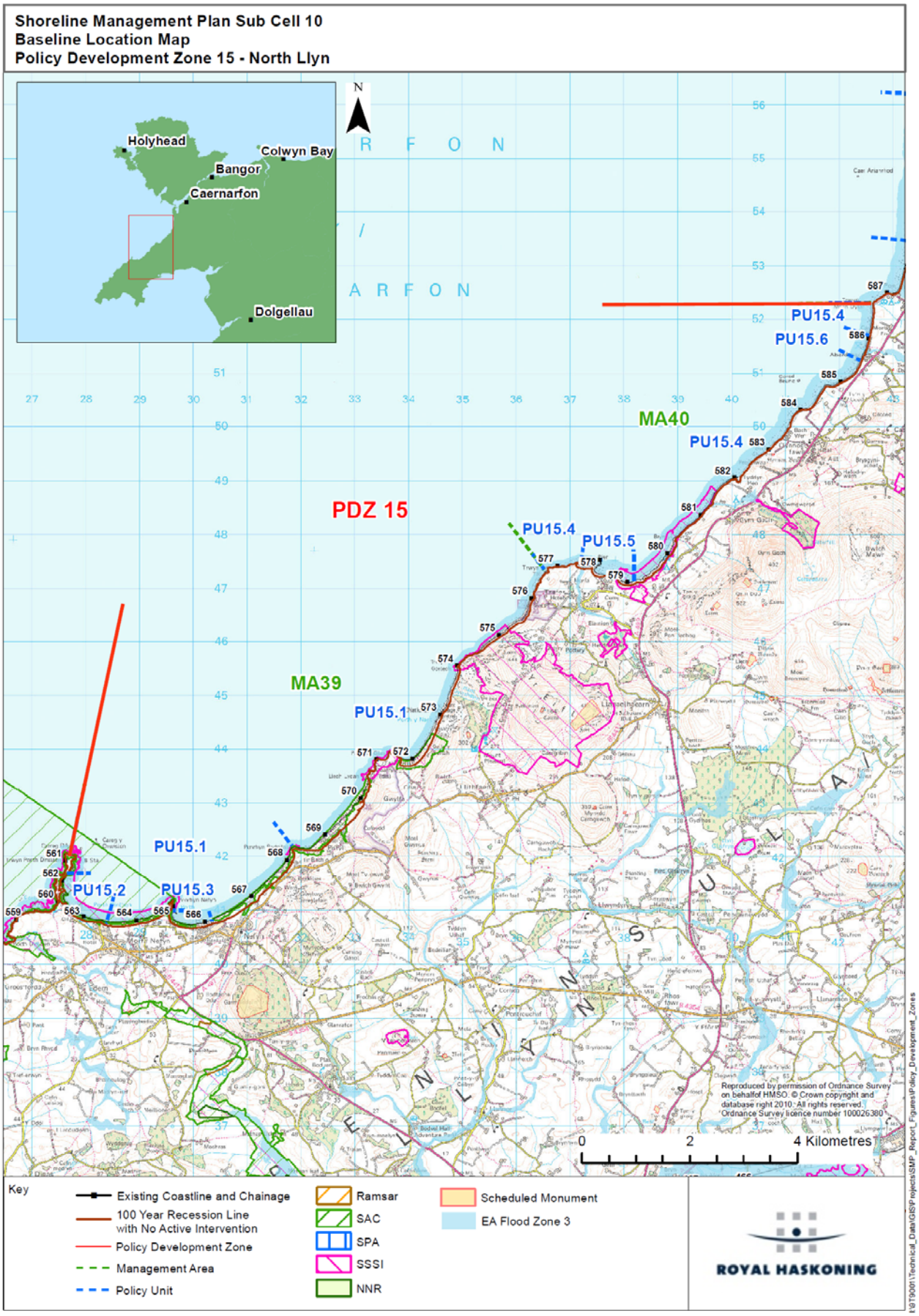
PDZ 15. NORTH LLYN:


Porth Dinllaen

Carreg Ddu to Trwyn Maen Dylan.

CONTENTS


Shoreline Management Plan Sub Cell 10
Baseline Location Map
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R F O N
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0
2
4 Kilometres
Key
Existing Coastline and Chainage
100 Year Recession Line with No Active Intervention
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SAC
SPA
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ROYAL HASKONING

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

The zone covers the coast between the rocky headland at Carreg Ddu and the low clay headland of Trwyn Maen Dylan, just to the south of Pontllyfni. The zone comprises the relatively high steep cliff backed bays of Porth Dinllaen, Porth Nefyn and Porth y Nant, running through to the massive headland at Trwyn y Tal and through to the much lower cliffs and more gently rising land around Clynnog fawr and Aberdesach.

Over the southern section, the coast is formed as a series of classically curved bays, with distinctive hard rock headlands controlling the erosion of areas of softer clay exposures. To the northern section, the land levels drop rapidly and the shoreline is fixed by the relatively more resistant foreshore of cobbles and shingle.

Porth Dinllaen.

The prominent headland to the south of the zone is the long thin rock peninsula running out to Carreg Ddu. This headland provides significant shelter from the dominate wave directions from the west and forms the sweeping curved bay of Porth Dinllaen, which is anchored by the northern headland Penrhyn Nefyn. At the western end of the bay is the Life Boat station and the small hamlet of Porth Dinllaen. Access to both is along the narrow headland to the edge of the golf course which takes up most of the headland. Access to the hamlet is then down a steep road to the collection of properties built on the narrow width of upper foreshore between the high water mark and the steeply rising cliff at the back. The properties, owned by the National Trust, include a public house and the grade II listed White Hall, together with a collection of fisherman's cottages. The image of the village is much used in portraying the heritage of the North Llyn coastline and is important as a local tourist destination.

Porth Dinllaen

There are three other properties at the shoreline further east within the bay. These properties are at the bottom of the only other access road to the foreshore, running down from the main village of Morfa Nefyn. This main settlement is set back from the steep coastal slope.

Porth Nefyn Access Point

East of the main access there are individual properties at the crest of the steep coastal slope. The land to the back of the cliffs is primarily in agricultural use. The whole bay, including the beach and coastal slopes are designated SAC.

Porth Nefyn.

Penrhyn Nefyn forms both the eastern headland to Porth Dinllaen and the western headland to the next bay, Porth Nefyn. The small village of Porth Nefyn sits in the

immediate lee of this headland and is protected by a breakwater. The village has an active harbour, moorings, and sailing club building, with properties to the back of the harbour area, tight against the steeply rising coastal slope. The main access to the village is along the foreshore from the main access point at Lon Garn in the centre of the bay. The access road runs down from the village of Nefyn and properties within the village encroach close to the crest and actually on the coastal slope. Around the access road are various properties including a café and facilities. The beach is popular for recreation and tourist use. There are various individual properties and caravan parks to the east of the village along the crest of the coastal slope. The coastal slope has a history of slippage, the last of which occurred in 2001 when there was a fatality. The bay ends to the north at the small headland of Penrhyn Bodeilias. The coastal slope of both Porth Nefyn and next shallower bay at Pistyll are designated SAC.

Pistyll and Porth y Nant.
There are a limited number of properties to the crest of the coastal slope to the back of the bay around Pistyll.

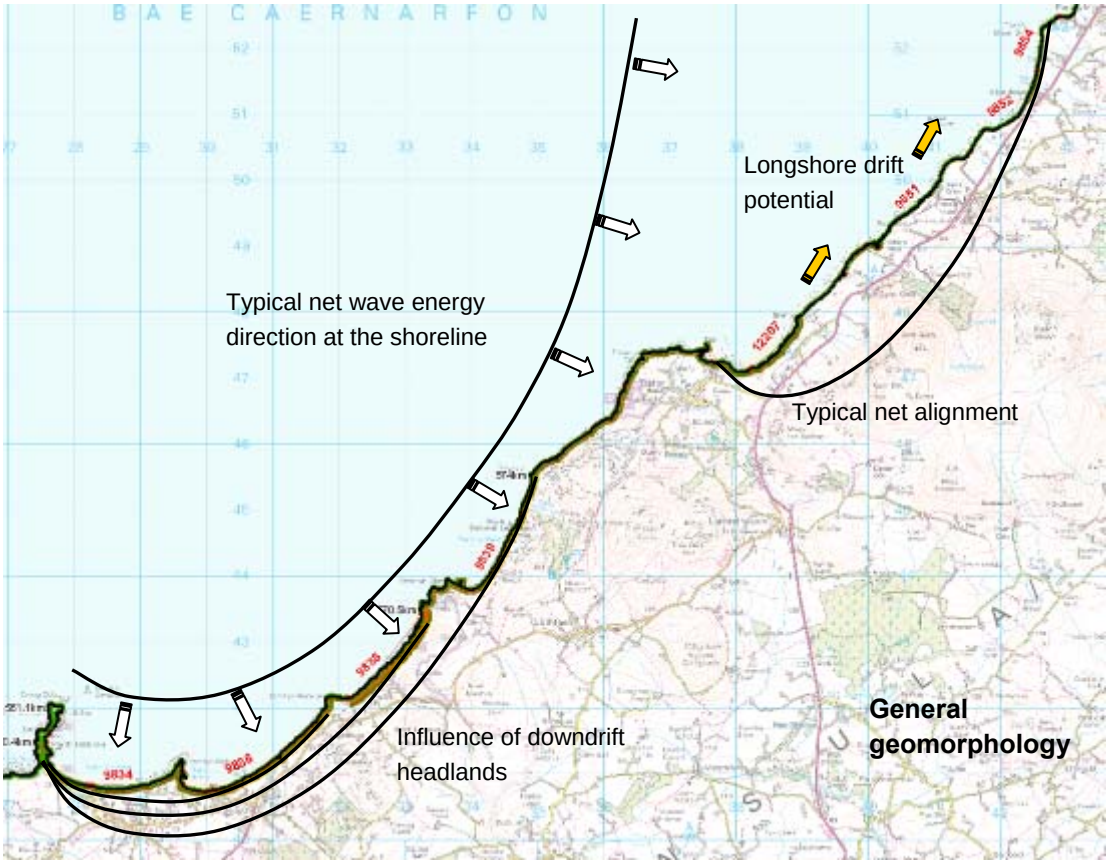
The final major bay in this series is Porth y Nant, which runs from Penrhyn Glas through to Trwyn y Gorlech and the start of the massive Yr Eifl/Trefor headland. The change in the coastal geomorphology approaching the large rock headland is reflected in steeper cliffs and the old quarry, close to which is located the Nant Gwrtheyrn Welsh Language and Heritage Centre.

Trefor and Aberdesach.
North of the headland is the small, old quarry port of Trefor, with its timber jetty and pier built out from a small but significant rock outcrop. The outcrop and pier provide shelter to a small sandy bay backed by a quay and car park. The coast cuts back slightly and reduces in level, running into the relatively straight low cliff backed shoreline which continues through to Aberdesach and Trwyn Maen Dylan. The only significant settlements along this section of the coast are at Clynnog and Aberdesach. The foreshore of the area is quite narrow and is backed typically by shingle and low cliff. Various small streams cut down through the cliff. Aberdesach is within a slight embayment and the additional foreshore width has allowed a small width of sandy beach. The small village has much of its property very close to the cliff edge to the north of the Afon Desach.

Although not designated within the Natura 2000 sites, there is a long area of SSSI designation running from just north of the Trefor through to the Afon Hen at Gyrn Goch.

2 Coastal Processes

The offshore wave climate is dominated by energy from the southwest although this is diffracted around the end of the Pen Llyn such that inshore the dominant direction is more from the west. There is, however, a long fetch over the Irish Sea to the northwest and north and significant wave energy can come from this sector. The shelter afforded by the various headlands of the southern section of the zone is clearly shown in the development of classic spiral shaped bays between headlands. Furthermore it can be seen how each bay is held forward by the hard rock headland at its northern end.



Generalising this, it may equally be seen that over the northern section of the zone, the slightly harder gravelly clay cliffs and foreshore have provided greater resistance to erosion, allowing the coast to be set forward of its natural geomorphologically stable position.

Within the southern bays, although they are swash aligned to the general net energy, they are also very sensitive to local wave direction. Monitoring has shown that there can be significant draw down of the beaches in front of defences but that the level of the beach can equally rapidly rebuild. The relative stability of the bays has reduced the long term erosion to the cliffs and inherently unstable coastal slopes. Major landslips have, however, occurred over the last two decades. At Pistyll, in 1997, there was a major failure with some 4ha of land being affected at the crest of the cliff. In 2001, there was a smaller slope slippage at the access point at Nefyn. Both were due primarily to groundwater affecting stability, but with cliff material moved on to the foreshore. With increased erosion due to sea level rise these frontages would wish to retreat to accommodate the increased wave energy. This will tend to reduce stability in the slope behind the beaches.

Over the northern section, there is slow more persistent erosion of the low back cliffs, with a trend of rolling back the shingle banks, which, in areas such as Aberdesach, provide protection from flooding. The cliffs do provide an important local supply of sediment that maintains the integrity of the system. Although there has been no sediment modelling within this area, the conceptualised geomorphology would suggest that this drift pattern reduces to the northern end of the Aberdesach bay. As the relatively soft headland at this point erodes back, sediment is allowed to bypass through to the Menai Strait system (PDZ16) to the north. The Afon Desach does interact to a degree with the shoreline and it is noticeable that the slightly set back position of the river mouth has allowed the development of the important shingle banks along the village frontage.

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. 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 following the table. While within local bays, sea level rise (SLR) will be a significant factor in future development of the shoreline, very slow erosion of the main hard headlands will still control the overall shape of the coast and they would be largely unaffected. 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 beaches there would be a natural roll back of the beach potentially in the order of 10m to 40m, depending on the nature of beach and the coast behind. As beaches, protecting relatively stable coastal slopes, erode or roll back, this could result in re-activating landslides and slope instability.

Location	NAI Base Rate (m/yr)	Notes	100yr. Erosion range (m)
Hard rock cliffs	0.05	Local land slip not significantly affected by SLR	5 - 20
Nefyn	0.3	Potential for landslips	40 - 100
Pistyll	0.75	Potential for major landslides	100 - 200
Trefor	0.1	Following failure of defences	20 - 50
Clynnog	0.1	Low clay cliffs slowly eroding	10 - 30
Aberdesach	0.05	Vulnerable to roll back with SLR	15 - 40

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.

Flooding

Increasing water levels will have a significant impact on the small villages in the area. To the south, Porth Dinllaen and Porth Nefyn are settled very close to the normal water line. Particularly in the case of Porth Dinllaen, a sea level rise of one metre would result in regular flooding to the majority of the properties. At Porth Nefyn the property is understood to be set at a slightly higher level. Even so, with sea level rise, there would be more frequent flooding.

Impact of different Sea Level Rise Scenarios

Under a 2m SLR scenario, flood risk would increase substantially over the next fifty years. Over the next 100 years, normal tide levels could reach the toe of the cliff at Porth Dinllaen and this would result in regular flooding to properties in Porth Nefyn. The property and access road to both bays would be under significant pressure from erosion.

There is very infrequent flood risk at Aberdesach. With sea level rise there would be substantially increased rates of erosion and flood risk would increase.

EXISTING DEFENCES

There are local areas of defence at Porth Dinllaen and at the Morfa Nefyn access, where rock armour protects the toe of the cliff and a sea wall is directly protecting property.

There are defences at Porth Nefyn at the back of the harbour and the breakwater provides significant protection. A seawall runs along the bottom of the cliff from the harbour through to the Lon Garn access point at Nefyn. This wall acts as much as a retraining structure as just simply protecting the toe of the slope against erosion.

At the access point an older wall protects the road and rock armour continues the defence of the coastal slope further to the east.

The pier acts as a defence at Trefor and at Aberdesach the shingle bank acts both to protect the cliff and as a flood defence.

UNCONSTRAINED SCENARIO

Under this scenario the behaviour of the coast is considered as if there were no man made defences. Effectively it reflects a situation where the defences were suddenly removed. Although recognised to be a totally theoretical scenario, the unconstrained scenario 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 how the coast might wish to change but also in defining the limits of interaction which the SMP should be considering.

The beach and backshore within each of the bays would attempt roll back. This would result in erosion of the toe of the coastal slopes and as a consequence the slopes would tend to reactivate with recession at the crest of the slopes. The process would create greater width over the foreshore and the system would maintain a dynamic equilibrium. In some areas, such as around Pistyll, and just north of Trefor, there is greater risk of more major slope failure which could result in significant and sudden failure of the slope.

Over much of the lower cliffed areas, erosion rates are likely to increase.

KEY INTERACTION WITH DEFENCES

Defences only significantly alter the behaviour of the natural coastline on a local scale. At present the main interaction is at the defences in the centre of Porth Dinllaen and Porth Nefyn bays. Under specific wave conditions, this can result in lowering of the beaches. The various breakwaters also have a local impact providing shelter and allowing build up of beaches behind.

3 Management Scenarios

3.1 No Active Intervention – Baseline Scenario 1

With the limited defence in place over much of the coast, the shoreline would, in most areas, continue to respond in an unconstrained manner. There would be continued slow retreat of the shoreline. As beaches erode, so would the toe to the coastal slopes and cliffs. This would provide sediment which sustains the beaches and the shoreline profile would be maintained, but set back. The headlands would erode at a far slower rate and would still provide shelter to the bays.

It is only in the local areas of defence that this process would be interrupted.

At present, even though there can be significant fluctuation in beach levels, the coast is really quite stable. The north section is tending to erode slightly faster than the more headland constrained southern beaches.

Porth Dinllaen.
At Porth Dinllaen, there is very little or no long-term erosion seen at present. Under this scenario the main risk is one of purely sea level rise. At present, it is estimated that five properties are at risk from flooding during more extreme events. This would become far more frequent with sea level rise.

Impact of different Sea Level Rise Scenarios
Under a 2m SLR, flood risk frequency to property would be at least an annual event.

The long term scenario would be the loss of the village.

In the centre of this bay, the defences to the limited number of properties are seen as being quite substantial and might be expected to still provide protection over the next 50 years. With a one metre sea level rise over the 100 years, these defences would start to be undermined as the beaches attempt to role back. This central defended area would become a headland within the bay and, under this scenario, when the defences do fail there would be a sudden rapid rate of erosion, loss of property and reactivation of the coastal slope. Access to the beach would be lost. Only those properties at the shore would be lost immediately, although there could then be loss of property further in land as the crest of the slope recesses.

Impact of different Sea Level Rise Scenarios
Under a 2m SLR, risk of loss of the lower properties could be brought forward to the end of Epoch 2 and several properties might be lost along the access road over the 100 year period.

Porth Nefyn.
At Porth Nefyn, the major impact would be the loss of the breakwater. As this structure fails, potentially over the second epoch the shoreline behind would suffer significant erosion. The use of the harbour would be lost. Under this NAI scenario, it is the loss of the breakwater and the erosion which is likely to lead to loss of the village within Epoch 3, rather than loss due to flooding.

The wall between the village and the central access point would become undermined as the coast readjusts to the loss of the breakwater, the loss of control at the access and as the shoreline generally rolls back. With the loss to the defence at the access, possibly

during Epoch 2, the wall between here and the harbour may fail towards the end of the second Epoch. The coastal slope behind would re-activate and there would be loss principally to open land above. In the main area of Nefyn, the important access road would be lost with the potential loss of four or five properties at the crest of the slope, during Epoch 3.

Impact of different Sea Level Rise Scenarios

Under a 2m SLR, the loss of properties in the harbour area would be brought forward but still only towards the end of Epoch 2, as this is more determined by the deterioration of the breakwater. However, there would be greater pressure on the wall at the toe of the slope and at the access point and these defences might fail over the next 30 years. Over the next 100 years, there would be significantly greater erosion at the access point and this could result in a greater rate and extent of coastal slope recession. It seems likely that up to 20 properties might be lost in the main village, with the potential loss of access to all properties along Rhodfar Mor.

In the above assessment, the critical behaviour of the coastal slope is uncertain and there is little information specific to levels of properties within the villages.

Further north there could be loss of individual properties and to farmland and caravan parks over the long term.

Trefor and Aberdesach.

The masonry pier at Trefor provides important protection to the coast to the west. As this structure fails, potentially during Epoch 2, erosion would increase. There is potential for loss of properties and loss of amenity use of the beach in Epoch 2 and through Epoch 3. At Aberdesach, there is a row of properties, protected by a wall and revetment. The main defence, however, is the shingle bank. With retreat of the shingle bank, the defence could fail over the next 50 years with significant erosion. This would lead to the loss of around 17 properties in Epoch 3.

There would be some important gain in terms of the natural environment under this scenario. The reactivation of coastal slope and the restoration of their natural condition could be seen as an important improvement in some areas.

3.2 With Present Management – Baseline Scenario 2

Table below sets out the present management policies under SMP1.

SMP 1			Subsequent Management Approach
No.	Unit	Policy	
Gwynedd/Ynys Mon			
1.3	Porth Dinllaen to Penthyn Bodeilas	SHTL	
1.4	Porth Bodeilas to Trefor	DN	
1.5	Trefor	SHTL	
1.6	Trefor to Dinas Dinlle	SHTL	

The North West Wales Catchment Flood Management Draft Plan does not go into detail for this area. Comments abstracted from the draft plan are set out below and the overall conclusion with respect to management generally in the area is to accept increased risk of fluvial flooding into the future.

Desach, Llifon, and Llyfni
These rivers have historic engineering in the river mouths, including shoal removal. The Afon Desach has been affected by the sand quarrying at Pant Glas nearby in the past. There is scope in the future for enhancement of this watercourse for flood risk and environmental benefits. Although the Llifon has been historically dredged, parts of it are now designated as a SPA and SSSI (not for riverine features), which will need to be taken into account if future flood risk management options were to change. The upper reaches of the Llyfni near Talysarn have been heavily modified which included the draining of Llyn Nantlle Isaf to facilitate slate quarrying activities.

Policy 2 - Reduce existing flood risk management actions (accepting that flood risk will increase over time). Note: this policy option involves a strategic increase in flooding in allocated areas, but is not intended to adversely affect the risk to individual properties.

Present management in the area is quite piecemeal, and over much of the frontage natural processes would continue.

Porth Dinllaen.
Sustaining flood defence to Porth Dinllaen would be difficult. It is interpreted from current policy that the intent would be to sustain the same level of flood defence. This would appear quite reasonable over the first epoch with minor improvements to the local defences. With sea level rise, there would be a need to construct new defences at the back of the beach, raising this defence in line with sea level rise. Gradually, but particularly over the Epoch 3, this defence would need to be so high that a continuous wall was created in front of the property. This would significantly alter the appearance, character and use of the area, such that its present broader value as a traditional small fishing hamlet would be lost. This approach is not seen as being sustainable.

In the centre of the bay, defences would have to be substantially increased and reinforced. The defended length would become more and more like a headland, impacting quite significantly on the natural landscape. Overtopping would become an increasing problem in terms of the properties behind the defences.

Porth Nefyn.
At Porth Nefyn, the main focus would be in improving and retaining the breakwater. This would be essential in maintaining the viability of defence to property and use of the harbour area. There would be a need to raise defence to property. This approach could potentially be sustained over the 100 years. One of the key difficulties would be in terms of access along the foreshore as the beach area was squeezed against the sea wall at the toe of the cliff.

Impact of different Sea Level Rise Scenarios
Under a 2m SLR, maintaining the protection to the harbour would become substantially more difficult. To provide the same degree of protection, the breakwater would need to be raised in excess of 2m over the 100 years. This would change its appearance and rather than being a low harbour feature would have to become a major rock armoured deepwater breakwater. Access along the foreshore would be lost apart from a limited period over low water.

Management of the Lon Garn access point is already important in terms of maintaining the shape of the coast to the west. This could be sustained but there would be a need for significant works to reinforce the existing seawall and rock armour to the east. A piecemeal approach to defence of this area, gradually reinforcing and improving

defences as they come under pressure, could well result in the effective encasement of the whole length with typically a rock revetment. This would have a significant detrimental impact on the landscape and the important beach use and amenity of the area.

Trefor and Aberdesach.
At Trefor, maintaining the pier would be an essential feature of management of defence to the small bay to the east. This would entail significant investment that would be difficult to justify from an erosion risk perspective. It would sustain use of the amenity aspects of the frontage but with a continuing loss of beach and foreshore.

At Aberdesach, reinforcing the existing defence would become more difficult as the shingle bank is squeezed against the backshore defence. The area does have the advantage of being set back form the general line of the coast and the main pressure would be that of the shingle bank wishing to roll back. As sea level rises, resisting this process would result in loss of the natural protection and the frontage would become increasingly erosive. Establishing a pattern of greater linear protection would be setting off in a direction where the need for defence would increase substantially over the 100 years and would result in a continuing increase in defence beyond that.

4 Summary Comparison and Assessment of Baseline scenarios

Table 1. Economic Assessment

The following tables provide a brief summary of erosion and flood damages determined by the SMP2 MDSF analysis for the individual area. 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.

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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)**
Location	*Res.*	*Com.*		*Res.*	*Com.*		*Res.*	*Com.*		*Res.*	*Com.*	
Port Dinllaen and Morfa Nefyn	1	1	108	3	1	554	6	2	922	13	4	480
Nefyn west	0	0	0	2	0	340	7	1	1289	14	1	245
Aberdesach	0	0	0	2	0	340	17	0	3638	17	0	219
										Total for PDZ1		**944**
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.*	
Port Dinllaen and Morfa Nefyn	1	0	108	2	0	321	3	0	533	5	0	291
Nefyn west	0	0	0	0	0	0	0	0	0	0	0	0
Aberdesach	0	0	0	0	0	0	17	0	3609	17	0	230
										Total for PDZ1		**521**

Notes: PVD determined for 1m SLR in 100 yrs.

Other information: Erosion damages take account of potential landslide loss due to erosion but there may be loss due to instability as a result of groundwater. Some properties at Porth Dinllaen could be lost due to flooding.

The following flood damages have been determined through the 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, and so 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**	**No. of properties**		**AAD**	**No. of properties**		**AAD**	**No. of properties**		**PVD**
Location	<1:10 yr.	>1:10 yr	**x £k**	<1:10 yr.	>1:10 yr	**x £k**	<1:10 yr.	>1:10 yr	**x £k**	<1:10 yr.	>1:10 yr	**(£x1000)**
Other areas within PDZ	0	0	0	0	0	0	0	0	0	0	0	0
Porth Dinllaen	0	5	4	0	5	8	0	5	45	5	1	281
Aberdesach	0	0	0	0	0	0	0	2	0.02	0	16	0.07
											Total for PDZ15	281

With Present Management	**No. of properties**		**AAD**	**No. of properties**		**AAD**	**No. of properties**		**AAD**	**No. of properties**		**PVD**
Location	<1:10 yr.	>1:10 yr	**x £k**	<1:10 yr.	>1:10 yr	**x £k**	<1:10 yr.	>1:10 yr	**x £k**	<1:10 yr.	>1:10 yr	**(£x1000)**
Other areas within PDZ	0	0	0	0	0		0	0	9	0	0	74
Porth Dinllaen	0	5	2	0	5	2	0	5	0.02	0	6	0.07
Aberdesach	0	0	0	0	0	0	0	2	0	0	16	0
											Total for PDZ15	74

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						
Identify communities at risk and allow opportunity for adaptation						
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 rural communities and support their connectivity to principal support centres						
Maintain recreational use of beaches and bays						
Maintain access to the coast including car parking and facilities						
Maintain access for boat use and associated water use activity						
Maintain character and integrity of coastal communities						
Maintain agricultural value of rural community						
Maintain agricultural industry and allow adaptation						
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.						
Avoid damage to and enhamce the natural landscape						
Maintain the human landscape and character of communities						

5 Discussion and Detailed Policy Development

What does come across quite clearly, is that, under present policy, there are long-term issues of maintaining the character and use of the area while also protecting quite specifically property and hard assets. If existing defences are maintained there will still be loss of beaches, increasing areas of flood risk and potential catastrophic failure. All the while, there would be increased pressure on the natural environment and damage to the landscape. In areas such as Morfa Nefyn and Porth Dinllaen, even if defences were increased, quite apart from the impact this would have on the essential coastal character of the local areas, with the increased sea level and increased potential for larger waves, there would be a much larger risk that during extreme events, defences would not protect life or properties.

At Nefyn and Porth Nefyn, the pressure on the wall at the toe of the cliff would increase, as this was defended, typically with a rock revetment, there would be loss of the beach and loss of access to the harbour area.

At Aberdesach, attempting to fix the coast would establish a principle for further larger defence that relied entirely on man made intervention. This would be increasingly difficult to manage or justify and is very likely to result in a future decision to abandon defences.

The overall conclusion, therefore, is that a change in approach will be needed.

Alternatively No Active Intervention would also not really address the issues. Just to walk away from defences would result in loss of property, loss of access to the important coastal areas and overall loss of the characteristic use of the area.

The real pressure for change comes with anticipated sea level rise. Under the present guidance of 1m SLR over the 100 years, the increased pressure would become apparent towards the end of Epoch 2, increasing significantly by the end of Epoch 3.

Impact of different Sea Level Rise Scenarios
Under a 2m SLR, this pressure on existing defences could become apparent over the next 30 years, significant between then and year 75, and then very severe by the end of the 100 year period.

Considering the two principal bays to the south:

Porth Dinllaen.
Within Porth Dinllaen, it would not seem sensible to continue to provide an expectation of defence to Porth Dinllaen over the full period of the SMP. It would be important to assess accurately the threshold level of properties within the hamlet, but in general terms, with a 1m sea level rise it would be expected that even if properties where adapted to be more resilient to flooding, the extent of general flooding within the community would mean that residential use would be untenable. Work could be undertaken to ensure that the small pier was sustained such that direct wave action was minimised. With support from the National Trust and the Local Authority in terms of monitoring and advice, together with the need for improved flood warning, there is a realistic opportunity to sustain the village over the next 50 to 75 years. This would in effect be a policy for Managed Realignment (or adaptation) over Epochs 1 and 2, concluding with a policy for No Active Intervention in Epoch 3. This approach would be seen as one where local action was actively supported to allow improvement and

reduction of direct flood impact at a local scale, working with the community to build resilience.

Further around the bay, sustaining the existing defence to the access and to property is not seen as being viable over the 100 years with sea level rise. The existing defences could be maintained but in the future increased overtopping is likely to result in significant risk. Any major works, such as creating a significant headland defence would have a significant impact on the natural environment and would be solely in defence of a very limited number of properties. Economically this is unlikely to be worthwhile. As with Porth Dinllaen, it is important to recognise that this would be a change that would result from sea level rise and that it is probable that defences could be maintained over the next 50 years. The policy for this local frontage would therefore be one of Hold The Line over Epochs 1 and 2, but with the long-term policy of Managed Realignment. This would need to consider how access to the foreshore could be maintained and how adapting defences could slow the rate of retreat.

The overall approach to the bay would be to allow natural development of the bay but through a process of change in approach to defence at the local areas discussed above. Overall, therefore, the bay is seen as one policy unit where there would be continued management in Epoch 1 (HTL) with managed realignment over Epochs 2 and 3.

Porth Nefyn.

In Porth Nefyn bay the issues are slightly different. The small harbour area and the property associated with this could, under a 1m sea level rise scenario, be sustained. Funding for this would need to be examined in more detail and it is probable that some joint local funding might well be required, given the harbour-use of the area. Access would be a key issue and this would need to be considered in detail. Maintaining the wall to the toe of the cliff would become increasingly difficult and would result in loss of beach area as well as access along the foreshore. The access point to the bay does, however, provide significant value at present in retaining beach levels to the west. The central defended area is also seen as providing important defence to a significant number of properties in the village above. In this respect there is seen as being no benefit in attempting to set back the defence.

As such, the whole of this section from the harbour through to the access point is seen as functioning very much as a unit. It is not considered sustainable to maintain the wall to the toe of the coastal slope and there could be significant benefit both in terms of maintaining healthy beach and in restoring the natural function of the coastal slope in eventually removing this wall. This would be undertaken only as part of a larger approach looking at maintaining defence to the harbour area and managing the area around the access. The overall policy approach would be Hold The Line over Epoch 1 and Epoch 2, with the intent of examining options for managed realignment of the whole western end of the bay during Epochs 2 for realignment in Epoch 3.

The eastern section of the bay would be for No Active intervention, through all epochs. This would also be the policy for the remainder of the southern section of coast within the zone.

Trefor and Aberdesach.
At Trefor, the essential management issues really relate to the continued amenity use of the frontage. While holding the line, effectively maintaining the pier, does act to retain the small beach in the area, the increase in sea level rise could still impact significantly on use of the area. To hold the line along the area of the car park is not likely to attract flood and erosion risk management funding. Given the conflicting issues, a policy of managed realignment would seem appropriate, allowing the local area to be considered in more detail but with the intent to allow greater width for natural development of the shoreline.

At Aberdesach, the emphasis has to be on avoiding the need to increase linear protection of the frontage. There is scope, due to the slight additional width of the foreshore areas to manage the development of the frontage, potentially managing the influence of the Afon Desach and the behaviour of the shingle bank to reduce the impact of sea level rise, without fundamentally altering the overall behaviour of the coast. In the long term, epoch 3, without resorting to harder defences there is likely to be loss of properties, either through erosion or flooding. To sustain the village, there would need to be consideration in terms of planning to allow development further back within the village. However, this needs to be considered alongside the even longer-term risk to a larger extent of land as the coast continues to erode back. This problem is strictly one of spatial planning rather than shoreline management. The policy for the local frontage would be for managed realignment over the three epochs.

Both in the case of Trefor and Aberdesach, management of these local frontages is seen as being essentially within a broader intent to allow the whole of this northern section of the coast to adapt naturally. With these policies in place, the weak sediment link between this northern area of PDZ15 and the next Policy Development Zone (PDZ16) would be maintained.

6 Management Summary

Over much of this area of the coast the long-term aim is to allow the coast to develop naturally. Even in areas that are defended at present, the aim is to adapt management to allow more sustainable risk management as sea level rises. The change from current policy is very dependent on the rate of sea level rise. As such, policies for management are quite local. The area is divided into two principle management areas and the policies are summaries below.

MA 39 NORTH LLYN BAYS: From Carreg Ddu to Trwyn y Tal

Policy Unit		**Policy Plan**			
		2025	**2055**	**2105**	**Comment**
15.1	Carreg Ddu to Trwyn y Tal	NAI	NAI	NAI	Overarching policy setting the base intent for the zone.
15.2	Porth Dinllaen, including Morfa Nefyn	HTL	MR	MR	This would require detailed planning for adaptation at Porth Dinllaen and managed retreat at the access at Morfa Nefyn
15.3	Porth Nefyn West	HTL	HTL	MR	Overarching policy setting the base intent for the zone.

Key: HTL - Hold the Line, A - Advance the Line, NAI – No Active Intervention MR – Managed Realignment

MA 40 NORTH LLYN SHORELINE: From Trwyn y Tal to Trwyn Maen Dylan

Policy Unit		**Policy Plan**			
		2025	**2055**	**2105**	**Comment**
15.4	Trwyn y Tal to Trwyn Maen Dylan	NAI	NAI	NAI	Overarching policy setting the base intent for the zone.
15.5	Trefor	MR	MR	MR	A detailed local plan would be needed to sustain amenity value of the area.
15.6	Aberdesach	MR	MR	MR	Local management of the shingle bank and river discharge to sustain natural defence of the area.
Key: HTL - Hold the Line, A - Advance the Line, NAI – No Active Intervention MR – Managed Realignment					

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PDZ15
Management Area Statements

MA 39 North Llyn Bays
Carreg Du to Trwyn y Tal

MA 40 North Llyn Shoreline
Trwyn y Tal to Trwyn Maen Dylan

Location reference:	**North Llyn Bays**
Management Area reference:	**M.A. 39**
Policy Development Zone:	PDZ15

* 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 39 & 40
Management Area
Policy Unit
Policy Development Zone
Scheduled Monument
N
Holyhead
Bangor
Caernarfon
Dolgellau
Aberystwyth
Llanguric
Fishguard
Carmarthen
Swansea
R N A R F O N
B A Y /
C A E R N A R F O N
MA39
MA40
PU15.1
PU15.2
PU15.3
PU15.4
PU15.5
PU15.6
PU16.1
PU16.2
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0
1.5
3 Kilometres
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
Exisitng Indicative EA Flood Zone 3
EA Flood Risk Zone 2 where under the SMP policy there would be increased probability of flooding
ROYAL HASKONING
I:\9T9001\Technical_Data\GIS\Projects\SMP_Report_Figures\Management Areas

SUMMARY OF PREFERRED PLAN RECOMMENDATIONS AND JUSTIFICATION

INTENT OF THE PLAN:

The majority of the coast is unmanaged and the intent of the plan is to maintain the natural function of the shoreline supporting the important nature conservation and landscape. There are, however, small settlements that add to the character of the coast and associated with these communities are various access points to the shoreline, important for tourism and amenity. There are two principal threats to current use of the area: that associated with the high risk of landslip, affecting in particular areas around Nefyn; and the second, the future flood risk to the communities at Porth Dinllaen and Porth Nefyn.

At Porth Dinllaen, in particular, this presents a significant problem in that increasing the height of defences in the future would seriously impact on the character and value of the village. In the longer term the village would not be sustainable. In the case of Porth Nefyn, there is more scope for management of the risk, but even here, in the longer term there would be significant issues in continuing to raise and strengthen defences. The approach to both these areas is to support management of defences, while it remains feasible to do so, but to move away from defence in the longer term. This will require planned relocation. At Porth Dinllaen there may be the need to plan such a change during epoch 2. For Porth Nefyn the change is more probably in epoch 3. Both would be very dependent of the rate of sea level rise.

At the access point at Nefyn, the aim is to maintain the defence through into epoch 3, but then with the possible need for change.

To the east of Nefyn the cliffs would continue to erode and slip and there is risk property and land use at the back of the present cliff crest.

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.

There are significant assets at risk but the changes planned go beyond actions normally funded by FCERM. Management and funding of change needs to be examined more broadly.

ACTIONS:

ACTION	PARTNERS
Shoreline monitoring	**GC**
Adaption planning ▪ Porth Dinllaen ▪ Porth Nefyn ▪ Nefyn	**PNP** **Communities** **Highways** **NT** **EA**
Promote awareness of cliff instability with respect to communities and property owners.	**GC**
Improve flood warning	**EA**
Assess in detail potential impact on historic environment	

DELIVERY OF THE PLAN

SUMMARY OF SPECIFIC POLICIES

Policy Unit		Policy Plan			
		2025	2055	2105	Comment
15.1	Carreg Ddu to Trwyn y Tal	NAI	NAI	NAI	Overarching policy setting the base intent for the zone.
15.2	Porth Dinllaen, including Morfa Nefyn	HTL	MR	MR	This would require detailed planning for adaptation at Porth Dinllaen and managed retreat at the access at Morfa Nefyn
15.3	Porth Nefyn West	HTL	HTL	MR	Overarching policy setting the base intent for the zone.
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. Continue to address safety issues at Nefyn with respect to landslips. Develop adaptation planning. Examine potential funding.
Medium term	Maintain defences while moving towards adaptive management.
Long term	Implement community based adaptation.

IMPLICATIONS OF THE PLAN

CHANGES FROM PRESENT MANAGEMENT

The approach to management changes from selectively Holding the Line to the development of long term plans for change to realignment and No Active Intervention.

ECONOMIC SUMMARY

Economics (£k PV)	by 2025	by 2055	by 2105	Total £k PV
NAI Damages	266.2	763.7	661.3	1,691.2
Preferred Plan Damages	237.7	363.9	363.0	964.5
Benefits	28.5	399.8	298.3	726.6
Costs	0.0	0.0	162.4	162.4

FLOOD AND EROSION RISK MANAGMENT

POTENTIAL LOSS

Potentially there are some 13 properties that could be lost to erosion. There would also be some increased risk of flooding to 5 properties.

BENEFITS OF THE PLAN

The plan provides a longer term sustainable approach to defence, maintaining defence to the core community areas while feasible to do so. Through early planning the consequence associated with flooding and erosion may in part be mitigated.

SUMMARY OF STRATEGIC ENVIRONMENTAL ASSESSMENT (INCLUDING HRA)

PDZ 15				
SEA Objective	**Impact of Preferred Policy for each Epoch**			
	1	**2**	**3**	**Mitigation**
Policy Units 15.1 to 15.6				
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.				Appropriate design
To minimise coastal flood and erosion risk to scheduled and other internationally and nationally important cultural heritage assets, sites and their setting.				Excavation and recording
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.				

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

The SMP policy in this PDZ provides a range of policies along the coastline including NAI, HTL and MR. PDZ 15 includes interest features of the Pen Llyn a`r Sarnau/ **Llŷn Peninsula** and the Sarnau SAC, the Corsydd Llyn/ Lleyn Fens SAC, and the Clogwyni Pen Llyn/ Seacliffs of Lleyn SAC.

Pen Llyn a`r Sarnau/ Llŷn Peninsula and the Sarnau SAC: **no adverse effect on the integrity of the SAC**.

Corsydd Llyn/ Lleyn Fens SAC: **no adverse effect on the integrity of the SAC**.

Clogwyni Pen Llyn/ Seacliffs of Lleyn SAC: **no adverse effect on the integrity of the SAC**.

SUMMARY CONCLUSION FROM THE WATER FRAMEWORK ASSESSMENT

This area was scoped out of the assessment.

Location reference:	**North Llyn Shoreline**
Management Area reference:	**M.A. 40**
Policy Development Zone:	PDZ15

* 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.

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100 year shoreline position:
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  Draft Preferred Policy.

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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 39 & 40
Management Area
Policy Unit
Policy Development Zone
Scheduled Monument
Holyhead
Bangor
Caernarfon
Dolgellau
Aberystwyth
Llanguric
Fishguard
Carmarthen
Swansea
N
R N A R F O N
B A Y /
C A E R N A R F O N
MA39
MA40
PU15.1
PU15.2
PU15.3
PU15.4
PU15.5
PU15.6
PU16.1
PU16.2
0 1.5 3 Kilometres
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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
Exisitng Indicative EA Flood Zone 3
EA Flood Risk Zone 2 where under the SMP policy there would be increased probability of flooding
ROYAL HASKONING

SUMMARY OF PREFERRED PLAN RECOMMENDATIONS AND JUSTIFICATION

INTENT OF THE PLAN:

The majority of the coast is unmanaged and the intent of the plan is to maintain the natural function of the shoreline supporting the important nature conservation and landscape. At a local scale, there is important local amenity use at Trefor and there is a small community at Aberdesach. These areas are discussed below.

At Trefor there would be benefit in maintaining the main pier to support use of the area, accepting that there would be continued erosion of the shoreline.

At Aberdesach, the intent of the plan is to allow the natural realignment of the shingle bank. The SMP does indicate that some work associated with management of the river could potentially provide benefit to the community. The realignment would need to be looked at in more detail. There might be scope for allowing relocation of properties further inland, although there could still be longer term risk of flooding impacting on these areas. The rate of sea level rise would be critical in making such decisions in terms of spatial planning.

KEY ISSUES/RISK AND UNCERTAINTY:

There are uncertainties in terms of timing of the changes in flooding and erosion. However, there is 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 and to continuing monitoring of the shoreline.

ACTIONS:

ACTION	PARTNERS
Shoreline monitoring	**GC**
Adaption planning ▪ Trefor ▪ Aberdesach	**PNP** **Communities** **EA**
Assess in detail potential impact on historic environment	

DELIVERY OF THE PLAN

SUMMARY OF SPECIFIC POLICIES

Policy Unit		Policy Plan			
		2025	2055	2105	Comment
15.4	Trwyn y Tal to Trwyn Maen Dylan	NAI	NAI	NAI	Overarching policy setting the base intent for the zone.
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15.6	Aberdesach	MR	MR	MR	Local management of the shingle bank and river discharge to sustain natural defence of the area.
Key: HTL - Hold the Line, A - Advance the Line, NAI – No Active Intervention MR – Managed Realignment					

PREFERRED POLICY TO IMPLEMENT PLAN:	
From present day	Address safety issues at Trefor. Develop local adaption plans.
Medium term	No specific works planned.
Long term	No specific works planned.

IMPLICATIONS OF THE PLAN

CHANGES FROM PRESENT MANAGEMENT

No significant change from present management.

ECONOMIC SUMMARY

Economics (£k PV)	by 2025	by 2055	by 2105	Total £k PV
NAI Damages	0.0	58.0	230.1	288.1
Preferred Plan Damages	0.0	58.0	230.1	288.1
Benefits	0.0	0.0	0.0	0.0
Costs	0.0	62.8	31.8	94.6

FLOOD AND EROSION RISK MANAGMENT

POTENTIAL LOSS

There could potentially be the loss of 19 properties in the area over the longer term.

BENEFITS OF THE PLAN

The plan provides a longer term sustainable approach to defence and identifies the risk to properties at Aberdesach, in the long term. This risk would be managed through actions defined in the plan.

SUMMARY OF STRATEGIC ENVIRONMENTAL ASSESSMENT (INCLUDING HRA)

PDZ 15				
SEA Objective	**Impact of Preferred Policy for each Epoch**			
	1	**2**	**3**	**Mitigation**
Policy Units 15.1 to 15.6				
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.				Appropriate design
To minimise coastal flood and erosion risk to scheduled and other internationally and nationally important cultural heritage assets, sites and their setting.				Excavation and recording
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.				

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.

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The SMP policy in this PDZ provides a range of policies along the coastline including NAI, HTL and MR. PDZ 15 includes interest features of the Pen Llyn a`r Sarnau/ **Llŷn Peninsula** and the Sarnau SAC, the Corsydd Llyn/ Lleyn Fens SAC, and the Clogwyni Pen Llyn/ Seacliffs of Lleyn SAC.

Pen Llyn a`r Sarnau/ Llŷn Peninsula and the Sarnau SAC: **no adverse effect on the integrity of the SAC**.

Corsydd Llyn/ Lleyn Fens SAC: **no adverse effect on the integrity of the SAC**.

Clogwyni Pen Llyn/ Seacliffs of Lleyn SAC: **no adverse effect on the integrity of the SAC**.

SUMMARY CONCLUSION FROM THE WATER FRAMEWORK ASSESSMENT

This area was scoped out of the assessment.