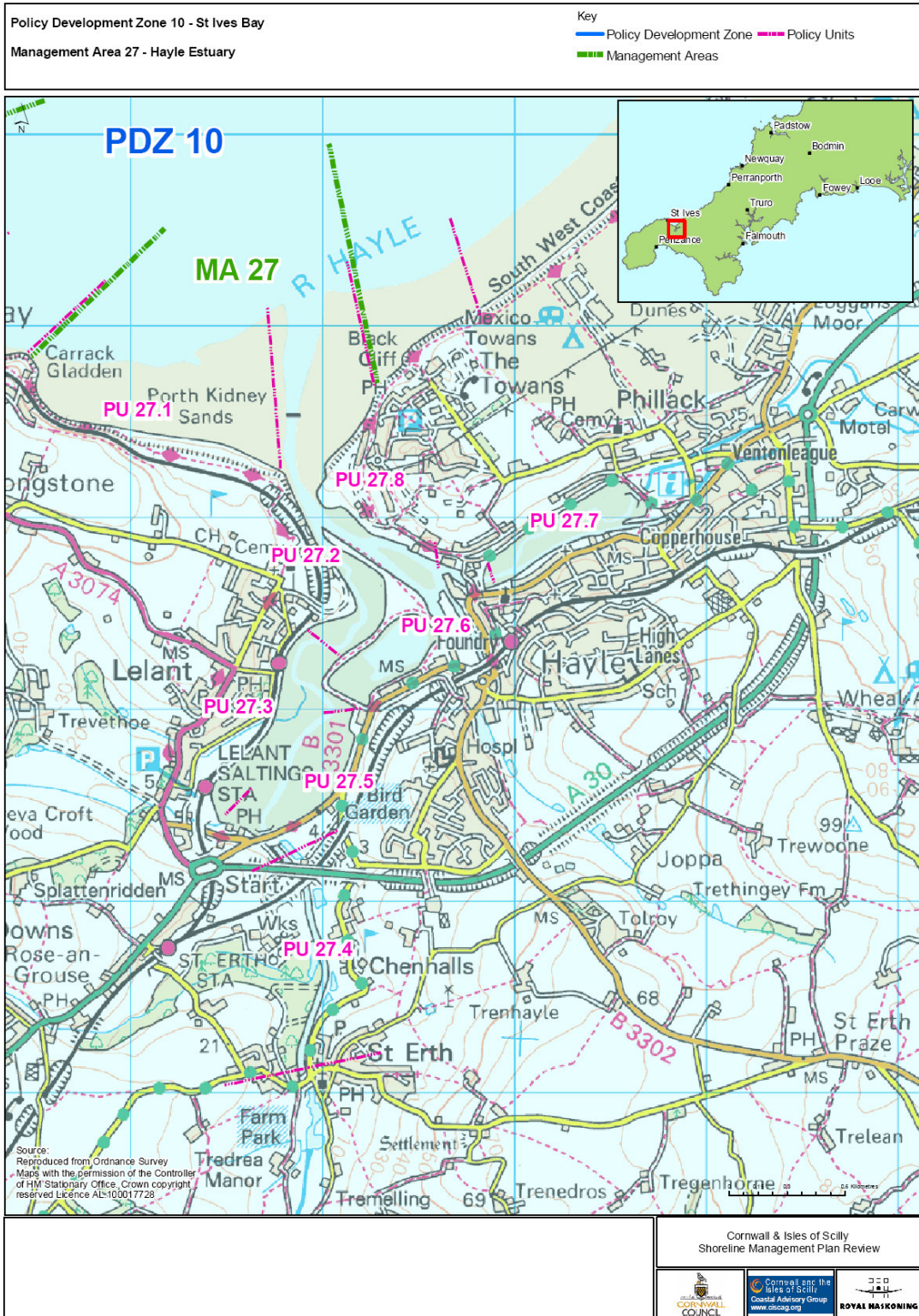
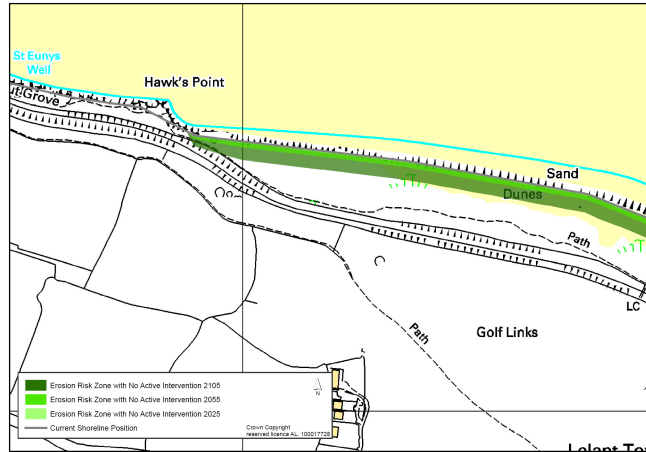


Location reference: Hayle Estuary
Management Area reference: MA27
Policy Development Zone: PDZ10

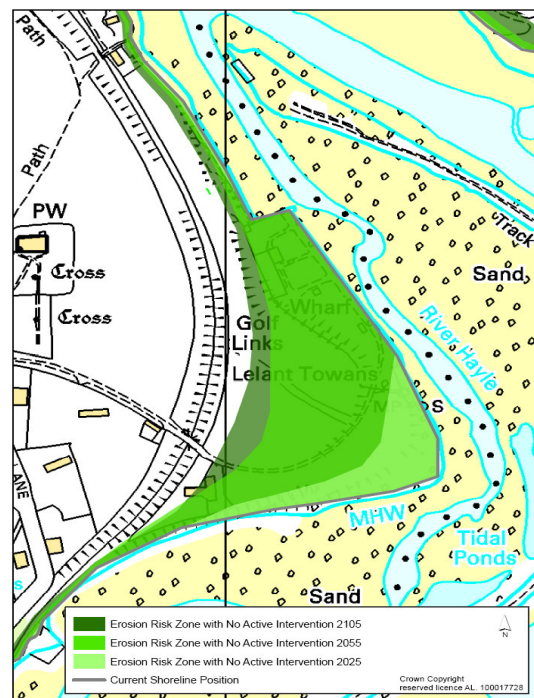
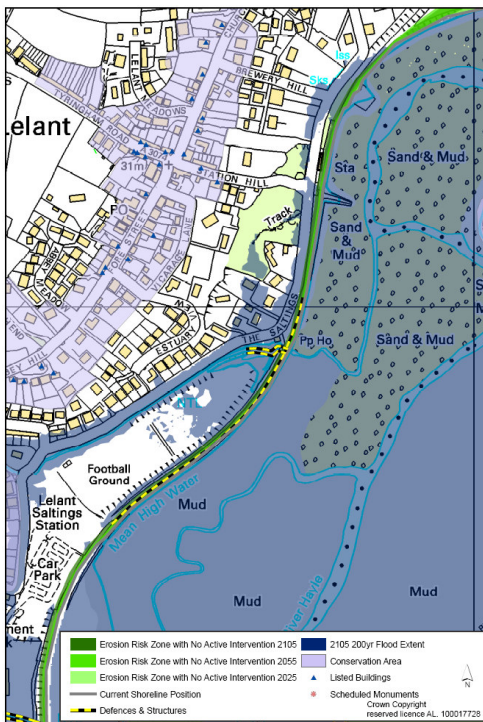


DISCUSSION AND DETAILED POLICY DEVELOPMENT

Some recession of the dune line may be expected at **Porth Kidney** in line with rising sea levels but the cliff line would be expected to remain stable, with little recession. The St Ives to St Erth railway line should generally remain at very low risk along this frontage, although in the medium to long term there is a potential risk where the hard cliff line meets the dunes – some probable recession here, possibly of up to 30m, could threaten a short section of the track (see inset map). This should be monitored but the most sustainable solution would be an inland realignment of this track section.



At Lelant Towns there may be some loss of dune area and roll back of the shoreline expected in response to sea level rise (see inset map, right) but the estuary is expected to remain a net sink for sediment, therefore foreshore levels may raise themselves in response to sea levels.



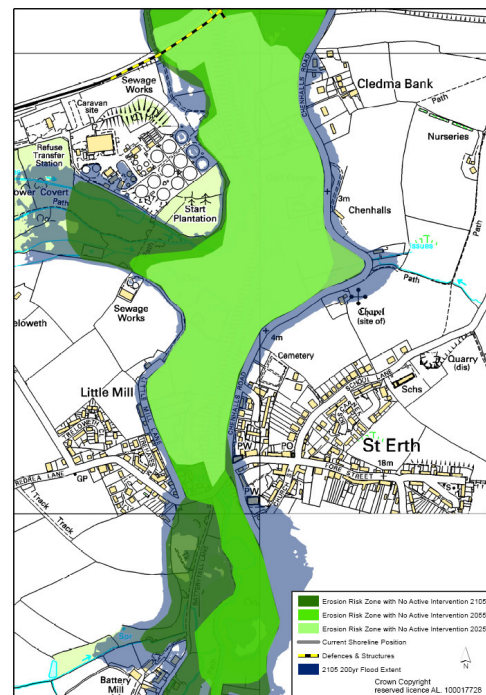
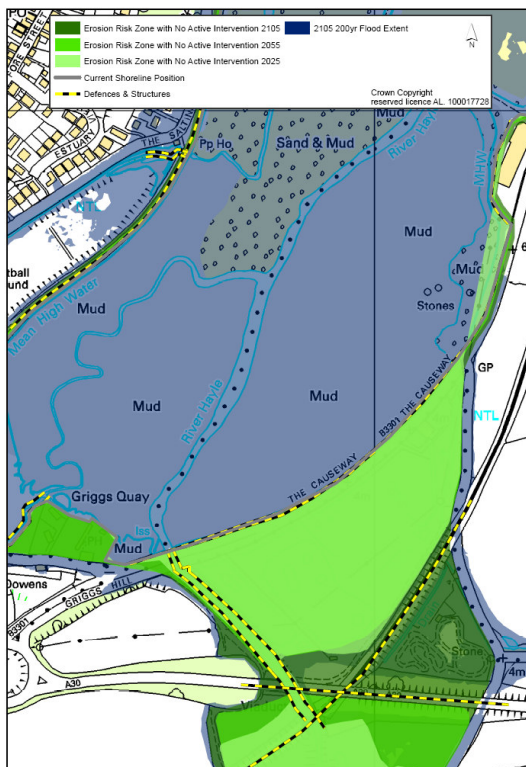
links. This approach could also provide intertidal habitat benefits.

The future response may partly depend on future dredging strategies and how much sediment is removed from within the estuary system. If loss is experienced this could impact on the golf links area. A managed realignment approach is preferred to accommodate the natural variability of this area and would allow a managed approach to the risks to the wharf, railway line and golf

Although some limited future flood risk exists along the more developed **Lelant** frontage, actual recession under the NAI scenario is anticipated to be very limited. This indicates the current shoreline position is relatively sustainable. In addition the St Erth to St Ives rail link runs along the entire length of the Lelant frontage immediately next to the shoreline (inset map, left). The importance of this local transport link to the wider economy and the perceived sustainability of the shoreline position dictate that a continued hold the line policy is preferred for the Lelant frontage.

A secondary driver for holding the line is the presence of The Saltings, a local access road which runs immediately behind the railway line. The low pressure on the frontage means there is no pressing requirement for managed realignment. A no active intervention approach however has been rejected due to the presence of the railway line as even minor erosion due to failure of defences would have a major impact.

Suggested removal of the tidal barrier at **St Erth** to provide habitat creation benefits would be likely to increase pressure on upstream defences and dictate that they become tidal defences rather than fluvial. A continued defence strategy as part of managed realignment is required to manage and reduce risks to some populated areas of St Erth. It is anticipated that forthcoming work will look at this complex area in more detail and will provide more detailed refinement of the preferred plan and policies taken forward in the SMP. There is certainly some extensive possibility of intertidal habitat creation when considering the possible extent of the floodplain and



shoreline position in 2105 (see inset map right).

Investigation into the possible opportunities of adopting a managed realignment approach along the **Griggs Quay / Causeway** frontage (inset map, left) are recommended to be taken forward as part of the SMP Action Plan. This could provide additional flood

storage and increase in lower estuary tidal prism (water volumes) to alleviate pressures at St Erth and elsewhere within the estuary. There are potentially significant habitat creation opportunities under this management approach. Given the important local transport routes in the vicinity (and historically the Causeway is a listed building), no active intervention is not considered suitable and although existing structures could be held in place, a hold the line policy in the long term would do little to help manage or alleviate future flood risk and would not allow opportunities for environmental improvements to be pursued. Therefore managed realignment is preferred in epochs 2 / 3 after an initial period of hold the line during epoch 1. It would be part of the management intent to establish a new outer line of defence however, to continue to protect communities and assets where necessary. These would most likely take the form of embankments or bunds and higher ground used where suitable to form a boundary. The preferred plan therefore leads the policy through a period of realignment but back to at least a partial hold the line during epoch 3.

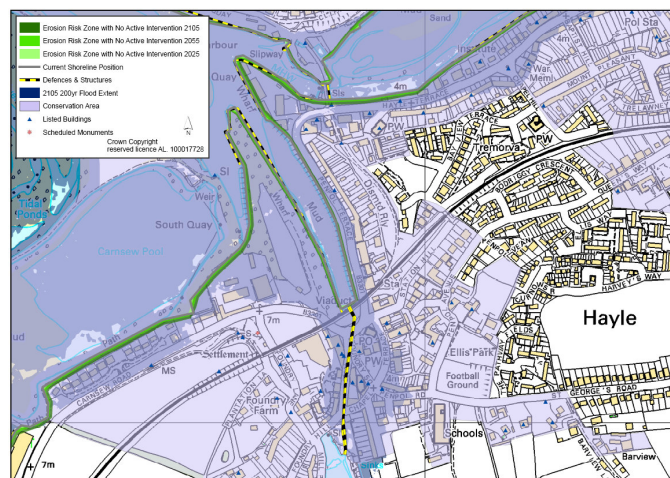
The potential benefits to nature conservation are quite significant within this area and could include some additions to key UK BAP habitat types, including intertidal mudflats, coastal saltmarsh and saline lagoons. The existing RSPB site which lies to the south-east of the Causeway needs to be considered in terms of impacts on the site itself and flood risks to the local road on its eastern boundary. The preferred plan would aim to support the current favourable status of the Hayle Estuary SSSI and any interventions must by necessity avoid any deterioration in quality of the site.

It is important to note that this policy is a key deliverable in terms of complying with the Water Framework Directive as laid out in the River Basin Management Plan.

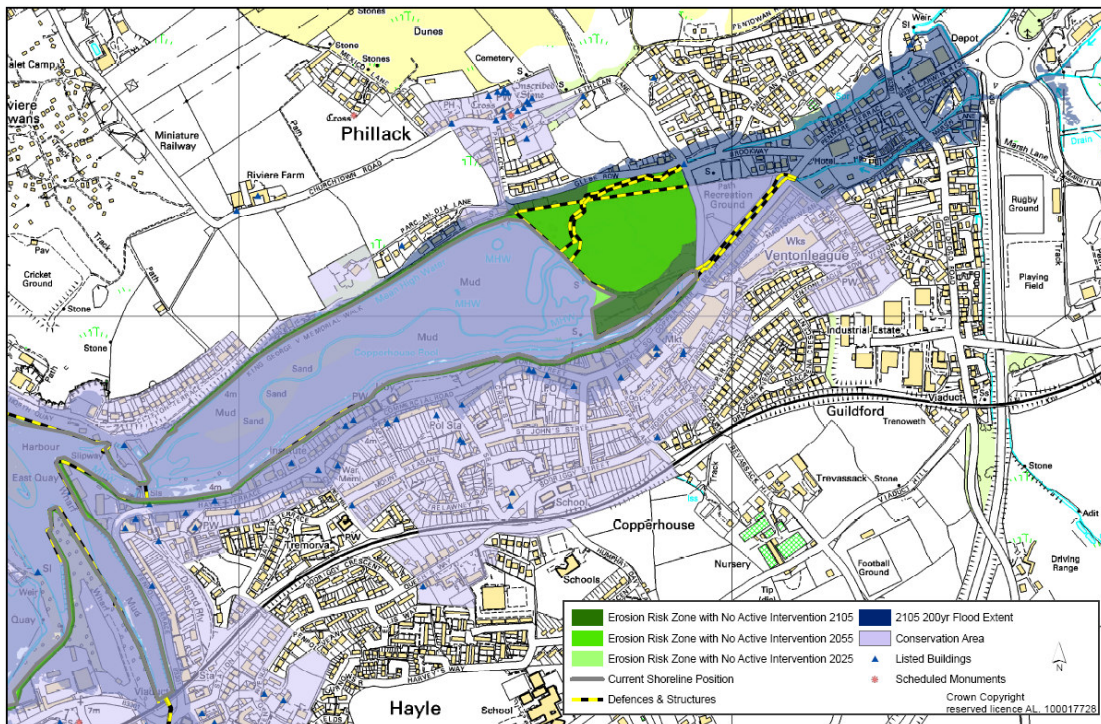
The Griggs Quay / Causeway area will be subject to significant change under the preferred plan in the medium to longer term and Land Use Planners and Transport Planners should consider the managed realignment strategy in future plans. This should be accompanied by policies to support any roll back of properties and community assets where necessary.

Holding the line within the **Hayle Harbour** area and along the quays and wharves is preferred as it facilitates the progression of re-development plans for this part of Hayle, perceived as being a critical part of the regeneration of the wider Hayle conurbation. It also provides consideration and protection of the historic listed quays and wharves, docks and the swing bridge, which are all listed features of the Cornwall and West Devon

Mining World Heritage Site. It follows therefore that this area is generally considered very important historically. The HTL policy should however not preclude local adjustment of the current shoreline configuration where it is necessary and possible



to do so without damage to the cited features. The Hayle Strategy should progress and refine the policy. Hold the line provides the most effective way of managing the flood risk to the area around the wharves and harbour of the South Quay, East Quay and particularly the risk which exists around the Viaduct and Foundry Square (see inset map below). No active intervention has been rejected as an unsuitable policy for this frontage. It is however likely that there will be aspects of managed realignment within the localised adjustment of the defences and structures along this frontage under future regeneration plans.



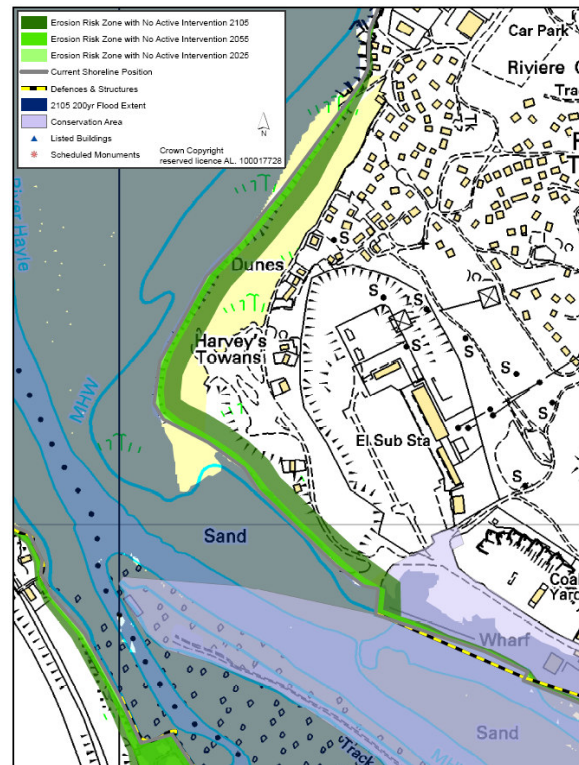
Significant future flood risk exists along the southern bank of the **Copperhouse Pool (see inset map above)**. This risk extends significantly into the Hayle Conservation Area and also into Ventonleague to the north-east of the Pool. The structures within this part of the estuary are currently managed as flood defences. There is very little scope for realignment due to the position and magnitude of residential development adjacent to the southern (and northern) banks of the pool. In addition, the Copperhouse Pool and its structures are also listed features of the Mining World Heritage Site. The preferred plan is to maintain the current level of protection provided to the residential development through a policy of hold the line. This would also prevent loss of, or damage to the WHS features. Consideration must be given to the Hayle Estuary and Carrick Gladen SSSI and the possible effects of sea level rise and possible changes in sluice management. Either of these factors could potentially affect the duration of tidal inundation across intertidal habitat areas, potentially changing habitat characteristics and decreasing extent or adversely affecting interest features or species.

Both hold the line and managed realignment policies throughout the Hayle Estuary area will have implications for the Hayle Estuary SSSI. HTL through the harbour

area will continue to modify the habitats and channel morphology and will restrict any movement of mean high water, potentially affecting durations of tide cover with rising sea levels. MR in other parts of the estuary will change hydrodynamics and potentially the plan shape of the upper estuary. This could potentially impact on intertidal areas in a number of different ways, including increased or decreased exposure times, changes in accretion and deposition patterns, increased tidal prism and tidal flow velocities.

There may be some loss of the dune front expected along the **Harvey's Towans** frontage (inset map, right) in response to sea level rise, but the estuary is expected to remain a net sink for sediment, therefore foreshore levels may raise themselves in response to sea levels. The future response may partly depend on future dredging strategies and how much sediment is removed from within the estuary system. In general the SMP would discourage the net removal of sediment from the system.

A managed realignment approach is preferred to accommodate the natural variability of this area and to allow priority to be given to enhancement of the natural dune system as a UK priority BAP Habitat, whilst continuing to encourage natural and sustainable response to climate change impacts. Guidance as to the type of local management approach under a policy of MR can be gained from the Cornwall Sand Dune and Beach Management Strategy. This can include management of the frontage to address any future risks to the on-shore wave hub cable termination point.



The high level economic appraisal for Management Area 27 provides a slightly negative benefit / cost ratio of 0.90 (refer to Economics Appraisal Summary Table below and Appendix H). This is based upon the very significant lengths of defences which require maintaining, relative to the assets they protect. This reinforces the need for managed realignment where possible. However this should not be seen as restricting to the hold the line policy preferred along the Hayle Harbour frontage or at Lelant, as the assessment does not take into account the future re-development plans which may alter the overall economics and provide a more robust benefit / cost ratio locally.

SUMMARY OF PREFERRED PLAN RECOMMENDATIONS AND JUSTIFICATION PLAN:

Location reference:	Hayle Estuary
Management Area reference:	MA27
Policy Development Zone:	PDZ10

PREFERRED POLICY TO IMPLEMENT PLAN:	
From present day (0-20 years)	MR at Lelant Towans. HTL along Lelant frontage / railway. HTL/MR at St Erth. MR along Griggs Quay / Causeway frontage. HTL within the Hayle Harbour area. HTL along the Copperhouse Pool frontages.
Medium term (20-50 years)	MR at Lelant Towans. HTL along Lelant frontage / railway. HTL/MR at St Erth. MR along Griggs Quay / Causeway frontage. HTL within the Hayle Harbour area. HTL along the Copperhouse Pool frontages.
Long term (50 -100 years)	MR at Lelant Towans. HTL along Lelant frontage / railway. HTL/MR at St Erth. MR along Griggs Quay / Causeway frontage. HTL within the Hayle Harbour area. HTL along the Copperhouse Pool frontages.

SUMMARY OF SPECIFIC POLICIES

Policy Unit		SMP1 Policy	SMP2 Policy Plan			Rationale
		50 yrs	2025	2055	2105	
27.1	Porth Kidney	Do nothing	NAI	NAI	NAI	Some recession of the dune line may be expected at Porth Kidney in line with rising sea levels but the cliff line would be expected to remain stable.
27.2	Lelant Towans	Hold the existing defence line	MR	MR	MR	A managed realignment approach is preferred to accommodate the natural variability of this area
27.3	Lelant frontage	Hold the existing defence line	HTL	HTL	HTL	Although some limited future flood risk exists along the frontage, actual recession under the NAI scenario is anticipated to be very limited.
27.4	St Erth	Not considered in SMP1	HTL/MR	HTL/MR	HTL/MR	A continued defence strategy as part of managed realignment is required to manage and reduce risks to some areas of St Erth.
27.5	Griggs Quay / Causeway	Hold the existing defence line	HTL	MR	HTL/MR	This area could provide additional flood storage and increase in estuary tidal prism to alleviate pressures at St Erth and elsewhere within the estuary. Potentially significant habitat creation opportunities also exist.
27.6	Harbour, East Quay & South Quay	Hold the existing defence line	HTL	HTL	HTL	Holding the line within the harbour area and along the quays and wharves is preferred as it facilitates the progression of re-development plans for this part of Hayle, perceived as

						being a critical part of the regeneration of the wider Hayle conurbation.
27.7	Copperhouse Pool	Hold the existing defence line	HTL	HTL	HTL	The preferred plan is to maintain the current level of protection provided to the residential development through a policy of hold the line. Hayle Strategy should progress and refine the policy.
27.8	Harvey's Towans	Hold the line	MR	MR	MR	A managed realignment approach is preferred to accommodate the natural variability of this area. This would allow priority to be given to enhancement of the natural dune system as a UK priority BAP Habitat
Key: HTL - Hold the Line, A - Advance the Line, NAI – No Active Intervention MR – Managed Realignment						

ENVIRONMENTAL ASSESSMENT

Strategic Environmental Assessment (SEA):

For the Hayle Estuary, the HTL and MR policy will ensure the continued protection of residential and commercial properties and assets along the frontages of Hayle and the following key features: Hayle Railway line; Hayle golf course; Lelant Conservation Area; Hayle Conservation Area; and Various Listed Buildings. It is important to note that the policy of MR at Griggs Quay and the Causeway is a key deliverable in terms of complying with the Water Framework Directive as laid out in the River Basin Management Plan.

The HTL policy will however potentially impact upon the integrity of designate sites including Hayle estuary & Carrack Gladden SSSI, Hayle estuary RSPB Nature Reserve and saline BAP habitats associated with Copperhouse Pool and reedbed BAP habitat; Railway Bridge (SM) and Black Cliff (RIG).

Appropriate Assessment (AA):

HTL is proposed at Lelant, St Erth, Hayle (Harbour, Quays, and Copperhouse Pool), with MR proposed at Lelant Towans, St Erth, Griggs Quay/Causeway, Griggs Quay/Causeway has a combination of HTL and MR/optional policies. These policy locations are at least 7km from the nearest Natura 2000 Site and, therefore, no direct or indirect effects are expected.

IMPLICATION WITH RESPECT TO BUILT ENVIRONMENT

Economics Summary		by 2025	by 2055	by 2105	Total £k PV
Property	Potential NAI Damages (£k PV)	2855.7	1782.8	770.4	5408.9
	Preferred Plan Damages (£k PV)	0.0	0.0	0.0	0.0
	Benefits of preferred plan (£k PV)	2855.7	1782.8	770.4	5408.9
	Costs of Implementing plan (£k PV)	3260	1638	1089	5987
				Benefit/Cost ratio of preferred plan	0.90

Notes

Marginal B/C ratio due to long lengths of frontages that need protection. Future re-development plans may alter the overall economics. Road disruption not included, which will increase B/c ratio