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C3 SCENARIO REF: BASELINE CASE 1 – NO ACTIVE INTERVENTION

C3.1 Introduction

This section describes the expected shoreline response assuming the scenario of “No Active Intervention”. This scenario has considered that there is no expenditure on maintaining or improving defences and that defences will therefore fail at a time dependent upon their residual life (see the Defence Table in Annex C2.1). The descriptions are based on the No Active Intervention erosion maps in Section C5.

SMP1 Management Unit	Location		Epoch		
			Years 0-20 (2025)	Years 20-50 (2055)	Years 50-100 (2105)
WEST SOLENT					
CBY7, LYM1 and 2	Hurst Spit	Hurst Spit	The performance and effectiveness of the shingle barrier spit would decline in response to the severity and frequency of storm events. Reduction in crest level and width of spit would increase risk of overwashing and catastrophic breaching of the spit. Breaching would result in widespread flooding of low-lying areas throughout the west Solent, affecting residential, commercial, industrial, heritage and agricultural assets. The higher water levels would reduce the effectiveness of existing defences and result in prolonged inundation, and loss of land, designated sites and amenity/tourist assets and facilities. A couple of properties are located within the EA flood zone 3 area in these units. (Due to the complexity of modelling shoreline behaviour at this site it is not possible to predict and quantify the erosion risk).		
LYM 3	Saltgrass Lane	Lymington Yacht Haven	The existing seawall would deteriorate and those sections not fronted by the natural protection of the inter-tidal saltmarshes would fail by year 35 through damaging overtopping events, and toe scour. Any breach in the seawall would result in a serious pollution risk to the hinterland as the lack of any defined flood compartments would result in wide spread inundation, affecting the former landfill site. Currently, there are 113 properties within the EA flood zone 3 area, including many isolated and individual properties; the potential flood risk by year 100 would affect 180 properties. Such flooding would also have a significant and adverse affect on the designated brackish and freshwater habitats and species. There would be a loss to the important amenity footpath.		
LYM4	Lymington River	Lymington River	The standard and condition of the existing flood defence walls and revetments would minimise the tidal flood risk over this epoch, partly due to the eroding inter-tidal habitats within the estuary acting as a natural defence.	The design life of the existing flood defence walls and revetments would be extended by the protection afforded them by the inter-tidal habitats within the estuary. As these natural defences continue to erode it is anticipated that the existing defences would begin to fail in this epoch. This would increase the risk, severity and extent of tidal flooding to Lymington Town, and other economic assets and facilities. There are 134 properties within the EA tidal flood zone 3 area.	Lymington and its low-lying environs would be routinely at risk from tidal flooding, with areas permanently inundated by the raised sea levels. The harbour-scape would be open to the Solent with no inter-tidal habitats present above sea level, with deeper channels for navigation. The potential flood risk by year 100 would affect 574 properties.
LYM5	Elmer's Court	Sowley Spits	The Policy Unit has an undefended shoreline, except for one short length of timber revetment and groynes protecting an individual property. It has been assumed that the existing defences would deteriorate towards the latter part of this epoch. The entire length of the frontage is naturally protected by varying widths of eroding saltmarsh and inter-tidal mudflats. There is potential for minor flooding of the low lying fringes but the natural topography limits the extent of flooding. It is anticipated that there would be no change in shoreline position, but the extent of inter-tidal mudflats and saltmarshes would be reducing.	The saltmarshes would be completely eroded between 2040 and 2050, and the inter-tidal mudflats would continue to erode but still provide limited flood protection to the naturally rising, undefended shoreline and existing defences. Potential for minor flooding, affecting 3 properties in the low lying fringes but natural topography would limit the extent of flooding. It is anticipated that the shoreline would erode, affecting a single property. Further erosion of inter-tidal habitats would result in an increase in fine sediments, a high proportion of which would be transported from the estuary by ebb-dominant tidal currents.	With no natural or manmade defences, the shoreline is estimated to erode at 0.8m/yr from 2070, affecting 2 properties. With predicted increases in sea level rise, further inundation of low lying fringes is anticipated, potentially affecting 4 properties by year 100, but natural topography will limit extent of flooding. Erosion of the shoreline would result in an introduction of coarser material forming a narrow fringing beach, however, it is predicted that rates of sediment transport eastwards would be low.
LYM6	Sowley Spits	Warren Farm Spit	The Policy Unit is characterised by a recent spit system at Sowley which has now re-sealed to form a continuous beach, with a revetment defending the remainder of the shoreline to the east. The foreshore consists of stony mudflats. Small sections of the revetment immediately east of the Sowley spits have a residual life of less than 5 years. An erosion rate of 0.1m/yr will commence by year 2010. Low amounts of coarser material would be introduced to the system supplying material to the narrow fringing beaches. It is predicted that rates of sediment transport eastwards would be low. There is potential for flooding of the low lying fringes but the natural topography limits the extent of flooding.	If sediment input decreases in this epoch, then Sowley beach could be prone to overwashing and re-breaching –The remainder of the revetment to the east has a residual life of approximately 25 years. Shoreline erosion will commence in year 2025 - 2030 at a rate of 0.1 - 0.5m/yr. Low amounts of coarser material would be introduced to the system supplying material to the narrow fringing beaches. It is predicted that rates of sediment transport eastwards would be low. There is potential for flooding of the low lying fringes, affecting 13 properties, but the natural topography limits the extent of flooding.	If sediment input decreases in this epoch Sowley beach could re-breach as it did in 1955, forming a permanent inlet. Shoreline erosion will continue along this frontage between 2055 - 2105 at a rate of 0.1 - 0.5m/yr. Low amounts of coarser material would be introduced to the system supplying material to the narrow fringing beaches. It is predicted that rates of sediment transport eastwards would be low. With predicted increases in sea level rise, further inundation of low lying fringes is anticipated, potentially affecting 25 properties within the EA flood zone 3 by year 100, but natural topography will limit extent of flooding. Only 2 properties face the threat of coastal erosion by 2105.

SMP1 Management Unit	Location		Epoch		
			Years 0-20 (2025)	Years 20-50 (2055)	Years 50-100 (2105)
LYM7	Warren Farm Spit	Gull Island	There are 10 properties within the EA tidal flood zone 3 tidal floodplain behind the undefended narrow sinuous spit feature that extends eastwards to the mouth of the Beaulieu River; the natural topography would limit the extent of flooding of the low lying land either side of the river. The spit would continue to rapidly respond to hydrodynamic conditions with landward rollover/migration rates of up to 1m/yr expected, potentially affecting 6 properties by year 100. There would be no change in the position of the naturally rising shoreline landward of the spit, as it would be protected by significant areas of saltmarsh, inter-tidal mudflat and freshwater habitats, located in the lee of the spit and within the river estuary. The easterly sediment transport rates would remain low.		
LYM8	Beaulieu River	Beaulieu River	A meandering estuary channel, surrounded by inter-tidal mudflats and saltmarshes provides natural protection to the shoreline. Towards the mouth of the river, the estuary widens and the expanse of inter-tidal habitat increases. There is limited potential of tidal flooding for the hinterland adjacent to the meandering channel because of the natural topography. However, towards the mouth of the river where the defences are located on the west side, there is potential for extensive flooding of the freshwater SPA. It is anticipated that there would be no change in shoreline position, but the extent of inter-tidal mudflats and saltmarshes would be reducing; it is estimated that the saltmarshes will disappear between 2033 - 2105.		
LYM 9 and LYM 10	Inchmery	Stansore Point	The cliffed section of this frontage would become more exposed to wave conditions as Needs Ore point and Gull Island are eroded or migrate landwards, and the rate of cliff erosion would increase. The concrete seawall at the eastern end of the frontage would continue to provide protection to the coast road but would be deteriorating and more vulnerable to failure towards end of epoch. The tidal regulated exchange sluice within the seawall would continue to control saline intrusion over this epoch. Lepe Country Park's defences would be ineffective to prevent flooding of the car park and its amenities.	The concrete seawall would deteriorate and fail by year 50, resulting in the hinterland floodplain to be permanently inundated, affecting agricultural land and designated habitats and species, and a single property by year 100. Continued cliff erosion would increase sediment transport volumes locally but are insufficient to accrete a significant beach at the toe.	
LYM 11 and LYM 12	Stansore Point	Hillhead, Calshot	The historic wartime remains would continue to be undermined by natural processes. At Bourne Gap the low beach level would be breached under storm conditions resulting in extensive saline flooding of designated freshwater habitats. These defences are expected to fail after 2020 as this frontage is relatively sheltered from the prevailing south-westerly storms, but does experience significant wave climate during south-easterly storms. The frontage would remain relatively stable due to width of beach but it is anticipated that there would be minor migration of beach crest or cliff toe under severe storm conditions at 0.3m/year. By year 100, a single property may be at risk from tidal flooding.		
LYM 13	Hillhead, Calshot	Calshot Spit	The softwood timber revetments and groynes that extend along the length of the shingle barrier beach, are expected to fail after 2020 as this frontage is relatively sheltered from the prevailing south-westerly storms, but does experience significant wave climate during south-easterly storms. The position, width and crest height of the barrier beach have remained stable over the period of available data. The rates of sediment transport along the spit are relatively low. The defences provide limited flood protection to beach huts and low lying hinterland, which has been reclaimed.	It is estimated that the beach would erode at 0.3m/yr, however, as the frontage is unpopulated there are no properties at risk from tidal flooding or coastal erosion in this unit.	
LYM 14	Calshot Spit	Calshot Spit	Calshot Spit extends north-eastwards and affords limited protection from storm waves to the saltmarshes in its lee and to Southampton Water. The softwood timber revetment and groynes, which extend 250m from the southern boundary of the Unit eastwards will deteriorate. The remaining frontage already contains relict timber groynes; a concrete wall along the Activity Centre provides flood protection. On the lee side of the spit there is a short section of timber wall, which is in poor condition. The position, width and crest height of the spit have remained stable over the period of available data. The major and increasing risk to numerous properties, buildings and access route associated with the Activity Centre, is tidal flooding due to sea level rise, during this epoch 2 properties are within the EA tidal floodzone.		
FAW1	Lee Of Calshot Spit	Lee Of Calshot Spit			
FAW2	Lee of Calshot Spit	Fawley Power station	Following the failure of defences, it is estimated that the spit would erode up to 0.3m/yr, which would cause the spit to narrow. Considering the 'fixed' nature of the spit, the width of the spit, and low rates of sediment supply, significant rollback of the spit would be inhibited. Under a severe storm events, the spit would experience catastrophic failure and complete breaching, severing the access road to the complex of properties and buildings located on the spit, and exposing the shoreline in the lee of the spit to increased flooding and the saltmarshes to wave attack.		

SMP1 Management Unit	Location		Epoch		
			Years 0-20 (2025)	Years 20-50 (2055)	Years 50-100 (2105)
FAW3	Fawley Power station	Fawley Power station	This unit is characterised by Fawley Power Station and fronting saltmarshes, which are sheltered from waves by Calshot Spit. The saltmarshes will be subject to gradual erosion through the process of coastal squeeze during this epoch. The EA tidal flood zone 3 covers most of the Fawley Power Station site, which lies on reclaimed land, but the main buildings are above the currently perceived flood risk level. There are no buildings predicted to be in the erosion zone.	Morphodynamic changes of the existing saltmarshes over these epochs may be crucial to controlling the rate and impacts of shoreline retreat and flooding. The saltmarshes are predicted to erode at a relatively slow pace compared with other saltmarsh sites across the North Solent (Baily and Pearson, 2003; SDCP, 2008). Inter-tidal habitats will be unable to migrate inland due to the topography of the reclaimed land. Increasing sea-levels and retreat of previously defended shoreline sections would be likely to impact leisure facilities at Ashlett Creek, the sites at Fawley Power and Oil Refinery and the railway track. There are 621 properties are at risk of flooding at FAW 7 (Hythe) by year 2105; and 3 properties in FAW 4 at risk of flooding and erosion by 2105.	
FAW4	Fawley Power station	Fawley Oil Refinery	This 1.2km long stretch of coastline is mostly undeveloped, and backed by the village of Fawley, and the hamlet of Ashlett. The saltmarshes will be subject to gradual erosion through the process of coastal squeeze during this epoch. The area is not at risk from tidal flooding or coastal erosion during this epoch.		
FAW5	Fawley Oil Refinery	Fawley Oil Refinery	This unit contains Fawley Oil Refinery, which is one of the largest in Europe. The EA tidal flood zone 3 extends up to 1km inland for a 500m long section of the refinery site behind the jetty area at the southern end of the unit. There is no coastal erosion predicted for this epoch although the saltmarshes will be subject to gradual erosion through the process of coastal squeeze.		
FAW6	Fawley Oil Refinery	Hythe Sailing Club	This unit is mostly wooded or agricultural, and includes a railway line and road, which both run close to the marsh that fronts the shoreline. Shore Road at the western end of the unit is within the EA tidal flood zone 3. There is no coastal erosion predicted for this epoch although the saltmarshes will be subject to gradual erosion through the process of coastal squeeze.		
FAW7	Hythe Sailing Club	Hythe Marina	The EA tidal flood zone 3 extends over 100m inland across this unit, covering 434 residential houses at Hythe. However, the concrete sea wall behind the promenade has been overtopped by tidal surges on several occasions and in 2008 flooding of properties was narrowly averted. The overtopping risk could worsen towards the end of the first epoch. There is no perceived erosion risk in this epoch.		
TEST1	Hythe Marina	Marchwood Military Port	The coastline in this unit comprises Dibden Bay, which is reclaimed land. The foreshore consists of a narrow upper beach except for a section stretching approximately 650m at the northwest end of the unit where sheet piling maintains the shoreline position but has restricted sediment supply to the upper foreshore. Hythe Marina at the south-eastern end is the only developed area, containing 244 properties that would potentially be inundated by the EA tidal flood zone 3. Due to the limited wave exposure of this stretch of shoreline, significant change or release of sediment from this unit is unlikely within this epoch. Potential sea level rise however might start to cause the already narrow beach to reduce in width.		Collapse of the steel sheet piling would lead to minimal coastal retreat. Flooding of the marina (245 properties) at the south-eastern end of the unit may threaten the rail track and residential properties behind and down drift. Erosion and widening of the foreshore would increase sediment supply downdrift.

SMP1 Management Unit	Location		Epoch		
			Years 0-20 (2025)	Years 20-50 (2055)	Years 50-100 (2105)
TEST2	Marchwood Military Port	Cracknore Hard	The northwest area of this 850m stretch of shoreline is backed by Marchwood Military Port, and Cracknore Hard (an industrial area), the majority of land is at present undeveloped. The northwest half of the unit is within the EA tidal flood zone 3, covering 7 properties and potentially impacting on the road that leads to the shoreline at Cracknore Hard.	Once the sea wall collapses, the shoreline is likely to retreat at a slow rate, although there are no properties predicted to be in the 100 year erosion zone. Seven properties are at risk of flooding in this epoch.	
TEST3	Cracknore Hard	Royal Navy Armaments Depot	This unit's coastline includes business, industrial and office developments that front the main area of residential housing in Marchwood. The flood risk zone covers 337 properties. The open space behind Marchwood incinerator, and the road and surrounding area at Cracknell Hard are also within the EA tidal flood zone 3. There is no intertidal foreshore, but a sea wall runs along the length of the unit, maintaining shoreline position. This environment is shielded from high wave energy so it is possible that the existing structure may stay intact for the majority of this epoch.	Once the sea wall collapses, the shoreline is likely to retreat at a slow rate. Two properties are located in the 100 year erosion zone and over 406 properties are at risk from tidal flooding by year 100.	
TEST4	Royal Navy Armaments Depot	Eling Creek	This is a predominantly agricultural and wooded length of shoreline including the village of Eling, which is currently outside the EA tidal flood zone 3 area. There is no erosion predicted for this epoch given the protection afforded by the inter-tidal area.	Over this epoch the flood risk zone is likely to move inland with rising sea levels; however, there appears to be no imminent risk of tidal flooding or coastal erosion to residential dwellings due to the low energy nature of this environment and saltmarsh presence in front of the shoreline. There would have to be shoreline retreat or expansion of the flood zone by over 50m inland to threaten the sewage treatment facility at the southeast of the unit; and 30m inland to impact a few houses along Marchwood Road.	
TEST5	Eling Creek	Redbridge	The foreshore within this unit is saltmarsh and mudflats. The main populated area is at the southwest extent of the unit, and is backed by the southern end of Totton. The flood risk areas run inland of Eling Creek (81 properties at risk), and also some of the main road on the east side of the river at Redbridge. Change of risk in this epoch may depend on the erosional status of the saltmarsh that protects this area and the low energy nature of this coastal environment.	The flood risk is likely to move inland over this timescale, impacting on approximately 463 properties. The response of the saltmarsh may be critical to moderating these effects.	
TEST6	Redbridge	Southampton Port	This is a long unit (over 9km) which contains a port frontage, built on reclaimed land. At the northern end of the unit, the majority of the container terminal area is elevated above the EA tidal flood zone 3. However, at Millbrook, the flood zone encroaches the main road (the A33) and many of the commercial premises along its southern side. Tidal flooding may be exacerbated by the fluvial flood risk from Monks Brook. To the east the flood zone stretches nearly 500m inland along the (approximately) 2km section of docks leading southeast towards Mayflower Park. Whilst this stretch of shoreline is above the EA flood zone 3 area, flooding of the docks may affect the areas behind including West Quay Road, northwest of the approach to the Red Funnel ferry terminal. In total there are 95 properties predicted to be at risk of tidal flooding in this epoch and no properties predicted to be at risk from erosion.	The docks in the vicinity of Millbrook are most at risk from rising sea-levels. The properties at risk of tidal flooding in 100 years time increases to 1249; no properties are predicted to be at risk from erosion.	

SMP1 Management Unit	Location		Epoch		
			Years 0-20 (2025)	Years 20-50 (2055)	Years 50-100 (2105)
ITCH1	Southampton Port	Ocean Village	This unit, situated on the west side of the river mouth, includes dock facilities which are located above currently anticipated flood levels that define the EA tidal flood zone 3 area. Flood defence structures may degrade during this epoch. Failure of the defences here could potentially create problems for the dock facilities.	It is predicted that over 16 properties containing 85 individual assets will be in the tidal flood zone by 2105.	
ITCH2	Ocean Village	Woodmill Lane Bridge	This unit spans approximately 7km of shoreline on the western side of the Itchen River, and is a key tidal flood risk area within Southampton. Whilst the marina area around Ocean Village is mostly outside the flood risk zone, in the vicinity of the Itchen Bridge the tidal flood extent stretches almost 800m inland, impacting on over 1895 properties. Flood defence structures may degrade during this epoch.	Tidal flood risk impacts would increase significantly to approximately 1164 properties by 2105.	
ITCH3	Woodmill Lane Bridge	Cobden Bridge	These units span over 7km of shoreline on the eastern side of the Itchen River. 526 residential properties and businesses at Bitterne and Woolston are within the EA tidal flood zone 3 risk area if flood defences fail during this epoch.	There are 1164 residential properties and businesses at risk of tidal flooding during this epoch.	
ITCH4	Cobden Bridge	Weston Point			
NET1	Weston Point	Netley Castle	The vast majority of this Policy Unit is undefended shoreline, which is naturally protected by a narrow shingle beach and approximately 350m of wide muddy foreshore. There is potential for minor tidal flooding of 174 properties to the west of the policy unit and flooding of Weston Parade Road. The potential for change in shoreline position is low, resulting in approximately 4m of shoreline erosion (0.2m/yr) by 2025. Due to the sheltered nature of the area, north-westerly transport of any new coarse material, will be limited.	The potential for flooding in the Policy Unit increases through time, affecting 184 properties by 2105 and completely flooding Weston Parade Road. The potential for change in shoreline position also increases to approximately 10m of shoreline erosion (at 0.2m/yr) by 2055 and 20m by 2105, thereby impacting on the western end of Weston Parade Road. Due to the sheltered nature of the area, north-westerly transport of any new coarse material, will be limited. There is the potential for lowering of the 350m wide muddy foreshore with sea level rise.	
NET2	Netley Castle	Netley Hard	This Policy Unit has a variety of coastal protection structures in place, the majority of which are expected to fail within year 1. This will lead to the shoreline eroding some 8m by 2025. Approximately a quarter of the material eroded is likely to be sand and gravel, which will feed local and adjacent beaches. Significant transport of this material is unlikely given the maximum significant wave heights observed here, with the finer materials removed as suspended load. These defences are fronted by a narrow natural beach and wide muddy foreshore. There is the potential for minor flooding of 9 properties, both residential and commercial, at the low lying fringes to the extreme south east of the unit.	The tidal flood risk area increases, however the number of properties affected does not increase significantly with only 12 properties now potentially at risk over the longer epochs. All coastal protection structures are predicted to have failed by 2055 leaving this stretch of coast fully exposed to natural erosion. A shoreline movement of approximately 14.8m by 2055 would begin to affect recreational and residential properties and buildings. By 2105 erosion of approximately 25m of the shoreline would effect access roads and paths, 9 residential properties and recreational buildings including the complete loss of the sailing club, flats and Victoria road. The volumes of eroded cliff sediment throughout the unit would allow widening of the narrow beach offering some protection from further losses. Given the potential for sea level rise, intertidal mudflat erosion would be exacerbated resulting in an increase of fine sediments and suspended load.	

SMP1 Management Unit	Location		Epoch		
			Years 0-20 (2025)	Years 20-50 (2055)	Years 50-100 (2105)
NET3	Netley Hard	Cliff House	<p>This unit is completely fronted by a sea wall, of which only 100m is expected to remain functional for more than 1 year. To the west there is little to no beach fronting the wall.</p> <p>Tidal flood risk over this period is negligible in terms of threat to property affecting only 1 building. The only region where there is no perceived erosion risk occurs in the east where sea defences have a residual life of 25yrs. Across the rest of the unit an erosion rate of 0.2m/yr is expected to move the current shoreline approximately 8.8m landward by 2025 resulting in the loss of the coastal path and parts of the access road running parallel to the shoreline. A quarter of the material released by this low cliff is likely to be sand and gravel, which although a low yield, may result in some growth of the existing narrow beach. Significant transport of this material is unlikely given the maximum significant wave heights observed here, with the finer materials removed as suspended load by ebb dominated tidal flow.</p>	<p>The risk of tidal flooding increases slightly over these epochs but only potentially affecting 2 residential properties.</p> <p>Defence structures are all expected to have failed by 2030 leaving this stretch of coast fully exposed to natural erosion. A shoreline movement of approximately 14.8m by 2055 will have consequences for access into Royal Victoria Country Park, possibly removing the end of Victoria road at the western margin of the unit. By 2105 the levels of erosion will result in up to 24.8m of shoreline recession, completely removing the access road to the sailing club and impacting on 2 properties. The volumes of eroded sediments supplied to the system may allow widening of the existing narrow beach. This may offer some protection acting as a negative feedback to further losses. Given the potential for sea level rise, erosion across the wide intertidal mudflat may be exacerbated resulting in an increase of fine sediments and suspended load.</p>	
NET4	Cliff House	Ensign Industrial Park	<p>A narrow steep gravelly beach stretches the entire length of this policy unit, backed by moderately vegetated low cliffs. No coastal protection structures are in place leaving the now stable region open to the possible effects of future sea level rise. A relatively wide muddy foreshore provides some degree of protection from low energy wave action. The threat of flooding posed to property is negligible; however the natural topography of the backshore means that the area at risk of flooding is wider at the east of the unit where the land is behind is lower than the beach.</p> <p>An annual erosion rate of 0.1m/yr is expected to move the current shoreline approximately 2m landward by 2025. There will be no loss to assets.</p>	<p>The area exposed to possible tidal flooding over these longer time periods is expected to increase only to the east of the unit where the land backing the beach is naturally low.</p> <p>Over these longer time periods the shoreline is expected to retreat 3m inland by 2055 and 11m by 2105. This would begin to threaten the road that runs almost parallel to the shore in front of the industrial estate, adjoining Westfield Common. The input of sediment into the system may result in the widening of the existing narrow beach offering some protection from further loss. Given the potential for sea level rise, erosion across the wide intertidal mudflat may be exacerbated resulting in an increase of fine suspended sediments.</p>	
NET5	Ensign Industrial Park	Hamble Oil Terminal	<p>This Policy unit is fronted by a relatively narrow steep gravelly beach backed by a sea wall, which only stretches the length of the oil terminal and is estimated to have a 6 year residual life. A relatively wide muddy foreshore provides some degree of protection from low energy wave action. There is the potential for flooding of the fringes of the oil terminal during this epoch which could cause damage to the equipment and buildings. An annual average erosion rate of 0.27m would result in a landward retreat of the shoreline by up to 9.1m by 2025, which would have serious consequences for the Oil refinery and its network of pipelines that run parallel to the beach. This input of sediment might result in some localised growth of the narrow beach as littoral drift is nominal and unlikely to be significant in this region.</p>	<p>The increased tidal flood risk area would impact 8 properties. Erosion is more likely to cause significant impacts given a predicted shoreline retreat of approximately 17m by 2055 and a 30m by 2105. This would result in extensive damage and disruption to the oil terminal and its network of buildings, pipelines and electrical substations. The sediment supplied through this erosion may allow some widening of the narrow beach and act as a negative feedback to further losses. Littoral drift is nominal and unlikely to be significant in this region given the small wave climate experienced here. Given the potential for sea level rise, erosion across the wide intertidal mudflat may be exacerbated resulting in an increase of fine suspended sediments.</p>	

SMP1 Management Unit	Location		Epoch		
			Years 0-20 (2025)	Years 20-50 (2055)	Years 50-100 (2105)
NET6	Hamble Oil Terminal	Hamble Common Point	A large proportion of this policy unit is fronted by a narrow beach backed by moderately vegetated low cliff and grassland. To the east of the unit there is a high revetment which is fronted by the ebb tidal delta of the Hamble (extending nearly 900m). There is the potential for widespread flooding of the boat yard and associated buildings over this period but no risk is posed to residential property. The undefended shoreline could potentially erode by 5m by the end of this epoch which would not impact on any assets.	There would not be a significant increase in extent of tidal flood risk area. Erosion of the shoreline is expected to reach approximately 13.5m by 2055, and 27m by 2105 but will not impact on any assets. These large inputs of sediment to the system could result in widening of the narrow beach and act as a negative feedback to further losses; alternatively this release of sediment could result in some growth of Hamble ebb-tidal delta.	
HAM1	Hamble Common Point	Satchell Marshes	This unit lies on the west bank of the River Hamble, comprises a marina and inter-tidal habitats, and backs onto Hamble Common. The steel sheet piled seawall will come to the end of its residual life in 20 years. There are 25 properties within the EA tidal flood zone 3 area, most are boating-related businesses. The level of risk is unlikely to change substantially over this epoch unless sea-level changes much more rapidly than currently anticipated. It is possible that increased sea-level and possibly higher fluvial flows associated with climate change could expand the flood risk zone and/or cause landward retreat of the shoreline putting pressure on the developed Hamble Village frontage, which is one of the UK's major yachting centres. There is the opportunity for marginal landward migration of inter-tidal habitats. If fine sediment input does not keep pace with sea level rise then saltmarshes will reduce in area and there will be seaward edge erosion of the mudflats as the tidal prism of the Hamble estuary increases by 2105. The existing defences will continue to cause coastal squeeze to the fronting inter-tidal habitats.		
HAM2	Satchell Marshes	Badnam Creek	These units lie on the west bank of the Hamble and are characterised by patchy defences, which will come to the end of their residual life in the next 20 years and large expanses of saltmarsh. This includes Satchell Marsh, which lies eastward of the Hamble Village, the edge of which is close to the EA tidal flood zone 3. Lincegrove and Rackett's marshes are backed by a railway line running over undeveloped land which is not currently considered part of the flood risk. There are however 10 properties in the flood risk zone. The existing defences will continue to cause coastal squeeze to the fronting inter-tidal habitats.	By 2105, 36 properties would be at risk from tidal flooding. The natural topography does not lend itself well to inland migration of inter-tidal habitats. If fine sediment input does not keep pace with sea level rise then saltmarshes will reduce in area and there will be seaward edge erosion of the mudflats as the tidal prism of the Hamble estuary increases by 2105.	
HAM3	Badnam Creek	Lands End Lane			
HAM4	Lands End Lane	Swanwick Shore Road	This unit comprises a marina, inter-tidal habitats and seawalls/revetments that will come to the end of their residual life in the next 20 years. The development at Lower Swanwick contains over 24 properties at flood risk within the EA tidal flood zone 3 area. This includes a mixture of industrial, commercial, maritime and residential property. The flood risk also covers part of the A27 main road on the Lower Swanwick side, prior to the bridge and part of the railway line on the Bursledon side. The existing defences will continue to cause coastal squeeze to the fronting inter-tidal habitats for the remainder of their residual lives.	There would be a total of 40 properties at risk of tidal flooding by 2105. There will be seaward edge erosion to the mudflat as the tidal prism of the Hamble estuary increases by 2105.	

SMP1 Management Unit	Location		Epoch		
			Years 0-20 (2025)	Years 20-50 (2055)	Years 50-100 (2105)
HAM5	Swanwick Shore Road	Crableck Marina	This unit comprises a natural bank, a proportion of Crableck Marina, inter-tidal habitats, woodland and agricultural areas, with 2 residential properties within the EA tidal flood zone 3 area. The existing defences will continue to cause coastal squeeze to the fronting inter-tidal habitats for the remainder of their residual lives.	By 2105 3 properties would be affected by tidal flooding within the EA tidal flood zone 3. There will be seaward edge erosion to the mudflat over this epoch with sea level rise.	
HAM6	Crableck Marina	Crableck Marina	This very short management unit, with approximately 350m of shoreline, comprises a steel sheet piled wall with a residual life of 20 years and contains Crableck Marina (and its boatyard). The fringes of this frontage lies within the EA tidal flood zone 3 and 2105 tidal flood zone 3, so may see disruption of its activities by flooding beginning from the first epoch. The existing defences will continue to cause coastal squeeze to the fronting inter-tidal habitats.		
HAM7	Crableck Marina	Warsash North	The clay embankment, sheltering inter-tidal habitat and undeveloped woodland, has a residual life greater than 10 years. The topography then gently slopes upwards towards developed areas inland that lie at least 50m from the edge of the EA tidal flood zone 3 extent. If the clay embankment was no longer maintained, sediment trapping would reduce, as the European designated saltmarshes would become increasingly exposed to stronger tidal currents. This would result in a reduction in area. One property is at risk of flooding in this epoch. The existing defences will continue to cause coastal squeeze to the fronting inter-tidal habitats.	15 properties would be at risk of tidal flooding by year 100. Inter-tidal areas may migrate inland marginally. If fine sediment input does not keep pace with sea level rise then saltmarshes will reduce in area.	
HAM8	Warsash North	Hook Park	A large proportion of this unit comprises intertidal habitat backed by a seawall with a residual life of less than 20 years. There would be 5 properties at risk from tidal flooding; the majority of development is set-back with the exception of the reclaimed area around the Harbour Master's Office, including a car park and sailing facilities, and the shoreline in front of the College of Nautical Studies further south. The existing defences will continue to cause coastal squeeze to the fronting inter-tidal habitats for the remainder of their residual lives.		

SMP1 Management Unit	Location		Epoch		
			Years 0-20 (2025)	Years 20-50 (2055)	Years 50-100 (2105)
EAST SOLENT					
CPU14	Solent Breezes	Hook Lake	<p>Below the beach toe this unit comprises a wide, muddy intertidal foreshore, with a predominantly narrow, gravel upper-beach containing a greater sand content towards the west at Solent Breezes where the beach is backed by a low, steep, sandstone cliff protected by gabions and boulders in front of the chalet development. These defences vary in condition and quality, the best having a residual life of over 10 years. It is predicted that the cliffed section to the east of the unit will undergo 0.4m per/yr erosion. Heading west towards the Hamble, in the direction of littoral drift, the cliffed section rapidly grades into a lower lying frontage, protected by a gravel ridge, defined as a defence with 1-10 years residual life. Sea defences here consist of an eroded sea wall of varying elevation and quality, with over 10 years residual life. Assets at risk within the EA tidal flood zone 3 are negligible.</p> <p>As the shoreline curves towards Hook Spit the foreshore narrows. Embankments with over 10 years residual life protect low-lying land from tidal flooding along the River Hamble frontage behind Hook Spit.</p> <p>Narrowing of intertidal foreshores may cause moderate acceleration of cliff retreat and a small increase in sediment supply to the shore, with gradual increase in drift potential. Hook Spit has in the past extended and recurved slowly into the Hamble Estuary, with its landward portion showing a tendency to accrete seawards, building a series of low gravel ridges at its neck and enclosing a foreland of marshy low-lying land. Whilst the Solent Breezes defences remain, a headland may begin to form which could in the long-term interfere with the north-western directed drift pathway that supplies sediments to Hook Spit, potentially leading to destabilisation of the spit.</p>	<p>Hook Spit is likely to slowly accrete further gravel ridges on its seaward face if exposed to an increased sediment supply from the failure of defences at Solent Breezes. These inputs could maintain spit stability and offset the natural tendency for it to recurve or rotate further towards the Warsash shoreline.</p> <p>Alternatively, if the Solent Breezes development has emerged as a minor headland from erosion to either side outflanking its defences, this could continue to disrupt sediment supply updrift. Under this scenario, Hook Spit could be prone to breaching, but it is probable that the Solent Breezes defences will fail before or near the start of this epoch and the eroding frontage will impact on 12 holiday homes.</p>	<p>Continued erosion at the currently anticipated rate under the NAI scenario suggests that the cliffed shoreline at the Solent Breezes end of the unit has the potential to retreat by more than 50m by 2105, threatening 12 properties. If Hook Spit does not receive sediment input from Solent Breezes then it could permanently breach, thereby forming inter-tidal habitat in it's lee.</p>

SMP1 Management Unit	Location		Epoch		
			Years 0-20 (2025)	Years 20-50 (2055)	Years 50-100 (2105)
CPU13	Hill Head Harbour	Solent Breezes	<p>The majority of this unit consists of a mixed gravel-sand upper beach and wide intertidal foreshore beyond the toe. Foreshore width narrows from 350m at the western end (where a littoral drift divide lies in proximity to the unit boundary at Solent Breezes), to 220m in front of Titchfield Haven. Most of the beach is backed by cliffs comprising Pleistocene Gravel overlying Bracklesham Sand. Recent erosion is of most concern at Chiling Cliff near Brownich Valley. Present erosion rates suggest this epoch could witness 10m of retreat between Solent Breezes and Brownich Farm; and approximately half this rate eastwards toward to Hill Head. This level of erosion could potentially pose a risk to 2 beach hut properties. The only structural defence in this unit, a concrete sea wall, protects the road in front of Titchfield Haven and has a residual life of approximately 11 years. This lies in the EA tidal flood zone 3 area, as do 48 properties immediately northwest of here including all of the beach huts.</p>	<p>By 2105 the cliffs at Chilling could have eroded by up to 50m (at an annual rate of 0.5m). The sea wall at Titchfield will have failed in the 0-20 year epoch resulting in up to 24m of erosion by 2105. The access road here will therefore have been reclaimed by the sea and Titchfield Haven would have breached and may have reverted back to being tidally dominated. The small harbour would also cease to exist. Cliff erosion may however feed and maintain foreshore levels, but the rate of cut-back may accelerate with increasing wave exposure and sea level rise, placing 35 beach hut properties at risk from coastal erosion. Increased sediment input to the system will continue to feed Brownich Spit and may even create a more substantial spit feature or cusped foreland at Titchfield Haven, possibly providing natural protection. If sediment input is not enough to build a substantial beach between the Meon and Titchfield Haven over this period, the beach will be breached flooding 48 properties and the road behind.</p>	
CPU12	Lee-on-the - Solent	Hill Head Harbour	<p>This beach is divided (almost in half) by Fareham and Gosport Borough Councils; each part with contrasting past and current management policy and processes operating, driven by variation in coastal orientation, wave exposure, sediment supply and potential economic risk behind the defence line. The intertidal foreshore at the mouth of Hill Head Harbour extends beyond 600m. The width narrows eastwards, eventually to a wider gravel upper surface with a much smaller lower foreshore at Lee-on-the-Solent, before re-widening at Browndown. Beach levels would continue to lower despite the timber groynes. The concrete sea wall has a residual life of approximately 11 years and without maintenance of the beach it may degrade significantly within this epoch. There is limited tidal flood risk. Under a NAI scenario, the cliffs would naturally retreat by approximately 10m by 2025. There is one property at risk from erosion and 10 properties at risk from tidal flooding in the 0-20 year epoch.</p>	<p>The coastline across this unit would be expected to retreat by a further 15m (a total of 25m landward from the present day) between 2025 and 2055. The rate may increase following the demise of the sea wall and reactivation of the cliffs. This could free up sediment to accumulate at Browndown and possibly Hill Head, but would threaten properties and assets of amenity value, particularly at Lee-on-the-Solent. At the Titchfield Haven end of the unit, erosion would impact on the road and 5 properties.</p>	<p>There could be a possible further 25m (a total of 50m from present day) of coastal retreat across the unit, cutting across Marine Parade and impacting infrastructure and businesses. In total, 43 properties would be at risk of erosion and 36 properties at risk of flooding by 2105. The large quantities of sediment entering the system could offer some level of natural defence, feeding and widening the beach across the whole unit.</p>

SMP1 Management Unit	Location		Epoch		
			Years 0-20 (2025)	Years 20-50 (2055)	Years 50-100 (2105)
			<p>CPU11</p> <p>Fort Gilkicker</p> <p>Browndown Ranges</p> <p>Browndown comprises a foreland structure consisting of numerous low gravel ridges, with a beach face that is narrower and steeper than at Lee-on-the-Solent. At the western end, ongoing erosion of the mid and upper foreshore observed since routine surveys began in 2003, would allow 6m of coastal retreat by 2025 but not impact on any property. This fronts a non-residential area used for military training but within the EA tidal flood zone 3 area. Heading east, Stokes Bay Road runs closely parallel to the shoreline for approximately 900m. 22 properties adjacent to the River Alver are within the EA tidal floodzone 3. The road nearby is protected by a sea wall with a residual life of approximately 10-20 years. It's foundations were exposed by a storm in 2005, indicating control of beach erosion may be key to halting potential 5-6m cut-back that would threaten the road by the end of this epoch. Towards Gilkicker, the erosion rate is similar, but land is lower lying and flood prone. At this location, residential properties are not threatened by flooding, but the 4 that are include a sailing and angling club, restaurant, inshore rescue service and golf course.</p>	<p>The future stability of the frontages at Browndown, Stokes Bay and Gilkicker Point would depend on maintenance of drift from the northwest, so may be influenced by the future management options chosen for Lee-on-the-Solent. There is expected to be an increasing rate of erosion over these epochs, with greatest coastal retreat towards the east; possibly up to 25m at the eastern end of Stokes Bay up to Gilkicker Point. Four properties would be at risk of erosion, and 89 properties would be at risk of tidal flooding by 2105.</p>	
<p>CPU10</p> <p>Fort Haslar</p> <p>Fort Gilkicker</p> <p>This unit encompasses shoreline that protects mostly MOD-owned land. This includes Fort Monckton No 1 Military Training Establishment that has its own beach. Between this location and Portsmouth Harbour entrance there is minimal beach material and reliance is on hard defences to maintain shoreline stability. Defences have a residual life less than 20 years. Without maintenance the natural coastal rate of retreat is expected to be approximately 0.5m/yr, resulting in one military property being at risk. Within the EA tidal flood zone 3 there is a Golf Course at Gilkicker Point and several military buildings.</p>	<p>When the unmaintained defences fail, beaches could be sensitive to breaching around Gilkicker Point. This could form an additional tidal inlet with associated spits and possible tidal deltas, depending on whether a lagoon or harbour forms. If a tidally influenced harbour were to form, the shoreline sediment transport systems would become increasingly segmented and complex due to new tidal connections and associated possible ebb tidal deltas. Potentially the coast could retreat by approximately 35m by 2105 compared to the present day, resulting in one private property and numerous military owned properties being at risk to erosion. In addition, a large expanse of military property and one private property would be predicted to be within the EA tidal flood zone 3.</p>				

SMP1 Management Unit	Location		Epoch		
			Years 0-20 (2025)	Years 20-50 (2055)	Years 50-100 (2105)
CPU9	Southsea Castle	Portsmouth Harbour Entrance	<p>This frontage is protected by concrete and masonry sea walls with a residual life of less than 20 years. Non-maintenance of these, could result in a breach of defences along Southsea Common, putting 1,377 properties at risk from tidal flooding. In addition, non-operation of the flood gates that protect Town Quay would exacerbate tidal flooding in Old Portsmouth. The beach narrows towards the north of Clarence Pier and is susceptible to erosion along the stretch fronting Southsea Common. There is theoretically the potential for 10m of shoreline retreat along this unit before 2025 without maintenance of shoreline defences, thereby starting to erode the promenade.</p>	<p>Failure of defences could lead to a further 10m of coastal erosion placing 7 properties at risk. With westward littoral drift there would be losses from beaches to the tidal inlet. Along the Southsea Common frontage, permanent breaches are likely with the low-lying hinterland reverting to a lagoon as it was in the 16th century, thereby flooding between 1,377- 4276 properties. The consequence of permanent breaches could see the development, over the next 20-50 years, of new tidal inlets with associated spits and possible tidal deltas, depending on whether a lagoon or harbour forms. If a tidally influenced harbour were to form, the shoreline sediment transport systems would become increasingly segmented and complex due to new tidal connections and associated possible ebb tidal deltas. It may be possible that the perimeter defences of the harbour would remain intact for some time, causing a slow increase in tidal prism with sea level rise, increasing slightly the potential for sediment to be stored within the tidal deltas and for deepening of the Harbour mouth.</p>	<p>With defences gone, the beach may migrate or erode back at an increased rate, potentially another 20m from 2055 to 2105 (a total of 40m from the present day) resulting in a loss to the promenade and causing 57 properties to be at risk from erosion. Southsea castle, an extremely valuable heritage site, would have also undergone significant damage as a result of erosion. Up to 4,276 properties are at risk of being flooded in 100 years time if a permanent breach occurred at Southsea Common or Canoe Lake (CPU8). The sediment transport system would continue to be influenced by the presence of any ebb-tidal deltas.</p>
CPU8	Hayling Ferry	Southsea Castle	<p>This unit spans approximately 4km of open coast before curving into a 1km strip up to the end of the spit that defines Langstone Harbour inlet. The exposed coastal frontage is protected by a shingle embankment, which is narrowest along the harbour inlet. This is backed by a range of flood defence structures, including masonry revetments, concrete sea walls and clay embankments. These defence components have a residual life of less than 20 years, except for part of the harbour entrance where the masonry revetment and shingle bank is defined as 1-10 years. Degradation and breaching of the defences would lead to increasingly frequent flood events along Southsea's Canoe Lake to Pitch and Putt stretch of the seafront road, impacting on up to 4,271 properties if a breach occurred at Canoe lake or Southsea Common (CPU9). Initial breaching along this frontage could occur within 10-20 years, with consequences beginning to occur at the end of this epoch and start of the next.</p> <p>In addition, potential coastal retreat of 7m is predicted at the lower lying western end of the unit, thereby impacting on the Canoe Lake to Pitch and Putt stretch of the seafront road; and 12m of potential erosion at the Eastney end where the wider beach offers greater natural protection. There is currently one property at risk of erosion in this epoch.</p>	<p>Along the Canoe Lake frontage permanent breaches are likely if existing defences are left to fail, with the low-lying hinterland reverting to a lagoon as it was in the 16th century. Thereby flooding between 4,271 - 6,653 properties. Erosion in this epoch decreases towards the eastern end of the unit, seeing only a 10m retreat between present day and 2055; whilst the Canoe Lake stretch may experience a total set-back of 25m from the present day. As a consequence of permanent breaches the development of new tidal inlets with associated spits and possible tidal deltas could be seen over the next 20-50 years. If a tidally influenced harbour were to form, the shoreline sediment transport systems would become increasingly segmented and complex due to new tidal connections and associated possible ebb tidal deltas. Only 2 properties will be affected by coastal erosion over this epoch.</p>	<p>The same slow rate of erosion would continue east of Eastney, but rising sea levels could accelerate retreat west of here, with the majority of the unit possibly set back by more than 45m from the present day by 2105, resulting in 18 properties becoming at risk of erosion along with the promenade and the seafront road. 6,653 properties are at risk of being flooded in 100 years time if a permanent breach at Canoe lake or Southsea common (CPU9) occurred. The sediment transport system would continue to be influenced by the presence of any ebb-tidal deltas. Where beach sediments are available and hinterlands are not below high tidal levels at Eastney, breaches are unlikely and would quickly become re-sealed by drift (Futurecoast).</p>

SMP1 Management Unit	Location		Epoch		
			Years 0-20 (2025)	Years 20-50 (2055)	Years 50-100 (2105)
CPU7	Inn On The Beach	Langstone Harbour	<p>the majority of the backshore land area is open space with a cusped foreland at Sinah Warren behind Gunner Point. The Inn on the Beach is protected by a substantial sea wall, whilst the shoreline immediately to the west is protected by a sloping timber revetment. These defences have a residual life of less than 20 years. As these defences deteriorate, the Inn on the Beach will cease to act as a groyne structure and could take the coastline back to the 1946 plan view shape prior to the recycling operations and installation of defences. This would result in erosion to the east of Inn on the Beach and accretion directly to the west. Erosion along the eastern side of Langstone Channel has in the past led to construction of a concrete wall, groynes and gabions to protect the Sailing Club. No active intervention would allow defences to be undermined during this epoch. There are no properties at erosion risk.</p> <p>However, the Sinah Common golf course, several properties on the harbour frontage, boatyards and the ferry terminal are all within the EA tidal floodzone 3.</p>	<p>The shoreline to the west of Inn on the beach will continue to accrete by as much as 48m. The Sinah Common golf course, 5 properties on the harbour frontage, boatyards and the ferry terminal are all within the EA tidal flood zone 3 extent.</p>	<p>By 2105 the shoreline may take a similar plan view shape to that in 1946 with accretion of up to 128 metres to the west of Inn on the beach. The Sinah Common golf course, several properties on the harbour frontage, boatyards and the ferry terminal are all within the EA tidal flood zone 3. No property is at risk from erosion.</p>
CPU6	Sandy Point	Inn On Beach On Hayling Island	<p>The 2.5km of coastline west of Eastoke could retreat by 4m over this epoch under a policy of no active intervention. It is anticipated that the Eastoke coastline to the east of the drift divide would recede by upto 42m once recharge operations stop and defences fail. In the absence of recycling operations, the shingle that passes Eastoke Point will first build out seawards to form a "ness" thereby slightly changing the configuration of Chichester Harbour inlet. It is considered that eventually the accumulation of shingle at the "ness" would also starve the beaches at Black Point spit, possibly leading to a breach in the vicinity of the coast guard station or further northward along the narrow spit leading to the Sailing Club (Eastoke Strategy).</p> <p>No properties are predicted to be in the erosion zone for the 0-20 year epoch, and 271 properties within the EA flood zone 3 area due to its low lying topography and wave exposure.</p>	<p>Historic rates of shoreline recession along the Eastoke frontage have been much higher than those seen recently, perhaps reflecting the roll back of a barrier system. Once the defences have completely failed, which may be before or near the start of these epochs, erosion would be rapid as the beach reaches an equilibrium. For the section of beach directly east of Inn on the Beach, it is predicted that once the rapid erosion between 20-50 years has subsided the beach will revert back to a more uniform rate of erosion for the 50-100 year epoch. Over 170m of retreat from the present day along the 1.5km developed stretch of shoreline between Eastoke and the Chichester Harbour Entrance would cause loss of 726 properties and extend the existing flood risk zone further north impacting on 1,432 properties.</p>	

SMP1 Management Unit	Location		Epoch		
			Years 0-20 (2025)	Years 20-50 (2055)	Years 50-100 (2105)
CPU5	Cakeham Estate	East Head	Non-maintenance of the gabions, timber breastwork and groyne which defend the western and central open coast of this unit could rapidly lead to degradation of these structures by year 20. The eastern 1.7km of this unit could retreat by approximately 40m by 2025 (1.9m/yr) with no properties predicted to be in the erosion zone for the first 20 years. 75 properties would lie within the EA flood zone 3 map along the open coast and at West Wittering. In the absence of defences or beach management there is a high probability of a major permanent breach occurring within 10 years.	Following deterioration of the defences the eastern 1.7km of this unit could retreat by an additional 55m by 2025. A total of 13 properties would be at risk from erosion by year 50.	The eastern 1.7km of this unit could retreat 190m inland by 2105, putting 56 properties at risk from erosion. The western end of the unit could see erosion of one property over the 100 years. East Head may benefit from an increase in sediment supply from erosion of the shore to the east, due to the westward sediment supply. Accretion may widen its neck to reduce the probability of breaching, and seal any previous breach. 381 properties would now be at risk to tidal flooding.
CPU4	Bracklesham	East Wittering	This unit contains historically eroding cliffs, protected by sea walls, timber breastworks and groyne. The clay beach platform has in recent years undergone long term erosion, but benefits from material moving alongshore from management operations updrift in CPU3. Defences are likely to collapse within this epoch, given their residual lives of 6-11 years, threatening 24 properties through the process of coastal erosion (at 1m/yr). 337 properties would be at risk from tidal flooding, but would increase due to overtopping as upper beach levels diminish.	The dynamic nature of this shoreline and transition that would be occurring along Bracklesham Bay in response to no management suggests that between 2025-2055 30m shoreline retreat is anticipated, and a further 50m by 2105 taking the total set-back from the present day to 100m. This would result in the loss of several roads and 508 properties in East Wittering and Bracklesham, and place up to 1,958 properties at risk from tidal flooding.	
CPU3	West Beach	Bracklesham	The entire length of this frontage comprises a shingle storm ridge overlying a flat sandy foreshore, which is the main line of defence to the flood prone hinterland. The flood risk area extends a considerable distance inland, far enough north to connect with Pagham Harbour, with the potential inundation area including 409 properties, a major caravan park, farmland and a holiday village at the western end of the unit. In the absence of defences or existing beach management, which currently involves regular recycling and reprofiling of the beach face; the geomorphological response would involve barrier breaching with a strong potential to form tidal inlets, thereby creating a new harbour/embayment for large areas of hinterland below mean sea level. Further east in the unit, the un-defended section of cliff line between the caravan park and Selsey is predicted to erode 26m by 2025. The defended cliffs fronting Selsey are predicted to erode at the same annual rate of 1.3m per annum, however, the defences are predicted to provide protection for the next 10 years. Following this, erosion will commence, impacting on 5 to 33 properties in the first epoch.	By year 20-50, one of two scenarios could occur at Medmerry, depending on sediment supply volumes. Where sediment supply continues or increases, a permanent inlet would form in the Medmerry shingle ridge, thereby creating a harbour with inter-tidal habitat and an ebb tidal delta; where an ebb tidal delta may form, wave patterns and sediment transport will be altered, thereby changing sediment transport downdrift at Bracklesham. If sediment supply was not sufficient to sustain any form of beach in the form of spits, then the existing shingle ridge would be completely overwashed, thereby forming an embayment behind. At Selsey Bill, erosion would continue, but would be moderated by the presence of the Mixon Reefs 2-3km offshore, and the variable presence of Kirk Arrow Spit and sediments yielded by erosion of raised beach deposits. Thus, a headland feature should remain; thereby continuing to exert control over the coastlines to its east and west (Futurecoast). It is predicted that 9 to 67 properties will be eroded by 2055 and 22-128 by 2105, and 479 properties could be at tidal flood risk. Futurecoast predicts that in the significantly longer term (100-300 years) the complete loss of Selsey Bill and transgression of the shoreline by several kilometres landward across the coastal plain should be anticipated; which could potentially re-seal Medmerry if enough sediment was transported north-west from Selsey.	

SMP1 Management Unit	Location	Epoch		
		Years 0-20 (2025)	Years 20-50 (2055)	Years 50-100 (2105)
Portsmouth Harbour		<p>Portsmouth Harbour, one of three natural harbours along this subsection of coast with a significantly high population density fringing its shores, occurs on the low ground formed by gently dipping Eocene and Oligocene beds that during lower Quaternary sea levels had their bases incised by rivers. The broad shape of the harbour formed during the flooding of the lower courses of these palaeo-rivers, although the harbour has since been subject to anthropogenic and natural modification to its current form (Futurecoast). The harbour is characterized by wide expanses of mudflat and saltmarsh at low tide. The mean tidal range is 1.9m; tidal currents primarily control the sediment transport within the harbour given its restricted opening and low exposure to wave energy. As the ebb tide is the dominant tidal flow in this region, net sediment transport is directed out of the centre of Portsmouth Harbour where it is moved offshore and deposited on Spit Sands and Hamilton Bank.</p>		
		<p>There is a broad range of defences around the harbour that include concrete seawalls, embankments and aprons, piling, shingle banks, revetments, splash walls, and vegetated banks. The evolution of Portsmouth Harbour over the next 100 years is very much dependent on sea level rise and failure and breaching of existing defences, many of which have already reached the end of their residual lives or are expected to fail within 10 years. Flooding of the low lying hinterland is therefore one of the major threats to property fringing the harbour with 6,205 properties in the EA floodzone by the end of 2025 and up to 13,849 by 2105. Properties placed at risk as a function of coastal erosion, whilst small in comparison to those affected by flooding, are still significant given that up to 9m of erosion by 2105 will impact on over 601 properties and businesses.</p> <p>As a function of the predicted rates of sea level rise and possible consequent breaching of hinterland the tidal prism of the harbour would increase substantially. This may result in an increased volume of sediment stored being transported out of the harbour and deposited on Spit Sands and Hamilton Bank, which may have a negative impact on shipping unless dredged. The fixed engineered nature of the harbour entrance would prevent channel widening as a response to the increased tidal prism and would therefore deepen instead. However is the sea walls in place were to have failed the channel could be expected to widen with implications for infrastructure located here. Given the increase in tidal flows experienced within the harbour over the next 100 years the inter-tidal habitats may continue to erode at an accelerated rate, being replaced with the already extensive mudflats. As the defences around the harbour breach there may be some opportunities for inter-tidal habitat creation thereby offsetting some of the loss. However, this may be at the expense of designated transitional freshwater SPA habitats and bird high tide roosting and feeding sites.</p>		
Langstone Harbour		<p>Langstone Harbour is one of three natural harbours along this subsection of coast and has a relatively high population density fringing its shores. It occurs on the low ground formed by gently dipping Eocene and Oligocene beds which, during lower Quaternary sea levels had their bases incised by rivers. The broad shape of the harbour formed during the flooding of the lower courses of these palaeo-rivers, although the harbour has since been subject to anthropogenic and natural modification to its current form (Futurecoast). The harbour is characterized by extensive intertidal and wetland habitats along with several nature reserves, bird high tide roosting and feeding sites, and marshes especially surrounding the numerous small islets. The mouth has two long recurved shingle spits, and there is an extensive ebb tidal delta offshore, the Winner Bank, which has been used for aggregate extraction. The beaches on either side are of shingle protected by groynes. There are embankments protecting the surrounding low-lying areas from flooding, and there has been considerable reclamation in the past, though the shoreline is relatively undeveloped compared to Portsmouth Harbour.</p> <p>A narrow channel connects the harbour through to the neighboring Portsmouth Harbour at high water, whilst a small channel to the north of Hayling Island connects it to Chichester Harbour, with the small water exchange being controlled by wind effects. The harbour contains extensive shellfish beds, and there have been recent works to improve the nature conservation properties of the system (Futurecoast).</p>		
		<p>There is a broad range of defences around the harbour that include concrete seawalls, embankments and aprons, piling, shingle banks, revetments, splash walls, and vegetated banks. The evolution of Lanstone Harbour over the next 100 years is very much dependent on sea level rise and failure and breaching of existing defences, many of which have already reached the end of their residual lives or are expected to fail within 10 years. Flooding of the low lying hinterland is therefore one of the major threats to property fringing the harbour with 4766 properties in the EA floodzone by 2025 and up to 11,870 by 2105. Some of the reclaimed inter-tidal areas are in fact not at risk of flooding because they have been infilled and now sit above EA tidal flood zone 3. The number of properties placed at risk as a function of coastal erosion is less significant in comparison to those affected by flooding, with up to 25m of erosion by 2105 impacting only 30 properties. The low cliffs to the east of the harbour along Hayling Billy will be expected to show significant erosion.</p> <p>As a function of the predicted rates of sea level rise and possible consequent breaching of hinterland, the tidal prism of the harbour may increase substantially. This may result in an increased volume of sediment stored being transported out of the harbour and deposited on the Winner Bank and foreshore of Hayling Island. The engineered nature of the harbour entrance may hinder further channel widening as a response to the increased tidal prism and it may therefore have to deepen instead. However if the sea walls and armour in place were to have failed as expected, the channel could be expected to widen with implications for infrastructure located here. Given the increase in tidal flows experienced within the harbour over the next 100 years the inter-tidal habitats may continue to erode at an accelerated rate, being replaced with the already extensive mudflats. As the defences around the harbour breach there may be some opportunities for inter-tidal habitat creation thereby offsetting some of the loss. However, this may be at the expense of designated transitional freshwater SPA habitats and bird high tide roosting and feeding sites.</p>		

SMP1 Management Unit	Location	Epoch		
		Years 0-20 (2025)	Years 20-50 (2055)	Years 50-100 (2105)
Chichester Harbour	<p>Chichester Harbour is one of three natural harbours along this subsection of coast and probably has the lowest population density of the Solent harbours fringing its shores. It occurs on the low ground formed by gently dipping Eocene and Oligocene beds which, during lower Quaternary sea levels had their bases incised by rivers. The broad shape of the harbour formed during the flooding of the lower courses of these palaeo-rivers, although the harbour has since been subject to anthropogenic and natural modification to its current form. The harbour is characterized by extensive intertidal and wetland habitats along with several nature reserves, bird roosting sites and marshes. It is a symmetrical tidal inlet, with extensive spits of sand and gravel. The mouth is narrow and the spits are subject to frequent modification by wave action during storms. The harbour is shallow and generally muddy and connected to Langstone Harbour by a small channel to the north of Hayling Island. There is an oyster fishery, and sailing and recreational interests. There is dredging at the mouth where there is a well-developed ebb tidal delta that has been exploited for gravel. There are only a few small streams that enter the harbour and the river flow is very small (Futurecoast).</p> <p>There is a broad range of defences around the harbour that includes seawalls, defended cliffs, shingle beaches, revetments and embankments. The evolution of Chichester Harbour over the next 100 years is very much dependent on sea level rise and failure and breaching of defences, many of which have already reached the end of their residual lives or are expected to fail within the first epoch. Flooding of the low lying hinterland is therefore one of the major threats to property fringing the harbour with 1139 properties in the EA floodzone by 2025 and up to 3196 by 2105. The number of properties placed at risk as a function of coastal erosion is less significant in comparison to those affected by flooding, with up to 25m of erosion by 2105 impacting 123 properties.</p> <p>As a function of the predicted rates of sea level rise and possible consequent breaching of hinterland, the tidal prism of the harbour may increase substantially. This may result in an increased volume of sediment stored being transported out of the harbour and deposited on the ebb tide delta and east pole sands. Given that the harbour mouth is already anomalously high (Futurecoast) further widening may not occur for some time in response to the increase in tidal prism.</p> <p>In the absence of defences or beach management at East Head there is a high probability of a major permanent breach occurring within 10 years. If this were to occur the shoreline sediment transport systems would become increasingly sedimented and complex due to new tidal connections and associated possible ebb tidal deltas.</p> <p>Given the increase in tidal flows experienced within the harbour over the next 100 years the inter-tidal habitats may continue to erode at an accelerated rate, being replaced with the already extensive mudflats. As the defences around the harbour breach there may be some opportunities for inter-tidal habitat creation thereby offsetting some of the loss. However, this may be at the expense of designated transitional freshwater SPA habitats and bird high tide roosting and feeding sites.</p>			

C4 SCENARIO REF: BASELINE CASE 2 – WITH PRESENT MANAGEMENT

C4.1 Introduction

This section provides an analysis of shoreline response assuming the scenario of “With Present Management”. This scenario has considered that all existing defence practices will continue, accepting that in some cases this will require considerable improvement to present defences in order to maintain their integrity and effectiveness.

SMP1 Management Unit	Location		Epoch		
			Years 0-20 (2025)	Years 20-50 (2055)	Years 50-100 (2105)
WEST SOLENT					
CBY7 and LYM1	Hurst Spit	Hurst Spit	The managed spit would continue to provide flood protection to the Western Solent coastal zone. Sediment recycling from North Point would maintain the navigation channel entrance to Keyhaven River, although the morphology of the saltmarshes and network of creeks and river channels would alter in response to continuing erosion of the saltmarshes in the lee of the spit. There is potential for flooding of 1 property.	The lee of the spit would become more exposed once the saltmarshes in Keyhaven estuary have reduced in areal extent and cease to provide dissipative protection from easterly storm waves. Adaptive management for the tip of North Point may be required in response to variable hydrodynamic conditions and sediment supply. There is potential for flooding of 1 property.	
LYM2 and 3	Saltgrass Lane	Lymington Yacht Haven	The concrete seawall that runs between Lymington and Pennington would continue to provide protection to properties and former landfill sites from tidal flooding despite the continued loss of fronting inter-tidal habitats, such as mudflat and saltmarsh. However, intervention would be required to increase the crest height and width of the seawall section between Pennington outfall and Saltgrass Lane, Keyhaven, to prevent inundation of the former landfill sites and flooding of Keyhaven village. The existing design assumed the width of saltmarsh would remain, acting as a natural flood defence. The incidence of waves overtopping the structure, between Lymington and Pennington may increase, thereby impacting on the designated habitats and nature reserve behind the wall.		
LYM4	Lymington River	Lymington River	The collection of privately owned and publicly maintained flood defences have a variety of crest heights and conditions along this frontage. The tidal limit of the Unit would remain at Bridge Road, which contains sluice gates that release flood waters into the estuary under low tide conditions. There would be no change in shoreline position, but the extent and vigour of the estuary's inter-tidal mudflats and saltmarshes would continue to reduce. The potential for tidal flooding of the low lying frontage on the east bank, particularly under severe storm surge conditions coincident with either heavy rainfall or large volumes of floodwaters flowing downstream, would remain.	There would be no change in shoreline position or landward extent of tidal waters, due to location of existing defences; the extent and vigour of the estuary's inter-tidal mudflats and saltmarshes would continue to reduce. The reduced extent of intertidal estuary habitats would result in more serious wave climate conditions, with larger wave heights being experienced under southerly or south-easterly storms further into the inner harbour area of the estuary. The potential for storm surges to cause tidal flooding, would remain.	
LYM5	Elmer's Court	Pitt's Deep	The vast majority of this Policy Unit is undefended shoreline, which is naturally protected by varying widths of eroding saltmarsh and inter-tidal mudflats; an individual private property is protected with timber groynes and a revetment. There is potential for minor flooding of the low lying fringes but the natural topography limits the extent of flooding. It is anticipated that there would be no change in shoreline position, but the extent of inter-tidal mudflats and saltmarshes would continue to reduce. Erosion of inter-tidal habitats would continue to release fine sediments, a high proportion of which would be transported from the estuary by ebb-dominant tidal currents.	The saltmarshes would be completely eroded between 2040 and 2050, and the inter-tidal mudflats would continue to erode but continue to provide protection to the naturally rising, undefended shoreline and existing defences. The timber groynes and revetment will require maintenance in this epoch. There would be potential for minor flooding of the low lying fringes but the natural topography limits the extent of flooding. There will be no significant change in shoreline position. Further erosion of inter-tidal habitats would result in an increase in fine sediments, a high proportion of which would be transported from the estuary by ebb-dominant tidal currents.	Due to the varying widths of inter-tidal habitat it is estimated that the natural flood defences will continue to provide a degree of protection to the undefended shoreline until 2105 and to existing defences until 2050. With predicted increases in sea level rise, further inundation of low lying fringes is anticipated but natural topography will limit extent of flooding. Erosion of the undefended shoreline would result in an introduction of coarser material forming a narrow fringing beach. It is predicted that rates of sediment transport eastwards would be low.

SMP1 Management Unit	Location		Epoch		
			Years 0-20 (2025)	Years 20-50 (2055)	Years 50-100 (2105)
LYM6	Pitt's Deep	Warren Farm Spit	<p>The Policy Unit was recently characterised by a spit system at Sowley, with a revetment defending the remainder of the shoreline to the east. The spits re-sealed in 2008 to form a continuous beach. The revetment will require maintenance in this epoch. An erosion rate of 0.1m/yr will commence by year 2010. Low amounts of coarser material would be introduced to the system supplying material to the narrow fringing beaches. It is predicted that rates of sediment transport eastwards would be low. There is potential for flooding of the low lying fringes but the natural topography limits the extent of flooding.</p>	<p>If sediment input ceases then the spits would be prone to overwashing and breaching, particularly with increases in sea level rise. Low amounts of coarser material would be introduced to the system supplying material to the narrow fringing beaches. It is predicted that rates of sediment transport eastwards would be low. There is potential for flooding of the low lying fringes but the natural topography limits the extent of flooding.</p>	
LYM7	Warren Farm Spit	Gull Island	<p>The undefended shoreline is a narrow sinuous spit feature that extends eastwards to the mouth of the Beaulieu River. The natural topography would limit the extent of flooding of the low lying land either side of the river. The spit would continue to rapidly respond to hydrodynamic conditions with landward rollover/migration rates of up to 1m/yr expected. There would be no change in the position of the naturally rising shoreline, as it would be protected by significant areas of saltmarsh, inter-tidal mudflat and freshwater habitats, located in the lee of the spit and within the river estuary. The easterly sediment transport rates would remain low.</p>		
LYM8	Beaulieu River	Beaulieu River	<p>This Policy Unit covers the Beaulieu Estuary which is comprised of a meandering estuary channel, surrounded by inter-tidal mudflats and saltmarshes which provides natural protection to the shoreline. Towards the mouth of the river, the estuary widens and the expanse of inter-tidal habitat increases. The majority of the estuary is undefended, apart from the low embankment protecting isolated properties and the freshwater SPA at the western mouth of the estuary. There is limited potential of tidal flooding for the hinterland adjacent to the meandering channel because of the natural topography. However, towards the mouth of the river where the defences are located on the west side, there is potential for extensive flooding of the transitional freshwater SPA habitats. It is anticipated that there would be no change in shoreline position but the extent of inter-tidal mudflats and saltmarshes would be reducing; it is estimated that the saltmarshes will disappear between 2033 - 2105.</p>	<p>There is limited potential of tidal flooding for the hinterland adjacent to the meandering channel because of the natural topography. However, towards the mouth of the river where the defences are located on the west side, the risk of breaching of the low embankments will increase unless maintenance is implemented to mitigate extensive flooding of the freshwater SPA. It is anticipated that there would be no change in shoreline position, but the saltmarsh extent will be drastically reducing. It is estimated that the saltmarshes may virtually disappear by 2033 - 2105. Further erosion of saltmarshes would result in an increase in fine sediments, a high proportion of which would be transported from the estuary by ebb-dominant tidal currents.</p>	

SMP1 Management Unit	Location		Epoch		
			Years 0-20 (2025)	Years 20-50 (2055)	Years 50-100 (2105)
LYM 9 and LYM 10	Inchmery	Stansore Point	The cliffed section of this frontage, which has relict timber groynes, will become more exposed to wave conditions as Needs Ore point and Gull Island are eroded or migrate landwards, which may alter the local hydrodynamics at the mouth of the Beaulieu River. The concrete seawall will continue to protect the coast road; the tidal regulated exchange sluice within the seawall enables the floodplain behind the defence to naturally convert to more saline conditions in a controlled manner.	The cliffed section would experience erosion under more exposed conditions, although this process may provide some cliff toe protection. Beach sediment transport rates and volumes would be relatively low. The existing defences at Lepe Country Park would be ineffective to prevent flooding of the car park and its amenities, which would either need to be relocated or abandoned unless other defences were implemented or the existing ones were maintained. All the defences here are expected to reach the end of their residual lives between 25-50 years. There is 1 property potentially at risk from flooding.	
LYM 11 and LYM 12	Stansore Point	Hillhead, Calshot	The historic wartime remains would continue to be gradually undermined by natural processes. This largely sheltered frontage, mainly undefended would remain relatively stable, with minor migration of beach crest or cliff toe under severe storm conditions. At Bourne Gap the low beach level, that currently forms a 'managed' barrier to tidal flooding under severe storm conditions, would need to be maintained, to prevent saline flooding of designated freshwater habitats. Defences in this unit are expected to reach the end of their residual lives within 25-50yrs.	Under rising sea levels and slightly higher erosion rates down drift, the beaches would generally accrete, but migrate landwards under severe storm conditions through erosion at cliff toe. Maintenance of the short length of barrier beach at Bourne Gap would be required, to prevent saline flooding of designated freshwater habitats. There is 1 property potentially at risk from flooding.	
LYM 13 and LYM 14	Hillhead, Calshot	Calshot Spit	Softwood timber revetments and groynes extend along the length of the shingle barrier beach and have residual lives of between 6 - 35 years . The position, width and crest height of the barrier beach have remained stable over the period of available data. The rates of sediment transport along the spit are relatively low, but occasionally sediment is recycled onto this section being dredged from the 'elbow' of Calshot Spit. The defences provide limited flood protection to beach huts and low lying hinterland, which has been reclaimed. There is one property at risk from flooding.		
LYM 14	Calshot Spit	Calshot Spit	Calshot Spit extends north-eastwards and affords limited protection from storm waves to the saltmarshes in its lee and to Southampton Water. Softwood timber revetment and groynes extend 250m from the southern boundary of the Unit towards the 'elbow' on the Solent facing frontage; the remaining frontage contains relict timber groynes and a concrete wall along the Calshot Activity Centre which does provide flood protection. The numerous buildings and access route associated with the Calshot Activity Centre would be affected by extreme water levels. On the lee side of the spit there is a short section of timber wall, which is in poor condition. The rates of sediment transport along the spit are low, but occasional recycling from the distal end of the recurved Calshot Spit onto the main beach section would be required. The major and increasing risk to this frontage is tidal flooding due to sea level rise. It is estimated that the barrier beach would erode up to 1.0m/year, which would cause the spit to narrow. Considering the 'fixed' nature of the spit, the width of the spit, prevailing conditions and low rates of sediment supply, significant rollback of the spit would be inhibited. Under a severe storm event, the spit would experience catastrophic failure and complete breaching.		

SMP1 Management Unit	Location		Epoch		
			Years 0-20 (2025)	Years 20-50 (2055)	Years 50-100 (2105)
FAW1	Lee Of Calshot Spit	Lee Of Calshot Spit	This unit spans the back of Calshot Spit, and is a low energy environment featuring saltmarshes and mudflats within the Calshot Marshes Local Nature Reserve. Much of the land is undeveloped, with the waters used for sporting activities. The existing defences are aimed at prevention of flooding to protect developments on the spit. Due to the low-energy nature of this environment it is unlikely that much change to defences would be required in this unit over this epoch to maintain the current shoreline position.	The defences will require significant upgrade in this epoch in order to maintain the existing shoreline as the saltmarshes decrease in area. The defences will continue to cause coastal squeeze to the fronting inter-tidal habitats. Management of the front of Calshot Spit (LYM14) will continue to protect the marsh areas shielded behind it. The elbow of Calshot Spit may require defences in this epoch to avoid a breach, if the existing accumulation of sediment moves north. This will maintain the integrity of the spit and access to the activity centre.	
FAW2	Lee of Calshot Spit	Fawley Power station	This unit contains grassland that is mostly reclaimed land, fronted by saltmarshes. The existing defences will continue to cause coastal squeeze to the fronting inter-tidal habitats.		
FAW3	Fawley Power station	Fawley Power station	The EA tidal floodzone 3 covers most of the Fawley Power Station site, built on reclaimed land. The main buildings are above the currently perceived flood risk. The power station is obviously a major economic asset that will require protection through maintenance of existing defences. However this will continue to cause coastal squeeze to the fronting inter-tidal habitats.	The flood risk is likely to increase with sea-level rise, so whilst the power station remains an asset within these epochs, existing defences will probably have to be upgraded. These may have to compensate for depleted saltmarsh and mudflats. The existing defences will continue to cause coastal squeeze to the fronting inter-tidal habitats.	
FAW4	Fawley Power station	Fawley Oil Refinery	This 1.2km long stretch of coastline is mostly undeveloped land owned by Esso, and backed by the village of Fawley, the hamlet of Ashlett, and agricultural land belonging to the Cadland Estate. Ashlett contains a couple of houses in the EA tidal floodzone 3. The existing defences will continue to cause coastal squeeze to the fronting inter-tidal habitats.	Depending on the amount of sea-level rise over this period, the current flood extent may reach east Fawley, whilst usage of Ashlett Creek for boating and leisure activities may have to be adapted for higher water levels, including improved/heightened defences to protect facilities and 3 residential properties at risk. The existing defences will continue to cause coastal squeeze to the fronting inter-tidal habitats.	
FAW5	Fawley Oil Refinery	Fawley Oil Refinery	This unit contains Fawley Oil Refinery, which is one of the largest in Europe. The EA tidal floodzone 3 extends up to 1km inland for a 500m long section of the refinery site behind the jetty area at the southern end of the unit. The existing defences will require maintenance and upgrades however will continue to cause coastal squeeze to the fronting inter-tidal habitats.	Whilst the oil refinery remains a valuable asset during these epochs, defences fringing and within the site will have to be maintained and improved to control flood risk, along with management of the adjacent low-lying land. The existing defences will continue to cause coastal squeeze to the fronting inter-tidal habitats.	
FAW6	Fawley Oil Refinery	Hythe Sailing Club	This unit is mostly wooded or agricultural, and includes a railway line and road, which both run close to the marsh that fronts the shoreline. Shore Road at the western half of the unit is within the EA tidal floodzone 3. The existing defences will continue to cause coastal squeeze to the fronting inter-tidal habitats.	Over the longer term, the road at the north-western area of the unit and the railway that runs almost parallel to the shoreline may have to be protected by structures to prevent flooding and shoreline retreat caused by sea-level rise. The marshes fronting the unit will probably contribute to reducing risk, and the behaviour of these over this epoch may be important. The existing defences will however continue to cause coastal squeeze to the fronting inter-tidal habitats.	

SMP1 Management Unit	Location		Epoch		
			Years 0-20 (2025)	Years 20-50 (2055)	Years 50-100 (2105)
			FAW7	Hythe Sailing Club	Hythe Marina
TEST1	Hythe Marina	Marchwood Military Port	The coastline is within Dibden Bay, which is owned by ABP Southampton. The mud and shingle foreshore comprises a narrow upper beach except for a section around the middle of the unit where sheet piling maintains the shoreline position. Hythe Marina at the southwest end is the only developed area. This land appears to lie above the level that would potentially be inundated by the EA tidal floodzone 3 classification and is unlikely to require much management within this epoch to prevent a significant change in shoreline position.	Maintenance of the existing structures protecting Hythe Marina may be required to maintain use of this facility at the south-eastern extent of this unit, with possible consequences for Hythe itself. If the shoreline position is to be maintained, the sheet piling would probably have to be replaced during these epochs, although allowing the beach to re-form may be a preferable long term solution to reduce the coastal squeeze effect to the mud and shingle foreshore.	
TEST2	Marchwood Military Port	Cracknore Hard	The northwest area of this 850m stretch of shoreline is backed by Marchwood Military Port, and Cracknore Hard (an industrial area). The majority of land in the middle of the unit is at present undeveloped but the northwest half of the unit is within the EA tidal floodzone 3 which extends more than 600m inland, and putting 7 properties potentially at risk of flooding.	Ongoing use of Cracknell Hard over this time scale will probably require construction of defences to reduce flood events that would inevitably impact on use of the existing facilities. Any new developments will need to consider the potential for flooding in this area. The military port, which is not currently within the EA flood zone, will presumably continue to maintain defences around the site to control flood risk and erosion. There are potentially 7 properties at risk of flooding.	
TEST3	Cracknore Hard	Royal Navy Armaments Depot	This unit's coastline includes business, industrial and office developments that front the main area of residential housing in Marchwood. The flood risk zone covers 337 properties. The open space behind Marchwood incinerator, and the road and surrounding area at Cracknell Hard are also within the EA tidal flood zone 3. There is no intertidal foreshore, but the sea wall runs along the length of the unit will require maintenance to maintain shoreline position. The existing defences will continue to cause coastal squeeze to the fronting inter-tidal habitats.	Additional defences may have to be considered to reduce flood risk under increased sea-level to Marchwood (the main area of this development currently lies at the edge of the flood zone). The developed area of Marchwood at the western edge of the unit will require flood defences capable of protecting it from high water levels, since it is already in the EA tidal floodzone 3. There is also the potential for up to 10m of erosion without defence upgrades, which could then begin to effect the structural integrity of the incinerator and surrounding buildings.	
TEST4	Royal Navy Armaments Depot	Eling Creek	This is a predominantly agricultural and wooded length of shoreline including the village of Eling, which is currently outside the EA tidal floodzone 3.	The majority of the unit, including Bury Road, a few houses and the sewage treatment works near Bury Farm (at the eastern end of the unit) lie well behind the shoreline (>100m), and outside the current EA tidal floodzone 3, so are not a key risk area. Eling Tide Mill is a Grade 2 listed building, and will require maintenance and possibly improvisation of the sea gates as an essential flood defence. Saltmarsh fronts most of the unit. Results from the SDCP (Cope et al, 2007) suggest that for Southampton Water, projected change under present management would be a slight decrease in saltmarsh evolution, whereas adoption of re-alignment as a management strategy would potentially replace the same amount lost.	

SMP1 Management Unit	Location		Epoch		
			Years 0-20 (2025)	Years 20-50 (2055)	Years 50-100 (2105)
TEST5	Eling Creek	Redbridge	The foreshore within this unit is saltmarsh and mudflats. The main populated area is at the southwest extent of the unit, and is backed by the southern end of Totton. The flood risk areas includes a small stretch inland of Eling Creek, and also some of the main road on the east side of the river at Redbridge. The flood zone lies less than 50m from urban areas of Totton, including the Civic Centre. Change of risk in this epoch may depend on the erosion status of the saltmarsh that protects this area. This unit may be quite safe from much change during this epoch due to the low energy nature of this coastal environment.	The Flood risk is likely to migrate landward during this epoch given the potential for sea level rise and river flooding. The response of the saltmarsh may be critical to moderating these effects however given the relatively close proximity to infrastructure re-alignment is not viable and therefore additional defences may have to be considered to reduce these risks, to the detriment of saltmarsh evolution.	
TEST6	Redbridge	Southampton Port	Flood risk to the southern end of Totton where the flood zone lies less than 50m from urban areas, may depend upon the erosional status of the saltmarsh within this epoch. This unit may be quite safe from much change due to its low energy exposure and existing natural and structural defences probably offering adequate protection. The road at Millbrook will need to be protected by maintenance of existing defences to minimise flooding along this busy transport route.	The flood risk is likely to migrate landward over this timescale due to the possibility of climate change causing rising sea-level and increased fluvial flows. The response of the saltmarsh may be critical to moderating these effects, but if this becomes compromised additional defences will have to be considered to maintain the existing hold the line policy, to protect Totton and the transport infrastructure on the opposite side of the river.	
ITCH1	Southampton Port	Ocean Village	This unit, situated on the west side of the river mouth, includes ABP-owned dock facilities that are located above currently anticipated flood levels that define the EA tidal flood zone 3 area.	The EA tidal flood zone 3 will have increased in area to encompass 16 properties containing up to 85 individual assets. Upgrades to existing defences will be necessary in order to minimise this risk and in order to prevent any erosion that might result from the strong tidal flows here.	
ITCH2	Ocean Village	Woodmill Lane Bridge	This unit includes part of the ABP owned dock facilities and Ocean Village. Defences will need to be upgraded and maintained in order to reduce the risk of flooding to the 1895 or more properties in the EA tidal floodzone 3 area.	The flood risk area will have significantly increased in size by the end of this epoch to encompass just under 5000 properties. Flood defences will need to be significantly upgraded to a higher standard than is currently in place. This could therefore lead to a higher potential for coastal squeeze and subsequent loss of the mudflats fronting the defences at low water, given the expected rates of sea level rise.	
ITCH3	Woodmill Lane Bridge	Cobden Bridge	The sea walls, revetments and gabions that run along this stretch of coastline have residual lives of 10 years or less. To prevent the tidal flooding of approximately 526 properties these defences would need to be maintained or upgraded. Erosion risk is minimised to tidal and riverine flow but would need to be taken into account when upgrading defences in order to maintain the current shoreline position.	Over this epoch the EA tidal floodzone will have significantly increased in size encompassing 1164 assets. To maintain the integrity of the shoreline and manage this significant flood risk, all of the defences across this stretch of coastline will require substantial upgrades.	
ITCH4	Cobden Bridge	Weston Point			

SMP1 Management Unit	Location		Epoch		
			Years 0-20 (2025)	Years 20-50 (2055)	Years 50-100 (2105)
NET1	Weston Point	Netley Castle	The vast majority of this Policy Unit is undefended shoreline, which is naturally protected by a narrow shingle beach and approximately 350m of wide muddy foreshore. To reduce the potential for minor flooding of approximately 174 residential properties to the west of the policy unit and flooding of Weston Parade Road existing or new defences may be need to be upgraded or put in place. The potential for change in shoreline position is low, resulting in approximately 4m of shoreline erosion (0.2m/year) by 2025. Due to the sheltered nature of the area, north-westerly transport of any new coarse material, will be limited.	The potential for flooding in the Policy Unit increases through time, with up to 184 residential properties in the flood risk zone by 2105. The potential for change in shoreline position also increases to approximately 10m of shoreline erosion (at 0.2m/year) by 2055 and 20m by 2105, with the potential to impact on the western end of Weston Parade Road. To minimise the potential for this tidal flooding and coastal erosion the existing beach may need replenishing and more defences may be required to maintain the standard of defence. Due to the sheltered nature of the area, north-westerly transport of any new coarse material, will be limited. There is the potential for lowering of the 350m wide muddy foreshore with sea level rise.	
NET2	Netley Castle	Netley Hard	This Policy Unit has varying levels of coastal protection and defence in place including sea walls, gabions, sheet piling and wood faced concrete, all complimented by a narrow natural beach and wide muddy foreshore. These defences will all need maintenance and upgrades in order to maintain the current standard over this epoch as most are expected have a residual life of less than 1 year. Over this period, in areas backed by sea walls and wood faced concrete, the beach would begin to narrow and steepen and beach levels would begin to lower. For most of the frontage these changes would be small.	By 2055 given ongoing sea level rise in some places the shoreline could be expected to lie at the foot of the seawalls. Landward retreat of the shoreline would continue where no protection is in place unless significant beach works are implemented here. Limited supply of sand and gravel from the low cliffs would accelerate the narrowing of the beaches where they still existed and intertidal mudflat erosion would be exacerbated resulting in an increase of fine sediments and suspended load which could be transported away from the area by tidal flows. If it were not for the integrity of the protection in place, several residential and commercial properties, especially to the east of the unit, would otherwise be at risk.	The area at risk of flooding gradually increases over the longer epochs however the number of properties affected remains potentially the same given the infrastructure at the south east of the unit. Upgrading of sea walls and increased maintenance would be essential in order to protect the properties on Victoria road from loss and flooding. Up to approximately 25m of erosion could potentially undermine and destroy the housing complex to the west of the unit unless significant beach works are undertaken. The risk of sea walls being undermined will increase temporarily. The only remaining inputs of sediment into the system would be to the west of the unit where no sea walls are in place. Across the rest of the unit very little beach would be left with the entire shoreline being located at the base of the defences.
NET3	Netley Hard	Cliff House	Within this epoch, the Southampton City Council owned sea-wall that backs the beach will need to be rebuilt to a similar standard of effectiveness after 1 year to prevent collapse, and subsequent shoreline retreat.	Although there is minimal residential flood risk within this unit, and this is unlikely to change over this period; the entire sea wall will have to be rebuilt to a similar standard of effectiveness in order to cope with sea level rise, a potentially lowering foreshore and to maintain the protection of Royal Victoria Country Park from erosion. This however would stop any sediment input into the system and perhaps exacerbate foreshore lowering. The drift divide within this unit provides some uncertainty in predictions of shoreline behaviour.	
NET4	Cliff House	Ensign Industrial Park	Continuation of no coastal protection could cause approximately 2m of retreat within this epoch, a relatively low rate anticipated on the basis of the current stability of this frontage and the natural foreshore protection against low-energy loading conditions. The threat of flooding posed to property is negligible; however the natural topography of the backshore means that the area at risk of flooding is wider at the east of the unit where the land is behind is lower than the beach.	The area exposed to possible tidal flooding over these longer time periods is expected to increase only to the east of the unit where the land backing the beach is naturally low. The shoreline is expected to retreat at an increasing rate over these epochs, a possible 3m by 2055 and further 8m by 2105 resulting in a total shoreline retreat of 11m since 2005. This input of sediment into the system may result in the widening of the existing narrow beach offering some protection from further loss. Given the potential for sea level rise erosion across the wide intertidal mudflat may be exacerbated resulting in an increase of fine suspended sediments. Despite inter-tidal shore face erosion being generally low in this region the finest materials could be removed as suspended load by the ebb-dominated tidal flow. The expected erosion would begin to threaten the road that runs almost parallel to the shore in front of the industrial estate, adjoining Westfield Common.	

SMP1 Management Unit	Location		Epoch		
			Years 0-20 (2025)	Years 20-50 (2055)	Years 50-100 (2105)
NET5	Ensign Industrial Park	Hamble Oil Terminal	<p>The western 220m metres of the unit where no defences are in place, continuing alongshore from NET4, could retreat by up to 6m by 2025 and result in the outflanking of the sea wall fronting the oil terminal unless the beach here is upgraded or the sea wall is extended.</p> <p>This remainder of the unit has a steep, narrow gravely beach backed by a sea wall that extends the length of the oil terminal. This sea wall is expected to fail within 6 years and therefore it will need to be rebuilt or upgraded to a similar standard of effectiveness in order to continue to offer protection. A relatively wide muddy foreshore provides some degree of protection from wave action however the wave conditions observed here are generally small in comparison to stretches of more open coastline.</p> <p>There is the potential for flooding of the fringes of the oil terminal, with the EA tidal floodzone 3 extending nearly 50m inland of the defence line.</p>	<p>The sea wall protecting the oil terminal again will have to be maintained and improved over the long-term to protect this asset from the potential increasing erosion and flood risk that may result from changing sedimentation and sea-level rise over these epochs.</p> <p>There may be implications for the oil terminal given a possible 28m of erosion located along the non fronted section to the western edge of the unit. The extension of the sea wall, westwards, may be necessary to prevent the risk of the defences being outflanked and the consequent damage and disruption to the oil terminal and its network of buildings, pipelines and electrical substations. This would stop all sediment input into the unit and may result in accelerated foreshore lowering and loss of beach, thus increasing the exposure of the defence to wave action. However the wave conditions observed here are generally small in comparison to stretches of more open coastline.</p>	
NET6	Hamble Oil Terminal	Hamble Common Point	<p>A large proportion of this policy unit is fronted by a narrow beach backed by moderately vegetated low cliff and grassland. This could retreat by over 5m before 2025. This however would not impact on any assets.</p> <p>The marina, which covers the headland east of Hamble Common, is protected by a high revetment that may require maintenance after 10 years given its residual life expectancy. The hinterland is low lying land within the EA tidal floodzone 3 which covers predominantly the river side of the entire land area from and around Hamble Point and over 400m westwards towards the common.</p> <p>There is no apparent risk of flooding or damage by erosion to residential property over this epoch.</p>	<p>The shoreline could be set back by around 30m by 2105 along the undefended western section of the unit. These inputs of sediment could allow widening of the narrow beach and possibly some growth of the Hamble Spit. Whilst these erosional losses would not have a direct impact on any assets, beach maintenance may still be required to prevent the outflanking of the sea wall fronting the marina.</p> <p>Continued maintenance of the defences around marina would be required to sustain its use, and prevent frequent flooding. Set back of the shoreline west of here would make the protected tip of the spit a more prominent feature.</p>	

SMP1 Management Unit	Location		Epoch		
			Years 0-20 (2025)	Years 20-50 (2055)	Years 50-100 (2105)
HAM1	Hamble Common Point	Satchell Marshes	This unit lies on the west bank of the River Hamble and comprises a marina and inter-tidal habitats, backing onto Hamble Common which is within the EA tidal floodzone 3 which links to NET1. There are approximately 25 properties at risk of flooding, most are boating-related businesses. The level of risk is unlikely to change substantially over this epoch unless sea-level changes much more rapidly than currently anticipated. The steel sheet piled seawall along this section is expected to come to the end of its residual life in 20 years and will therefore need to be maintained or rebuilt. The existing defences will continue to cause coastal squeeze to the fronting inter-tidal habitats.	Erosion rates are not known for this section. However, it is possible that increased sea-level and possibly higher fluvial flows associated with climate change could expand the flood risk zone and/or cause landward retreat of the shoreline putting pressure on the developed Hamble Village frontage, which is one of the UK's major yachting centres. The existing defences will continue to cause coastal squeeze to the fronting inter-tidal habitats.	
HAM2	Satchell Marshes	Badnam Creek	These units lie on the west bank of the Hamble and are predominantly characterised by marshes and patchy defences which come to the end of their residual life in the next 20 years. The defences will require maintenance in order to protect properties from flooding. This includes Satchell Marsh, which is of conservation importance and lies eastward of Hamble Village, the edge of which is close to the EA tidal floodzone 3. Lincegrove and Rackett's marshes align HAM3, and backing these is a railway line running over undeveloped land which is not currently considered part of the flood risk. There are 10 properties potentially at risk of flooding. The existing defences will continue to cause coastal squeeze to the fronting inter-tidal habitats.	By 2105, 36 properties would be at risk from tidal flooding. The natural topography does not lend itself well to inland migration inter-tidal habitats. If fine sediment input does not keep pace with sea level rise then saltmarshes will reduce in area and there will be seaward edge erosion of the mudflats as the tidal prism of the Hamble estuary increases by 2105. The existing defences will continue to cause coastal squeeze to the fronting inter-tidal habitats.	
HAM3	Badnam Creek	Lands End Lane			
HAM4	Lands End Lane	Swanwick Shore Road	The sea walls and revetments in place here are expected to fail within 20 years and will therefore need to be maintained and upgraded in order to remain functional. If defences are maintained, there will be no properties at risk from tidal flooding. The existing defences will continue to cause coastal squeeze to the fronting inter-tidal habitats.		
HAM5	Swanwick Shore Road	Crableck Marina	This unit comprises a natural bank, a proportion of Crableck Marina, inter-tidal habitats, woodland and agricultural areas. There are 3 properties at risk from tidal flooding by 2105. The existing defences will most likely require continue to cause coastal squeeze to the fronting inter-tidal habitats for the remainder of their residual lives.		
HAM6	Crableck Marina	Crableck Marina	This very short management unit contains Crableck Marina (and its boatyard) and narrow mudflats. Defences here have residual lives of less than 20 years and would therefore require upgrades and maintenance in order to maintain the current standard. There will be one property at risk by 2105. The existing defences will continue to cause coastal squeeze to the fronting inter-tidal habitats.		

SMP1 Management Unit	Location		Epoch		
			Years 0-20 (2025)	Years 20-50 (2055)	Years 50-100 (2105)
HAM7	Crableck Marina	Warsash North	<p>Given that the clay embankment is located in a sheltered area, has a residual life greater than 10 years and does not prevent flooding to property, it may only require minimal maintenance to maintain the current standard of protection. Developed areas inland are located at least 50m from the edge of the 2105 tidal floodzone 3 extent. Isolated properties are on the edge of the 2105 tidal floodplain north of Holly Hill Woodland Park. There is 1 property potentially at risk of flooding.</p> <p>Inter-tidal areas may migrate inland marginally. If fine sediment input does not keep pace with sea level rise then saltmarshes will reduce in area. The existing defences will continue to cause coastal squeeze to the fronting inter-tidal habitats but will also protect those in its lee.</p>		
HAM8	Warsash North	Hook Park	<p>Most of this unit is not at flood risk, since the majority of development is set-back and a large proportion of land area comprises an important intertidal habitat. This is with the exception of the reclaimed area around the Harbour Master's Office, including a car park and sailing facilities, as well as the shoreline in front of the College of Nautical Studies further south. Inter-tidal areas may migrate inland marginally. The existing defences will require maintenance and upgrades to maintain the current standard of the defence but will continue to exacerbate coastal squeeze to the fronting inter-tidal habitats.</p>		

SMP1 Management Unit	Location		Epoch			
			Years 0-20 (2025)	Years 20-50 (2055)	Years 50-100 (2105)	
EAST SOLENT						
CPU14	Solent Breezes	Hook Lake	<p>Provided that the gabions and other defences are maintained to a similar standard of effectiveness, when they reach the end of their residual lives in 10yrs, the relatively sheltered nature of this environment should allow the chalets at Solent Breezes to remain protected. It is debatable whether the grass embankments and run-down sea wall west of Solent Breezes will be depleted over this epoch or whether they will require upgrading to maintain the status quo. Unless defences are put in place or the shingle bank is maintained across the entire frontage, Solent Breezes could begin to form a headland as the gabions are outflanked. This could then interfere with the north western directed drift pathway that supplies sediments to Hook spit and therefore lead to its destabilisation.</p> <p>However, attempts to maintain the present shoreline position along the whole unit will be detrimental to Hook Spit.</p>	<p>The intertidal foreshore has narrowed considerably throughout this frontage over the past 135 years, which is likely to continue under rising sea levels. The key to the overall unit's stability may depend on whether there is a continuation of the current 'hold the line' management policy, or simply a prioritisation of maintaining the shoreline position at Solent Breezes, causing it to emerge as a minor headland. It may be viable to move the chalet development inland to benefit the overall health of the unit and to maintain Hook Spit. However, even if a small headland were to form at Solent Breezes, material eroded to the west, where no defences are in place, might still continue to feed the spit. If the rejuvenation of the spit could not keep pace with the rate of sea level rise, there might be a tendency for the spit to breach or slowly erode and therefore threaten the intertidal habitat in its lee with potential erosion.</p>		
CPU13	Hill Head Harbour	Solent Breezes	<p>Within this epoch the concrete sea wall protecting the road will need upgrading, given that it has a residual life of 10 years. The 48 properties and the road directly behind the beach between Meon and Titchfield Haven are within the EA tidal floodzone 3, therefore the shingle beach will also need upgrading in order to sustain the current standard of protection if sediment input from the eroding cliffs does not provide a substantial natural defence. Coastal retreat will be 10m for the undefended section between Brownwich Farm and Solent Breezes given the no active intervention policy for this stretch of coast.</p>	<p>The undefended cliffed section to the west could retreat over 50m by 2105 compared to the present day. The section east of here is expected to be set back approximately 30m from the present day, but may benefit from material produced from cliff erosion updrift. The beach between the Meon and Titchfield Haven will need upgrading in order to protect the 48 properties from flooding in it's lee if sediment from the eroding cliffs does not build a substantial defence. The beach in front of the sea wall at Titchfield might narrow and steepen given the potential for sea level rise, however it is more likely that the large amounts of sediment supplied by cliff erosion updrift may maintain a healthy beach here. The sea wall protecting the harbour will need upgrading to maintain the harbours integrity.</p>		
CPU12	Lee-on-the-Solent	Hill Head Harbour	<p>The Fareham and Gosport sections of this unit are currently well defended; maintenance of beach levels and sea-walls in accordance with the 'hold the line' policy may come at an increasing cost over time as more defences are upgraded and more replenishments become necessary.</p>	<p>Continuation of a beach management plan will be crucial to maintain beach levels at Lee-on-the-Solent and protect the sea wall. Further artificial recharges will be required for the entire unit until the process becomes technically impossible. Hill Head will also undergo offshore sediment loss. The beach may narrow and steepen given the potential for sea level rise and given that the entire unit will now no longer be receiving any material from the cliffs or rivers in this region.</p>		

SMP1 Management Unit	Location		Epoch		
			Years 0-20 (2025)	Years 20-50 (2055)	Years 50-100 (2105)
CPU11	Fort Gilkicker	Browndown Ranges	Maintaining the Stokes Bay sea wall would protect the road running alongside it, but the beach may also require improvements such as crest heightening and beach recharge. Also, continued cut back of the shoreline on the undefended shingle beach either side of the structures may cause outflanking of the sea wall under extreme sea level and storm conditions, making it redundant as a flood defence structure. Approximately 0.3m - 0.5m/year erosion can be expected over this epoch, totalling 10m.	Over this epoch there is expected to be a total of 50m of erosion where no sea defences are present unless beach maintenance is undertaken. The sea wall protecting the section of Gosport in the vicinity of the Alver will probably have to be heightened and extended westwards to prevent overtopping and outflanking; perhaps with addition of a drainage capable of reducing the impact of fluvial flooding in this low-lying zone. In front of the defended sections of this unit the beach may narrow and steepen given the potential for sea level rise. However the sediment input from the non defended frontage in this unit could help to maintain a functional beach in the immediately adjacent regions over this epoch. Given the net eastward drift identified here by HR Wallingford (2005) it is however more likely that the eroded material will be delivered to the wide accreting gravel beach at Gilkicker point. Since the flood risk is likely to expand inland beyond Fort Road (at the Gilkicker end) heightening of embankments or other flood defences will be necessary.	
CPU10	Fort Haslar	Fort Gilkicker	Maintaining the structural defences along the section approaching Portsmouth Harbour Entrance is required to protect the MOD owned assets. Approximately 6m of shoreline retreat could occur at Gilkicker Point where no defences are present and if no other defence measures are implemented here.	The state of the beach between Gilkicker Point and Fort Monckton may depend on sediment supply from updrift and whether the groynes remain capable of capturing beach material. With sea-level rise and ongoing erosion over this epoch, foreshore retreat of a further 10m is probable in the vicinity of Gilkicker Point. The beach at Fort Monckton will probably require additional material to maintain the foreshore and supports the structures that protect this military training establishment. Eastwards of here, there is almost no foreshore above the water line, and maintenance of the sea walls extending to Portsmouth Harbour will remain essential. Scour at the base of the sea walls may become more of a problem.	
CPU9	Southsea Castle	Portsmouth Harbour Entrance	Defences play a crucial role in protecting this low-lying and exposed frontage, with the presence of well-maintained concrete and masonry sea walls and tidal flood gates protecting Old Portsmouth. The beach at the headland at Southsea Castle is non-existent; it narrows north of Clarence Pier and is susceptible to erosion along Southsea Common. Continued beach nourishment would be required to maintain the current level of protection in this epoch. Historic Old Portsmouth has experienced severe flooding in the past, and wave overtopping frequently forces the closure of Clarence Esplanade. The Isle of Wight shelters this frontage from long period swell, but sea defences would have to be improved to keep pace with sea level rise and prevent 1377 properties being at risk of flooding.	The Futurecoast study suggests that defences will have to be upgraded substantially within the next 20 to 50 years, particularly if there is a lack of focus on maintaining beach width and height.	Assuming a significant population remain at risk in flood prone areas (up to 4,276 properties), beach and sea defences will already have been heightened considerably to cope with sea level rise and increased risk. The consequence could be greater than in previous years and therefore the structural integrity of the defences will be paramount in order to reduce the probability of tidal inundation occurring. Defences will not only need to be maintained but more probably rebuilt to a higher standard of effectiveness than is currently in place. Beach nourishment however may no longer be cost effective or practical given the potential for sea level rise and coastal squeeze. The tidal inlet at Portsmouth Harbour could deepen as the tidal prism increases with sea level rise.

SMP1 Management Unit	Location		Epoch		
			Years 0-20 (2025)	Years 20-50 (2055)	Years 50-100 (2105)
CPU8	Hayling Ferry	Southsea Castle	Defences play a crucial role in protecting this low-lying and exposed frontage, with the presence of a masonry revetment, concrete sea wall (including the promenade) and clay embankment protecting Southsea and Eastney from flooding. An alternative to the present 'hold the line' policy is not viable over this epoch given that between 4,271 and 6,653 properties could be flooded. Maintenance of the existing foreshore and structures when they reach the end of their residual lives in 1-10 years should ensure this shoreline remains stable.	The beach and sea walls along this section will be under pressure from increased wave attack over this epoch and will require improvement to keep pace with sea-level rise, and a possible increase in the present erosion rate.	By 2105 sea defence structures will require significant ongoing maintenance to protect low lying areas. Assuming a significant population remain at risk in flood prone areas (up to 6653 properties), beaches and sea defences will already have been heightened considerably to cope with sea level rise and storm events. The consequence could be greater than in previous years, and therefore structural integrity of the defences will be paramount. More frequent recharges and construction maintenance will be essential in order to reduce probability of tidal inundation occurring. Defences will not only need to be maintained but more probably rebuilt to a higher standard of effectiveness than is currently in place. Beach nourishment however may no longer be cost effective or practical given the potential for sea level rise and coastal squeeze.
CPU7	Inn On The Beach	Langstone Harbour	The shingle foreshore is expected to retreat where the NAI policy exists where backshore land area is open space. However, small sections that are defended will retain their shoreline position. Maintenance of the substantial sea wall protecting The Inn on the Beach will be necessary by the end of this epoch, as will maintenance of the sloping timber revetment to the west. These defences have a residual life of 20 years. The defences that protect the Sailing Club may also need maintenance. The Sinah Common golf course may be vulnerable to natural retreat, whilst defences may be considered for the several properties on the harbour frontage, boatyards and the ferry terminal that are all within the EA floodzone 3.		
CPU6	Sandy Point	Inn On Beach On Hayling Island	With a history of rapid erosion and flooding East Hayling has traditionally been difficult to defend, with beach and near shore processes subject to annual and seasonal change. Minor changes in offshore wave direction can reverse drift directions causing erosion and overtopping. Maintaining the current policy of 'hold the line' would continue to protect Hayling if beach levels in front of defences continue to be nourished during this epoch. The majority of defences in this unit are expected to reach the end of their residual lives in 1-10 years unless maintenance is implemented during this epoch.	Without beaches, defensive structures will have to become increasingly substantial to provide the present day standard of defence. Over the longer term, structural defences and beaches together will be essential, with large quantities of externally obtained material necessary to maintain an acceptable level of flood risk. As with Portsea, the allocation of resources in terms of structural improvements and post-storm response to beach erosion will be important, particularly because of the dynamic nature of this environment and exposure to high-energy swell waves.	
CPU5	Cakeham Estate	East Head	The beaches and foreshore in front of defences along Bracklesham Bay will continue to experience steepening and lowering; this is likely to lead to increasing adaptive management commitments if these defences are to be maintained because of lower foreshore levels, which will offer minimal energy dissipation, especially with increased sea-levels. Exposure to wave attack may increasingly expose the foundations of structures. East Head Spit will experience continued sediment starvation, requiring an increase in protection at The Hinge.		

SMP1 Management Unit	Location		Epoch		
			Years 0-20 (2025)	Years 20-50 (2055)	Years 50-100 (2105)
CPU4	Bracklesham	East Wittering	<p>East Wittering is fortunate to be slightly elevated compared to the rest of the bay, but according to Futurecoast, the beaches and foreshore in front of defences will continue to experience steepening and lowering. Continuation of a hold the line policy is likely to require increased management effort within 6-11 years (when defences reach the end of their residual lives) to maintain the existing defences because of the inability of the beach to serve as a natural defence against incoming wave energy. This will be a result of long-term erosion down to the clay bedrock and lowered upper foreshore levels. This problem may also expose the foundations of any existing structures.</p>	<p>Occurrence of overtopping over these epochs will depend upon the state of the upper beach. The current defences will require continual upgrades in order to protect the hinterland from storm events.</p>	
CPU3	West Beach	Bracklesham	<p>Continued maintenance of beach levels, revetments and sea walls will be required to protect the developed inland area of Selsey at the eastern end of the unit; whilst immediately to the west, Medmerry would require increased resources to protect the hinterland from flooding.</p>	<p>Even if management practices were to increase along the Medmerry frontage, they may not be sufficient to prevent heavy overtopping and breaching during sustained storm action. Considerable effort may be required to prevent Selsey becoming an Island as it did in 1910 (Futurecoast). Defences are predicted to have failed in the 0-20 epoch and will not only need more maintenance but more probably rebuilt to a higher standard of effectiveness than is currently in place. Beach nourishment and re-profiling will have to become much more frequent in order to maintain any beach however may no longer be cost effective or practical given the potential for breaching as a result of sea level rise and coastal squeeze.</p>	

SMP1 Management Unit	Location	Epoch		
		Years 0-20 (2025)	Years 20-50 (2055)	Years 50-100 (2105)
Portsmouth Harbour		Given that all of the defence measures in place are expected to reach the end of their residual lives within 1-10 years, substantial works will need to be undertaken in order to prevent loss of land and over 600 properties to coastal erosion over the next 100 yrs. It is flood risk however that poses the most significant threat to property and infrastructure around Portsmouth Harbour with 13,849 properties and businesses at risk by 2105 unless appropriate action is taken. Continued maintenance of the current defences and upgrading to a standard higher than is currently in place will be required.		
		Given the expected rates of sea level rise the harbour's tidal prism will naturally try to increase. If the current line is held at the harbours edges preventing this increase, elevations of intertidal habitats and mudflats can be expected to lower significantly over the coming 100 years. This will not only be a result of the harbour deepening but also as a function of increased sea levels and coastal squeeze. Inter-tidal habitat loss will be of major concern and will have to be mitigated and/or compensated for elsewhere in accordance with current environmental legislation.		
		The increase in tidal flow may also result in an increased volume of sediment stored being transported out of the harbour and deposited on Spit Sands and Hamilton Bank, which would have a negative impact on shipping unless dredged. The fixed engineered nature of the harbour entrance would prevent channel widening as a response to the increased tidal prism and may therefore cause the channel to deepen instead.		
Langstone Harbour		Given that all of the defence measures in place are expected to reach the end of their residual lives within 1-10 years, substantial works will need to be undertaken in order to prevent loss of land and property to coastal erosion over the next 100 yrs. It is flood risk however that poses the most significant threat to property and infrastructure around Langstone Harbour with 11,870 properties and businesses at risk by 2105 unless appropriate action is taken. Continued maintenance of the current defences and upgrading to a standard higher than is currently in place will be required, however currently undefended stretches of coastline, for example the Kench area, will remain undefended. Here 65 properties will be within the EA Floodzone by the end of 2105 unless significant defences are implemented.		
		Given the expected rates of sea level rise the harbours tidal prism will naturally increase. If the current line is held at the harbours edges preventing this increase, elevations of intertidal habitats and mudflats can be expected to lower significantly over the coming 100 years. This will not only be a result of the harbour deepening but also as a function of increased sea levels and coastal squeeze. Inter-tidal habitat loss will be of major concern and will have to be mitigated and/or compensated for elsewhere in accordance with current environmental legislation. Several of the small islets towards the north of the harbour may be inundated or eroded completely towards the end of 2105.		
		The increase in tidal flow may also result in an increased volume of sediment stored being transported out of the harbour and deposited on the Winner and foreshore of Hayling Island. The fixed engineered nature of the harbour entrance would prevent channel widening as a response to the increased tidal prism and therefore cause the channel to deepen instead.		
Chichester Harbour		Given that all of the defence measures in place expected to reach the end of their residual lives within the first epoch, substantial works will need to be undertaken in order to prevent loss of land and property to coastal erosion over the next 100 yrs. It is flood risk however that poses the most significant threat to property and infrastructure around Chichester Harbour with 3196 properties and businesses at risk by 2105 unless appropriate action is taken. Continued maintenance of the current defences and upgrading to a standard higher than is currently in place will be required.		
		In recent years it has been presumed that the progressive increase in the width and depth of the Chichester Harbour entrance reflects its adjustment to a more stable condition, in equilibrium with hydrodynamics and hydraulic regime (ABP Research and Consultancy, Ltd, 2000). However, as a function of the predicted rates of sea level rise and possible consequent breaching of hinterland, the tidal prism of the harbour may have increased substantially by 2105. If the current line is held at the harbours edges preventing this increase, the elevations of intertidal habitats and mudflats can be expected to lower significantly over the coming 100 years.		
		This will not only be a result of the harbour deepening but also as a function of increased sea levels and coastal squeeze. Inter-tidal habitat loss will be of major concern and will have to be mitigated and/or compensated for elsewhere in accordance with current environmental legislation. The increase in tidal flow and erosion within the harbour may result in an increased volume of sediment stored being transported out of the system and deposited on the ebb tide delta and East Poole Sands. East Head Spit could benefit from this increase with accretion at its neck reducing the probability of breaching or sealing any previous breach.		

