

PDZ 7. NEW QUAY BAY AND LITTLE QUAY BAY:

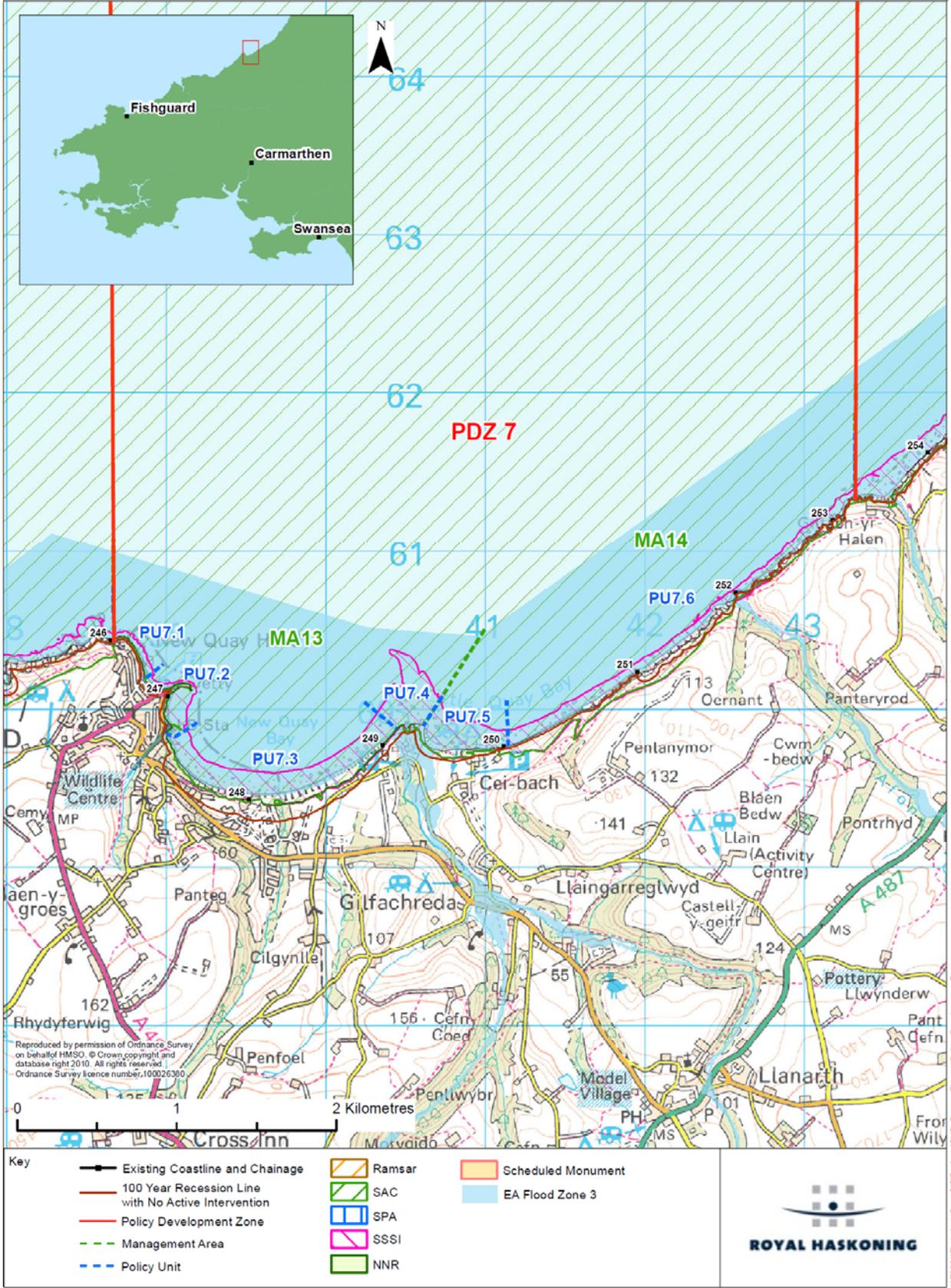


New Quay Head to Gilfach yr Halen.

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Shoreline Management Plan Sub Cell 9
 Baseline Location Map
 Policy Development Zone 7 - Newquay Bay



Definitions of Scenarios Considered in Policy Development

This section defines the various scenarios that are used throughout the discussion of the Policy Development Zone.

Sea Level Rise

It is recognised that there is a continuing uncertainty with respect to Sea Level Rise (SLR). Taking different SLR scenarios may affect the scale of impact or the timing of some changes, either in terms of sustainable management or in terms of impacts. In the discussion below of the baseline and alternative management scenarios, the Defra guidance on SLR has been generally been used. Where, in any specific area, the impact of SLR is felt to be significant and may change the context of management this discussion is held within a separate box, relevant to that section of text.

Management scenarios;

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 the 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.

Baseline Scenarios

- **No Active Intervention (NAI) – Scenario 1**, where there would be no further work to maintain or replace defences. At the end of their residual life, structures would fail. There would be no raising of defences to improve standards of protection.
- **With Present Management (WPM)– Scenario 2**. This scenario applies the policies set in the SMP1 or, where relevant, takes updated or clarified policies, if subsequent work has been undertaken e.g. studies or strategies. In many locations, the approach to management defined by SMP1 only covers a 50 year period. Where this is so, the intent of how the coast is being managed has been assumed to apply into the future. It should be noted that WPM does not necessarily imply a Hold The Line approach throughout the zone, in many areas present management may be for a No Active Intervention approach or one of Managed Realignment.

The aim of the No Active Intervention is to identify what is at risk if defences were not maintained. In a similar way, With Present Management aims to examine how the coast may develop, identifying where there are benefits in this management approach or where there may be issues arising in the future.

At the end of this sub-section a brief summary and comparison of the economic risk for each of the baseline scenarios is provided, based on the MDSF analysis undertaken during the SMP (including other study findings where relevant). The baseline scenarios are also assessed in terms of how they address the overall objectives for the Zone. This comparison between the baseline scenarios sets the scene for discussing possible alternative management scenarios which better address all the issues. This discussion is provided in the subsequent sub-section.

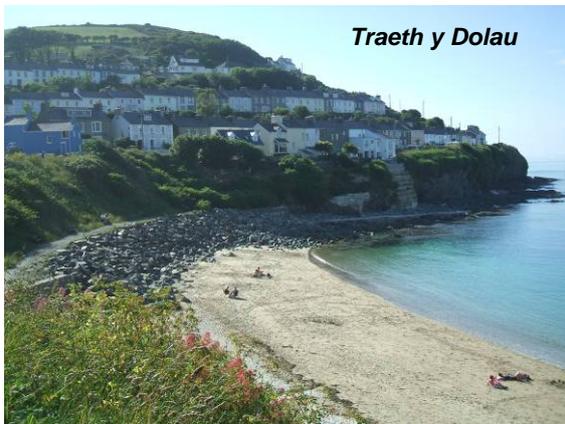
1 Local Description

This zone covers the two bays of New Quay and Cei Bach between New Quay Head and Gilfach yr Halen. The two bays are separated by the controlled headland of Llanina Point. New Quay is the main development in this PDZ, with smaller rural settlements at Llanina and Cai Bach and the caravan park of Gilfach yr Halen.

Aside from the settlements the remainder of the PDZ is agricultural land use of the cliff crest.

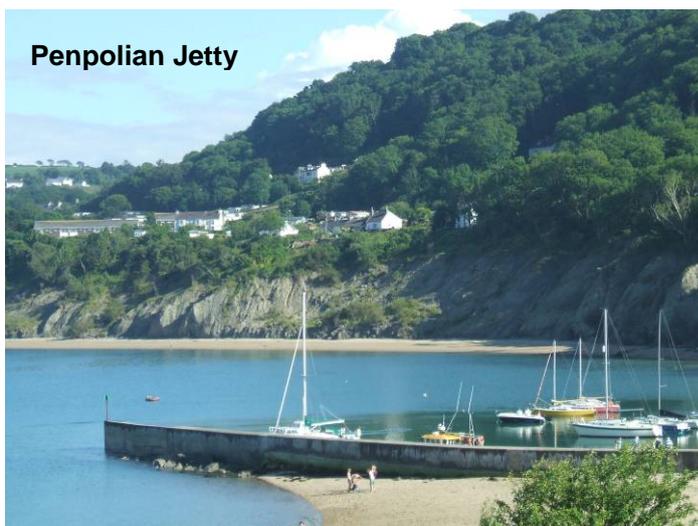
New Quay Bay

New Quay bay is a 2km, north facing, crenulate bay situated in Central Cardigan Bay, anchored by the rocky headland of New Quay Head in the west and the softer headland of Llanina Point in the east. The rocky New Quay headland provides the main shelter to the bay, but the Victorian Stone Pier appears to directly influence the development of



the main bay and holds a smaller bay to the west of the pier. The town supports a large community and locally important fishing fleet, with a fish factory to the west of the headland. The town extends around to the main headland to the west of the harbour with three rows of houses, situated very close to the cliff edge. Erosion of this area in the past led to the existing coast protection works, however, the clay cliffs have continued to erode through non marine processes.

To the south of the Stone Pier, (north of Penpolion Jetty) sediment has accreted and created a fairly wide sandy beach. The town caters to a large summertime population with many summer homes, shops and cafes situated within this bay. New Quay Bay is a popular summertime blue flag beach. The pier and the bay are also popular spots for wildlife and dolphin watching. Further to the east of the bay, the soft erodible clay cliffs have allowed the coast to develop a sweeping bay shape. There are a number of



properties along this frontage and although situated at a high elevation, are the subject of cliff instability and coastal slumping. This instability was monitored in 2007 and potential management options have been considered. (High Point Rendell, 2007).

The eastern headland of the bay, Llanina Point acts as an anchor point for the bay rather than an influence on wave characteristics. It is an undeveloped headland, containing one property and the church of St Ina. This headland is held in part by a small breakwater. However, historically this point has seen significant

erosion and it is believed that since the 7th century erosion has resulted in the loss of three, possibly up to six previous churches at this location.

Cei Bach to Gilfach yr Halen

This is a reasonably undeveloped section of coastline, containing mainly agricultural land. There is a small holiday park located to the east of Llanina point at Cei Bach, within Cei Bach bay and another at the north eastern most point of the PDZ at Gilfach yr Halen. Properties making up the community of Cei Bach sit on the boulder clay cliffs, where as the remainder of the PDZ to the north is composed of harder rock with pockets of boulder clay. The boulder clay coastal slope has been protected by a revetment and the beach has been stabilised with groynes. Gilfach yr Halen, at the northern extent of the PDZ is a small holiday park of about 20 holiday homes, situated on the rocky cliffs to the west of Afon Cwinten.

This PDZ is noted for its environmental importance and is designated an SSSI and a Marine SAC.

2 Coastal Processes

The zone is relatively sheltered from the dominant Atlantic southwesterly offshore wave climate, although it is still subject to longer swell from this offshore direction, diffracting around the general promontory of Pembrokeshire and around Cardigan Bay in a clockwise direction. The dominant wave directions for this north-northwest facing coast vary between the south-south west and the north, with the largest waves coming from the west. There is evidence of significant erosion over this PDZ, and substantial cliff instability, particularly in the south, within the central area of New Quay Bay and within Cei Bach.

The coastal processes within New Quay Bay are somewhat complex. Due to the crenulated shaped nature of the bay, wave action is the dominant process involved in shaping the bay. To the north of the stone pier, at Traeth Dolau, New Quay Head forms a promontory creating a tidal flood eddy in the lee of the headland. There is little



sediment drift at the shoreline. However, it has been reported that there is a significant shoal across the nearshore area. The character of this shoal is reported to have changed with the change in the type of shell fish processed at the factory around the headland. Despite the fact that the shoal appears to consist largely of shells, coming from the factory, it also strongly supports the evidence that the general area is supplied with sediment from the west. Traeth Dolau is nourished

mainly by the material from the cliffs of New Quay Head but also from sediment in the nearshore area. In this nearshore area, principally, sediment is then moved through to the nearshore of the main bay.

To the south of the Stone Pier there different processes at work. The harbour area has always experiencing accretion since the construction of the pier. This material has to be

regularly removed from the harbour. Previous analysis of sediment movement around the shore shows that the bay is close to equilibrium with respect to longshore wave energy. The net drift of sediment at the shoreline is towards the northeast although at Llanina this drift is reduced and there is the potential for drift reversal. The bay is also subject to a tidal gyre such that finer sand sediment can be moved in a more westerly direction. There can also be significant general movement in this direction when the shoreline is subject to north easterly storms. The main process is that of sediment driven into the bay by wave action. This



can form as bars around the bay, particularly in front of the New Quay Harbour area. The general trend at the shoreline is for sediment to be moved onto the upper foreshore or drawn down from the upper foreshore. More locally or under specific wave conditions sediment can be moved around the bay. The variation is seen from monitoring. In areas such as the harbour or in terms of beach levels to the west of George Street variation is quite considerably and this confirms this broader pattern of onshore/ offshore sediment transfer within a generally stable bay. The hard rock cliffs and defences in the harbour area and the fact that the slower erosion and slumping of the cliffs over the main length of the bay constrain the full development of the crenulate bay shape, prevent sufficient width at the back shore for development of a fully stable beach. The immediate response of the foreshore to accrete following the construction of the Stone Pier and the accretion that occurred following the improvement to the Penpolion Jetty, support this concept that the bay is very close to equilibrium and that any action that introduces effective width to the system has an immediate response at the shoreline. The corollary of this is that any failure of the key control points would cause major adjustment in the overall shape of the bay.

The cliffs and coastal slopes along New Quay bay are experiencing quite significant deep seated slippage. Major slips that have occurred every 15 to 25 years have pushed material over the foreshore, advancing the toe of the cliffs, which is then exposed to wave attack and erosion. The stability of the cliff was most recently studied in 2007 by High Point Rendell and various management options have been considered, involving reinforcement of the slope with reprofiling, nailing and geomesh, construction of a new access road, maintenance of the Llanina groynes and New Quay harbour and continuous monitoring of the slope. While protection to the toe would slow the rate of erosion, it is recognised that without other works there would continue to be slope slippage.

Moving further north along the PDZ, is the promontory headland of Llanina Point, which acts to regulate sediment loss from New Quay Bay. The main influence is the natural hard glacial deposits over the foreshore. The groyne at the end of Llanina point reinforces this natural structure and retains beach sand and gravel on the upper beach.

Cei Bach forms a small shallowly crenulated bay running through to the relatively straight, higher, harder cliff line to the north. Llanina Point, and more significantly the intertidal foreshore of Carreg Ina, influences wave transformation in Little Quay Bay. The presence of the reef, has allowed for the creation of the small bay to develop in the lee

of Llanina Point. This bay is, in a similar way to New Quay Bay, relatively stable experiencing only minimal eastward sediment drift and a slight erosion of the backshore. If there were to be any retreat of Llanina point, this bay would experience greater wave attack and therefore more risk of erosion. However, the shoreline is held forward by the hard defences and these defences also retain the coastal slope above. The influence on the bay can be seen in the set back of the shoreline to the north of the defences.

Further to the north, hard rock processes dominate and there is a low net drift along the cliffs to the north. In sections where the hard rock is interrupted with soft boulder clay, small pocket beaches may be seen where sediment has deposited. The slight reorientation of the coast further north of Gilfach yr Halen and the change in nature of the coast indicates that it is north of this point that provides the principal sediment supply on to Aberaeron.

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 in the following table.

| Location | NAI Base Rate (m/yr) | Notes | 100yr. Erosion range (m) |
|----------------------|----------------------|--|--------------------------|
| New Quay Cliffs | 0.2 | | 20m |
| Brongwyn Lane Cliffs | 0.4 | On-going monitoring shows variation in erosion and accretion of the foreshore. | 40m |
| Traeth Gwyn Cliffs | 0.4 | On-going monitoring shows variation in erosion and accretion of the foreshore. | 100 |
| Llanina Cliffs | 0.2 | On-going monitoring shows variation in erosion and accretion of the foreshore. | 45 |
| Gilfach y Halen | 0.04 | | 15m to 40m |

Base 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.

As sea levels rise, the cliffs are exposed to greater wave energy attack and therefore will experience increased recession rates. As the cliff continues slip this will in turn feed the beach and reduce the cliff sensitivity at higher sea levels. The increased cliff failing will become a problem at New Quay Bay, where the properties are already at great risk. Although often triggered by coastal erosion the main recession is in the cliff instability.

FLOODING

With future sea level rise, there is little risk in this area of flooding due to the height of the cliffs and the location of properties. However, increase sea levels will have an impact on coastal over topping of the Stone Pier at New Quay and defences to Cei Bach.

EXISTING DEFENCES

The main defences are at New Quay, locally at Cei Bach. There is an important defence structure reinforcing the Llanina headland.

To the west of New Quay head lays Traeth Y Dolau, a small beach defended to the north by a rock revetment, berm and slipway access ramp. There are local private defences to the cliff and property to the north.



Traeth Y Dolau

To the east of Traeth y Dolau, is the Stone Pier. The pier is constructed of masonry revetment, topped by a masonry wave wall, with concrete facing in places and a rock armour toe. There is also a small jetty protected by a revetment, protruding from the end of the pier.

Between the Stone Pier and Penpolion Jetty, the inner harbour is protected by masonry and concrete retaining walls along the hard cliff face.



New Quay

The old masonry blockwork Penpolion jetty was encased in reinforced concrete with rock armouring to its seaward side in 1984.. To the south of the jetty, is a small masonry blockwork wall, running up to the base of the cliffs. The remainder of the bay up to Llanina point is undefended apart from very local crib work to places along the cliff line.

The other area of man made defence is Llanina Point and Cei Bach. Llanina Point is a soft cliff promontory, protected by a reinforced concrete terminal structure with rock filled steel crib groyne at the mouth of Afon Llethi. The end of the headland, to the east of the Afon Llethi, is protected with rock armour at the toe of the cliff and a combination of steel breastwork and groynes. In Cei Bach Bay, the soft clay cliffs are protected with concrete at the base of the cliffs, fronted by rock armour and a timber groyne field. The groynes were put in place to stabilise the sand and shingle beach and the rock armour is to protect the unstable cliffs behind.

The remainder of the PDZ is undefended.

UNCONSTRAINED SCENARIO

The softer boulder clay cliffs would continue to erode back as at present, as would the harder cliffs, but at a slower rate. At New Quay, the absence of the hard defences would create a very different bay. The north end of the Harbour, in the lee of the stone pier would probably be set back, in line with the hard rocks to the north of Traeth y Dolau. The absence of the stone pier and of Penpolion Jetty, would have allowed the coast to curve into one larger bay, only being influenced locally by the rock outcrop at the root of the Pier. There would be significant loss of beach width and the cliffs along New Quay bay would erode back significantly. Under an unconstrained scenario, the current cliff line would probably run along the location of George Street and the general shoreline would set back as much as 100m along the whole length. Without the existing defences at the Llanina headland, this anchor point would potentially be set back and would encourage the two bays of New Quay and Little Quay to develop into one large bay. As with New Quay Bay, the Cei Back frontage would set back generally some 50m.

KEY INTERACTION WITH DEFENCES

The above discussion highlights the way in which defences generally over the bays are holding the shoreline forward. North of the pier defences are influencing the coast quite locally. The defence at Traeth y Dolau locally protect and stabilise the coastal slope. The Stone Pier acts as a major control point for the whole bay as does Llanina Point in relation to both New Quay Bay and Cei Bach.

3 Management Scenarios

3.1 No Active Intervention – Baseline Scenario 1.

At New Quay head, the cliffs will continue to erode slowly and the defences at Traeth y Dolau would gradually deteriorate. There would be loss of housing along Rock Street. This has the potential also to impact on the road through to the fish factory in epoch 2. The main defence at Traeth y Dolau is likely to remain effective through epoch 2, but with sea level rise this may start to fail. This would result in loss of access through the town as well as resulting in further loss of property.

The Stone pier is deteriorating slowly and in need of small repairs to cracks. There is concern that there are more structural problems, although previous local examination suggests that there is no major voiding. Even so, over possibly epoch 2, more major damage could occur. This would rapidly increase given the heavy wave loading. A breach in the Pier



would result in the loss of the harbour and subsequent loss of the beach, further damage to properties along Glanmor Terrace and severe damage to the centre of New Quay. It would also result in changes over the whole bay, with accelerated loss to the holiday park and properties along the whole frontage. The Penpolion Jetty would also suffer loss and with it there would be loss of the lifeboat station and further loss of properties behind. As sea levels rise, the recession rates of the eroding cliffs will increase, although the wide sandy foreshore will provide some protection. The levels of the beach are likely to build from material fed from the eroding cliffs and from nearshore sources, maintaining short term equilibrium. It is anticipated that material from the centre of the bay will move towards the ends of the bay, meaning recession rates will become greater in the middle of the bay, eventually leading to a change in plan shape of the coast in this area.

Impact of different Sea Level Rise Scenarios

Under the NAI scenario the main impact of more rapid Sea Level Rise would be in terms of timescales. With a 2m SLR over the 100 year period, deterioration of defences within the harbour would occur during Epoch two. The erosion of the cliffs would occur at a faster rate along the backshore of the bay under a 2m scenario.

At Llanina Point the rock and groyne structures stabilising and maintaining the headland would fail possibly towards the end of epoch 1, placing the headland itself at risk of

erosion. This would in turn affect the plan shape of New Quay Bay as it relies upon this promontory as an anchor point. With an increase in Sea levels, the subtidal Carreg Ina would become more submerged and would act less in influencing Cei Bach allowing larger waves into the southern part of the bay and hence leading to further cliff retreat, and lowering of the shore platform. The defence at Cei Bach would in any event fail during the early part of epoch 2 and the cliff instability would result in loss of property. The cliffs from Cei Bach to Gilfach yr Halen are likely to be subject to greater wave attack with sea level rise and further cliff erosion.

3.2 With Present Management – Baseline Scenario 2.

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

| SMP 1 | | | Subsequent Management Approach |
|-----------------|--------------------|--------|--------------------------------|
| No. | Management Unit | Policy | |
| Ceredigion SMP1 | | | |
| 7.1 | New Quay Head | HTL | |
| 7.2 | New Quay Harbour | HTL | |
| 7.3a | Sunnydale | R | |
| 7.3b | Traeth Gwyn | R | |
| 8.1 | Cei Bach (Llanina) | R | |
| 8.2 | Cei Bach | HTL | |
| 8.3 | Cei Bach East | DN | |

Key: DN – do nothing, HTL – Hold The Line, SHTL – Selectively Hold The Line, R – Retreat, deferred – policy deferred subject to further monitoring or study.

The general approach to management is, therefore, to sustain existing defences to the developed sections of the coast but to allow continued erosion to occur elsewhere.

The policy of HTL at New Quay Head was strictly in relation to the factory, access to the factory and in maintaining existing defences to Traeth y Dolau over a 50 year period. Defence at Rock Street was seen as one principally of cliff instability exacerbated by wave exposure. On this basis over longer period there would still be loss of property and the potential loss of access. Particularly with respect to the property the necessary encasing of the cliff would impact on the SSSI and potentially on the Marine SAC. Within Traeth y Dolau the main issue would be over the longer term with increasing beach loss. Even so the main defence could be sustained and the important access through the town maintained over the 100 years.

Maintaining the pier would be both sustainable and essential in maintaining the harbour and maintaining the central function of the town. With sea level rise the pier would have to be strengthened and raised. With sea level rise there may be some loss of beach and protection. The same would be the case for the Penpolion Jetty.

The policy of retreat the line at Sunnydale and along Traeth Gwyn would allow the coast to continue to erode back, however, maintaining the Pier would limit more excessive erosion of the toe. The concept in SMP1 at Llanina was that the basic control of the shoreline would be maintained rather than specifically holding the cliff line at this point. This again would support the principle of managing the retreat of the cliffs within the main bay.

Cei Bach would be exposed to greater wave energy. Extending the policy for holding the line in the face of sea level rise would therefore require significantly greater effort and is not likely to be justified beyond the maintenance of the existing defences. However, if the policy was taken forward under this scenario there would be significant loss of beach and potential damage to the natural landscape.

The existing approach for Cei Bach to Gilfach yr Halen, is Do Nothing. The cliffs and shoreline would continue to function naturally maintaining the landscape.

Impact of different Sea Level Rise Scenarios

With higher Sea Level Rise of 2m over the next 100 years, defences to New Quay Harbour would need to be raised to cope with the higher sea levels and increased wave attack to the cliffs. The need for more major works at the Old Stone Pier would be brought forward to early in epoch 2 and there would be the possible need for works at Llanina over the same sort of period.

4 Summary Comparison and Assessment of Baseline scenarios.

Table 1 compares the economic damages that might arise under the two baseline scenarios. Table 2 provides a summary comparison in terms of the overall objectives based on the key issues identified in the introduction to this Coastal Area.

Erosion damages and those associated with flooding are identified separately in Table 1. The aim of this table is to demonstrate the potential economic damage that might arise from either flooding or erosion. As such properties that might be lost in the future due to erosion are not discounted from the assessment of flooding. Similarly, properties whose value may have been written off due to regular flood damage are still included within the assessment of erosion. Such an approach is clearly not strictly in line with normal economic appraisal at strategy or scheme level. It is however, considered appropriate at the higher level of the SMP assessment where the essential aim is in identifying potential different forms of risk in assessing different scenarios. Where this is felt to disproportionately distort the economic assessment then this is identified in appendix H and the economic case adjusted accordingly.

The assessment of economic damage is made using a simplified Modelling Decision Support Framework (MDSF). In the case of erosion, this GIS based tool takes the predicted erosion distance for any section of the coast based on the assessment of erosion by the end of each epoch. It is then taken that there would be a linear erosion rate between these timelines (e.g. a property located midway between the epoch 1 timeline (20 years) and that for epoch 2 (50 years) would be taken as being lost in 35 years). Each property is defined by a single point rather than by its full footprint. No account is taken in the assessment of loss of access or loss of services, although this is discussed in the text where critical. The MDSF method then draws information from a property data base, providing general information with respect to that property. The value of the property is discounted in terms of when that property may be lost.

In the case of flooding, the open coast water levels are assessed against threshold levels for individual properties based again on the property point source data base. No detailed modelling has been undertaken to assess flow paths and or possible increase in water levels due to estuary processes. It is taken that, when a flood defence fails or is overtopped, the whole flood area behind a defence is open to flooding and that flooding would occur to the full extent of the potential flood plain, over a single high water period. Damages are assessed in relation to the depth of flooding that would occur based on the type of property identified in the data base. From this assessment of potential flood damage for any specific water level condition, annual average flood damages are determined during each epoch. An average annual average damage value is taken between the present (2010) and 50 years time (2060) and between 2060 and 2110. This average value is taken in determining an estimate of discounted Present Value (PV) Damages over the period of the SMP. This simplified approach allows consideration of flood risk under different sea level rise predictions for different 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: | | Value x £k | No. of properties | | PV Damages (£x1000) |
| | Res. | Com. | | Res. | Com. | | Res. | Com. | | Res. | Com. | |
| Location | Res. | Com. | | Res. | Com. | | Res. | Com. | | Res. | Com. | |
| New Head | 0 | 0 | 0 | 1 | 0 | 128 | 16 | 1 | 2037 | 16 | 1 | 183 |
| New Quay | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 12 | 1556 | 9 | 12 | 127 |
| New Bay | 0 | 0 | 0 | 6 | 0 | 951 | 19 | 0 | 2471 | 35 | 0 | 514 |
| Cei Bach | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Total for PDZ1 | | | | | | | | | | | | |
| 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. | |
| New Head | 0 | 0 | 0 | 1 | 0 | 128 | 16 | 1 | 2037 | 16 | 1 | 183 |
| New Quay | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| New Bay | 0 | 0 | 0 | 6 | 0 | 951 | 19 | 0 | 2471 | 35 | 0 | 514 |
| Cei Bach | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Total for PDZ1 | | | | | | | | | | | | |
| Notes: PVD determined for 1m SLR in 100 yrs. | | | | | | | | | | | | |
| Other information: Damages may arise due to additional cliff instability not identified using MDSF. | | | | | | | | | | | | |

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 | | | tidal risk 2m SLR | | |
|-------------------------|-----------------------|----------|-------------|-----------------------|----------|-------------|-----------------------|----------|-------------|-------------------|----------|-----------------|
| No Active Intervention | No. of properties | | AAD x £k | No. of properties | | AAD x £k | No. of properties | | AAD x £k | No. of properties | | PVD (£x1000) |
| Location | <1:10 yr. | >1:10 yr | | <1:10 yr. | >1:10 yr | | <1:10 yr. | >1:10 yr | | <1:10 yr. | >1:10 yr | |
| New Quay Head | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| New Quay Bay | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| Total for PDZ7 | | | | | | | | | | | | 0 |
| 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) |
| Location | <1:10 yr. | >1:10 yr | | <1:10 yr. | >1:10 yr | | <1:10 yr. | >1:10 yr | | <1:10 yr. | >1:10 yr | |
| New Quay Head | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| New Quay Bay | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| Total for PDZ7 | | | | | | | | | | | | 0 |

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 | Fails | | | | | Acceptable |
| Protect properties from flood and erosion loss | Fails | | | | Neutral | |
| Minimise the need for increasing effort and management of coastal defences | | Neutral | | Fails | | |
| Avoid reliance on defence particularly where there is a risk of catastrophic failure | | | Acceptable | Fails | | |
| Identify areas where sudden failure of the coastal slope could result in unacceptable risk | Fails | | | | Neutral | |
| Maintain access to the communities and villages | Fails | | | | | Acceptable |
| Maintain New Quay as regional centres for the communities. | Fails | | | | | Acceptable |
| Maintain recreational use of beaches | Fails | | | | Neutral | |
| Maintain access to the coast including car parking and facilities | Fails | | | | Neutral | |
| Maintain access for boat use and beaches | Fails | | | | | Acceptable |
| Maintain access for boat use and associated water sport activity | Fails | | | | | Acceptable |
| To maintain New Quay as a viable commercial centre and support opportunities for regeneration, | Fails | | | | | Acceptable |
| To maintain the use and development of New Quay Harbour. | Fails | | | | | Acceptable |
| Maintain character and integrity of coastal communities | Fails | | | | | Acceptable |
| Identify risk and reduce risk of loss of heritage features where possible | | Neutral | | | Neutral | |
| Maintain historic landscape | Fails | | | | | Acceptable |
| Prevent disturbance or deterioration to historic sites and their setting | | Neutral | | | Neutral | |
| 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. | | | Acceptable | Fails | | |
| Maintain or enhance the condition or integrity of the national (SSSI) designated sites . | | | Acceptable | | Neutral | |
| Maintain and enhance educational and scientific understanding of geology and geomorphology | | | Acceptable | | | Acceptable |
| Avoid damage to and enhance the natural landscape. | | | Acceptable | Fails | | |
| Maintain the human landscape and character of communities | Fails | | | | Neutral | |

5 Discussion and Detailed Policy Development

Overall the SMP does recognise the importance of tourism to the broader area and indeed to Wales. It also recognises that New Quay is an important community in its own right. In considering this, the SMP recognises there are several different aspects that support this: the core wellbeing of the town, the essential landscape, culture and nature conservation value which provides the setting of the community and supports the tourism to the area and, of course, the needs of individuals. This has to be set within the context of the current and increasing pressure on the coast in the future.

Under a no active intervention scenario, it is clear to see that the coastline around New Quay Bay and Little Quay bay would change quite significantly. Without defences, the important centre of the town would be lost. The failure of the Pier would result in increased erosion rates generally around the bay, increasing instability and recession of the soft clay coastal slope. The town around the Harbour is, therefore, seen to be heavily dependent on its defences.

Along the main section of the bay, the problems are not just erosion at the toe of the coastal slope but are due to the nature of the slope. Attempting to hold the toe against erosion would require heavy defences along the whole frontage and these would need to be increased in the future as sea level rises. There would be significant impact on the landscape, on nature conservation and would eventually result in loss of the beach. Even with such defences in place, this would only partially address the problems of coastal slippage and there would still be a risk to properties and the Holiday Park situated at the crest of the slope.

This problem has been investigated on several occasions in the past. The conclusion has remained that to undertake works in this area is not economically justified. This, together with the significant impact on the overall environment, was considered during the development of the first SMP (SMP1) and resulted in the policy to allow the shoreline to continue to retreat. This has been reviewed in SMP2 and this review confirms that defence of the frontage would be unsustainable.

However, both SMP1 and SMP2, identify that, in addition to the important, control imposed on the bay by the Pier, the other significant control point, associated with the shape of the bay, is Llanina Point. It is considered important that erosion of this Point is managed. In doing so, this would assist in slowing erosion of the central frontages allowing increased opportunity and time for planning for change and loss of property.

It is highlighted that, in taking this approach in SMP2, there is no fundamental change in policy for the frontage from that defines over a decade ago. Where defences are not considered to be appropriate, affordable or sustainable, the role of the SMP2 is to highlight this risk to management of the coast and those individuals affected. Clearly some of these issues have to be dealt with through the planning system to ensure that the broader issues are dealt with. Where there are individuals at risk, this is being discussed with them through the Council's Coastal Management section and the Council is collecting further monitoring data to help provide further advice.

The above sets out an overview of the approach set out in the SMP, highlighting the interaction between different sections of the whole bay. This is now discussed below in relation to specific sections of the frontage.

New Quay Head, being a hard rock promontory will always be there. However, in the future with sea level rise and increased wave attack associated with this, the cliffs will suffer greater erosion. In particular defence to the Rock Street properties would require significant new defences, going beyond those private defences already constructed. Private works to support the cliff, protecting gardens and eventually the properties themselves, would not be precluded by the SMP policy, but would be subject to normal procedures and approval, recognising the important nature conservation designations and landscape.

Private defence to the factory is seen as being sustainable while the factory is in operation. The main issue would be in terms of access and this depends critically on the position of the underlying harder rock. Traeth Dolau will come under increased pressure in the longer term, but the basic defence is seen as being sustainable and worthwhile to stop the loss of the main road through the town. There would, in the future, need to be works to either protect the frontage from wave attack or limit the loss of the beach to the east. While the present approach of replenishing the beach with sand from the harbour assists in this, this will become less sustainable unless additional protection of the beach is provided. This goes beyond the policy level of the SMP and would have to be assessed in relation to the nature conservation designation.

Overall, Traeth y Dolau really forms part of the main core area of the town and is considered within the policy unit for that larger area, below.

The first policy unit therefore defined as covering the natural cliff of New Quay Head, the factory and Rock Street and the policy would be for Managed Realignment. The strategic issue is to maintain the factory and the access to the factory. Private defence to the cliff and to property would have to be viewed in relation to this and would at an individual level be subject to normal approval processes.

Maintaining the Pier is fundamental to sustaining New Quay. Not just the harbour but the very character and use of the area. The plan would be to Hold the Line including Traeth y Dolau and the Penpolion Jetty. There is little scope for realignment landward and with sea level rise there is the potential for loss of beach. In the future, alongside the need to raise the Pier, consideration may need to be given as to how defence of the area could be improved through extension of the Pier or construction of other defence structures. This goes beyond the remit of the SMP, beyond noting that works in this critical area would provide benefit in terms of controlling the shoreline over the whole of the bay.

Along the soft clay cliffs of New Quay Bay, processes are already occurring that are placing the properties at risk. The deep seated land slumping in this area would not be totally eliminated by defence at the toe. There would also be a need for extensive cliff stabilisation and such extensive works would not be economically justified. There will be increased erosion and, therefore cliff instability with sea level rise. There has in the past been discussion of managed access to the shoreline, this could potentially be achieved but with a clear intent that this might need to be further adjusted in the future. The behaviour of the coastal slope will be critically affected by management at Llanina. The intent here would be to manage erosion and to reinforce as necessary the influence of the point in relation to management of the coast to either side. In doing this, the impact of natural processes could be managed to a degree, increasing the opportunity for adaptation.

The existing structures defending the Point are considered sustainable and do provide a valuable function both locally and in the broader context of managing the whole frontage. With sea level rise, the natural defence to the point will come under significantly greater pressure. The SMP, therefore, says that the general approach to defence of the Point should be continued, but that this should not be in the form of a linear wall or revetment, but should be more, as present, in terms of a breakwater or other reinforcement to the way in which the point works as a control structure. This is the level to which the SMP can consider defence, recognising that it sets the context for detailed work in the future. This is reflected in the policy of Managed Realignment.

Clearly in developing any detailed approach, the local assets at risk would be considered and every effort would be made to protect important local features, such as the church, when works are required. In this it, the works undertaken by Dwr Cymru have been taken into account, although, in fact, the main works are not seen as being at risk from flooding or erosion, even under a No Active Intervention policy.

The nature of the main central section frontage does vary around the bay. At the western end are the relatively steep cliffs under George Street. This slightly more resilient geology appears to lie further back from the shoreline as one moves east around the bay. Works have been undertaken at George Street and a retaining wall has been constructed to support the main road into New Quay. This has been possible because of the ground conditions in this general area.

The nature of the coastal slope changes at the point where Bronwyn Lane joins George Street. One critical and strategically important area of management would be to the main road into New Quay. It remains uncertain to what degree this is constructed over harder rock in the area behind George Street. This is one area, where given the potential larger scale impacts greater management might be justified in terms of the shoreline. This would however be consistent with a general approach of managed realignment for the whole coastal slope area of the bay.

From George Street through to effectively the Afon Felen, close to Ffynnon Feddyg, the coastal slope comprises clay-rich glacial till. This section of the coastal slope is subject to major deep seated failure, as is evident from the terracing that has occurred and the cracks that appear in the slope. Failure occurs both as a general movement and as more major landslips. The way in which this failure occurs is very difficult to predict, in that general movement occurs virtually all the time, with larger failures occurring over periods of a decade or more.

Although erosion of the toe of the cliff is a contributory factor in this failure, even in the absence of erosion at the toe, the coastal slope would still be unstable. This basic instability is made worse by rainfall and general drainage of land water. Both increased erosion of the toe due sea level rise and increased rainfall will tend to make this situation worse in the future with climate change.

Moving further east, the nature of the coastal slope again changes, with the slope being less influenced by water running off the hinterland to the back. It is also provided better control in terms of erosion due to the influence of Llanina Point. This slope, which has been regraded in places, tends to be more stable, although it can suffer general surface slippage.

The SMP has drawn from previous studies in attempting to define the probable rates of toe erosion and cliff crest retreat. However, it is not possible to be at all precise in defining such lines and there is the further uncertainty were properties, such as Traeth Gwyn House, are situated actually upon a terrace formed by previous failure and rotation of the slope.

Over the central section (Traeth Gwyn) it might be expected that the forward properties, together with properties at the lower end of Bronwyn Lane, would be lost within the next 10 to 30 years. Access to properties could be lost over the same period of time as Bronwyn Lane continues to settle.

To the east, Ffynnon Feddyg could be lost over the next 10 years. The property Majoda is set slightly further back and might, therefore, be expected to have a life of up to 75 years.

The main Holiday Park is also at risk and has suffered gradual loss over a long period of time. The sewer, running along the back of the coastal slope, and in places constructed on pillars across sections of the coastal slope, is at risk. The estimated time of such loss is between 25 to 50 years. It is noted that construction of the sewer was based on an assumption that coast protection works might be undertaken but in the recognition that the sewer (which was constructed between 1972 and 1975) was at long term risk.

None of these estimates are certain, as in the past there has been larger movement of the coastal slope which, as well as taking out a significant area of land directly, has also caused more local movement in the slope behind.

The SMP 1 policy for this area was for retreat. This policy, from ten years ago, is in effect carried forward in SMP2, with the policy of Managed Realignment over this central area. This is, therefore, not a new policy for the area but does highlight the difficulty in taking forward a policy that severely affects the property and interests of individuals in areas of significant risk. The Council has increased monitoring of the frontage, with the support of the Welsh Government as part of the overall monitoring of coastal behaviour. While it is recognised that monitoring does not actually reduce the consequences of loss, it is essential in providing better guidance to those affected.

Moving through to Cei Bach, there are properties along the coastal slope properties. The defences at Cei bach have assisted in stabilising the beach and securing the cliffs, however, justification for works in this area is difficult economically and in the future, even with maintaining the control provided by Llanina Point, continuing defence to this area is not considered sustainable in the long term. In the short to medium term the policy would be to Hold the Line, however, in the long term as the existing defences fail the intent would be for Managed Realignment.

As discussed above, due to the uncertainties associated with the instability of the coastal slope, it is difficult to predict precisely when property might be lost. The SMP anticipates that existing defence at the toe would still provide an improved level of toe defence over epoch 1 and possibly through to epoch 2. Monitoring of slope instability will continue to provide further information as to the risk to property behind the defences.

The cliffs of Carreg Ddu are currently undefended and undeveloped. The plan for this unit will be to allow it to slowly erode.

6

Management Summary.

The approach to management does not substantially change from that of SMP1. Two management areas are defined, although both rely to a degree on management at Llanina Point. The policies are summarised below.

M.A.13 NEW QUAY BAY: From New Quay Head to Llanina Point.

| Policy Unit | | Policy Plan | | | Comment |
|--|--|-------------|------|------|---|
| | | 2025 | 2055 | 2105 | |
| 7.1 | New Quay Head to Traeth Dolau | MR | MR | NAI | MR this would not preclude private defence to the fish factory + may require minor works to maintain road. Private works to stabilise cliff would be subject to appropriate approvals |
| 7.2 | Traeth y Dolau, New Quay Harbour to Penpolion. | HTL | HTL | HTL | |
| 7.3 | New Quay Bay | MR | MR | MR | Manage the retreat of this cliff, Local cliff drainage and local defence could allow adaptation. |
| 7.4 | Llanina Point | MR | MR | MR | Managing this headland as sea levels rise to ensure it behaves as a control point for the bays. |
| Key: HTL - Hold the Line, A - Advance the Line, NAI – No Active Intervention MR – Managed Realignment | | | | | |

M.A.14 LITTLE QUAY BAY: From Llanina Point to Gilfach yr Halen.

| Policy Unit | | Policy Plan | | | Comment |
|--|------------|-------------|------|------|---|
| | | 2025 | 2055 | 2105 | |
| 7.5 | Cei Bach | HTL | HTL | MR | Maintaining existing defences in the short term, gradually allowing natural processes to deepen the bay in the longer term. |
| 7.6 | Carreg Ddu | NAI | NAI | NAI | |
| Key: HTL - Hold the Line, A - Advance the Line, NAI – No Active Intervention MR – Managed Realignment | | | | | |

PDZ7
Management Area Statements

New Quay Bay
New Quay Head to Llanina Point

Cei Bach
Llanina Point to Gilfach yr Halen

| | |
|-----------------------------------|---------------------|
| Location reference: | New Quay Bay |
| Management Area reference: | M.A. 13 |
| Policy Development Zone: | PDZ7 |

* 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 13, 14 & 15**

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



| 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 |
| | Ramsar |
| | SAC |
| | SPA |
| | 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 |



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SUMMARY OF PREFERRED PLAN RECOMMENDATIONS AND JUSTIFICATION

INTENT OF THE PLAN:

The aim of the plan is to sustain the community of New Quay, its important harbour area and sea front, together with the areas of beach.

To the north of the harbour, towards New Quay Head, the significance of the shell fish processing factory is noted and associated with this is the need to maintain access along Rock Street. The aim of the plan is to sustain the access road and subject to normal approvals to support the continued private defence of the factory. While the revetment at Traeth y Dolau would be maintained, the intent along the frontage to the north would be for a managed realignment, specifically aiming to maintain the access road. There would be no intent to provide additional defence to properties along the Rock Street frontage and any proposed private work would be subject to normal approvals, recognising that this could impact on the nature conservation values and may as a consequence not be allowed.

Maintaining the Old Stone Pier and, to the east, continuing to manage the control imposed by Llanina Point, provides a degree of control to the entire bay. Beyond maintaining this bay shape, there would be no intent to actively manage this section of unstable coastal slope. The only caveat is in relation to the main road in to New Quay where over much of the frontage the coastal slope is actively slumping. Some slope instability work has been undertaken along the George Street frontage and the need for further work would be reviewed. Works along the rest of the frontage would be through planning control in relation to adaption of the Holiday Parks.

KEY ISSUES/RISK AND UNCERTAINTY:

There are uncertainties with regards to the failure timeframes of the cliffs and coastal slope both at Rock Street and around the main section of the Bay. This is further impacted by sea level rise. It will be important to relate this to national monitoring of sea level rise and more general climate change. There will also need to be an agreed response plan developed with property and land owners as to continued use of the area and future adaption.

Much of the risk to the core of New Quay is in the longer term and the economic assessment within the SMP does not fully reflect the benefits provided by the existing defences as no account is taken of the loss of the harbour, services or access. Even so, to maintain the Pier might not be economically justified purely in terms of FCERM funding. The intent is to continue to maintain this structure, but to do so there needs to be further examination of the broader benefits this structure brings to the town and there needs to be development of a New Quay Harbour Futures Plan, looking at the opportunity for collaborative funding.

ACTIONS:

| ACTION | PARTNERS |
|--|---------------------------------|
| Shoreline and coastal slope monitoring | CSC |
| New Quay Future Plan | Community CSC |
| Adaptation Planning | CSC |
| ▪ Rock Street ▪ Main Bay | Landowners Highways |

DELIVERY OF THE PLAN

SUMMARY OF SPECIFIC POLICIES

| Policy Unit | | Policy Plan | | | Comment |
|--|--|-------------|------|------|---|
| | | 2025 | 2055 | 2105 | |
| 7.1 | New Quay Head to Traeth Dolau | MR | MR | NAI | MR this would not preclude private defence to the fish factory + may require minor works to maintain road. Private works to stabilise cliff would be subject to appropriate approvals |
| 7.2 | Traeth y Dolau, New Quay Harbour to Penpolion. | HTL | HTL | HTL | |
| 7.3 | New Quay Bay | MR | MR | MR | Manage the retreat of this cliff, Local cliff drainage and local defence could allow adaptation. |
| 7.4 | Llanina Point | MR | MR | MR | Managing this headland as sea levels rise to ensure it behaves as a control point for the bays. |
| 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 plans for adaptation and New Quay Futures. Monitor stability of coastal slope. Maintain access along Rock Street. |
| Medium term | Maintain existing defences. Implement plans for adaptation and New Quay Futures. Monitor stability of coastal slope. Maintain access along Rock Street. Review need for management at Llanina. |
| Long term | Maintain existing defences. Implement plans for adaptation and New Quay Futures. Monitor stability of coastal slope. Maintain access along Rock Street. |

IMPLICATIONS OF THE PLAN

CHANGES FROM PRESENT MANAGEMENT

The Policy along New Head changes to MR. The policy intent for other areas remains the same.

ECONOMIC SUMMARY

| Economics (£k PV) | by 2025 | by 2055 | by 2105 | Total £k PV |
|------------------------|---------|---------|---------|-------------|
| NAI Damages | 0.0 | 332.0 | 434.3 | 766.3 |
| Preferred Plan Damages | 0.0 | 332.0 | 307.4 | 639.4 |
| Benefits | 0.0 | 0.0 | 126.9 | 126.9 |
| Costs | 363.9 | 6.3 | 483.0 | 853.1 |

FLOOD AND EROSION RISK MANAGEMENT

POTENTIAL LOSS

There is likely to be loss of property at Rock Street and over the main bay area. Potentially over one hundred years there could be loss of some 28 properties in the area. There would also be loss of land occupied by the Holiday Parks.

BENEFITS OF THE PLAN

The plan provides a longer term sustainable approach to defence to the main centre of New Quay, together with the Harbour area. The Plan would also intend to maintain the main access roads. Some 56 properties are potentially at risk. The plan would secure the future for some 26 of these properties.

SUMMARY OF STRATEGIC ENVIRONMENTAL ASSESSMENT (INCLUDING HRA)

| PDZ 7 | | | | |
|--|---|---|---|------------------|
| SEA Objective | Impact of Preferred Policy for each Epoch | | | |
| | 1 | 2 | 3 | Mitigation |
| Policy Unit 7.1 to 7.6 | | | | |
| 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). | | | | |
| To avoid adverse impacts on, conserve and where practical enhance the designated interest of nationally designated nature conservation sites. Maintain/achieve favourable condition. | | | | |
| To avoid adverse impacts on, conserve and where practical enhance national and local BAP habitats. | | | | Habitat creation |
| To support natural processes and maintain geological exposures throughout nationally designated geological sites. | | | | |
| 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. | | | | |
| To minimise coastal flood and erosion risk to scheduled and other internationally and nationally important cultural heritage assets, sites and their setting. | | | | |
| To minimise the impact of policies on marine operations and activities. | | | | |
| To minimise coastal flood and erosion risk to critical infrastructure and maintain critical services. | | | | |
| To minimise coastal flood and erosion risk to agricultural land and horticultural activities. | | | | |
| To minimise coastal flood and erosion risk to people and residential property. | | | | |
| To minimise coastal flood and erosion risk to key community, recreational and amenity facilities. | | | | |
| To minimise coastal flood and erosion risk to industrial, commercial, economic and tourism assets and activities. | | | | Relocation |

Impacts on tourism (Holiday Parks) may be potentially mitigated through time limited use and relocation, subject to planning.

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

The SMP policy in this PDZ provides a range of policies along the coastline including NAI, HTL and MR. PDZ 7 includes interest features of the Cardigan Bay / Bae Ceredigion SAC.

- 4C7.2.1 **Implications for the integrity of the Site:** The various policies do not result in a constraint to the development of Cardigan Bay SAC habitats as a result of sea level rise, and as such there will be **no adverse effect on the integrity of the SAC.**

SUMMARY CONCLUSION FROM THE WATER FRAMEWORK ASSESSMENT

This area was scoped out of the assessment. The assessment below, relevant to this management area highlights potential impacts to sections of coast outside this management area.

| Water body (and relevant PDZ) | Environmental Objectives met? | | | | WFD Summary Statement required? | Achievement of Any South East RBMP Mitigation Measures? | Details on how the specific South East RBMP Mitigation Measures have been attained (dark green = achieved; light green = partly achieved & red = not achieved) |
|--|-------------------------------|------|--------------|------|--|---|--|
| | WFD 1 | WFD2 | WFD3 | WFD4 | | | |
| Cardigan Bay Central (Coastal) (PDZs 6, 7 and 8) (MAN 12,13,14,15 and 16) | N/A | ✓ | ✗ (PDZ 8) | ✓ | Yes – Environmental Objective WFD3 may not be met because of the SMPs policy in PDZ 8 (MAN 15). | There were no relevant measures to the SMP2 for this water body. | N/A |

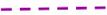
| | |
|-----------------------------------|-----------------|
| Location reference: | Cei Bach |
| Management Area reference: | M.A. 14 |
| Policy Development Zone: | PDZ7 |

* 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.

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- 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 13, 14 & 15**

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



| 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 |



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SUMMARY OF PREFERRED PLAN RECOMMENDATIONS AND JUSTIFICATION

INTENT OF THE PLAN:

The long term intent of the plan recognises the increasing difficulty in sustaining the frontage defence and the opportunity to restore the natural function of the bay. This would support shoreline nature conservation values, supporting adaption in the future.

There is a potential risk to properties on the coastal slope behind the existing defences at the back of the shoreline. This longer term risk is not fully included in the MDFS evaluation of damages. Even so, it is considered that the long term management of defences would not be sustainable.

The intent of the plan is to maintain the existing defences at present and to support maintenance of private defences. This would be subject to more detailed study of slope behaviour. As the defences begin to fail, probably in epoch 2, the intent would be not to replace them but to manage the loss and relocation of property at risk. The plan provides some potential benefit in terms of habitat.

KEY ISSUES/RISK AND UNCERTAINTY:

There are uncertainties in terms of timing of the proposed changes. There is also a need for a detailed planned response to change. It will be important to relate this to national monitoring of sea level rise and more general climate change.

Future maintenance of defences over epochs 1 and 2 would be subject to further justification with respect to properties at risk.

ACTIONS:

| ACTION | PARTNERS |
|--|----------------------------|
| Shoreline and coastal slope monitoring | CSC |
| Adaptation planning | CSC Communities |

DELIVERY OF THE PLAN

SUMMARY OF SPECIFIC POLICIES

| Policy Unit | | Policy Plan | | | Comment |
|--|------------|-------------|------|------|---|
| | | 2025 | 2055 | 2105 | |
| 7.5 | Cei Bach | HTL | HTL | MR | Maintaining existing defences in the short term, gradually allowing natural processes to deepen the bay in the longer term. |
| 7.6 | Carreg Ddu | 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 existing defences. Undertake a more detailed assessment of risk due to slope instability. |
| Medium term | Maintain existing defences while moving towards adaptive management |
| Long term | Stop management of defences and allow shoreline to adjust. |

IMPLICATIONS OF THE PLAN

CHANGES FROM PRESENT MANAGEMENT

The policy for defence changes from HTL to MR in epoch 3.

ECONOMIC SUMMARY

| Economics (£k PV) | by 2025 | by 2055 | by 2105 | Total £k PV |
|------------------------|---------|---------|---------|-------------|
| NAI Damages | 0.0 | 0.0 | 0.0 | 0.0 |
| Preferred Plan Damages | 0.0 | 0.0 | 0.0 | 0.0 |
| Benefits | 0.0 | 0.0 | 0.0 | 0.0 |
| Costs | 124.1 | 0.0 | 119.7 | 243.8 |

FLOOD AND EROSION RISK MANAGEMENT

POTENTIAL LOSS

There would be an increased risk of loss to properties due to coastal slope instability. Further investigation would be required to understand this risk in more detail.

BENEFITS OF THE PLAN

The plan provides time and opportunity for adaptation, while developing an approach in keeping with and supporting nature conservation and landscape values.

SUMMARY OF STRATEGIC ENVIRONMENTAL ASSESSMENT (INCLUDING HRA)

| PDZ 7 | | | | |
|--|---|---|---|------------------|
| SEA Objective | Impact of Preferred Policy for each Epoch | | | |
| | 1 | 2 | 3 | Mitigation |
| Policy Unit 7.1 to 7.6 | | | | |
| 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). | | | | |
| To avoid adverse impacts on, conserve and where practical enhance the designated interest of nationally designated nature conservation sites. Maintain/achieve favourable condition. | | | | |
| To avoid adverse impacts on, conserve and where practical enhance national and local BAP habitats. | | | | Habitat creation |
| To support natural processes and maintain geological exposures throughout nationally designated geological sites. | | | | |
| 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. | | | | |
| To minimise coastal flood and erosion risk to scheduled and other internationally and nationally important cultural heritage assets, sites and their setting. | | | | |
| To minimise the impact of policies on marine operations and activities. | | | | |
| To minimise coastal flood and erosion risk to critical infrastructure and maintain critical services. | | | | |
| To minimise coastal flood and erosion risk to agricultural land and horticultural activities. | | | | |
| To minimise coastal flood and erosion risk to people and residential property. | | | | |
| To minimise coastal flood and erosion risk to key community, recreational and amenity facilities. | | | | |
| To minimise coastal flood and erosion risk to industrial, commercial, economic and tourism assets and activities. | | | | Relocation |

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

The SMP policy in this PDZ provides a range of policies along the coastline including NAI, HTL and MR. PDZ 7 includes interest features of the Cardigan Bay / Bae Ceredigion SAC.

4C7.2.2 Implications for the integrity of the Site: The various policies do not result in a constraint to the development of Cardigan Bay SAC habitats as a result of sea level rise, and as such there will be **no adverse effect on the integrity of the SAC.**

SUMMARY CONCLUSION FROM THE WATER FRAMEWORK ASSESSMENT

This area was scoped out of the assessment. The assessment below, relevant to this management area highlights potential impacts to sections of coast outside this management area.

| Water body (and relevant PDZ) | Environmental Objectives met? | | | | WFD Summary Statement required? | Achievement of Any South East RBMP Mitigation Measures? | Details on how the specific South East RBMP Mitigation Measures have been attained (dark green = achieved; light green = partly achieved & red = not achieved) |
|--|-------------------------------|------|--------------|------|--|---|--|
| | WFD 1 | WFD2 | WFD3 | WFD4 | | | |
| Cardigan Bay Central (Coastal) (PDZs 6, 7 and 8) (MAN 12,13,14,15 and 16) | N/A | ✓ | ✗ (PDZ 8) | ✓ | Yes – Environmental Objective WFD3 may not be met because of the SMPs policy in PDZ 8 (MAN 15). | There were no relevant measures to the SMP2 for this water body. | N/A |