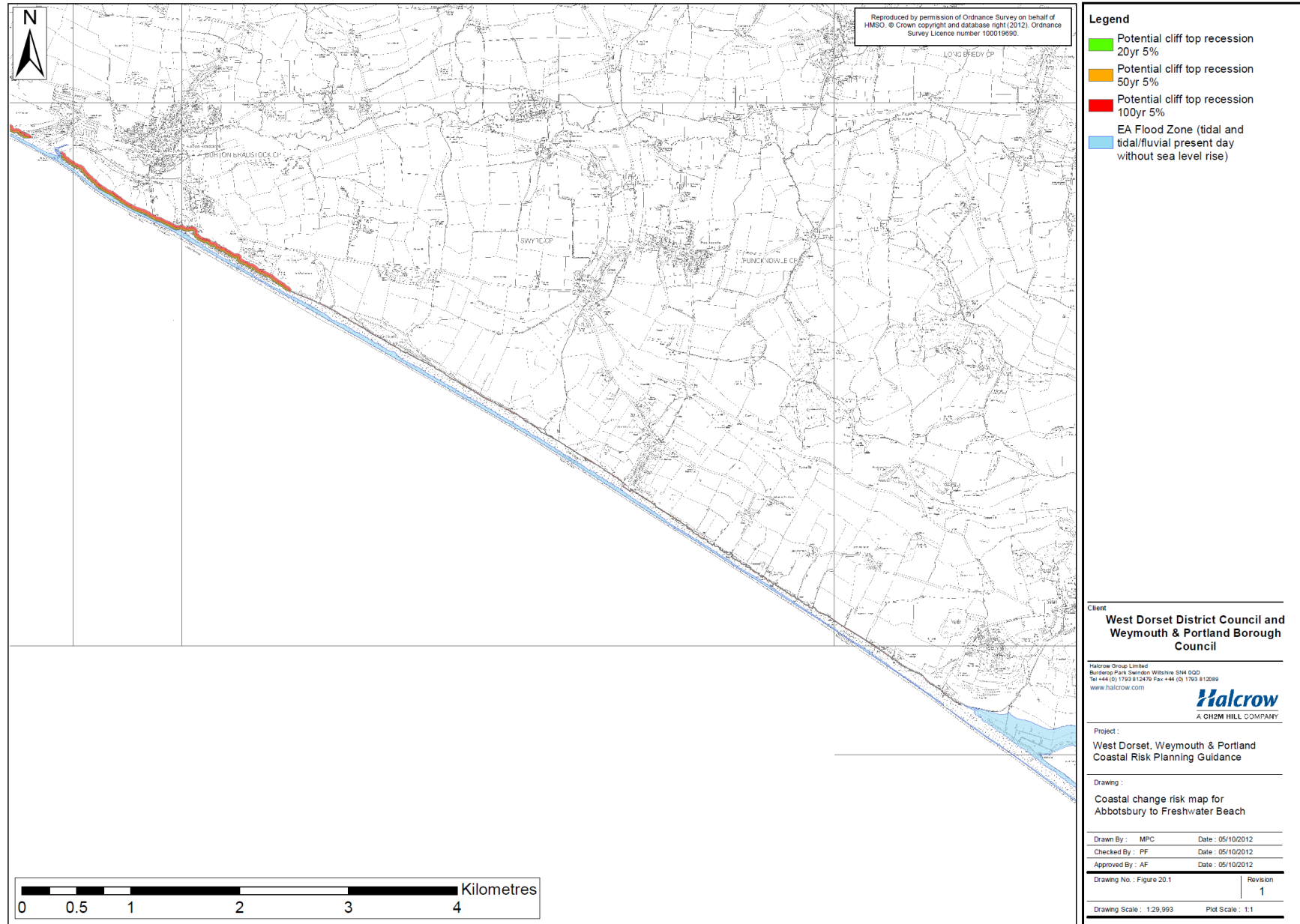


20 Abbotsbury to Freshwater Beach

20.1 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.



20.2 Description of coastal area

This section extends from Abbotsbury in the east to Freshwater Beach at Burton Bradstock in the west, giving a frontage length of approximately 10.5km.

The coastline is largely undeveloped and natural, and is comprised of a variety of actively eroding clay and sandstone cliffs and currently dormant relict coastal slopes, all fronted by Chesil Beach.

There are a number of localised areas of development along this section, notably the car park and facilities at Abbotsbury located immediately behind the beach; the village of West Bexington and in particular the West Dorset District Council car park that has been constructed on top of Chesil Beach on the seaward side of the village; and the car park and restaurant at Hive Beach, Burton Bradstock.

There are also several individual properties located at various points along this section on the coastal slope and cliff top, particularly the eastern end of Burton Cliff by Hive Beach where a small length of gabion defences have been constructed at the cliff toe to protect against erosion.

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.

20.3 Shoreline Management Plan policy

This section is covered by SMP policy units 6a05, 6a06, 6a07 and 6a08.

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.

20.4 Coastal change risks

20.4.1 Nature of the risks

The primary risk along this frontage is future erosion of the various active cliffs and potential reactivation of currently dormant relict coastal slopes.

In places such as Burton Cliff at Burton Bradstock, this risk is related to wave action at the cliff toe causing undercutting and rock falls. In other parts of this section the risk is more related to groundwater levels, although wave action at the cliff toe is a key factor in ongoing instability. The degree of wave action at the toe of the cliffs and coastal slopes varies along this section with protection being provided by Chesil Beach, particularly towards the south-eastern end of this section along the base of the currently dormant relict cliffs.

As sea levels rise, Chesil Beach could begin to roll-back landwards in areas where it is backed by low-lying land. However, in areas where the beach is backed by rising ground, then the beach will become naturally squeezed against leading to a much narrower beach in these areas. Where this occurs, this will increase the exposure of the toe of the cliffs and coastal slopes to wave action along a greater length of this section.

This squeeze effect will also present a risk to the car park at West Bexington that could become undermined by lowering beach levels in front of this structure.

20.4.2 Potential extent of risk

The extent of erosion risk along this section varies depending upon the nature of the cliffs and coastal slopes. It will also be affected by the rate of sea level rise and the amount of narrowing of Chesil Beach that this results in.

The assessment of cliff recession potential over the next 100 years identifies that the active clay cliffs along this section could erode by up to 50m over this period, whilst the more resistant sandstone Burton Cliff at the north-western end of this section could erode by up to 40m over the same period (refer to Section 1.3.3 and Appendix A).

Whilst there is insufficient data about the currently dormant relict coastal slopes along the south-east part of this section to enable robust prediction of future coastal change, assessment of cliff recession potential over the next 100 years defines a risk zone of 8m for this area (refer to Section 1.3.3 and Appendix A), although this will be highly dependent upon the amount of narrowing that occurs along Chesil Beach over the next 100 years.

20.4.3 Timing/frequency of risk occurrence

The risk of erosion in the immediate future is towards the north-western part of this section where Chesil Beach is already narrow against the base of Burton Cliff and cliff falls occur periodically in localised sections about every 10 years, with up to 10m of cliff top recession resulting in a single event. As sea levels rise, the frequency of cliff fall events is not expected to alter significantly (Halcrow, 2011a).

The simple low clay cliffs to the south-east of Hive Beach are also actively eroding. These clay cliffs receded as a result of groundwater levels and experience infrequent landslides every 10-100 years (Halcrow, 2011a).

As sea levels rise and Chesil Beach is squeezed against the rising ground that backs it, particularly along the south-eastern part of this section, then the amount of wave action at the toe of the currently dormant relict coastal slope could increase in the future. This in turn could result in increased potential for reactivation of the dormant relict coastal slope and so the risk of coastal slope instability in these areas in the longer term.

20.4.4 Existing assets at risk

Cliff erosion along Burton Cliff poses a risk to properties along the cliff top, with loss of property likely to occur within 50-100 years.

As Chesil Beach rolls-back in the longer term, the car parks and properties at Abbotsbury and Hive Beach could be affected by the beach migrating to these lower-lying areas.

At West Bexington, the car park may constrain beach roll-back processes and this could result in draw-down of the beach levels in front of this structure during storm events and lead to an increased risk of undermining. Any future plans to replace the car park should consider alternative locations inland.

Properties along this section located on the coastal slope could become at risk of increased instability in the longer term if sea level rise results in narrowing of Chesil Beach and so increased exposure of the toe of the slope to wave action.

20.4.5 Future planned developments at risk

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

20.5 Recommendations for development management

20.5.1 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 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. 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.

20.5.2 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:

- 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.

20.5.3 Planning policy recommendations

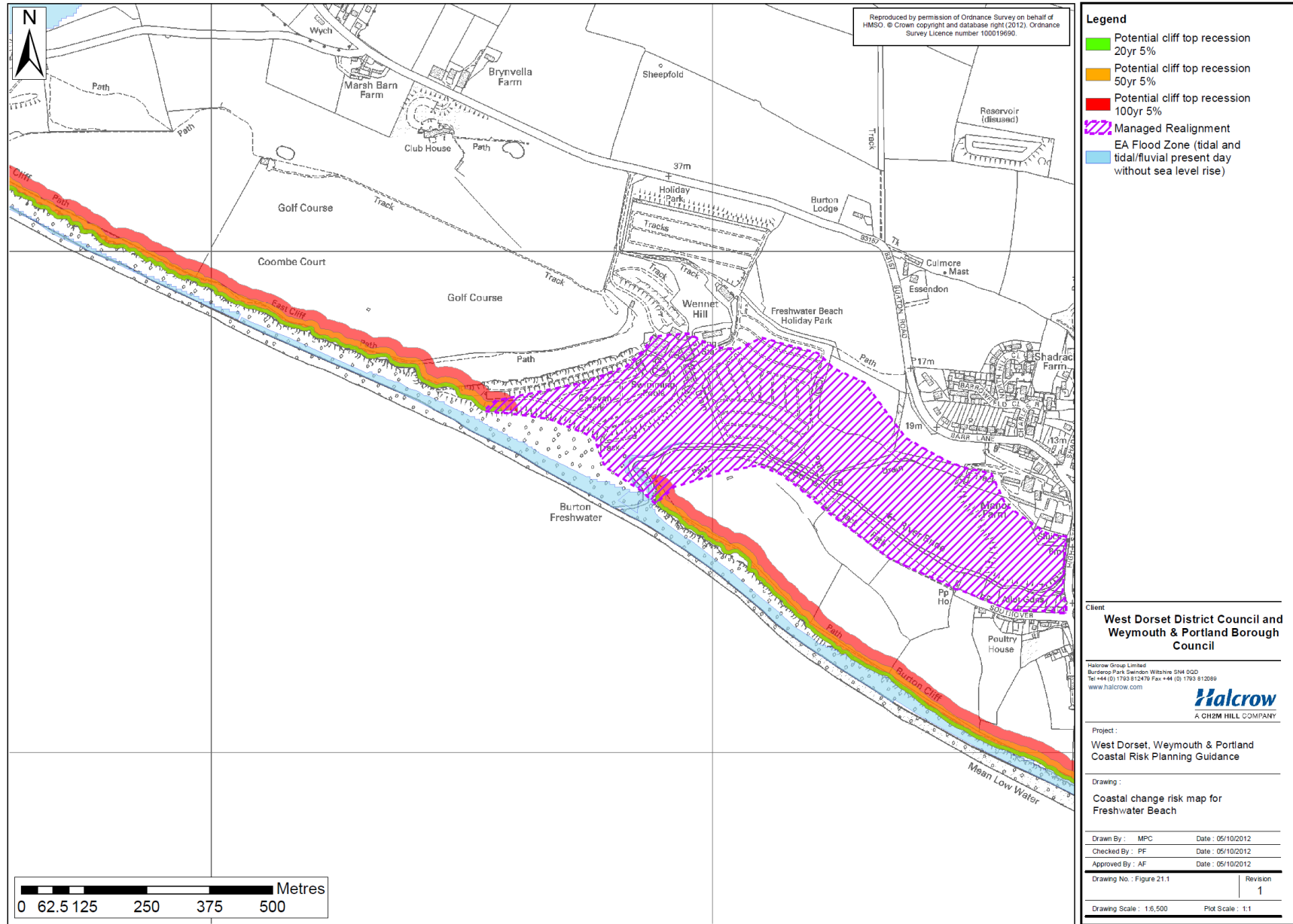
This section of coast should be included within any future CCMA developed for the area. The CCMA should consider the development constraints defined in Section 20.5.1 as well as options to facilitate the relocation of existing properties and other assets within the defined erosion risk zones. Reference 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).

21 Freshwater Beach

21.1 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.



21.2 Description of coastal area

This section extends along Freshwater Beach between the sandstone cliffs of Burton Cliff to the east and East Cliff to the west, covering a frontage approximately 0.4km in length.

The mouth of the River Bride discharges to the sea against the base of Burton Cliff at the eastern end of this section. The mouth of the river is managed by the Environment Agency as part of the flood risk management for the village of Burton Bradstock located a short distance in land. These flood risk management measures also include maintenance of a series of flood embankments along the River Bride.

The remainder of this section is comprised of shingle beach. The Freshwater Beach Caravan Park occupies the land atop and behind the beach. The caravan park is also largely protected from flooding by the Environment Agency's flood embankments.

The South West Coastal Path runs along parts 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; and the Lyme Bay and Torbay candidate SAC.

21.3 Shoreline Management Plan policy

This section is covered by SMP policy unit 6a09.

The SMP policy for this section is for **managed realignment** of the beach over the next 100 years in order to continue to manage the risk of flooding to Burton Bradstock.

This policy enables controlled realignment of the beach position in line with the retreat of the adjacent cliffs located on either side of the beach.

This policy also identifies the likely need to construct a secondary defence line inland between the mouth of the River Bride and Burton Bradstock in order to provide long-term flood risk management to Burton Bradstock.

21.4 Coastal change risks

21.4.1 Nature of the risks

The risks to this section are from tidal/fluvial flooding via the River Bride and erosion of the beach as sea levels rise. The sandstone cliffs at either end of this section erode as a result of wave undercutting at the cliff toe that lead to localised rock falls.

There is also a risk of the beach area being outflanked by erosion of the adjacent undefended cliffs if Freshwater Beach is constrained in any way from adapting its position in line with this cliff retreat (i.e. artificially held in its current position whilst the adjacent cliffs erode landwards).

21.4.2 Potential extent of risk

The assessment of cliff recession potential over the next 100 years identifies that the sandstone cliffs at either end of this section could erode by upto 40m over this period (refer to Section 1.3.3 and Appendix A).

The area at risk of flooding encompasses much of this section including the area along the River Bride and parts of the Caravan Park. 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 (Halcrow, 2008).

In order to facilitate future realignment of the shoreline along this section, and to enable construction of a secondary defence line to manage the risk of flooding to Burton Bradstock in the longer-term, an area of land between the existing shoreline and the B3157 High Street at Burton Bradstock should be set-aside for this purpose.

Further detailed study is required to determine the exact position of any future secondary defence line. This will ultimately be guided by the extent and rate of retreat of Freshwater Beach and the adjacent cliffs.

21.4.3 Timing/frequency of risk occurrence

The management of the beach along this section to implement the SMP policy will be an ongoing operational requirement. The SMP predicts that construction of a secondary defence line to provide longer term management of flood risk to Burton Bradstock will be required within the next 20-50 years. This depends upon the rate of retreat of sea level rise and how the beach responds to this, as well as the rate of retreat of the adjacent cliffs (Halcrow, 2011a).

21.4.4 Existing assets at risk

The managed realignment of the beach as the adjacent cliffs erode primarily poses a risk to the more seaward parts of the Freshwater Beach Caravan Park, which will be lost as the beach migrates landwards. Adaptation along this section would require relocation of caravans within the area of Freshwater Bay Caravan Park. This would need to be implemented in accordance with Draft Local Plan policy ECON 7 CARAVAN AND CAMPING SITES.

The risk of coastal flooding to Burton Bradstock will remain managed if the SMP policy is implemented. This will be supported by the construction of a secondary defence line in the next 20-50 years. In order to facilitate future construction of a secondary defence line, an area of land between Burton Bradstock and the mouth of the River Bride will need to be set-aside for this purpose. This area currently utilised by the Freshwater Beach Caravan Park.

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

21.4.5 Future planned developments at risk

Any plans for managing coastal flood risk to Burton Bradstock will have to consider potential implications for Draft Local Plan policy ENV 6 BURTON BRADSTOCK FLOOD ALLEVIATION SCHEME which aims to implement measures to manage surface water flood risk.

The area defined as the maximum extent within which Managed Realignment would be expected to occur, is immediately adjacent to (but does not encroach into) the south western edge of the Burton Bradstock DDB.

21.5 Recommendations for development management

21.5.1 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 within the zone identified for accommodating future realignment.
- Time-limited planning consent for a limited range of developments is most appropriate within this 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. 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 short term holiday lets or camping/caravan sites or facilities associated with tourism and leisure (e.g. cafes, entertainment 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.

21.5.2 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:

- 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.

21.5.3 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 21.5.1 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 both (a) 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) 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.

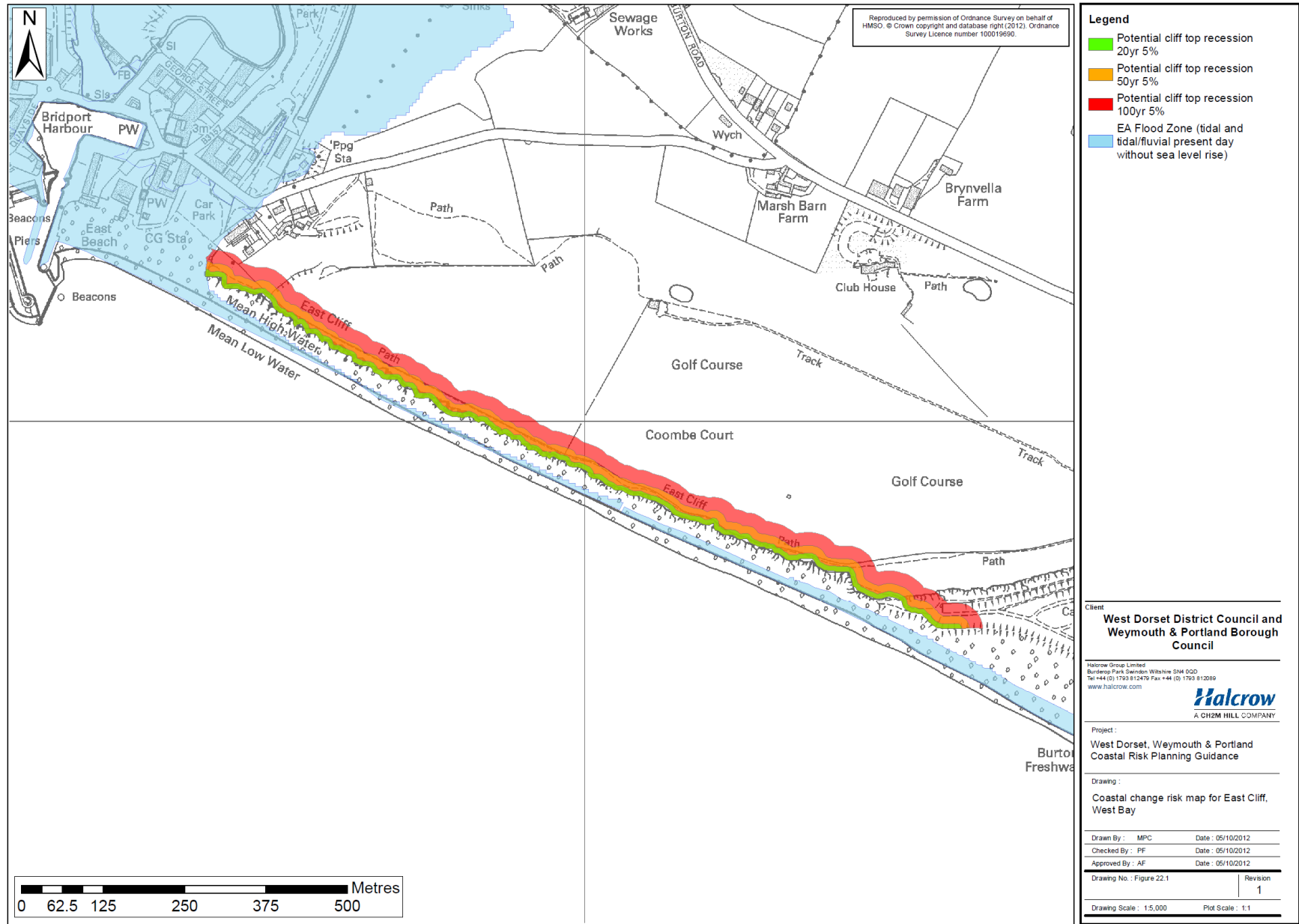
The availability of funding for continued defence along all of this section is uncertain. Therefore to continue to defend this area and so reduce coastal flood and erosion risk in the future, it is very likely that partnership funding will be required. This should be reflected in future policies for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

22 East Cliff, West Bay

22.1 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.



22.2 Description of coastal area

This section extends along the sandstone East Cliff between Freshwater Beach at Burton Bradstock and East Beach at West Bay, covering a frontage approximately 1.1km in length.

This section is completely natural and undefended, and is fronted by a narrow shingle beach at the cliff toe.

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

Landwards of the coast path is Bridport & West Dorset Golf 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 or in very close proximity to the South Dorset AONB; the Chesil Beach and The Fleet SAC; and the Lyme Bay and Torbay candidate SAC.

22.3 Shoreline Management Plan policy

This section is covered by SMP policy unit 6a10.

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.

22.4 Coastal change risks

22.4.1 Nature of the risks

This section is at risk of erosion by localised rock falls that result from wave undercutting at the base of the cliff.

22.4.2 Potential extent of risk

The assessment of cliff recession potential over the next 100 years identifies that East Cliff could erode by upto 45m over this period (refer to Section 1.3.3 and Appendix A).

22.4.3 Timing/frequency of risk occurrence

Cliff falls occur periodically in localised parts of this section about every 10 years, with upto 10m of cliff top recession resulting in a single event. As sea levels rise, the frequency of cliff fall events is not expected to alter significantly (Halcrow, 2011a).

22.4.4 Existing assets at risk

The only assets at risk of erosion are the seaward parts Bridport & West Dorset Golf Club and parts of the coastal path.

22.4.5 Future planned developments at risk

The 2006 Adopted Local Plan (West Dorset District Council, 2006) identifies the area of West Bay 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 along the western part of East Cliff.

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

22.5 Recommendations for development management

22.5.1 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.
- 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. 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.

22.5.2 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:

- 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.

22.5.3 Planning policy recommendations

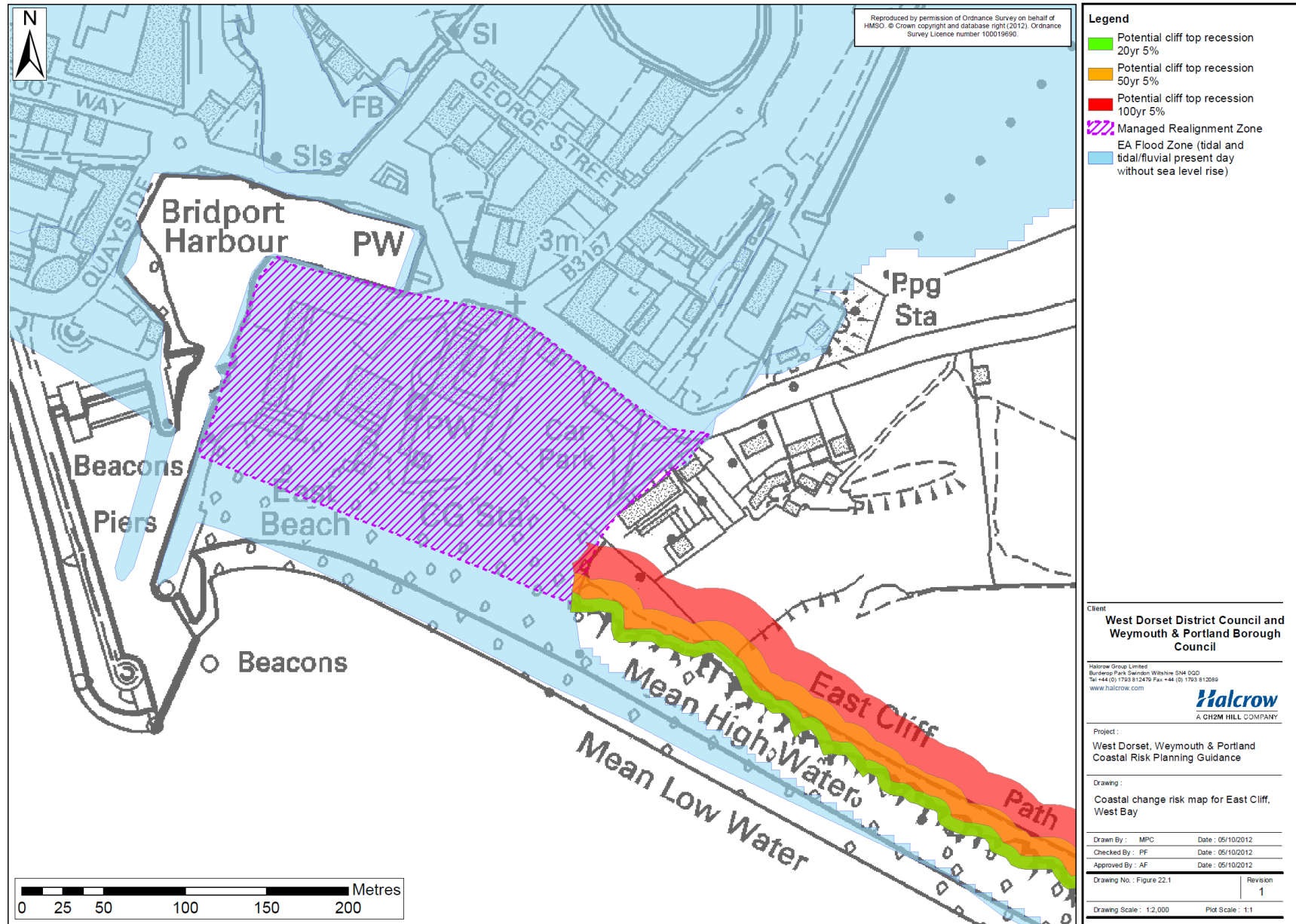
This section of coast should be included within any future CCMA developed for the area. The CCMA should consider the development constraints defined in Section 22.5.1 as well as options to facilitate the relocation of existing properties and other assets within the defined erosion risk zones. Reference 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).

23 East Beach, West Bay

23.1 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.



23.2 Description of coastal area

This section covers East Beach at West Bay, which extends approximately 0.2km between East Cliff to the east and West Bay Harbour entrance to the west.

The beach is managed to provide protection against the risk of flooding to West Bay but there are no hard defences (e.g. seawalls) along this frontage. The flood protection relies upon a sufficient volume of beach material being retained along this frontage. This is managed by regular beach management works undertaken by the Environment Agency.

The beach is a popular amenity beach in summer months. The land behind the beach is low-lying and occupied by a range of residential and commercial properties, as well as a public car park operated by West Dorset District Council and infrastructure to support marine industry, including fishing, that operates from West Bay Harbour and which is located along the harbour walls behind East Beach.

The South West Coastal Path also runs along 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; and the Lyme Bay and Torbay candidate SAC.

23.3 Shoreline Management Plan policy

This section is covered by SMP policy unit 6a11.

The SMP policy is to continue to protect the wider West Bay against the risk of flooding.

Along East Beach, it is expected that to continue to rely on a managed beach to provide the required level of flood protection along the existing alignment will become unsustainable at some point over the next 100 years, particularly as sea levels rise and the adjacent East Cliff erodes.

As such, the policy for East Beach is to **hold the line** of the beach for as long as possible but once this becomes technically and economically difficult, to implement a transitional policy of **managed realignment** to a new defence line inland that will then be maintained under a longer-term policy of **hold the line**.

This policy also identifies the likely need to construct a harder defence line landwards of the existing beach position in order to provide long-term flood risk management to the wider West Bay.

23.4 Coastal change risks

23.4.1 Nature of the risks

The risks to this section are from flooding as a result of erosion and overtopping of the beach during storm events, a risk that will increase as sea levels rise.

The adjacent sandstone East Cliff will continue to erode as a result of wave undercutting at the cliff toe that lead to localised rock falls. As this occurs, there is also a risk of East Beach being outflanked if East Beach is constrained in any way

from adapting its position in line with this cliff retreat (i.e. artificially held in its current position whilst the adjacent cliff erodes landwards).

23.4.2 Potential extent of risk

The adjacent East Cliff could erode by upto 45m over the next 100 years (refer to Section 22.4.2).

The area at risk of flooding encompasses much of the eastern side of West Bay for some distance inland. 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 (Halcrow, 2008).

In order to facilitate future realignment of the shoreline along this section, and to enable construction of a new defence line to manage the risk of flooding to the wide West Bay in the longer-term, an area of land immediately behind the existing shoreline 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 East Beach as sea levels rise and the rate of erosion of the adjacent cliff.

23.4.3 Timing/frequency of risk occurrence

The management of the beach along this section to implement the SMP policy will be an ongoing operational requirement. The SMP predicts that construction of a new defence line to provide longer term management of flood risk to Burton Bradstock will be required within the next 50-100 years. This depends upon the rate of retreat of sea level rise and how the beach responds to this, as well as the rate of retreat of the adjacent cliff (Halcrow, 2011a). It is possible that a new defence line could be required much sooner than predicted in the SMP.

23.4.4 Existing assets at risk

In order to facilitate future realignment of the defence line along this section, the area of land between the existing defence line at East Beach and the B3157 should be considered for being set-aside for this purpose. This area currently includes many residential and commercial properties, East Beach Car Park and the eastern side of the infrastructure around West Bay Harbour.

The armouring of the frontage with harder defences instead of beach material may also impact the amenity and tourism value of East 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 part of future realignment.

23.4.5 Future planned developments at risk

The 2006 Adopted Local Plan (West Dorset District Council, 2006) identifies the area of West Bay 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.

23.5 Recommendations for development management

23.5.1 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 within the zone identified for accommodating future realignment.
- Time-limited planning consent for a limited range of developments is most appropriate within this 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. 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 short term holiday lets or camping/caravan sites or facilities associated with tourism and leisure (e.g. cafes, entertainment 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.

23.5.2 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:

- 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.

23.5.3 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 23.5.1 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 public space requirements of the area; 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.

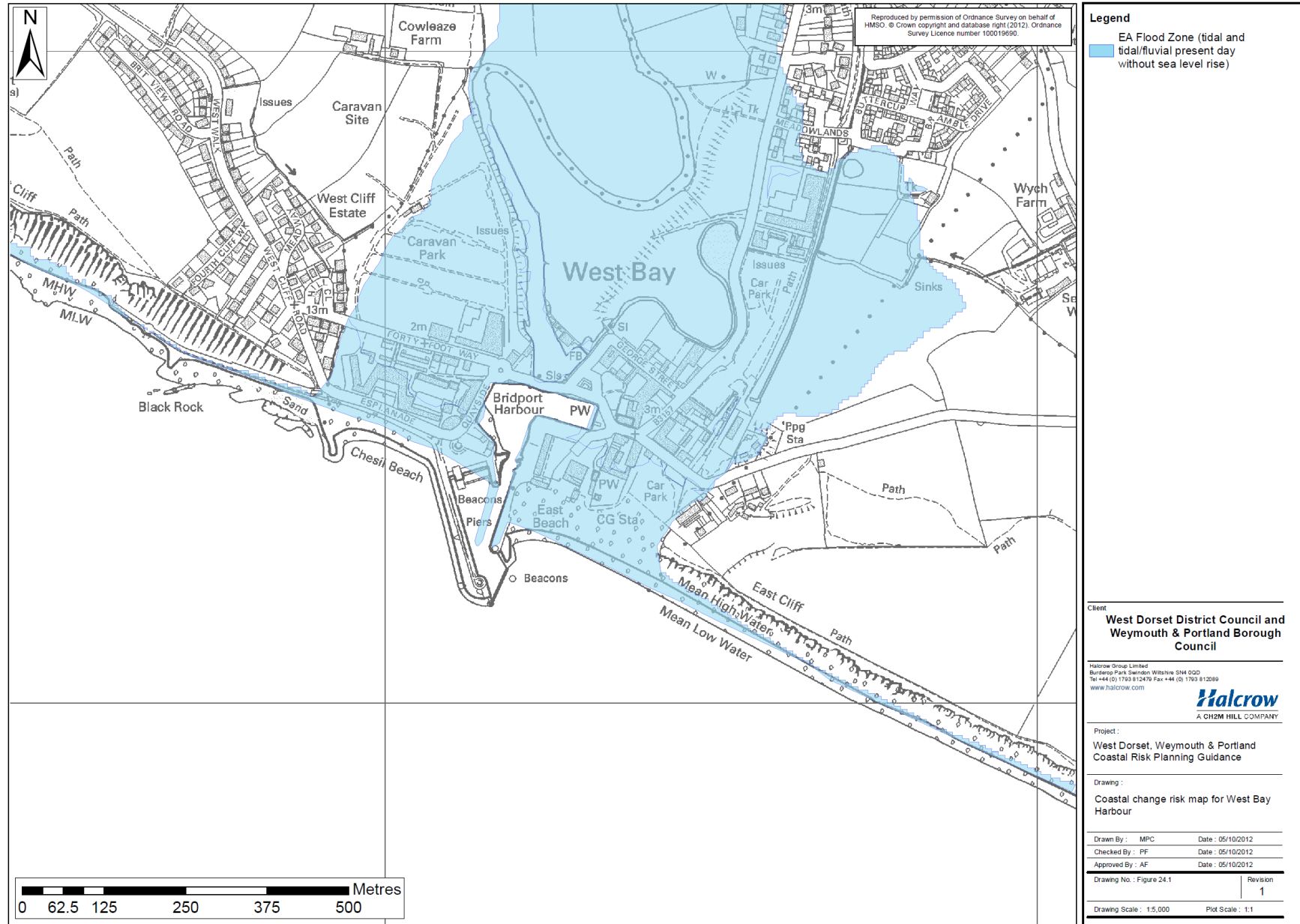
The availability of funding for continued defence along all of this section is uncertain. Therefore to continue to defend this area and so reduce coastal flood and erosion risk in the future, it is very likely that partnership funding will be required. This should be reflected in future policies for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

24 West Bay Harbour

24.1 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.



24.2 Description of coastal area

This section encompasses the area occupied by West Bay Harbour, covering a frontage approximately 0.7km in length.

West Bay Harbour provides a completely artificial mouth to the River Brit that discharges to the sea via the harbour through a culvert located on the northern side of the harbour. This culvert is used by the Environment Agency to manage flood risk upstream of West Bay towards the town of Bridport.

The harbour was largely re-developed as part of the West Bay Coastal Defence and Harbour Improvement Scheme implemented by West Dorset District Council in 2005.

The harbour is a working harbour with a small fishing fleet and tourist and dive charters operating from the harbour.

Around the perimeter of the harbour are a number of commercial and residential properties, as well as the quayside road that links the western and eastern sides of West Bay.

This section is within or in very close proximity to the UNESCO Dorset and East Devon World Heritage Site; the South Dorset AONB; the Chesil Beach and The Fleet SAC; the Sidmouth to West Bay SAC; and the Lyme Bay and Torbay candidate SAC.

24.3 Shoreline Management Plan policy

This section is covered by SMP policy unit 6a12.

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.

24.4 Coastal change risks

24.4.1 Nature of the risks

The risk to this area is from flooding as a result of storm surge events causing overflow of the harbour walls.

There is also a risk to this area from flooding via the adjacent East Beach (refer to Section 23) and West Beach (refer to Section 25) frontages.

24.4.2 Potential extent of risk

The area at risk of flooding encompasses much of the West Bay area and extends for some distance inland up the River Brit. 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 (Halcrow, 2008).

24.4.3 Timing/frequency of risk occurrence

Flooding of this section could occur at any time. The probability of a large event causing significant overflow of the harbour walls is currently low, although this will increase as sea levels rise and therefore higher harbour walls or alternative flood control measures will be required to counter the effects of rising sea levels.

24.4.4 Existing assets at risk

The variety of commercial and residential properties and infrastructure located around West Bay Harbour are all at risk of flooding.

24.4.5 Future planned developments at risk

The 2006 Adopted Local Plan (West Dorset District Council, 2006) identifies the area of West Bay 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.

24.5 Recommendations for development management

24.5.1 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.

24.5.2 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:

- 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.

24.5.3 Planning policy recommendations

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

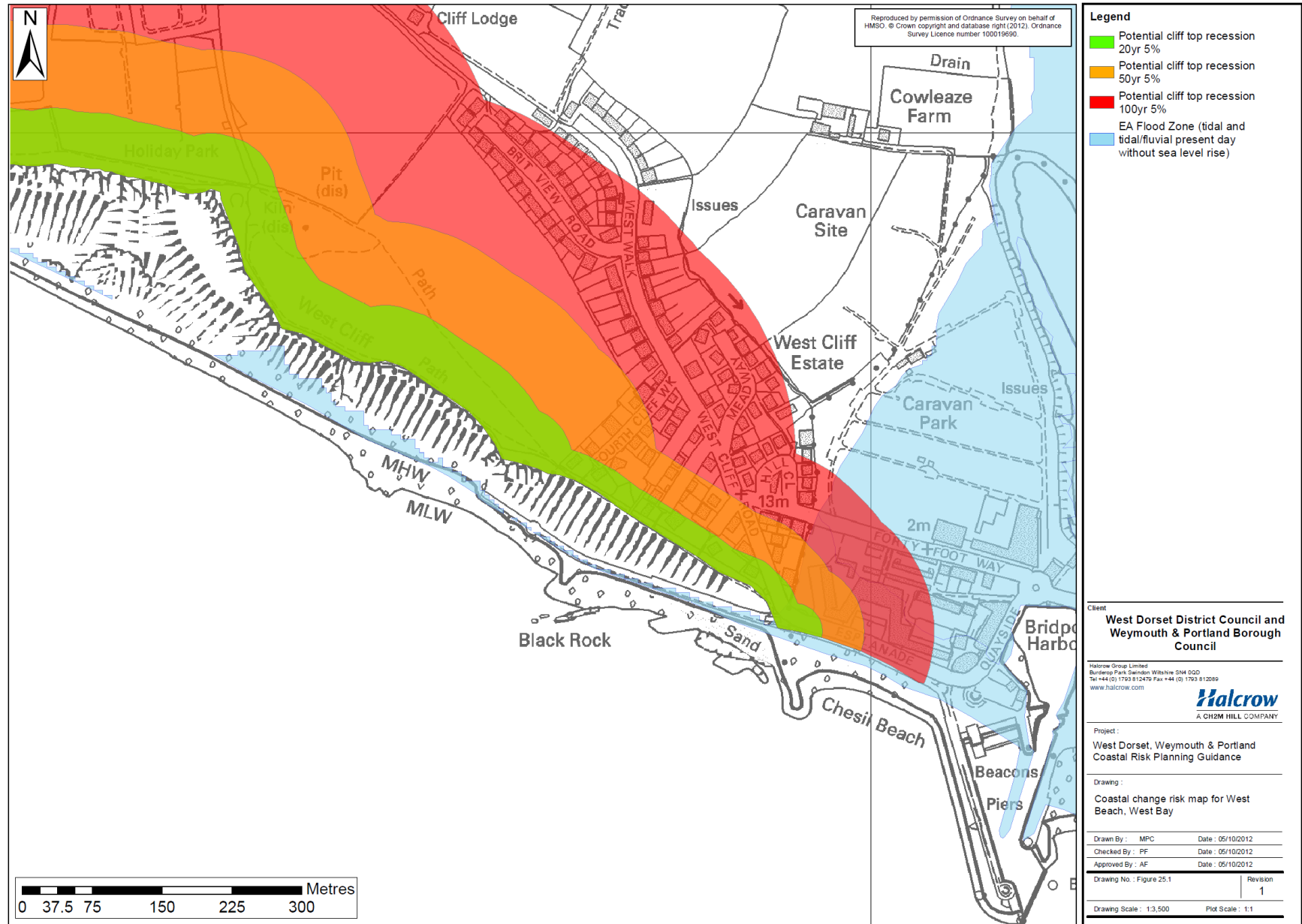
The availability of funding for continued defence along all of this section is uncertain. Therefore to continue to defend this area and so reduce coastal flood risk in the future, it is very likely that partnership funding will be required. This should be reflected in future policies for this area (refer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

25 West Beach, West Bay

25.1 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.



25.2 Description of coastal area

This section extends from the western side of West Bay Harbour entrance to the western end of the seawall adjacent to West Cliff, covering a frontage approximately 0.6km in length.

The entire length is defended by seawalls, rock revetment, rock groynes, slope stabilisation measures and recharged beach that have been constructed by West Dorset District Council over the years.

The seawall that extends along this section is topped by a promenade used by pedestrians. Along the eastern part of this section, the promenade is backed by lower-lying land that includes residential properties and a local highway that provides access to properties.

Along the western part of this section the defences are located at the base of high ground that rises up to form West Cliff. The cliff slope in this area is stabilised against the risk of land slip events and atop this there are a number of residential properties that are accessed by West Cliff Road.

The South West Coastal Path also runs along the seawall and atop West Cliff within this section.

This western part of this section area is also 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 Sidmouth to West Bay SAC; and the Lyme Bay and Torbay candidate SAC.

25.3 Shoreline Management Plan policy

This section is covered by SMP policy unit 6a12.

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.

25.4 Coastal change risks

25.4.1 Nature of the risks

The eastern part of this section is at risk of flooding by wave overtopping of the seawall. 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 beach along this part is artificial and will need ongoing recharge in the future in order to retain a beach here as sea levels rise. If beach recharge in the future is not viable, the beach along this frontage would be expected to experience coastal squeeze and become much narrower as a result (Halcrow, 2012b).

The western part of this section could be at risk of land instability due to groundwater levels should the slope stabilisation measures not be maintained in the future. This risk would be increased if the defences at the base of the cliff were not to be maintained.

There is also a risk of the defences along this section being outflanked by the future recession of the adjacent undefended West Cliff further to the west.

25.4.2 Potential extent of risk

The area currently at risk of flooding in the eastern part of this section is defined by the Environment Agency's flood zone map. The extent of future flood risk is demonstrated in the SFRA (Halcrow, 2008).

Assuming that defences along West Cliff are maintained, then the risk of future land slip events occurring in this area is likely to remain low. However, the risk of land slip events occurring along the adjacent undefended West Cliff causing outflanking of this section, particularly at the western end of the defences, will increase as sea levels rise. The assessment of recession potential over the next 100 years for West Cliff defines a risk zone of 300m for this area (refer to Section 1.3.3 and Appendix A), reflecting the potential for outflanking to occur from the west.

25.4.3 Timing/frequency of risk occurrence

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

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

The risk of outflanking of the defences at the western end as a result of future recession of the adjacent undefended West Cliff will increase over time.

25.4.4 Existing assets at risk

The range of residential and commercial properties and infrastructure such as road and public paths are at risk of flooding in the eastern part of this section.

Should defences not be maintained along the western part of this section, then there are a number of residential cliff top properties at risk of erosion.

Some of these cliff top properties, particularly those towards the western side of West Bay along West Walk and Brit View Road could be at risk of erosion from the future recession of the undefended West Cliff area that is adjacent to this section.

The loss of beach along the eastern part of this section as sea levels rise, if not countered with beach recharge, will also denude a vital tourism asset that is the beach and so this could impact upon the local economy.

25.4.5 Future planned developments at risk

The 2006 Adopted Local Plan (West Dorset District Council, 2006) identifies the area of West Bay 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.

25.5 Recommendations for development management

25.5.1 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 this 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 erosion risk zone are short term holiday lets or camping/caravan sites or facilities associated with tourism and leisure (e.g. cafes, entertainment 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 West Cliff.
- Along the floodable eastern part of this section, there will 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.

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.

25.5.2 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:

- 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.

25.5.3 Planning policy recommendations

The western cliffed part of this section of coast should be included within any future CCMA developed for the area, reflecting the potential erosion of this area from future cliff recession of the adjacent undefended West Cliff. The CCMA should consider the development constraints defined in Section 25.5.1 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).

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

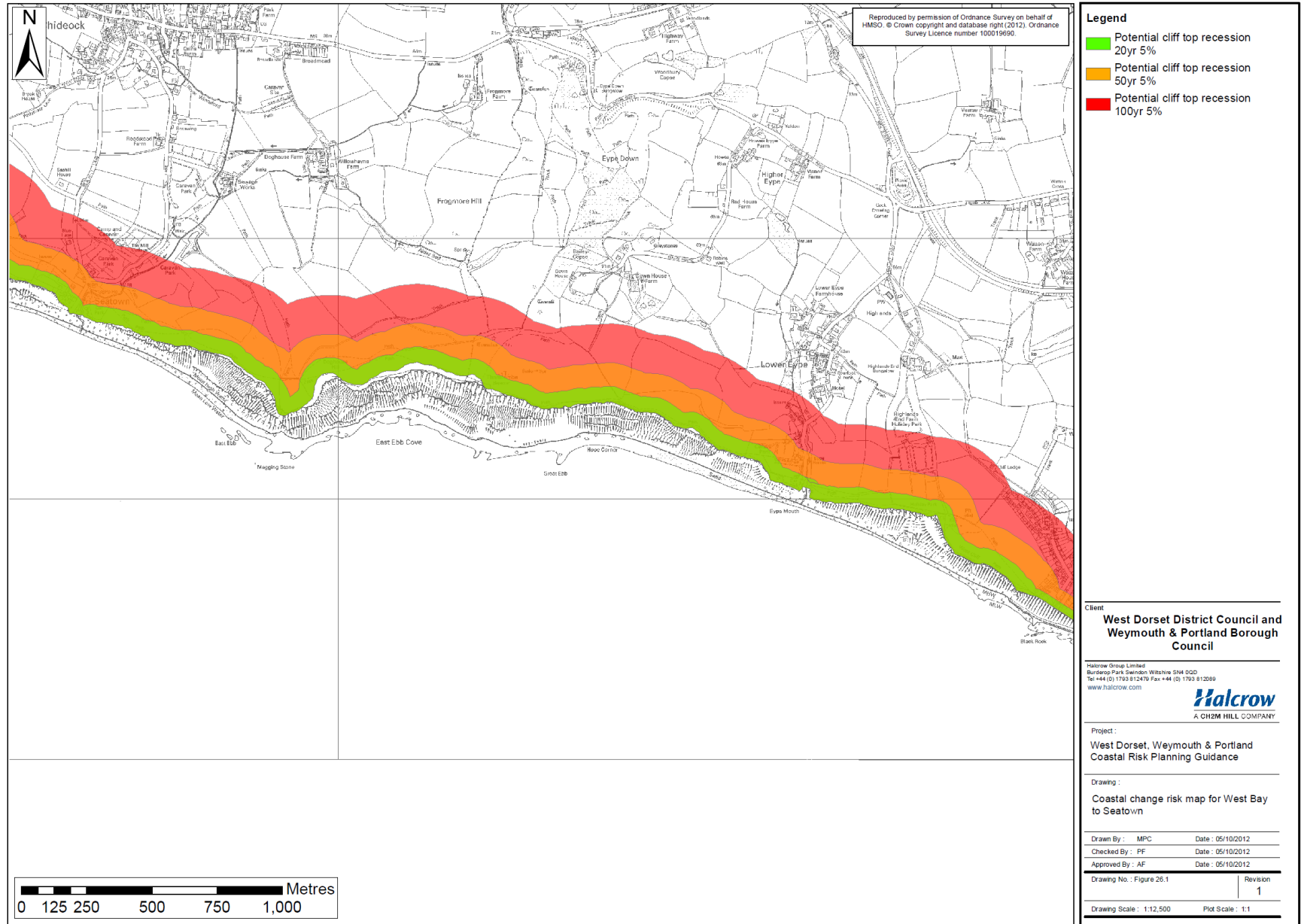
The availability of funding for continued defence along all of this section is uncertain. Therefore to continue to defend this area and so reduce coastal flood and erosion risk in the future, it is very likely that partnership funding will be required. This should be reflected in future policies for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

26 West Bay to Seatown

26.1 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).



26.2 Description of coastal area

This section is dominated by high clay-rich cliffs extending from the western side of West Bay in the east to the eastern side of the mouth of the River Winniford at Seatown in the west, a frontage length of approximately 3.9km.

The cliffs are subject to complex landsliding processes and are fronted in parts by narrow shingle beaches and rocky shore platforms. It is for these processes that this section area is also 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 Sidmouth to West Bay SAC; and the Lyme Bay and Torbay candidate SAC.

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

There is very little development along the cliff top, except at Eype where there are a number of properties and holiday/caravan parks located within 250m of the cliff top. There is also a car park atop the cliff at Seatown at the western end of this section.

26.3 Shoreline Management Plan policy

This section is covered by SMP policy units 6a13 and 6a14.

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.

26.4 Coastal change risks

26.4.1 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 narrow 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 slopes in the future.

26.4.2 Potential extent of risk

The assessment of recession potential over the next 100 years defines a risk zone of 300m for this section of coast (refer to Section 1.3.3 and Appendix A).

26.4.3 Timing/frequency of risk occurrence

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

26.4.4 Existing assets at risk

The assets along this section that are at risk of coastal erosion and landsliding in the near future are the car park at Seatown and the seaward parts of development at Eype. In the longer term, further areas of development at Eype as well as cliff top areas at West Bay (refer to Section 25) will be at risk, depending upon the location and extent of future cliff recession events. Adaptation along this section would require relocation of caravans within the area of Eype holiday/caravan park. This would need to be implemented in accordance with Draft Local Plan policy ECON 7 CARAVAN AND CAMPING SITES.

The car park at Seatown is used by visitors to the area and provides an important asset to the local economy. Provision may therefore be required to relocate car parking provision.

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

26.4.5 Future planned developments at risk

The 2006 Adopted Local Plan (West Dorset District Council, 2006) identifies the area of West Bay 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 along the undefended eastern part of this section at West Cliff.

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

26.5 Recommendations for development management

26.5.1 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.

26.5.2 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:

- 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.

26.5.3 Planning policy recommendations

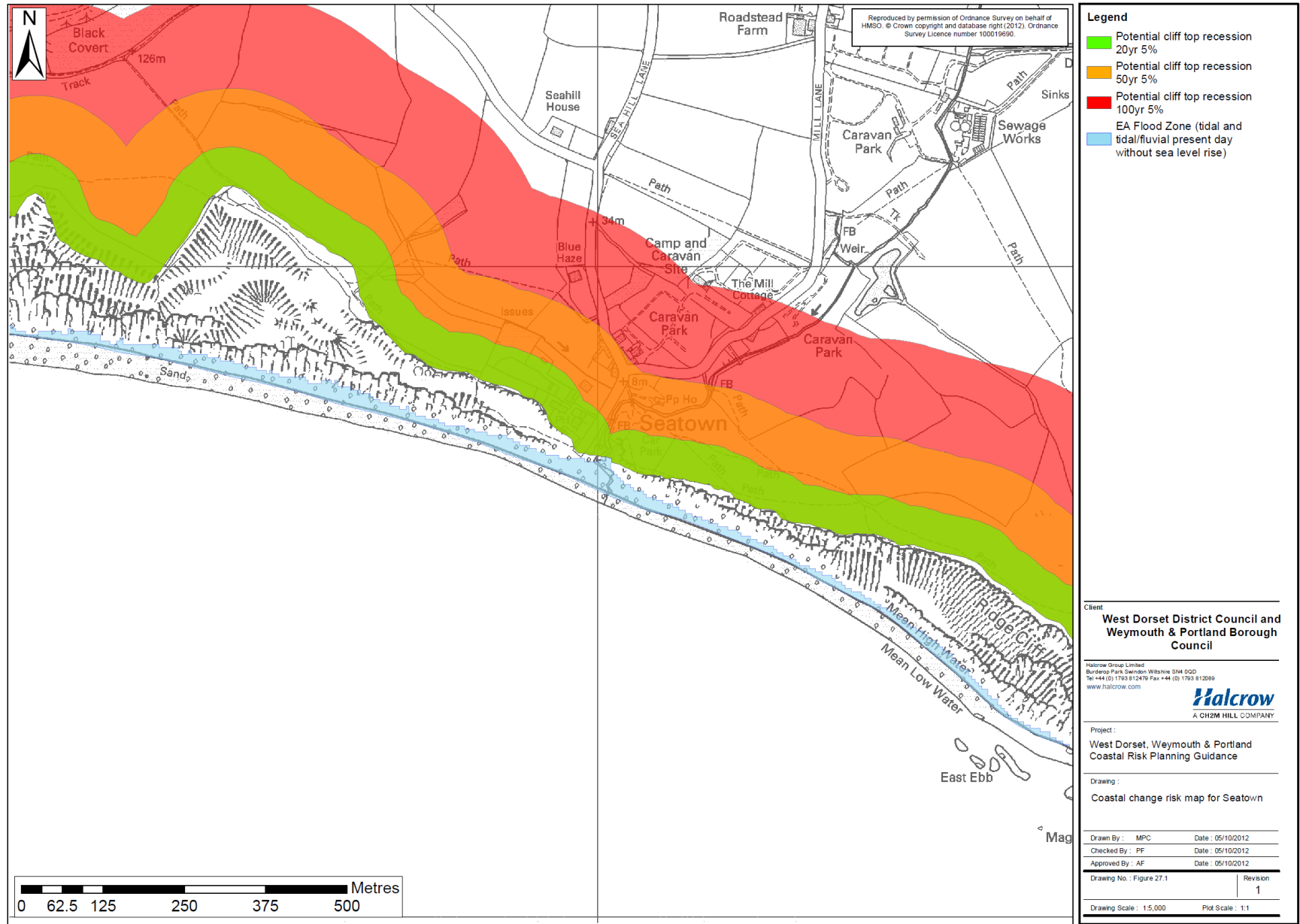
This section of coast should be included within any future CCMA developed for the area. The CCMA should consider the development constraints defined in Section 26.5.1 as well as options to facilitate the relocation of existing properties and other assets within the defined erosion risk zones. This includes caravans at Eype and the car park at Seatown as discussed in Section 26.4.4. 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).

27 Seatown

27.1 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.



27.2 Description of coastal area

This section extends along the currently defended frontage of Seatown for approximately 0.2km from the western side of the River Winniford.

The defences in this area were constructed in the mid-1990s and consist of slope drainage aimed at stabilising the coastal slope and so reduce the risk of future land slip events. The slope drainage is protected at the cliff toe by rock armour and shingle beach. Despite this intervention, episodic erosion still occurs as a result of groundwater conditions.

These defences protect a number of residential properties and public house that are all located within 100m of the cliff top. These properties are accessed by a local road that runs inland perpendicular to the coast.

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

This area is also 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 Sidmouth to West Bay SAC; and the Lyme Bay and Torbay candidate SAC.

27.3 Shoreline Management Plan policy

This section is covered by SMP policy unit 6a15.

The SMP policy for this section is for the current slope stabilisation measures and supporting coastal 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 scheme constructed in the mid-1990s 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 a combination of groundwater levels and wave action at the cliff toe.

27.4 Coastal change risks

27.4.1 Nature of the risks

The clay-rich cliffs along this section are subject to complex landsliding related primarily to groundwater levels. This is currently reduced as the slope drainage is maintained. However, this risk will increase as maintenance of the defences ends in the next 20-50 years.

However, ongoing coastal erosion at the cliff toe, which is an important factor in ongoing cliff instability, is currently reduced by the rock armour at the cliff toe. The beach along this section also 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. As sea levels rise and the rock armour is not maintained 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 slopes in the future.

This area is also at risk of outflanking by the continued recession of the adjacent undefended cliffs immediately to the west of Seatown.

27.4.2 Potential extent of risk

Despite the slope drainage measures introduced along this section, episodic erosion still occurs. Up to 60m of recession could occur in the next 20 years, whilst up to 300m of cliff top recession could occur over the next 100 years (refer to Section 1.3.3 and Appendix A).

The undefended cliffs immediately west of Seatown could also experience up to 300m of recession over the next 100 years (refer to Section 28.4.2).

27.4.3 Timing/frequency of risk occurrence

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

The risk of these events occurring will increase once the defences along this section become unsustainable to maintain and their effect on reducing recession locally is eventually removed in the medium to long term.

27.4.4 Existing asset at risk

The more seaward properties along this section could be at risk of erosion within the next 20 years, even with the existing defences being maintained in this period. Once these defences become unsustainable to maintain, then further properties inland will become at risk of cliff top recession in the longer term.

Road access to properties along this section of coast would likely be less of a concern as most properties would be affected by erosion before the access road that serves them.

27.4.5 Future planned developments at risk

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

27.5 Recommendations for development management

27.5.1 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.

27.5.2 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:

- 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.

27.5.3 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 27.5.1 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).

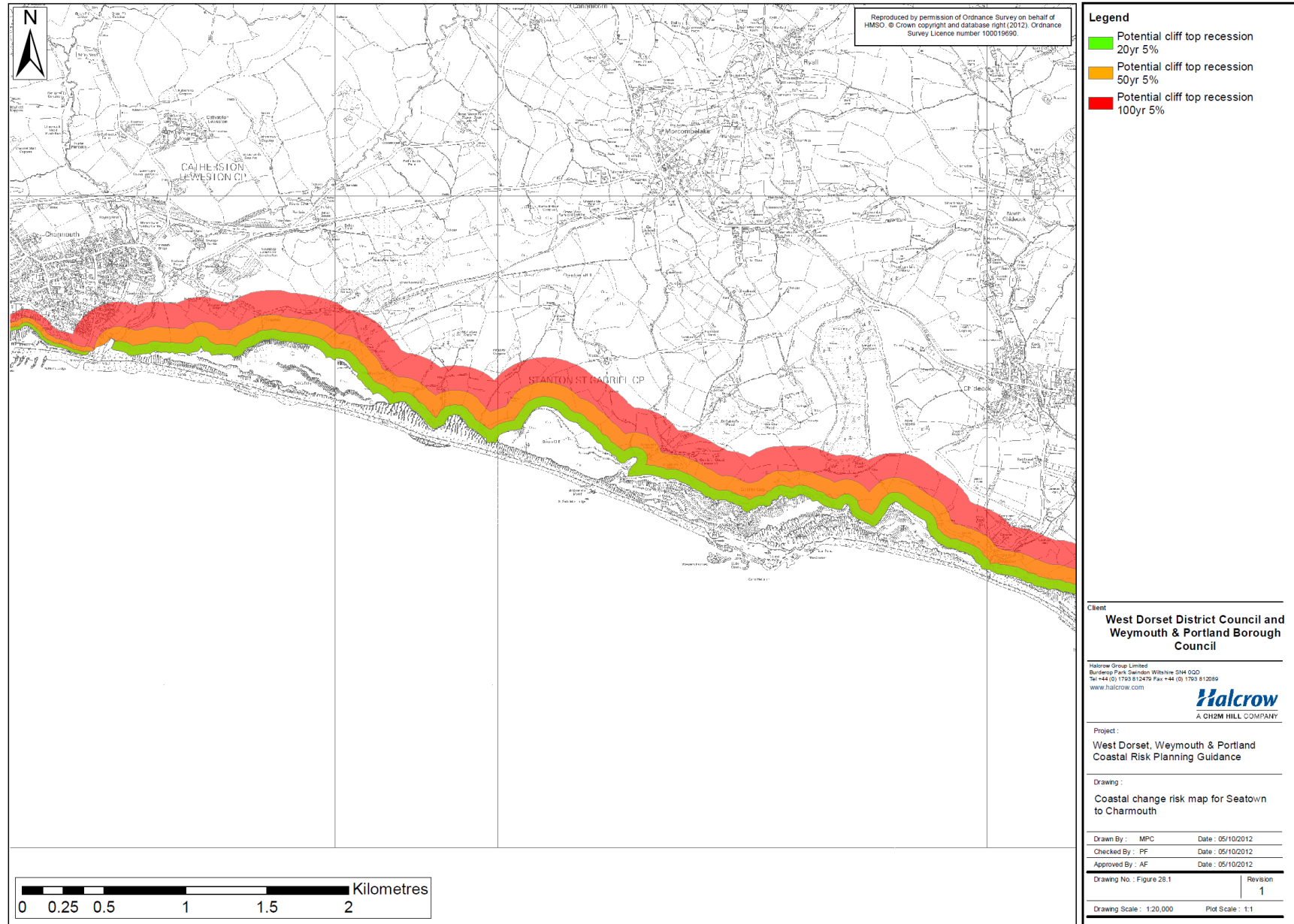
28 Seatown to Charmouth

28.1 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).

Note: this map should be used in conjunction with the land instability zonal map provided in Appendix C.



28.2 Description of coastal area

This section is dominated by high, clay-rich cliffs extending from the western side of Seatown in the east to the eastern side of the mouth of the River Char at Charmouth in the west, a frontage length of approximately 5.4km.

The cliffs are subject to complex landsliding processes and are fronted in parts by narrow shingle beaches and rocky shore platforms. It is for these processes that this section area is also 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 Sidmouth to West Bay SAC; and the Lyme Bay and Torbay candidate SAC.

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

There is very little development along the cliff edge with only a few isolated properties, typically agricultural buildings and farm houses, located within 500m of the cliff top along this section. The greatest number of properties within 500m of the cliff edge is at the western end towards Charmouth, where several properties are located along Stonebarrow Lane.

28.3 Shoreline Management Plan policy

This section is covered by SMP policy units 6a16 and 6a17.

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.

28.4 Coastal change risks

28.4.1 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 narrow 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 slopes in the future.

28.4.2 Potential extent of risk

The assessment of recession potential over the next 100 years defines a risk zone of 300m for this section of coast (refer to Section 1.3.3 and Appendix A).

28.4.3 Timing/frequency of risk occurrence

The main risk along this frontage is from mudflows and large-scale rotational land slip events along the clay-rich cliffs. These events are episodic in nature and difficult

to predict. Larger events have historically occurred about every 100 years, although smaller scale events occur much more frequently (Halcrow, 2011a).

28.4.4 Existing assets at risk

The main asset at risk of erosion along this section in the immediate future is the coast path. This will need adapting as the coast erodes in the future.

The few properties and local access road along this section will remain at risk of future land slip events, though it is depends upon the location and extent of such events. This risk could increase as sea levels rise and the fronting beach becomes increasingly submerged, leading to greater rate of erosion at the cliff toe and so greater instability in the coastal slope.

28.4.5 Future planned developments at risk

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

28.5 Recommendations for development management

28.5.1 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.
- Any development towards the Charmouth end of this section should also give consideration to the existing ground instability guidance map for Lyme Regis and Charmouth (High-Point Rendel, 2004) in addition to the risk zone map provided in this guidance (refer to Appendix C).
- 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.

28.5.2 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:

- 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.

28.5.3 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 28.5.1 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).

29 River Char, Charmouth

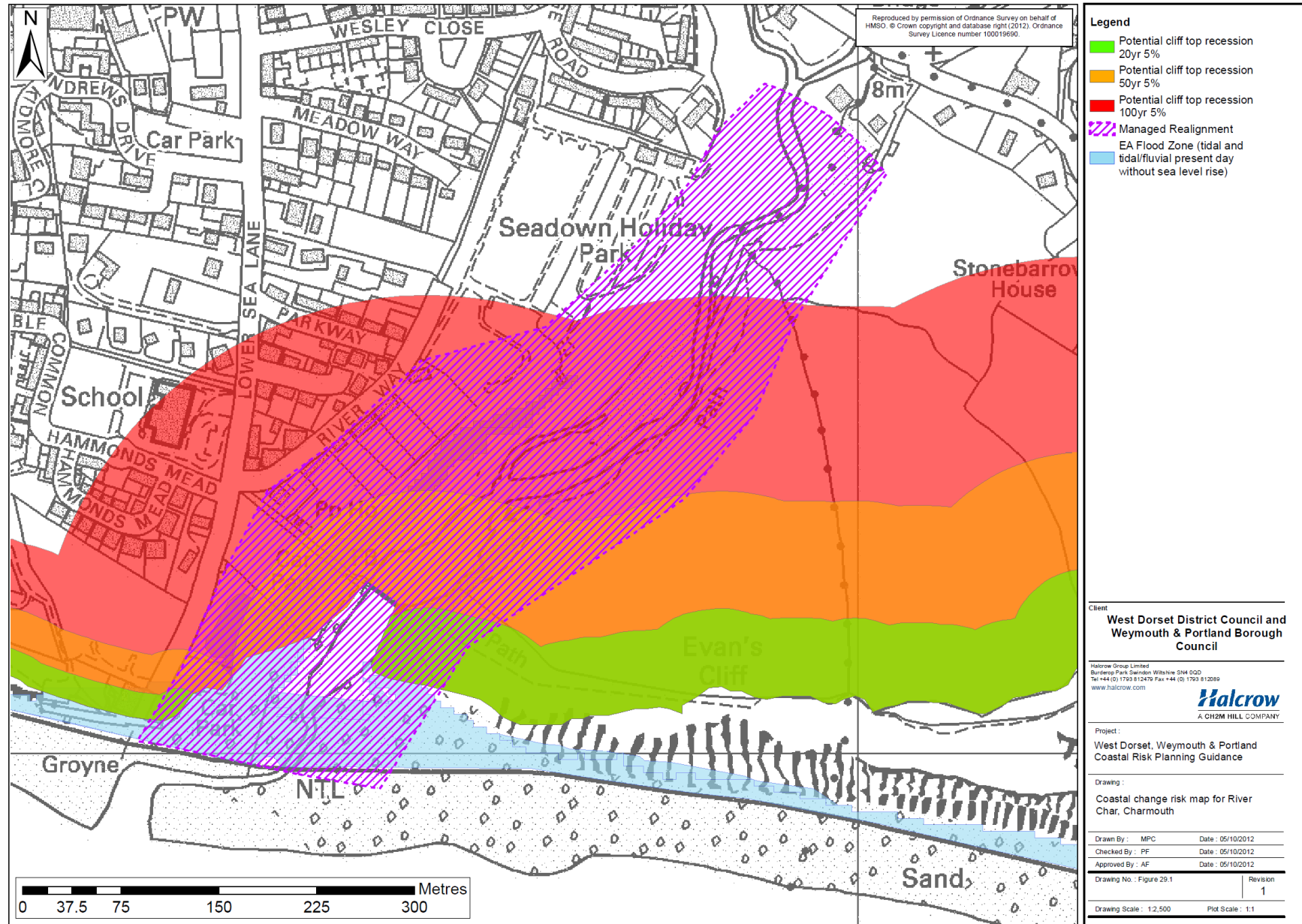
29.1 Risk zone mapping

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).

Note: this map should be used in conjunction with the land instability zonal map provided in Appendix C.

- 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.



29.2 Description of coastal area

This section extends approximately 0.25km across the mouth of the River Char at Charmouth, where the river discharges to sea over the shingle beach. The National Trust Visitor Centre and car park is located on the western side of the river mouth.

The tidal limit of the river is currently at the back of the beach, which periodically blocks the discharge and causes ponding of the water as far upstream as approximately Stonebarrow Lane.

There is very little development within the flood zone of the River Char between the river mouth and Stonebarrow Lane.

The South West Coastal Path also runs along this section.

This area is also 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 Sidmouth to West Bay SAC; and the Lyme Bay and Torbay candidate SAC.

29.3 Shoreline Management Plan policy

This section is covered by SMP policy unit 6a18.

The SMP policy for this section is for **managed realignment** over the next 100 years to enable a set-back defence to be constructed within the channel of the River Char if required to manage flood risk in the future that may increase as sea levels rise and lead to tidal incursion upstream of its current limit.

29.4 Coastal change risks

29.4.1 Nature of the risks

The primary risk in this area is from flooding to the low lying parts of this section. This risk comes from both overtopping of the defences along the western part of this section, and from combined tidal/fluviial flooding via the River Char.

In addition, the beach along the mouth of the River Char will be expected to roll-back landwards into the channel both in response to the retreat of the adjacent undefended cliffs and as sea levels rise. This roll-back poses an increased risk of flooding upstream.

29.4.2 Potential extent of risk

The area at risk of flooding encompasses much of this section including the area of the National Trust Visitor Centre and car park and along the channel of the River Char. 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 (Halcrow, 2008).

In order to facilitate future realignment within the River Char, and to enable construction of a secondary defence line to manage the risk of flooding to upstream areas if required in the longer-term, an area of land between the existing shoreline and Stonebarrow Lane within the River Char valley should be set-aside for this future purpose.

Further detailed study is required to determine the need for and exact position of any future secondary defence line. This will ultimately be guided by the extent and rate of roll-back of the beach at the mouth of the River Char as sea levels rise, and the extent and rate of retreat of the adjacent undefended cliffs.

29.4.3 Timing/frequency of risk occurrence

The SMP predicts that construction of a set-back defence line to provide longer term management of flood risk within the River Char valley could be required within the next 20-50 years. This depends upon the rate of retreat of sea level rise and how the beach responds to this, as well as the rate of retreat of the adjacent cliffs (Halcrow, 2011a).

29.4.4 Existing assets at risk

Within the River Char valley there are no assets at immediate risk of flooding. The roll-back of the beach into the River Char valley as sea levels rise poses an increased risk of flooding to assets upstream. This risk could be managed by construction of a set-back defence in the future, or by other measures to adapt the land within the flood risk zone.

The only asset at risk of flooding in the immediate future along this section is the National Trust Visitor Centre and car park. These risks could occur at anytime, but would increase in the future as sea levels rise.

29.4.5 Future planned developments at risk

The 2006 Adopted Local Plan (West Dorset District Council, 2006) identifies the area of Charmouth 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.

29.5 Recommendations for development management

29.5.1 Development constraints

Within the River Char, no permanent development should occur within the zone identified for accommodating future realignment. Time-limited planning consent for a limited range of developments is most appropriate within this 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. In this area any development will should also include plans for its safe removal as part of future implementation of the managed realignment policy.

Any development should also give consideration to the existing ground instability guidance map for Lyme Regis and Charmouth (High-Point Rendel, 2004) in addition to the risk zone map provided in this guidance (refer to Appendix C).

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 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.

29.5.2 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:

- 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.

29.5.3 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 29.5.1 as well as options to facilitate the relocation of existing properties and other assets within the defined potential managed realignment zone. 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).

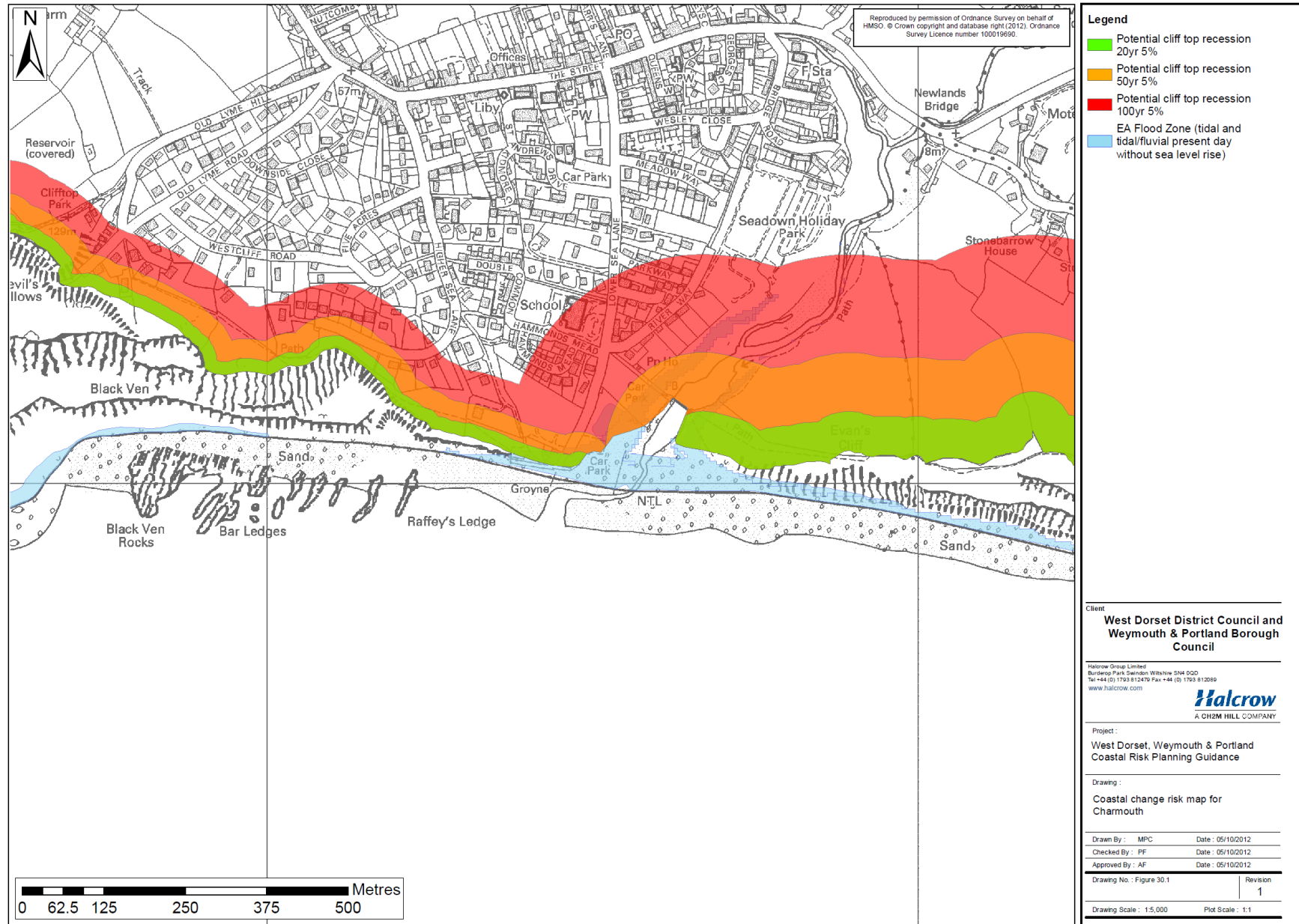
The availability of funding for continued defence along all of this section is uncertain. Therefore to continue to defend this area and so reduce coastal flood and erosion risk in the future, it is very likely that partnership funding will be required. This should be reflected in future policies for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

30 Charmouth

30.1 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.



30.2 Description of coastal area

This section extends approximately 0.1km along the short length of defences that front the National Trust Visitor Centre at Charmouth and protect this area against flooding and erosion.

The only asset within 100m of the coastline along this defended section of open coast at Charmouth is the National Trust Visitor Centre and car park. This provides access to visitors to the coast who access the beach and cliffs from this area.

The South West Coastal Path also runs along this section.

This area is also 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 Sidmouth to West Bay SAC; and the Lyme Bay and Torbay candidate SAC.

30.3 Shoreline Management Plan policy

This section is covered by SMP policy unit 6a18.

The SMP policy is for the existing defences to be maintained under a policy of **hold the line** in the immediate future. 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 existing defence reaches the end of its functional life. Once the defences become uneconomical to maintain they will gradually deteriorate and their effectiveness at reducing risk of coastal erosion and flooding 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 a combination of groundwater levels and wave action at the cliff toe.

This area would also be expected to be more frequently inundated by flooding once defence is no longer provided.

30.4 Coastal change risks

30.4.1 Nature of the risks

The primary risk in this area in the immediate future is from flooding. This risk comes from both overtopping of the defences and from combined tidal/fluvial flooding via the River Char to the east of this section.

In addition, the beach along the mouth of the River Char will be expected to roll-back landwards into the channel as sea levels rise. This roll-back poses an increased risk of flooding to this section and greater exposure to wave energy along the eastern part of the existing defences.

In the future, as maintenance of the defences is withdrawn, there will be an increased risk of coastal erosion and flooding along this section. This area could also become outflanked by erosion of the adjacent undefended cliffs to the west of the defences.

30.4.2 Potential extent of risk

The area at risk of flooding in the immediate future encompasses all of this section including the area of the National Trust Visitor Centre and car park. 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 (Halcrow, 2008).

This section is also at risk of outflanking by the adjacent undefended cliffs, which could recede by up to 300m over the next 100 years (refer to Section 31.4.2).

Once maintenance of the existing defences along this section is withdrawn, the defences will gradually deteriorate and their effectiveness at reducing the risk of coastal erosion and flooding 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 maintained by wave action at the cliff toe.

The flood risk will also increase once defence is no longer provided.

30.4.3 Timing/frequency of risk occurrence

The SMP predicts that the defences along this section will become unsustainable to maintain within 20-50 years and so the risk of erosion and increased flooding in this area as defences fail will increase from this period onwards.

The risk of outflanking of the existing defences by recession of the adjacent undefended cliffs to the west could arise at any time, even before maintenance of the defences has been withdrawn. These adjacent cliffs erode as a result of mudflows and large-scale rotational land slip events. These events are episodic in nature and difficult to predict. Larger events have historically occurred about every 100 years, although smaller scale events occur much more frequently (Halcrow, 2011a).

30.4.4 Existing assets at risk

The only asset at risk of flooding and erosion along this section is the National Trust Visitor Centre and car park. These risks could occur at anytime, but would increase in the future as sea levels rise and maintenance of defences is withdrawn.

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

30.4.5 Future planned developments at risk

The 2006 Adopted Local Plan (West Dorset District Council, 2006) identifies the area of Charmouth 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.

30.5 Recommendations for development management

30.5.1 Development constraints

Along this section where the SMP policy is for the existing defence to be withdrawn, no permanent development should occur in the area at risk of flooding or 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 erosion risk zone. Any development that does occur in this erosion risk area 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.

Any development should also give consideration to the existing zonal instability guidance map for Lyme Regis and Charmouth (High-Point Rendel, 2004) in addition to the risk zone map provided in this guidance (refer to Appendix C).

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 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.

30.5.2 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:

- 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.

30.5.3 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 30.5.1 as well as options to facilitate the relocation of existing properties and other assets within the defined erosion risk zone. 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).

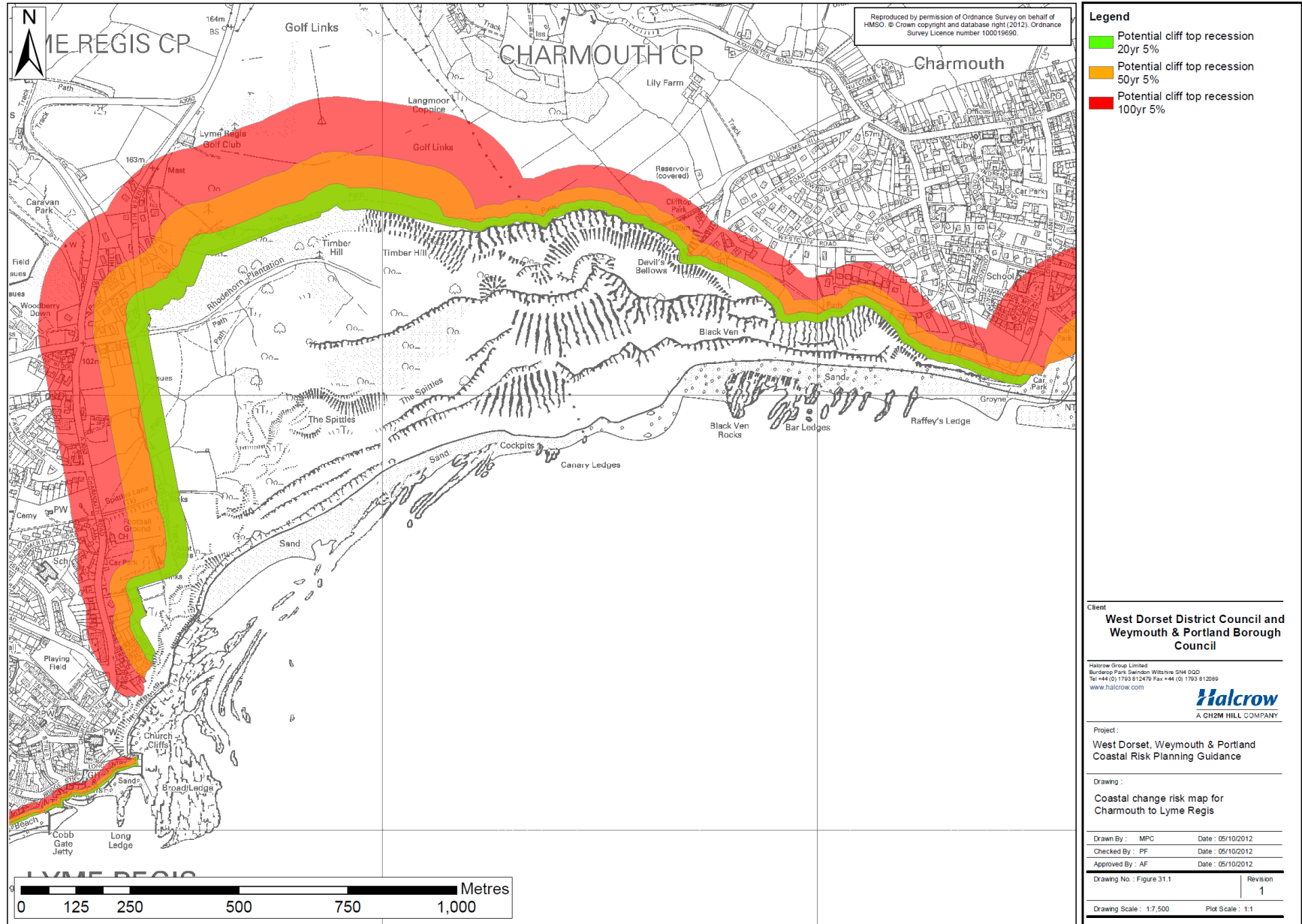
31 Charmouth to Lyme Regis East

31.1 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).

Note: this map should be used in conjunction with the land instability zonal map provided in Appendix C.



31.2 Description of coastal area

This section is dominated by high clay-rich cliffs, known as Black Ven and The Spittles, which extend from Charmouth in the east to East Cliff at Lyme Regis in the west, a frontage length of approximately 1.9km.

The cliffs are subject to complex landsliding processes and are fronted in by narrow shingle beaches and rocky shore platforms. It is for these processes that this section area is also 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 Sidmouth to West Bay SAC; and the Lyme Bay and Torbay candidate SAC.

The South West Coastal Path runs along the top of the back-scar located at the rear of the land slip zone that extends along this section. Lyme Regis Golf Course is also located in this area atop the cliff, as is the former Spittles Lane landfill site.

Developed areas are located above the cliffs along this section, notably along the western side of Charmouth and the eastern side of Lyme Regis. These developed areas include residential and commercial properties and key access roads.

31.3 Shoreline Management Plan policy

This section is covered by SMP policy unit 6a19.

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.

31.4 Coastal change risks

31.4.1 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 narrow 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 slopes in the future.

31.4.2 Potential extent of risk

The assessment of recession potential over the next 100 years defines a risk zone of 300m for this section of coast (refer to Section 1.3.3 and Appendix A).

31.4.3 Timing/frequency of risk occurrence

The main risk along this frontage is from mudflows and large-scale rotational land slip events along the clay-rich cliffs. These events are episodic in nature and difficult

to predict. Larger events have historically occurred about every 100 years, although smaller scale events occur much more frequently (Halcrow, 2011a).

31.4.4 Existing assets at risk

The developed areas along this section on the western side of Charmouth and eastern side of Lyme Regis will remain at risk of future land slip events, though it depends upon the location and extent of such events. This risk could increase as sea levels rise and the fronting beach becomes increasingly submerged, leading to greater rate of erosion at the cliff toe and so greater instability in the coastal slope.

The coast path will also need adapting as the cliff top retreats landwards in the future.

31.4.5 Future planned developments at risk

Draft Local Plan policy LYME 1 LAND AT WOODBERRY DOWN is identified within a DDB for mixed use development to include housing and retention of existing employment use. This area could potentially be affected by land instability issues in the longer term, depending upon the extent and location of future recession of the cliffs along this section.

Draft Local Plan Policy LYME 2 LAND AROUND LYME REGIS seeks to explore and develop options for the long-term growth of Lyme Regis. Erosion in this area will constrain options for growth along this section.

The 2006 Adopted Local Plan (West Dorset District Council, 2006) identifies the areas of Charmouth and Lyme Regis as being within DDBs. These DDBs have been saved in the Draft Local Plan and therefore future development within these areas could be affected by future coastal change along this undefended section of coast.

31.5 Recommendations for development management

31.5.1 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.
- Any development should also give consideration to the existing zonal instability guidance map for Lyme Regis and Charmouth (High-Point Rendel,

2004) in addition to the risk zone map provided in this guidance (refer to Appendix C).

- 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.

31.5.2 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:

- 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.

31.5.3 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 31.5.1 as well as options to facilitate the relocation of existing properties and other assets within the defined erosion risk zone. Reference should also be made to both (a) 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) and (b) the *Guidance on the management of landfill sites and land contamination on eroding and low-lying coasts* (CIRLA, 2012) in respect of the former Spittles Lane landfill site.

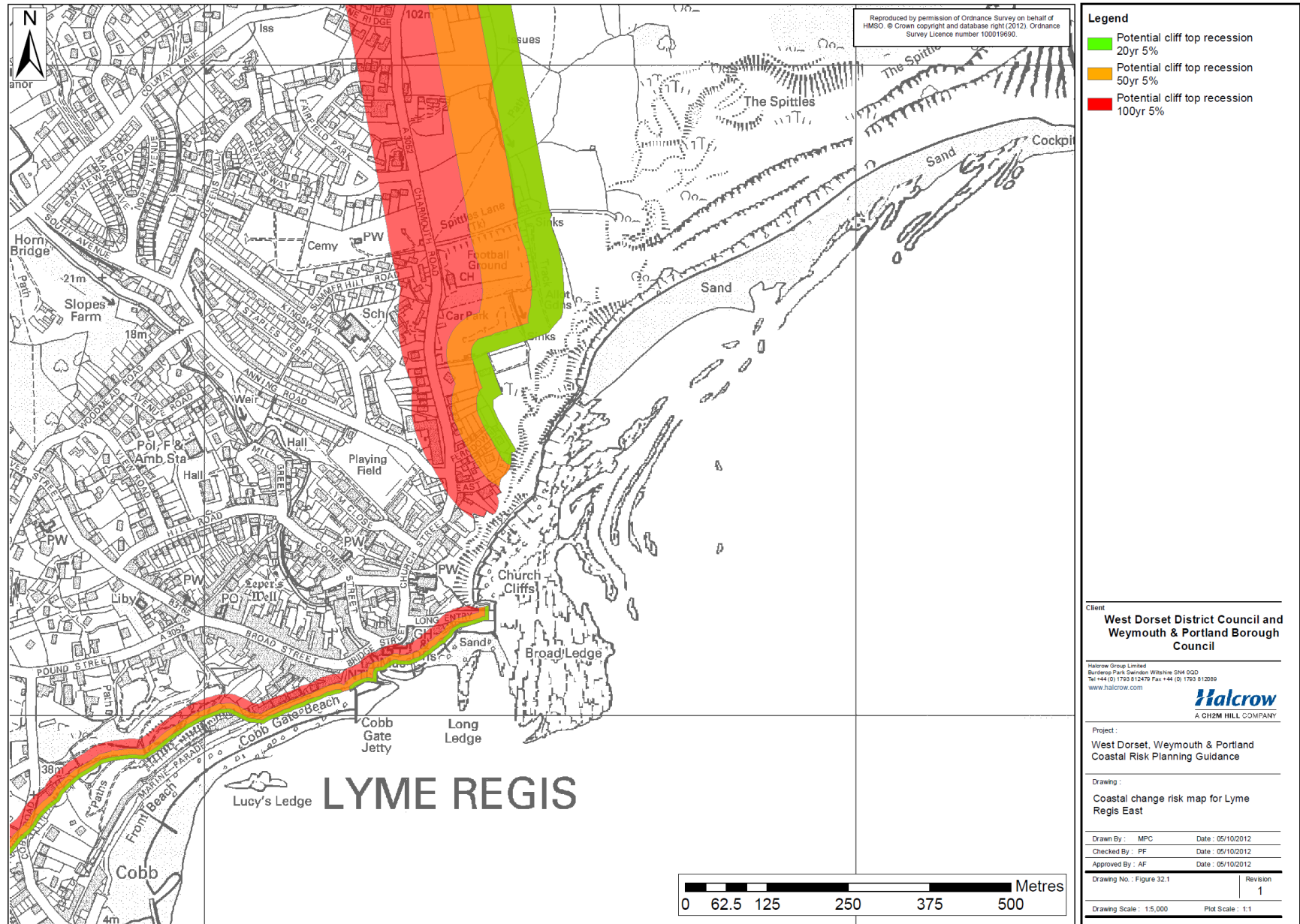
32 Lyme Regis East

32.1 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).

Note: this map should be used in conjunction with the land instability zonal map provided in Appendix C.



32.2 Description of coastal area

This section extends along the defended eastern side of Lyme Regis between the undefended, actively landsliding cliffs to the north and east, and Broad Ledge to the south. This covers a frontage approximately 0.5km in length that encompasses East Cliff and Church Cliff.

The defences along this section include seawalls and slope stabilisation measures. These are in the process of being improved as part of the Lyme Regis Environmental Improvement Phase IV Scheme. This scheme is expected to provide protection to this part of Lyme Regis for the next 50-100 years although this depends upon the extent of future recession of the adjacent undefended cliffs to the north and east.

The defences protect a large number of properties, car parks and the important access route of the A3052 Charmouth Road along the eastern side of Lyme Regis against the risk of coastal erosion and land instability.

This area is also 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 Sidmouth to West Bay SAC; and the Lyme Bay and Torbay candidate SAC.

32.3 Shoreline Management Plan policy

This section is covered by SMP policy unit 6a20.

The SMP policy for this section is to **hold the line** for much of the next 100 years. This means that defence against erosion could continue to be provided should funding be available to do so.

However, in the longer term the SMP recognises that the undefended cliffs to the north and east could lead to the defended section being outflanked. In order to continue to protect much of the eastern side of Lyme Regis, continued intervention could occur though the policy would transition to one of **managed realignment** supported by adaptation of the cliff top area as it may become unsustainable to defend all of this length in the longer term.

32.4 Coastal change risks

32.4.1 Nature of the risks

The defended cliffs along this section are at risk of erosion if the defences are not maintained. This risk is not likely to arise until the very long term, depending upon how sustainable it remains to maintain the defences along this section in the future.

The risk of the adjacent undefended cliffs to the north and east of this section are subject to episodic complex landsliding events and these could cause outflanking of this defended section in the future.

32.4.2 Potential extent of risk

The continued maintenance of the defences along this section will prevent significant erosion along much of this section over the next 50-100 years. However, as the defences reach the end of their design life there will be an increasing risk of erosion in

the longer-term. If the defences are not maintained in the future, the area of land between the cliff top and A3052 Charmouth Road would be at risk of recession.

The northern part of this section is also the most vulnerable to erosion as a result of outflanking by the retreat of the adjacent undefended cliffs to the north and east. These adjacent cliffs could retreat by upto 300m over the next 100 years (refer to Section 31.4.2).

32.4.3 Timing/frequency of risk occurrence

Assuming that future defences are provided along this section in line with the SMP policy, the risk of erosion to the eastern side of Lyme Regis will continue to be reduced for much of the next 50-100 years, so long as it remains sustainable to continue defending this section. In the very long-term, as the existing defences reach the end of their effective life it may become unsustainable to continue to defend all of this section.

The risk of outflanking of the existing defences by recession of the adjacent undefended cliffs to the north and east could arise at any time. These adjacent cliffs erode as a result of mudflows and large-scale rotational land slip events. These events are episodic in nature and difficult to predict. Larger events have historically occurred about every 100 years, although smaller scale events occur much more frequently (Halcrow, 2011a).

32.4.4 Existing assets at risk

The greatest risk for much of the next 100 years is to assets such as the A3052 Charmouth Road and a number of properties located along the cliff top area at the northern end of this section. This risk is as a result of the potential outflanking of this section by erosion of the adjacent undefended cliffs.

Assuming that the SMP policy is implemented, then the majority of this section will continue to be protected against erosion for the next 50-100 years.

32.4.5 Future planned developments at risk

Draft Local Plan Policy LYME 2 LAND AROUND LYME REGIS seeks to explore and develop options for the long-term growth of Lyme Regis. The potential for erosion along this section, particularly the northern part that is at risk of outflanking, will constrain options for growth along parts of this section.

The 2006 Adopted Local Plan (West Dorset District Council, 2006) identifies the area of Lyme Regis 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.

32.5 Recommendations for development management

32.5.1 Development constraints

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

However, the northernmost part of this section could be vulnerable in the longer term from recession of the adjacent undefended cliffs. In this area no permanent development should occur 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 northern part of this section.

Any development that does occur in this northern part 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 in this area 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.

Any development should also give consideration to the existing zonal instability guidance map for Lyme Regis and Charmouth (High-Point Rendel, 2004) in addition to the risk zone map provided in this guidance (refer to Appendix C).

The types of development likely to be appropriate in this northern part 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 in relation to the recession of the adjacent undefended cliffs.

32.5.2 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:

- 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.

32.5.3 Planning policy recommendations

This section of coast should be included within any future CCMA developed for the area due to both the potential for erosion of this area by future recession of the undefended cliff to the east and uncertainty about future funding of defence in the long term. The CCMA should consider the development constraints defined in Section 32.5.1 as well as options to facilitate the relocation of existing properties and other assets within the defined erosion risk zone. 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).

33 Lyme Regis Central

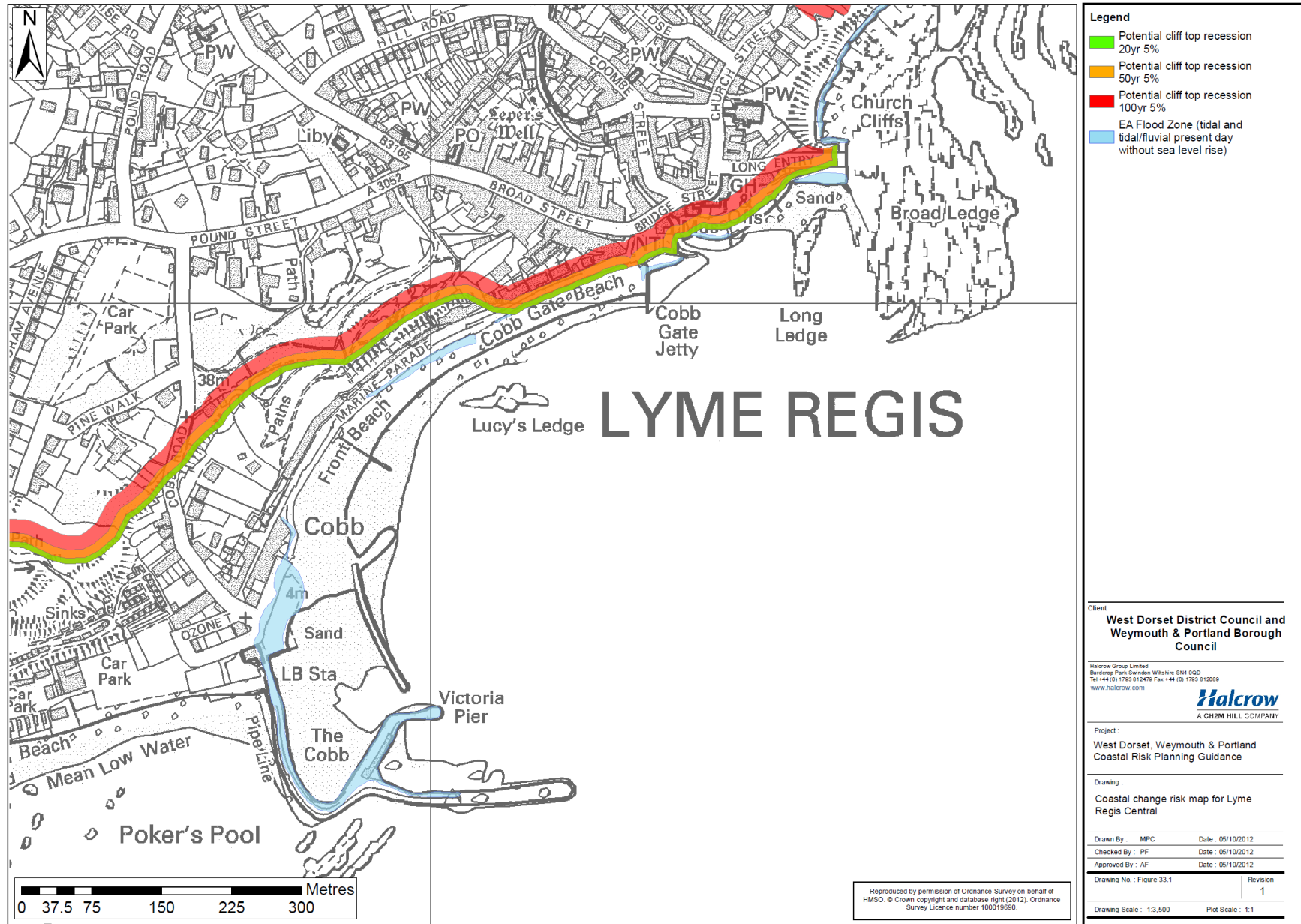
33.1 Risk zone mapping

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).

Note: this map should be used in conjunction with the land instability zonal map provided in Appendix C.

- 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.



33.2 Description of coastal area

This section extends along the defended central section of Lyme Regis between Broad Ledge to the east and The Cobb to the west, covering a frontage approximately 1.0km in length.

The defences along this section include seawalls, groynes, recharged beaches and slope stabilisation measures. These were constructed as part of the Lyme Regis Environmental Improvement Phase II Scheme completed in 2007. This scheme is expected to provide protection to this part of Lyme Regis for the next 50-100 years.

The defences protect a large number of properties and tourist assets such as cafés restaurants and visitor centre from erosion and land sliding. The defences also provide amenity benefit as promenades and access to the beach is incorporated within the design of the structures, whilst the recharged beaches provide amenity resource, all of which are important to the local economy.

The River Lim discharges to the sea via a culvert at the eastern end of this section.

The eastern part of this section is also 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 Sidmouth to West Bay SAC; and the Lyme Bay and Torbay candidate SAC.

The western end of this section is occupied by Lyme Regis Harbour and the historic harbour breakwater of The Cobb. The harbour is a working harbour with a small fishing fleet and tourist and dive charters operating from the harbour.

33.3 Shoreline Management Plan policy

This section is covered by SMP policy unit 6a21.

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

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

Continued defence will require periodic beach recharge so long as it remains economically viable to do so. This is likely to require partnership funding in the future (i.e. multiple funding sources) (Halcrow, 2012).

33.4 Coastal change risks

33.4.1 Nature of the risks

This section is at risk of erosion and landsliding. However, assuming that the defences constructed in 2007 are maintained in line with the SMP policy, then this risk will remain low for the next 50-100 years, although infrequent, small scale, localised land slip events driven by groundwater levels within the coastal slope could still occur.

To support this continued defence it will be important to ensure that the seawall at the base of the cliff continues to be protected against wave action. This is currently protected by the recharged beaches along this section. However, as sea levels rise and cause coastal squeeze and narrowing/loss of the beach along this frontage it will be necessary to undertake further beach recharge in the future. Ongoing beach recharge

would reduce the coastal squeeze impact, but this will likely become increasingly difficult to achieve as sea level rise accelerates. It is likely that the form of the defences along this section could have to become more armoured with hard defence with little (if any beach) in front of the defence in the longer term to continue to provide adequate protection against erosion risk. This is not likely to occur until the longer term.

In the longer term, as sea levels rise, lower lying parts of this section could be at increased risk of flooding (Halcrow, 2008).

33.4.2 Potential extent of risk

Assuming that defences along this central section of Lyme Regis are maintained, then the risk of future land slip events occurring in this area is likely to remain low. However, infrequent, small scale land slip events as a result of groundwater levels could still occur. The assessment of recession potential over the next 100 years defines a risk zone of 30m for this area as a result of this mechanism (refer to Section 1.3.3 and Appendix A).

The areas along the frontage vulnerable to increased flood risk in the future as sea levels rise is demonstrated in the SFRA (Halcrow, 2008).

33.4.3 Timing/frequency of risk occurrence

Assuming that defences along this central section of Lyme Regis are maintained, then the risk of future land slip events occurring in this area is likely to remain low.

The loss of beach along this section will be a gradual occurrence and accelerate over time as sea level rise accelerates in 50-100 years. The increased risk of flooding will develop in line with the loss of beach over similar time scales.

33.4.4 Existing assets at risk

Assuming that the SMP policy is implemented, then the developed areas along this section will continue to be protected against erosion for the next 50-100 years.

The loss of beach along this section as sea levels rise, if not countered with beach recharge, will denude a vital tourism asset that is the beach and this would impact upon the local economy.

33.4.5 Future planned developments at risk

The 2006 Adopted Local Plan (West Dorset District Council, 2006) identifies the area of Lyme Regis 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 at risk of erosion or flooding.

If it becomes unsustainable to maintain defence along the seawall through beach recharge and a harder form of defence is required in the longer term, then this could impact upon the local economy.

33.5 Recommendations for development management

33.5.1 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 infrequent, small scale land slip events as a result of groundwater levels could still occur. In this area, property owners/developers should be made aware of the general advice provided in Section 1.3.4.

Any development should also give consideration to the existing zonal instability guidance map for Lyme Regis and Charmouth (High-Point Rendel, 2004) in addition to the risk zone map provided in this guidance (refer to Appendix C).

There will, however, be an increased risk of flooding to lower lying parts in the future. 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.

33.5.2 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:

- 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.

33.5.3 Planning policy recommendations

Future defence provision along this section should consider integration with public space requirements for the area. 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).

34 Lyme Regis West

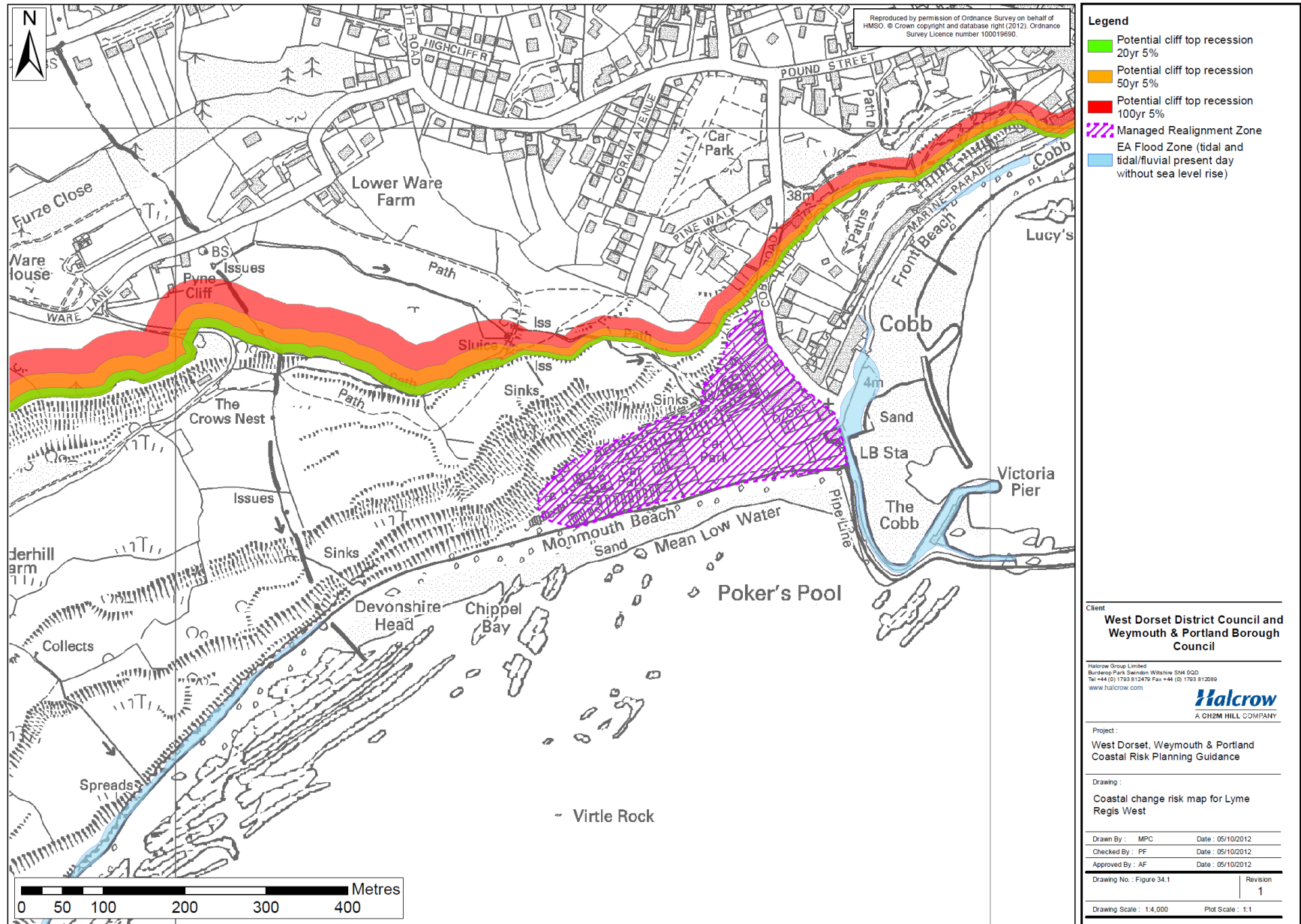
34.1 Risk zone mapping

The risk zone map for this section shows the following:

- 5% probability potential top cliff 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).

Note: this map should be used in conjunction with the land instability zonal map provided in Appendix C.

- 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.



34.2 Description of coastal area

This section extends along the western side of Lyme Regis from The Cobb in the east to the Dorset/Devon border in the west, covering a frontage approximately 0.7km in length.

This section is dominated by high clay-rich cliffs that form the eastern end of Ware Cliffs, and which are fronted by Monmouth Beach and rocky shore platforms. The cliffs are subject to complex landsliding processes and it is for these processes that this section area is also 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 Sidmouth to West Bay SAC; and the Lyme Bay and Torbay candidate SAC.

There are no formal defences along this section. However, The Cobb breakwater acts to constrain transport of beach sediment further east from Monmouth Beach, therefore helping to retain beach material locally in this area.

Along the eastern part of this section, the area above the beach is occupied by a car park and boat storage yard, as well as several properties and a number of beach huts. The high ground in this area is developed and there are many properties and roads within 250m of the cliff headscarp.

The western part of this section is undefended, natural cliff subject to complex landsliding processes. There is much less development along the cliff top in this area, with only a few properties along Ware Lane located within 250m of the cliff headscarp.

34.3 Shoreline Management Plan policy

This section is covered by SMP policy units 6a22 and 6a23.

The SMP policy for the eastern part of this section is to continue to defend the western side of Lyme Regis from erosion and flooding through a policy to **hold the line** for much of the next 100 years.

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

However, the SMP identifies that to achieve this policy in the longer term, it may be necessary to undergo a period of transition to realign coast along Monmouth Beach. This could include construction of a formal defence within the car park area to prevent an increased risk of erosion and flooding via this area to developments along the central part of Lyme Regis in the vicinity of The Cobb as sea levels rise.

For the undefended cliffs along the western part of this section the SMP policy for 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.

34.4 Coastal change risks

34.4.1 Nature of the risks

The cliffs along the defended eastern part of this section are at risk of erosion and complex landsliding events if the defences are not maintained and improved to address sea level rise pressures in the medium to longer term.

The continued presence of defences along this section will add to the long-term trend of erosion along much of Monmouth Beach that has been occurring for about the last 100-150 years. The localised accretion adjacent to The Cobb is not sufficient to counter this trend. As sea levels rise and cause coastal squeeze and further narrowing/loss of the beach along this frontage, it will be necessary to provide a more formal defence in this area, likely in a more sustainable, realigned position in order to provide protection to the wider area along the western side of Lyme Regis.

The undefended, natural cliffs along the western part of 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 platforms along this section 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.

The low-lying parts of Lyme Regis at the base of the cliff are also vulnerable to coastal flooding. As sea levels rise so too will the risk of coastal flooding in this area, which will also pose a risk to the adjacent low-lying areas of Lyme Regis around The Cobb Gate/harbour area (refer also to Section 33).

34.4.2 Potential extent of risk

The continued defence against erosion and flooding along the eastern part of this section will prevent significant erosion along much of this area, although to achieve this it is expected that it will be necessary to provide a more formal defence in this area, likely in a more sustainable, realigned position in order to provide protection to the wider area along the western side of Lyme Regis. 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. However, the area of land currently occupied by the car park and boat storage facilities to the west of The Cobb should be considered for being set-aside for this purpose.

The undefended, natural cliffs along the western part of 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 60m for this section of coast (refer to Section 1.3.3 and Appendix A).

34.4.3 Timing/frequency of risk occurrence

Assuming that future defence along the eastern part of this section is provided in line with the SMP policy, the risk of erosion and flooding to the western side of Lyme Regis will continue to be reduced for much of the next 50-100 years. To achieve this it may be necessary to construct a more formal defence in this area, likely in a more sustainable, realigned position, within the next 20-50 years.

The risk of outflanking of the defended part of this section by recession of the adjacent undefended cliffs in the western part could arise at any time. These adjacent cliffs erode as a result of large-scale rotational land slip events. These events are episodic in nature and difficult to predict. Larger events have historically occurred about every 250-1000 years, although smaller scale events occur much more frequently (Halcrow, 2011a).

34.4.4 Existing assets at risk

The greatest risk for much of the next 100 years is to properties and roads located along the cliff top area along this section. This risk in the eastern part of this section is as a result of the potential outflanking by erosion of the adjacent undefended cliffs in the western part of this section.

Assuming that the SMP policy is implemented, then the majority of this section will continue to be protected against erosion and flooding for the next 50-100 years. However, in order to facilitate future realignment of defences to achieve the SMP policy, the area of land to the west of The Cobb should be considered for being set-aside for this purpose. This could impact upon the space currently occupied by car parks and boat storage facilities, as well as a number of properties and beach huts.

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

34.4.5 Future planned developments at risk

Draft Local Plan Policy LYME 2 LAND AROUND LYME REGIS seeks to explore and develop options for the long-term growth of Lyme Regis. The potential for erosion and landsliding along this section, as well as the potential need to provide a realigned defence position along the eastern part within the next 20-50 years, will constrain options for growth along parts of this section.

34.5 Recommendations for development management

34.5.1 Development constraints

No permanent development should occur within the zone identified for accommodating future realignment. Time-limited planning consent for a limited range of developments is most appropriate within this 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. In this area any development will should also include plans for its safe removal as part of future implementation of the managed realignment policy.

Along the natural, undefended western part of this section 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 erosion risk zone. Any development that does occur in this erosion risk area 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.

Any development should also give consideration to the existing zonal instability guidance map for Lyme Regis and Charmouth (High-Point Rendel, 2004) in addition to the risk zone map provided in this guidance (refer to Appendix C).

The types of development likely to be appropriate in these areas are short term holiday lets or camping/caravan sites or facilities associated with tourism and leisure (e.g. cafes, entertainment 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.

34.5.2 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:

- 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.

34.5.3 Planning policy recommendations

This section of coast should be included within any future CCMA developed for the area, reflecting both the potential erosion of this area from future cliff recession of the adjacent undefended cliff along the western part of this section, as well as the SMP policy for managed realignment. The CCMA should consider the development constraints defined in Section 34.5.1 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).

Future defence provision along this section should consider integration with public space requirements for the area. 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).

35 Recommendations for Future Updates

35.1 Updating this coastal risk planning guidance

Updates of this coastal risk planning guidance should only occur when there is either new data available that improves the evidence upon which the assessments made in this document, or changes are made to the adopted FCERM policy for an area.

Examples of when new data of this kind may become available include:

- Updates to the National Coastal Erosion Risk Mapping.
- Revisions to Flood Zone Mapping that account for changes in climate change guidance and/or wave overtopping effects.
- Detailed studies of cliff geology/geomorphology.
- Detailed studies of managed realignment sites.
- Development of FCERM strategies/studies/schemes that investigate coastal processes in greater detail than the SMP.

Examples of when changes to the adopted FCERM policy may occur include:

- Update of the SMP.
- Completion of detailed assessment as part of FCERM strategies that challenge the SMP policy assumptions (*NB: the SMP2 action plan identifies that FCERM strategies should be undertaken for (a) Weymouth Bay and Portland Harbour and (b) Lyme Bay from Chiswell to Beer Head at some time in the next 10 years prior to the SMP being updated (Halcrow, 2011a).*)

35.2 Suggested further studies to improve risk zone mapping

The coastal risk planning guidance presented in this document is based upon a limited amount of data in most areas. Therefore to improve this data and the risk zone mapping that is based upon it, the following studies could be undertaken (either as standalone studies or within the context of FCERM strategies/scheme appraisals):

- Monitoring of cliff areas to capture enhanced data on cliff landslide/fall events and overall rates of cliff top change (linking with the Regional Coastal Monitoring Programmes work in this area as appropriate).
- Geological and geomorphological mapping and modelling of complex cliff areas to improve assessment of instability to support the assessment of headscarp recession provided in this guidance. *Note*, currently only zonal mapping of this kind is available for Lyme Regis/Charmouth (refer to Appendix C). Such studies should prioritise areas where the cliff top area has the greatest development (i.e. north-west shore of Portland Harbour from Bingleaves to Dowman Place, and Furzy Cliff).
- Investigation of managed realignment sites to confirm the feasibility of implementing the SMP policy in these areas, and refine the potential extent of managed realignment.

- Updated flood risk mapping for present day and future scenarios allowing for sea level rise and wave overtopping to be produced in a consistent way for the whole area.

35.3 Other recommendations

In addition to studies to improve the data that underpins the risk zone mapping presented in this coastal risk planning guidance, the following are 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:

13. 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 CCMAAs.
14. When CCMAAs 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).
15. Alongside development of CCMAAs, 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.
16. 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.
17. 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.
18. 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.
19. Provide land charges information to raise awareness of coastal change issues in the area to potential property buyers.
20. 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.

21. 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 CCMA's.
22. 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.
23. 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.
24. 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).

References

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Glossary

Term	Definition
Accretion	Accumulation of sediment due to the natural action of waves, currents and wind.
ATL	Advance the Line. An SMP policy to build new defences on the seaward side of the existing defence line to reclaim land.
Amenity	The tangible or intangible elements of a location that contribute to a perceived positive character of the area for the enjoyment of those that use it.
AONB	Area of Outstanding Natural Beauty. Designated by the Countryside Commission. The purpose of the AONB designation is to identify areas of national importance and to promote the conservation and enhancement of natural beauty. This includes protecting its flora, fauna, geological and landscape features. This is a statutory designation.
Barrier Beach	A sand or shingle bar above high tide, parallel to the coastline and separated from it by a lagoon.
Beach	A deposit of non-cohesive material (e.g. sand, gravel) situated on the interface between dry land and the sea (or other large expanse of water) and actively 'worked' by present day hydrodynamic processes (i.e. waves, tides and currents) and sometimes by winds.
Beach recharge (nourishment)	Artificial process of replenishing a beach with material from another source.
Beach recycling/re-profiling	The movement of sediment along a beach area, typically from areas of accretion to areas of erosion, and shaping the beach profile to have a desired crest height, width and slope.
Beach Rollback	A process that occurs along barrier beaches 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 backward. Also known as 'beach rollover'.
BMP	Beach Management Plan. It provides a basis for the management of a beach for coastal defence purposes, taking into account coastal processes and the other uses of the beach.
Breaching	Failure of the beach head allowing flooding by tidal action.
CBUs	Cliff Behaviour Units provide an important framework for the investigation and management of cliffs. Each CBU includes the foreshore, the cliff top and the processes that act upon them, all of which can have a significant influence on cliff instability and recession behaviour.
CCMA	Coastal Change Management Area. An area identified in Local Plans as likely to be affected by coastal change (physical change to the shoreline through erosion, coastal landslip, permanent inundation or coastal accretion).
Cliff instability	Process that involves slope failure and mass movement of a coastal slope or cliff and may result in deposition of debris on the beach and foreshore. Some landslides are very large and extend a considerable distance inland, offshore and deep below beach level and 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.

Term	Definition
Cliff recession	The landward retreat of the cliff profile (from cliff toe to cliff top) in response to cliff instability and erosion processes. It is not a simple or uniform process in space or time and depends on a variety of factors that control the rates of detachment and transport. Long-term data on magnitude and frequency of recession events can be used to determine rates of historical change that can be used to estimate future behaviour. Short-term records of magnitude and frequency are likely to be misleading
Climate change	Long term changes in rainfall, temperature, wind speed and sea-level. The term is generally used for changes resulting from human intervention in atmospheric processes through, for example, the release of greenhouse gases to the atmosphere from burning fossil fuels, the results of which may lead to increased rainfall and sea level rise.
Coastal erosion	A process driven by wave and tidal energy at the coast which is dissipated by frictional drag associated with the scour, mobilisation and transport of sediments by tides and waves. 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.
Coastal squeeze	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.
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.
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.
DDB	Defined Development Boundary. Area defined in the Local Plan within which development is to be focussed.
Defra	Department for Environment, Food and Rural Affairs (formerly known as MAFF)
Environment Agency	Environment Agency. UK non-departmental government body responsible for delivering integrated environmental management including flood defence, water resources, water quality and pollution control.
Erosion	Wearing away of the land, usually by the action of natural forces.
Flood and Coastal Risk Management	Flood and coastal risk management addresses the scientific and engineering issues of rainfall, runoff, rivers and flood inundation, and coastal erosion, as well as the human and socio-economic issues of planning, development and management.

Term	Definition
Flood Zone	A geographical area officially designated subject to potential flood damage. The Environment Agency uses Flood Zone 2 and Flood Zone 3.
Geomorphology/ morphology	The branch of physical geography/geology which deals with the form of the Earth, the general configuration of its surface, the distribution of the land, water, etc.
Groyne	Narrow, roughly shore-normal structure built to reduce longshore currents, and/or to trap and retain beach material. Most groynes are of timber or rock, and extend from a seawall, or the backshore, well onto the foreshore and rarely even further offshore.
Groyne bay	The compartment between two groynes.
Hard defence	General term applied to impermeable coastal defence structures of concrete, timber, steel, masonry etc, which reflect a high proportion of incident wave energy.
HTL	Hold the Line. An SMP policy to maintain or change the level of protection provided by defences in their present location.
Intertidal zone	The zone between the high and low water marks.
Listed Building	A building or other structure officially designated as being of special architectural, historical or cultural significance.
Locally generated (wind) waves	Locally generated short period and irregular waves created by the flow of air over water.
Longshore transport	Movement of material parallel to the shore, also referred to as longshore drift.
MCZ	Marine Conservation Zone. MCZs are in the process of being established by Natural England and the Joint Nature Conservation Committee under the Marine & Coastal Access Act 2009. Once designated, MCZs will protect nationally important marine wildlife, habitats, geology and geomorphology and can be designated anywhere in English inshore and UK offshore waters. In South-West England MCZs are being defined through the Finding Sanctuary project.
MHWN	Mean High Water Neap.
MHWS	Mean High Water Spring.
MLWN	Mean Low Water Neap.
MLWS	Mean Low Water Spring.
Monitoring	Systematic recording over time
MR	Managed Realignment. An SMP policy that allows the shoreline position to move backwards (or forwards) with management to control or limit movement.
MSL	Mean Sea Level.
NCERM	National Coastal Erosion Risk Mapping.
Nearshore	The zone that extends from the swash zone to the position marking the start of the offshore zone, typically to water depths of about 20m.

Term	Definition
NAI	No Active Intervention. An SMP policy that assumes that existing defences are no longer maintained and will fail over time or undefended frontages will be allowed to evolve naturally.
NPPF	National Planning Policy Framework. The current planning guidance for England issued by the Department for Communities and Local Government in March 2012.
Overtopping	Water carried over the top of a coastal defence due to wave run-up exceeding the crest height.
Overwashing	The effect of waves overtopping a coastal defence, often carrying sediment landwards which is then lost to the beach system.
Policy Unit	A Policy Unit relates to the policy area defined by the Shoreline Management Plan (SMP).
Ramsar Site	Designated under the, "Ramsar Convention on Wetlands of International Importance especially as Waterfowl Habitat." 1971. The objective of this designation it to stem the progressive encroachment onto, and loss of, wetlands.
Relict	Landforms or sediments formed or deposited by processes no longer active in the area.
Rock Armour	Wide-graded quarry stone normally bulk-placed as a protective layer to prevent erosion of the seabed and or other slopes by current and/or wave action.
SAC	Special Area of Conservation: this designation aims to protect habitats or species of European importance and can include Marine Areas. SACs are designated under the EC Habitats Directive (92/43/EEC) and will form part of the Natura 2000 site network. All SACs sites are also protected as Site of Special Scientific Interest, except those in the marine environment below the Mean Low Water (MLW).
Scheduled Monument	Scheduled Monument: formerly referred to as Scheduled Ancient Monuments. Scheduled Monuments are nationally important archaeological sites which have been awarded scheduled status in order to protect and preserve the site for the educational and cultural benefit of future generations. The main legislation concerning archaeology in the UK is the Ancient Monuments and Archaeological Areas Act 1979. This Act, building on legislation dating back to 1882, provides for nationally important archaeological sites to be statutorily protected as Scheduled Monuments.
Scour	Removal of underwater material by waves or currents, especially at the toe of a shore protection structure.
Sea level change	The rise and fall of sea levels throughout time in response to global climate and local tectonic changes.
Seawall	Massive structure built along the shore to prevent erosion and damage by wave action.
Sediment	Particulate matter derived from rock, minerals or bioclastic debris.
Sediment transport	The movement of a mass of sedimentary material by the forces of currents and waves.
SFRA	Strategic Flood Risk Assessment. A requirement of the National Planning Policy Framework is for all local plans to be supported by an SFRA. These are developed in consultation with the Environment Agency and form the basis for preparing appropriate policies for flood risk management for these areas.

Term	Definition
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 (RSLR) is the main forcing parameter.
Simple landslide (systems)	A single sequence of inputs and outputs with variable amounts of storage. 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.
SMP	Shoreline Management Plan. It provides a large-scale assessment of the risks associated with coastal processes and presents a policy framework to manage these risks to people and the developed, historic and natural environment in a sustainable manner. It does not guarantee funding for implementing the SMP policy.
SPA	Special Protection Area. These are internationally important sites, being set up to establish a network of protected areas for birds
SSSI	Sites of Special Scientific Interest. These sites, notified by Natural England, represent some of the best examples of Britain's natural features including flora, fauna, and geology. This is a statutory designation
Standard of Protection (SoP)	The level of return period event which the defence is expected to withstand without experiencing significant failure.
Storm surge	A rise in the sea surface on an open coast, resulting from a storm.
Sustainability (in coastal flood and erosion risk management)	The degree to which coastal flood and erosion risk management options avoid tying future generations into inflexible or expensive options for flood defence. This usually includes consideration of other defences and likely developments as well as processes within catchments. It will take account of long term demand for non-renewable materials.
Swell waves	Remotely wind-generated waves (i.e. Waves that are generated away from the site). Swell characteristically exhibits a more regular and longer period and has longer crests than locally generated waves.
Tide	Periodic rising and falling of large bodies of water resulting from the gravitational attraction of the moon and sun acting on the rotating earth.
Toe level	The level of the lowest part of a structure, generally forming the transition to the underlying ground.
UNESCO	United Nations Educational, Scientific and Cultural Organisation.
WDDC	West Dorset District Council. Coastal Operating Authority as defined under the Coast Protection Act 1949 with permissive powers to provide defence against coastal erosion.
WPBC	Weymouth & Portland Borough Council. Coastal Operating Authority as defined under the Coast Protection Act 1949 with permissive powers to provide defence against coastal erosion.
World Heritage Site	A place of 'outstanding universal value' selected by UNESCO.