrow Group Limited
Burderop Park Swindon Wiltshire SN4 0QD
Tel +44 (0) 1793 812475 Fax +44 (0) 1793 812089
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Project :
West Dorset, Weymouth & Portland Coastal Risk Planning Guidance
Drawing :
Coastal change risk map for Isle of Portland
Drawn By : MPC Date : 05/10/2012
Checked By : PF Date : 05/10/2012
Approved By : AF Date : 05/10/2012
Drawing No. : Figure 17.1
Revision 1
Drawing Scale : 1:20,000
Plot Scale : 1:1

17.2 Description of coastal area

This section encompasses the undefended, natural coast of the Isle of Portland, extending from Kings Pier on the eastern side of Portland to West Weare on the western side of Portland, covering a frontage approximately 11.8km in length.

The majority of this section is comprised of high limestone cliffs. At West Weare the limestone forms a cap to softer underlying clay cliffs that are exposed in this area. The cliffs are mainly fronted by rocky shore platforms.

The cliff top area is mostly undeveloped. Some parts of the cliff top area were former quarries that are now used for leisure purposes, such as Tout Quarry on the western side of Portland.

The South West Coastal Path runs along the cliff top for most of this section.

In some parts, stepped access is provided from the cliff top to small gravel and boulder pocket beaches at the shoreline, such as at Church Ope Cove.

This area is designated for its geological and geomorphological features as part of the UNESCO Dorset and East Devon World Heritage Site. It is also within or in very close proximity to the Isle of Portland to Studland Cliffs SAC; the Studland to Portland Inshore SAC; the South of Portland recommended MCZ; and the Chesil Beach and Stennis Ledges recommended MCZ.

17.3 Shoreline Management Plan policy

This section is covered by SMP policy units 5g23 and 6a01.

The SMP policy for this section is for **no active intervention** over the next 100 years.

This means that there is no expectation for constructing any flood or coastal protection measures along this section of coast over this period. As such, this section will be allowed to continue to evolve naturally.

17.4 Coastal change risks

17.4.1 Nature of the risks

The risk along this section is from erosion of the cliffs along this frontage.

Localised pocket beaches and rock shore platforms are likely to become submerged as sea levels rise.

17.4.2 Potential extent of risk

The limestone cliffs that form much of this section are hard and resistant to erosion. They fail as a result of wave undercutting at the cliff toe. The cliff falls caused by this process result in localised loss of perhaps a few metres of cliff top at a time (Halcrow, 2011a). The assessment of cliff recession potential over the next 100 years defines a risk zone of 6m for these resistant cliffs (refer to Section 1.3.3 and Appendix A).

The cliffs at West Weare are slightly more susceptible to erosion, due to the underlying clay beds being exposed at the surface. The assessment of recession potential over the next 100 years for defines a risk zone of 6m for this area as a result of this mechanism. However, where the underlying clay beds are exposed at the

surface along the eastern side of the Isle of Portland, from East Weare to Rufus Castle, there could be up to 30m of cliff top recession over the next 100 years (refer to Section 1.3.3 and Appendix A).

17.4.3 Timing/frequency of risk occurrence

The cliffs along this section fail as a result of infrequent small scale rock falls. This frequency is unlikely to change as sea levels rise (Halcrow, 2011a).

The cliffs at West Weare have the potential to experience an increased frequency of events in the future in response to climate change (Halcrow, 2011a).

17.4.4 Existing assets at risk

There are not thought to be any properties or infrastructure at risk of erosion. Some historic features such as Rufus Castle could be impacted, although this depends upon the location of future cliff falls.

The coast path will also be likely need to adapting in some places as the cliff top erodes in the future.

Access to localised pocket beaches from the cliff top may be lost to erosion, depending upon where cliff falls occur. This may be less of an issue in the longer term if beaches become submerged due to sea level rise.

17.4.5 Future planned developments at risk

Future cliff erosion at West Weare has the potential to impact upon the delivery of policy PORT 4 PORTLAND QUARRIES NATURE PARK within the Draft Local Plan.

Future cliff erosion could also impact seaward parts of the Southwell Business Park on Portland. This area is identified as a Key Employment Site in the Draft Local Plan.

17.5 Recommendations for development management

17.5.1 Development constraints

Based upon the available data assessed in developing this coastal risk planning guidance, the following constraints on development are recommended along this section of coast:

- No permanent development should occur in the area at risk of erosion along the cliff top or the coastal slope seawards of the defined erosion bands.
- Time-limited planning consent for a limited range of developments is most appropriate within the risk zone.
- Any development that does occur will need to be appropriate for the area given the expected timing of future risks, and should be limited in its size and extent. Any development should also demonstrate how it will adapt to future coastal change risks, including how it can be safely removed in advance of its loss to coastal change. It should also consider the general advice provided in Section 1.3.4.
- The types of development likely to be appropriate in this area are short term holiday lets or camping/caravan sites or facilities associated with tourism and

leisure (e.g. cafes etc.). Extensions to existing properties may also be appropriate.

- Any time-limited planning consent should include re-appraisal periods to enable the consent period to be extended or reduced, depending upon the actual rate of coastal change experienced in the future.

Should an applicant be able to robustly demonstrate that the data underpinning this coastal risk planning guidance is inaccurate in an area of proposed development, then approval of planning applications could be granted.

17.5.2 Planning application requirements

In addition to complying with all other relevant Weymouth & Portland Planning Application Requirements (Weymouth & Portland Borough Council, 2008), planning applications along this section will also need to provide the following evidence in relation to demonstrating consideration of coastal risks associated with development:

- Geotechnical Appraisal will be required for any development that proposes to construct any form of structure or proposes to discharge water (e.g. via soakaways) within, or in close proximity to, the risk zones identified for this section. All proposed developments that meet these criteria should submit a geotechnical appraisal to demonstrate that the development would not have an adverse effect on the stability of the coastal slope and so the safety and serviceability of the development itself or surrounding area/properties.

  The Geotechnical Appraisal Report advice and template provided in Appendix B should be used to ensure that the required information is provided by developers.

- Vulnerability Assessment to demonstrate that the development is unlikely to be at risk from coastal change within the period for which time-limited planning consent is being sought. This should relate to the evidence provided in the Geotechnical Appraisal.

17.5.3 Planning policy recommendations

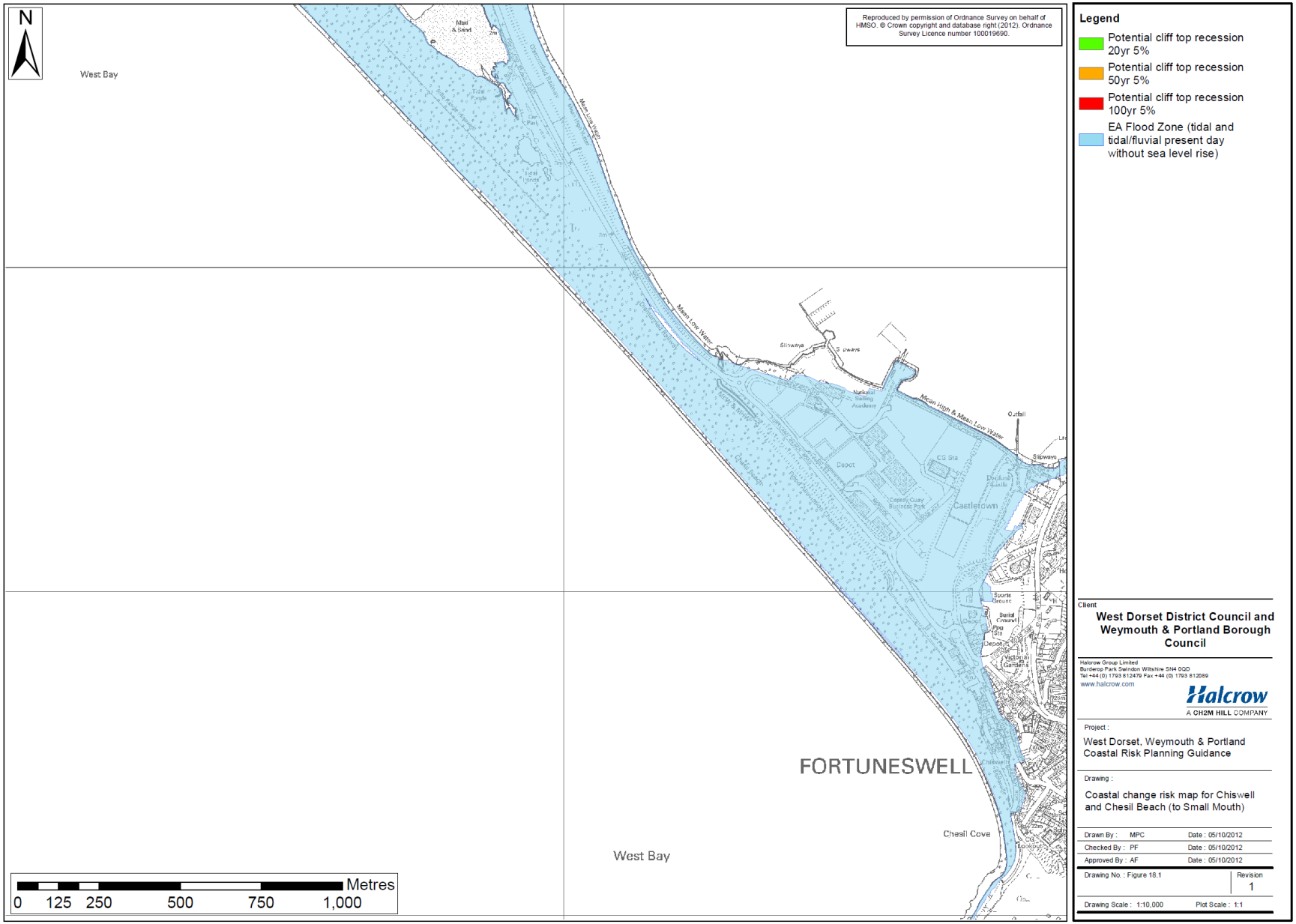
This section of coast should be included within any future CCMA developed for the area. The CCMA should consider the development constraints defined in Section 17.5.1 as well as options to facilitate the relocation of existing properties and other assets within the defined erosion risk zones. Reference should also be made to the national *Coastal Change Adaptation Planning Guidance* currently being developed for Defra in a project led by East Riding of Yorkshire Council and Halcrow (due to be published in 2013).

18 Chiswell and Chesil Beach (to Small Mouth)

18.1 Risk zone mapping

The risk zone map for this section shows the following:

- 5% probability potential cliff top recession zones for 20, 50 and 100 years into the future (i.e. in any of the three periods, there is a 5% chance that some parts of the frontage will reach the landward limit of the defined zone).
- Environment Agency flood zone mapping for the present day (i.e. no sea level rise effects shown) from tidal and combined tidal-fluvial sources of flooding.


N
West Bay
Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown copyright and database right (2012). Ordnance Survey Licence number 100019690.
Mean Low Water
Mean High & Mean Low Water
Slipways
Outfall
Castletown
FORTUNESWELL
Chesil Cove
West Bay
Metres
0 125 250 500 750 1,000
Legend
Potential cliff top recession 20yr 5%
Potential cliff top recession 50yr 5%
Potential cliff top recession 100yr 5%
EA Flood Zone (tidal and tidal/fluvial present day without sea level rise)
Client
West Dorset District Council and Weymouth & Portland Borough Council
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Tel +44 (0) 1793 812479 Fax +44 (0) 1793 812089
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Project :
West Dorset, Weymouth & Portland Coastal Risk Planning Guidance
Drawing :
Coastal change risk map for Chiswell and Chesil Beach (to Small Mouth)
Drawn By : MPC Date : 05/10/2012
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Revision 1
Drawing Scale : 1:10,000
Plot Scale : 1:1

18.2 Description of coastal area

This section extends from the north-western side of the Isle of Portland in a north-west direction along Chesil Beach to Small Mouth, covering a frontage approximately 3.3km in length.

The south-eastern part of this section protects the extensively developed areas of Chiswell, Fortuneswell and Osprey Quay against the risk of flooding and erosion.

At the very south-eastern end the land rises steeply to the cliffs at West Weare and Fortuneswell. A seawall and slope stabilisation measures operated by Weymouth & Portland Borough Council reduce the risk of erosion in this part. The cliffs at West Weare are comprised of a limestone cap atop softer underlying clay cliffs that are exposed in this area.

Immediately adjacent to these erosion defences is the Environment Agency's seawall that protects the low-lying area of Chiswell against the risk of flooding. This seawall is supported by an interceptor drain that diverts water percolating through the beach into a culvert and then flood alleviation channel that discharges into Portland Harbour at the northern end of Osprey Quay.

The north-western end of the seawall is a transition zone between defended and undefended beach. This transition is provided by gabion mattresses that extend for 550m along the crest of the beach to provide a minimum crest level to protect against flooding. These gabions end adjacent to the point where the interceptor drain culvert meets the flood alleviation channel.

Beyond the gabion mattresses Chesil Beach is undefended along its length. This section is backed at is south-eastern end by the A354 Portland Beach Road, Osprey Quay, Chesil Beach Visitor Centre and car park and the flood alleviation channel that is part of the Chiswell flood defence system. The very north-eastern part of this section is backed by the southern end of The Fleet.

The South West Coastal Path runs along the top of the seawalls at the south-eastern end of this section, and then along the A345 Portland Beach Road along the north-western part.

This area is designated for its geological and geomorphological features as part of the UNESCO Dorset and East Devon World Heritage Site. It is also within or in very close proximity to the Isle of Portland to Studland Cliffs SAC; the Studland to Portland Inshore SAC; the Chesil Beach and The Fleet SAC; the Chesil Beach and The Fleet SPA; the Chesil Beach and The Fleet Ramsar site; and the Chesil Beach and Stennis Ledges recommended MCZ.

18.3 Shoreline Management Plan policy

This section is covered by SMP policy units 6a02 and 6a03.

The SMP policy for the southern part of this section at Chiswell where defences already exist is to **hold the line** for the next 100 years. This policy means that defence against flooding and erosion could continue to be provided in this area should funding be available to do so.

The SMP policy for the northern part of this section along the currently undefended part of Chesil Beach that is backed by Osprey Quay and the A354 is one of **managed**

realignment. This policy allows for the expected future roll-back of Chesil Beach towards Portland Harbour to be controlled to some extent, but only so far as to rebuild the beach artificially following storm events. It is not certain how sustainable this policy will be in the longer term, or indeed what the position of the beach would be following any such intervention measures.

The SMP also identifies that an event on the scale of the November 1824 'Great Gale' that caused wide spread damage along much of the Dorset coast, including extensive wave overtopping of Chesil Beach that destroyed around 80 properties at Chiswell (West, 2005) could occur again in the future.

18.4 Coastal change risks

18.4.1 Nature of the risks

The primary risk along this section is from coastal flooding of the entire area by wave overtopping of, or percolation through, Chesil Beach. Such flooding could occur at any point along this section at any time. There is much uncertainty about the physical processes that result in flood events in this area, although flooding when it does occur is often rapid in its onset with little advance warning.

In the longer term, as Chesil Beach rolls-back towards Portland Harbour, the A354 Portland Beach Road and then Osprey Quay will be increasingly at risk. This is most likely to be an issue towards the western end of Osprey Quay and northwards to Small Mouth. Here the SMP policy for Chesil Beach is for managed realignment but only to artificially rebuild the beach if required following storm events. This policy could allow some control over the rate of roll-back of the beach although it is uncertain how sustainable this will be or where the position of the beach will be following any such intervention. *Note, that the beach when it is rebuilt – either by human or natural means – would be in a more easterly position than present as rebuilding would occur where the majority of beach material is located (beach material would not be moved back westwards).*

At the very south-eastern end of this section, there is a risk of coastal erosion if the existing seawall and slope stabilisation measures are not maintained in the future, as this would increase the likelihood of defence failure and exposure of the toe of the coastal slope to wave action. This in turn would increase instability in the cliffs at West Weare. There will, however, remain the potential for small scale, localised areas of instability due to groundwater effects and the potential for some outflanking of this area by erosion of the adjacent undefended cliffs to the south-east.

18.4.2 Potential extent of risk

The area at risk of flooding encompasses all of this section. This current flood risk extent is defined by the Environment Agency's flood zone maps. The extent of future flood risk is demonstrated in the SFRA (Royal Haskoning, 2006).

The roll-back of Chesil Beach towards Portland Harbour is predicted to result in the eastward migration of the beach by between 50-120m over the next 100 years (Halcrow, 2010).

At the very south-eastern end of this section, the cliffs at West Weare may erode by about 6m over the next 100 years as a result of groundwater driven instability, even

with the toe of the coastal slope being protected (refer to Section 1.3.3 and Appendix A).

18.4.3 Timing/frequency of risk occurrence

Flooding of the low-lying part of this section could occur at any time. However, the probability of flooding from the Chesil Beach frontage is uncertain as the processes that result in flooding from this area are not fully understood (Halcrow, 2011a).

The future roll-back of Chesil Beach towards Portland Harbour could begin to impact the Chesil Beach Visitor Centre and car park, A354 Portland Beach Road and then Osprey Quay within the next 50-100 years, although there is currently significant uncertainty about the rate of roll-back. There is also uncertainty about how sustainable measures to manage the roll-back of Chesil Beach will be as and when the SMP policy for managed realignment along the north-eastern part of this section is implemented.

At the very south-eastern end of this section, the risk of coastal erosion will remain very low assuming that the SMP policy to maintain the seawall and slope stabilisation measures is implemented.

18.4.4 Existing assets at risk

At Chiswell, the area behind Chesil Beach to at least the A354 Chiswell High Street is at risk of flooding.

From Victoria Square northwards, the entire area is at of risk of flooding. This includes Osprey Quay and all the development contained therein, the A354 Portland Beach Road, and the Chesil Beach Visitor Centre and car park.

Assuming that protection of the cliff toe continues in line with the SMP policy, then the risk of erosion affecting existing development on and above the cliff top of West Weare will continue to be very low.

18.4.5 Future planned developments at risk

The Draft Local Plan identifies the area at Chiswell as being within a DDB. Part of this area immediately east of Chesil Beach is within the defined flood risk zone.

The Draft Local Plan policy PORT 2 OSPREY QUAY, which promotes the development of this area as a mixed use site with housing, tourism and tourist and leisure related uses, is at risk of flooding. This risk could arise at anytime given the uncertainty about the physical processes at Chesil Beach that result in flooding. This risk is likely to increase in the future as sea levels rise.

This policy could also be at risk if the future roll-back of Chesil Beach towards Portland Harbour either directly impacts this area, or impacts access from the A354 Portland Beach Road.

The risk of flooding from the Chesil Beach side would, however, continue to be managed by maintenance of the Environment Agency's flood embankments to manage the flow of any flood water through the site. These areas should not be developed as part of the Draft Local Plan policy.

The potential impacts of beach roll-back could lead to alternative transport links being required.

18.5 Recommendations for development management

18.5.1 Development constraints

Assuming that the SMP policy is implemented, there is no significant risk to development from coastal change along the currently defended southern part of this section over the next 100 years. However, to achieve the SMP policy and so enable continued development in this area, it is anticipated that developer contributions will be required. These may arise through a Community Infrastructure Levy, Section 106 contributions or other mechanisms.

Along the undefended remainder of this section, there will be an increasing risk of both flooding and encroachment as Chesil Beach rolls-back towards Portland Harbour.

The risk of this occurring will increase over time, and therefore no permanent development should occur in the areas at risk of future roll-back of Chesil Beach. Time-limited planning consent for a limited range of developments is most appropriate within this risk zone.

Any development that does occur will need to be appropriate for the area given the expected timing of future risks, and should be limited in its size and extent. Any development should also demonstrate how it will be adapted for future coastal risks such as increased risk of flooding in line with the requirements of Draft Local Plan policy ENV 5 FLOOD RISK.

The types of development likely to be appropriate in this area are those that require a coastal location and/or provide substantial social and economic benefits to the community (e.g. hotels, shops, offices, leisure activities etc.).

Any time-limited planning consent should include re-appraisal periods to enable the consent period to be extended or reduced, depending upon the actual rate of coastal change experienced along Chesil Beach.

18.5.2 Planning application requirements

In addition to complying with all other relevant Weymouth & Portland Planning Application Requirements (Weymouth & Portland Borough Council, 2008), planning applications along this section will also need to provide the following evidence in relation to demonstrating consideration of coastal risks associated with development:

- Flood Risk Assessment in line with the requirements of the National Planning Policy Framework Technical Guidance (Department for Communities & Local Government, 2012b) if proposed development is within or close to a defined flood zone.

  As part of this, it should be demonstrated that for developments within a defined flood zone that measures have been considered to ensure the resiliency of the development to flooding in line with best practice guidance provided by CIRIA at www.ciria.org/flooding/flood_performance.html and/or www.ciria.org/flooding/advice_sheets.html.

- For development on the coastal slope and/or above the cliff top at West Weare, a Geotechnical Appraisal will be required for any development that proposes to construct any form of structure or proposes to discharge water (e.g. via soakaways) within, or in close proximity to, the risk zones identified for this section. All proposed developments that meet these criteria should submit a geotechnical appraisal to demonstrate that the development would not have an adverse effect on the stability of the coastal slope and so the safety and serviceability of the development itself or surrounding area/properties.

  The Geotechnical Appraisal Report advice and template provided in Appendix B should be used to ensure that the required information is provided by developers.

- For development on or above the cliff top at West Weare, a Vulnerability Assessment will be required to demonstrate that the development is unlikely to be at risk from coastal change within the period for which time-limited planning consent is being sought. This should relate to the evidence provided in the Geotechnical Appraisal.

18.5.3 Planning policy recommendations

This section of coast should be included within any future CCMA developed for the area due to both the potential future evolution and roll-back of Chesil Beach and the potential for the cliffed part of this section along West Weare to be subject to the risk of small scale, infrequent land slip events even with continued defence of the toe of the coastal slope. Reference should also be made to the national *Coastal Change Adaptation Planning Guidance* currently being developed for Defra in a project led by East Riding of Yorkshire Council and Halcrow (due to be published in 2013).

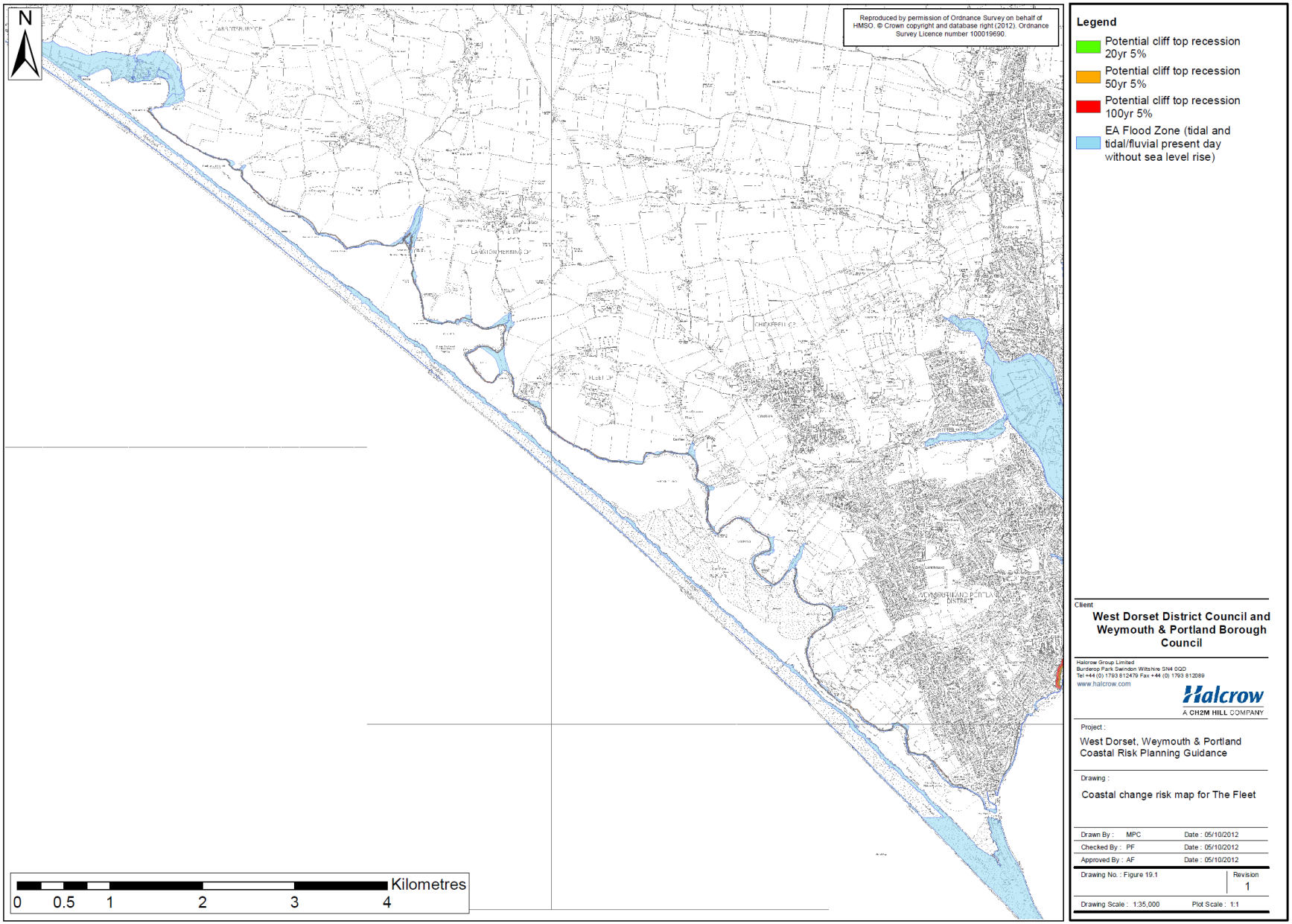
The availability of funding for continued defence along all of this section is uncertain. Therefore to continue to defend this area and so reduce coastal flood and erosion risk in the future, it is very likely that partnership funding will be required. This should be reflected in future policies for this area (refer to Section 1.3.2).

19 The Fleet

19.1 Risk zone mapping

The risk zone map for this section shows the following:

- 5% probability potential cliff top recession zones for 20, 50 and 100 years into the future (i.e. in any of the three periods, there is a 5% chance that some parts of the frontage will reach the landward limit of the defined zone).
- Environment Agency flood zone mapping for the present day (i.e. no sea level rise effects shown) from tidal and combined tidal-fluvial sources of flooding.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Legend
Potential cliff top recession 20yr 5%
Potential cliff top recession 50yr 5%
Potential cliff top recession 100yr 5%
EA Flood Zone (tidal and tidal/fluvial present day without sea level rise)
Kilometres
0 0.5 1 2 3 4
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Approved By : AF Date : 05/10/2012
Drawing No. : Figure 19.1
Revision 1
Drawing Scale : 1:35,000 Plot Scale : 1:1

19.2 Description of coastal area

This section is approximately 29.1km in length and encompasses the entire shoreline of The Fleet lagoon, from Small Mouth at Weymouth in the east to Abbotsbury in the west.

The western shoreline of The Fleet is occupied by Chesil Beach and is undeveloped. Chesil Beach also provides protection from wave action to the eastern shore of The Fleet.

The eastern shore of the Fleet lagoon is largely undefended and natural. This shoreline is comprised of low cliffs intersected by low-lying areas where small streams discharge into the Fleet. There are, however, some small areas of defence along this shoreline associated with providing localised access for management (and emergencies) by the Fleet Warden. The largest areas of defended shoreline are at the south-eastern end of the Fleet shoreline, notably at the Wyke Regis Bridging Camp and towards Ferrybridge at Small Mouth.

There is very little development within 100m of the shoreline, except for the hotel at Moonfleet; the Swannery at Abbotsbury; the Littlesea and Chesil Beach Holiday Parks at Weymouth; and the caravan park/camping grounds at East Fleet; all of which are located closer to the shoreline.

The South West Coastal Path runs either along or in close proximity to the shoreline along much of this section.

This area is designated for its geological and geomorphological features as part of the UNESCO Dorset and East Devon World Heritage Site. It is also within or in very close proximity to the South Dorset AONB; the Chesil Beach and The Fleet SAC; the Chesil Beach and The Fleet SPA; the Chesil Beach and The Fleet Ramsar site; the Lyme Bay and Torbay candidate SAC; and the Chesil Beach and Stennis Ledges recommended MCZ.

19.3 Shoreline Management Plan policy

This section is covered by SMP policy unit 6a04.

The SMP policy for this section is for **no active intervention** over the next 100 years.

This means that there is no expectation for constructing any flood or coastal protection measures along this section of coast over this period. As such, this section will be allowed to continue to evolve naturally.

The exception to this is the allowance for continued maintenance of localised infrastructure that is required to provide localised access along parts of The Fleet for management purposes.

The SMP also identifies that an event on the scale of the November 1824 'Great Gale' that caused wide spread damage along much of the Dorset coast, including extensive wave overtopping of Chesil Beach that destroyed the village of East Fleet and the ferry crossing at Wyke Regis (West, 2005) could occur again in the future.

19.4 Coastal change risks

19.4.1 Nature of the risks

The primary risk along this area is from erosion of the low-lying cliffs along the eastern shoreline of The Fleet.

There is also a risk of flooding in some low-lying parts of the shoreline, particularly at Abbotsbury.

In the longer term as sea levels rise, Chesil Beach will naturally roll-back towards the eastern shoreline of The Fleet. The Fleet will become smaller in size as a result. This natural evolution will result in an increased risk of Chesil Beach being overtopped or even breached during storm events more frequently than has occurred historically. This will increase the risk of flooding along the lower-lying parts of the eastern shoreline of The Fleet. This could also lead to greater wave action at the toe of the low-cliffs along the eastern shoreline, leading to increased coastal erosion in some parts. This would also impact upon the designated features of The Fleet, however as this is a natural change it is understood that there is no requirement to provide compensatory habitat for this loss.

19.4.2 Potential extent of risk

The low-cliffs along the eastern shore of The Fleet erode as a result of small-scale, very infrequent landslides. The assessment of cliff recession potential over the next 100 years defines a risk zone of 7m for this area (refer to Section 1.3.3 and Appendix A).

The areas at risk of flooding along localised parts of this section are defined by the Environment Agency's flood zone maps. The main flood risk area at present is around Abbotsbury Swannery, although much of this area is undeveloped. As sea levels rise other areas will become at increased risk of flooding, particularly towards Ferrybridge.

The roll-back of Chesil Beach towards the eastern shore of The Fleet is predicted to result in the eastward migration of the beach by between 50-120m over the next 100 years (Halcrow, 2010).

19.4.3 Timing/frequency of risk occurrence

The low-cliffs along this section erode as a result of small-scale, very infrequent landslides that occur every 10-100 years (Halcrow, 2011a).

Flooding of the low-lying part of this section could occur at any time. As sea levels rise, the probability and extent of flooding is expected to increase.

The probability of flooding by overtopping or breaching of Chesil Beach during large storm events is uncertain as the processes that result in flooding from this pathway are not fully understood. As Chesil Beach rolls-back towards the eastern shore of The Fleet in the longer-term, the probability flooding via this pathway is expected to increase.

19.4.4 Existing assets at risk

Along this section, there is very low risk to permanent development from erosion over the next 100 years.

There is, however, potential for seaward parts of holiday parks and campsites and the coastal path to be eroded, depending upon where future erosion events occur along the shoreline. Adaptation in these areas to relocate caravans would be needed. This would need to be implemented in accordance with Draft Local Plan policy ECON 7 CARAVAN AND CAMPING SITES.

The main assets at risk of coastal flooding are at Abbotsbury Swannery and Ferrybridge towards Small Mouth, particularly if existing defences at the latter are not maintained as sea levels rise.

19.4.5 Future planned developments at risk

The 2005 Adopted Local Plan (Weymouth & Portland Borough Council, 2005) identifies the southern shoreline of The Fleet (between the Weymouth & Portland and West Dorset local authority boundary and Ferry Bridge) as being within a DDB. This DDB has been saved in the Draft Local Plan and therefore future development within this area could be affected by future coastal change.

There are no other planned developments in this area within the Draft Local Plan.

19.5 Recommendations for development management

19.5.1 Development constraints

Based upon the available data assessed in developing this coastal risk planning guidance, the following constraints on development are recommended along this section of coast:

- No permanent development should occur in the areas at risk of erosion along the cliff top or the coastal slope seawards of the defined erosion bands.
- Time-limited planning consent for a limited range of developments is most appropriate within these risk zones.
- Any development that does occur will need to be appropriate for the area given the expected timing of future risks, and should be limited in its size and extent. It should also consider the general advice provided in Section 1.3.4.
- Any development should also demonstrate how it will adapt to future coastal change risks, including how it can be safely removed in advance of its loss to coastal change or how it is adapted for future flood risk in line with the requirements of Draft Local Plan policy ENV 5 FLOOD RISK.
- The types of development likely to be appropriate in this area are short term holiday lets or camping/caravan sites or facilities associated with tourism and leisure (e.g. cafes etc.). Extensions to existing properties may also be appropriate.
- Any time-limited planning consent should include re-appraisal periods to enable the consent period to be extended or reduced, depending upon the actual rate of coastal change experienced in the future.

Should an applicant be able to robustly demonstrate that the data underpinning this coastal risk planning guidance is inaccurate in an area of proposed development, then approval of planning applications could be granted.

19.5.2 Planning application requirements

In addition to complying with all other relevant West Dorset or Weymouth & Portland Planning Application Requirements (West Dorset District Council, 2011; Weymouth & Portland Borough Council, 2008), planning applications along this section will also need to provide the following evidence:

- Geotechnical Appraisal will be required for any development that proposes to construct any form of structure or proposes to discharge water (e.g. via soakaways) within, or in close proximity to, the risk zones identified for this section. All proposed developments that meet these criteria should submit a geotechnical appraisal to demonstrate that the development would not have an adverse effect on the stability of the coastal slope and so the safety and serviceability of the development itself or surrounding area/properties.

  The Geotechnical Appraisal Report advice and template provided in Appendix B should be used to ensure that the required information is provided by developers.

- Vulnerability Assessment to demonstrate that the development is unlikely to be at risk from coastal change within the period for which time-limited planning consent is being sought. This should relate to the evidence provided in the Geotechnical Appraisal.

- Flood Risk Assessment in line with the requirements of the National Planning Policy Framework Technical Guidance (Department for Communities & Local Government, 2012b) if proposed development is within or close to a defined flood zone (e.g. Abbotsbury Swannery area and Ferrybridge).

  As part of this, it should be demonstrated that for developments within a defined flood zone that measures have been considered to ensure the resiliency of the development to flooding in line with best practice guidance provided by CIRIA at www.ciria.org/flooding/flood_performance.html and/or www.ciria.org/flooding/advice_sheets.html.

19.5.3 Planning policy recommendations

This section of coast should be included within any future CCMA developed for the area. The CCMA should consider the development constraints defined in Section 19.5.1 as well as options to facilitate the relocation of existing properties and other assets such as caravans (refer to Section 19.4.4) within the defined erosion risk zones. Reference should also be made to the national *Coastal Change Adaptation Planning Guidance* currently being developed for Defra in a project led by East Riding of Yorkshire Council and Halcrow (due to be published in 2013).