

REPORT

Cornwall and Isles of Scilly Shoreline Management Plan 2

Isles of Scilly Mid Term Review Appendix A

Client: Council of the Isles of Scilly

Reference: WATPB5573R001D01

Revision: 01/Draft

Date: 12 August 2016

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Classification

Open



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Appendices

MA 42	St Mary's
MA 43.	St Martin's
MA 44	Tresco
MA 45	Bryher
MA 46	St Agnes and Gugh

MA 42

St Mary's

Open



Location Reference:	St Mary's
Management Area reference:	MA 42
Policy Development Zone:	PDZ18



DELIVERY OF THE PLAN
SUMMARY OF SPECIFIC POLICIES

Policy Unit		SMP1 Policy	SMP2 Policy Plan			Comment
		50 yrs	2025	2055	2105	
42.1	The Mermaid Wall	Hold the line	HTL	HTL	HTL	This part of the quay is integral to the continued shelter of the remainder of the Town Beach frontage.
42.2	The Quay	Hold the line	HTL	HTL	HTL	This part of the quay is also integral to the continued shelter of the remainder of the Town Beach frontage.
42.3	The Quay to Custom House	Hold the line	HTL	HTL	MR	Increasing pressure upon this part of the frontage may dictate that a longer term accommodation of rising sea levels is made.
42.4	Custom house to Cam Thomas	Hold the line	HTL	HTL	MR	As with the previous policy unit frontage, a longer term realignment to accommodate rising sea levels and address the increasing risk factors is likely to be necessary.
42.5	Porth Mellon	Hold the line	HTL	MR	MR	Realignment beyond epoch 1 needed to consider management of the increasing flood risk.
42.6	Thomas Porth	Do nothing	NAI	NAI	NAI	Risks from erosion and flooding are indicated to be limited at Thomas Porth.
42.7	Porth Loo	Retreat the line	NAI	MR	MR	Likely to be necessary to consider realignment of the road beyond epoch 1.
42.8	Taylor's Island to Innisidgen	Do nothing	NAI	NAI	NAI	It is not considered necessary to undertake any protection of the is frontage, as pathways can be re-routed and other risks relate to non-residential assets.
42.9	Innisidgen to Porth Hellick Point	Do nothing	NAI	NAI	NAI	A continuation of the no active intervention policy is preferred. Would satisfy objectives relating to the AONB and Heritage Coast designations.
42.10	Porth Hellick	Hold the line	HTL	MR	NAI	Consideration should be given to realignment of the embankment to provide improved, robust natural defence to the Higher Moors area.
42.11	Salakee Down	Do nothing	NAI	NAI	NAI	No risks have been identified for Salakee Down.
42.12	Porth Minick	Hold the line	HTL	MR	MR	The preferred option would be to undertake some realignment of the defence to prevent excessive coastal squeeze developing.
42.13	Tolman Point	Do nothing	NAI	NAI	NAI	Would satisfy objectives relating to the AONB.
42.14	Tolman Point to Old Town Slip	Do nothing	NAI	NAI	NAI	Would satisfy objectives relating to the AONB.
42.15	Old Town Slip to Old Church	Hold the line	HTL	MR	MR	It is recommended to hold the line in the short term and consider the

Policy Unit		SMP1 Policy	SMP2 Policy Plan			
		50 yrs	2025	2055	2105	Comment
						controlled roll back of the defences over longer term.
42.16	Old Church to Carn Leh	Do nothing	NAI	NAI	NAI	Some low-risk recession of the low ram cliffs would be expected along this frontage.
42.17	Carn Leh to Playground	Do nothing	NAI	NAI	NAI	An ongoing no active intervention policy is preferred. Would satisfy objectives relating to the AONB and Heritage Coast designations.
42.18	Playground to Slipway (Porthcressa)	Hold the line	HTL	NAI	NAI	Significant erosion may be expected under the NAI policy, however with little development or assets immediately at risk, economic justification for holding the line in longer term may become difficult. This frontage must however, be a key consideration as part of the overall management of risk at Porthcressa, particularly tying in with Policy Units 42.19 and 42.20.
42.19	Slipway to Little Carn	Hold the line	HTL	HTL (with localised MR)	MR	Holding the line in the short to medium term will allow further monitoring of the coastal squeeze impacts, particularly in terms of beach levels, and changes in the beach slope and width. However the management intention must be to also address the very significant risks posed by potential occurrence of an extreme storm event. Managed realignment of the defensive line is however likely to be required in the medium to longer term – but the intention would not be to allow significant narrowing of the isthmus to occur.
42.20	Little Carn to Sally Port	Hold the line	HTL	HTL (with localised MR)	MR	The rationale is as stated for Policy Unit 42.19 above.
42.21	Sally Port to the Quay (The Garrison)	Do nothing	NAI (with localised HTL)	NAI (with localised HTL)	NAI (with localised HTL)	A no active intervention approach is preferred in the long term. However this should not preclude localised management taking place (defined as localised HTL) around all sections of the Garrison frontage to address ongoing stability issues along cliff line.

PREFERRED POLICY TO IMPLEMENT PLAN:

From present day	NAI along the undefended cliffs and coves. Generally HTL along current defended frontages and closely monitor cliff recession rates, beach levels, widths and slope changes.
Medium term	NAI along the undefended cliffs and coves. Continue to HTL around Quay and Town Beach frontage. Adapt and realign the Old Town, Porthcressa and Porth Mellon and Porth Loo frontages.

Long term	NAI along the undefended cliffs and coves. Continue to HTL along the Quay but look to realign and adapt the Town Beach frontage from the quay to Thomas Porth. Continue to adapt and realign the Old Town, Porthcressa and Porth Mellon and Porth Loo frontages.
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GENERAL DISCUSSION AND APPROACH TO THE MID TERM REVIEW

GENERAL DISCUSSION AND APPROACH

As discussed in the introduction a slightly different approach has been taken to the SMP review of the Isles of Scilly. Each island has been considered in the SMP as an individual Management Area. However, it is recognised that within each island there can, in some locations, be greater connectivity across sections of an island in terms of use and impact, effectively linking Policy Units that are not necessarily contiguous. This has become more apparent during discussions over the site visit in understanding and taking forward actions and intent developed from the SMP.

Without wishing to complicate or diverge from the consistency between SMPs, it has been felt necessary to group certain policy units within this review in order that the intent of management set out in the SMP is brought out more clearly. To avoid confusion with the previously defined higher level Management Areas or the more detailed Policy units, such clusters of Policy Units are referred to as Policy Intent Areas (PIAs).

While recognising the essential issues focussed around the main settlement areas of St Mary's (Hugh Town and Old Town) and the critical nature of the two freshwater supply areas (Lower and Higher Moors), the SMP highlights the significant increasing vulnerability of St Mary's to sea level rise and the potential of increased storminess. As such, there is a need for long term planning for the whole southern section of the island including a review of critical infrastructure both in terms of immediate risk and longer term threats. This needs to be supported by better information on wave climate and monitoring of water levels.

Notwithstanding this need for a full strategy to be developed for St Mary's, and indeed supporting this, it is sensible to group certain policy units as Policy Intent Areas:

PIA42 a - (PU42.3, 4 and PU42. 18,19 and 20), focussing on the management of risk to the core of Hugh Town and the isthmus. At present there is flood risk within the centre of the town, affecting the sewerage and road drainage system together with the risk of storm flooding from the south, with overtopping of the defence to Porthcressa bay. Defences have been improved over this southern frontage but, to the back of Town Beach, rely on a melange of individual properties and local defence. With sea level rise, risk to the area increases. In addition, with sea level rise there is the potential for beach loss exacerbating this problem. Consideration of both areas, north and south, is essential in managing this core area.

Further to the east, is the area of Lower Moor, **PIA42 b** (PU42.5 and 7 and PU 15). This area is important for fresh water supply to the island but also contains important infrastructure and local businesses. There is flood risk from Porth Mellon (PU42.5) and from the south along the Old Town Bay frontage PU42.15 and potential risk due principally to overtopping from Porth Loo (PU42.7), where there has been a history of damage. While each frontage poses individual management issues, each potentially contributes to the risk to the Lower Moor area.

Policy units PU42.12 – Porth Minick, and PU42.10 – Porth Hellick, are less directly connected in terms of the actual areas affected but still influence decisions made with respect to the overall long term planning for St Mary's. In the case of Porth Minick there is potential influence on the Old Town area. In the case of Porth Hellick, the frontage acts to protect the Higher Moors area and as a consequence influences decisions with respect to fresh water supply. Both areas are where SMP policy change occurs in epoch 2 from the SMP1 policy of (Hold the Line) HTL to a policy of Managed realignment (MR). These two areas are considered separately below.

In other areas of the island, specifically around the northern extent, the policy of No Active Intervention (NAI) defined in SMP1 has been taken forward. This policy does have local implications with respect to issues

such as the coastal path and there is a need to ensure that these issues are being considered into the future.

The policy around the southwestern headland is for NAI, although critically this is because over much of the area there is no need for intervention. The SMP recognises that locally there may need to be management particularly with respect to historic features. This needs local consideration with the aim to preserve such features without undue impact on the broader landscape values.

The area of the Mermaid Wall and the Quay both have a policy of HTL and it should be noted that the Quay, in particular provides important shelter to Town Beach, linking management here through to the Policy Intent Area PAI 42.a.

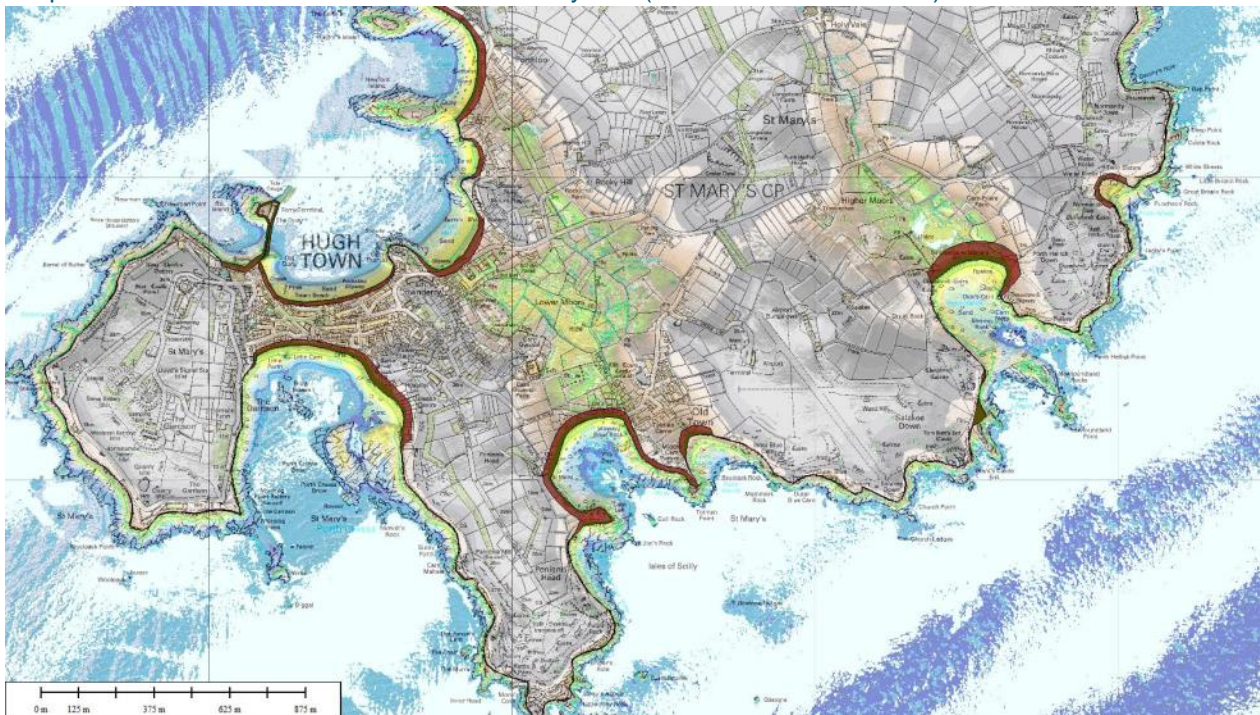
SMP intent

The SMP highlights the substantial risk to infrastructure and the fundamental use of the island in response to sea level rise and climate change. The SMP states in relation to Hugh Town that:

“Although management of the risks in-situ, based upon current projections for sea level rise in isolation, appears achievable, it is the uncertainty within the climatic projections which dictates that Hugh Town is in a very vulnerable position... if sea level rise were to increase by a substantial amount above the current projections, percolation through and rising water levels within the main body of the isthmus may have severe implications for foundation stability of buildings and general stability of the isthmus itself”

Similar warnings apply to other frontages.

The image below highlights information provided within the SMP, showing the principle low lying areas and the potential areas of erosion over the next 100 years (shaded as brown zones).



General Information Provided in the SMP

Overall, the approach set out in the SMP aims to support the existing use and values of the island, while highlighting the increasing pressures and looking for ways to mitigate these pressures where possible. Key concerns are that attempting fix coastal defence is likely to give rise to increasing pressure for erosion with associated loss of beach levels, increasing risk of sudden and catastrophic failure of defences and increasing the need for further investment in hardening the approach to defence. The SMP looks, therefore,

to highlight where more adaptive approaches may be taken, recognising that this will involve a more integrated approach, requiring long term land use planning, involving the communities and principle land owners.

It is recognised that adaptation will take time and, ideally needs to be a gradual change into the future. The SMP, therefore, emphasises the need to start thinking about this now, aiming to incorporate a longer term perspective in meeting the future needs to the island. In many ways the SMP should be seen as laying down a foundation for broader scale planning, importantly recognising that local broader scale issues may influence the specific manner in which longer term policies are taken forward.

It is within this overall concept that specific critical areas of the coast are discussed below.

REVIEW AND APPLICATION

PA142 a

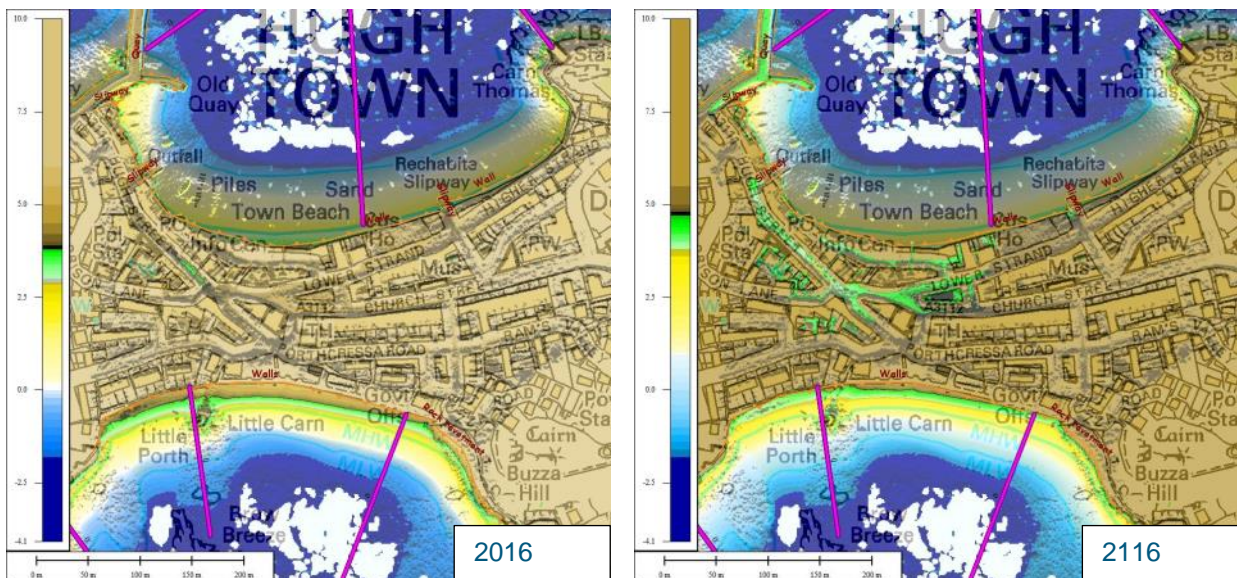
This area covers the core of Hugh Town and, therefore, the most critical settlement of the island. At present occasional but serious flooding occurs around the low lying area of the high street linked to the road drainage and sewerage system during heavy rainfall. The images below highlight this area of risk (shaded in green) showing areas at present below the extreme 1 in 100 year sea water level (T100). The images show a comparison of ground levels based on predicted extreme conditions now (2016) and in 100 years' time (2116).

In addition, there is a risk of flooding due to wave overtopping from the south, with water flowing down in to the centre of the town. Coupled to this is the risk of ground water percolation through the structure of the isthmus.

Along both frontages there is also the risk of loss of beach levels due to increased wave height. The Quay will reduce the influence of this on Town Beach but the southern beach will tend to suffer coastal squeeze against the hard line of defences.

The ground level information is presented as comparative plots. For each image the following colour contours have been used:

Below mid- tide level		Extreme water levels to 1:100	
Upper intertidal to MHWS		Above 1:100 yr level	



Comparison of ground levels in relation to water levels for 2016 and 2116.

This poses two distinct risks to future management, although it has to be understood that these risks are linked and require a joined up approach.

Flood risk

- It may be seen that, in addition to the problems of tidal locking (stopping rainfall draining from the area of high water), the properties and local defences along the Town Beach frontage actually act as a flood defence. In the future tidal locking will become more of an issue and it will become more critical to manage the various defences along the frontage as a competent defence line.
- Recent works have been undertaken to improve both flood risk and amenity value of the central length of the Porthcressa defences (2012). This importantly maintains the width of the upper crest area, allowing space for future raising of the defence while still allowing incorporation of buildings and amenity features. Such an approach demonstrates how the principles for adaptation set out in the SMP may be applied. However, in adjacent sections this may be more difficult, where already this ability for future proofing is compromised by existing development and buildings. As with Town Beach, the integrity of individual lengths of the flood defence system has to be viewed as a whole. This would require discussion with individual property owners in raising awareness of future issues.
- Underlying the management of the whole area is the vulnerability of the road drainage and sewerage system. This needs to be considered as part of a wholesale assessment and review of critical infrastructure for the island.
- Furthermore, even with future raising of defences, there may be a risk under more extreme events that overtopping will still occur. The SMP recognises the need to plan for such an eventuality such that overtopping is managed in a manner that impacts are mitigated.



Erosion and coastal change

- The SMP recognises that there is little opportunity for adjustment of the alignment of defences over much of the Town Beach frontage in response to sea level rise because of the presence of properties. Locally there will be the need to consider how individual properties may need to be adapted and this is the interpretation that should be placed on the move to a policy of MR in epoch 3, rather than the idea of actually moving the alignment of properties. This needs to be communicated to individual property and business owners such that they are able to make plans for the future in line with managing the risk of sea level rise.
- Potentially greater opportunity exists with respect to the open ground adjacent to the Custom House along the Lower Strand. This is already discussed in the SMP but is further highlighted in the review. Recent works have been undertaken to improve the sea wall in front of the green and further works may be required here and further to the north. In the future, this defence will come under increased pressure. The area provides one of the few sections of actual beach use and access to the foreshore. In considering future management and, therefore the attitude to more immediate works, consideration should be given as to how this area might be adapted and possibly realigned. Essentially it will be important to maintain the upper crest width such that flood defence may be



landscaped into the frontage while also considering the possible need to set back the existing front-face defence line to mitigate the impact of beach loss. This needs to be discussed within a broader consideration of adaption of the sea front.

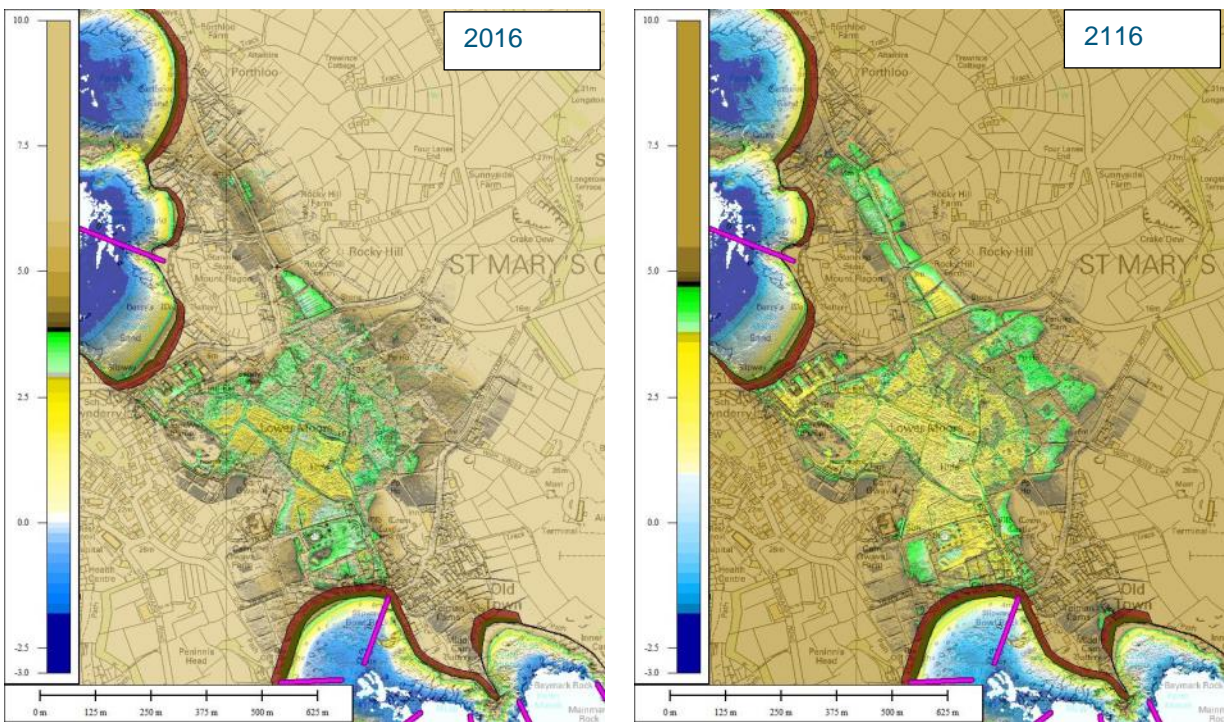
- Similar consideration needs to be given to development of the beach along the Porthcressa frontage. While the works along the crest provide future opportunity for raising the defence level, the SMP recognises that there is limited opportunity to set back the front face of the defence. In this area, the SMP recommends that realignment should look at the opportunities for building defences forward to retain sediment and reduce wave action. This needs to be developed further as a detailed long term strategy for management.

PAI42 b

This area extends as the Lower Moor across the width of the island, also extending as a low lying valley up towards Porth Loo. This is shown in the following images showing ground levels relative to water levels for 2016 and 2116.

The ground level information is presented as comparative plots. For each image the following colour contours have been used:

Below mid- tide level		Extreme water levels to 1:100	
Upper intertidal to MHWS		Above 1:100 yr level	



Comparison of ground levels in relation to water levels for 2016 and 2116.

The area as a whole contains important infrastructure such as the island’s waste management site and is one of the principle sources of freshwater for the island. In addition the area is important for its ecological value and management of the influence on freshwater and saline or brackish habitats. More specific to each coastal frontage is the need to maintain the landscape and ecological quality of the dunes and foreshores, alongside aspects of coastal use and the transport network.

Each frontage is discussed below with reference to the above images.

Along the northern side of the island the most critical risk occurs in relation to Porth Mellon where there is a narrow, partially defended dune ridge, with the narrowest section being to the south of the bay. The main

road runs along this ridge with property and industrial units lying just to the south of the road. It may be seen from the above images that potential future erosion threatens to take out the road and expose the area behind to regular still water level flooding to the Lower Moor in general. Even at present the area of the industrial estate suffers flooding during heavy rainfall, exacerbated by tidal locking.

The SMP highlights the difficulty and tension in management between allowing the development of the



natural dune system, and thereby encouraging the development of a more naturally robust system of defence and the need to ensure that breach or excessive overtopping of the coastal ridge does not occur affecting the road, the local industry and the broader scale interests of Lower Moor. The SMP policy moves from initially holding the line to a policy of managed realignment. Key points coming from this review are:

- over much of the frontage the aim should be to maintain the width of the dune area so that the dune system has room to adapt. Critically this will require careful agreement over any future proposed defence of the boat house, recognising that the backshore will retreat further back. In addition as the dune

line retreats there may be conflict with the trackway set within the dunes. The aim would be not to attempt to manage the dunes along this line but to look at alternative access routes. In addition, as the dunes retreat it will be important to maintain the open area behind the dunes to allow development of the natural defence system.

This will require agreements with local businesses and land owners prior to pressure becoming critical.

- At the southern end, the SMP recognises that there may be the need for further intervention to protect the road. Direct protection along this section may be required but alternative options for management such as controlling the developing alignment may be more appropriate.
- The aim is to continue to provide a sustainable level of protection to the hinterland but even so it has to be recognised that under more extreme conditions there is increased flood risk. This approach needs to be planned for looking at how use of the area in the future may need to adapt and how the impact of flooding may be mitigated.

At Porth Loo, while even in the future there does not appear to be a direct still water flood risk through to



the Lower Moor, the frontage has suffered continuing erosion and pressure on defences and it is reported that overtopping due to wave action has contributed to flooding of the wider hinterland. This bay is more exposed to wave action than areas further to the south. The area immediately behind the recently constructed defences is used as a boat park providing an important storage and service area to boats moored within Town Beach. To the northern end of the bay is the main northern coastal road and this has been lost and reinstated in the past and is now defended.

The nature of the new defences along the central section of the beach is unlikely to be sufficiently robust to resist future pressure. Although constructed in an appropriate manner to minimise the visual impacts, the defence allows no width for change in the beach for development of the backshore with sea level rise. Whilst accepting the importance of the boat yard and the services this provides to the wider area, it has to be recognised that over the longer term development along this line of defence will require significantly more investment and will tend to result in lowering of the beach.

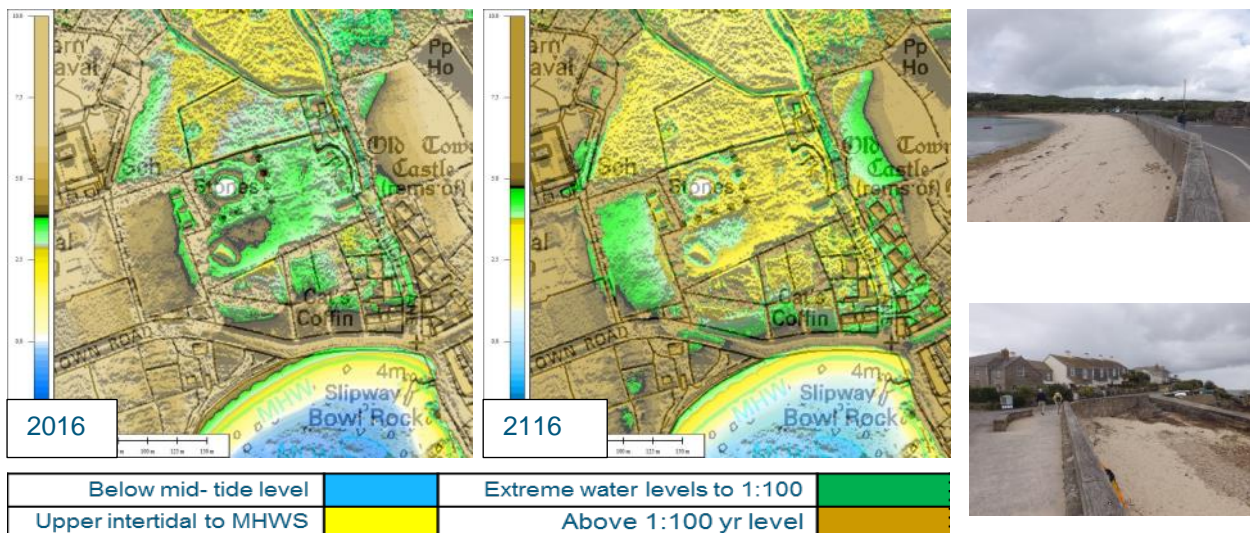
The SMP policy in the short term is for NAI recognising a more managed approach to backshore development in the future. It is understood that the recent works were principally along the line of less formal

defences. Even so, the fact that these defence works have been carried out does demonstrate that at the local level there is considered to be more value associated with the frontage than had been determined by the high level economic assessment undertaken in the SMP. This has to be acknowledged in this review. However the concerns and consequences expressed by the SMP still apply and it is still felt that any further future plans for the area take into account the caution contained within the SMP. In particular:

- Future management of the area should consider the long term pressure on the frontage and consideration should be given to setting back the defence line to increase the width and opportunity for more appropriate management of the risk. This might well still include protection to the boat yard but in such a manner as to allow the beach to be maintained. This should be discussed at the earliest opportunity with all parties involved so that possible development of the land use does not constrain future opportunities for more sustainable management of defences.
- With respect to the road to the northern end of the bay, this should be considered as part of discussion over management of the boat yard area. The road is considered an important part of the infrastructure, although there may be alternative access routes. There may be opportunities for realigning the road and these need to be considered in relation to management of the whole frontage.
- Further investigation should be undertaken to establish the degree to which overtopping might give rise to significant flooding of the wider hinterland. This approach would assist in developing long term plans for the area.

To the south, the defence of Lower Moor is provided by the sea wall to the road at the back of Old Town Bay. The SMP identifies this as one of the most vulnerable sections of defence around the island, with extreme pressure on the frontage with sea level rise.

At present, as shown below, there is a reasonable width or ridge along which runs the main road through the village, linking between the airport and Hugh Town. The area of Lower Moor, immediately behind the ridge is generally at a level less than of the T100 extreme water level, with some properties at risk along Trench Lane under this typical return period event. Indeed, during severe overtopping events these properties are now at risk from flooding. In the future (in 100 years), the immediate area of Lower Moor is below the level of normal spring tides, increasing the area of the Moor potentially at risk from saline seepage and potential inundation in the event of a breach of the coastal ridge.



Comparison of ground levels in relation to water levels for 2016 and 2116 with respect to Old Town Bay

This poses major issues with respect to long term management, with the SMP questioning the viability and sustainability of maintaining defences along this frontage in the future:

- Attempting to hold the existing defence would require major increase in the height of the defences and increased strengthening of the wall, increasing the likelihood of significant beach lowering, significant impact on amenity and landscape and running an increasing risk of sudden and catastrophic failure of defences should design standards be exceeded with little subsequent opportunity for adaptation.
- Against this, moving to a policy of managed realignment of the defence would need further study with respect to change in the nature of the southern Lower Moor area, with more detailed examination and discussion of potential influence and implications for management of the Lower Moor area as a whole.
- This broader investigation would need further examination of other uses and values associated with Lower Moor including: the impact on water supplies linked to a broader study of future water requirements for the island, the impact on existing habitat and the potential opportunities for change to management accepting a more sustainable systems based approach to management and the implications with respect to the industrial use and the Waste Management Site, all of which this in with the need for a review of critical infrastructure around the island.
- Associated with this would be the need to review the transport network affected by MR

Quite clearly, the policy shift to MR in epoch 2 could have major impact of many broad scale aspects of planning for the island as a whole. As recommended by the SMP, these need to be considered well in advance of making future decisions for the frontage or being forced to make decisions following a major storm event.

Alongside such broader scale issues there are local issues that need to be addressed including:

- MR would impact on properties within the area. The risks associated with this including the current trend of increased risk need to be discussed with the local community, involving members of the community in longer term planning.
- There is an existing risk of flooding of the road and along Trench Lane, with the potential for flooding due to wave action along Old Town Road. Emergency planning is required to address this and any more immediate plans to improve the current situation need to be set within the context of longer term plans for management of the whole area.

It may be seen that this PAI42.b raises several important strategic issues relating to the whole area of Lower Moor as well as more local issues affecting communities and businesses with respect to individual frontages. A key element of the Action Plan developing from the SMP review is the involvement and establishment of management groups capable of inputting to the broad scale development of a plan for the whole area. This needs to be supported by a strategic review of critical infrastructure, taking account of the above discussions.

Developing from this there is a need for local management plans to be developed with respect to individual areas.

This whole process will necessarily be iterative and should be seen as establishing an underlying structure of communication, discussion and involvement that will support decision making into the future. In many aspects, as with other areas of the island, there is a need for better information on water levels and wave climate both in relation to existing conditions and in setting up a monitoring baseline examining the rate of changes actually occurring in relation to sea level and the response of the shoreline.

Policy Unit 44.12

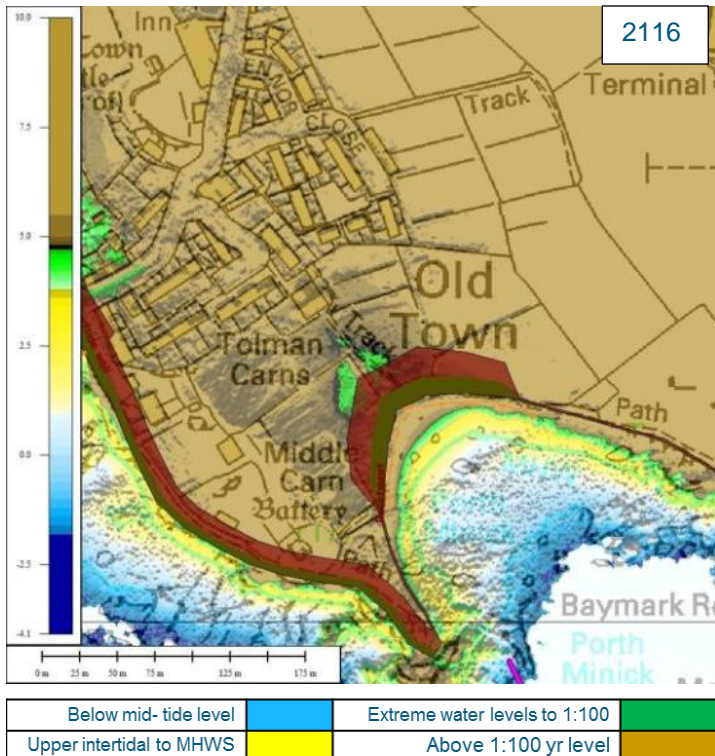
Locally there is concern, following flooding during 2012 and 2014, as to the potential extent of flood risk to Old Town as a result of overtopping or of breach in the semi natural defences to the back of Porth Minick.

The SMP policy for the area changes from one of HTL in epoch 1 to one of MR in epochs 2 and 3.

As part of this review, new Lidar information has been used to assess this risk as shown in the following image, based on ground levels in relation to projected water levels for 2116. While the estimated potential erosion lines over the next 100 years show that the impact of erosion would cut back well within the valley, the actual flood extent is unlikely to affect properties to Old Town. At present ground levels within the valley are above the T100 still water level.

The fact that flooding has been recorded in the past seems to confirm the suggestion in the SMP that flooding is likely to be a result of wave overtopping with the valley acting as flood storage potentially at a higher level than still water level. The typical level of the backshore is around 7m OD, while ground levels around properties within Old Town are around 6m OD and above. The T500 water level estimated with sea level rise in year 100 is around 4.8m. The flood risk issue might be resolved more effectively through allowing reduced crest level to develop and ensuring good drainage rather than maintaining a forward ridge that retains overtopping water level.

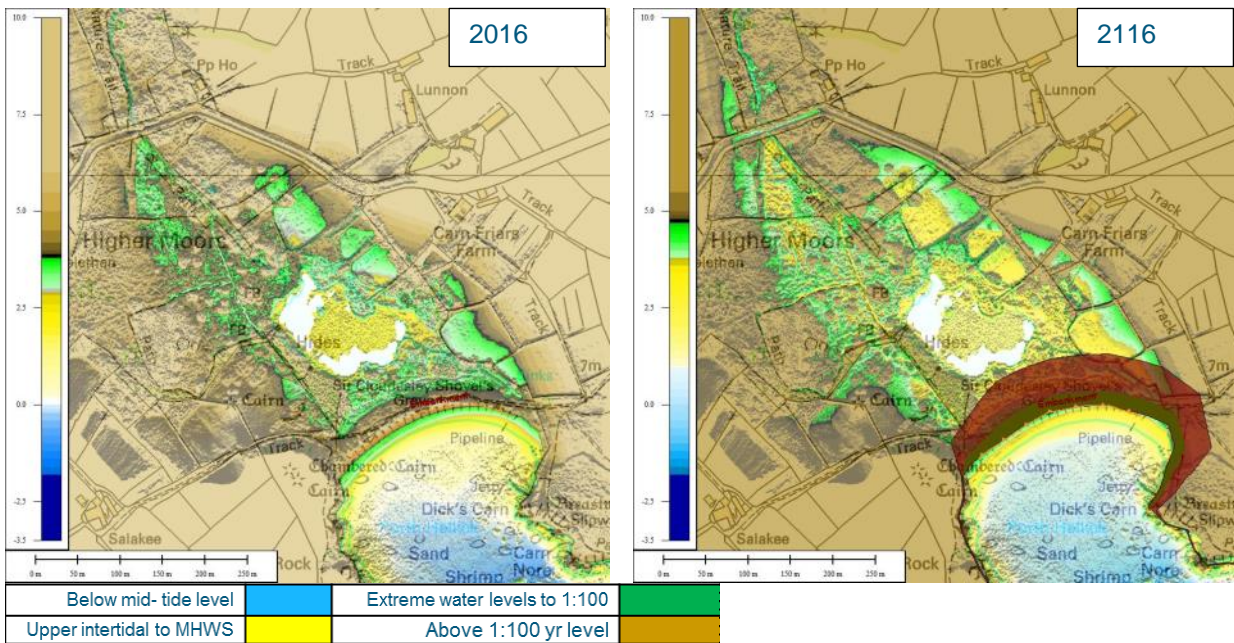
The review, therefore, concludes that MR is still seen as being the most appropriate policy, possibly even advancing this policy in to epoch 1 subject to further detailed confirmation of ground levels and overtopping. In discussion with land owners, this site might provide the opportunity to create a valuable demonstration site, in restoring the natural function of a bay.



Ground levels in relation to water levels for 2116

Although separated physically from the other main freshwater supply to the island, there are obviously links in term of long term management of High Moor in relation to the issues posed by management of Lower Moor. An area around the fringe of the moor potentially offers a suitable site for a desalination plant in 20 to 30 years' time. Clearly the selection of such a site needs to consider the potential flood risk and the SMP policy for managed realignment moving towards allowing the natural development of the bay over the longer term.

As with Lower Moor, the valley of High Moor is of important ecological status and present and future flood risk needs take this in to consideration.



Comparison of ground levels in relation to water levels for 2016 and 2116

The image above shows the ground levels within the valley for both present day and 2116. The back shore of Porth Hellick comprises a natural sand/ grit ridge that appears to function in part in a similar manner to a more normal shingle backshore storm ridge. The back face of the ridge appears to have benefited from past over-wash of sediment, providing a good volume of sediment and reliance to back face wash out potentially allowing further natural adaptation.

The most vulnerable section of the natural defence is at the eastern end of the bay and this area may require further attention in the future to ensure the overall integrity of the defence.

At present and as a general principle, management should attempt to work with the natural process of change in the beach and profile. It is recommended that a more detailed assessment is made of the present day stability of the ridge and that a better assessment is made of the standard of protection this ridge provides.

Moving forward from this, discussions should be held with interested parties as to the longer term impact of potentially increased overtopping and flooding, with the intention to allow the moor to adapt more naturally to change.

A revised action plan for St Mary's has been developed as a result of this mid-term review of the SMP. This is presented below.

ACTIONS:

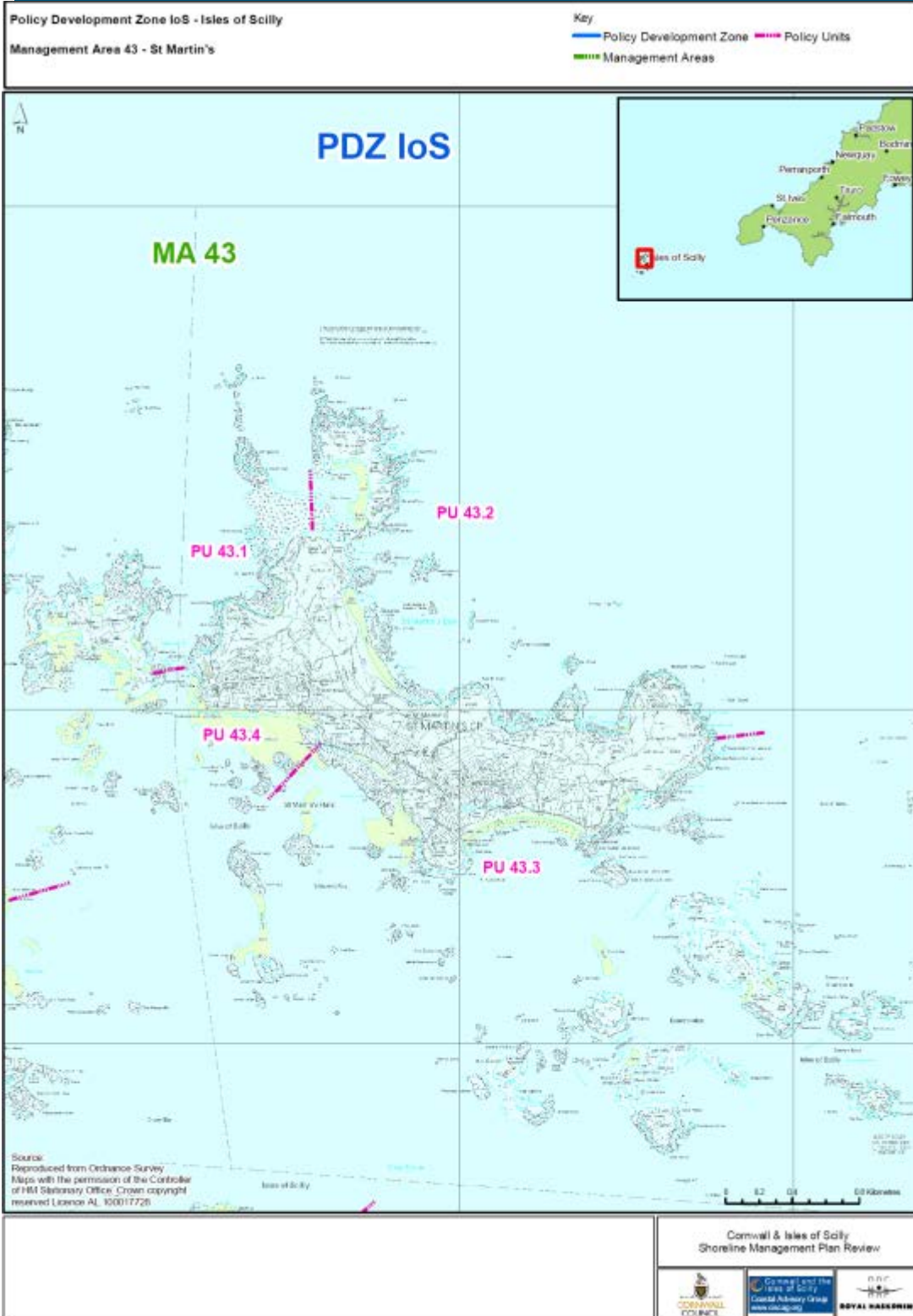
No.	Type	Owner	Action	Partners	Programme
42/MON1/ pco	Monitoring	PCO	Ensure that adequate baseline information is in place to allow on-going long term monitoring of erosion and beach behaviour and sea level rise. Review areas as identified in the discussion within this review and ensure that adequate coverage is maintained of critical beaches. Monitoring should include, where appropriate the profile of backshore ridges and dunes.	IoSc EA	2016 On going
42/INV1/IoSc	Awareness	IoSc	Organise an initial public meeting to highlight and raise awareness of issues posed by the recommendations of the SMP in relation to all areas covered by the review. Based around the outcomes of this meeting identify and confirm where more select groups are established to examine and discuss issues in more detail.	Community, Businesses NE, Duchy, EA	2016
42/INV2/IoSc PIA 42.a	Involvement	IoSc	Organise an initial focussed meeting to highlight and discuss issues in relation to local management and potential opportunities for management of the two main coastal frontages to Hugh Town. Agree the structure for future communication and involvement of the community.	Hugh Town Community, Businesses, NE, Duchy, EA	2016
42/INV3/IoSc PIA 42.a	Agreement	IoSc	Discuss and establish agreement over the approach taken to management of individual private defences with respect to the two Hugh Town frontages.	EA	2016
42/INV4/IoSc PIA 42.b	Involvement	IoSc	Organise an initial focussed meeting to highlight and discuss issues in relation to local management and potential opportunities for management of Lower Moor area. Agree the structure for future communication and involvement of the community and establish local management groups to function under a wider communication and development group.	Community representatives of Porth Mellon, Old Town and Porthloo, Businesses, NE, Duchy, EA	2017
42/INV5/IoSc PU42.7	Management planning	IoSc	Initiate a meeting to discuss and agree objectives and potential future management of defences of the shoreline at Porth Loo.	Community representatives, Businesses, NE, Duchy, EA	2017
42/INV6/IoSc PU42.15	Management planning	IoSc	Initiate a meeting to discuss and agree objectives and potential future management of defences of the shoreline at Old Town.	Community representatives, highways, Businesses, NE, Duchy, EA	2017

42/INV7/loSc PU42.15	Management planning	loSc	Initiate a meeting to discuss and agree objectives and potential future management of defences of the shoreline at Porth Mellon.	Community representatives, highways, Businesses, NE, Duchy, EA	2017
42/Rst1/loSc PU42.12	Adaptation planning	loSc	Initiate a meeting to discuss and examine potential opportunities for MR and future management at Porth Minick, developing and undertaking critical assessment of flood risk and management.	Land owners, Community representatives, NE, EA	2017
42/INV8/loSc PU42.10	Adaptation planning	loSc	Initiate a meeting to discuss and examine potential opportunities for MR and future management at Porth Hellick.	Land owners, Community representatives, NE, EA	2017
42/Gst/loS	Strategic	loS	Undertake a strategic review of critical infrastructure and needs	As required	2016
42/Rst3/loSc	Data	loSc	Gain agreement and funding for water level and wave monitoring around the islands	EA, PCO	2016 on going
42/Rst4/loSc	Risk assessment studies	loSc	Undertake more detailed overtopping and flood risk assessments to inform management planning at: Porth Loo – overtopping study to inform strategic risk. Porth Mellon – assess present and future risk to southern area. Old Town – assess present and future flood risk Porth Hellick – assess present and developing standard of protection to High Moor.	EA	2017
42/Rst5/loSc PU42.3 and 4	Risk management study	loSc	Develop risk management plan and outline business case for investment	EA, Local community and business community, Duchy, NE	2018
42/Rst6/loSc PU42.5	Risk management study	loSc	Develop risk management plan and outline business case for potential investment	EA, Local community and business community, Duchy, NE	2020
42/Rst7/loSc PU42.15	Risk management study	loSc	Develop risk management plan and outline business case for potential investment	EA, Local community and business community, Duchy, NE	2020

MA 43

St Martin's

Location reference:	St Martin's
Management Area Reference:	MA 43
Policy Development Zone:	PDZ18



DELIVERY OF THE PLAN
SUMMARY OF SPECIFIC POLICIES

Policy Unit		SMP1 Policy	SMP2 Policy Plan			Comment
		50 yrs	2025	2055	2105	
43.1	Tean Sound	Do nothing	NAI	NAI	NAI	Very little risk identified. Low rates of shoreline recession likely.
43.2	St Martins Bay	Do nothing	NAI	NAI	NAI	Little risk identified other than to footpaths in St Martin's Bay area.
43.3	St Martin's Flats	Do nothing	NAI	NAI	NAI	Higher rates of erosion likely along this frontage, particularly around Cruther's Hill where a possible 60m of recession could be experienced by 2105. NAI would satisfy objectives relating to the AONB and Heritage Coast designations. Coastal tracks and footpaths at risk and will require re-routing.
43.4	Middle Town	Do nothing	NAI	NAI	NAI	No active intervention is the preferred ongoing policy. Would satisfy objectives relating to the AONB and Heritage Coast designations.
Key: HTL - Hold the Line, A - Advance the Line, NAI – No Active Intervention MR – Managed Realignment						

PREFERRED POLICY TO IMPLEMENT PLAN:

From present day	NAI along entire frontage. Monitor condition of historic suites at Cruther's Hill.
Medium term	NAI along entire frontage. Monitor condition of historic suites at Cruther's Hill.
Long term	NAI along entire frontage. Monitor condition of historic suites at Cruther's Hill.

GENERAL DISCUSSION AND APPROACH TO THE MID TERM REVIEW
GENERAL DISCUSSION AND APPROACH

St Martin's is one of the least developed of the five inhabited islands being covered in detail by the SMP and much of it is managed by the Isles of Scilly Wildlife Trust.

There are few formal defences to the generally steeply rising land and little interaction between sections of the shoreline. The SMP policy covered under the four policy units on the island is for continued NAI. There is, however, the important area of the Higher Town Quay and associated local defences related to the access to the Quay. To the south and west of the island there is a small area currently shown as being below the level of the 1:100 year extreme water level, between Lower and Middle Town. However this area, used as a camping ground is some distance behind the shoreline with higher ground between it and the coast.

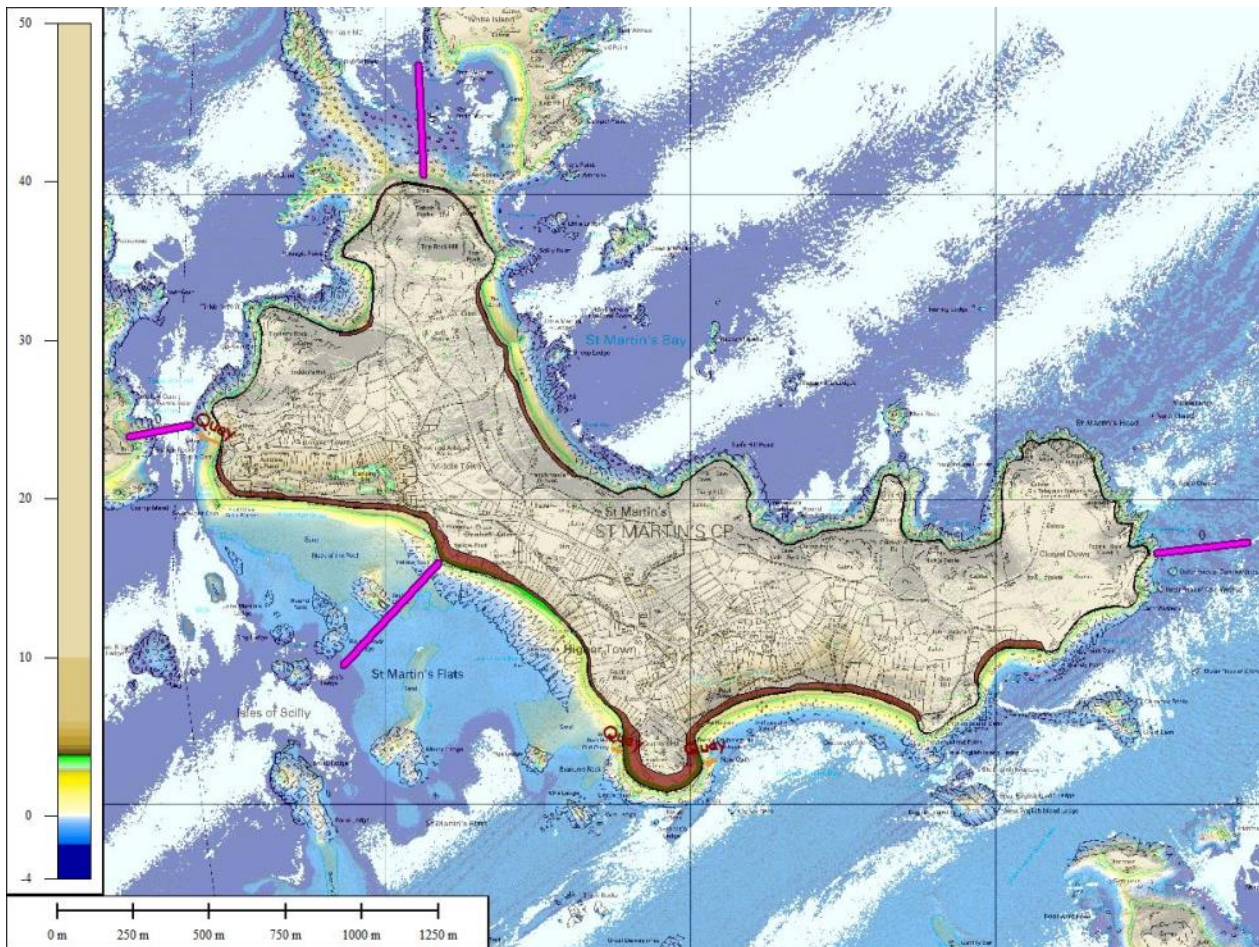
The main issues raised in the mid term review are relation to maintaining access to the island and the application of local management with respect to the high level policy of NAI. This issue is discussed in relation to Policy Unit 43.3 but aims to develop this in terms of the other policy units around the island.

SMP intent

The overall intent of the policies within the SMP for St Martin's are to maintain and allow enhancement of the natural environmental landscape. As such the SMP2 aims to continue the policy developed in SMP1 of NAI. While this provides the main aspect of management, locally it is important to support the continued habitation of the island where this can be achieved in a sustainable manner without disrupting natural process.

In this, the SMP has attempted to draw out key aspects of coastal behaviour to help inform future local management decisions. In this way the SMP should be seen as defining overall policy at a high level, while providing guidance with respect to local issue of management.

As part of this guidance the SMP provides important information with respect to flood issues and anticipated rates of erosion. This is shown in the following map of St Martin's, highlighting the anticipated range of coastal change that might be expected over the next 50 and 100 years.



General Information Provided in the SMP

This is considered in more detail with respect to Policy Unit 43.3 below as part of the review.

REVIEW AND APPLICATION

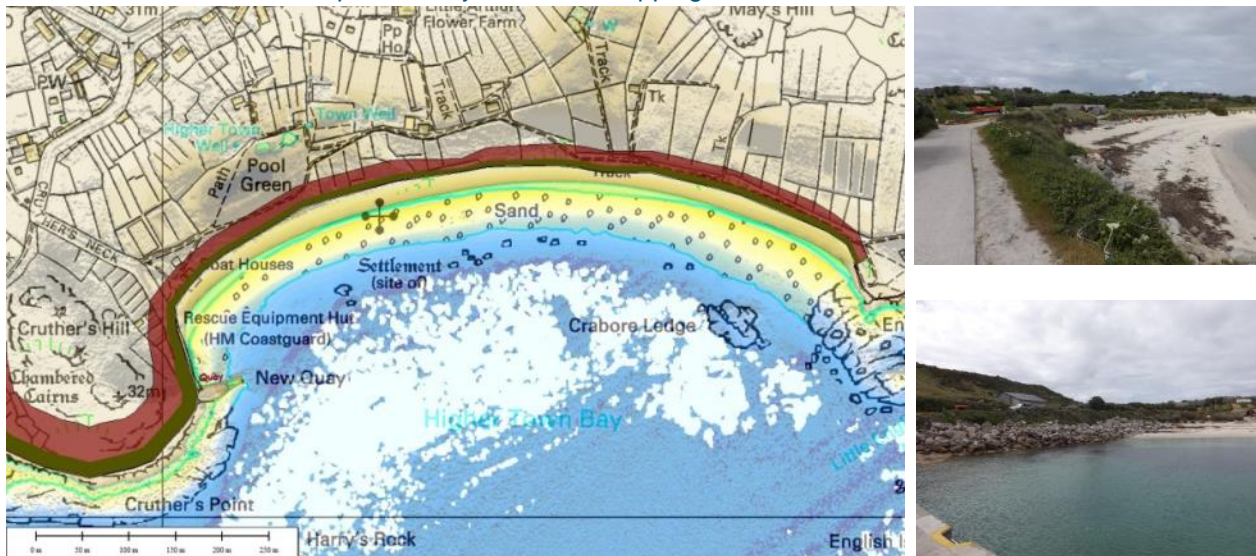
Policy Unit 43.3

The unit comprises a long curved bay, with a good beach backed by a low dune over much of the frontage. The dune line has suffered slight erosion with cliffing of the dune face. While it would be anticipated that there would be variation of erosion and local toe accretion the general long trend will be one of retreat as highlighted in the map below.

The natural beach plan runs into the protected cliff line running out in the lee of Higher Town Quay. This rock rip rap revetment behind the Quay acts to protect the access road to



the Quay as well as protecting some limited number of properties. The crest of the bank behind the rock has suffered minor erosion, presumably due to overtopping.



Local Plan and Images of the western corner of PU43.3

Slightly beyond the revetment there is some local defence to a beach access and slipway.

At present the Quay and these areas of protection do not constrain the natural development of the dunes, while providing an essential access to the island. In the longer term, with sea level rise, the dune will cut back potentially some 8m over the next 50 years and potentially some 25m over the 100 year period. It will be important that this continues to be monitored to better define such rates.

As this cut back occurs there will be little impact on the main revetment length (notwithstanding the increased water levels and potential for higher wave energy) apart from at its eastern end, where there is less protection from the quay itself. Maintaining the revetment and reinforcing its crest will have little impact on the natural landscape. While any works undertaken would have to be approved in the normal manner, fundamentally works to maintain the quay and access road would not be in conflict with the overall intent of the SMP.

At the eastern end of the revetment, however, there may be pressure to extend the length of revetment to prevent outflanking. This starts to impose more upon the natural processes and runs the risk of establishing a principle of acceptance that the revetment might continue to be extended further in the future. This then becomes a creeping incursion gradually taking more and more resource and impinging to an ever increasing extent on the landscape. The pressure for this becomes particularly acute following severe storm damage and this needs to be planned for in advance.

The presence of the local protection equally starts developing an attitude of the need for continued defence and again runs the risk of being extended along the natural dune frontage.

These issues have to be considered in taking forward management of the area, examining first the need for further defence in a critical manner and then adapting approaches that minimise this incursion.

While it goes beyond the scope of this review to define specific approaches to defence at this scale, it is considered that, in this area, there may be scope for adapting the shape of the local area of defence such that it allows for transition between the defence and the natural dune to the east, while also providing additional support to management of the natural frontage through to the eastern end of the main revetment.

Open



In this way the aims and intent of the SMP may be maintained while locally addressing the local needs of the island.

ACTIONS:

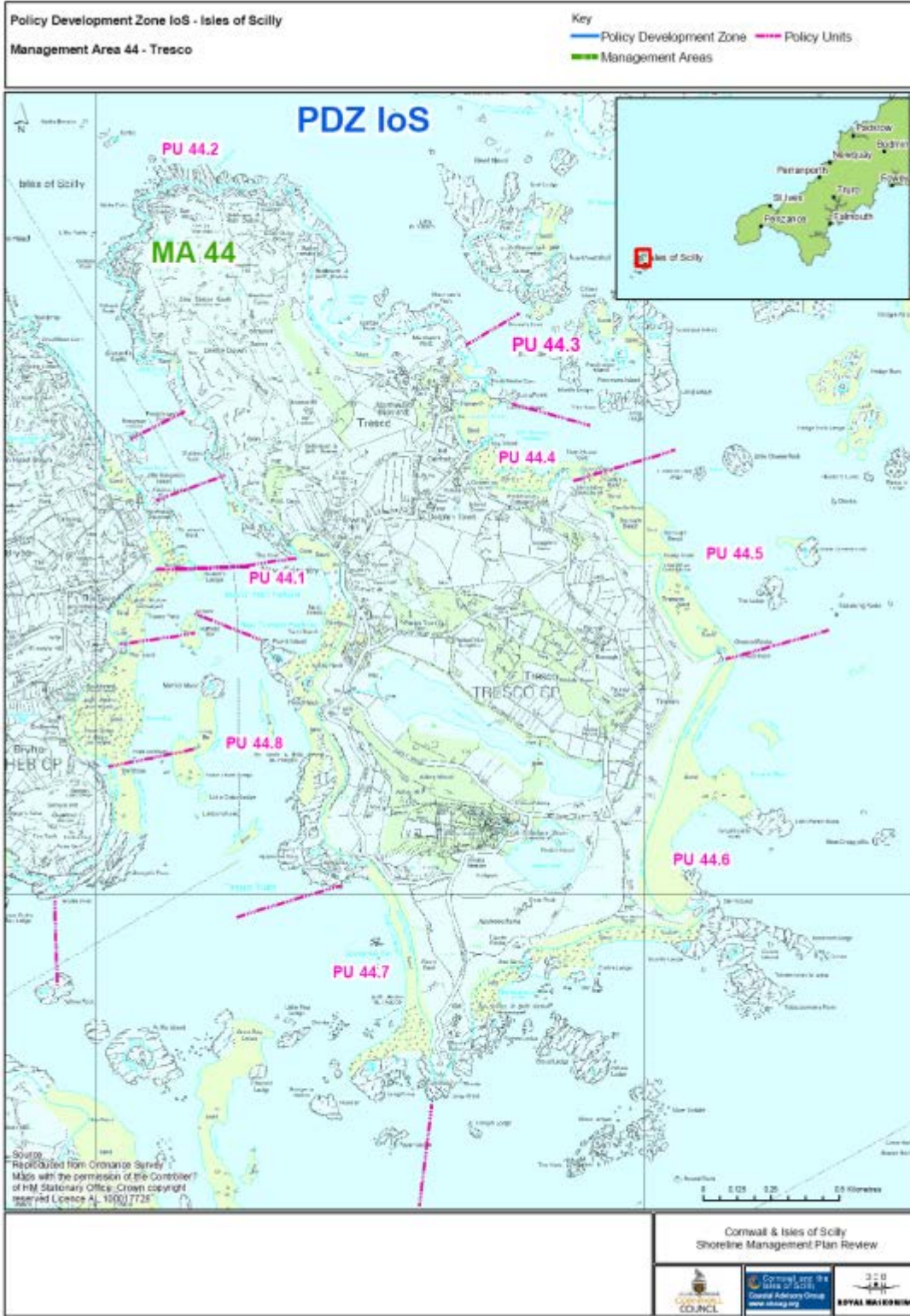
No.	Type	Owner	Action	Partners	Programme
43/MON1/ pco	Monitoring	PCO	Ensure that adequate baseline information is in place to allow on-going long term monitoring of erosion and beach behaviour and sea level rise	IoSc EA	2016 On going
43/INV1/IoSc 43.3 a	Agreement	IoSc	Initiate a discussion of future management needs with respect to future local action within this NAI Policy Unit. Agree in principle potential actions.	Community, NE, Duchy, EA, Isles of Scilly Wildlife Trust	2016



MA 44

Tresco

Location Reference:	Tresco
Management Area Reference:	MA 44
Policy Development Zone:	PDZ18



DELIVERY OF THE PLAN

SUMMARY OF SPECIFIC POLICIES

Policy Unit		SMP1 Policy	SMP2 Policy Plan			Comment
		50 yrs	2025	2055	2105	
44.1	New Grimsby	Hold the line	HTL	HTL	HTL	Current shoreline position is likely to be technically sustainable into the longer term, although some coastal squeeze pressures may develop.
44.2	Castle Down	Do nothing	NAI	NAI	NAI	Would satisfy objectives relating to the AONB and SPA / SAC designations.
44.3	Ravens Porth (formerly referred to as Island Hotel)	Hold the line	HTL	HTL	MR	. This more exposed frontage may require some realignment in the longer term. (note this policy unit boundary has been amended and extended to include Ravens Porth)
44.4	Green Porth (formerly referred to as Old Grimsby)	Do nothing	NAI	NAI	NAI	Would satisfy objectives relating to the AONB. (note the policy boundary has been amended to include just the dune backed beach of Green Porth)
44.5	Rushy Point	Do nothing	NAI	NAI	NAI	Would satisfy objectives relating to the AONB
44.6	South Beach / Pentle Bay	Advance the line	NAI	NAI	NAI	Would satisfy objectives relating to the AONB and SPA / SAC designations.
44.7	Appletree Bay	Advance the line	NAI	NAI	NAI	Would satisfy objectives relating to the AONB
44.8	Tresco Flats	Retreat the line	NAI	NAI	NAI	No active intervention is the preferred ongoing policy. Would satisfy objectives relating to the AONB
Key: HTL - Hold the Line, A - Advance the Line, NAI – No Active Intervention MR – Managed Realignment						

PREFERRED POLICY TO IMPLEMENT PLAN:

From present day	HTL at New Grimsby. HTL at Island Hotel. NAI along the remainder of the Tresco frontage.
Medium term	HTL at New Grimsby. HTL at Island Hotel. NAI along the remainder of the Tresco frontage.
Long term	HTL at New Grimsby. MR at Island Hotel. NAI along the remainder of the Tresco frontage.

GENERAL DISCUSSION AND APPROACH TO THE MID TERM REVIEW

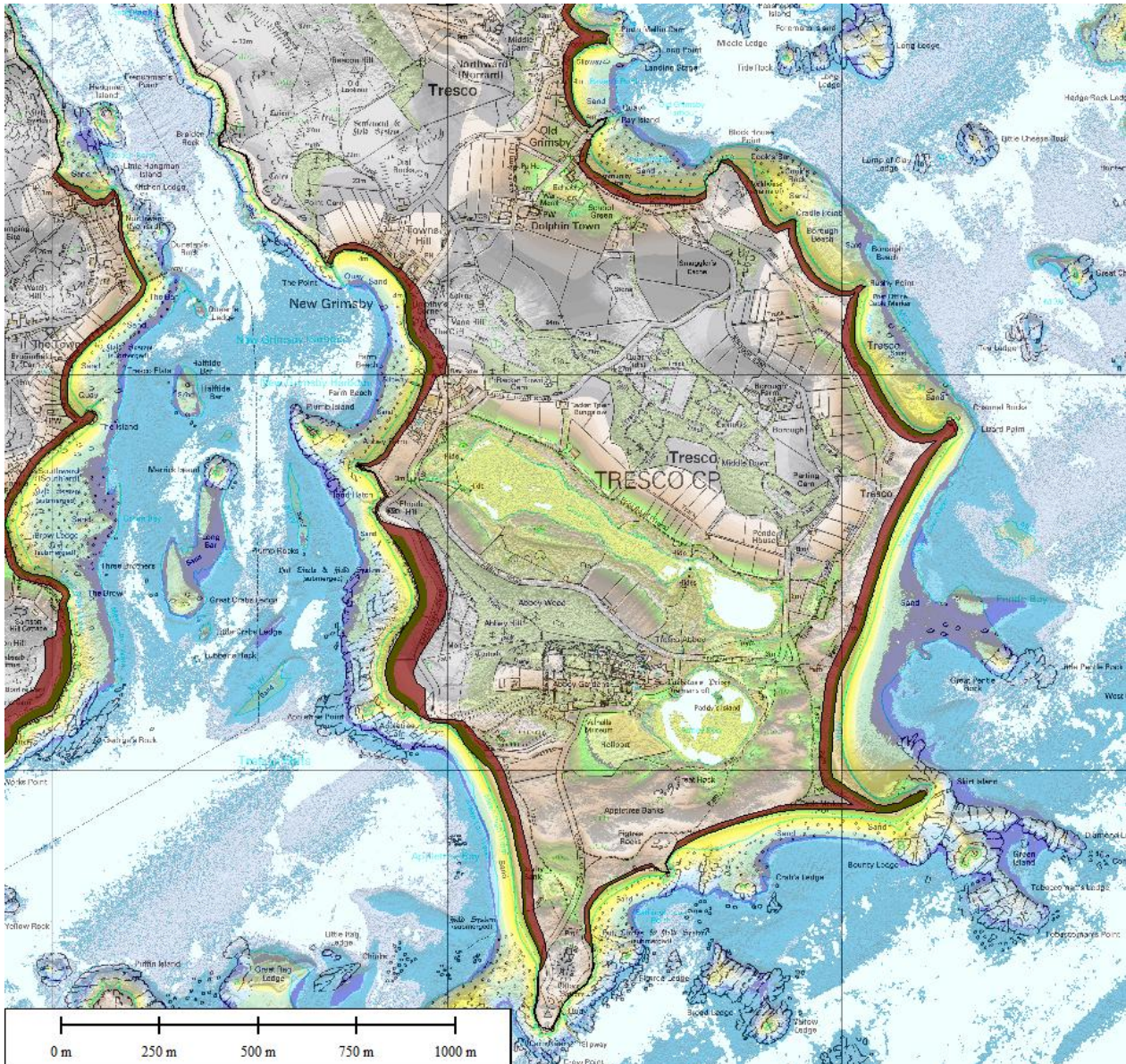
GENERAL DISCUSSION AND APPROACH

As discussed in the introduction a slightly different approach has been taken to the SMP review of the Isles of Scilly. Each island has been considered in the SMP as an individual Management Area. However, it is recognised that within each island there can, in some locations, be greater connectivity across sections of an island in terms of use and impact, effectively linking Policy Units that are not necessarily contiguous. This has become more apparent during discussions over the site visit in understanding and taking forward actions and intent developed from the SMP.

Without wishing to complicate or diverge from the consistency between SMPs, it has been felt necessary to group certain policy units within this review in order that the intent of management set out in the SMP is brought out more clearly. To avoid confusion with the previously defined higher level Management Areas or the more detailed Policy units, such clusters of Policy Units are referred to as Policy Intent Areas (PIAs).

In terms of applying this to Tresco, there is an obvious north south division within the island, with the northern section typically being harder elevated rock forming the island, the southern section comprising a large lower lying area of land including the Great Pool and the Abbey Pool and lower lying areas of the Appletree Banks.

The following image shows the baseline information provided by the SMP and highlights the discussion above. (Potential erosion zones are shaded in – dark green 2055 and brown 2115.)

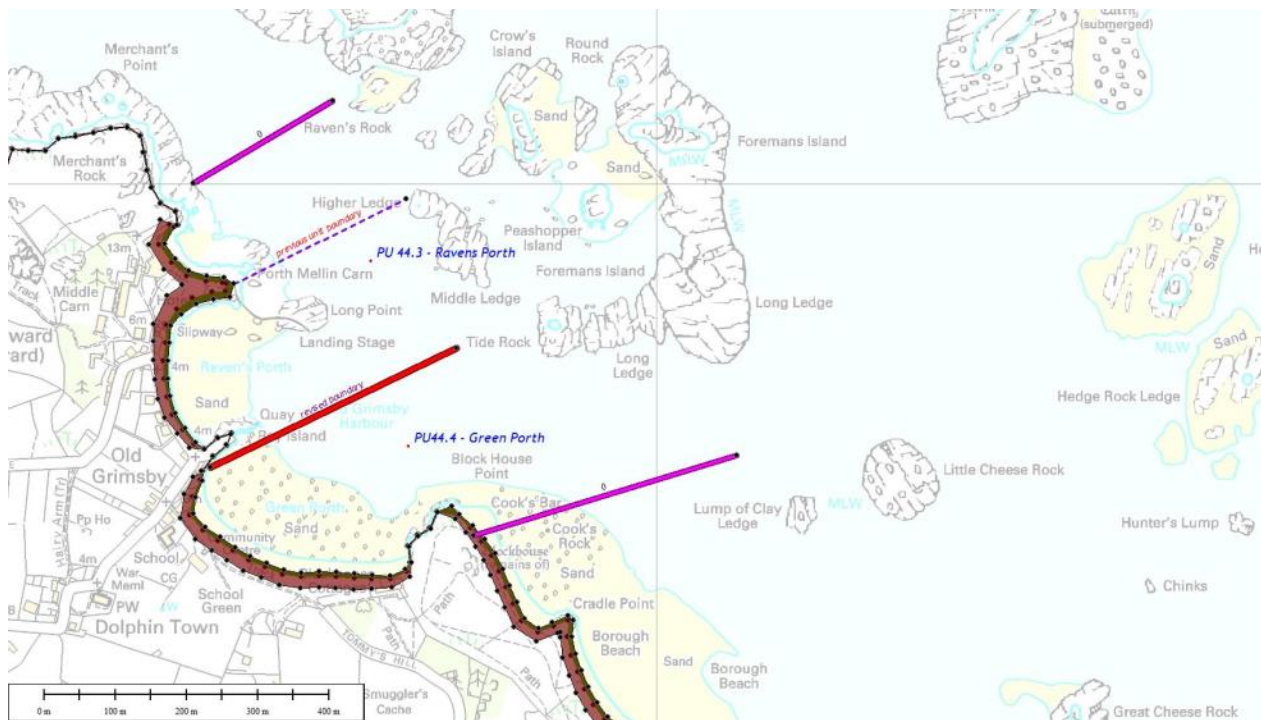


General Information Provided in the SMP

While policy unit 44.1 – New Grimsby spans across this division, this PU has a policy of HTL over all epochs with the intent to sustain the main development on the island and as such does not specifically feature within this review. Basically, this policy is still considered sensible and appropriate.

The southern section of the island including PU44.6, 7 and 8 all have SMP2 policies for NAI over all epochs, which is in specific definition different from the SMP1 policies. In reality, however, the intent remains the same. However, in discussion during the site visit concerns were raised over the possible way in which flooding might occur affecting the whole southern section of the island. In reviewing this, these Policy Units are gathered as **PIA44.a** recognising the potential inland interactions and dependencies.

On the eastern side of the island, following the site inspection it has been agreed that there should be some modification of policy unit boundaries to capture better the intent of the SMP2 in terms of the way in which policies are applied across PU44.3 and PU44.4. This change is shown in the following image and would be formalised following discussion within the review. With this in mind it is also considered sensible to include these two policy units within an Intent Area as **PIA44.b**.



Proposed change to Policy Unit boundaries.

SMP intent

The SMP recognises the important landscape value of the coastline of the island, highlighting that this is essential in sustaining enjoyment and visitor attraction. Maintaining this natural character underlies the approach taken by the SMP. Obviously, within this, it is important to support existing communities and the facilities provided by development, maintaining the use of the island.

Within this overall intent, therefore, the aim has been to prioritise maintaining, wherever possible, the natural evolution of the shoreline rather than imposing protection and intervention which would only lead to increased management in the face of sea level rise. This is best illustrated in relation to the many roads and tracks around the island, where in general the intent is to realign these rather than to take action to continue to defend such features. The aim of the SMP has been to provide information necessary to plan for such future realignment.

The importance of Old Grimsby and New Grimsby is, however, recognised. In the case of New Grimsby the SMP highlights the need to address the developing pressure on the coast. Within the policy of HTL there may be scope for future local realignment and the way in which defences are developed needs to consider these longer term pressures. With respect to Old Grimsby the intent of the SMP is to sustain the use and protection to the area but it highlights that over the longer term there will be the need for more significant adaptation. In particular, the SMP highlights the pressure on the coast around the Hotel and aims to highlight how this may be, to some degree, mitigated. Continued protection and more particularly maintaining the front line properties will become increasingly difficult and difficult decisions will be required, including the

possibility of relocation. It is essential that these long term issues are considered now rather than in response to a worsening situation.

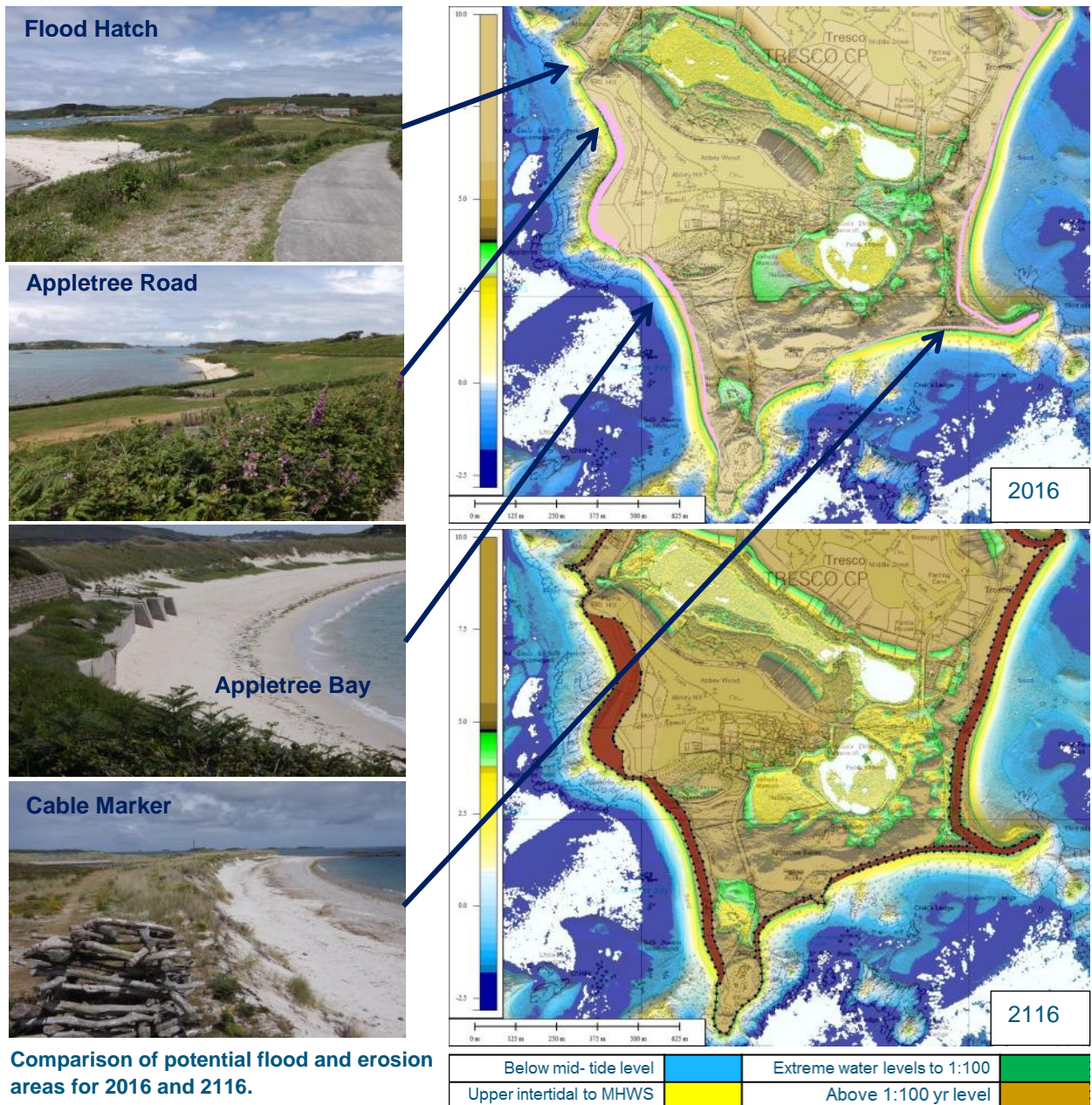
During the review of the SMP two other issues have been raised:

- Concern in relation to potential coastal flood and erosion vulnerability of road routes to the only low water quay for the island, which is at the south of the island.
- The potential impact of flooding from areas of erosion at the coast affecting larger areas of the hinterland of the island.

REVIEW AND APPLICATION

PAI 44.a Southern Area

The area is shown in the images below. The maps show ground levels relative to water levels for 2016 and in 2116. The plots also highlight the estimated erosion lines over the next 50 year (in the 2016 image as the pink area) and the 100 year erosion line (in the 2116 image as the dark red area).



Key areas subject to this review are shown on the above image and these are discussed below.

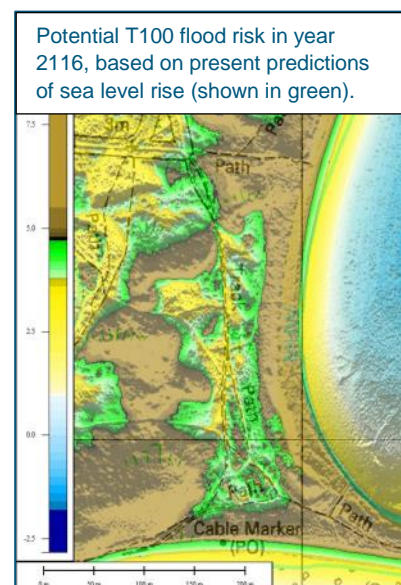
- There is concern that NAI may result in overtopping or breach through to the Great Pool from the Flood Hatch beach, potentially affecting the larger area. While this area is relatively narrow, there is not considered to be an immediate risk and the SMP projections of erosion would suggest no substantial risk in the future. It is noted that there is a sluice to the Great Pool at this location, although it is uncertain where this exits at the coast. It would be sensible to investigate this and assess any risk to any outfall for the future.
- The Appletree road is shown as being at potential risk in the long term. Under the SMP policy the road would require relocation. Erosion of this cliff line will require monitoring to better assess this risk and allow long term planning for the road.
- To the northern end of Appletree Bay there is a section of sea wall protecting the road. The wall is in generally poor condition and repair work has been undertaken. Under the SMP policy no further action would be taken to sustain this defence. The Lidar data would suggest that there is no substantial flood route. However, it was noted during the inspection that this area has particularly dense tree cover and this may distort the data, particularly at the eastern end of the obvious valley, linking through to the Abby Pool. This should be investigated further.

At present, the condition of the wall does not appear to pose an immediate risk to the road. The agreed SMP policy would support the relocation of the road rather than works being undertaken to substantially reinforce this structure. It is however, suggested that minor works if seen as being advisable in the short term would not counter to the SMP policy if these works were undertaken in a manner compatible with the nature of the existing defence. The intent of the SMP is to ensure the continuing natural function of the shoreline. At present there is no significant evidence that the wall has a broader influence on the shoreline. In the future the wall will be in advance of the natural shoreline and the intent would certainly be that this should not result in incremental extension of the defence to the south.

Subject to findings related to the possibly more extensive flood zone, it will be necessary to review how the road might be realigned to a more sustainable position.

- Further south along Appletree Bay, the dunes, as anticipated, show signs of erosion (although it appears that some recovery has taken place). The main track through to new all tide quay at Carn Near could eventually be affected. The intent would not be to defend the road. There is a need to develop a plan for realignment.
- Following the storms in 2014 the area, around the cable marker at the eastern end of Bathinghouse Porth, was subject to erosion; as was much of the cliffed dune frontage. While it is understood that the cable being marked is well beneath the surface there is concern that erosion in this area might open up flooding to the valley behind. Some minor works were undertaken to locally defend the marker. During the inspection, it was noted that some recovery of the dunes has occurred, with evidence of embryo dune development at the toe. Hardening the shoreline, even over a short distance in this area, is likely to impose a significant disruption to the naturally developing line of the dunes and cliffs, always with the risk that further works would be undertaken in the future, extending the need for defences to prevent outflanking.

Clearly there is a need to examine further the risk to the cable and to review the use and vulnerability of the wood storage and maintenance yard behind. However, in terms of more extensive flood risk it appears based on the Lidar data that, even in the future there is limited connectivity through to low lying areas

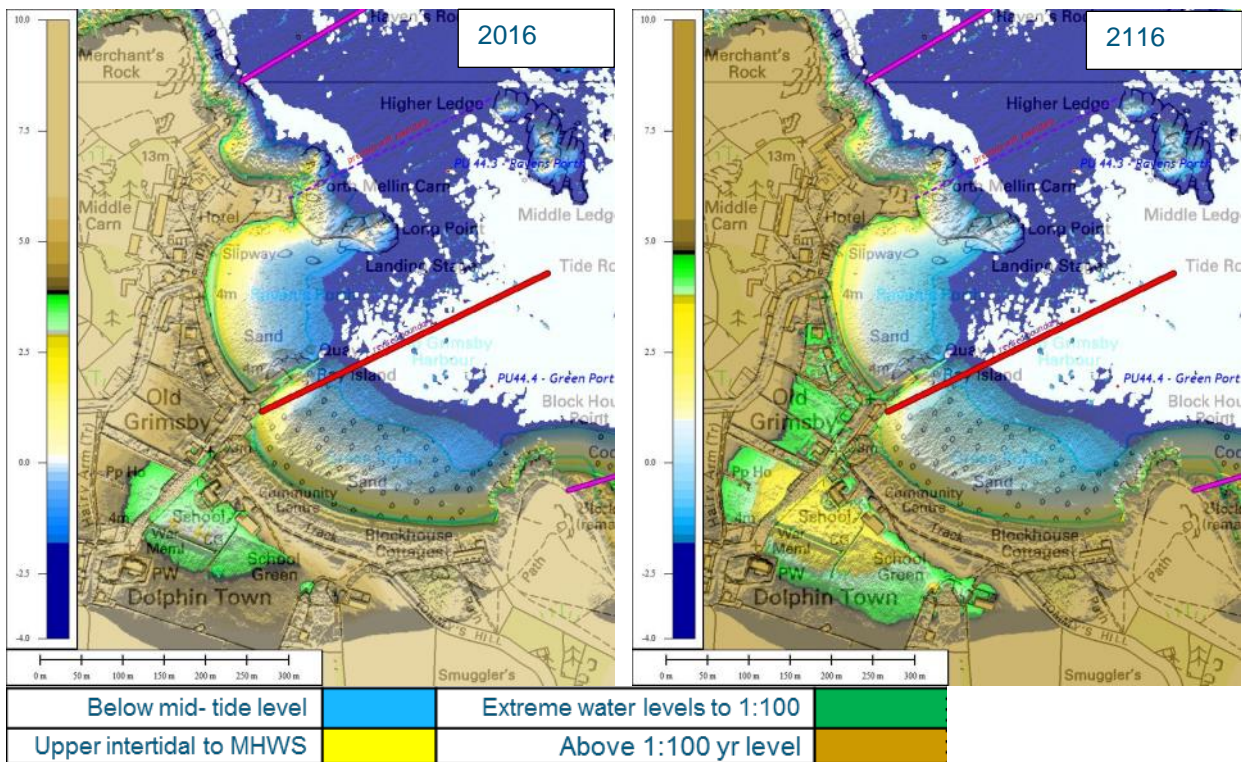


further to the north, as shown in the relevant image. Future risk could be managed by locally raising land levels at the critical point in the valley.

Maintaining the natural function of the dune system, as recommended by the SMP, is likely to provide adequate protection to the area.

PAI44 b

As explained earlier, it is proposed to amend the boundaries of PU44.3 and PU44.4. This is shown in the following image outlining and comparing the potential ground levels in relation to flood risk in 2016 and 2116. The policies for the two units remain the same in that in PU44.3 this recognises the importance of the hotel and property associated with the area but equally that with sea level rise there will be a need for adaptation (HTL epoch 1 and 2 and MR in epoch 3). With respect to PU44.4 the policy aims to maintain the wide and active dune system, providing protection to the area behind with a policy if NAI across all epochs.



Comparison of ground levels in relation to water levels for 2016 and 2116

It may be seen that the critical area of flood risk occurs around the southern part of Old Grimsby and the lower areas of Dolphin Town. In maintaining the naturally functioning dune system to the back of Green Porth, this provides a defence in to the future.

Addressing the issues of sea level rise and the potential for coastal squeeze and loss of beaches poses substantial risk within PU44.3 in the future.

At the same time, the area is highly valued for its natural quality of landscape.



In relation to the hotel, further development of the facilities has to a degree imposed further constraint on the natural development of the foreshore. The nature of the area suggests that there is adequate supply of sediment generally but the issue relates to the potential limited width of the upper beach and back shore to maintain beach levels.

Even at present, as seen from the photograph of the hotel frontage, an upper beach is only allowed to develop where the defence is slightly set back. Over the next fifty years this situation will deteriorate and it would only be where defences are no longer held or where the shoreline is allowed to erode back that an upper beach will be maintained. This needs to be considered within the long term planning and future development of the resort.



Further south within the bay, the situation is becoming more critical with limited width for adaptation. While properties in this area are above the T100 extreme water level at present, they are increasingly at risk due to wave overtopping.

At present there may be sufficient width over the crest of the defence to address such risk. In the future, with reduced beach levels and increased water levels overtopping will become increasingly frequent and more severe. Over the 100 year period still water level could exceed the level of defence over part of the frontage and overtopping is likely to affect significant areas around Dolphin Town.



ACTIONS:

No.	Type	Owner	Action	Partners	Programme
44/MON1/ pco	Monitoring	PCO	Ensure that adequate baseline information is in place to allow on-going long term monitoring of erosion and beach behaviour and sea level rise. Review areas as identified in this discussion within the review and ensure that adequate coverage is maintained of critical beaches. Monitoring should include, where appropriate the profile of backshore ridges and dunes.	IoSc EA	2016 On going
44/INV1/IoSc PIA 42.b	Agreement	IoSc	Agree proposed change in boundaries for PU44.3 and 44.4.	EA, Tresco Estate, Duchy,	2016
44/INV2/IoSc PAI44.a	Management planning	IoSc	Initiate a meeting to discuss and confirm objectives and aims set out in the SMP with respect to NAI and the potential approaches to realignment of various access routes and at cable land fall.	Tresco Estate, Duchy, NE, EA	2016
44/Rst1/Tresco Estate	Data	Tresco Estate	Undertake more detailed survey of potentially low lying valley at the northern end of Appletree Bay	POC?	2016
44/INV2/IoSc PAI44.b	Adaptation planning	IoSc	Initiate a meeting to raise awareness of issues and to promote discussion over future management	Tresco Estate, Duchy, NE, EA	2016



MA 45

Bryher

Location Reference:	Bryher
Management Area Reference:	MA 45
Policy Development Zone:	PDZ18

Policy Development Zone IoS - Isles of Scilly
Management Area 45 - Bryher

Key
— Policy Development Zone — Policy Units
— Management Areas



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Corwall & Isles of Scilly
Shoreline Management Plan Review



DELIVERY OF THE PLAN
SUMMARY OF SPECIFIC POLICIES

Policy Unit		SMP1 Policy	SMP2 Policy Plan			Comment
		50 yrs	2025	2055	2105	
45.1	Great Porth North	Hold the line	HTL	NAI (with localised HTL)	NAI (with localised HTL)	Holding the line in epoch 1 would allow monitoring of the rate (predicted up to 35m over 100 years) of shoreline recession.
45.2	Stinking Porth	Do nothing	NAI	NAI	NAI	No significant risks identified.
45.3	Gweal Hill	Do nothing	NAI	NAI	NAI	No significant risks identified.
45.4	Great Popplestones	Hold the line	HTL	NAI	NAI	Initial hold the line should monitor rate to test, but longer term aim would be to move to NAI.
45.5	Little Popplestones	Hold the line	NAI	NAI	NAI	. The preferred policy therefore would be NAI, which should satisfy objectives relating to the AONB
45.6	Popplestone Brow	Do nothing	NAI	NAI	NAI	No significant risks identified
45.7	Popplestone Brow to Hangman Island	Do nothing	NAI	NAI	NAI	No significant risks identified
45.8	Kitchen Porth	Do nothing	NAI	NAI	NAI	No significant risks identified
45.9	Post Office to the Bar	Do nothing	NAI	NAI	NAI	No significant risks identified
45.10	The Bar to the Quay	Do nothing	NAI	NAI	NAI	No significant risks identified
45.11	Southward	Do nothing	NAI	NAI	NAI	No significant risks identified
45.12	The Brow to Works Point	Do nothing	NAI	NAI	NAI	No significant risks identified
45.13	Works Point to Great Carn	Retreat the line	NAI	NAI	NAI	No significant risks identified

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

PREFERRED POLICY TO IMPLEMENT PLAN:

From present day	NAI along all undefended cliff and cove shorelines. HTL at Great Porth North and Great Popplestones.
Medium term	NAI along all undefended cliff and cove shorelines.
Long term	NAI along all undefended cliff and cove shorelines.

GENERAL DISCUSSION AND APPROACH TO THE MID TERM REVIEW

GENERAL DISCUSSION AND APPROACH

As discussed in the introduction a slightly different approach has been taken to the SMP review of the Isles of Scilly. Each island has been considered in the SMP as an individual Management Area. However, it is recognised that within each island there can, in some locations, be greater connectivity across sections of an island in terms of use and impact, effectively linking Policy Units that are not necessarily contiguous. This has become more apparent during discussions over the site visit in understanding and taking forward actions and intent developed from the SMP.

Without wishing to complicate or diverge from the consistency between SMPs, it has been felt necessary to group certain policy units within this review in order that the intent of management set out in the SMP is brought out more clearly. To avoid confusion with the previously defined higher level Management Areas or the more detailed Policy units, such clusters of Policy Units are referred to as Policy Intent Areas (PIAs).

In terms of Bryher there are two areas where this applies:

PIA45 a (PUs 45.1, 2, 4 and 5). These frontages, separated by the rock headland of Gweal Hill, each front the area of the Great Pool and potentially give rise to management issues relating to water supplies and protection to property at the rear of the Great Pool flood area.

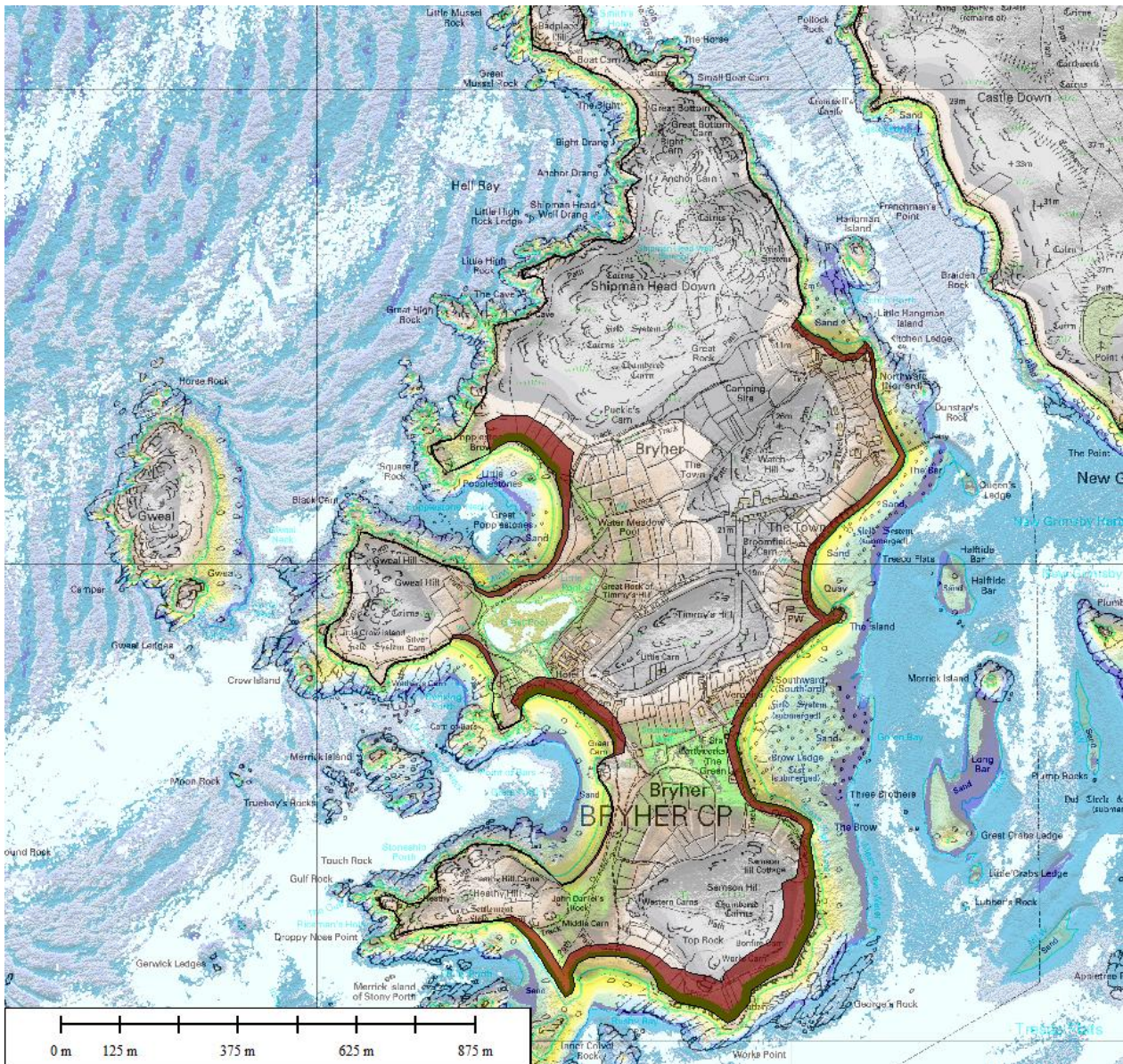
PIA45 b (PUs 45.1, 13 and 11). These frontages all give on to the area of the Green. While policy in each is for NAI, and in particular PU45.11 where there is greatest potential for flooding of the hinterland, there is the need to consider the potential future risks affecting the Green as a whole specifically the risk that the southern section of the island might be separated from the northern part of Bryher. Included within this area although as a separate issue is the management of the Quay.

SMP intent

The main settlement areas tend to be to higher ground and naturally protected. Locally, SMP policy is driven at least in part by the need to sustain assets such as the Hotel to the back of the Great Pool, which is considered as important for the economy of Bryher, and by fresh water supplies potentially affected by saline intrusion. However, in the majority, policy is steered by the need to maintain the essential natural character of the island and maintaining the natural function of the ecological system.

As such over the whole island, and generally continuing the policies of SMP1, the intent is to move towards allowing natural change to occur in the longer term. The review focusses principally, therefore, on how management might be developed to assist in moving towards this aim.

The image below provides an indication of the extent of coastal change that might be anticipated and how this relates to areas of use and the topography. (Potential erosion zones are shaded in – dark green 2055 and brown 2115.)



General Information Provided in the SMP

REVIEW AND APPLICATION

PAI45 a

The area focusses around the strategic management of the Great Pool and areas associated with the general lower lying areas around the Great Pool.

There is at present a fresh water abstraction and water treatment plant to the north of the low lying area. However, the Great Pool itself is understood to be brackish.

To the rear of the Great Pool is the Hotel development, with some properties to higher ground running to the south. There is a small cluster of properties to the small rock headland of Carn of Bars, which separates Stinking Porth from the larger bay of Great Porth to the south.



The northern frontage of the Great Pool area comprises Great Popplestones and Little Popplestones sections of the Popplestones bay.

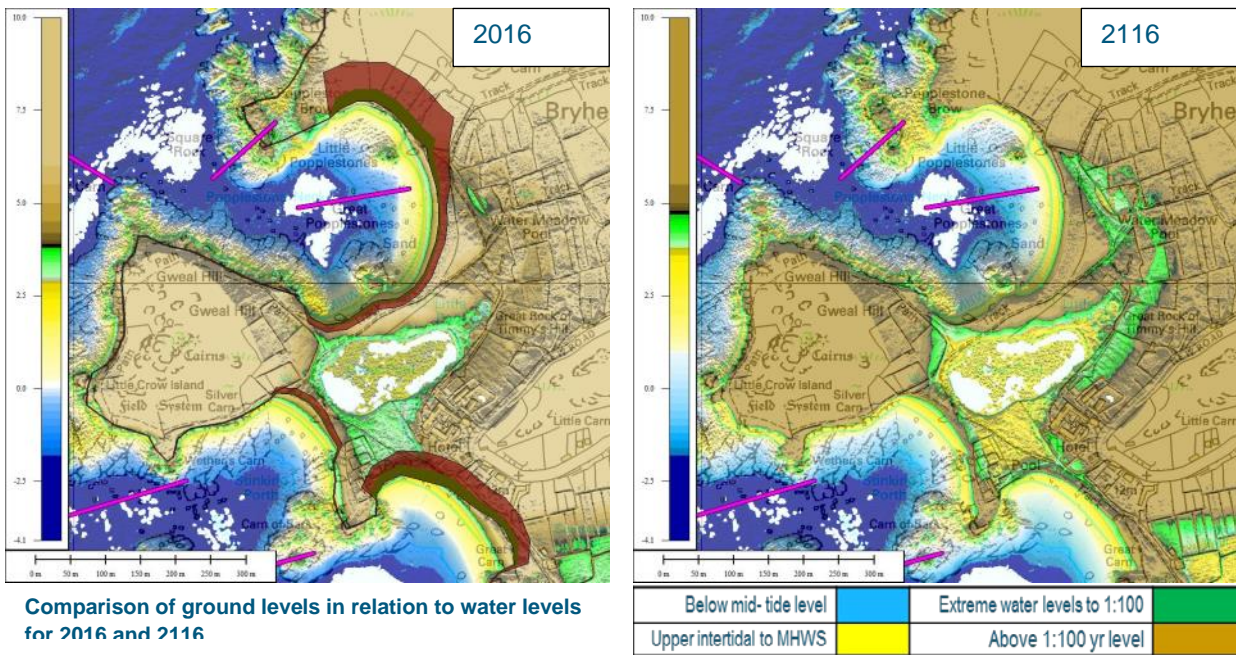
The southern sections, Great Porth and Stinking Porth are respectively protected by a rip rap reveted face to a natural rock bank and a rock bank and ridge.

To the north, Great Popplestones consists of a natural rock bank and ridge reinforced by rip rap and a masonry/concrete crest wall.

This gives way to the generally wider area of sand dunes along the Little Popplestones section, reverting to a natural stone facing, to an earth ridge behind, towards the north.



In term of actual flood and erosion risk, this is shown in the plots below showing ground levels relative water levels for 2016 and 2116.



It may be seen that at present there is little direct flood risk to the central area of the Great Pool. In the longer term there is possible risk, following inundation of the area, to properties on the Carn of Bars rock headland and the area just south of the hotel, where at present there is an electricity sub-station. It should however be noted that the area used at present from water treatment becomes a significantly greater risk in the future.

The overall intent of the SMP is to allow gradual change, allowing the area to develop naturally to a position where future management would be unnecessary. The key to this is seen as being through managing the natural and semi-natural defences to overtop without catastrophic failure. It is accepted within the SMP that

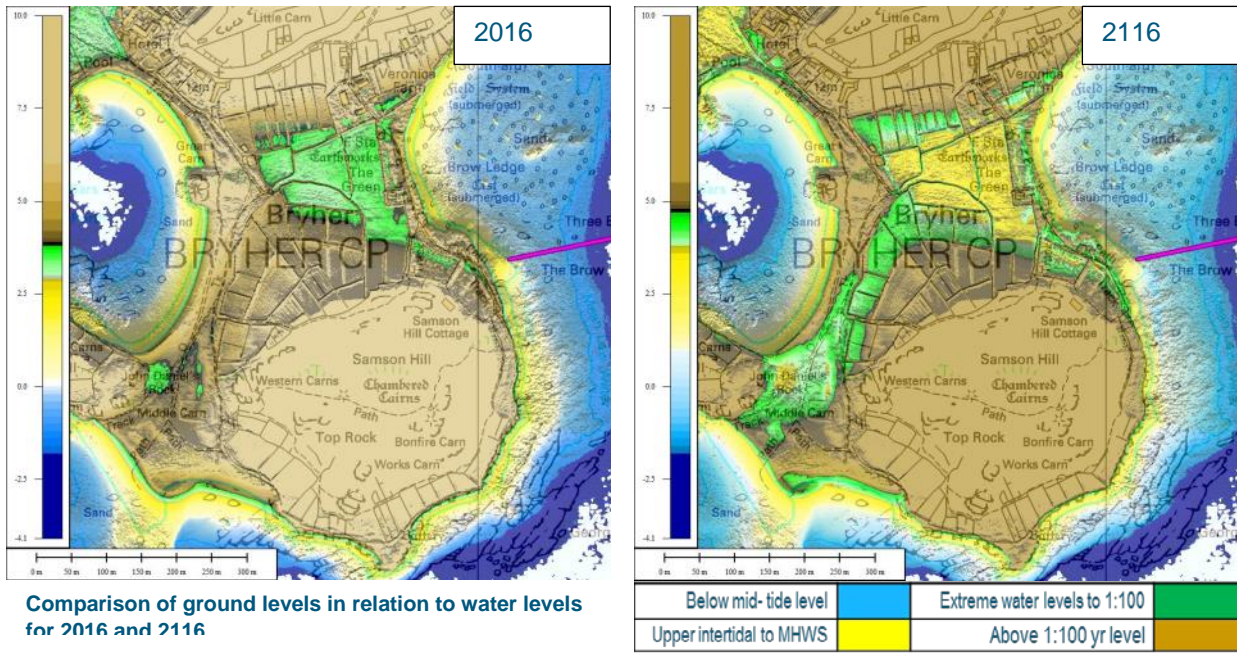
it may be necessary to continue to manage and possibly reinforce the revetment to the northern end of the Great Porth. This also maintains access to the properties of Carn of Bars. In other areas the essential element of management is to maintain the back slope integrity, allowing stones to move over the crest. To a degree this is the approach that has developed historically along the Great Popplestones frontage.

Essentially, in allowing increasing overtopping over time, there is a need also to manage the accumulation of water within the Great Pool area, ensuring that there is adequate drainage such that properties around the periphery do not suffer damage.

This overall approach needs to be discussed and agreed and developed in detail with local residents and the landowner. Particular consideration needs to be given to the future and vulnerability of the water treatment area.

PAI45 b

The SMP approach to this area is for NAI. As may be seen from the plots below showing potential flood extents risk now and in 2116, at present the area of the Green is primarily at risk from flooding from the eastern side.



In the future potentially as the coast erodes back to the south of Great Porth and potentially along the south coast, more extensive flooding could occur on extreme conditions.

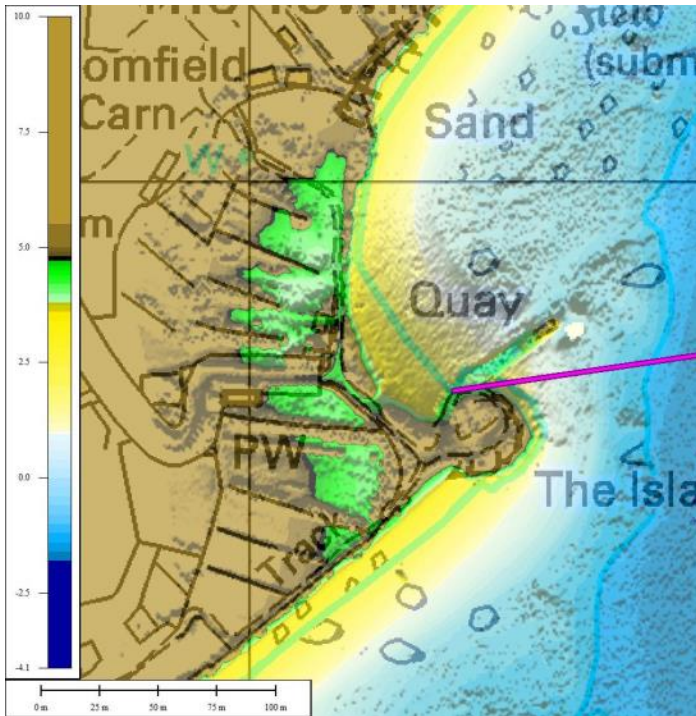
Within the Green, the area would be subject to regular flooding by the end of epoch 1 and indeed, being then below the level of MHWS could become permanently saline with the development of salt marsh.

However, even under such circumstances, the various areas of high ground would remain connected.

This scenario of the future needs to be communicated to those with an interest in the area, such that they may plan ahead.

At the northern end of this area is the main Quay for the island. While this facility sits within Policy Units with an intent of NAI, such a policy really refers to the overall approach to management of the full unit. While at present the area around the Quay and behind the Quay (including the grave yard) is not at excessive risk of flooding, there is on-going pressure for erosion. Management of this is not seen as being out of step with the policies and approach set out in the SMP.

However, as may be seen in the plot below, in the longer term, there is more substantial risk associated with this area. This important area and future access to the Quay needs to be considered and form part of a local management plan.



ACTIONS:

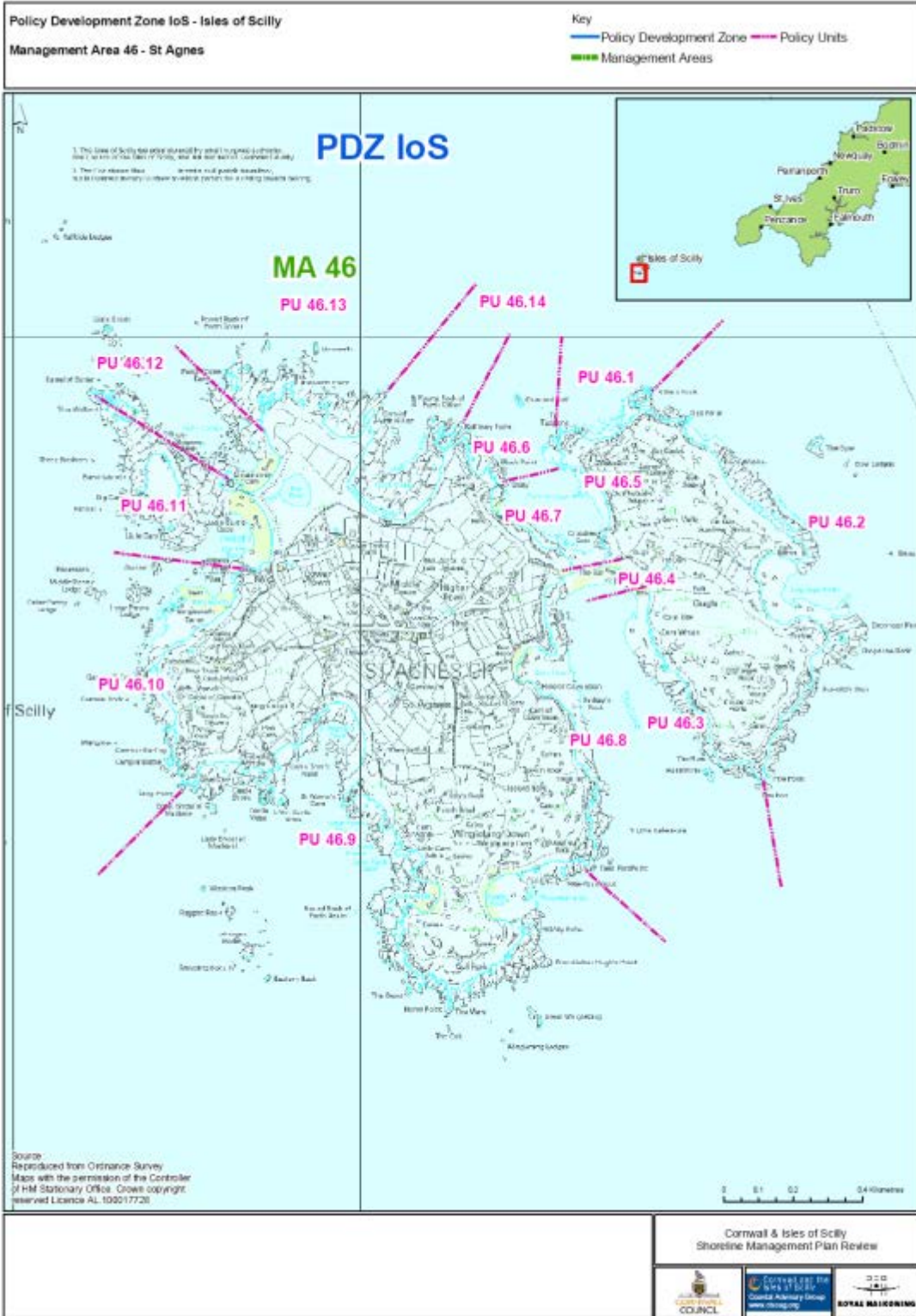
No.	Type	Owner	Action	Partners	Programme
45/MON1/ pco	Monitoring	PCO	Ensure that adequate baseline information is in place to allow on-going long term monitoring of erosion and beach behaviour and sea level rise. Review areas as identified in the discussion within the review and ensure that adequate coverage is maintained of critical beaches. Monitoring should include, where appropriate the profile of backshore ridges and dunes.	IoSc EA	2016 On going
45/INV1/IoSc PIA 45.a	Involvement	IoSc	Initiate a meeting to increase awareness and to discuss the issues raised in the review with respect to future management of the Great Pool area. The aim would be to gain agreement to future approach to management and to highlight specific local issues.	Residents, Businesses NE, Duchy, EA	2016
45/INV2/IoSc PAI 45.b	Involvement	IoSc	Initiate a meeting to increase awareness and to discuss the issues raised in the review with respect to future management of the Green area. The aim would be to gain agreement to future approach to management and to highlight specific local issues.	Residents, Businesses NE, Duchy, EA	2016
45/Rst1/IoSc The Quay	Risk management plan	IoSc	Develop a management plan for future management of the area around the Quay.	EA, Local community and business community, Duchy, NE	2017



MA 46

St Agnes and Gugh

Location Reference:	St Agnes and Gugh
Management Area Reference:	MA 46
Policy Development Zone:	PDZ18



DELIVERY OF THE PLAN
SUMMARY OF SPECIFIC POLICIES

Policy Unit		SMP1 Policy	SMP2 Policy Plan			Comment
			50 yrs	2025	2055	
46.1	Tol Tuppens to Kittern Rock (Gugh)	Do nothing	NAI	NAI	NAI	No risks identified shoreline is resistant to erosion.
46.2	Kittern Rock to The Hoe (Gugh)	Do nothing	NAI	NAI	NAI	No risks identified shoreline is resistant to erosion.
46.3	The Hoe to the Bar (Gugh)	Do nothing	NAI	NAI	NAI	No risks identified shoreline is resistant to erosion..
46.4	The Bar	Do nothing	NAI	NAI	NAI	May be subject to morphological change due to sea level rise. Should be monitored.
46.5	The Bar to Tol Tuppens	Do nothing	NAI	NAI	NAI	No risks identified shoreline is resistant to erosion.
46.6	Kallimay Point to the Jetty	Do nothing	NAI	NAI	NAI	No risks identified shoreline is resistant to erosion.
46.7	The Jetty to the Bar	Hold the line	NAI	NAI	NAI	Local management of the quay and jetty structures to ensure continued link to St Mary's.
46.8	The Bar to Tean Plat Point	Do nothing	NAI	NAI	NAI	No risks identified shoreline is resistant to erosion.
46.9	Tean Plat Point to Long Point	Do nothing	NAI	NAI	NAI	No risks identified shoreline is resistant to erosion.
46.10	Long Point to Pereglis slips	Do nothing	NAI	NAI	NAI	No risks identified shoreline is resistant to erosion.
46.11	Pereglis Slips to Ginamoney Carn	Hold the line	HTL	HTL	HTL	Risk to the Big Pool from erosion and inundation.
46.12	Ginamoney Carn to Browarth Point	Hold the line	HTL	HTL	HTL	Risk to the Big Pool from erosion and inundation.
46.13	Browarth Point	Do nothing	NAI	NAI	NAI	No risks identified shoreline is resistant to erosion.
46.14	Browarth Point to Kallimay Point	Hold the line	NAI	NAI (with localised HTL)	NAI (with localised HTL)	No risks identified shoreline is resistant to erosion.

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

PREFERRED POLICY TO IMPLEMENT PLAN:

From present day	NAI along all undefended cliff and cove shorelines. HTL around the south-west and north-west facing shorelines of the Big Pool area.
Medium term	NAI along all undefended cliff and cove shorelines. HTL around the south-west and north-west facing shorelines and localised HTL around the north east shoreline of the Big Pool area.
Long term	NAI along all undefended cliff and cove shorelines. HTL around the south-west and north-west facing shorelines and localised HTL around the north east shoreline of the Big Pool area.

GENERAL DISCUSSION AND APPROACH TO THE MID TERM REVIEW

GENERAL DISCUSSION AND APPROACH

As discussed in the introduction a slightly different approach has been taken to the SMP review of the Isles of Scilly. Each island has been considered in the SMP as an individual Management Area. However, it is recognised that within each island there can, in some locations, be greater connectivity across sections of an island in terms of use and impact, effectively linking Policy Units that are not necessarily contiguous. This has become more apparent during discussions over the site visit in understanding and taking forward actions and intent developed from the SMP.

Without wishing to complicate or diverge from the consistency between SMPs, it has been felt necessary to group certain policy units within this review in order that the intent of management set out in the SMP is brought out more clearly. To avoid confusion with the previously defined higher level Management Areas or the more detailed Policy units, such clusters of Policy Units are referred to as Policy Intent Areas (PIAs).

In terms of St Agnes, one such Policy Intent Area (PIA46.a) has been defined, which groups together the management of PU 46.11, 12, 13 and 14, focusing on the management of the area around the Big Pool with the associated flood risk to lower lying properties of Lower Town. While this is an area where the key policy units are HTL, the issue developing from the SMP is more subtle in considering how, in general this might be achieved and what actions emerge from this.

In addition, in discussion with the Isles of Scilly Council, there are minor local issues relating to Policy Unit 46.4 and 46.7. These are discussed below.

SMP intent

The overall intent of the policies within the SMP are to secure and maintain the continued habitation and use of the island while clearly not impacting on, and aiming so far as is possible, to enhance the natural environment and landscape. Over much of the island this does not present an issue and the policies of NAI around the south, east and much of the west facing coast supports this intent.

The main issue identified in the SMP focussed on the area of the Big Pool, to the north of the island. The SMP identified the “risk to the Big Pool from erosion and inundation and possible saline contamination of drinking water supply”. As such the SMP states that “Whilst this area provides main potable supply to the island the preferred plan and policy would be to hold the line.”

However, the SMP also goes on to highlight that:

“For a longer term perspective it may be necessary to consider how this is done and whether it is technically sustainable into the future. There are also issues (as on the other islands) relating to percolation of sea water through the embankments and saline intrusion in to the islands groundwater, due to sea level rise. These potential issues need to be considered in more detail as part of an overall strategy into fresh water supply security for the entire archipelago.”

The SMP identifies current defences in the area alongside an assessment of erosion over the next 50 year and 100 years. This is shown on the map below covering the northern section of the island. The map highlights potentially significant erosion within Periglis Bay and Porth Coose.



General Information Provided in the SMP

In other areas of the northern section of the island, the SMP recommends that there is a policy of NAI, but that this should not jeopardise the use of the main Quay.

REVIEW AND APPLICATION

PAI46 a

While not strictly a management change area, in that the policy of HTL for the northern section of the island is carried forward from SMP1 through to SMP2, the issues raised by the SMP over longer term sustainability are reviewed for the whole of PIA46a.

On advice from the Duchy of Cornwall, there is now some doubt as to importance of the Pool as an integral part of the fresh water system. It is reported that borehole wells providing fresh water to properties are independent of the Big Pool. This does need to be confirmed as it remains a critical issue and there is some disagreement based on existing information.

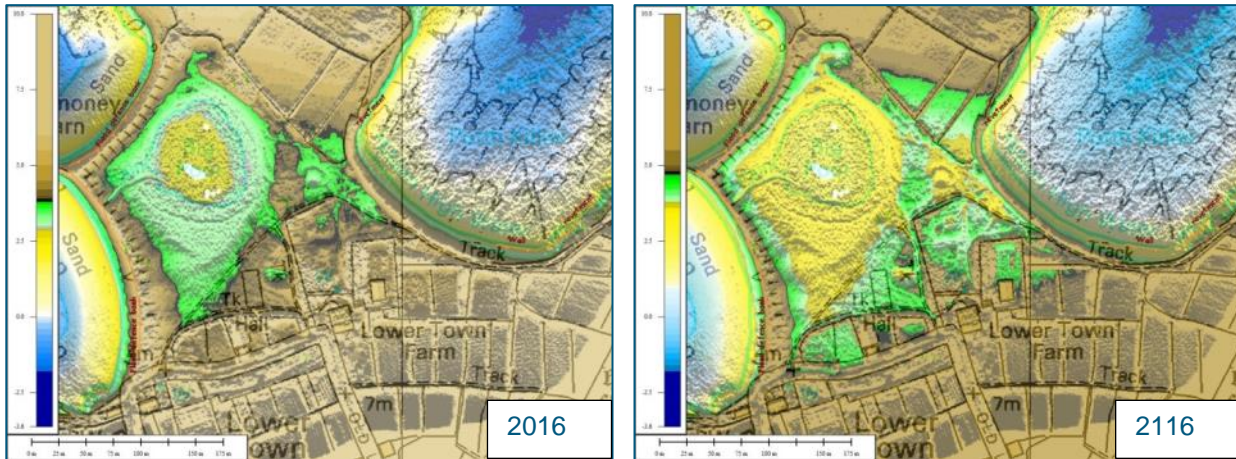
The Pool and surrounding land is considered as an essential recreational area for the community and is used for community events. The Pool is also designated an SSSI. There has also been some local development around the lower part of Lower Town, including the Community Hall and modernisation of the electricity sub-station.

The storms in 2014 resulted in some damage to the main stone banks and repairs, understood to have been led by the Duchy supported by the community, were undertaken. The storms and associated overtopping raised concerns with respect to more substantial risk of breach and highlights the need for an overall agreed approach to maintaining defences while encouraging and preparing for possible longer term adaptation.

As part of the review, recent Lidar data has been obtained from the EA open data site and this has been assessed in relation present day (2016) and current projections of future water levels (2116) based on UKCIP09 projections.

This information is presented as comparative plots below. For each image the following colour contours have been used:

Below mid- tide level		Extreme water levels to 1:100	
Upper intertidal to MHWS		Above 1:100 yr level	



Comparison of ground levels in relation to water levels for 2016 and 2116.

The following general observations are made; there is the need to examine this further in detail, beyond the scope of the mid-term review.

Beach and defence structure.

- At present there is a relatively healthy bank width both to the west and northwest of the Pool, although both banks are put under pressure under storm event conditions and are likely to suffer overtopping on more extreme events. Due to the width of the banks, breaching is more likely to occur due to crest damage which may result in back slope failure, rather than direct cutting through of the front face.
- In the long term both banks will become progressively thinner and, based on the assessment of erosion provided in the SMP, wish to move back. Attempting to fix the front face of the banks would impact on beach levels and would become increasingly difficult to manage.
- The eastern bank is already relatively thin but appears to be protected by a continuous concrete matting defence system, limiting damage to the front face, the crest and potentially the back slope.
- In the long term without raising this bank, there would be significant overtopping potential from specific storm directions.

Flood extent

- The potential still water level flood extent is shown in green based on a 1:100 year water level.
- At present there is a potential flood route (either due to overtopping or breach) between the eastern defence and the main area of the Pool.
- Assuming that drainage would be possible, equalising levels within the Pool area and sea level, then generally property within the lower part of Lower Town would be above still water flood levels on a 1:100 year event. This basic assumption, taking account of wave overtopping, needs to be examined in detail.
- There is the possibility that the electricity substation is at flood risk at present.
- In the long term the indicative potential flood extent would place properties at risk. In particular there might be risk to the new Community Hall in addition to properties to the east.
- A significant area around the Pool would be below MHWS, with the potential for substantial habitat change, irrespective of defences.

This very basic re-assessment of the present and future situation reinforces the issue raised by the SMP. While it would be technically possible to defend the whole area, it is suggested that in the longer term, maintaining the full defence system to provide the same standard of protection and defence would become increasingly unsustainable.

The overall intent defined by the SMP remains the same, based on the concept of protection to the integrity of the community and maintaining an important natural resource in terms of habitat and the recreational use of the Big Pool area. However, without very major investment the nature of the habitat and use of the area will change. Clearly this also has to be considered alongside the potential implications of the Big Pool with respect to saline intrusion into the fresh water supply system.

Given this all, it is considered the policies for the area would remain as HTL, but that a more adaptive approach is taken to management of change within this higher level intent.

While it is beyond the scope of this review to recommend specific defence measures, consideration could be given to reinforcing the back crest and slope of the main banks within the intent of maintaining a level of defence, without allowing breaching and without constraining development and natural roll back of the front face.

Some level of overtopping would need to be accepted and the degree to which the defence is overtopped on any return period event would increase over time. This might allow progressive adaptation of the area around the Big Pool.

It would be sensible to develop alongside this, or any other form of defence, a more detailed examination of flood risk and a strategy for present management in the event of a major storm. It may overtime be necessary to provide local or setback flood defences to the lower part of Lower Town.

It would be recommended that the basic findings of this review are communicated and discussed with the local community and land owner. Together with the need for continued monitoring and review of possible management approaches and further examination of the hydrology of the area forms the basis of the action plan for the area. As part of the above, Natural England should be involved with development of on-going management and the development of a longer term strategic approach.

It was also suggested that a review should be undertaken of available historic maps in assessing areas in the past where saline intrusion might be highlighted and in assessing past rates of erosion of the main banks.

The above provides the review of the main areas of concern with respect to St Agnes. Two more local issues were noted and are discussed briefly below.

Policy Unit 46.7

The broad intent within this Policy Unit is to allow natural development of the shoreline (NAI). However, as stated in the SMP, there is acknowledgement of the need to maintain the Quay and confirmation that minor repair and management of local defences within the unit would not conflict with the broader SMP intent.

Specifically, within this Unit some erosion has been noted to the cliff between the main Quay and the slipway below the site of the Turks Head pub. This is a heavily vegetated section of coastal slope. At present, the extent of erosion does not appear to threaten any assets. It is recommended that local monitoring is undertaken. Should the rate of erosion be considered to threaten assets behind, consideration should initially be given to moving back these assets. If this were considered impractical, local regrading or

reinforcement to the coastal slope would not be considered to have a significant impact on coastal processes. Normal procedure would need to be followed in developing any form of intervention.

Policy Unit 46.4.

The development of the Bar could result in significant change in geomorphology and processes affecting the area and access between St Agnes and Gugh. The SMP highlights the need to monitor change in this area.

ACTIONS:

No.	Type	Owner	Action	Partners	Programme
46/MON1/ pco	Monitoring	PCO	Ensure that adequate baseline information is in place to allow on-going long term monitoring of erosion and beach behaviour and sea level rise	IoSc EA	2016 On going
46/INV1/IoSc PIA46 a	Awareness	IoSc	Organise initial community meeting to discuss and raise awareness of issues posed by on-going pressures on the frontage. Discussion of potential options and constraints. Agree overall aims and scope for adaptation.	Community, NE, Duchy, EA	2016
46/Rst1/IoSc	Data	IoSc	Collate Historic mapping		2016
46/Rst1/DoC	Data	Duchy	Undertake hydrologic study to ascertain role of Big Pool with regards the integrity of the island's freshwater supply. ¹	IoSc, Community	2016
46/Rst2/IoSc	Local management strategy	IoSc	Undertake development of management strategy based around agreed aims in 46/INV1/IoSc. Review erosion risk. Re-assess flood risk based on overtopping analysis. Review and develop defence management plan, both as a response plan and longer term management.	EA, Community, Duchy, NE, Service providers	2017

Notes:

1. This issue is critical to determining long term management. While it is important to involve the community at an early stage (46/INV1/IoSc) one of the key issues for discussion will be in relation to the underlying hydrology (46/Rst1/DoC).

Open

