

PDZ2. ST BRIDE'S BAY:

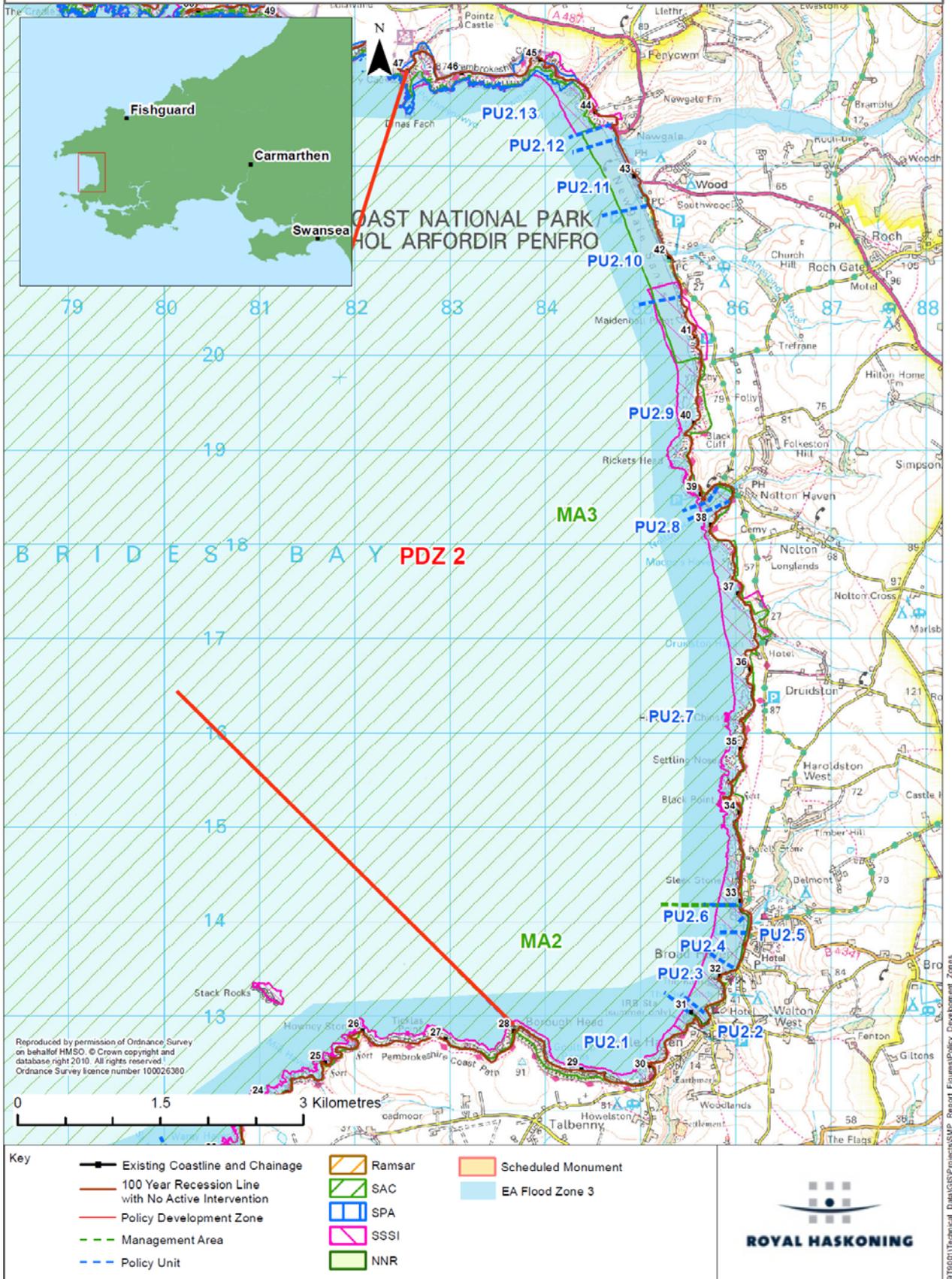


Borough Head to Dinas Fach

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**Shoreline Management Plan Sub Cell 8
Baseline Location Map
Policy Development Zone 2 - St Brides Bay**



1 Local Description

The Zone covers the main backshore of St Brides bay, extending from Little Haven in the south through to Newgale at the northern end. The frontage comprises three typical sections; the small sub bay of Little Haven and Broad Haven, the more exposed central section of high cliffs and narrow beaches with the villages of Druidston and Nolton Haven, and the long shingle back beach of Newgale Sands.

At the southern extent of the Zone, Little Haven sits within a deeply indented bay within a more generally rocky cliff frontage extending around from Borough Head. The main coastal road, running out of the village, runs close the coastal cliff top immediately to the west of the village. The cliffs through to Borough Head contain post-Medieval remains of old anthracite (Culm) workings, and the cliffs are designated SSSI and are part of the larger SAC.



The road runs down a steep hill to the sea front of Little Haven. Within the centre of the village the road crosses a bridge just back from the shore, before rising quite steeply into the centre of the village. The bridge and stream separates the southern part of the village from the main centre. The bay is backed by sea walls and the slipway, and comprises a wide sandy foreshore with a shingle storm beach, up against the wall. The bay is relatively narrow, enclosed by rock cliffs. The southern headland runs out to form a narrow rock peninsula upon which there is a small old navigation structure, protected by a concrete block revetment. Properties are close behind the sea wall, with a pub and garden occupying much of the seafront. The village has an inshore rescue station and the beach and slipway are important to a small fishing community and for launching diving boats and other water sport activities. The village has a very high proportion of second homes and is an important tourism centre.



The rock headlands forming the bay are heavily folded rock strata and are designated SSSI and part of the SAC.

The headlands to the south extend only part way over the sandy foreshore, giving access at low tide around to Broad Haven, some 500m further north. There are several roads out of the village on the northern side of the bay. The Settlands Hill road is the main access and coastal road between Little Haven and Broad Haven. This road runs very close to the crest of the coastal cliff between the two settlements at the back of Settlands Bay.



Broad Haven

The coast road then runs down in to Broad Haven.

Broad Haven Sands is some 600m in length, forming a less indented bay than at Little Haven. The bay comprises a wide sandy beach, with sand running back to the now generally protected low coast slope behind. Over much of the bay this back beach area is covered during most high waters. Likewise, a lot of the bay, particularly the northern half, the beach is backed by a narrow shingle bank.

The main village sits to the centre of the bay, with two streams cutting the coast to north and south of the main village. The northern stream lies within a relatively wide, low valley.

The southern stream is much narrower and runs in a culvert through Broadhaven Bridge, under the road. South of the bridge there are a small collection of properties including sea front shops, a pub and toilets. The main slipway to the beach is at the point where the coast road runs down the hill from the north. This slipway and the collection of properties form the main seafront area of the village.

Further north, there is a small area of reclaimed coastal slope in front of one of the main seafront hotels. The coast road runs along the whole frontage just to the back of the shoreline defences, reaching its highest point just south of the central promenade.

Beyond here the road effectively runs along an embankment formed by the Haroldston



Broad Haven

Bridge, rising, at the northern end of the bay, up the cliffs of Haroldston Hill. The bay ends with the rock headland of Haroldston Hill. The beach area of the bay is designated as SSSI and SAC, with the cliffs to the north also falling within these areas of designation. There is evidence of old mine-working within the cliffs, whilst to the back of the coast the remains of a Neolithic, bronze age stone circle exists. Further along the headland is the SAM of Harold Stone, set some 60m away from the cliff edge.

The following section of the coast, to the north, comprises relatively high rock cliffs with wide areas of rock platform at their base. Over the whole 6km through to Newgale Sands, at the north western corner of St Brides Bay, there are only narrow areas of intertidal sand and shingle foreshore at Druidston and Nolton Haven.



The cliffs and foreshore in this area are designated SSI and SAC. Along this section of the coast are various sites and finds of archaeological significance, ranging from worked flints through to more modern coal workings. There is also the hill fort at Black Rock (SAM). Present day development tends to be set back from the coast along the road, except at Nolton Haven where the road runs down to the back of the bay across a small bridge. The majority of property within the village is along the two roads running in land following the two valleys to the back of the bay. There is a small section of dune and earth bay forming the northern back to the bay. The bay itself comprises a sand intertidal foreshore backed by a shingle storm beach.



The coastal road runs north out of the village and, once clear of the village, is set well back from the coastal cliffs. The road rises before dropping back to the coast at the start of Newgale Sands.

The southern part of Newgale is a small collection of properties, a car park and a large caravan park, set within the wide valley of Bathesland Water. The valley is closed off by the backshore shingle ridge upon which the road is built. A stream runs through a small bridge under the road.

The road then runs through to the main part of Newgale, which is separated from southern Newgale by the headland of Sibbernock Point. The road along Sibbernock Point is cut into the low rock headland. Once around the point, the coast road sets back behind the main large shingle ridge and area of scrub dunes, finally joining the main A487 from Haverfordwest.

The main village of Newgale is at the northern side of the wide, low lying valley of Brandy Brook. The stream cuts the coast to the north of the valley behind the main shingle ridge, which forces the stream north against the rock cliff at the northern end of Newgale sands.

Where the coast road joins the A487, there is a popular car park, some caravan parks set back from the coast and various properties within the scrub dune area. From the junction of the roads, the A487 runs directly behind the shingle ridge. This road is often affected by wave overtopping and by shingle being thrown over and on to the road. The road is the main southern route through Newgale and Solva, to St Davids.



In the valley immediately behind the road there are several properties and a petrol station which have all been affected by flooding and the overtopping of shingle. The road is maintained by shingle clearance on a regular basis. The road crosses a bridge over the Brandy Brook and then rises up through the main part of the village, continuing well in land of the coast over the higher ground at the northern end of the Zone.

The Zone ends with the initial section of the higher rock-cliff line making up the northern flank of St Brides Bay. The cliffs are designated SSSI, SAC and SPA. The final headland of the Zone is at Dinas Fach. Along this headland is a prehistoric promontory fort which is designated as a SAM. This site is accessed from the coastal path by a narrow neck of land.

2 Coastal Processes

The Zone sits well back within the influence of St Brides Bay. The dominant wave direction is from the open ocean to the southwest. The southern part of the frontage is considerably more sheltered than the central and northern sections.

Little Haven and Broad Haven sit within a smaller sub-bay of the main bay running from Borough Head, to the cliffs north of Broad Haven. The backshores of each settlement are further constrained by the local rock headlands that define each local bay.

Little Haven acts as a small cove with very little longshore movement of the backshore shingle ridge. The main process is one of slow pressure for retreat of the shingle bank. This is evidenced by the regular need to clear shingle from the stream under the bridge. The area is subject to regular flooding which is in part caused by the blockage of the stream. This would obviously be more severe with Sea Level Rise.

Broad Haven can be subject to more change along the upper beach, with changes in the level of sand, which exposes or covers areas of the shingle at the backshore. The cliff



line and earth bank to the southern area of the village is under pressure to erode and is defended by sea walls and rock revetments. Over the central section of the bay, because of the wave reflection off the reclaimed promenade, beach levels tend to be lower. However, the slight advance of the shoreline at this position does also tend to hold the shingle embankment over the northern section of the frontage. The trend is for this shingle ridge to roll back and this is constrained by the defences and the

road. The village can be subject to flooding at present, with wave overtopping over the southern slipway. There can be quite severe overtopping of the central wall. Only at the southern end of the village are there properties which might be flooded during an extreme event, as a result of Still Water Levels. With Sea Level Rise, it is really the same areas that would typically be flooded, but at greater risk. The main threat to the village is from erosion, with the risk to the road and, due to the greater depth of water and greater wave energy, the lowering of beach levels.

To the northern end beyond Broad Haven there is some risk to the road due to the potential for limited instability of the coastal slope above the rock base.

The central cliff section of the Zone is eroding back slowly. Nolton Haven is similar to Little Haven in that the narrowness of the bay restricts significant variation in wave approach, and the principal processes acting on the backshore here is for a roll back of the shingle ridge. The area of earth cliff and dune to the north of the bay are subject to occasional erosion, and this together with the roll back of the shingle ridge, will increase with Sea Level Rise.

The two sections of Newgale sands present a wider, more open frontage. There is the same pressure for roll back of the shingle ridge but there is, to the north, also some suggestion of a weak northerly drift along the whole frontage. As the ridge rolls back the headland at Sibbernock Point would become more exposed. With increasing Sea Level

Rise, and increasing pressure for the ridge to roll back, it will become ever more difficult to maintain the road. As the ridge rolls back there is the potential for the Brandy Brook to cut through the ridge to the south of the bridge.

POTENTIAL BASELINE EROSION RATES

A distinction is made between basic erosion of the shoreline and cliff recession, affecting the crest of cliffs and coastal slopes. This is noted in the table below together with other relevant factors. In assessing erosion and recession in the future, allowance has been made for Sea Level Rise and this is discussed in Appendix C. This is also discussed briefly following the table.

Within each of the bays and open shingle-backed frontages, Sea Level Rise (SLR) will be a significant factor in future development of the shoreline. The central cliffs, although relatively resistant to erosion would still be affected by SLR as they are exposed to increased wave action. Where there are softer cliffs or shorelines suffering erosion, the rate of erosion is likely to increase with SLR. This might be by a factor of 1.7 to 2.5 times the existing base erosion rate, over the 100 years. Where there are more stable features, such as fully developed storm beaches there would be a natural roll back of the beach, potentially in the order of 10m to 40m, depending of the nature of beach and the coast behind. As beaches, protecting at present relatively stable coastal slopes, erode or roll back, this could result in the re-activation of landslides and slope instability.

| Location | NAI Base Rate (m/yr) | Notes | 100yr. Erosion range (m) |
|-----------------|----------------------|-----------------------------------------|--------------------------|
| Little Haven | 0.05 | Roll back of beach | 30 - 50 |
| Broad Haven | 0.1 – 0.2 | Adjustment following loss of defences | 20 - 70 |
| Nolton Cliffs | 0.05 | Slow erosion and occasional rock falls. | 10 - 20 |
| Newgale Sands | 0.05 – 0.1 | Roll back of beach | 15 - 60 |
| Newgale village | 0.1 | Erosion and landslip | 10 - 25 |
| Penycwm cliffs | 0.05 | Slow erosion and occasional rock falls. | 5 - 10 |

Base erosion rates have been assessed from monitoring and historical data. The range of potential erosion is assessed in terms of variation from the base rate and sensitivity in potential Sea Level Rise. Further detail on erosion rates, together with erosion maps are provided in Appendix C

FLOODING

The key areas of potential flood risk are at Little Haven, Broadhaven and within the two valleys of Newgale. There is some risk at Nolton Haven.

EXISTING DEFENCES

There are defences at Little Haven and at Broad Haven. These defences are generally in moderate condition, protected by the shingle banks at the back of the beach. In the case of Broad Haven there is a relatively heavy concrete wall to the southern end, protecting the road. Wave overtopping can still affect the coastal slope behind. The various sections of rock revetment along the frontage have been designed based on their position at the back of the beach. With Sea Level Rise these rock defences may fail. The wall defending the forward area of the Broad Haven promenade is subject to overtopping and with increased wave activity is likely to suffer erosion at the toe.

To the northern section of Broad Haven the wall sits behind a shingle bank and protects the road. The road is further protected at the northern end by more substantial concrete walls.

There are only light defences to the back of Nolton Haven beach, these include the road bridge.

The only forward defence along the Newgale frontage, is where the road runs over the headland at Sibbernock Point. There is, however, a low wall to the back of the shingle ridge, retaining the back face slope of the shingle.

UNCONSTRAINED SCENARIO

Under this scenario, the behaviour of the coast is considered as if there were no man made defences; effectively if they were suddenly not there. Although recognised to be a totally theoretical scenario it does provide a better understanding of how we are influencing coastal behaviour and therefore the stresses and broader scale impact that are introduced. This assists in assessing first how the coast might wish to change but also in defining the limits of interaction which the SMP should be considering.

In this Zone there are only local sections of defence. Generally, the coastline would erode back slowly.

Without the defences at Little Haven the backshore shingle bank might set back some 20m, taking out the road and road bridge. This process of roll back would continue and increase. Similarly at Broad Haven, the whole coast would have eroded back some 20m, continuing at an increasing rate in the future. The area where the existing wall is in front of the shoreline, is an area of slightly higher ground between the two valleys. There is, therefore, the possibility that this is constructed over a local headland. Without defences this would have eroded back but may still act to separate the two natural shingle banks to either side, forming potentially two smaller backshore bays.

There would be little change at Nolton Haven but the shingle bank will continue to roll back.

At Newgale the shingle ridge would be much as it is at present, but rolling back with Sea Level Rise. Without the management of the shingle in front of the A487, the ridge is likely to be lower in places, with more regular overtopping.

KEY INTERACTION WITH DEFENCES

Defences and management practice over the whole area tend to hold the natural shingle banks forward and in doing so, stop the beaches fully developing as natural storm beaches. In the case of Broad Haven North and Newgale, it is possible that the shingle ridges would breach more regularly, with flooding to the rear.

3 Management Scenarios

3.1 No Active Intervention – Baseline Scenario 1.



Little Haven

All the coast would continue to erode, or, where there are well developed beaches, roll back. This process is constrained at present by defences as identified above.

At Little Haven the defences without maintenance would tend to fail, possibly over the first Epoch. The slipway might also fail over a similar period of time. A recent feasibility study identified that 10 properties currently suffer

flooding. This is from wave overtopping and flooding due to river blockage. This would become more severe under this scenario, but with only four properties suffering inundation due to Still Water Level as Sea Level Rise increases. The main loss would be to the road and bridge, both due to erosion and regular flooding. There would be loss of the public house and properties on the cliff to the north, due to erosion. The sea front would return to a natural shingle bank and the two parts of the village would be separated.

Impact of different Sea Level Rise Scenarios

While the impact of erosion would occur sooner, the extent of flooding would not be much more severe, even under the 2m SLR scenario. The number of properties at risk from direct Still Water Level flooding would not increase.

It is probable that the road over Settlands Bay may be lost due to erosion, possibly in Epoch three. This, together with the loss of the road through Little Haven would place greater reliance on the Walton Road and the road down Walton Hill, into Little Haven.

At Broad Haven, defences would fail over the first and second Epochs. At the southern end of the village, erosion and roll back of the frontage would occur, taking out the road in the second Epoch and quite probably the front line of property over the third Epoch. Much of the sea front, including the sea front facilities and hotel would be lost over the next 100 years. As erosion occurs so there would also be an increased risk of flooding to this area of the village.

To the north of the village there would be increased loss of the shingle bank initially, but as defences fail during the second Epoch, the natural bank would reform to a degree. The road would be lost and there would be some increased flooding within the valley.

Impact of different Sea Level Rise Scenarios

While to the southern area of the village a substantially greater number of properties are potentially at risk under a 2m Sea Level Rise Scenario, to the northern part of the village only one property is shown as being at significant risk, even under this more extreme SLR Scenario.

The road out of Broad Haven could be at risk from landslide at the crest. However, this is not shown as impacting on property or on the standing stones or Harold stone (SAM). There would be continued erosion and landslide that may impact significantly of the fort at Black Rock (SAM).

At Nolton Haven, defences would fail over the first two Epochs. The main issue would be of erosion. This would cut the road over the second Epoch with further erosion quite probably affecting all roads into the village during the third Epoch. This would, in effect, mean that not just the coastal road would be lost but that the two roads coming from inland would end at the shoreline. The village would be very fragmented. The public house would also be lost.

At Newgale, over the whole frontage there would be a retreat of the shingle bank. The rear of the shingle ridge would be some 20m to 40 further inland than at present. This would also expose the coastal slope coming down into the southern part of Newgale and would also increase pressure of erosion where the road runs along Sibbernock Point. Whilst allowing the shingle bank to roll back would maintain its general integrity, it would become lower due to overtopping and would be overtopped more regularly. This would result in more frequent flooding of each of the valleys, being significantly worse in the

case of the northern Brandy Brook valley, with a substantial part of the valley being flooded during the second Epoch on normal Spring Tides.

Impact of different Sea Level Rise Scenarios

The flood extent increases significantly in the Brandy Brook valley during Epoch two with just 0.36m SLR. In Epoch three with 1m SLR the area increases further. With a 2m SLR Scenario, the MHWS flood area increases little over the 1m scenario.



The erosion would result in both sections of coastal road being lost. This, coupled with the increased flooding, would result in loss of property within the northern valley.

Over the final cliffed section of the Zone, erosion would continue slowly to the hard rock cliffs.

Under a No Active Intervention Scenario the coastal road would be loss in several places. These include:

- At Little Haven, affecting access through the village but also to the south at Musselwick bay. Access to the village would be via Walton Hill.
- At Settlands, cutting the coastal link between Little Haven and Broad Haven.
- At Broad Haven, along the entire seafront.
- At Nolton Haven, significantly reducing access to the village and closing the coastal road between Broad haven and Newgale. Both roads into this area would be lost, with no alternative roads to the caravan park and car park.
- At Newgale, along the back of the shingle ridge, this would close the existing main road to Solva and St David's.

3.2 With Present Management – Baseline Scenario 2.

The following table sets out current policy and management approach for the Zone.

| SMP 1 No. | Unit | Policy | Subsequent Management Approach |
|--------------------------------------------------------------------------------------------------------|--------------------------------|-------------|-----------------------------------------------------------|
| North Pembrokeshire. (Note policy was developed for short term and long term over the 50 year period.) | | | |
| 18STB/MH | Wooltack Point to Little Haven | DN/DN | |
| 18LH /A | Little Haven | HLT/HTL | Feasibility study recommends a scheme to improve defences |
| 18LH/B | Little Haven (undefended) | DN/DN | |
| 18BRH/A/B/C | Broad Haven | HTL/HTL | Minor improvement to defences |
| 18BRH/D | The Settlands | DN/deferred | |

| SMP 1 | | | Subsequent Management Approach |
|--------|-------------------------------|--------------|------------------------------------------|
| No. | Unit | Policy | |
| 18NT/B | Broad Haven to Nolton Haven | DN/DN | |
| 18NT/A | Nolton Haven | HTL/HTL | |
| 18NG/C | Nolton Haven to Newgale Sands | DN/DN | |
| 18NG/B | Newgale Sands | HTL/deferred | Response management to shingle overwash. |
| 18NG/A | Newgale Sands to Cwm Bach | DN/DN | |

The following information is taken from the Pembrokeshire and Ceredigion Rivers CFMP Draft Plan.

| | |
|-------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Policy Unit 4 Western Coastal Rivers | The Western Coastal Rivers Policy Unit comprises many short steep watercourses, which respond quickly to rainfall and drain the coast of Pembrokeshire, from Tenby, in a westerly direction to Fishguard. |
| Problem / risk: | Problem: The main source of flooding is fluvial flooding and tidally influenced fluvial flooding. River channels quickly fill and flow out of bank across the floodplain. Onset is rapid and duration is likely to be short. Tidally influenced fluvial flooding is a problem in the lower river reaches especially when high tides and strong winds combine with high river levels. Localised surface water flooding is also a problem. |
| Policy selected | Policy 4 – Take further action to sustain the current level of flood risk into the future. |
| Catchment-wide opportunities & constraints | Constraints: Steep, short coastal catchments, with potential for rapid response to flooding such as the Nevern, Solva, Gwaun and Brandy Brook in the Western Coastal Rivers Policy Unit, are difficult to manage. We must recognise that there are few options available which will change the frequency or extent of flooding and there is limited opportunity to improve flood warning in steep, short coastal catchments which have a rapid response to rainfall. Our approach to managing flood risk must focus on reducing the impact. |

With the exception of the developed areas, With Present Management has a policy of NAI, as its baseline scenario 1. The discussion below focuses on the developed frontages.



The recent feasibility study suggested improvement to defences to raise the standard of defence within the village to 1:200 year standard. These indicative works would entail construction of a new wall, effectively over the entire frontage, with realignment and boards across the slipway. It is acknowledged that partially closing the slipway would cause some difficulty for launching the IRB. With increased water level and the increased pressure on the frontage there would also be a need, possibly

within Epoch two, for additional works to support the sea wall. The new sea wall would

have to be raised in line with Sea Level Rise. Under a 1m SLR Scenario, this would mean raising the wall by an equivalent height. This would start to have a significant impact on the visual aspects of the village in the long term.

Impact of different Sea Level Rise Scenarios

With a 2m SLR scenario, the height of the wall would block views from the lower part of the village and increase difficulty of access to the beach. Under this scenario there would be a need to substantially raise the wall during the second Epoch.

While the integrity of property within the village would be safeguarded, the impact on tourism is likely to be significant. With Sea Level Rise, there would be increased risk of tidal blocking of the stream and increased risk of fluvial flooding.

Broad Haven.

Along the southern section of the village and through to the centre the road level is of the order of 5m rising to 8m just north of the main hotel. Over much of the frontage the earth grass bank is at a slightly higher level. Only where the stream cuts through the defence and at the southern slipway are the general ground levels lower. In holding the line to this frontage there would need to be significant strengthening of the sea walls and raising of the earth bank, to alleviate flooding. In particular, the advanced line of the central promenade would need to be improved, probably with a rock armour toe to avoid undermining. There is generally sufficient width along the frontage to allow works to be carried out without significant impact on either the foreshore, or the visual aspect of the seafront. This area of the village would be sustained, although there would be; loss of upper foreshore, affecting tourism; and, particularly by the bridge, considerable pressure on the defences.



To the north of the village, sustaining both the protection provided by, and the level of, defence would be more difficult. The wall and bridge rely upon the shingle bank for protection. As sea level rises this shingle bank would become difficult to maintain and quite probably towards the end of Epoch two would need to be replaced along the whole length with a rock revetment. The bridge would need to be sluiced if the valley was to be defended against coastal flooding. Apart from the road there would

be little justification in doing so.

At Nolton Haven there is little risk to property due to flooding, however there is significant risk due to anticipated erosion. The road is currently at a level of some 6m and the shingle ridge is relatively healthy, with little direct interaction between the road defence and the behaviour of the foreshore. In holding the line, there would be a need to raise and increase the integrity of the protection works. This would safeguard properties and the access into



and through the village. Taking a Hold The Line policy to the dune and earth bank to the north of the village would require significantly more work to stop all erosion. This would be difficult to justify.

The road into the southern part of Newgale from the south would need to be protected, possibly during the second Epoch to stop erosion of the coastal slope. This would maintain access to the valley. Attempting to sufficiently stabilise the shingle bank, upon which the road runs across the valley, would require major intervention. This would destroy the natural feature, creating a narrow shingle backshore similar to that along the northern part of Broad Haven. The road running out to the north would need substantial protection works where it runs across the headland. This area already shows signs of interaction with the shingle bank, causing a degree of erosion.

Along the northern part of Newgale sands the bank is managed by reprofiling. This might be possible over the next 20 years, subject to Sea Level Rise. To continue a policy of Hold The Line along this frontage would ultimately require construction of a rock revetment over much, if not all, the frontage. This would be increasingly difficult to maintain and there would need to be works undertaken to reduce flooding from the tidally locked stream within the valley. This would maintain the access along the frontage, but all at significant cost to the natural environment.

4 Summary Comparison and Assessment of Baseline scenarios.

Table 1. Economic Assessment

The following table provides a brief summary of erosion 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 | | 50 – 100 years (2m SLR) | | | | | |
|----------------------------------------------|--------------------|------|---------------|--------------------|----------------|------------|-------------------------|------|---------------------|-------------------|------------|---------------------|
| No Active Intervention | No. of properties: | | Value x £k | No. of properties: | | Value x £k | No. of properties: | | PV Damages (£x1000) | | | |
| Location | Res. | Com. | | Res. | Com. | | Res. | Com. | | Res. | Com. | |
| Little Haven | 0 | 0 | 0 | 1 | 1 | 132 | 4 | 1 | 684 | 16 | 2 | 111 |
| Broad Haven | 0 | 0 | 0 | 0 | 0 | 0 | 42 | 0 | 4,202 | 44 | 2 | 270 |
| Newgale | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 449 | 1 | 2 | 23 |
| Total for PDZ2 | | | | | | | | | | | 404 | |
| With Present Management | No. of properties | | Value x £k | No. of properties | | Value x £k | No. of properties | | Value x £k | No. of properties | | PV Damages (£x1000) |
| Location | Res. | Com. | | Res. | Com. | | Res. | Com. | | Res. | Com. | |
| Little Haven | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 134 | 1 | 0 | 7 |
| Broad Haven | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Newgale | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 449 | 2 | 2 | 23 |
| Total for PDZ2 | | | | | | | | | | | 30 | |
| Notes: PVD determined for 1m SLR in 100 yrs. | | | | | | | | | | | | |
| Other information: | | | | | | | | | | | | |

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

| No Active Intervention | Flood risk tidal 2010 | | | Flood risk tidal 2060 | | | Flood risk tidal 2110 | | | tidal risk 2m SLR | | PVD (£x1000) |
|-------------------------|-----------------------|----------|----------|-----------------------|----------|----------|-----------------------|----------|----------|-------------------|----------|--------------|
| | No. of properties | | AAD x £k | No. of properties | | AAD x £k | No. of properties | | AAD x £k | No. of properties | | |
| | <1:10 yr. | >1:10 yr | | <1:10 yr. | >1:10 yr | | <1:10 yr. | >1:10 yr | | <1:10 yr. | >1:10 yr | |
| <i>Location</i> | | | | | | | | | | | | |
| Little Haven | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 1.4 | 4 | 0 | 4.4 |
| Broad Haven | 0 | 4 | 0.3 | 3 | 11 | 1 | 14 | 8 | 107 | 23 | 5 | 348 |
| Nolton Haven | | | 0 | 0 | 0 | 0 | 0 | 1 | 0.02 | 1 | 0 | 0.06 |
| Newgale | 3 | 0 | 34 | 3 | 1 | 38 | 3 | 1 | 390 | 4 | 2 | 2165 |
| Total for PDZ2 | | | | | | | | | | | 2518 | |
| With Present Management | No. of properties | | AAD x £k | No. of properties | | AAD x £k | No. of properties | | AAD x £k | No. of properties | | PVD (£x1000) |
| <i>Location</i> | <1:10 yr. | >1:10 yr | | <1:10 yr. | >1:10 yr | | <1:10 yr. | >1:10 yr | | <1:10 yr. | >1:10 yr | |
| Little Haven | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0.83 | 0 | 4 | 2.6 |
| Broad Haven | 0 | 1 | 0.18 | 0 | 14 | 0.67 | 0 | 22 | 3.52 | 0 | 28 | 20 |
| Nolton Haven | 0 | 0 | | 0 | 0 | | 0 | 1 | 0.02 | 1 | 0 | 0.06 |
| Newgale | 0 | 3 | 7 | 0 | 4 | 38 | 3 | 1 | 47 | 4 | 2 | 605 |
| Total for PDZ2 | | | | | | | | | | | 678 | |

Feasibility study for Little Haven indicates current damages to some 12 properties due to wave overtopping and river blockage, with a PVD £545K.

Table 2. General Assessment of Objectives

The following table provides an overall assessment of how the two baseline scenarios impact upon the overall objectives. Specific 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 |
| Reduce risk to life. | | | | | | |
| Protect properties from flood and erosion loss. | | | | | | |
| Minimise the need for increasing effort and management of coastal defences. | | | | | | |
| Avoid reliance on defence particularly where there is a risk of catastrophic failure. | | | | | | |
| Maintain access to villages along St Brides Bay and connectivity with Haverfordwest. | | | | | | |
| Maintain main residential centres. | | | | | | |
| Maintain recreational use of beaches. | | | | | | |
| Maintain access to the coast including car parking and facilities. | | | | | | |
| Maintain access for boat use and associated diving activity. | | | | | | |
| Maintain character and integrity of coastal communities. | | | | | | |
| Identify risk and reduce risk of loss of heritage features where possible. | | | | | | |
| Maintain historic landscape. | | | | | | |
| Prevent disturbance or deterioration to historic sites and their setting. | | | | | | |
| Maintain or enhance the condition or integrity of the international (SAC, SPA) designated sites and interest features within the context of a dynamic coastal system. | | | | | | |
| Maintain or enhance the condition or integrity of the national (SSSI) designated sites and interest features within the context of a dynamic coastal system. | | | | | | |
| Maintain and enhance educational and scientific understanding of geology and geomorphology. | | | | | | |
| Avoid damage to and enhance the natural landscape. | | | | | | |
| Maintain the human landscape and character of communities. | | | | | | |
| Maintain access to St David's. | | | | | | |

5 Discussion and Detailed Policy Development

Over much larger sections of the coast there is no justification for intervention and to do so would have a serious impact on the important natural features of the shoreline. This will, at present, have consequences for the historic environment in that there would be continued risk to specific features of archaeological significance. In particular: along the section from Borough Head through to Little Haven, there could be loss of evidence of the Culm workings and associated dwellings; some of the areas between Broad Haven and Newgale, where there is evidence of prehistoric flint workings and more recent mining, could suffer loss, together with continued erosion of the fort at Black Rock. In the north, at Dinas Fach, there would be continuing loss to the promontory fort.

To attempt to protect these features would result in ever increasing and costly works, which would severely impact on the nature conservation values and to a degree on the historic context of the area. It is acknowledged that this loss will require significant effort in terms of recording and mitigation and that this needs to be planned and funded over the next 100 years.

A key issue along the frontage is the coastal road and the potentially more significant transport route of the A487, at Newgale. The SMP1 suggested that further consideration be given to defence of the coastal road at Settlands, between Little Haven and Broad Haven. It seems unlikely that defence of this frontage could be undertaken and continued over the long term without significant impact of the nature conservation values of the area. Given that there is an alternative route between the two villages, works here are not felt to be justified. Similarly, works to protect the road just south of Little Haven

would be difficult to justify at Musselwick. However, here there may be a need to realign the road to ensure access to the Strawberry Hill area of Little Haven.



At Nolton Haven, despite the increasing risk of flooding to the main road, it would be possible to maintain the coast road and hence access to different areas of the village; to the south of the village and to the north through to the southern part of Newgale. This could become quite critical when considering the issues along the main road through Newgale and the northerly access to the southern part of Newgale. The position of the A487 is not considered sustainable even under present sea level conditions beyond the first Epoch. With even minor increase in Sea Level Rise, certainly

over the second Epoch, the pressure for the shingle ridge to move in land, together with the increased risk of regular flooding makes the position of the road untenable.

Therefore, over the period of the SMP there would need to be significant re-thinking of the road system throughout the area. The most urgent area for consideration would be at Newgale and this would need to examine the justification for re-routing the A487 in land. In the other areas identified above, the problems are likely to be during the third Epoch. Even so, since there will be a need to realign the road over in the future, the

critical section in maintaining the general position of the shoreline, both to north and south; it already forms a slight headland along the frontage, although it is evidently not designed to fulfil this function.

There is increased risk of flooding directly from sea levels and from the stream to the south of the main village. This might be better managed if there was the opportunity to set back this frontage, linking through to the valley behind. This creates the opportunity to maintain important shoreline width. Consideration would then have to be given to the feasibility of re-constructing the road with a new bridge. This area of realignment could then be held to the southern end, by reinforcing the protection of the corner by the slipway; this would maintain the defence to the access road. Protecting the whole frontage on its current line is not expected to be justified in the long term. The option outlined above, of: holding the centre and reinforcing this as a promontory; maintaining and improving defence to the south by the slipway, but also allowing retreat over the area between, is seen as an opportunity to address this in a more sustainable manner.

In a similar manner, to the north, maintaining the central section as a promontory, with its higher ground behind but allowing the retreat at Haroldston Bridge would both create a more sustainable area of beach and foreshore, while also minimise cost of defence. The road over this section would be difficult to maintain in to the future and it is unlikely that its continued defence would be justified..

In both areas there would need to be further consideration of flood issues and, as importantly, a review of how the essential elements of the village can be retained. It goes beyond the remit of the SMP to address these issues in detail. However, the policy intent for the whole frontage would be to maintain defences into Epoch two but with the intent to adopt Managed Realignment towards the end of Epoch two and into Epoch three. Critical to timing of such change would be Sea Level Rise and the response of the foreshore area. This would need to be monitored. However, it would be important to start considering overall adaptation measures now, such that further development of the village, could be in line with future change to a more sustainable position.

Nolton Haven. There are existing flood issues with the road. However, this is quite a critical position in the road network, with four routes converging and with development of the small village along each of these. The shape and orientation of the bay means that the southern corner gains a significant degree of shelter and that the main pressure for future erosion with Sea Level Rise is against the earth bank and dunes to the north of the bay. It is considered that even with Sea Level Rise of 2m over the next 100 years, it would be sustainable to manage the existing defences in the vicinity of the road. It would not preclude significantly more regular flooding in the longer term over periods of high water. It would also not be anticipated that defence was extended further along the soft earth bank section and indeed, maintaining the opportunity for this area to respond and erode naturally would be important in providing sediment to this enclosed bay. The overall intent would be to allow natural realignment but with the aim to encourage the build up of the beach in front of the road; with the intent of not allowing loss of the road through erosion. The policies for the frontage would therefore be Managed Realignment.

Newgale. The above policy at Nolton Haven would maintain the opportunity for access from the hinterland along the coast road to the southern valley of Newgale. Maintaining the road across the valley is not seen as being a sustainable possibly much beyond the first Epoch. There may need to be some stabilisation works carried out to the southern cliff line to sustain the road in this local area. The road in from the north is also likely to be able to be maintained into the second Epoch. However, the intent would not be to

maintain defence to this road into Epoch three. The policy intent for this southern section of Newgale is therefore for Managed Realignment.

Over the northern valley, the intent would be to maintain access along the main road for as long as possible by shingle clearance. There is already monitoring of the work involved in taking this approach. It is anticipated, however, that during Epoch two this would not provide sufficient security to the road and that the road would, in effect, be lost.

This would require significant planning to maintain access to the southern area of the St David's Peninsula.

Along with the road, increased flooding to the valley is likely to make the properties and businesses untenable much beyond the start of the second Epoch. There would be a need to move the car park in land as the shingle bank rolls back, although the property under Pinch and West Hill, together with the old Lime Kiln is not seen as being at risk over the period of the SMP.

At the main village of Newgale, the shingle would roll back, and although they would still have some protection from this shingle, the cliffs would eventually come under more pressure from Erosion. It is probable that there could be loss of property towards the end of the final Epoch. This erosion is not seen as putting the rest of the village at risk and there might be scope for some protection works, possibly in association with management of the stream. Over the whole section of Newgale, therefore, the intent would be to allow natural retreat of the shingle. Over the main valley frontage the intent would be eventually to create a situation where there was no need for intervention. This would require an initial policy of Managed Realignment over the first two Epochs. At the northern end the policy would be for Managed Realignment over all epochs, not precluding the potential need to defend the main core to the village.

The final section of the Zone is the high cliffs through to Dinas Fach. The policy here would be for No Active intervention.

6 Management Summary.

The intent of the Plan over much of the Zone is to allow natural behaviour of the coast. Only in front of the various settlements does the intent change to sustain communities whilst also recognising the need for adaptation. The Policy Units reflect this and are grouped into two Management Areas.

M.A.2 LITTLE HAVEN AND BROAD HAVEN: From Borough Head to Emmet Rock

| Policy Unit | | Policy Plan | | | |
|-------------|----------------------------------|-------------|------|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | 2025 | 2055 | 2105 | Comment |
| 2.1 | Borough Hd. to the Point | NAI | NAI | NAI | Possible need to realign road to Little Haven. |
| 2.2 | Little Haven | HTL | HTL | MR | Improvement to defences standard would not be anticipated over the short and medium term. The use and structure of the lower village would need to be examined. |
| 2.3 | The Settlands | NAI | NAI | NAI | Potential long term loss of coast road. |
| 2.4 | Southern and central Broad Haven | HTL | HTL | MR | Consider options for realignment in the area of Broadhaven Bridge. |
| 2.5 | Broad Haven North | HTL | MR | NAI | Lost of road. |

| | | | | | |
|----------------------------------------------------------------------------------------------------------|-----------------|-----|-----|----|---------------------------------|
| 2.6 | Haroldston Hill | HTL | HTL | MR | Maintain access from the north. |
| Key: HTL - Hold The Line, A - Advance the Line, NAI – No Active Intervention MR – Managed Realignment | | | | | |

M.A.3 NOLTON HAVEN AND NEWGALE: From Emmet Rock to Dinas Fach

| Policy Unit | | Policy Plan | | | Comment |
|----------------------------------------------------------------------------------------------------------|---------------------|-------------|------|------|-------------------------------------------------------------------------------------------------------------|
| | | 2025 | 2055 | 2105 | |
| 2.7 | Haroldston Cliff | NAI | NAI | NAI | |
| 2.8 | Nolton Haven | HTL | MR | MR | The intent is to maintain access with local works to sustain the road. |
| 2.9 | Rickets Head | NAI | NAI | NAI | |
| 2.10 | Newgale Sands south | MR | MR | MR | Manage the realignment and loss to road, while protecting access from the south. |
| 2.11 | Newgale Sands north | MR | MR | NAI | Manage shingle on the road but with the long term intent of allowing the shingle ridge to behave naturally. |
| 2.12 | Newgale village | MR | MR | MR | Manage the cliffs and position of the stream to sustain the upper village. |
| 2.13 | Penycwm cliffs | NAI | NAI | NAI | |
| Key: HTL - Hold The Line, A - Advance the Line, NAI – No Active Intervention MR – Managed Realignment | | | | | |

PDZ2

Management Area Statements

MA2 Little Haven and Broad Haven

Borough Head to Emmet Rock

MA3 Nolton Haven and Newgale

Emmet Rock to Dinas Fach

| | |
|-----------------------------------|-------------------------------------|
| Location reference: | Little Haven and Broad Haven |
| Management Area reference: | M.A. 2 |
| Policy Development Zone: | PDZ2 |

* Note: Predicted shoreline mapping is based on a combination of monitoring data, analysis of historical maps 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.

The following descriptions are provided to assist interpretation of the map shown overleaf.

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 "Draft 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 Draft Preferred Policy this distinction is made in showing two different lines:

-  With Present Management.
-  Draft Preferred Policy.

Flood Risk Zones



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 Draft SMP document show where SMP policy might influence the management of flood risk.



Indicate areas where the intent of the SMP draft 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 Draft SMP document.

**Shoreline Management Plan Sub Cell 10
Baseline Location Map
Management Area 2**

- Management Area
- Policy Unit
- Policy Development Zone
- Scheduled Monument



| Key | |
|------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| — 100 Year Shoreline Position: | Ramsar |
| — Preferred Policy would be the same as With Present Management | SAC |
| — With Present Management where this differs from the Preferred Policy | SPA |
| — Preferred Policy where this differs from the With Present Management | SSSI |
| | NNR |
| | Existing Indicative EA Flood Zone 3 |
| | EA Flood Risk Zone 2 where under the SMP policy there would be increased probability of flooding |



SUMMARY OF PREFERRED PLAN RECOMMENDATIONS AND JUSTIFICATION

INTENT OF THE PLAN:

Much of this area is natural, undefended coast and shoreline with important ecological and landscape values. Within this, and benefiting from the natural landscape, are the two villages of Little Haven and Broad Haven. Over much of the shoreline the intent of the plan is to allow the coast to evolve naturally. At the two villages the aim of the plan is maintain the defences, most probably as they are at present, over the short to medium term. This is going to be increasingly difficult towards the end of epoch two and during epoch three.

At Little Haven, during epoch three, the management intent is to retreat the current defences to sustain the width necessary to maintain a healthy beach which is essential both to the defence of the village and in maintaining the character of the village. This would result in the loss of the road and, depending on sea level rise, may mean the loss of properties immediately behind the road. The stream will need to be managed but the aim of the plan would be to allow this to be undertaken in such manner that the fluvial flood risk would be reduced. At Broad Haven existing defence to the main village frontage and to the area to the south would be maintained over the first two epoch but recognising that during epoch three the line of the existing defences may well change. This may mean that the some areas of defence are set back and that the aim would be to open the entrance to the valley of the southern stream. The aim would be to sustain defence to properties in terms of flood risk and to maintain the road. However, the road may need to be realigned and taken across the stream over a bridge. This may mean loss of properties in this area and is something that needs to be examined in detail. At the northern end of the village, the existing defences would be retained and maintained over epoch one. Beyond epoch one, there is likely to be the need to realign defences due to the increased pressure as a result of sea level rise. The timing of such a change would be driven by the actual pressure that develops due to sea level rise. Even so, planning for change needs to happen over epoch one. The long term intent would be that the centre of Broad Haven continues to be managed but recognising that this will be a headland. The realignment to north and south would provide width such that a beach would be maintained as an important value to the area. To the north this will mean that the road would be lost. The long term plan is to sustain both communities and to encourage and allow planned adaption.

KEY ISSUES/RISK AND UNCERTAINTY:

There are uncertainties both in terms of timing and in terms of funding the proposed changes. There is also a need for a detailed planned response to change. It will be important to monitor the behaviour of the coast along both the developed areas and this will need to be related to national monitoring of sea level rise and more general climate change.

ACTIONS:

| ACTION | PARTNERS |
|----------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|
| Shoreline monitoring | PCC |
| Adaption planning Little Haven and Broad Haven | PNP Communities Highways PCC |
| Local management of defences | PCC |
| Coast protection strategy developed in conjunction with adaption planning. Develop opportunity for habitat creation. | PCC PNP Highways Communities |
| Assess in detail potential impact on historic environment | |

DELIVERY OF THE PLAN**SUMMARY OF SPECIFIC POLICIES**

| Policy Unit | | Policy Plan | | | |
|----------------------------------------------------------------------------------------------------------|----------------------------------|-------------|------|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | 2025 | 2055 | 2105 | Comment |
| 2.1 | Borough Hd. to the Point | NAI | NAI | NAI | Possible need to realign road to Little Haven. |
| 2.2 | Little Haven | HTL | HTL | MR | Improvement to defences standard would not be anticipated over the short and medium term. The use and structure of the lower village would need to be examined. |
| 2.3 | The Settlands | NAI | NAI | NAI | Potential long term loss of coast road. |
| 2.4 | Southern and central Broad Haven | HTL | HTL | MR | Consider options for realignment in the area of Broadhaven Bridge. |
| 2.5 | Broad Haven North | HTL | MR | NAI | Lost of road. |
| 2.6 | Haroldston Hill | HTL | HTL | MR | Maintain access from the north. |
| Key: HTL - Hold The Line, A - Advance the Line, NAI – No Active Intervention MR – Managed Realignment | | | | | |

| PREFERRED POLICY TO IMPLEMENT PLAN: | |
|--------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| From present day | Maintain existing defences. Develop flood warning for area. |
| Medium term | Maintain existing defence at Little Haven. Adapt management at the centre of Broad Haven to enable subsequent realignment. |
| Long term | Remove existing defence to Broad Haven north and realign defence to the south. |

IMPLICATIONS OF THE PLAN

CHANGES FROM PRESENT MANAGEMENT

Due to increased pressure on defences and the long term impact this would have on sustaining defences in an appropriate manner, the policy for Little Haven and Broad Haven change from Hold the Line to Managed Realignment over epochs 2 and 3.

ECONOMIC SUMMARY

| Economics (£k PV) | by 2025 | by 2055 | by 2105 | Total £k PV |
|----------------------------|---------|---------|---------|-------------|
| Potential NAI Damages | 3.8 | 69.4 | 659.8 | 732.9 |
| Preferred Plan Damages | 2.3 | 4.7 | 55.7 | 62.7 |
| Benefits | 1.5 | 64.6 | 604.1 | 670.2 |
| Costs of Implementing plan | 5.0 | 546.3 | 232.5 | 783.8 |

FLOOD AND EROSION RISK MANAGEMENT

POTENTIAL LOSS

There will continue to be risk of flooding both from wave overtopping and from the river discharge. There would be loss of properties at both Broad Haven and Little Haven. There would be loss of the existing road access along the shoreline. This would need to be examined in detail.

BENEFITS OF THE PLAN

The plan provides a longer term sustainable approach to defence, maintaining defence to the core areas of both villages, while also maintaining important amenity use of the area.

The plan provides coast protection to some 42 properties that might otherwise be lost to erosion. The plan also significantly reduces flood risk to properties in Broad Haven.

SUMMARY OF STRATEGIC ENVIRONMENTAL ASSESSMENT (INCLUDING HRA)

| PDZ 2 | | | | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|------------|-------------|--------------------------------------|
| SEA Objective | Impact of Preferred Policy for each Epoch | | | |
| | 1 | 2 | 3 | Mitigation |
| Policy Units 2.1 to 2.13 | | | | |
| To support natural processes, maintain and enhance the integrity of internationally designated nature conservation sites. Maintain / achieve favourable condition of their interest features (habitats and species). | Red | Red | Light Blue | |
| To avoid adverse impacts on, conserve and where practical enhance the designated interest of nationally designated nature conservation sites. Maintain/achieve favourable condition. | Light Blue | Light Blue | Green | Habitat creation |
| To avoid adverse impacts on, conserve and where practical enhance national and local BAP habitats. | Dark Blue | Dark Blue | Light Blue | Habitat creation |
| To support natural processes and maintain geological exposures throughout nationally designated geological sites. | Light Blue | Light Blue | Light Blue | |
| To conserve and enhance nationally designated landscapes in relation to risks from coastal flooding and erosion and avoid conflict with AONB and National Park Management Plan Objectives. | Green | Green | Green | Appropriate design |
| To minimise coastal flood and erosion risk to scheduled and other internationally and nationally important cultural heritage assets, sites and their setting. | Light Blue | Light Blue | Light Blue | Excavation and recording |
| To minimise the impact of policies on marine operations and activities. | Green | Green | Green | |
| To minimise coastal flood and erosion risk to critical infrastructure and maintain critical services. | Green | Light Blue | Light Blue | Relocation or realignment |
| To minimise coastal flood and erosion risk to agricultural land and horticultural activities. | Light Blue | Light Blue | Light Blue | |
| To minimise coastal flood and erosion risk to people and residential property. | Green | Green | Light Green | Relocation |
| To minimise coastal flood and erosion risk to key community, recreational and amenity facilities. | Light Blue | Green | Green | Realignment of coastal path (PU 2.9) |
| To minimise coastal flood and erosion risk to industrial, commercial, economic and tourism assets and activities. | Light Blue | Light Blue | Light Blue | |

Mitigation associated with the impacted features of the historic environment may include excavation and recording and monitoring of erosion rates.

This table provides a summary of the SEA (appendix E) and reference should be made to the Appendix for full details of the assessment.

These next two sections provide a headline summary of the findings of the HRA (Appendix G) and the WFA (Appendix H). Reference should be made as appropriate to these Appendices for full details.

HRA SUMMARY

| Designated Site | PU | Habitat Type | Extent of Loss of Habitat (ha) | | | |
|--------------------------|-----|---------------------|--------------------------------|---------|---------|-------|
| | | | Epoch 1 | Epoch 2 | Epoch 3 | Total |
| Pembrokeshire Marine SAC | 2.2 | Intertidal sandflat | 0.23 | 0.02 | | 0.26 |
| | 2.4 | Intertidal sandflat | 0.01 | 0.60 | | 0.61 |
| | 2.5 | Intertidal sandflat | 0.12 | | | 0.12 |
| | 2.6 | Intertidal sandflat | 0.08 | 0.37 | | 0.45 |

3.1 *Pembrokeshire Marine/ Sir Benfro Forol SAC: It is concluded that there would be an **adverse effect on the integrity** of the intertidal sandflat habitat within the boundary of the SAC as a result of the SMP2 policies. There will however, be no adverse effect on the integrity of the other SAC features.*

SUMMARY CONCLUSION FROM THE WATER FRAMEWORK ASSESSMENT

This area was scoped out of the assessment.

| | |
|-----------------------------------|---------------------------------|
| Location reference: | Nolton Haven and Newgale |
| Management Area reference: | M.A. 3 |
| Policy Development Zone: | PDZ2 |

* Note: Predicted shoreline mapping is based on a combination of monitoring data, analysis of historical maps 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.

The following descriptions are provided to assist interpretation of the map shown overleaf.

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 “Draft Preferred Policy” being put forward through the Shoreline Management Plan.

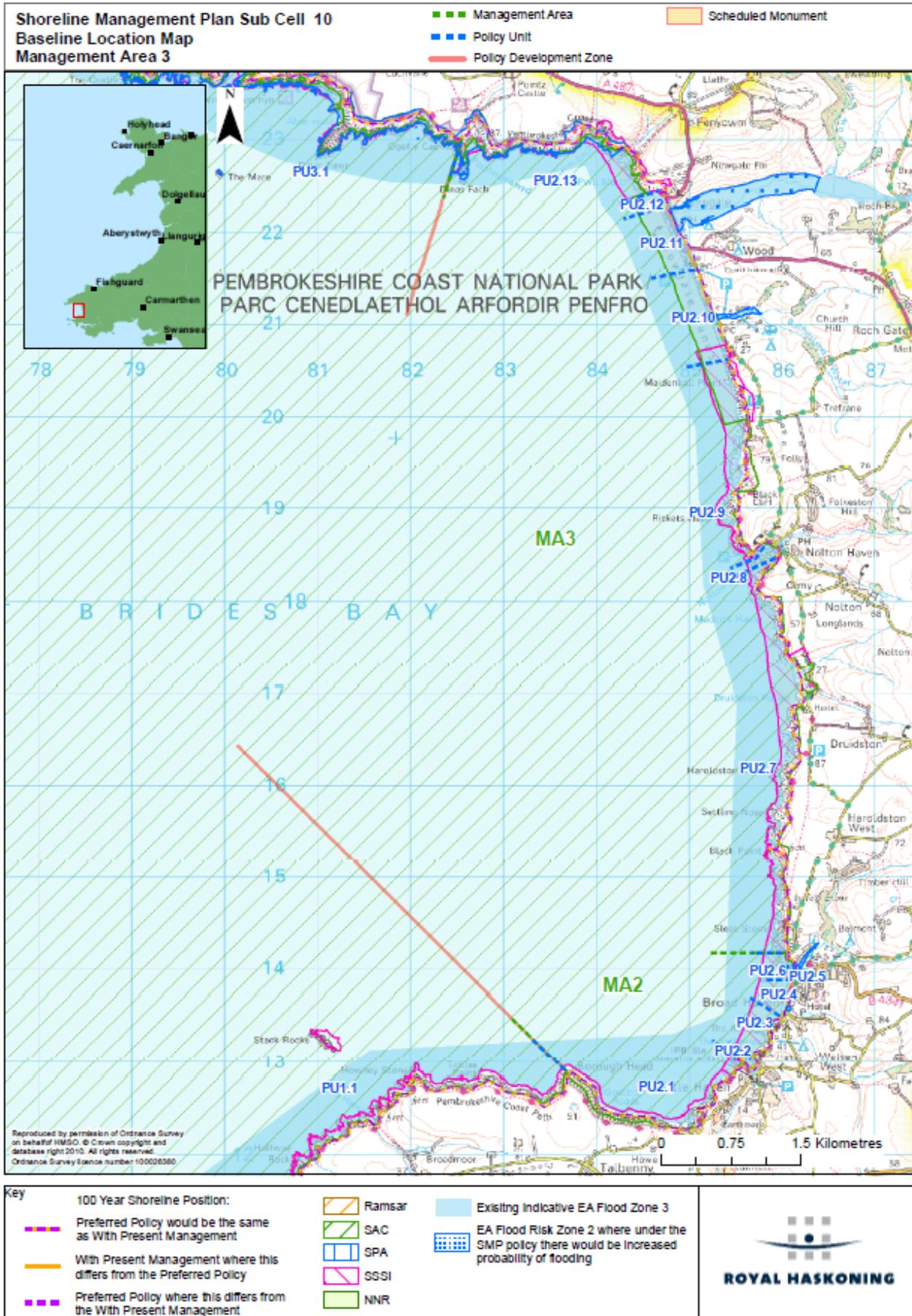
-  In some areas the preferred policy does not change from that under the existing management approach. In some areas where there are hard defences this can be accurately identified. In other areas there is greater uncertainty. Even so, where the shoreline is likely to be quite clearly defined by a change 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 Draft Preferred Policy this distinction is made in showing two different lines:

-  With Present Management.
-  Draft Preferred Policy.

Flood Risk Zones

-  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 Draft SMP document show where SMP policy might influence the management of flood risk.
-  Indicate areas where the intent of the SMP draft 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 Draft SMP document.



SUMMARY OF PREFERRED PLAN RECOMMENDATIONS AND JUSTIFICATION

INTENT OF THE PLAN:

The underlying intent of the plan is to maintain the natural development of the shoreline, while accepting that there needs to be local management to sustain the villages, access and the important tourism and amenity use of the area. The main threat to existing use of the area is as a result of sea level rise and the pressure for the large shingle banks to roll back. During epoch 1 this risk is considered manageable through storm warning and road clearance. However, in the future, the intent of the plan would be to allow this process of roll back to occur without intervention.

As this occurs there will be significantly increased risk of flooding to the valleys behind. The aim within the plan is to support adaption to this natural behaviour. Therefore the intent would be to maintain the access to the southern valley of Newgale at its southern end. This would mean that the cliff to the south would be protected to support the road, and this would provide the main access to this area.

The approach to the northern valley would be to close the road and this will result in loss of properties and the petrol station. The main transport network will be disrupted and this needs to be addressed at a regional level.

There are no defences at present to the main village to the north and the planned realignment will need to consider the risks at this location. However, the intent is to sustain the community in this area. The realignment over the main frontage is likely to result in a change in the position of the stream and this may well result in better shingle defence to the toe of the slope.

The area also contains Nolton Haven. Here the intent of the plan would be to maintain defence to the road. This is seen as essential in maintaining access both locally to property and to the southern part of Newgale. There would be increased flood risk to property as sea level rises and there would need to be improved flood warning and there would no intent to prevent erosion to the rest of the shoreline.

KEY ISSUES/RISK AND UNCERTAINTY:

There are uncertainties both in terms of timing and in terms of funding the proposed changes. There is also a need for a detailed planned response to change. It will be important to monitor the behaviour of the coast along frontage and this will need to be related to national monitoring of sea level rise and more general climate change.

ACTIONS:

| ACTION | PARTNERS | |
|-------------------------------------------------------------------------|--------------------------------------|------------|
| Review the transport network and develop plan for loss of road | Highways PCC | PNP |
| Development management plan for relocation of properties and businesses | PCC Property owners | PNP |
| Shoreline monitoring | PCC | EA |
| Develop detailed strategy for realignment | PCC | EA |
| Review plan for relocation of footpath | PNP | |
| Improve flood warning | EA | PCC |
| Relocate car parks | PNP | |
| Examine opportunities for Habitat re-creation | EA CCW | PNP |

DELIVERY OF THE PLAN

SUMMARY OF SPECIFIC POLICIES

| Policy Unit | | Policy Plan | | | Comment |
|----------------------------------------------------------------------------------------------------------|---------------------|-------------|------|------|-------------------------------------------------------------------------------------------------------------|
| | | 2025 | 2055 | 2105 | |
| 2.7 | Haroldston Cliff | NAI | NAI | NAI | |
| 2.8 | Nolton Haven | HTL | MR | MR | The intent is to maintain access with local works to sustain the road. |
| 2.9 | Rickets Head | NAI | NAI | NAI | |
| 2.10 | Newgale Sands south | MR | MR | MR | Manage the realignment and loss to road, while protecting access from the south. |
| 2.11 | Newgale Sands north | MR | MR | NAI | Manage shingle on the road but with the long term intent of allowing the shingle ridge to behave naturally. |
| 2.12 | Newgale village | MR | MR | MR | Manage the cliffs and position of the stream to sustain the upper village. |
| 2.13 | Penycwm cliffs | NAI | NAI | NAI | |
| Key: HTL - Hold The Line, A - Advance the Line, NAI – No Active Intervention MR – Managed Realignment | | | | | |

| PREFERRED POLICY TO IMPLEMENT PLAN: | |
|-------------------------------------|------------------------------------------------------------------------------------------|
| From present day | Maintain current practice of storm warning and road clearance |
| Medium term | Implement strategy for managed realignment |
| Long term | Maintain defence to road at Nolton Haven and locally to road at southern end of Newgale. |

IMPLICATIONS OF THE PLAN

CHANGES FROM PRESENT MANAGEMENT

At Noltan Haven defence would focus on maintaining the road. The plan confirms policy set in SMP1.

ECONOMIC SUMMARY

| Economics (£k PV) | by 2025 | by 2055 | by 2105 | Total £k PV |
|----------------------------|---------|---------|---------|-------------|
| Potential NAI Damages | 423.2 | 401.0 | 1,364.3 | 2,188.5 |
| Preferred Plan Damages | 0.0 | 0.0 | 1,364.3 | 1,364.3 |
| Benefits | 423.2 | 401.0 | 0.0 | 824.2 |
| Costs of Implementing plan | 8.5 | 5.6 | 87.2 | 101.4 |

FLOOD AND EROSION RISK MANAGEMENT

POTENTIAL LOSS

The main loss would be to the coastal road and properties behind. There would still be risk of flooding to property.

BENEFITS OF THE PLAN

The plan maintains essential access to communities and puts in place a process for reducing flood risk and establishing a sustainable plan for risk management in the future.

SUMMARY OF STRATEGIC ENVIRONMENTAL ASSESSMENT (INCLUDING HRA)

| PDZ 2 | | | | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|------------|-------------|--------------------------------------|
| SEA Objective | Impact of Preferred Policy for each Epoch | | | |
| | 1 | 2 | 3 | Mitigation |
| Policy Units 2.1 to 2.13 | | | | |
| To support natural processes, maintain and enhance the integrity of internationally designated nature conservation sites. Maintain / achieve favourable condition of their interest features (habitats and species). | Red | Red | Light Blue | |
| To avoid adverse impacts on, conserve and where practical enhance the designated interest of nationally designated nature conservation sites. Maintain/achieve favourable condition. | Light Blue | Light Blue | Green | Habitat creation |
| To avoid adverse impacts on, conserve and where practical enhance national and local BAP habitats. | Dark Blue | Dark Blue | Light Blue | Habitat creation |
| To support natural processes and maintain geological exposures throughout nationally designated geological sites. | Light Blue | Light Blue | Light Blue | |
| To conserve and enhance nationally designated landscapes in relation to risks from coastal flooding and erosion and avoid conflict with AONB and National Park Management Plan Objectives. | Green | Green | Green | Appropriate design |
| To minimise coastal flood and erosion risk to scheduled and other internationally and nationally important cultural heritage assets, sites and their setting. | Light Blue | Light Blue | Light Blue | Excavation and recording |
| To minimise the impact of policies on marine operations and activities. | Green | Green | Green | |
| To minimise coastal flood and erosion risk to critical infrastructure and maintain critical services. | Green | Light Blue | Light Blue | Relocation or realignment |
| To minimise coastal flood and erosion risk to agricultural land and horticultural activities. | Light Blue | Light Blue | Light Blue | |
| To minimise coastal flood and erosion risk to people and residential property. | Green | Green | Light Green | Relocation |
| To minimise coastal flood and erosion risk to key community, recreational and amenity facilities. | Light Blue | Green | Green | Realignment of coastal path (PU 2.9) |
| To minimise coastal flood and erosion risk to industrial, commercial, economic and tourism assets and activities. | Light Blue | Light Blue | Light Blue | |

Mitigation associated with the impacted features of the historic environment may include excavation and recording and monitoring of erosion rates.

This table provides a summary of the SEA (appendix E) and reference should be made to the Appendix for full details of the assessment.

These next two sections provide a headline summary of the findings of the HRA (Appendix G) and the WFA (Appendix H). Reference should be made as appropriate to these Appendices for full details.

HRA SUMMARY

| Designated Site | PU | Habitat Type | Extent of Loss of Habitat (ha) | | | |
|--------------------------|-----|---------------------|--------------------------------|---------|---------|-------|
| | | | Epoch 1 | Epoch 2 | Epoch 3 | Total |
| Pembrokeshire Marine SAC | 2.8 | Intertidal sandflat | 0.32 | | | 0.32 |

- 4.1 *Pembrokeshire Marine/ Sir Benfro Forol SAC: It is concluded that there would be an **adverse effect on the integrity** of the intertidal sandflat habitat within the boundary of the SAC as a result of the SMP2 policies. There will however, be no adverse effect on the integrity of the other SAC features.*

SUMMARY CONCLUSION FROM THE WATER FRAMEWORK ASSESSMENT

This area was scoped out of the assessment.