4.4 Policy Development Zone 3 - Bembridge and Sandown Bay (PDZ3)

Left to right: Sandown Bay from Culver Down, Sandown seafront, Bembridge Harbour (© Isle of Wight Council)

4.4 Policy Development Zone 3 - Bembridge and Sandown Bay (PDZ3)

Contents

Key facts:

Policy Development Zone 3: includes the communities of St. Helens, Bembridge, Forelands, Whitecliff Bay, Yaverland, Sandown, Lake, Shanklin and Luccombe.

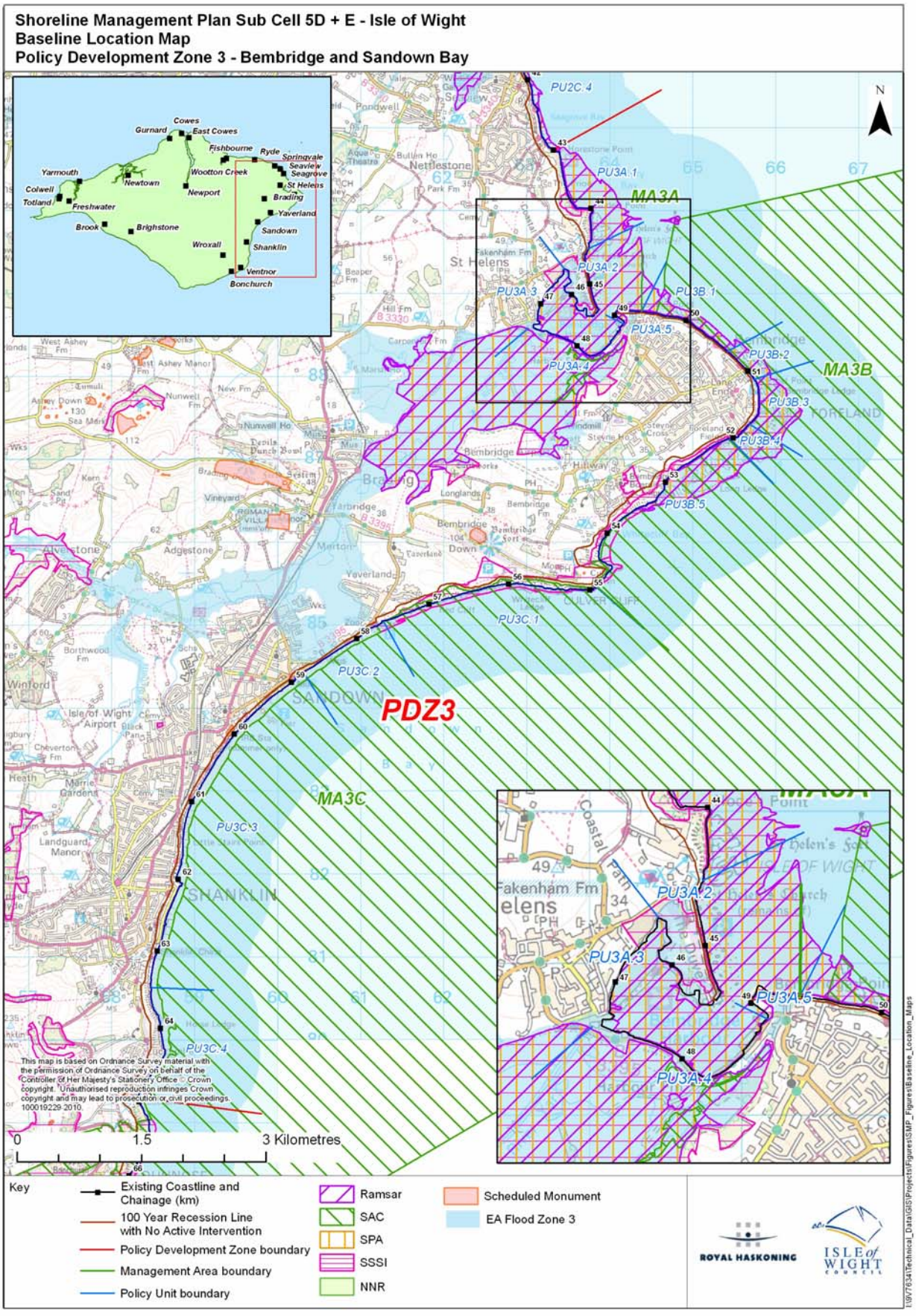
PDZ3 frontage = approximately. 23km in length (including Bembridge Harbour)

PDZ3 boundaries = from Horestone Point (Nettlestone) to Luccombe.

As listed in SMP2 Appendices: areas IW13 to IW19

Old policies from SMP1 in 1997, reviewed in this chapter:

Unit	Location	Length	Policy
RYD9	Horestone Point to St Helens Tower	1526m	Retreat the existing defence line
RYD10	The Duver, St Helens	790m	Hold the existing defence line
RYD 11	Bembridge Harbour	3064m	Hold the existing defence line
RYD12	Bembridge Point to Foreland Fields	2960m	Hold the existing defence line
RYD13	Foreland Fields to Culver Cliff	2448m	Do nothing
SAN1	Culver Cliff	1740m	Do nothing
SAN2	Culver Cliff to Yaverland	1248m	Do nothing
SAN3	Yaverland	540m	Hold the existing defence line
SAN4	Sandown Zoo to Fort Street, Sandown	500m	Hold the existing defence line
SAN5	Fort Street to Ferncliff Road, Sandown	1061m	Hold the existing defence line
SAN6	Ferncliff Road to Hope Beach	2170m	Hold the existing defence line
SAN7	Hope Beach to Shanklin Chine	1195m	Hold the existing defence line
SAN8	Shanklin Chine to Horse Ledge	896m	Hold the existing defence line


Shoreline Management Plan Sub Cell 5D + E - Isle of Wight
Baseline Location Map
Policy Development Zone 3 - Bembridge and Sandown Bay
PDZ3
MA3A
MA3B
MA3C
PU2C 4
PU3A 1
PU3A 2
PU3A 3
PU3A 4
PU3A 5
PU3B 1
PU3B 2
PU3B 3
PU3B 4
PU3B 5
PU3C 1
PU3C 2
PU3C 3
PU3C 4
Cowes
Gurnard
East Cowes
Fishbourne
Ryde
Springvale
Seaview
Seagrove
Wootton Creek
St Helens
Brading
Yaverland
Sandown
Shanklin
Ventnor
Bonchurch
Yarmouth
Newtown
Newport
Colwell
Totland
Freshwater
Brook
Brighstone
Wroxall
N
This map is based on Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office © Crown copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings. 100019229 2010.
0
1.5
3 Kilometres
Key
Existing Coastline and Chainage (km)
100 Year Recession Line with No Active Intervention
Policy Development Zone boundary
Management Area boundary
Policy Unit boundary
Ramsar
SAC
SPA
SSSI
NNR
Scheduled Monument
EA Flood Zone 3
ROYAL HASKONING
ISLE of WIGHT COUNCIL

1. Overview & Description

1.1 Principal Features (further details are provided in Appendix D)

Built Environment:

The East Wight headland includes the seafront or harbourside communities of Bembridge, St. Helens, Forelands and Whitecliff Bay. The coastal villages are generally characterised by historic buildings, narrow streets, detached cliff top properties and estates above generally gently sloping coastlines. At Bembridge is the RNLI Lifeboat station pier, extending over the Bembridge limestone ledges. There are scattered hotels and holiday parks.

To the south (and separated by the 104m high distinctive Chalk headland of Culver Cliff) is the long sweep of Sandown Bay with seafront and cliff-top communities at Yaverland, Sandown, Lake, Shanklin and Luccombe. The built environment in Sandown Bay is predominately Victorian and reflects the typical characteristics of a British seaside holiday resort, with esplanades, seafront and cliff top hotels, beach huts, wide sandy beaches and a multitude of seafront concessions and small businesses. Footpaths follow the 40m high cliff top and cliff foot, and a series of access steps and a cliff lift at Shanklin provide additional access to the promenade and seafront.

The two frontages along this PDZ are intrinsically linked by the low-lying fluvial (and potential tidal) floodplain of the East Yar valley. This covers the area from behind the sea defences on Culver Parade in Sandown through past Brading to an outlet through Embankment Road into Bembridge Harbour. If the defences fail at either end of the floodplain, areas of Sandown, Brading and St. Helens will be at risk from tidal flooding events (particularly in combination with fluvial flooding). Potentially, in the long term, all key access routes across the valley floor to the communities of Bembridge and Forelands will be affected by breaches or increasingly regular tidal inundation.

Local roads run the length of Sandown seafront, Shanklin esplanade and also provide access to seafront properties at a number of points in east Wight. Also lying within the Eastern Yar valley behind the defences at Sandown Bay is the Southern Water waste water treatment works for the Isle of Wight.

Heritage and Amenity:

Heritage:

This PDZ encompasses a variety of sites, finds and palaeoenvironmental deposits documenting human and environmental history, with 320 monument records and 3 scheduled monuments (SMs). The most prolific Palaeolithic site on the Island is on the cliff top at Priory Bay and preliminary investigations suggest that it is potentially of national importance. Other Palaeolithic finds related to the Bembridge Raised Beach deposits are eroding from the cliffs between Forelands Point and Whitecliff Bay. The East Yar valley preserves palaeoenvironmental deposits. The marsh between Yaverland and Bembridge has been progressively reclaimed. A wall is believed to have existed at Yaverland since the 1200's, a major reclamation to "Great and Little Sluice" in the 1500's and the present reclamation to the sluice between Bembridge and St Helens when the railway was built in the late 1800's. As the coastline rises up to the Chalk headland, there is much evidence of Bronze Age Activity, including a Barrow which is a Scheduled Monument (SM) at the top of Culver Cliff. Along the cliff line at Culver moving toward Yaverland pre-historic and Roman occupation and salt-making has been identified. Military defences become a predominant historical feature from Culver Cliff south to Shanklin, with abundant military marker stones. Of significance are St Helens Fort, Yaverland Battery and Sandown Barrack Battery, all SMs and two air wreck sites in the marine zone. The built environment contains 21 Grade II listed buildings and 4 conservation areas as well as three items of the local list of sites of Historic Interest. Offshore 44 shipwrecks have been recorded.

Amenity:

The amenity value of the PDZ is vital to the local economy which relies on recreational and tourism use by both residents and visitors.

The east Wight headland is less developed with quieter beaches, small cafes and beach huts with access through footpaths, limited local roads and car parks. Bembridge Harbour is significant for its recreational moorings and marine businesses. There are two holiday camps located between Forelands and Whitecliff Bay. Culver Down headland is popular with walkers for its beautiful views and natural environment. A small pub and café are located near the end of the ridge.

Within Sandown Bay the frontage rapidly changes to a developed and popular tourist destination with large Victorian hotels and residences. Both Sandown and Shanklin are Blue Flag beaches and are widely used by swimmers, recreational fishermen and watersports enthusiasts. There are two sailing clubs, one at either end of the bay, and many hotels, pubs, nightclubs, amusements and a popular promenade seawall that runs continuously from Yaverland south to Shanklin Chine (approximately. 5km). Sandown Pier houses amusements and funfair rides and provides access to views of the coast and seascape.

Landscape provides an important aspect of the recreational and tourism values, with coastal headlands and coastal cliffs flanking the towns and villages.

Nature Conservation:

There are a variety of coastal habitats within this PDZ from intertidal rocky shores to long stretches of sandy beaches. The frontage along Priory Bay consists of rocky shores, whilst the Bembridge Harbour mouth is two sand and shingle spits backed by sand dunes. Within the harbour and beyond (up the flood plain of the River Yar to Brading) are a variety of habitats, including vegetated shingle, saltmarsh, mudflats, saline lagoons and reedbeds. This area supports large numbers of over wintering wildfowl and waders. Bembridge Point to Whitecliff Bay comprises diverse Chalk and limestone rocky intertidal ledges, with a number of large lagoons supporting seagrass beds, kelps and red algae communities. The eroding maritime cliffs from Bembridge to Yaverland are of geological importance for their exposed rock sequences and range of species they support. The coastline from Yaverland to Luccombe Chine comprises protected sandy beaches, with the subtidal clay exposures and mudstone reefs that support faunal turf communities.

The coastline sits within two internationally designated sites that cover the entire length of the coastline, as well as a third area inland within Bembridge Harbour. Within this PDZ, the most easterly extent of the Solent and Southampton Water Ramsar and SPA runs from Horestone Point to the middle of Whitecliff Bay. Within Bembridge Harbour there is also the Solent and Isle of Wight Lagoons SAC, which is designated for it coastal lagoons which are regarded as a priority feature. The designated SPA and Ramsar area includes Bembridge Harbour and Brading Marshes that sit within the flood zone of the River Yar up to Brading. There are two component SSSI's for the SPA within the PDZ. The first is Brading Marshes to St Helens Ledges SSSI that protects a wide range of coastal habitats, including Biodiversity Action Plan (BAP) priority habitats, and which support important bird species. The habitats include boulder and cobble shores, seagrass beds, intertidal mudflats, saltmarsh, reedbeds, saline lagoons and coastal grazing marsh, and include areas for high tide roosts. Whitecliff Bay and Bembridge Ledges SSSI protects BAP priority habitats including rocky shores, seagrass beds, intertidal Chalk maritime cliffs and slopes and calcareous grassland. In addition there are two other coastal SSSI's within the PDZ that do not comprise part of the SPA. The first is Bembridge School and Cliffs SSSI, which sits above Whitecliff Bay, and is of geological importance for quaternary succession. The second is Bembridge Down SSSI, which runs from Culver Down along Whitecliff Ledge to near Sandown Zoo, and which is designated for the biological importance of the soft Chalk cliffs, grassland, vegetated shingle and boulder and cobble shores, as well as the geological interest features of the Wealden Group. The second international designation within PDZ 3 is the South Wight Maritime SAC, which covers much of this PDZ, since it begins at Bembridge Point and runs round the south side of the Island to Hatherwood Point north of the Needles in PDZ 6 (covering an area of 19,863ha). The SAC covers both the coastline and subtidal areas offshore, and include Annex 1 habitats such as reefs, vegetated sea cliffs and submerged and partially submerged sea caves.

1.2 Key Values

Residential communities are present along much of the coastline and rely heavily on the tourism industry and amenity infrastructure, especially in Sandown Bay. The natural environment is a key driver in terms of the open and evolving coastal cliffs at Whitecliff Bay, Culver and Luccombe, the ledges at Bembridge, and also the internationally important habitats of the Eastern Yar Valley and around Bembridge Harbour.

The character of the area can be considered in three sections. The character of the northern section the character is distinctly rural with the communities of Bembridge and those surrounding Bembridge Harbour and the Eastern Yar Valley. The central section comprises Culver Cliff, Bembridge Down and the adjacent Whitecliff Bay and the northern section of Sandown Bay. The southern section comprises the seafront of Sandown.

In the northern section, while there is significant local development and important local commercial activity associated with the harbour, the key driver is seen as to maintain the essential rural characteristics. An essential part of this is maintaining and enhancing the high nature conservation status of the area. Local but strategic transport routes are an important value to the East Wight communities. The principal driver for the central section of the frontage is its natural landscape, although locally there is significant Heritage value associated with the area. Sandown, in contrast to the rest of PDZ area is an important developed economic hub for the Isle of Wight, with essential economic infrastructure based significantly upon tourism. This tourism is based principally around its coastal use, the important access to and use of the beach, supporting and supported by the promenade and seafront development. These key drivers for management are summarised by the large scale objectives outlined below.

At the local scale, particularly with respect to the northern section, there is important recreational and tourism use of the shoreline around Bembridge Harbour and along the Bembridge sea front.

1.3 Objectives

Overarching objectives for PDZ3:

- To sustain and adapt important centres of economic activity including Sandown Bay.
- To sustain and adapt the communities of East Wight to reduce flood and erosion risks.
- To address the risk of tidal inundation of the Eastern Yar Valley and access to East Wight communities.
- To maintain important access along the seafront and shoreline use of the area.
- To maintain the habitat within Brading Marshes, in accordance with the Habitat Regulations (European designated freshwater habitat)
- To support opportunity for adaptation supporting and enhancing the nature conservation value of the area subject to natural processes.
- To maintain the important landscape.
- To sustain the historic landscape and environment where practical.

1.4 Description

PDZ3 is a mixed frontage of defended and undefended coastline with two distinctive areas that require a co-ordinated approach to shoreline management. The low-lying East Yar valley links the area surrounding Bembridge Harbour and the northern coastline of Sandown Bay. If the sea defences fail or breach at either side of the floodplain, the valley is at increasing risk of tidal flooding, putting at risk properties and businesses in Sandown, Brading, St. Helens and Bembridge and transforming the natural environment. The communities of Bembridge and Forelands are also accessed by transport links crossing this potential tidal floodplain.

Left: Erosion at Horestone Point undermining the wooded slopes, February 2009.

In the north of this area the relatively steep wooded coastal slopes at Horestone Point and Priory Bay are weak, often saturated and have potential for slope failure and reactivation triggered by coastal erosion. Horestone Point is eroding and in the longer term is expected to reduce as a headland. Coastal slope reactivation backing the quiet shore of Priory Bay will encroach back towards nearby hotel and holiday park assets above the bay.

Right: Bembridge Harbour looking towards the east Wight headland of Bembridge and Foreland.

At the mouth of Bembridge Harbour the two sand spits of St. Helens Duver and Bembridge Point provide localised areas of sediment accumulation and provide shelter from surface waves. The Duver is attached to the land at its northern end, with a small number of residential properties, car park, café and beach huts located on the seaward face of the spit along a promenade protected by a seawall (and groyne field). Some marine industry is located near the tip of the spit, linked by an access road. Bembridge Harbour is the remnant of a much larger Estuary truncated and drained in the 1880s, protected by Embankment Road. At low tide the harbour almost dries. Outside the harbour entrance the low-tide channel of the Eastern Yar extends north then east towards St. Helens Fort. The harbour is bordered by residential properties, houseboats, marinas and some marine industry.

Below: Cliff erosion near Foreland Point

Moving south, the Bembridge coastline is partially developed with residential properties generally set some distance back from the shoreline. At Bembridge Foreland there is a small width of recreational frontage, behind which exists denser tourist and residential accommodation. Around the headland the low cliff line is generally eroding, although ledges of relatively resistant Bembridge Limestone form wide shore platforms of up to 500m width at low tide, providing protection from high energy waves. From Foreland to Whitecliff Bay the cliffs rise in height and the coastline is largely undefended and naturally evolving, supplying quantities of sandy shoreline sediments downdrift to the north. Cliff recession rates are likely to increase as sea level rises, increasing the vulnerability of the cliff to wave attack. The coastal path runs along the cliff tops of this scenic bay of geological importance and a large holiday park and a number of chalets front the coastline. The shoreline of Whitecliff Bay is set back 300m from the resistant Chalk

headland of Culver Cliff to the south, which will continue to be slowly eroded but is sufficiently large to continue to exert a major control on shoreline evolution to the north and south.

Left: View from Culver Down towards Yaverland and Sandown

The headland of eroding Chalk, sandstone and weak clay cliffs from Culver to Yaverland is of geological and environmental importance, and the retreating shoreline is already set back from the seawall to the south. There is a well developed sand beach and wide intertidal area in front of the eroding cliffs in this area.

To the south, the seawalls lining the frontage of Yaverland, Sandown and Shanklin provide protection along the whole length of the central part of the bay. At Yaverland the defended shoreline is approximately 10m in advance of the eroding cliff line to the north. The upper beach in this area is significantly less effective and is held in place by groynes. At Culver Parade the seawall acts as both coast protection and sea defence, protecting the natural barrier to the low lying area of the Eastern Yar valley bordering Sandown, Brading and Bembridge Harbour.

Below: Wave spray over the Culver Parade seawall near Dinosaur Isle museum, Sandown, October 2004.

Right: Sandown seafront and pier.

The beach in front of Sandown, in the area of the Pier, is relatively wide with a drying upper beach along the frontage. The beach is held at its northern point by a short breakwater, separating the central beach from the much diminished beach to the north. This provides an important amenity feature of the frontage.

If the Eastern Yar Valley is also breached at Bembridge Harbour, the interaction of the twin breaches would affect the long-term evolution of the system. This would be compounded by fluvial flooding and have serious consequences for access to the communities living on the eastern side of the inundated valley floodplain.

From Sandown to Shanklin continuous seawalls front steep sandstone cliffs protecting the continuous cliff-top development of the towns of Sandown, Lake and Shanklin. It also protects access paths and some cliff-foot businesses located on the seawall. This area is currently vulnerable to cliff-falls from the former seacliffs, which would fully reactivate and erode following deterioration and failure of the seawalls. The continuous seawall promenade and cliff top footpath are popular amenity routes.

Left: Lake cliffs and the seafront promenade linking Sandown and Shanklin.

At Shanklin, Hope Groyne plays an important role in controlling Shanklin Esplanade beach and road access. The coastline steps forward approximately 80m due to previous beach movement and then subsequent infill development (which includes the Southern Water pumping station and car parking adjacent to the groyne, which also protects the only access road cutting down through the cliffline to Shanklin Esplanade). The key industry in the area is tourism led by the long sandy beaches, amenity access and attractions, hotels and residential properties, and scenic coastal cliffs.

Moving south from Shanklin Esplanade towards Luccombe village there is a transition from defended to undefended coast. There is a row of cliff top development along this exposed frontage (rows of large properties and blocks of flats etc.), leading towards Luccombe village. Recession of the cliffs within this frontage will continue or accelerate as the cliffs are sensitive to winter rainfall with increasing potential for landslide reactivation in the south resulting from erosion as well as water in the ground.

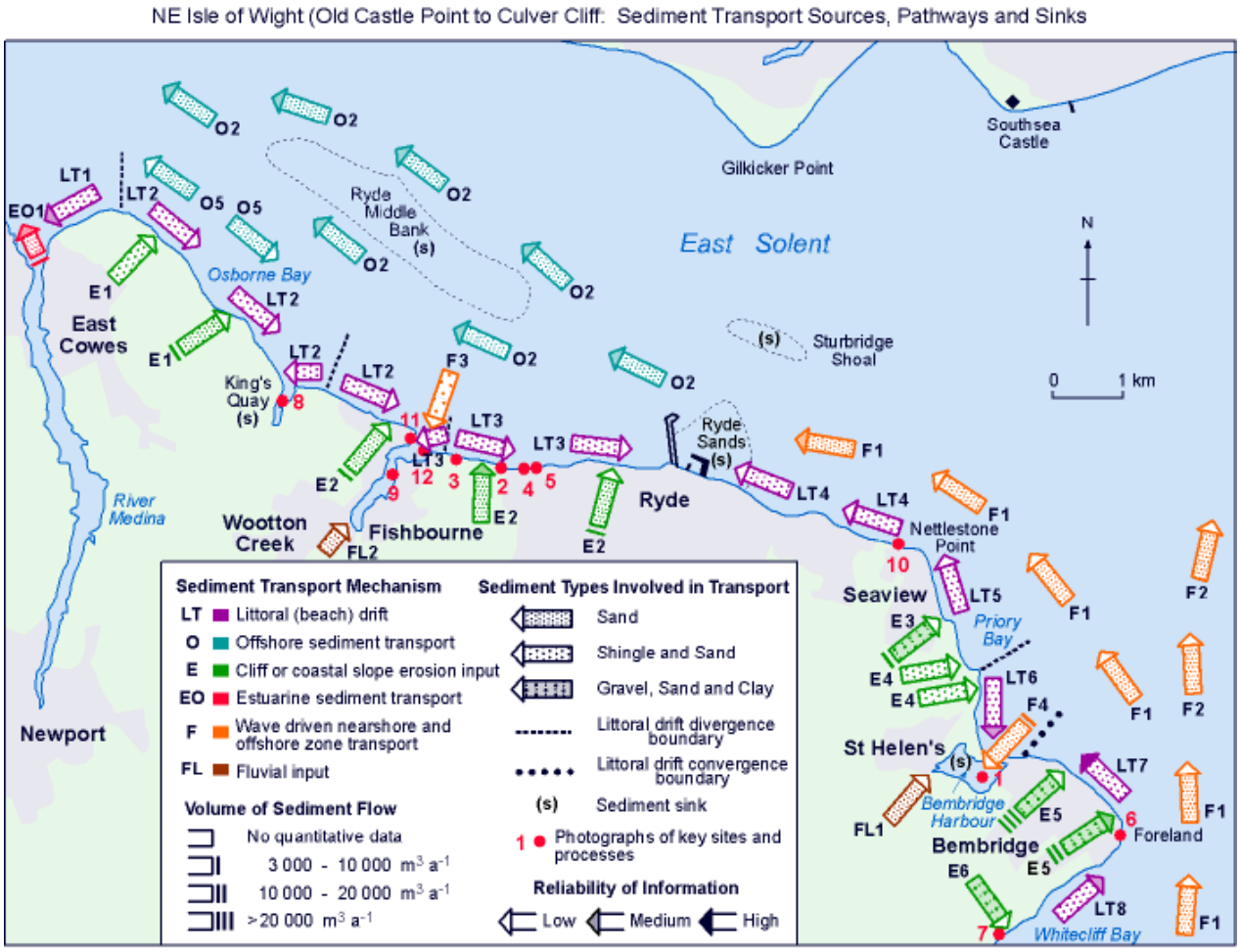
1.5 Physical Processes

1.5.1 Coastal Processes (further details are provided in Appendix C1).

This PDZ includes the eastern headland of the Isle of Wight, the inlet of Bembridge Harbour and the broad sweep of south-east facing Sandown Bay. The low-lying reclaimed Eastern Yar valley links both coastlines inland of the headland. The following summary outlines the wave climate, tidal flows, geomorphological controls, sediment supplies and coastal processes characterising PDZ3.

1.5.1.1 Horestone Point to Culver Cliff including the Eastern Yar Valley

The north-east shore of the Isle of Wight coast forms the southern margin of the Eastern Solent. The general pattern is sediment movement is summarised in the following diagram from the SCOPAC Sediment transport study.



Sediment transport sources, pathways and sinks on the north east coast, from SCOPAC Sediment Transport Study, 2004.

The coast is mostly low-lying, or only of moderate relief. The coast around the eastern tip of the Isle of Wight is open to waves generated in Hayling Bay and also diffracted waves from the English Channel. Wave energy is therefore moderate and approaches from a predominantly east or south-east direction. Offshore gradients are relatively gentle and the shoreline is generally not greatly affected by tidal currents. At the small inlet of Bembridge Harbour tidal flow through the narrow entrance generates rapid currents which interrupt littoral sediment transport causing local circulation effects and associated changes in coastal configuration. With the exception of raised beach deposits at Bembridge and Forelands, the local geological types of the cliffs yield mostly fine sediments as they erode and tend to contribute to the suspended sediment load of the Solent waters rather than to local beaches. Much of this coast is of moderate to low wave energy, so there are opportunities to ameliorate coastal problems by more widespread applications of modest replenishment or recycling schemes.

The embayment of Priory Bay has been formed by erosion of soft clay strata between rocky (Bembridge Limestone) headlands. The shape of the bay is characteristic of a general north-westward net drift. The headlands partly intercept littoral sediments thus accounting for the moderately wide sandy beach in northern and central parts and depletion in the south of the bay. Remnants of sea-wall and defence structures, which protect the toe of the coastal slope have been undermined following falling beach levels and landslides that have surged over and through the walls. Major extension and intensification of the activity of these cliffs are anticipated due to sea-level rise and increased winter rainfall. Some sands and limestones would be yielded although the majority of supply will be clays. The coastal slope failures will at first accentuate the two headlands bounding Priory Bay as landslide toes extend seaward, but later will reduce their definition as debris is eroded and transported and the headlands are eroded back. There exists a northward

nearshore drift pathway that has the potential to contribute material from this frontage to Ryde Sands. Material released from Nodes Bay, however, is likely to be supplied to St Helens Duver.

There is local drift divergence at Nodes Point near the northern margin of this PDZ, historically forming St. Helens Duver spit. The short sediment supply pathway to St. Helens Duver (reversed from the general northwards trend) means the stabilised spit is susceptible to sediment starvation and local beaches are especially sensitive to variations in sediment supply. Beach sediments drift to the southern tip of the spit where they are intercepted by tidal currents within the Bembridge Harbour entrance and flushed offshore by dominant ebb currents. Beach levels fell significantly along the Duver in the late 1980s so that improvements to the existing groyne system were necessary so as to minimise further beach losses to the tidal channel. The contribution of harbour channel dredging to these erosion problems is difficult to establish due to lack of information.

Bembridge Harbour is a small, enclosed estuary sheltered by double sandy spits. It currently covers an area approximately. 600m by 1km wide. The former estuary to the south-west was drastically truncated in the 1880s, when over 80% of its area was reclaimed. It used to run nearly 4km inland to the town of Brading. At the current Harbour entrance, the largest spit is that extending from the north-west direction, which is composed mainly of stabilised sand, known as St. Helens Duver. At low tide the harbour almost dries, apart from a channel into the River Yar behind. There are residential houseboats, marinas and sailing clubs. River flow into the estuary is small. The Harbour is open to the sea at all states of the tide and therefore exposed to tidal surges and storm surges. St. Helens Duver and Bembridge Point spits form a local sediment sink and shelter Bembridge Harbour from swell waves, with the waves experienced within the Harbour being locally generated wind waves which are expected to have significant wave heights of less than 0.3m. Tidal flow through the narrow entrance to the inlet can generate rapid currents which interrupt littoral sediment transport causing local circulation effects and associated changes in coastal configuration. Tidal currents are insufficient to remove all littoral drift material from the entrance channel. Beach extraction has been practised near Bembridge Point, linked to the navigation channel to Bembridge Harbour. The Eastern Yar valley is presently defended from inundation by embankments around the margins of Bembridge Harbour and by seawall stabilisation of the vulnerable barrier at Yaverland in Sandown Bay. The Eastern Yar river behind Embankment Road (and extending upstream to Sandown) exhibits a degree of flashy behaviour, quickly responding to rainfall events particularly in the upper reaches. Summer flows are generally low. Significant flows occur and inundate the flood plain in the lower reaches following 3 to 4 days of rainfall. The water level of the marshland is close to low tide neaps, so an increase in this will reduce drainage through the outlet at Bembridge sluice at Embankment Road.
With the continued siltation within the harbour, it would be anticipated that the harbour entrance is in a continuous process of change. The processes of siltation and the knock on effect at the harbour mouth may well still be part of the adjustment of the estuary system following the closing off of significant tidal prism. This adjustment of the entrance may have resulted in the southerly extension of the St Helens Duver and the extension of Bembridge Point outer spit northwards.

Left: The village of Bembridge, looking north-west towards Bembridge Harbour (Isle of Wight Council).

From Bembridge to Forelands the coast is characterised by low active and relic cliffs (5-15m height) formed of Bembridge Marls capped by variable thicknesses of shingle-rich raised beach deposits. Some frontages are undefended and erosion contributes quantities of beach-forming shingle and sand. The relic cliffs are primarily located to the north-west of the Bembridge lifeboat slipway, whereas active cliffs are located to the south-east of this point. Bembridge limestone outcrops on the foreshore to form an extensive series of ledges and reefs that provide protection to the cliffs against wave attack at low and mid tide. Narrow upper beaches are formed of mixed sand and shingle derived from local cliff sources. Dominant north-

westward littoral drift is indicated by some sediment accumulations on the south east side of groynes, outfalls and the substantial accumulation forming the sand spit of Bembridge Point.

From Forelands to Whitecliff Bay, rapid erosion of the high, mostly fine grained cliffs has yielded a plentiful supply of well-sorted, mobile sand for the construction of a wide, flat beach at Whitecliff Bay. There is a small backshore fringe of Chalk and flint coarse gravel and cobbles, and the progressive southwards increase in the size and frequency of the Chalk pebbles gives a clear indication of net northwards longshore transport. A significant proportion of the beach shingle is derived from the long-term erosion of the thick overburden raised beach of gravels at the cliff crest. A set of curvilinear limestone ledges forms a nearshore-offshore reef and provides some protection to the coastal cliffs. The wide reefs and ledges of Bembridge Ledges provide an effective buffer to wave energy (except when waves are propagated from the south-east or east). Each ledge represents the outcrop of a distinct litho-stratigraphic horizon in the Bembridge Limestone sequence; they are virtually horizontal, but have a local relief of up to 2m. Several centimetres of sand may blanket the upper ledges after the incidence of storm waves suggesting that significant quantities may be transported. The tidal streams flow approximately parallel to the coastline, and may operate in conjunction with wave action to promote longshore transport of sand around the Foreland. The cliffs, cut into the soft Eocene and Oligocene sands, clays and limestones, are unprotected along most of this frontage. They are subject to failure creating complex landslide morphologies of scarps and degradation terraces. Cliff behaviour is controlled by lithology with complex cliffs developed in interbedded sequences around Black Rock Point, simple rock fall and gully dominated cliffs in sandy strata in the steep central parts of the bay and mudslides forming deep embayments cutting the clayey southern cliff tops.

Southward of Foreland Fields the coastal relief rises to 40m at Black Rock Point and the cliffs formed in gently northward dipping Bembridge Marls exhibit an increasing degree of landsliding. In the north a partly inactive simple cliff form occurs towards Black Rock Point where a fully active stepped profile is developed, evident with benches being controlled lithologically by thin limestones occurring within the predominantly clayey strata.

The cliffs in Whitecliff Bay comprise a steeply northward dipping sequence of soft sand and clay Palaeocene, Eocene and Oligocene strata. Mudslides are developed in the steeply dipping Reading and London Clay strata in Whitecliff Bay.

Left: View from Culver Cliff headland, looking north-west over Bembridge Ledges towards Forelands, July 2009.

The small lengths of informal defences in Whitecliff Bay are of marginal significance in restraining sediment yield. Much of the clay and silt sized sediment mobilised by periodic slope failures and other mass movement processes is probably transferred offshore in suspension. The sand fraction contributes to the wide intertidal zone between Culver Cliff and Long Ledge. This frontage supplies significant quantities of sandy shoreline sediments downdrift so variations in behaviour that affect cliff erosion, sediment inputs and shoreline sediment transport can have impacts on other frontages to the north.

The shoreline is set back up to 300m from the Chalk headland of Culver Cliff, illustrating the effects of differential erosion according to rock structure and lithology. The effect of the intertidal Bembridge ridge may also be seen both in controlling cliff erosion over the Foreland Field area and in acting as a control point in the crenulate development of Whitecliff Bay.

Culver Cliff is a prominent, slightly oversteepened, Chalk headland fronted by a boulder-strewn platform. The Chalk headland rises to over 100m in height and separates Whitecliff Bay to the north and Sandown Bay to the south.

Unconstrained scenario:

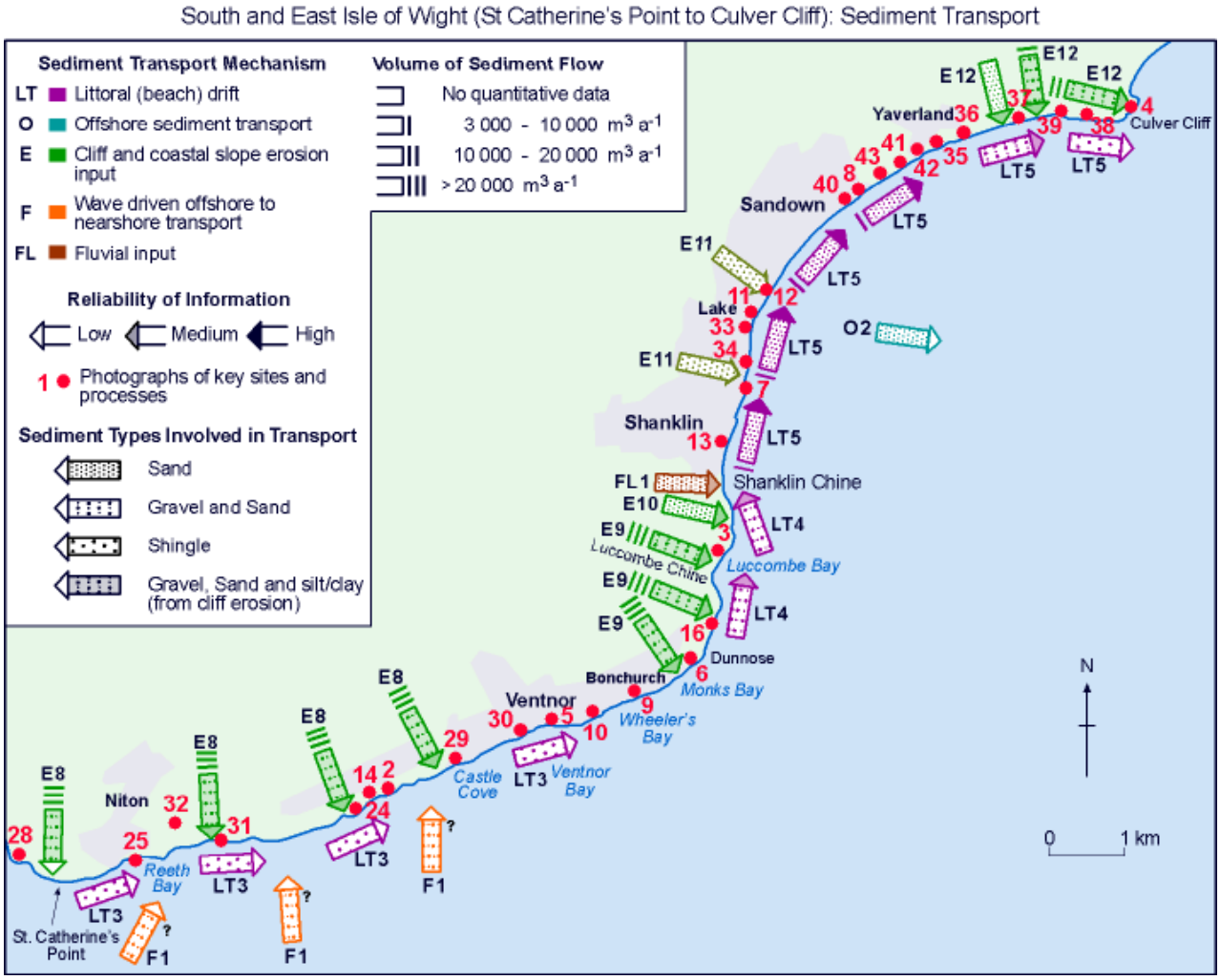
The 'unconstrained' scenario provides a vision of how the coast could evolve if not controlled by man-made structures such as coastal defences. This is a key step in understanding the 'natural' response of the coast.

Without defences, there is the potential for a general re-activation and intensification of ground movement within the coastal slopes and cliffs around Priory Bay and Node's Point over the next century. Cliff landslides and coastal retreat could at first accentuate the minor headlands, but thereafter reduce their definition as debris is eroded and transported. Sediments yielded by cliff erosion are likely to contribute to local foreshores and counter previous narrowing trends, eventually contributing towards drift inputs to both Ryde Sands and St Helens Duver. St Helens Duver is extremely sensitive to erosion without defences, comprised of loose dune sands stabilised only by a thin vegetation cover. Sediments would be likely to become entrained and transported southward by the dominant littoral drift and become deposited within the Bembridge Harbour channel. Without defences, the Duver is likely to remain in some form as its natural behaviour is re-established. Bembridge Point would be likely to accrete more rapidly in future as cliffs updrift re-activate and contribute additional sediments to the northward drift pathway. A large portion of the Eastern Yar valley would be inundated by tidal flooding without defences forming Embankment Road in Bembridge and Culver Parade in Yaverland. Tidal inundation would impact upon the current European designated freshwater habitat. Opening up the Eastern Yar estuary would, at least initially, substantially increase the tidal prism at Bembridge Harbour. This is likely to increase and reshape the entrance with the potential for sediment to be retained on the St Helens Duver, although this spit could tend to shorten as the entrance widened. There remains the uncertainty as to whether accretion would continue within the estuary, reversing this process.

From Bembridge to Foreland Fields general re-activation and intensification of the relic and active cliffs is anticipated throughout the frontage due to the present depleted state of beaches together with the effects of future sea level rise. The low cliffs are relatively exposed and would once again contribute material from the raised beach deposits to local beaches and may enhance their capacity to dissipate wave action. The cliffs immediately to the south of Foreland Fields would be likely to experience erosion at their toes, eventually triggering new failures and conversion to fully active retreating profiles. The cliffs of Whitecliff Bay will continue to retreat rapidly and contribute increasing sediments to the northwards littoral drift system. This process of erosion would be exacerbated by the increased water depth over the Bembridge Ridge, increasing wave action and erosion of the toe of the cliff.

1.5.1.2 Sandown Bay

The coast of Sandown Bay has developed through marine erosion of the predominantly soft clays and sands. Erosion would have operated over the past 5,000-6,000 years, since the rising sea-level has approached its present elevation. Extensive shore platforms provide evidence for long-term recession in outcrops of more resistant bedrock, and appear to extend seawards of low water. In total, several kilometres of recession have occurred; sufficient to release large quantities of predominantly sandy sediment into Sandown Bay.



Sediment transport sources, pathways and sinks on the south east coast, from SCOPAC Sediment Transport Study, 2004.

The key headland of Culver Cliff is undefended in the centre of the PDZ and is sufficiently large to retain geomorphological control over the adjacent shorelines. To the south, the regular plan-form of Sandown Bay is maintained by the presence of continuous defence structures through the centre of the Bay preventing cliff erosion and tidal breach, although the northern and southern margins of the Bay are undefended.

In the south of the bay the east-facing coast is relatively protected from waves generated by dominant westerly winds, although it is subject to the residual energy of swell waves refracted by a combination of offshore seabed topography and the acute change in coastal plan at Dunnose. It is, however, fully exposed to a fetch distance of just over 200km, extending east and east-south-east within the Channel, over which large waves can be propagated in association with easterly gale-

force winds. In the north of the Bay the shoreline is less sheltered as it faces south-south-east and is vulnerable to southerly winds associated with surges.

Almost the entire length of Sandown Bay is characterised by active cliff development, with adjoining sandy beaches and shore platforms of variable length, height and width. Between Shanklin Chine and Culver Cliff there are clearly defined offsets in beach width associated with the numerous groynes, which indicate that the dominant longshore transport is from south to north. Long term maintenance of the beaches of Sandown Bay is dependent upon continuation of cliff erosion inputs. Whilst some sandy sediments have remained within the bay, most have been transported elsewhere. It has been suggested that this material could have contributed to Ryde Sands although other areas of potential accumulation also exist to the east of the bay.

The natural behaviour of parts of this coastline have been largely influenced and constrained by past management practices and the presence of coastal defences. With the emergence of the twin resorts of Shanklin and Sandown in the 19th century, installation of substantial sea walls and promenades has removed the former cliffline from the direct influence of wave-induced attack. The coastal frontage between Yaverland and Shanklin Chine is fully protected by a variety of structures. These include sea walls, revetments and groyne fields that have been subject to both renewal and extension for more than a century. The groyne system between Shanklin and Sandown has succeeded in retaining substantial quantities of sand, transported from south to north by the net direction of littoral drift, retaining a sandy amenity beach. This has resulted in part in the paucity of sediment along the Yaverland frontage. Supply deficit is also a consequence of the removal of sediment supply from cliff erosion as a direct result of seawall/esplanade construction. Although isolated from wave activity by sea defences, the 40m high former high sea cliffs behind the seawall promenade from Sandown to Shanklin remain geomorphologically active, due to sub-aerial weathering and mass movement. Various protection techniques including cliff-top regrading, drainage, timber shuttering, geofabric/grass matting, netting, rock bolting and talus reprofiling and removal have been implemented to manage this problem over a 3.5km length at Shanklin. At Shanklin Esplanade the Hope Groyne is key to retaining an effective Esplanade and beach along Shanklin seafront.

Left: View north-west from Shanklin across Sandown Bay, towards Culver Cliff (Chalk headland) in the distance. The former sea cliffs are stabilised in the centre of the bay and sediment transport is from south to north-west, forming important amenity beaches (Isle of Wight Council).

Although the centre of Sandown Bay is currently defended, there are high, actively-eroding cliffs in the north and south of the Bay which may increasingly outflank the defences. In the north, immediately north-east of Yaverland the seawall terminates and mudstone, clay, sandstone and Chalk cliffs at Yaverland and Culver are actively eroding and retreating, supplying sediments to the northwards littoral drift system. Along the undefended sections of this coastline there is evidence of substantial retreat. For example, at Yaverland the foundations of early nineteenth century buildings at Yaverland Fort, now exposed on the foreshore, indicate approximately 0.5km of cliffline retreat, over the past century. Repeated semi-rotational slides, and their rapid removal by wave action, have resulted in as much as 20m of cliff top retreat in less than one year at specific sites with slope instability evident up to 70m inland.

Importantly, coastal recession has truncated a tributary of the Eastern Yar Valley at Yaverland along Culver Parade, linking Sandown Bay to Bembridge Harbour along the low-lying river valley.

Sediments migrated into this channel mouth in the form of a former barrier beach have been stabilised with a seawall that prevents marine inundation and preserves artificially the regular plan-form of Sandown Bay. If the sea defence wall and embankment along Culver Parade fails the beach barrier would rapidly be subject to overwashing, landward migration and breaching. A large hinterland extending into the valley of the Eastern Yar could be inundated and generate a large tidal prism that could maintain a permanent tidal inlet with an ebb-tidal delta, which may support beaches to the south but could expose the downdrift Yaverland cliffs (to the north) to additional toe erosion.

At the southern end of this section of coast, from Shanklin towards the cliff-top village of Luccombe, there are few defences, with undefended cliffs in the south of the PDZ. It is likely that active cliff erosion from Monk's Bay to Shanklin is the chief source of sand contributing to the beaches in Sandown Bay, were net littoral drift is from south to north.

Unconstrained scenario:

The 'unconstrained' scenario provides a vision of how the coast could evolve if not controlled by man-made structures such as coastal defences. This is a key step in understanding the 'natural' response of the coast.

If the shoreline of Sandown Bay was unconstrained by seawalls or defences in the future, cliffs in central parts of the Bay would re-activate immediately, retreat at moderate to high rates and resume their inputs of sandy sediments to the foreshore. The relatively resistant headlands of Dunnose and Culver Cliff would continue to be slowly eroded, but are sufficiently large to continue to exert a control over shoreline evolution. There would be a breach through toe the southern extent of the Eastern Yar valley. It is uncertain whether this would act as a new estuary mouth or would merely result in increased flood potential within the Yar system. If the former, there is potential for a natural ebb delta developing which would influence the plan shape of the bay.

1.5.2. Existing Defences

The following description of coastal defences outlines the current condition and expected remaining effective life of the defences in the area, if no further maintenance is carried out. In addition to the following summary, individual defences are described in Appendix C2_Defence Appraisal areas IW13 to IW29

This PDZ is characterised by a series of man-made defences (assisted by natural limestone ledges) defending the eastern headland of the Isle of Wight around the community of Bembridge and maintaining the plan-form of Sandown Bay. The defended frontages are separated by eroding geologically important cliff lines and embayments.

From Priory Bay to St. Helens Duver some limited lengths of defence structures have been installed to protect the toe of the coastal slope, but these now remain as relic defences.

Defences extend along St Helens Duver frontage to Bembridge Groyne at the southern tip of the stabilised sand spit, which. Steel piling is in poor condition and suffering from excessive corrosion. The deteriorating seawall fronting the Duver is expected to fail in 10-25 years time, and has been further weakened by recent cavities.

Within Bembridge Harbour the protection is a combination of both formal defences and defences that are part of private, leisure, and industrial related infrastructure. The area south of St Helens Duver is undefended and managed by The National Trust while concrete and masonry walls protect the harbour front section of St. Helens. The key flood defence is Embankment Road, a former railway embankment forming the back of the Harbour now supporting the coastal road and coastal infrastructure with sluice gates through the embankment. The embankment is approximately 10m wide at its narrowest point and approximately 1,500m long. Within the

embankment are critical services including gas pipes, telephone and electric cables. The seaward face of the embankment and the margins of Bembridge Harbour are strengthened by some localised protection works such as concrete and masonry seawalls and sections of timber and rock revetment, with residual lives of generally 10-25 years.

Along the wooded slope from Bembridge Point to Foreland a piecemeal revetment and groyne defences have been constructed. These defences have stabilised some sections of the eroding cliffs. In addition several beach recharges fronting Bembridge Hotel have been completed. South of Forelands an undefended frontage extends to Whitecliff Bay with the exception of a short section of revetment and gabion defences in poor condition. These largely have been ineffective in stabilising the cliff.

South of the undefended Culver headland, Sandown Bay is controlled by defence structures (sea walls, revetments and groynes) through the centre of the Bay that have been subject to both renewal and extension for more than a century. The groyne system between Shanklin and Sandown has succeeded in retaining substantial quantities of sand, though the groyne field is deteriorating; and the groynes located along Culver Parade and Lake Revetment are in poor condition. In Shanklin, the concrete Hope Groyne promontory plays an essential role in maintaining Shanklin Esplanade beach and road access to the remainder of this frontage to the south. South of Shanklin the cliff line is undefended, although from Shanklin to Luccombe Bay gaps exist between several ineffective deteriorated steel planked permeable groynes and the undefended cliff base. The seawall at Culver Parade in Yaverland is important to maintain the current form of the bay, preventing tidal beach into the low-lying valley behind. The seawall is structurally in good condition, but has a poor seaward profile. The groynes in front are in poor condition and hence the beach is low, increasing potential damage to the wall by undermining and overtopping. A recent assessment by the Eastern Yar Flood and Erosion Risk Management Strategy estimates that, with maintenance, the seawall can provide adequate protection until 2085.

In summary, without maintenance the majority of the defences throughout the PDZ will deteriorate and fail towards the end of the first epoch (in approximately 20 years) and expose the coastline to active erosion and retreat.

1.5.3 Potential Baseline Erosion Rates

The SMP reviewed a wide range of data to define the current and potential rates of coastal erosion and cliff retreat along the Isle of Wight coast using the best available information. Full details can be found in Appendix C3. Future erosion rates are predicted using Walkden & Dickson formula (2008) and allow for future sea level rise –the full methodology is explained in the Appendix. Predicted sea level rise rates of 4mm/yr (to 2025), 8.5mm/yr (to 2055), 12mm/yr (to 2085) then 15mm/yr (to 2105) have been used, in accordance with SMP national guidance by Defra. These rates equate to 7cm of sea level rise (above the 2009 baseline) by 2025, 32cm by 2055 and 98cm by 2105. The IW numbering units refer to lengths of coast for which future behaviour is described and mapped in Appendix C based on SMP1 and Strategies. These are not SMP2 policy units which are developed in section 3 below.

Potential total erosion over the next 100 years is shown, however it is important to note that this is an estimate that is based on an undefended coastline. Within Appendix C3, these erosion rates are only applied following the predicted failure date of each individual element of the defences within the unit; therefore the resulting erosion amounts shown in the Appendix C3 tables and maps (and used in the development of this SMP) will show smaller erosion totals than the overview provided below.

Potential coastal erosion rates (all figures in metres/year):-

Numbering in SMP2 Appendices (2010) *(area and name, clockwise)*		NE Strategy Study Morphodynamic Unit No.	Current to 2055	2055 to 2085	2085 to 2105	Potential 100 year erosion (if undefended) -total in metres	Plus potential slope reactivation triggered by erosion	Notes
IW13	**Priory Bay**	33	0.30	0.35	0.39	33	100m	Remnants of defences
		34	0.30	0.35	0.39	33	40m	
		35	0.40	0.47	0.52	44	130m	
IW14	**St. Helens Duver**	36	0.23	0.27	0.29	25		Erosion resisted by defences
IW15	**Bembridge Harbour**	37	0.00	0.00	0.00	0		Tidal flood risk
IW16	**Bembridge Point**	38	0.00	0.00	0.00	0		Stable sand spit
		39	0.15	0.18	0.19	17		Erosion partially resisted by defences
IW17	**Bembridge**	39 (13a)	0.15	0.18	0.19	17		
IW18	**Foreland**	Northern - 40	0.20	0.24	0.26	22		
		Central - 40	0.50	0.59	0.65	56		
		Southern - 40	0.30	0.35	0.39	33		
IW19	**Whitecliff Bay**	41	0.50	0.59	0.65	56		Generally undefended, minor defences in centre of bay
		42	0.66	0.78	0.85	73		
		43	0.5	0.59	0.65	56		
		44	1.4	1.65	1.81	156		
		45	0.2	0.24	0.26	22		

Numbering in SMP2 Appendices (2010) *(area and name, clockwise)*		Historical Rate	Current to 2025	2025 to 2055	2055 to 2085	2085 to 2105	Potential 100 year erosion (if undefended)	Notes
IW20	**Culver Cliff**	0.20	0.23	0.30	0.35	0.38	32	Undefended
IW21	**Yaverland Cliffs**	0.40	0.46	0.61	0.71	0.77	64	
IW22	**Yaverland Car park**	0.30	0.35	0.46	0.53	0.58	48	Erosion resisted by defences
IW23	**Yaverland Zoo**	0.30	0.35	0.46	0.53	0.58	48	
IW24	**Culver Parade**	0.30	0.35	0.46	0.53	0.58	48	
IW25	**Sandown Esplanade**	0.30	0.35	0.46	0.53	0.58	48	
IW26	**Lake Cliffs**	0.30	0.35	0.46	0.53	0.58	48	
IW27	**Shanklin Esplanade**	0.40	0.46	0.61	0.71	0.77	64	
IW28	**Luccombe Road, Shanklin**	0.30	0.35	0.46	0.53	0.58	48	Erosion partially resisted by defences
IW29	**Luccombe**	0.40	0.46	0.61	0.71	0.77	64	Undefended

Note:
i) Erosion rates have been determined from monitoring data and examination of historical records and have been calculated to take account of sea level rise –see Appendix C3 for details.
ii) The IW numbering units refer to lengths of coast described in Appendix C. These are not SMP2 policy units.

2. Baseline management scenarios

2.1 Present Management

Present management of the shoreline is taken as the policy defined by SMP1, modified by subsequent strategies or studies. It should be noted that in the case of SMP1 the period over which the assessment was carried out was 50 years. SMP2 extends this to an assessment period of 100 years. The table below sets of the current shoreline management policies for PDZ3. This SMP2 will assess all the available evidence and update these previous management policies.

The key documents outlining the present management of the shoreline in this PDZ are:-

Isle of Wight Shoreline Management Plan 1 (1997)
The first Shoreline Management Plan (SMP1) for the Isle of Wight's coast was published in 1997. It consists of two volumes.

- Volume 1 is the 'Data Collection and Objective Setting', which presents information on a range of topics including coastal processes, natural environment, etc.
- Volume 2 is the 'Management Strategy', which presents information for each Management Unit around the Island's coast and sets a management Policy for each unit.

Coastal Defence Strategy Studies, Isle of Wight
Whilst the Shoreline Management Plan provides the risk framework for management of the coast, Coastal Defence Strategy Studies provide a more detailed assessment of particular frontages in order to identify the most suitable type of coastal defence schemes that may be required to fulfil the agreed shoreline management policy and to plan a programme of future works.

North East Coastal Defence Strategy Study, Isle of Wight (2004)
The North-East Coastal Defence Strategy Study, which extends from the Shrape Breakwater at East Cowes to Culver Cliff, was completed in 2005. The Plan sets out the works programme along the north-east coast frontage for the next five years including details on costings. The North-East Strategy consists of a summary report and detailed Appendices.

Sandown & Undercliff Coastal Defence Strategy Study
A Coastal Defence Strategy Study for the Sandown and Undercliff coastlines will be completed following the publication of SMP2.

Eastern Yar Flood and Erosion Risk Management Strategy (2010)
The Environment Agency and the Isle of Wight Council have produced the Eastern Yar Flood and Erosion Risk Management Strategy. The Strategy sets out how flooding and erosion risks in the east Yar catchment and around Bembridge harbour will be managed.

Catchment Flood Management Plan:
The Environment Agency has undertaken a programme of Catchment Flood Management Plans (CFMPs) for the major river catchments in the Southern Region. A CFMP is a large scale plan that covers an entire river catchment or group of catchments that identifies long-term, sustainable policies to manage flood risk within the catchment. These policies form the basis for development of Strategy Plans, covering all or part of the overall catchment area, which will identify in more detail appropriate flood defence measures.

Whilst CFMPs principally address fluvial (river) flooding, SMPs address tidal (sea) flooding, alongside coastal erosion. The boundary between the CFMP and the SMP in this area is the A3020 road crossing Newport Harbour, marking the main transition from tidal to fluvial issues. The Isle of Wight Catchment Flood Management Plan (Summary Report) was published in December 2009.

- Sub Area 5: Lower Eastern Yar

"The issues in this sub-area: This sub-area covers the lower section of the Eastern Yar catchment from Alverstone to its mouth at the tidal sluice at St. Helens. The tidal defence at Embankment Road stops seawater from travelling up the river and allows a freshwater habitat upstream. The subject of the coastal defence line is being considered under the ongoing Eastern Yar fluvial and coastal strategy. Flood flows in the policy unit largely result from overbank flooding of fluvial flows which spill out onto the floodplain. The downstream end of the catchment is protected from tidal ingress by a tide locked sluice, however this can lead to tide locked fluvial flooding. In addition there have also been incidents of surface water drainage flooding and a very limited amount of groundwater flooding."

Policy Option 6 – areas of low to moderate flood risk where we will take action with others to store water or manage run-off in locations that provide overall flood risk reduction or environmental benefits.

The previous shoreline management policies set for this PDZ are listed in the table below:

Due to the variety of numbering systems used in the management documents, a consistent set of numbers IW1 to IW59 have been used clockwise around the IW coast to present information in the SMP2 Appendices and organise information in the table below. These are not SMP2 policy units which are developed in section 3 below.

Numbering in SMP2 Appendices (2010)		SMP1 (1997)		North East Coastal Defence Strategy Study (2004)		Eastern Yar Flood and Erosion Risk Management Strategy (2010)	
IW Unit	**Name**	**Unit**	**Policy**	**Unit**	**Policy**	**Unit**	**Policy**
IW13	PRIORY BAY	RYD9 - Horestone Point to St Helens Tower	Retreat the existing defence line	sMU 10 - Horestone Point to St Helens Point	No Active Intervention, but Monitor		
IW14	ST HELENS DUVER	RYD10 - The Duver, St Helens	Hold the existing line	SMU11 - St Helens Point to Ducie Avenue	Hold the Line by Maintenance. Carry out further studies. Review generic option based upon the results.	Frontage 3: The Duver *(including the inner face of the spit)*	Maintain the seawall for 50 years
IW15	BEMBRIDGE HARBOUR	RYD 11 - Bembridge Harbour	Hold the existing line	SMU12 - Bembridge Harbour (inner harbour)	Hold the Line by Maintenance. Carry out further studies. Review generic option based upon the results.	Frontage 2: St Helens	Hold the line - maintain
						Frontage 1: Embankment Road	Hold the line -sustain
						Frontage 5: Eastern Yar River	Do minimum
						Frontage 4: Bembridge Point *(including the inner face of the spit)*	Do nothing but monitor
IW16	BEMBRIDGE POINT	RYD12 - Bembridge Point to Foreland Fields	Hold the existing defence line	SMU11 - St Helens Point to Ducie Avenue	Hold the Line by Maintenance. Carry out further studies. Review generic option based upon the results.		
IW17	BEMBRIDGE			SMU13a - Ducie Avenue to Lifeboat Station	Managed Realignment, by slowing the rate of erosion		
IW18	FORELAND			SMU13b – Northern: Lifeboat Station to Fisherman's Walk	Hold the Line by Seawall Encasement		
				SMU13b – Central: Fisherman's Walk to	Managed Realignment by Beach Management		

				Paddock Drive	
				SMU13b – Southern: Paddock Drive to Foreland Fields	Hold the Line by Seawall Encasement
IW19	WHITECLIFF BAY	RYD13 - Foreland Fields to Culver Cliff	Do nothing	SMU 14 - Foreland Fields to Culver Cliff	No Active Intervention, but Monitor
IW20	CULVER CLIFF	SAN1 - Culver Cliff	Do nothing	*Strategy level examination of this frontage will be completed following publication of SMP2.*	
IW21	YAVERLAND CLIFFS	SAN2 - Culver Cliff to Yaverland	Do nothing		
IW22	YAVERLAND CAR PARK	SAN3 - Yaverland	Hold the existing defence line		
IW23	YAVERLAND, ISLE OF WIGHT ZOO				
IW24	CULVER PARADE	SAN4 - Sandown Zoo to Fort Street, Sandown	Hold the existing line		
IW25	SANDOWN ESPLANADE	SAN5 - Fort Street to Ferncliff Road, Sandown	Hold the existing defence line		
IW26	LAKE CLIFFS	SAN6 - Ferncliff Road to Hope Beach	Hold the existing defence line		
IW27	SHANKLIN ESPLANADE	SAN7 - Hope Beach to Shanklin Chine	Hold the existing defence line		
IW28	LUCCOMBE ROAD, SHANKLIN	SAN8 - Shanklin Chine to Horse Ledge	Hold the existing defence line		

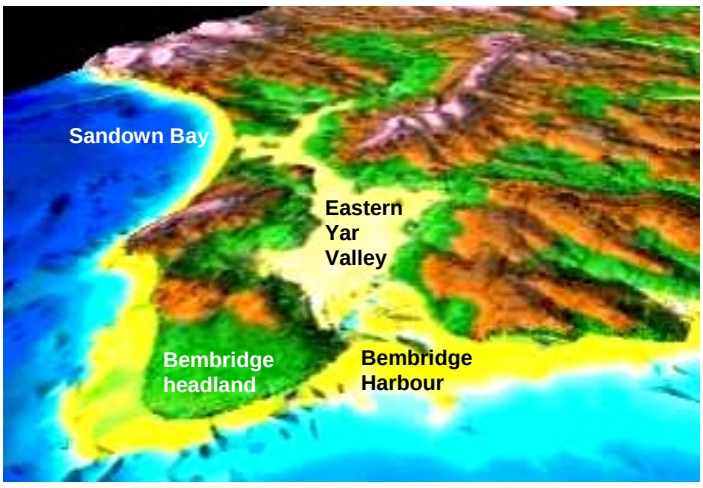
2.2 Baseline Scenarios for the Policy Development Zone

Summary of future coastal risks in PDZ3

At Horestone Point and Priory Bay there is potential for coastal slope retreat extending some distance inland. At St Helens Duver a number of properties are at risk from tidal flooding, with the main risk wave overtopping and loss of the Duver seawall, although tidal flooding encroaching from the rear of the Duver (Bembridge Harbour) will increasingly affect the area over the next 20-100 years. Deterioration or loss of St Helens Duver due to erosion and flooding would impact upon local properties and businesses in the area and also could have significant impacts on the adjacent frontages of Bembridge Harbour to the west and Bembridge Point to the south. The standard of protection of the Embankment Road defence (backing Bembridge Harbour) will decrease over time, increasing the risk that the Embankment will be overtopped, resulting in increasing numbers of commercial and residential properties at tidal flood risk and also the inundation of Brading Marshes with saline water (the largest freshwater habitat in the Solent and Southampton Water SPA). From Forelands to Whitecliff Bay, a line of assets and properties along the shoreline and cliff top will be effected by cliff erosion and retreat. All along the former sea cliffs of Sandown Bay, significant cliff foot amenities and infrastructure and cliff top properties will be increasingly at risk from coastal erosion and cliff retreat over the next 100 years. A tidal breach near Yaverland into the Eastern Yar Valley will place large numbers of residential and commercial properties and significant infrastructure at risk of tidal flooding.

2.2.1 No Active Intervention (Scenario 1, NAI)

Under this scenario no further work would be undertaken to maintain defences. Where defences fail they would not be repaired. The principal difference between this scenario and the unconstrained scenario discussed earlier is the residual impact existing defences would have on the behaviour of the coast. A detailed description of this NAI scenario is given in Appendix C3, area by area. The following discussion provides a summary, drawing together an overview with particular focus on how the use of the coast would be effected. In particular, this baseline scenario is discussed with respect to the overarching objectives set out previously in sub-section 1.3 of this PDZ3.



General topography of the low-lying Eastern Yar Valley, looking south-west.

Shoreline defences around the north section of the zone, in the area either side of Bembridge Harbour, tend to be low concrete and masonry walls at the crest of the beach. Typically these defences have an unmaintained residual life of 10 to 20 years. Many are old and require relatively high levels of maintenance. More substantial defences are in place at the headland by St Helens Old Church, at the northern end of the St Helens Duver, and at Lane End in Bembridge. Both areas are strongly influenced by outcropping rock platforms in the foreshore; the large rock platform forming Nodes Point and Tyne Ledge to Bembridge Ledge respectively. Although the underlying rock outcrops tend to anchor the coast at these points, delimiting the entrance to Bembridge Harbour, the softer overlying headlands in both locations, under this scenario, will tend to erode back.

To the north of and at Nodes Point the old defence has effectively failed and, as this continues, the toe of the slope will continue to erode, increasing the existing instability and failure of the high coastal slope around Priory Bay. This slope failure will result in significant loss to the Nodes Point Holiday Centre, although the main buildings of the Holiday Centre are like to be unaffected over the 100 year period of the SMP2.

The defence at St Helens Old Church has indirectly assisted the development of a relatively healthy beach in front of defences to the northern part of the Duver. Over the main section of the St Helens Duver, the defence is under considerably greater pressure and the entrance channel to Bembridge Harbour, running along the face of the Duver, tends to restrict the width available for a beach protecting the sea wall. This section therefore acts to a degree as a shallow embayment. As defences fail under this scenario, recent work by the Strategy suggests that Duver is likely to remain in some form as its natural behaviour is re-established. There would be sediment lost at the northern end, a deepening of the embayment over the central section of the frontage and potential loss of the southern head of the Duver curving back into the harbour. This process would result in loss of some property along the Duver. There may be potential for breaching of the spit as erosion from the front of the Duver meets increasing extents of tidal inundation from the rear, but the Duver may, however, roll back maintaining its overall integrity, despite sea level rise.

This section of coastline forms part of the Solent and Southampton Water SPA and Ramsar sites. It supports important habitats, including sand and mudflats, vegetated shingle, saltmarsh, and sand dunes on the Duver. These in turn support important bird populations. While NAI is expected to result in only minor changes to habitats on the seaward side of the Duver, more significant changes are expected within Bembridge Harbour.

On the southern shoulder of Bembridge Harbour, the Groyne at Bembridge Point would fail and typically the spit would tend to move landward as the general headland erodes back. However, the beach levels around the groyne are stable although the groyne is in a very poor state of repair; it is regularly submerged and allows sediment to pass through it. Hence the spit is likely to stay in its current position even if the groyne collapses and disappears, based on research undertaken by the East Yar Strategy. The limited width of erosion would only threaten limited numbers of properties on this side of the harbour, but would tend to disrupt use of the harbour entrance and would impact on the water access immediately within the entrance. There is also a continued local flood risk to property just behind Bembridge Point.

The harbour is formed within the much curtailed mouth of the Eastern Yar estuary. The main defence to the back of the harbour is an embankment, along which runs one of the main road links to Bembridge (Embankment Road). The extent of the old estuary is shown by the potential tidal floodplain on the figure below, extending back past Brading and behind Sandown. The figure also shows flood risk along the rear of St. Helens Duver.

Current potential tidal flood risk in the Eastern Yar, if defences were not in place (1:1 year tidal flood area, present day). This image shows the low-lying nature of the valley and that current vulnerability to tidal inundation would already exist without the defences in place at Embankment Road in Bembridge and Culver Parade in Sandown..

The northern part of the old estuary, north of Yarbridge in Brading, is (over virtually all its area) designated at an international level for its nature conservation value. The intertidal and coastal habitats within Bembridge Harbour are designated as part of the Solent and Southampton Water SPA and Ramsar sites, and lagoons which have formed in a depression behind the sea wall near Bembridge are designated as part of the Solent and Isle of Wight Lagoons SAC, as they support particularly high species diversity. The coastal land surrounding the lagoons and to the rear of Bembridge Harbour forms Brading Marshes to St Helen's Ledges SSSI. Principal transport routes also run through the area and there are significant residential and commercial areas, particularly to the south. Under this NAI scenario the embankment behind Bembridge Harbour would be increasingly overtopped with increasing sea level rise (at present the embankment is at a level equivalent to the 1: 25 year surge tide level. In 50 years time, with anticipated sea level rise, this level would be equivalent to a 1:1 year surge tide). Although a limited amount of overtopping can be tolerated within the marsh, the embankment may fail under this scenario, which would open up the old estuary. This would have significant impact on environmental and social values.

The opening up of the estuary would also increase the tidal prism (tidal volume) flowing through the Harbour entrance. There is the possibility that the current process of infill would still occur, gradually warping up the level of land within the valley but, even so, the increase in tidal flow through the mouth of the estuary would significantly alter the behaviour of the shoreline discussed above. The increased flow, while attempting to widen the entrance, could also tend to hold the southern end of the Duver, probably tending to hold the spit head further seaward, although there is the possibility that the old northern channel could be re-established such that the main estuary mouth actually cuts through the Duver at its northern end. There remains significant uncertainty as to future re-established natural estuary behaviour under this scenario. However, the point made is

that there would be substantial change to the area, with, if unmanaged, significant impact on the use of the harbour and shoreline management. NAI in this area would not sustain or allow adaptation of the communities and local commercial interests bordering the harbour. It would not maintain access to east Wight communities and, due to the change to saline conditions, would not support some of the key nature conservation values of the area, with areas of saltmarsh, lagoon and coastal marsh habitat altered and lost. Due also to the increased flood risk in the upper valley of the Eastern Yar, there would be disruption to the economic support to the urban areas of Sandown Bay. Arguably the landscape, though changed, would still be much valued, but there would be loss to the historic environment. Access to the shoreline would be affected but most significantly the use of the harbour, without some form of intervention and control, would be difficult.

Moving south from the Bembridge Harbour area is the east Wight headland. Defence around this headland is, as along the coast to the north, relatively ad hoc collection of private and local authority protection works, initially fairly continuous around Bembridge but the tailing out along the Forelands Fields area through to the undefended section of Whitecliff Bay and Culver Cliff. The main controlling feature of the headland is the Bembridge Ledges, with defences protecting the toe of the coastal cliff and slope behind.

Defences along the Bembridge frontage would fail during the first epoch and erosion and exposure of the cliffed backshore would be re-established. There would be little loss to the northern side of Bembridge but as erosion continued there would be loss of properties, the RNLI station and slipway at the end of Land End Road. The erosion of the defended headland at the Forelands would during the second and third epochs, first effect and then result in loss of the hotel and parts of the Holiday Village. Similarly the failure of the wall south of the hotel would result in loss of some properties in the area of Forelands Field, Beachfield roads and Paddock Drive.

Continuing erosion along Forelands Fields and Whitecliff Bay would also result in loss of properties and impact on the holiday park and caravan parks. Erosion would continue to supply sediment both to the beaches in this area and to the frontages further north along the area. This would support beach use (although diminished due to loss of supporting coastal infrastructure). NAI would also support the natural evolution of features of conservation interest along this coastal stretch, which include the nearshore reefs, areas of seagrass, and vegetated sea cliffs that form part of the South Wight Maritime SAC, and the Solent and Southampton SPA/Ramsar sites. No significant habitat loss or gain is expected with gradual roll back of the coast, though reef systems may be altered as a result of rising sea levels (the relative exposure of rock ridges would change).

In terms of the overarching objectives it is only at Lane End, with the loss of the Pier, RNLI and coast use infrastructure, that there would be a significant loss of broader scale social value. This does not take account of the significant losses to individuals and specific commercial interests.

Culver Cliff would continue to erode slowly but would also continue to act as the dominant geomorphological control to coastal behaviour to the north and south. It is not predicted that there would be loss to identified assets associated with the main headland but there is recognised to be possible archaeological interest in the area which may be identified within the predicted erosion zone. The continued erosion of Red Cliff at the eastern end of Yaverland would result in loss of the old disused gun battery and the sailing club. The main loss to both these features would be in the third epoch. Red Cliff does however, provide important sediment supply to the local beaches and probably more generally to the wider nearshore area of Sandown Bay.

Over the rest of Sandown Bay through to Shanklin Chine the coast is quite heavily defended and the defences are in good condition such that, even without maintenance, they are likely to form a competent defence against erosion over the first epoch. They would, however, fail beyond that. There would be significant loss to infrastructure and properties along the whole length of the bay.

At the northern end of this section, defences are constructed across the southern valley of the Eastern Yar river. Land levels behind the defences are consistently below the level of normal high tides and as such the failure of the defence would probably result in a tidal inlet. It is unclear whether this would be maintained or whether sediment filling the breach would form a new ridge, closing the inlet. As sea level rises, however, the capacity of the inlet would increase and it may well act as a new estuary mouth. Flooding would occur even under present day water levels, having a similar impact to that described earlier in considering the loss of defence behind Bembridge Harbour. It is uncertain whether there would be any preference between the two new entrances to the valley. There is a tidal gradient between water levels on the southern open coast and that at Bembridge. This could result in complex flow patterns.

Potentially the new tidal inlet would create its own ebb delta. This has the potential to change sediment transfer along Sandown Bay. The ebb delta would tend to retain shoreline sediment to the south and west, in addition to providing some increased protection to the Yaverland frontage. The corollary of this would be that the plan form along the Red Cliff frontage would from more as a local separate bay, with, initially some increased erosion as the shoreline adjusts to the change in sediment drift.

Overall the NAI scenario would have major impacts on the identified values of Sandown Bay. The failure of key cross-shore structures controlling upper beach drift, such as the concrete groyne breakwaters at Shanklin and at the northern end of Sandown, would result in a loss of upper beach along much of the area. The cliffs behind the defences would be reactivated and provide some increased sediment to the system. However, this would not be held in front of the cliff, rather being moved to the north and offshore. Erosion would continue beyond the 100 year period of the SMP with little gain in terms of creating a more stable bay line.

In the context of the overarching objectives, there would be substantial and significant loss in terms of sustaining the important economic value of development in Sandown Bay. Indeed, due to the continuing loss that would occur beyond epoch 3, this impact on the viability of this regionally important economic hub would continue to deteriorate. This would be exacerbated by the losses within the valley of the Yar and the loss of access to areas of the towns. Without some form of management, erosion and loss would continue in the area of Yaverland, with little real opportunity for adaptation to maintain the coherence of this community. Access to East Wight communities would be disrupted and access along the sea front would be lost. While in principle allowing this frontage to evolve naturally, in reality the lack of investment in the sea front and eventually the main towns, together with the dilapidation of buildings at continuing risk of loss, would result in very major impacts on the built landscape and the cultural and historical environment. Despite the potential value in creating new saline habitat within the upper Yar valley, there would be significant loss of existing designated freshwater areas in the lower Yar. On the wider coastline running from Culver Cliff to Shanklin, nature conservation interests are focused on small and generally narrow sections of coastal cliffs that lie within the South Wight Maritime SAC. NAI will work with the natural processes of erosion and succession of the cliff line.

The economic damages due to flooding and erosion are summarised in Table 1, at the end of this sub-section and a summary of impacts with respect to the overarching objectives are set out in Table 2, in comparison with the assessment made for the following With Present Management Scenario.

2.2.2. With Present Management (Scenario 2, WPM)

This scenario is defined by current management practice as set out by policy defined in SMP1 and in some areas modified by more detailed examination through subsequent strategies. The various policies and approaches that are in place are summarised in the table at the start of this section 2.

Overall, the approach to management may be defined as the intent to:

- Maintain and improve the standard of defence at the rear of Bembridge Harbour and while maintaining defence at the entrance to the harbour over the first two epochs, changing this to a more adaptive management over the third epoch.
- Remaining fragments of defences to the north of St Helens Duver (Priory Bay and Nodes Point) would continue to fail and natural erosion take place.
- Over the Bembridge frontage, 'with present management' would allow general realignment of the coast, acting to maintain beach levels but with the intent to hold the line at Lane End and along the defended frontage to the east of Foreland Fields.
- There would be no management of defence from this last area through to Culver Cliff or to the west of the Culver headland through to the start of Yaverland.
- Where the defences start at Yaverland and beyond, all the way through to the Shanklin Chine area, defences would be maintained. The defence approach to manage sediment drift along the frontage through maintaining the groynes would continue through to Knock Cliff. Below Luccombe village and to the south of this PDZ the natural recession of the undefended coast will continue.

At the northern end of the frontage, at Priory Bay, the impacts would be similar those discussed in scenario 1 (NAI). Critically at the southern end of this section in front of St Helens Church, the defences would be held but potentially only for the first epoch. This provides scope for maintaining the narrow section of beach to the northern end of the Duver, important for the management of the sea wall and reducing erosion to the properties in the area. The main section of the Duver would be maintained but then allowed to fail and the Duver re-establish its natural behaviour. There would be significant and increasing pressure on this section of wall over the next 50 years. To maintain the wall may in fact need a new or significantly improved defence to be put in place. In addition to creating a new defence asset, such action may engender an expectation of longer term continued defence. It is also noted that despite defence at the front face of the Duver, property on the Duver is at risk from tidal flooding in the medium to long term. There would, under this scenario, be no intent to put in place new defence against this risk encroaching from the low-lying inside of the Duver. Some private defences on the tip of the Duver and surrounding sections of the former millpond and waterside St Helens would be maintained, although the defence line is not continuous.

As identified, the main embankment behind Bembridge Harbour would be maintained and raised in line with sea level rise. This would maintain defence to the Eastern Yar Valley. A significant justification for the maintenance of defences here is the protection of designated freshwater habitats to the rear of the embankment, around Brading Marshes, which also support important bird populations (including Brent Goose). Quite probably, with sea level rise the area would need to be pumped to maintain appropriate water levels both for flood risk management and water level management. In principle maintaining and raising the embankment is not seen as being unsustainable, in that in maintaining this defence the process of infill of the harbour is likely to continue. This will have a knock on effect on the entrance channel, Bembridge Point and the Duver. The Point and spit would be maintained, although the recent Strategy indicates that it would not be necessary to maintain the groyne; the spit would be self-sustaining. To a degree this would depend on continued sediment supply from the east. Under this scenario, the intent would be to allow much of the westerly Bembridge frontage to erode. This would help support the sediment supply to the harbour area. There are flood risk areas around Bembridge Point and the intent would be to include protection of these affected properties as part of a scheme for Embankment Road.

Further around the Bembridge headland, the walls at the Lifeboat Station to Fisherman's Walk would be maintained, but the section of coast to the south would still erode with only minor works to manage sediment loss. This will result in the maintained wall coming under increased pressure as a result of both sea level rise and as a result of potential outflanking. Similarly, further west at Forelands, where the existing defence is maintained, this defence would need to be substantially improved over time.

Over the Whitecliff Bay and Culver headland and cliffs, this scenario is the same as scenario 1; i.e. for no intervention. There would continue to be losses of property, to the holiday park and caravan sites. The frontage to the south of Culver headland through to the northern end of the existing defences at Yaverland would also continue not to be defended.

In defending the northern end of Yaverland and the length of potential breach through to the southern end of the Yar Valley (through Culver Parade), this sea wall, already quite markedly in front of the shoreline to the north, will be further exposed. Future erosion of approximately 64m could occur over 100 years. Maintaining this wall is likely to result in reducing the drift to the north, quite possibly increasing erosion to the cliffs.

Over the rest of the Sandown Bay frontage, the intent is to maintain defences. These structures, overall, will come under increased pressure, as beach levels fall with increased wave action and water depth. Drift rates may well increase although the walls themselves do prevent sediment from entering the system. There remains the potential in some areas, particularly between Sandown and Shanklin, for continued cliff falls. These are relatively local but would continue under this scenario and can be triggered by seasons of heavy rainfall. At the southern end there would continue to be significant recession of the cliff crest, with the potential loss of property and possible loss of the cliff path in front of Luccombe Village. Road access to Luccombe could be threatened. Maintaining defences will prevent the natural erosion and succession of the cliff line here.

Summary:
Considering the overarching objectives this scenario would support; specifically the continued viability and economic activity of Sandown Bay, it should be recognised that there would be substantial loss of beaches in the longer term and this may compromise traditional tourism values to the area. Continued defence at Yaverland would be under greatest pressure. In Bembridge Harbour the various commercial activities would be supported but, with the increased siltation of the harbour and the increasing flood risk to the area behind the Duver and around the harbour, there would be a need for adaptation to new conditions. In other areas there would be loss to properties and the various holiday parks but, while significant in terms of the individuals involved, this would not substantially damage the local economy. In areas of loss, the aim, under this scenario, is to try and slow loss, allowing greater time for adaptation.

In is the intention that policies maintain the freshwater habitats of the Eastern Yar, which are of conservation importance in their own right, and as a result of the bird populations that they support. Maintenance and upgrading of existing defences is required in a number of locations, particularly at the southern end of the Yar Valley, to ensure this outcome. However along other stretches of this coastline, most significantly along the cliffed coastline from Culver to Shanklin, natural processes of coastal erosion and succession will be allowed to continue.

Over much of Sandown Bay and within the Yar Valley historic features would be defended, although there would be loss to the north of Yaverland and potentially around the entrance to Bembridge Harbour.

Table 1a. Economic Assessment – Erosion damages

The following table provides a brief summary of damages determined by the SMP2 MDSF analysis for the whole PDZ. Further details are provided in Appendix H. Where further, more detailed information is provided by studies, this is highlighted. The table aims to provide an initial high level assessment of potential damages occurring under the two baseline scenarios.

ASSESSMENT OF EROSION DAMAGES

Epoch	0 – 20 year			20 – 50 years			50 – 100 years			
No Active Intervention	**Number of properties:**		**Value**	**Number of properties:**		**Value**	**Number of properties:**		**Value**	**PV Damages**
Location	*Residential*	*Commercial*	**x £1000**	*Residential*	*Commercial*	**x £1000**	*Residential*	*Commercial*	**x £1000**	**(£x1000)**
Horestone to Bembridge Hr.	0	35	1,020	0	20	600	3	20	1,202	1,237
Bembridge to Culver Cliff	5	2	1,143	1	11	344	8	13	1,845	1.384
Yaverland and Red Cliff	0	0	0	0	0	0	0	12	453	32
Sandown and Shanklin	0	18	1,419	12	60	3,584	188	130	42,157	7,057
									Total for PDZ3	**9,711**
With Present Management	**Number of properties**		**Value**	**Number of properties**		**Value**	**Number of properties**		**Value**	**PV Damages**
Location	*Residential*	*Commercial*	**x £1000**	*Residential*	*Commercial*	**x £1000**	*Residential*	*Commercial*	**x £1000**	**(£x1000)**
Horestone to Bembridge Hr.	0	34	1,020	0	14	420	0	12	360	1,111
Bembridge to Culver Cliff	5	0	958	1	7	225	5	7	1,138	1,105
Yaverland and Red Cliff	0	0	0	0	0	0	0	5	375	27
Sandown and Shanklin	0	0	0	0	2	30	9	1	1,725	36
									Total for PDZ3	**2,379**
Notes										
SMP.										

Table 1b. Economic Assessment –Flood damages

The following flood damages have been determined through use of MDSF. These figures are aimed to indicate the level and impact of flood risk rather than being a detailed economic appraisal. In many areas substantial numbers of properties would be liable to flooding on the more frequent events both under NAI and WPM, a nominal write off value has been allowed in the table for properties at frequent risk; this generally excludes values at risk at present on a 1:1 year event, in 50 years time for the 1:10 year event and in 100 year time the 1:50 year event.

ASSESSMENT OF POTENTIAL FLOOD RISK

	Flood risk tidal 2010			Flood risk tidal 2060			Flood risk tidal 2110			
No Active Intervention	**No. of properties**		**AAD**	**No. of properties**		**AAD**	**Number of properties**		**AAD**	**PVD**
Location	< 1:100yr	>1:100yr	**x £1000**	< 1:100yr	>1:100yr	**x £1000**	< 1:100yr	>1:100yr	**x £1000**	**(£x1000)**
St Helens Duver (K)	32	5	771	38	4	1,687	49	5	3,198	38,726
Eastern Yar North (L1,2,3)	454	95	5,150	555	45	7,785	616	20	12,005	198,840
Eastern Yar South (L4)	544	74	20,979	624	76	27,922	748	33	40,373	750,073
Upper Eastern Yar (L5)	481	65	1,128	551	50	1,704	635	26	2,758	43,952
Agricultural Total			53			57			65	1,654
									Total for PDZ3	1,033,245

With Present Management	**No. of properties**		**AAD**	**No. of properties**		**AAD**	**No. of properties**		**AAD**	**PVD**
Location	< 1:100yr	>1:100yr	**x £1000**	< 1:100yr	>1:100yr	**x £1000**	< 1:100yr	>1:100yr	**x £1000**	**(£x1000)**
St Helens Duver (K)	32	5	131	38	4	234	49	5	75	4,654
Eastern Yar North (L1,2,3)	454	95	678	555	45	941	616	20	272	21,327
Eastern Yar South (L4)	544	74	543	624	76	678	748	33	888	18,532
Upper Eastern Yar (L5)	481	65	33	551	50	45	635	26	61	1,191
Agricultural Total			4			4			5	129
									Total for PDZ3	45,833

Table 2. General Assessment of Objectives

The following table provides an overall assessment of how the two baseline scenarios impact upon the overall objectives agreed by stakeholders. These objectives are set out in more detail within Appendix E. The table aims to provide an initial high level assessment of the two baseline scenarios, highlighting potential issues of conflict. These issues are discussed in the following section, examining alternative management scenarios from which SMP2 policy is then derived.

STAKEHOLDER OBJECTIVE	NAI			WPM		
	Fails	Neutral	Acceptable	Fails	Neutral	Acceptable
To sustain and adapt important centres of economic activity including Sandown Bay.						
To sustain and adapt the communities of East Wight to reduce flood and erosion risks.						
To address the risk of tidal inundation of the Eastern Yar Valley and access to East Wight communities.						
To maintain important access along the seafront and shoreline use of the area.						
To protect Brading Marshes (European designated freshwater habitat)						
To support opportunity for adaptation supporting and enhancing the nature conservation value of the area subject to natural processes						
To maintain the important landscape						
To sustain the historic landscape and environment where practicable						

3. Discussion and detailed policy development

3.1. Comparison of Baseline Scenarios

From the above assessment of the baseline scenarios it may be seen that Scenario 1 (No Active Intervention) is not an option if the key values of the area are to be addressed. The scenario would result in loss of use within the Bembridge Harbour area which supports the local economy and hence communities; without the opportunity to adapt sensibly to this change. More significantly, from a regional scale, Sandown Bay is accepted as a major tourism destination, with the threat of substantial and on-going loss of the towns of Sandown and Shanklin and essentially their seafront amenity. Equally, from a national and international perspective is the change in habitat that would occur with inundation of the Eastern Yar Valley. The lower part of the valley, backing directly on to Bembridge Harbour is designated for its freshwater environment and, based on the discussion and consultation undertaken through the recent Strategy, is not realistically replaceable. The overall conclusion coming from the assessment, therefore, is that the coastal flood and erosion and geomorphological behaviour of the area has to be managed.

Considering the second baseline scenario (With Present Management), in looking at the present approach to management, it can be understood that, while the approach delivers many of the objectives at present, there are concerns that in managing the shoreline there are pressures building within the system. This would result in increased fragility of the system and increasing reliance on defence. In the long term (in some areas beyond the period of the SMP) it might be anticipated that change will be necessary. If this change were not managed, in moving from the current form of management there would be sudden losses, with little opportunity to put in place change of use to accommodate the changes in circumstances. Many of these changes would be driven by sea level rise and the associated risk of erosion, increased or change in sediment transport and the level to which defences would need to be built. This situation is epitomised by the management of the Eastern Yar Valley; not so much at the Bembridge Harbour end of the valley, where the accretion within the harbour and the opportunity to raise defences along the embankment is identified in the Strategy as being sustainable for a long time hence, but at the sea front at Yaverland, where the seawall is already under considerable pressure and vulnerable to overtopping. Other areas of change equally raise concerns:

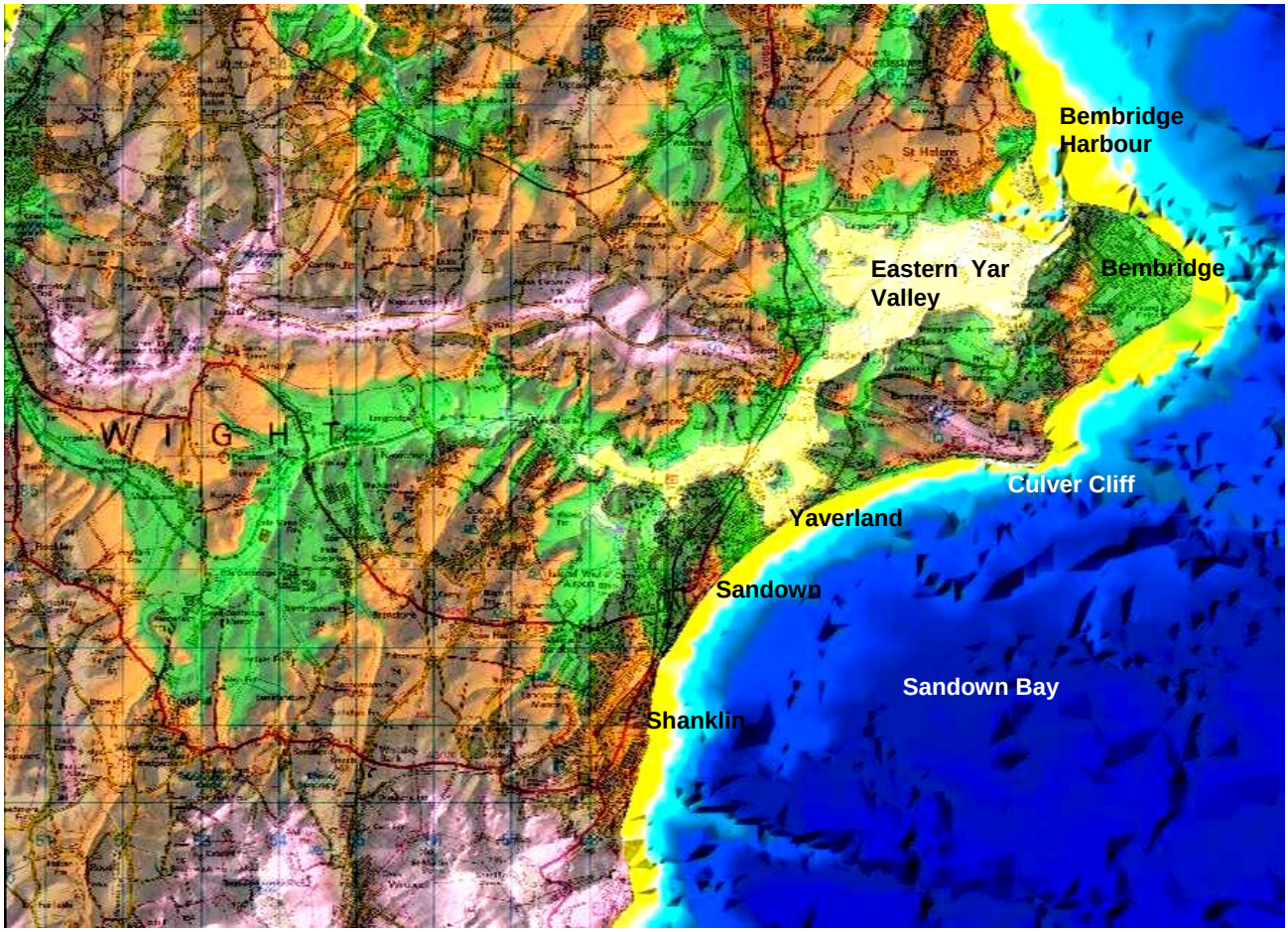
- There may be increasing difficulty in maintaining a reasonable beach width along the main tourism frontages of Sandown and Shanklin. While the broader economic case for continued defence may be made based on the assets at risk, the loss of this beach area would have a significant impact on the economic viability of many of those assets.
- Maintaining local sections of defence around the Bembridge headland run the risk of being outflanked if actions are not co-ordinated with the way in which the undefended sections of coast between defended lengths are managed.
- Adopting the SMP1 policy along the Duver of maintaining defence over fifty years but then potentially abandoning defence of this section beyond that, as suggested by the Strategy, imposes initially considerable constraint on the way in which this frontage may wish to adapt, potentially creating greater fragility within the spit behaviour and leading to sudden change to the use of the area.

Neither baseline, therefore, fully delivers a sustainable approach to management, although Scenario 2 (With Present Management) does set a generally acceptable intent. It is therefore the delivery of that intent within Scenario 2, as to how the coast needs to be managed, that needs to be examined further.

3.2. Discussion of Approach and High Level Policy

The zone might be considered as three units: the Bembridge Harbour area with the associated Eastern Yar Valley, the Bembridge and Culver Headland, and Sandown Bay, again with its association with the Eastern Yar Valley.

Culver Cliff imposes a major control on the southern part of the system. At the large scale Bembridge Forelands equally controls the extent and behaviour of Bembridge Harbour entrance. In either case, regardless of the management approach, the geomorphological presence of these features will continue to dominate the behaviour of the zone. In reality, No Active Intervention would be the approach taken to the Culver Cliff; it is not sensible to attempt to manage the slow erosion in this area. With respect to the Bembridge headland there are issues, in terms of sediment supply and the impact of defence on this, that have to be considered in relation to Bembridge Harbour. However, at the large scale this headland will remain as a controlling feature.



PDZ3: General topography and bathymetry of the zone.

The principal management issue linking Sandown Bay and the Bembridge Harbour area is, therefore, the management of the Eastern Yar Valley. The following discussion, in developing the plan, focuses initially on this aspect of the zone.

The Eastern Yar Flood and Erosion Risk Management Strategy makes a clear and strong case for continued defence to the back of Bembridge Harbour. Although also supported by economics based on risk to assets, the driving feature for defence is maintaining the internationally designated habitat in the lower valley. This area of designation (SPA and Ramsar) covers the whole area of the valley floor extending down to the bridge at Yarbridge. Further upstream there are other regional and national nature conservation designations. The principal economic drivers for defence

are divided between the areas to the north and to the south of Yarbridge, with local assets at risk spread around the fringes of the lower valley, with a more intense congregation of assets within the upper valley, to the northern end of Sandown and to the housing estate of Yaverland. Many of the properties and commercial buildings in the upper valley are within the 1:1 year tidal flood plain, based on present sea levels, and indeed much of the valley floor between Sandown and Yaverland would be within the intertidal zone if undefended. The main access routes through to the communities of Eastern Wight are across the embankment at Bembridge Harbour, at Yarbridge, and along the sea front of Sandown Bay. Additionally the principal A-road and railway from Sandown towards Ryde crosses the Yar Valley to the north of Sandown.

The Eastern Yar Strategy assumes the long term protection of the sea front at Yaverland (based on SMP 1 policy). This assumption needs to be considered further given the constraint it imposes on management of the frontage.

If the defence of the sea front were abandoned, this would open the Eastern Yar valley to flooding in the same way as might occur if the embankment at Bembridge Harbour were allowed to fail. However, there would be the realistic opportunity to maintain defence to the lower valley (north of Yarbridge) by embanking the road at Yarbridge. The lower valley would still have a fluvial input from the catchment to the east and west, maintaining freshwater interest. However, a breach at Yaverland may address the issues of extreme runoff from the Yar and the need for pumping to maintain appropriate water levels as the valley becomes increasing tidally locked in the future.

With respect to the upper section of the Eastern Yar, there would be significant flood risk to areas of Sandown and Yaverland and these would need to be considered, together with how best to manage the rail and road access to Sandown. This would require careful examination of the cost-effectiveness of a potential managed breach. There would, however, be real potential in creating new saline habitat within the area of the upper Yar, as well as potential for more adaptive management of the shoreline.

In principle, this option for changing management at Yaverland is not, therefore, ruled out in the longer term. With the potential of maintaining a defence at Yarbridge, this allows the opportunity to consider management of the shorelines of Sandown Bay and Bembridge Harbour separately. In looking at this from the perspective of the Sandown Bay frontage, the issues in terms of increased risk would need to be considered in relation to the sustainability of defence at the shoreline.

Based on this conclusion, it is possible to sub-divide the PDZ further focussing on key issues for management:

- The local management of the Bembridge headland is considered, recognising the need to maintain the sediment supply to Bembridge Harbour area.
- Bembridge Harbour area considers in particular the management of the Duver, the interaction and management practice of dredging near Bembridge Spit and the supply of sediment from the cliffs to the north.
- Sandown Bay and the long term issues of maintaining sustainable defence to key areas of economic and social value.

3.3. Plan and Policy Development

Although not in geographic order, each of the three areas are discussed in the order set out above, recognising the logical implications of broader scale interactions between areas.

Bembridge Headland to Culver Cliff

The current management takes an approach of no active intervention between Forelands Fields and Culver Cliff. The SMP would concur with this policy, despite the potential loss of some 22 properties (mainly associated with the holiday park but also the Old House during the second epoch). These properties and assets are relatively isolated and would remain vulnerable to general

cliff instability even with toe defence in place. Any long term intent to protect areas locally would be outflanked and possibly overtaken by cliff failure. The section of coast provides an important sediment supply to the shoreline and any attempt to provide more wholesale protection would be detrimental to the geological and nature conservation interest in the area.

This policy would continue to provide sediment in support of management further to the east in assisting to support beaches.

In the area of Forelands Fields is a collection of properties at risk under a no active intervention policy. It has been assessed through the NE Coastal Defence Strategy (2004) that the sea wall in this area could be maintained through encasement. While at present this could be economically justified, the very exposed position of this defence makes long term management for the frontage harder to manage. The critical driver of this is sea level rise. As the ledges, which provide a high degree of protection to the foreshore, become more submerged, the effort to defend the frontage would substantially increase. The Strategy recommends that to north of here management should take the form of slowing erosion through beach management. Further north the approach would be to maintain the defence in the area of the Lifeboat Station. This again would be increasingly difficult to sustain with sea level rise. In each case the approach is to sustain some degree of defence while technically sensible. The longer term outcome would be accepting that the sea walls were unsustainable and their replacement could not be fully justified.

An alternative overall approach would be to manage the whole headland in a more complete manner. Typically this would involve construction of headland breakwaters with the intent of retaining significantly greater levels of sediment, establishing a long term intent to stop erosion and retain use of the headland. While such an approach might allow significant lengths of shoreline to remain effectively undefended, it is likely to be considered to have a significant detrimental impact of the designated nature conservation interests.

There are, therefore, two potential approaches which are quite different in their whole attitude to management of the frontage. In the first, the overall intent would be to manage the continuing process of retreat; a process that will continue beyond the 100 years considered by the SMP. In the second, the approach would be one of realigning the coast with the intent to hold the overall line, in effect, indefinitely. This alternative approach could not be recommended within the SMP2 without more detailed examination of the impact on the nature conservation values, potential affect on sediment drift to the north nor without the ability to identify alternative funding sources beyond that justified by coast protection.

The SMP policy is, therefore, based on the first of these approaches. Over the short to medium term the existing defences would be maintained and, in the area between, there would be the aim to manage sediment drift locally to the backshore to manage a retreating foreshore. In the long term, probably within the third epoch, management would change to allowing and managing retreat over the whole length, managing drift along the frontage to slow rates of erosion but without replacement of the sea walls. The change in policy would be triggered by such aspects as the level of overtopping, damage and outflanking of the sea wall. A clear intent would need to be signalled that in this area, that while the existing defences would be maintained and even improved, they would not be replaced or raised. This is in line with the Strategy but provides clearer long term intent. The policy differs substantially from SMP1 due to consideration of a longer timescale and the further understanding of sea level rise. The policy would initially be defined as three units of Hold the Line to the two lengths of defence during epochs 1 and 2 and a policy of managed realignment to the unit between. In epoch three the units would be merged, with one policy covering all three of managed realignment.

Such a policy is unlikely to impact significantly on drift supply to the north and therefore would not impact on sediment supply to Bembridge Harbour.

There is no justification for undertaking defence works along the frontage from Lane End Road through to Ducie Avenue. This would not preclude limited management through control of drift to slow erosion but only to the extent that it did not impact on nature conservation interests and did not impose a constraint on sediment supply to the north. The policy here is for No Active Intervention.

Bembridge Harbour

The Strategy for the area effectively sets the intent of policy. The SMP highlights certain issues that come from a potentially broader remit and longer term perspective of looking at management implications beyond the 100 years; even thought the plan only develops policy over the initial 100 years.

At the northern end of the frontage, while net shoreline drift is to the south, towards the harbour, there is a more northerly biased drift indicated in the nearshore area. This is potentially, in part, fed from the offshore side Bembridge spit and may be fed by sediment flushing from the area of the harbour where the channel eventually cuts through the Bembridge spit. The harbour, therefore, does act principally as a sediment sink but with some anticipated loss to the nearshore system. It is important, therefore, that sediment is still fed to the area of the harbour. This supply comes in part from the Bembridge headland to the south (as discussed above) and from the eroding cliffs of Priory Bay, but also from the nearshore system. For sustainable management of the area, maintaining these supplies is important, not least in maintaining the integrity of St. Helens Duver.

The Duver is a natural feature that has relied for its creation and continued sustainability on good connection with this general mechanism of sediment supply. Its ability to adjust to change in response to the position and pressures created by the harbour channel and connection with sediment supplies in the area is important. The position of the channel is itself a function of the behaviour and development of the Bembridge spit and more recently upon the dredging effort put in to maintain navigation. The hard defence along the Duver has both reduced the capacity of the feature to respond naturally and has as a consequence detached the shoreline of the Duver from its natural nearshore supply of sediment.

In the long term, the intent is that the harbour system would be managed in way that the usage of the harbour is maintained and that flood and coastal erosion risk is reduced. This has to be undertaken in a manner in balance with the natural processes. This requires a co-ordinated approach, moving away from local reaction to change to a position where management and use can adapt to natural change without causing significant knock on effects or imposing unsustainable constraints on the system.

The Eastern Yar Flood and Erosion Risk Management Strategy (led by the Environment Agency, 2010) looks in detail at management of the embankment at the back of the harbour and concludes that this should be maintained and raised in line with sea level rise. The SMP concurs with this finding. The importance of the designated freshwater marsh habitat of Brading Marshes is an essential part of the justification for maintaining the defence line at Embankment Road. Sustaining Embankment Road will primarily meet obligations to protect the internationally protected habitat in and around Brading Marshes (under Article 6 of the habitat regulations). The Eastern Yar Strategy also advises that Embankment Road also protects around 450 properties and the key road between Bembridge and St Helens from flooding to a standard of 1:25 and meets obligations under the Bembridge Harbour railways act. In developing this approach it is taken that the flood risk to properties and commercial activity at the western and eastern ends of the embankment would be considered in detail and the most effective line of improved defence would be considered taking these properties into account. The Strategy recommends that along the St Helens frontage (in the west of the harbour) defences are maintained at their current level for the next 100 years, to allow protection from tidal flooding of the mix of residential, commercial and recreational facilities along the water's edge at the lower margin of the village. It is anticipated that the existing structures will need to be maintained and the wall may need to be repaired every 10 years. The SMP supports this need and the clarity provided by the Strategy stating that securing central government funding

for this frontage will be difficult, therefore homeowners and businesses should be prepared to take action to protect their homes and properties from flooding. The Strategy encourages riparian owners to continue ongoing maintenance of the harbour wall.

The harbour area is at present accreting and monitoring suggests that the system has the capacity to accrete at least in line with sea level rise. This would impact on the area of the wharf in the east of the harbour and assets identified as being at flood risk in this area would need to adapt alongside the need for the defence line to be raised in response to sea level rise as part of a scheme for Embankment Road.

Accretion would be expected to continue behind St. Helens Duver but there would continue to be flood risk to properties along and within the spit, encroaching from the low-lying inner side of the spit. The intent of the SMP is to allow maintenance of the existing limited areas of private and public defences along the St. Helens Duver in the short to medium term, before adapting the change in the long term. In more detail along the inner St. Helens Duver the defence line is not continuous and it is not the intention to provide new defences on the inner spit given the important nature conservation values of this area.

The front face of the St. Helens Duver presents a more difficult management issue, given both the poor condition of the defence and the legal issues understood to apply to this area. The history of defence along this length prevents natural development of the dune behind and reduces the future ability of the frontage to adjust to natural change. It is recommended by the SMP that no new defence is imposed upon this frontage, although recognising that there may be a commitment to maintaining the existing structure while sustainable to do so. The intent would be to manage the alignment of the St. Helens Duver in such a way that it still provides a robust defence against breach and wave overtopping. Continued defence along the existing line reduces this long term capacity of the St. Helens Duver to provide this defence making it increasingly vulnerable to sudden failure under extreme storm conditions. As part of the intent to re-introduce a more natural defence to the harbour behind and properties within the St. Helens Duver, it would be expected that the defence to the northern part of the Duver, in front of St Helens Church is maintained in the short to medium term. Defence in this area clearly provides a degree of protection to the northern end of the St. Helens Duver, establishing a stable base from which to manage the rest of the frontage. This would be considered as part of an overall policy of managed realignment of St. Helens Duver. The southern end of St. Helens Duver might also be managed, principally with the intent of maintaining navigation to the harbour. Control of this point would need to be considered alongside the intent to manage adjustment of the main Duver frontage. Critical to management of St. Helens Duver would be the continued monitoring and regulation of dredging of the harbour entrance channel. As a better understanding is obtained as to the impacts of this dredging, so this could be developed as part of the overall management plan.

Although the Strategy indicates that there is little value in maintaining the deteriorating groyne at Bembridge Point as the spit is likely to remain stable, from a flood and erosion risk perspective, there remains the possibility that this structure influences the hydro-dynamic regime of the harbour entrance and as such its position should be considered in relation to the behaviour of the channel and the influence this has on navigation and the management of the adjacent St. Helens Duver. It is, however, recognised that the main pressure on St. Helens Duver is probably as a result of the flood flows rather the ebb. It would be anticipated that it is on the ebb when the groyne would be most effective.

To the north of the harbour area, there is little economic value for preventing continued erosion and slippage of the cliffs to Priory Bay or Nodes Headland. To intervene would significantly impact on sediment supplies to the harbour area. The policy running north from St Helens Church would continue to be No Active intervention.

The analysis undertaken by the SMP suggests that there is flood risk to some properties behind Bembridge Point, increasing with sea level rise. Given the Strategy's findings that the root of

Bembridge Spit is naturally stable, and that therefore the area is not under pressure from erosion, the intention of shoreline management in this area would be 'no active intervention' along the spit with continuation of natural coastal processes along the shoreline and the sand dunes. This includes the intention to not maintain or repair Bembridge Point Groyne at public expense. The Strategy concluded that Bembridge Point Groyne does not have a flood or erosion risk purpose - ie it does not protect any properties from flooding or erosion. However, it is not causing any problems and does not need to be removed. Coastal monitoring data showed that Bembridge Point has been stable for some time, the groyne forms a core to the point which has aided this stabilisation. There is no proposal to spend public funds to repair the groyne, however, the SMP recognises that the owner may wish to maintain the groyne at his expense, and the IWC, Environment Agency and Natural England would not object to this maintenance in theory, subject to the normal planning permissions. Immediately adjacent to the sand spit the Strategy recognises that properties are at flood risk behind Bembridge Point (between the top of Embankment Road and the open sea to the north) but this risk comes from Embankment Road rather than the open coast at Bembridge Point. It proposes including protection of these properties as part of a comprehensive 'hold the line' defence scheme for the Embankment Road frontage. The SMP supports this assessment and intended management outlined in the Strategy.

Sandown Bay

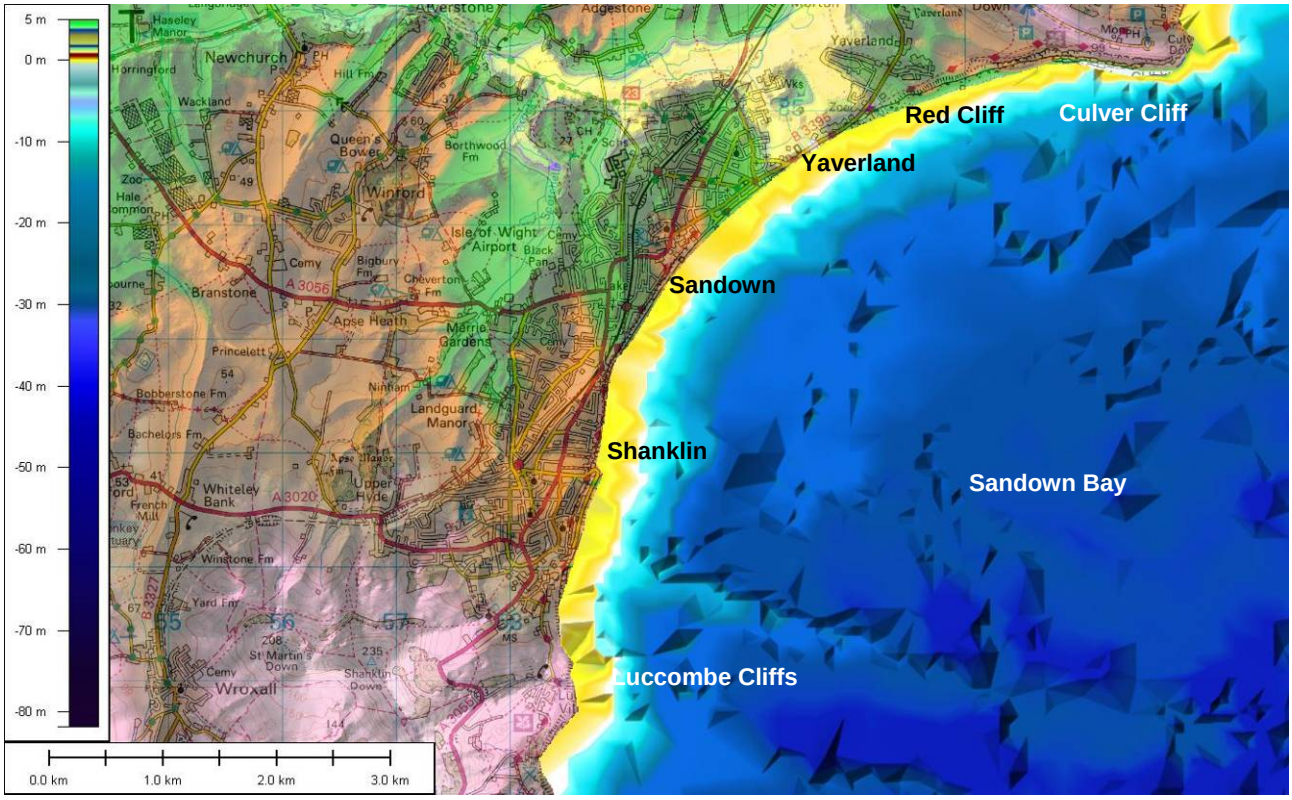
Sandown and Shanklin have been identified as important economic hubs in sustaining the economic prosperity of the Isle of Wight. Much of this regional value is associated with tourism, with the sea front, promenade and beaches being an essential feature of the area. This value is within the context of the important historic value of both the developed and the more natural areas of the coastline and the superb landscape provided by Culver and Luccombe cliffs the either end of the Bay. The problem in maintaining defence to the developed frontage is the increasing pressure as a result of anticipated sea level rise. Despite defence remaining technically feasible, a linear approach to defence would result in steepening of the backshore beach and substantial loss of amenity beach area.

The only new supply of sediment to the frontage comes from the erosion of the adjacent cliffs. At the southern end of the frontage, the generally undefended section of coastline between Horse Ledge and the southern end of the Shanklin, the shoreline is both subject to erosion and cliff recession. Material provided by this cliff is important to sustaining sediment along the rest of the Bay. The policy for this section is No Active intervention. Locally some properties would be at risk during epoch 3. Management at the southern end of the Shanklin promenade may provide protection to some of these properties, but the intent would be that defences did not encroach further south than at present, also that changes to the management of the existing defence would not interfere with the important supply of sediment to the main bay.

To the north, the erosion of Red Cliff does provide sediment to the system and, while there is a weak longshore drift to the north, it would be anticipated that this frontage also provides, more generally, sediment to the nearshore area contributing to the reservoir of sediment within the bay. Over this section of the coast the policy would be for No Active Intervention. This would result in loss to commercial amenity assets and the historically important Gun Battery at the northern end of Yaverland. It would neither be economically justifiable nor technically sensible to further extend defences to the north. This policy does highlight the step that is already developing between the defended and undefended section of coast at Yaverland. The nature of this step with a very clear change from the shoreline being held forward by the defence and the immediate cut back in the area undefended, does suggests that this is more a result of the evident backshore strength (concrete walls do not erode, relatively soft cliffs do), rather than an consequence of drift starvation north of the wall. It does, however, highlight the problem of outflanking of the defences and the increased exposure the defence faces in the future.

The overall intent over the main developed frontage would be to sustain the towns and the important amenity value. This developed area is seen as covering four slightly different areas. At Shanklin the shoreline is held in advance of what might have been expected to be the natural

curve of the bay. This is seen as being a feature as much of the local geology and the ridge running through into the nearshore sea bed as of development taking place in advance of a more natural curve of the bay. The defence line is, however, held forward by the breakwater at the northern end of the promenade.



General topography and bathymetry of Sandown Bay.

Immediately north of the Shanklin promenade, the defence steps back and runs as a promenade close to the toe of the cliff below Lake. Beach levels are low in front of the promenade. This is seen as being principally a lack of width and due to the slight reorientation of the whole coastline rather than being a result of sediment being trapped along the main Shanklin frontage. Basically there is an increased drift potential along the frontage which does not allow sediment to be retained over the upper beach.

The shoreline then adjusts over the main Sandown frontage to the apparently more natural curve of a typical crenulate bay. The suggested decrease in drift potential along this frontage does support a higher beach and this is reinforced by the breakwater at the northern end.

The final section across the Eastern Yar Valley, between Sandown and Yaverland is now in advance of the natural bay shoreline as discussed above in relation to the set back of the undefended Red Cliff area to the north.

Management of all four sections is seen as being economically sustainable adopting current practice over the first epoch. Certainly over the southern three sections described above (Shanklin, Lake promenade and Sandown) there is little or no opportunity for general realignment either with respect to the values associated with the sea front or from a technical view point. In addition to loss of the main built amenity along the coast, any additional width created between the existing defence line and the steeply rising cliffs would be insufficient to allow any substantially greater upper beach to develop. In effect removal of existing defence would merely transfer the management problem further back.

Monitoring data, demonstrating the variation both seasonally and over longer periods, shows the potential for the upper beach to be both drawn down and banked up against the defences along all sections of the developed shoreline. This would indicate significant cross shore movement, as well as the evident longshore behaviour, highlighting the important interaction between the shoreline and the nearshore area. In many ways the shoreline may be seen as two mechanisms: that driven by longshore drift, most obviously exemplified by the trapping of sand against existing cross shore breakwaters, and this interaction of sand moved to and from the wide intertidal beach and nearshore zone into the area of the upper beach. There is therefore likely to be opportunity to manage these two processes to develop and retain beaches along the main defended length and this is considered to be the likely sustainable approach in the future with sea level rise. Artificial recharge of the frontage, without some additional control, would be committing to an approach which is likely to be unsustainable in the longer term. Sediment would be transported longshore and lost to the nearshore area. More probably the need will be for larger cross shore and nearshore structures to ensure the important amenity value of the frontage is maintained.

Given the increasing anticipated pressure on national funding in the future, together with the increasing actual cost in moving towards cross shore or nearshore structures, there may be a need for additional funding sources to maintain the full economic value of the area. Typically other sources would need to recognise the importance of tourism to the Isle of Wight and the importance of this area in that respect.

Developing from this there might be opportunity for deliberately advancing the line, making use of control structures to reclaim land and attract additional funding to the area. Such an approach would require overall planning of the frontage both in terms of the interaction between sections of the shoreline and in terms of spatial planning of new development in keeping with the use of the present sea front. It would have significant impacts on the environment and character of the area. In particular the expectation of ongoing sporadic but notable cliff-falls occurring from the former seacliffs, behind and above much of the current defence line, would also be a key issue for consideration. Advancing the line may be an option in the third epoch, recognising the time necessary to develop such a process. Fortunately, the condition of defences is such that there would be time to develop this while still maintaining the existing approach over the short to medium term. The policy over the main three southerly defended and developed frontages is therefore Hold the Line. The possibility of advancing the defence line in the future would have important impacts on cliff risk assessment, character, environment, amenity use and businesses of the area. At the level of the investigation undertaken by the SMP, these issues cannot be adequately addressed. The possibility could be investigated further and would need extensive co-ordinated planning. The SMP, therefore, cannot recommend this as policy but this option could be examined in more detail in a Coastal Defence Strategy.

The fourth of the defended sections within Sandown Bay (Sandown to Yaverland) is potentially different both in its character and its nature. It is, in effect, the transition both from the area of intensive sea front development and use and the transition zone between the defended and undefended shoreline. This frontage provides essential protection against breach through to the Eastern Yar Valley. The economic assessment, though only at a high level, indicates substantial economic risk of flooding the area behind. There would, therefore, be good justification in maintaining the defence over this area. This could justify increasing the robustness and standard of protection provided and further development of the cross shore/nearshore control of the shoreline drift and shape of the coast in line with the approach recommended to the south. However, this would continue to incur increasing cost (which is likely to be justified) in to the future but would also result in a very stark change from defence to natural erosion to the north of Yaverland.

Because of the nature of the area, there remains an alternative approach of allowing and managing a breach into the Eastern Yar Valley. This has the potential of restoring natural estuary conditions to the upper Yar Valley and, through the potential to create a significant ebb tide delta, providing a far more natural transition between the developed coast and the natural coast to the north. There would be substantial economic, environmental and social implications of this. These

would include: loss of nationally designated sites but opportunity for significant saline habitat, the need for either new defence to be created around the edges of the new estuary or the need to move property and infrastructure, and the need to safeguard important transport routes. At the level of the investigation undertaken by the SMP, none of these issues can be addressed. The approach, which would need to be developed further would need extensive co-ordinated planning and is not something that is likely to be considered within the first two epochs. The SMP, therefore, cannot recommend this as policy but does strongly recommend that this approach is given further thought and discussion as a potentially more sustainable manner of managing this area of the shoreline. The underlying policy for this frontage is Hold the Line, but the option of realignment rather than advance the line is offered as a realistic if challenging alternative in the third epoch which could be examined in a Coastal Defence Strategy.

PDZ3
Management Area Statements

- **Bembridge Harbour (MA 3A)** includes five policy units.
- **Bembridge Headland to Culver Cliff (MA 3B)** includes five policy units, reducing to three in epoch 3.
- **Sandown Bay (MA 3C)** includes six policy units.

Within these areas a summary of policy is provided below. Management Areas statements are provided in the following sheets, with maps showing each area.

Location reference	**Bembridge Harbour**
Management Area reference	**MA 3A**
Policy Development Zone	**PDZ 3**

The following descriptions are provided to assist interpretation of the maps shown of each Management Area.

* Note: Predicted shoreline mapping is based on a combination of monitoring data, analysis of historical rates and geomorphological assessment with allowance for sea level rise. Due to inherent uncertainties in predicting future change, these predictions are necessarily indicative. For use beyond the purpose of the shoreline management plan, reference should be made to the baseline data (see Appendix C3).

100 year shoreline position:
The following maps aim to summarise the anticipated position of the shoreline in 100 years under the two scenarios of "With Present Management" and under the "Preferred Policy" being put forward through the Shoreline Management Plan.

In some areas the preferred policy does not change from that under the existing management approach. In some areas where there are hard defences this can be accurately identified. In other areas there is greater uncertainty. Even so, where the shoreline is likely to be quite clearly defined by a change such as the crest of a cliff the estimated position is shown as a single line.

- Where there is a difference between With Present Management and the Preferred Policy this distinction is made in showing two different lines:

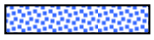
With Present Management.
Preferred Policy.

-  In some areas, the Preferred Policy either promotes a more adaptive approach to management or recognises that the shoreline is better considered as a width rather than a narrow line. This is represented on the map by a broader zone of management:

Flood Risk Zones:
All flood risk zones are based upon the current tidal EA Flood Zone 2. This is an extreme flood event (1:1000 year at current levels) meaning that it has 0.1% chance of occurring each year.

General Flood Risk Zones. The explanation of these zones is provided on the Environment Agency's web site www.environment-agency.gov.uk. The maps within this SMP document show where SMP policy might influence the management of flood risk.

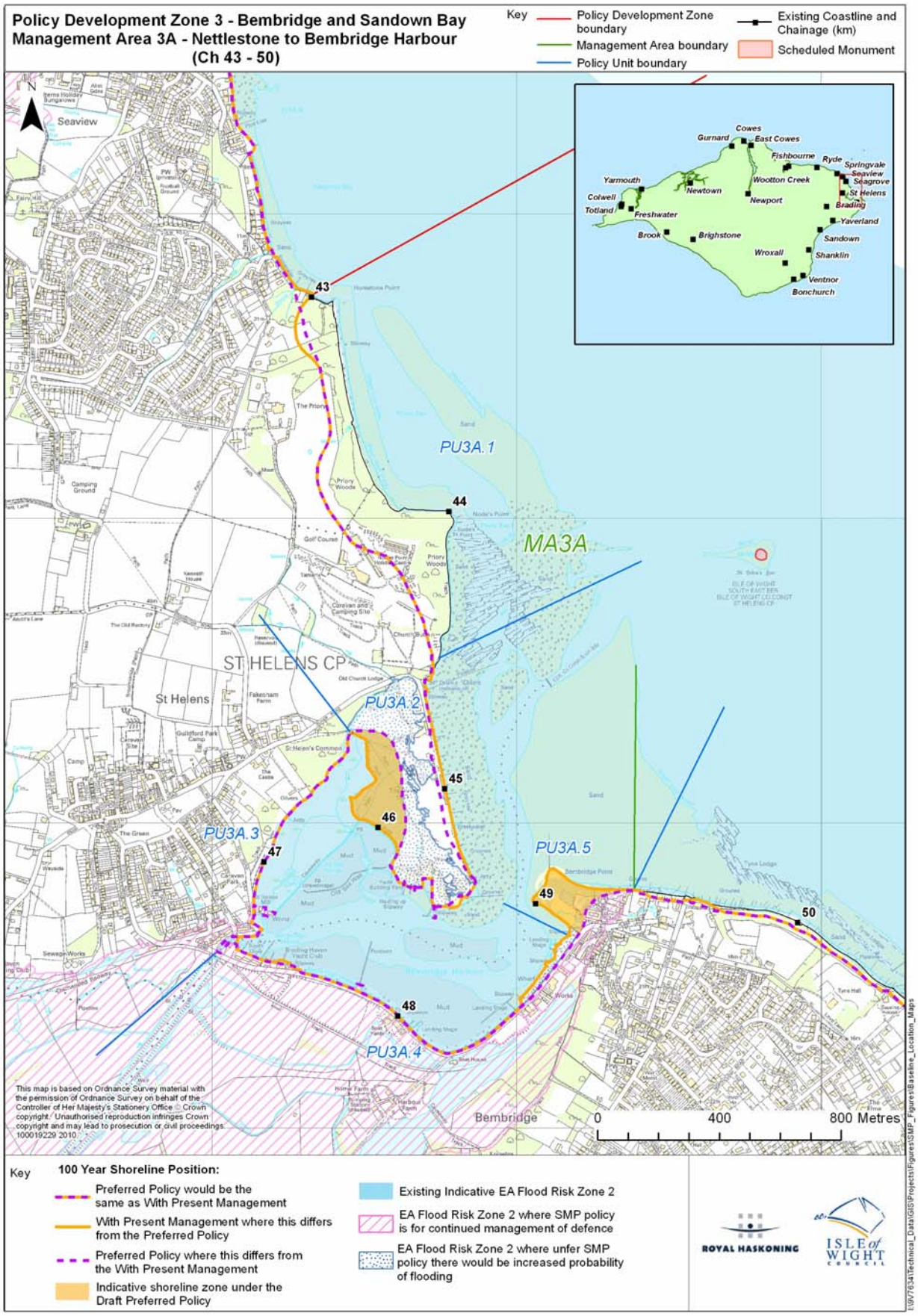
Indicate areas where the intent of the SMP policy is to continue to manage this risk.



Indicate where over the 100 years the policy would allow increased risk of flooding.

The maps should be read in conjunction with the text within the SMP document.

Note: This Management Area corresponds to IW13, 14, 15 and 16 in selected Appendices.


Policy Development Zone 3 - Bembridge and Sandown Bay
Management Area 3A - Nettlestone to Bembridge Harbour
(Ch 43 - 50)
Key
Policy Development Zone boundary
Management Area boundary
Policy Unit boundary
Existing Coastline and Chainage (km)
Scheduled Monument
Seaview
Cowes
Gurnard
East Cowes
Fishbourne
Ryde
Springvale
Seaview
Seagrove
Wootton Creek
St Helens
Brading
Yaverland
Sandown
Shanklin
Ventnor
Bonchurch
Yarmouth
Newtown
Newport
Colwell
Totland
Freshwater
Brook
Brighstone
Wroxall
PU3A.1
PU3A.2
PU3A.3
PU3A.4
PU3A.5
MA3A
ST HELENS CP
St Helens
43
44
45
46
47
48
49
50
Bembridge
0
400
800 Metres
This map is based on Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office © Crown copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings. 100019229 2010
Key
100 Year Shoreline Position:
Preferred Policy would be the same as With Present Management
With Present Management where this differs from the Preferred Policy
Preferred Policy where this differs from the With Present Management
Indicative shoreline zone under the Draft Preferred Policy
Existing Indicative EA Flood Risk Zone 2
EA Flood Risk Zone 2 where SMP policy is for continued management of defence
EA Flood Risk Zone 2 where unfer SMP policy there would be increased probability of flooding
ROYAL HASKONING
ISLE of WIGHT COUNCIL

SUMMARY OF PREFERRED PLAN RECOMMENDATIONS AND JUSTIFICATION

PLAN:

There are several important factors relating to the management of this area. The overall intent is to maintain the flood defence provided by the embankment at back of the harbour, reducing flood risk to the Eastern Yar river valley. In managing this, the intent is also to continue to manage the flood risk to St Helens and the properties at Bembridge Point. Alongside this is the intent to sustain use of Bembridge Harbour, together with the aim of supporting continued use of areas of St Helens Duver. This Management Area has been examined in detail through the Eastern Yar Flood and Erosion Risk Management Strategy (Environment Agency, 2010).

Essential to long term management is the need to maintain sediment supply to the area and to maintain the overall natural resilience of St Helens Duver as an important feature providing protection to the harbour area. To achieve this, and to sustain the important nature conservation interest in the harbour area (intertidal mudflats and saltmarsh habitats), there is a need to introduce a better ability for the natural system of the Duver to evolve in response to change in the estuary and in response to sea level rise. The current line of defence works fronting the Duver is against this, creating an artificially constrained alignment that will be become increasingly difficult to maintain and one that increases the vulnerability of the Duver in the face of extreme storm conditions and sea level rise. The intent of the plan is to support maintenance of the existing defence to the front face of the Duver in the short to medium term in accordance with historic local management requirements but with the aim to allow managed realignment beyond this. The whole frontage would continue to be managed with the intent of maintaining defence at the northern end and maintaining control at the head of the spit. Allowing the central section to realign would provide width for this section to adapt to change in the alignment of the main channel, while still forming a robust defence against overtopping and potential breach. This approach to managed realignment needs to incorporate future need for dredging the main channel and to be developed as an overall management plan for the area. An essential factor in future harbour management activities is the need to maintain sediment supply to the area, to complement the plan to continue to protect the Duver.

The management intent along the inner face of the St Helens Duver would be support local action to sustain both the nature conservation value (intertidal mudflats, saltmarsh and sand dune habitats) and current use of the southern end of the Duver by local marine industry. There would, however, be increased flood risk to the inner face of the Duver and it is not intended to provide a continuous defence of this area against flooding. Existing defences can be maintained for 50 years, then the policy of Managed Realignment creates potential to realign defences after this time. Along the water's edge of St Helens, the existing defences can be maintained at their current level for 100 years but it is recognised that securing central government funding will be difficult for this frontage and homeowners and businesses should be prepared to take action to protect their properties from flooding.

As outlined by the Eastern Yar Flood and Erosion Risk Management Strategy (led by the Environment Agency, 2010), sustaining Embankment Road will primarily meet obligations to protect the internationally protected freshwater habitat in and around Brading Marshes (under Article 6 of the habitat regulations), as well as protecting around 450 properties and the key road between Bembridge and St Helens from flooding to a standard of 1:25 and meets obligations under the Bembridge Harbour railways act.

At Bembridge Point, the intent to manage the frontage is specifically in respect of the property at flood risk. It would not be the intent to manage the behaviour and development of Bembridge Spit. The aim is to allow natural behaviour of the coast, to maintain the sediment supply from the shoreline to the south (around the Bembridge headland). There is no proposal to spend public funds to repair the groyne, however, the SMP recognises that NAI would not preclude private maintenance of the groyne if there is a wish to do so, subject to the normal planning permissions.

The behaviour of the spit would need to be considered as part of the management plan for maintaining the channel and the realignment of the St Helens Duver in the long term.

PREFERRED POLICY TO IMPLEMENT PLAN:	
From present day	Maintain the embankment and flood defence along Embankment Road. Support riparian owners undertaking local defence to St Helens the harbour area. Maintain defence of St Helens Duver. Manage the harbour entrance channel to ensure no adverse effect upon coastal processes.
Medium term	Maintain the embankment and flood defence along Embankment Road and to properties at Bembridge Point. Support riparian owners undertaking local defence to St Helens the harbour area. Maintain defence of St Helens Duver, with consideration of the intent to reduce management of the area in the long term.
Long term	Maintain the embankment and flood defence along Embankment Road and to properties at Bembridge Point. Support riparian owners undertaking local defence to St Helens the harbour area. Maintain defence to the northern end and control of the southern end of the Duver in line with a management plan for realignment of the Duver and management of the main channel.

SUMMARY OF SPECIFIC POLICIES

Policy Unit (& length)		**Policy Plan**			
		to 2025	**to 2055**	**to 2105**	**Comment**
PU3A.1	**Priory Bay** (1,515m)	NAI	NAI	NAI	
PU3A.2	**St. Helens Duver** (1,958m)	HTL	HTL	MR	HTL with public and private defences; Realignment in the third epoch in line with a plan for management of the harbour entrance.
PU3A.3	**St Helens** (879m)	HTL	HTL	HTL	Maintain the defences at the current level. Securing central government funding will be difficult for this frontage and homeowners and businesses should be prepared to take action to protect their properties from flooding.
PU3A.4	**Embankment Road** (1,497m)	HTL	HTL	HTL	Strong links to PU3C.2.
PU3A.5	**Bembridge Point** (583m)	NAI	NAI	NAI	No intervention will be undertaken at public expense along the shoreline of Bembridge Point (allowing the groyne to collapse/disappear and continuation of natural coastal processes along the beach and the sand dunes). However, NAI does not preclude private maintenance of the groyne. Nb. During epoch one a new defence alignment to be defined that links Embankment Road (PU3A.4) with higher ground at the back of Bembridge Point; this will provide a continuous defence around properties that will be held in future epochs (nb. Eastern Yar Strategy 2010).
Key: HTL - Hold the Line, A - Advance the Line, NAI – No Active Intervention, MR – Managed Realignment					

CHANGES FROM PRESENT MANAGEMENT

The general intent of management remains the same in that the aim is to continue management of flood risk to the Eastern Yar valley and to the main areas of properties to the rear of the harbour, while also sustaining the use of the harbour. However, in practice the SMP introduces change in terms of management of the St Helens Duver, reflecting the findings of the Eastern Yar Strategy and in taking a longer term perspective. For the Duver, the policy would change to Managed Realignment in the long-term.

IMPLICATION WITH RESPECT TO BUILT ENVIRONMENT

Economics		**by 2025**	**by 2055**	**by 2105**	**Total £k PV**
Property	Potential NAI Damages/ Cost £k PV	75,045	86,033	77,726	238,804
	Preferred Plan Damages £k PV	11,908	12,161	5,042	29,111
	Benefits £k PV	63,137	73,872	72,684	209,693
	Costs of Implementing plan £k PV	5,437	2,497	1,342	9,276

The preferred plan for this Management Area is economically viable overall. Individual schemes will need to be investigated in further detail to assess their economic viability and affordability.

Location reference	**Bembridge Headland to Culver Cliff**
Management Area reference	**MA 3B**
Policy Development Zone	**PDZ 3**

The following descriptions are provided to assist interpretation of the maps shown of each Management Area.

* Note: Predicted shoreline mapping is based on a combination of monitoring data, analysis of historical rates and geomorphological assessment with allowance for sea level rise. Due to inherent uncertainties in predicting future change, these predictions are necessarily indicative. For use beyond the purpose of the shoreline management plan, reference should be made to the baseline data (see Appendix C3).

100 year shoreline position:
The following maps aim to summarise the anticipated position of the shoreline in 100 years under the two scenarios of "With Present Management" and under the "Preferred Policy" being put forward through the Shoreline Management Plan.

In some areas the preferred policy does not change from that under the existing management approach. In some areas where there are hard defences this can be accurately identified. In other areas there is greater uncertainty. Even so, where the shoreline is likely to be quite clearly defined by a change such as the crest of a cliff the estimated position is shown as a single line.

- Where there is a difference between With Present Management and the Preferred Policy this distinction is made in showing two different lines:

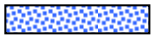
With Present Management.
Preferred Policy.

-  In some areas, the Preferred Policy either promotes a more adaptive approach to management or recognises that the shoreline is better considered as a width rather than a narrow line. This is represented on the map by a broader zone of management:

Flood Risk Zones:
All flood risk zones are based upon the current tidal EA Flood Zone 2. This is an extreme flood event (1:1000 year at current levels) meaning that it has 0.1% chance of occurring each year.

General Flood Risk Zones. The explanation of these zones is provided on the Environment Agency's web site www.environment-agency.gov.uk. The maps within this SMP document show where SMP policy might influence the management of flood risk.

Indicate areas where the intent of the SMP policy is to continue to manage this risk.



Indicate where over the 100 years the policy would allow increased risk of flooding.

The maps should be read in conjunction with the text within the SMP document.

Note: This Management Area corresponds to IW17, 18 and 19 in selected Appendices.


Policy Development Zone 3 - Bembridge and Sandown Bay
Management Area 3B - Bembridge Harbour to Culver Cliff
(Ch 49 - 55)
Key
Policy Development Zone boundary
Management Area boundary
Policy Unit boundary
Existing Coastline and Chainage (km)
Scheduled Monument
N
ST HELENS CP
St Helens
BEMBRIDGE CP
Bembridge
Bembridge Airport
45
46
47
48
49
50
51
52
53
54
55
56
PU3B
PU3B.2
PU3B.3
PU3B.4
PU3B.5
MA3B
Cowes
Gurnard
East Cowes
Fishbourne
Ryde
Springvale
Seaview
Seagrove
St Helens
Bembridge
Yaverland
Sandown
Shanklin
Ventnor
Bonchurch
Wroxall
Brighstone
Brook
Freshwater
Totland
Colwell
Yarmouth
Newtown
Newport
Wootton Creek
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0
400
800 Metres
Key
100 Year Shoreline Position:
Preferred Policy would be the same as With Present Management
With Present Management where this differs from the Preferred Policy
Preferred Policy where this differs from the With Present Management
Indicative shoreline zone under the Preferred Policy
Existing Indicative EA Flood Risk Zone 2
EA Flood Risk Zone 2 where SMP policy is for continued management of defence
EA Flood Risk Zone 2 where under SMP policy there would be increased probability of flooding
ROYAL HASKONING
ISLE of WIGHT COUNCIL
I:\0v7634\Technical_Data\GIS\Projects\Figures\SMP_Figures\Baseline_Location_Maps

SUMMARY OF PREFERRED PLAN RECOMMENDATIONS AND JUSTIFICATION

PLAN:

Much of the frontage is of international importance for nature conservation with the foreshore and the Bembridge Ledges (nearshore reefs) an essential aspect of this. The outcropping rock ledges also act to provide important erosion protection to the main frontage. The undefended areas of Whitecliff Bay are subject to active slumping and erosion of the toe of the coastal slope, and together with the erosion of the low cliffs around to Bembridge provide important sediment supply both locally and as a feed to Bembridge Harbour. The rock outcrop has retained sediment along the backshore and local defences have been constructed taking advantage of this. There will be increased pressure on existing defences with sea level rise as the rock outcrop becomes progressively submerged. There will be an increased risk to existing defences due to outflanking as undefended sections of coast erode back. The intent of the plan is to maintain defence to local areas while sustainable to do so. However, the longer term intent is to manage the natural realignment of the area. This intent would support efforts to slow erosion through recharge and shoreline control of the backshore where detailed study can demonstrate that this does not significantly impact of the nature conservation values. The intent would, however, be to maintain the general pattern of sediment drift along the frontage and to areas to the north. It is anticipated that existing defence would be maintained to areas of Foreland Fields and Lane End during epochs one and two but this would critically depend on the rate of sea level rise. There would be no intent to significantly improve or raise defences, or to extend defences beyond their present length. In the long term there would continue to be management of the area in slowing erosion but with no intent to construct new hard defences. Managed realignment would therefore be implemented as a continuing approach of allowing the shoreline to retreat. The aim would be to increase the time before property was affected or lost and to maintain local use of the frontage. It will be important to continue monitoring of the frontage to provide improved advice to property owners as to when property might be lost. In Whitecliff Bay, the important geological, nature conservation interest and landscape of the area supports continued policy of no active intervention in this area; adaptation to cliff top retreat will be required.

PREFERRED POLICY TO IMPLEMENT PLAN:	
From present day	Maintain local existing defences and beach control structures. Examine opportunities for beach management. Monitor recession rates and improve predictions of erosion. Continue NAI along undefended frontages.
Medium term	Maintain local existing defences and beach control structures. Examine opportunities for beach management. Monitor recession rates and improve predictions of erosion. Develop adaptation planning with the intent of slowing erosion. Continue NAI along Whitecliff Bay.
Long term	Abandon existing hard defence but maintain an approach of beach management and slowing erosion rates in a coordinated manner along the whole frontage. Continue NAI along Whitecliff Bay.

SUMMARY OF SPECIFIC POLICIES

Policy Unit (& length)		**Policy Plan**			
		to 2025	**to 2055**	**to 2105**	**Comment**
PU3B.1	**Bembridge** (1,233m)	NAI	NAI	NAI	
PU3B.2	**Lane End** (472m)	HTL	HTL	MR	Gradually reduce influence of management as existing defences fail in the third epoch.
PU3B.3	**Foreland** (600m)	MR	MR		
PU3B.4	**Foreland Fields** (309m)	HTL	HTL		
PU3B.5	**Whitecliff Bay** (2,831m)	NAI	NAI	NAI	
Key: HTL - Hold the Line, A - Advance the Line, NAI – No Active Intervention MR – Managed Realignment					

CHANGES FROM PRESENT MANAGEMENT

There would be no change in policy from that of No Active Intervention at Whitecliff Bay. The current approach to management of existing defences would continue along other sections of the frontage over the next two epochs but recognising that in the third epoch this would change to a policy of Managed Realignment. In detail this would influence the way in which the existing Hold the Line policy was implemented, in that maintenance would be undertaken on the basis of sustaining defence only over this period of time. A longer term plan would be developed to manage the realignment of the frontage.

IMPLICATION WITH RESPECT TO BUILT ENVIRONMENT

Economics		by 2025	by 2055	by 2105	Total £k PV
Property	Potential NAI Damages/ Cost £k PV	1,080	130	174	1,384
	Preferred Plan Damages £k PV	895	102	116	1,112
	Benefits £k PV	185	29	59	272
	Costs of Implementing plan £k PV	159	157	377	693

The preferred plan for this Management Area is not economically viable overall, although individual works will need to be investigated in further detail to assess their economic viability and affordability, including examining the level of maintenance required. This has been recognised in the preferred plan by moving towards 'Managed Realignment' and 'No Active Intervention' in the third epoch, allowing time for the local community to adapt. Given the low benefit/cost ratio, it is unlikely that all interventions will be funded nationally, so third-party funding sources should be explored at strategy and scheme level.

Location reference	**Sandown Bay**
Management Area reference	**MA 3C**
Policy Development Zone	**PDZ 3**

The following descriptions are provided to assist interpretation of the maps shown of each Management Area.

* Note: Predicted shoreline mapping is based on a combination of monitoring data, analysis of historical rates and geomorphological assessment with allowance for sea level rise. Due to inherent uncertainties in predicting future change, these predictions are necessarily indicative. For use beyond the purpose of the shoreline management plan, reference should be made to the baseline data (see Appendix C3).

100 year shoreline position:
The following maps aim to summarise the anticipated position of the shoreline in 100 years under the two scenarios of "With Present Management" and under the "Preferred Policy" being put forward through the Shoreline Management Plan.

In some areas the preferred policy does not change from that under the existing management approach. In some areas where there are hard defences this can be accurately identified. In other areas there is greater uncertainty. Even so, where the shoreline is likely to be quite clearly defined by a change such as the crest of a cliff the estimated position is shown as a single line.

- Where there is a difference between With Present Management and the Preferred Policy this distinction is made in showing two different lines:

With Present Management.
Preferred Policy.

-  In some areas, the Preferred Policy either promotes a more adaptive approach to management or recognises that the shoreline is better considered as a width rather than a narrow line. This is represented on the map by a broader zone of management:

Flood Risk Zones:
All flood risk zones are based upon the current tidal EA Flood Zone 2. This is an extreme flood event (1:1000 year at current levels) meaning that it has 0.1% chance of occurring each year.

General Flood Risk Zones. The explanation of these zones is provided on the Environment Agency's web site www.environment-agency.gov.uk. The maps within this SMP document show where SMP policy might influence the management of flood risk.

Indicate areas where the intent of the SMP policy is to continue to manage this risk.

Indicate where over the 100 years the policy would allow increased risk of flooding.

The maps should be read in conjunction with the text within the SMP document.

Note: This Management Area corresponds to IW20 to 25 in selected Appendices.


Policy Development Zone 3 - Bembridge and Sandown Bay
Management Area 3C - Culver Cliff to Luccombe (Ch 55 - 65)
Key
Policy Development Zone boundary
Management Area boundary
Policy Unit boundary
Existing Coastline and Chainage (km)
Scheduled Monument
Cowes
Gurnard
East Cowes
Fishbourne
Ryde
Springvale
Seaview
Seagrove
Wootton Creek
Yarmouth
Newtown
Newport
St Helens
Brading
Colwell
Totland
Freshwater
Yaverland
Brook
Brighstone
Sandown
Wroxall
Shanklin
Ventnor
Bonchurch
Yarbridge
Longlands
Bembridge
Bembridge Fm
Bembridge Sort
Morton
Yaverland
Down
Whitecliff Ledge
CULVER
Red Cliff
PU3C.1
PU3C.2
PU3C.3
PU3C.4
MA3C
SANDOWN
Sandown Bay
SHANKLIN
Little Stairs Point
Shanklin Chine
Horse Ledge
Luccombe Village
Luccombe Bay
Luccombe Chine
Isle of Wight Airport
Black Pan
IRB Sta (summer only)
Pier
54
55
56
57
58
59
60
61
62
63
64
65
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0
0.5
1 Kilometre
Key
100 Year Shoreline Position:
Preferred Policy would be the same as With Present Management
With Present Management where this differs from the Preferred Policy
Preferred Policy where this differs from the With Present Management
Indicative shoreline zone under the Preferred Policy
Existing Indicative EA Flood Risk Zone 2
EA Flood Risk Zone 2 where SMP policy is for continued management of defence
EA Flood Risk Zone 2 where under SMP policy there would be increased probability of flooding
ROYAL HASKONING
ISLE of WIGHT COUNCIL

SUMMARY OF PREFERRED PLAN RECOMMENDATIONS AND JUSTIFICATION

PLAN:

The aim of the plan is to sustain the important economic and tourism value of the frontage alongside the equally important and interrelated nature conservation and landscape values of Sandown Bay. The intent is therefore to continue to defend the essential built areas of the frontage, maintaining also the important beaches, while continuing a policy of no intervention along the natural sections of the coast to north and south. An important aspect of this is that defence should not encroach beyond areas currently defended. This is essential in maintaining the supply of sediment to the whole area of the bay, in addition to maintaining nature conservation values. This will result in loss of property and features of the historic environment; adaptation will be required. Equally important will be the need to consider options, along the defended areas, for sustaining beach levels. This will be significantly more difficult as sea level rises. This longer term concern raises the issue of funding and the need to consider the degree to which alternative funding may be required to sustain an appropriate form of management which would address both the need for defence and the requirement to support essential recreational and tourism interests. The SMP identifies the probable need to move from the current linear approach of defence to one where there is a need to impose more control on sediment movement with cross shore structures. The option for advancing the line, with the intent of adding value to the area, has been raised by the SMP but is not specifically taken forward as a long term policy option. It would remain, however, as an option that could be considered further in developing a Strategy for the developed frontage. The further issue is raised with respect to the transition between the defended and undefended shoreline at Yaverland. This would require specific attention in developing a Strategy. The SMP identifies the potential advantage that might arise from opening a new estuary entrance through Culver Parade at Yaverland. The potential benefits of this, in terms of supporting sediment accumulation and beach width to the south and reducing long-term and increasing reliance on raised defences protecting the low-lying river floodplain behind, can be considered further but alongside the benefits significant adverse economic, social and environmental impacts would also occur.

PREFERRED POLICY TO IMPLEMENT PLAN:	
From present day	Maintain and improve existing defences. Maintain a No Active Intervention policy to other areas.
Medium term	Maintain and improve existing defences. Maintain a No Active Intervention policy to other areas. Consider potential adaptation of use in undefended areas.
Long term	Maintain and improve existing defences, with further consideration of potential for retaining a functional beach and economic defences, alongside consideration of the potential for managed realignment to the north. Maintain a No Active Intervention policy to other areas. Consider potential adaptation of use in undefended areas.

SUMMARY OF SPECIFIC POLICIES

Policy Unit (& length)		**Policy Plan**			
		to 2025	**to 2055**	**to 2105**	**Comment**
PU3C.1	**Culver Cliff and Red Cliff** (2,733m)	NAI	NAI	NAI	
PU3C.2	**Yaverland and Eastern Yar Valley** (1,201m)	HTL	HTL	HTL	Strong links to PU3A.4.
PU3C.3	**Sandown and Shanklin** (4,691m)	HTL	HTL	HTL	
PU3C.4	**Luccombe** (1,436m)	NAI	NAI	NAI	
Key: HTL - Hold the Line, A - Advance the Line, NAI – No Active Intervention MR – Managed Realignment					

CHANGES FROM PRESENT MANAGEMENT

Overall the policy for management of the developed areas continues. The intent however is that defences would not be extended beyond those areas currently managed and there will be areas of transition between defended and undefended sections of shoreline.

IMPLICATION WITH RESPECT TO BUILT ENVIRONMENT

Economics		by 2025	by 2055	by 2105	Total £k PV
Property	Potential NAI Damages/ Cost £k PV	277,987	289,421	233,706	801,114
	Preferred Plan Damages £k PV	7,218	7,245	5,415	19,878
	Benefits £k PV	270,769	282,176	228,291	781,236
	Costs of Implementing plan £k PV	772	1,613	3,351	5,735

The preferred plan for this Management Area is clearly economically viable overall. Individual schemes will need to be investigated in further detail to assess their economic viability and affordability.