

## **3 BASIS FOR DEVELOPMENT OF THE PLAN**

The full detail of the coastal processes and assessment of coastal and flood defences for the North Solent SMP region is provided in Appendix C.

### **3.1 Historical Perspective**

Much of the present shoreline of the English Channel has been shaped by sea level rise during the Holocene period, following the last glaciation. Flooding of the English Channel commenced as sea levels rose. By approximately 8,000 years ago the entire English Channel, including the Dover Straits, was inundated; the Western Solent entrance formed approximately 7,500 years ago following the drowning of the Solent River system when the chalk ridge between the Isle of Purbeck and the Isle of Wight was breached. The northern coastline of the Solent is largely low-lying and dominated by major drowned valleys that form the existing estuarine system.

Sea level attained a level close to its present position around 5,000 years ago, and the modern hydrodynamic regime has been operating since this time. In the early stages of this inundation, the onshore migration of significant quantities of sediment resulted in the formation of shingle barriers that rolled back to form the present shoreline and many of the present beaches. After sea level reached its present position, mudflats and saltmarsh began to form around the peripheries of the sheltered estuary systems.

The Solent region, responding to isostatic readjustment, is experiencing a fall in land levels of an estimated 0.5mm/yr; UKCIP (2002) quote a 0.9mm decrease in land levels for the South East region. Over the last 2,000 years sea level rise has continued, but at much lower rates resulting in ongoing, but less dramatic, changes at the shoreline. With continued or accelerating rates of relative sea level rise, changes to the present coastal systems will result.

The North Solent SMP shoreline, including the harbours, has been significantly influenced and defined by anthropogenic activity over hundreds of years, as evidenced through its rich heritage. Land reclamation and the enclosure of former saltmarsh areas by the construction of defences have taken place periodically since the Roman times. This has led to a corresponding decrease in tidal prism of the estuary and harbours. The degree of future geomorphological change within the Solent estuary and harbours may be dependent on a change in driving forces such as sea level rise, storminess, increases in fresh water flows and the ability of the system to respond to these drivers.

### **3.2 Sustainable Policy**

The following assumptions and criteria were used when considering policy scenario options for a Policy Unit:

Existing heavily-populated centres of development and redevelopment within these areas will continue to require protection to minimize risk of tidal flooding and erosion until the end of the second epoch. Beyond this epoch, key policy drivers and flood and erosion risk will determine the long-term policy to be appraised. Residential development is currently restricted to existing developed areas (e.g. Southampton City, Portsmouth City, large towns), largely due to landscape and nature conservation designations, and extent of tidal flood and erosion risk areas. Although increasing housing targets will require further development within the North Solent area, this need will largely be met outside of the SMP study area, or outside the identified potential flood or erosion risk areas (see Partnership for Urban South Hampshire (PUSH) <http://www.push.gov.uk> )

Existing industrial development, requiring a coastal location or maritime access will continue to require protection to minimize risk of tidal flooding and erosion until the end of the second epoch. Beyond this epoch, key policy drivers and flood and erosion risk will determine the long-term policy to be appraised. Industrial development is currently restricted to existing developed areas. Coastal industrial assets include Naval and MOD facilities, Southampton container port, Portsmouth ferry terminal, oil refinery, power stations, etc.

Advance the Line policy option to be assessed where there is potential for land reclamation or for defences seaward of existing line of defence. Discussions within the Client Steering Group indicated that this policy is not applicable within the entire North Solent SMP area due to the complexity of the coastal processes, the number and extent of nature conservation designations and the use of the nearshore zone for navigation, transport and recreation. It has, therefore, not been considered further in the development of the plan.

Consideration of making beneficial use of dredgings has been discussed by members of the Client Steering Group in relation to other studies and coastal defence strategies for a number of years, and was raised at key stakeholder meetings. Recycling dredged sediments should be considered at a Coastal Defence Strategy level, as an option for implementing an SMP policy; for example, for raising of beach levels to protect foundations of existing seawalls, or for stabilising saltmarsh margins to prolong their natural flood defence functions.

Managed Realignment policy options have been assessed where there is potential for the shoreline retreat to improve coastal processes, shoreline alignment or habitat creation purposes. Sites identified on private landholdings are considered during the policy appraisal stages of SMP development but can only be achieved following discussions with and consent of the private landowners. No proposed managed realignment or environmental enhancement opportunities will be imposed or implemented in these circumstances without the landowner's full consent. The landowner's willingness or otherwise to consider the proposed policy was sought and

recorded through the public consultation and reflected in the preferred policy in the final SMP.

Land ownership is considered a key factor but was not considered as an objective-led policy driver. Discussions with landowners and land managers are essential in order to determine viability and feasibility of proposed habitat creation opportunities.

Private landowners have certain rights to protect their property and to continue to maintain existing defences, provided it does not constitute 'development' of any kind without the need for planning permission but they should always check with their Local Planning Authority before carrying out any works. These rights apply and remain regardless of the SMP policies. The SMP and its policies do not remove the rights of the private owner to maintain their defences to protect their property, land or assets; nor does the SMP policy prejudice any application for planning permission for improvements to existing defences. Engineering works continue to require the applicant to seek planning permission and the other necessary licences and consents, prior to works being carried out; such applications will need to be considered by the relevant planning authority on a case by case basis, to take into account site specific conditions and factors.

Following discussions with the Client Steering Group and EA it was agreed that for the coastline frontage between Pagham Harbour and Chichester Harbour entrance, the policies recommended and approved through the Pagham to East Head Coastal Defence Strategy (CDS) would be endorsed by the SMP process.

The recommended policies arising from the draft Portchester to Emsworth CDS have been the only policy scenarios to be assessed (for the frontages covered) as they had been through lengthy public consultation and completed policy scenario and economic assessments to determine and recommend policies. It should be noted that these policies have not been approved by the Portchester to Emsworth CDS Project Team members.

The recommended policies arising from the draft River Itchen, Weston Shore, Netley and River Hamble CDS have also been the only policy scenarios to be assessed for the frontages covered, as they had completed a detailed economic appraisal and Appropriate Assessment to determine and recommend policies.

### **3.2.1 Coastal Processes and Coastal Defence**

#### **Climate Change and Increasing Tidal Flood Risk**

The coastline is undergoing constant change due to long-term and large scale impacts of climate change, namely sea level rise, through to the day-to-day effects of waves and tidal currents. It is the implications of climate change that will determine sustainable shoreline management into the future.

The first round of Shoreline Management Plans considered the impacts of future climate change and sea level rise by applying the precautionary Ministry of Agriculture, Fisheries and Food (MAFF) guidance of 6mm per annum. Defra have subsequently modified these sea level rise allowances in 2006, in response to research and improved predictive climate modelling, and advice from the Intergovernmental Panel on Climate Change (IPCC) and UK Climate Impacts Programme (UKCIP) (FCDPAG, 2006). Global mean sea level rise projections for the 2110s were extrapolated from the 2020s, 2050s and 2080s. The baseline for calculating sea level rise for a given year was 1990. The latest guidance takes into account land movement and the effects of thermal expansion of the sea, up to the year 2115. Additional contributions from tidal surges and waves are not included. The new allowances are shown in Table 2.

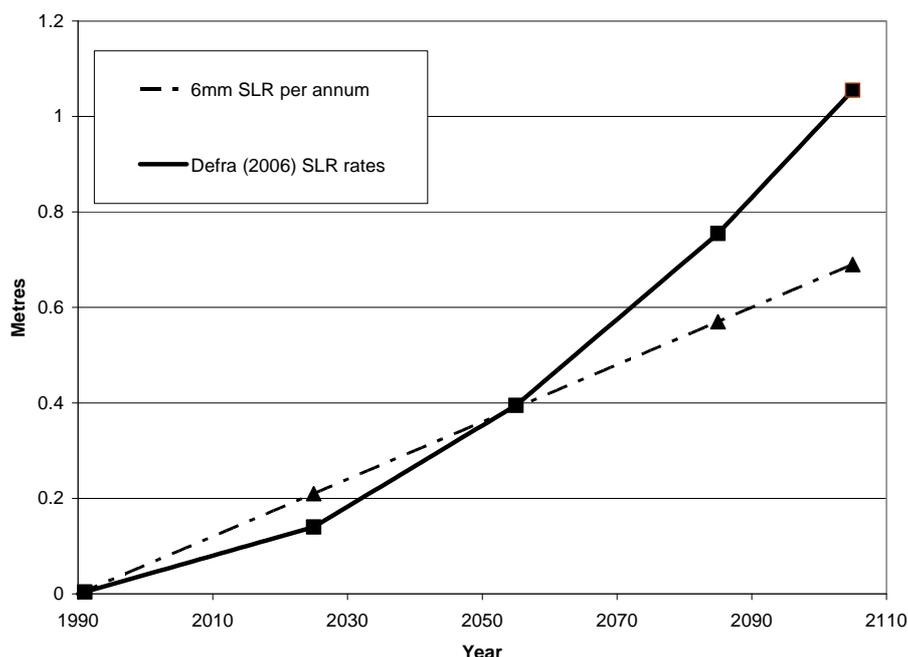
Administrative Region	Assumed Vertical Land Movement (mm/yr)	Net Sea Level Rise (mm/yr)				Previous Defra (2002) allowances
		1990-2025	2025-2055	2055-2085	2085-2115	
Eastern England, East Midlands, London, South East England	-0.8	4.0	8.5	12.0	15.0	6mm/yr
South West and Wales	-0.5	3.5	8.0	11.5	14.5	5mm/yr
North West and North East England, Scotland	+0.8	2.5	7.0	10.0	13.0	4mm/yr

**Table 2.** Regional net sea level rise allowances (FCDPAG, 2006).

Figure 9 shows the latest, exponential Defra predicted sea level rise compared with the old 6mm per annum guide. The Defra guidance of 4mm per annum sea level rise until 2025 is actually a lower rate than was previously applied. From 2025 onwards, the new predicted rate rises steeply, eventually resulting in mean sea level being 0.4m higher than the previous 6mm per annum guide. This has serious implications when planning for future sea defences. Figures 10 to 15 indicate the increasing residual risk of tidal flooding within the North Solent region i.e. the risk of flooding if existing defences failed or not maintained, or overwhelmed by a storm event that exceeded the design limits of the existing defences.

Rising sea levels will increase the probability of flooding for low lying areas protected by a hard defence or barrier beach/spit, as the amount of freeboard between water level and crest level of the defences will be reduced. Waves would break further inshore and potentially increase risk of wave overtopping of structures or features and the tidal prism of the harbours, estuaries and

tidal rivers may also increase, which may impact on urbanized residential and industrial areas and the extent of environmentally sensitive habitats.



**Figure 9:** Comparison of current Defra sea level rise allowances with previous guidance of 6mm per annum for South East England region

Recent climate studies have indicated that there are significant changes occurring within our climate; with more severe storms (intensity, frequency, duration, etc.), increasing rainfall and rising sea levels. Increasing rainfall in-between longer periods of dryer weather can lead to increased fluvial flows in catchments and consequently increased erosion downstream within estuaries of inter-tidal areas and pressure on defences.

It is extremely important that the long-term plan in the SMP recognises these future issues and reflects likely future constraints to management planning. Thus the SMP acts as an early warning to those other plans and initiatives that are vital to the communities and infrastructure within the coastal/estuary zones.

### Changes at the coast

The past, present and future forms of the North Solent shoreline are shaped by anthropogenic constraints, the antecedent geology, natural forces and coastal vegetation. As well as being rich in biodiversity, the North Solent is highly developed and has a thriving tourist industry. Because the North Solent is highly developed, 76% of its shoreline is protected from flooding and/or erosion. The geomorphological and ecological systems are heavily managed and engineered and do not always behave in a natural manner.

The reclamation of extensive areas of former coastal lowland for agriculture, port industrial and residential development has produced many areas where the shoreline is today artificially seaward of its natural position. Human intervention to construct embankments and drain the backing land for agricultural production and, historically, storage of contaminated materials, has also produced numerous sites that are now internationally, nationally and locally designated for their nature conservation importance and value. Many of these are also important amenity and recreational areas, both on land and in the nearshore marine environments. Under natural circumstances (i.e. no development or defences) these coastal frontages would have naturally evolved into inter-tidal or coastal habitats. The man-made defences that now protect areas of freshwater and terrestrial habitats also prevent natural landward migration of inter-tidal habitats, termed coastal squeeze.

The ability of the system to respond to future conditions is limited by constraints such as the underlying geology, available sediment supply and location, position and standard of protection of the sea defences. Another key constraint for the adaptability of the shoreline is that the majority of the Solent region has considerable residential, commercial, industrial and agricultural development. Development pressures are likely to increase over the short to medium term. At least 60% of the shoreline is privately owned and/or the defences are maintained by third parties. A number of these privately owned sites and defences provide protection to areas of significant environmental importance.

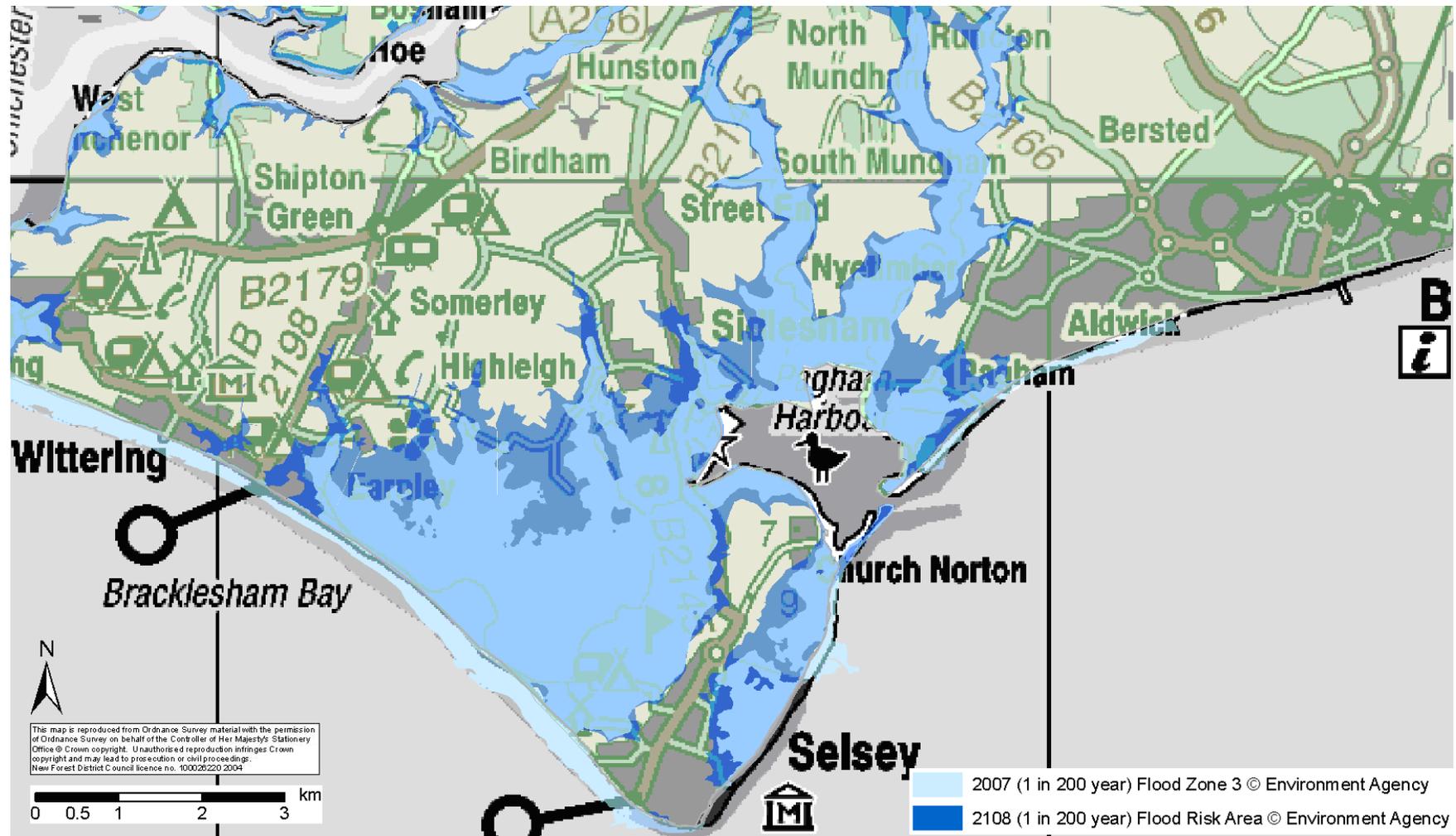


Figure 10: Increasing residual tidal flood risk over next 100 years – Pagham Harbour and Selsey Bill

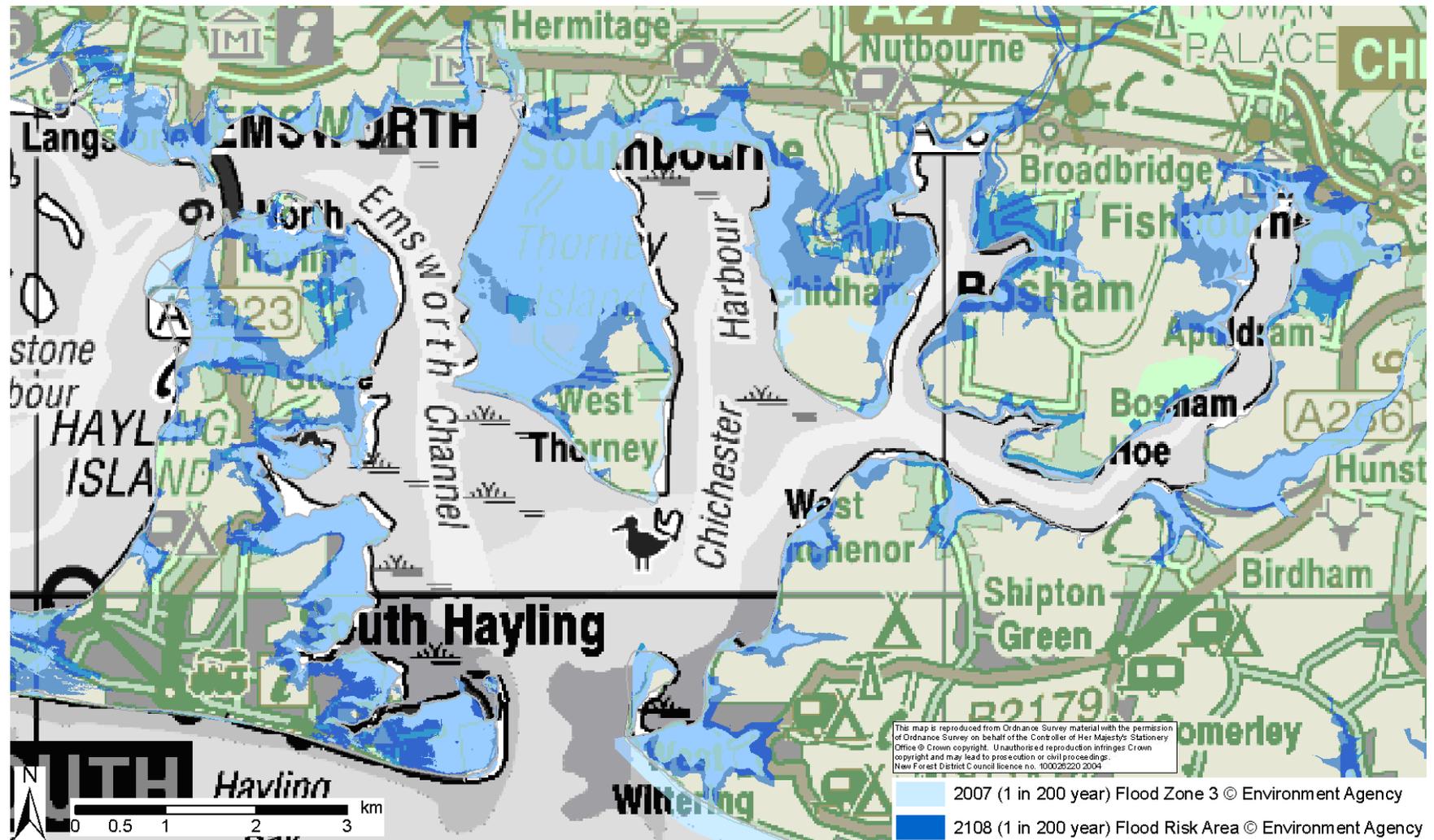


Figure 11: Increasing residual tidal flood risk over next 100 years – Chichester Harbour

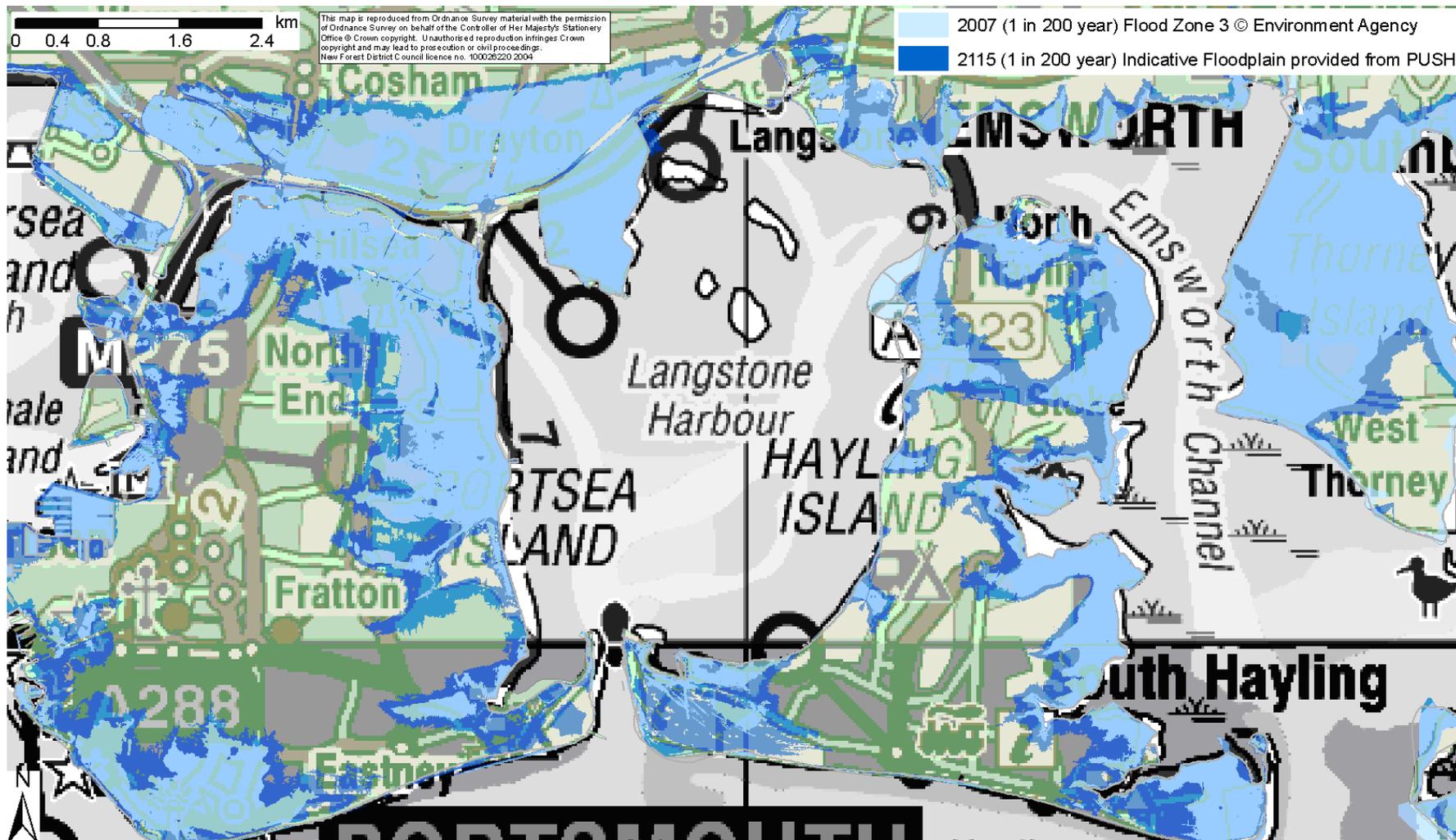


Figure 12: Increasing residual tidal flood risk over next 100 years – Langstone Harbour

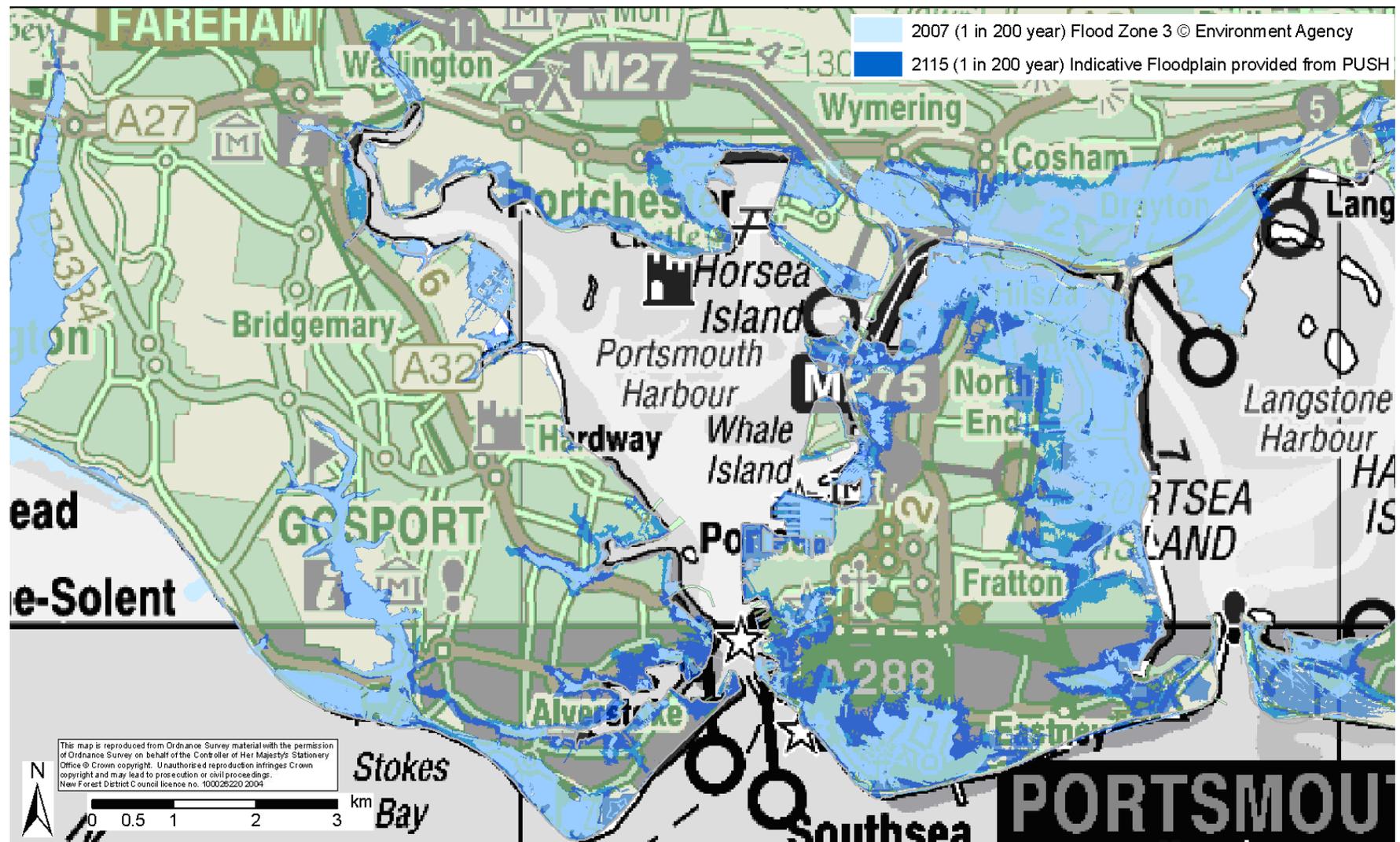


Figure 13: Increasing residual tidal flood risk over next 100 years – Portsmouth Harbour

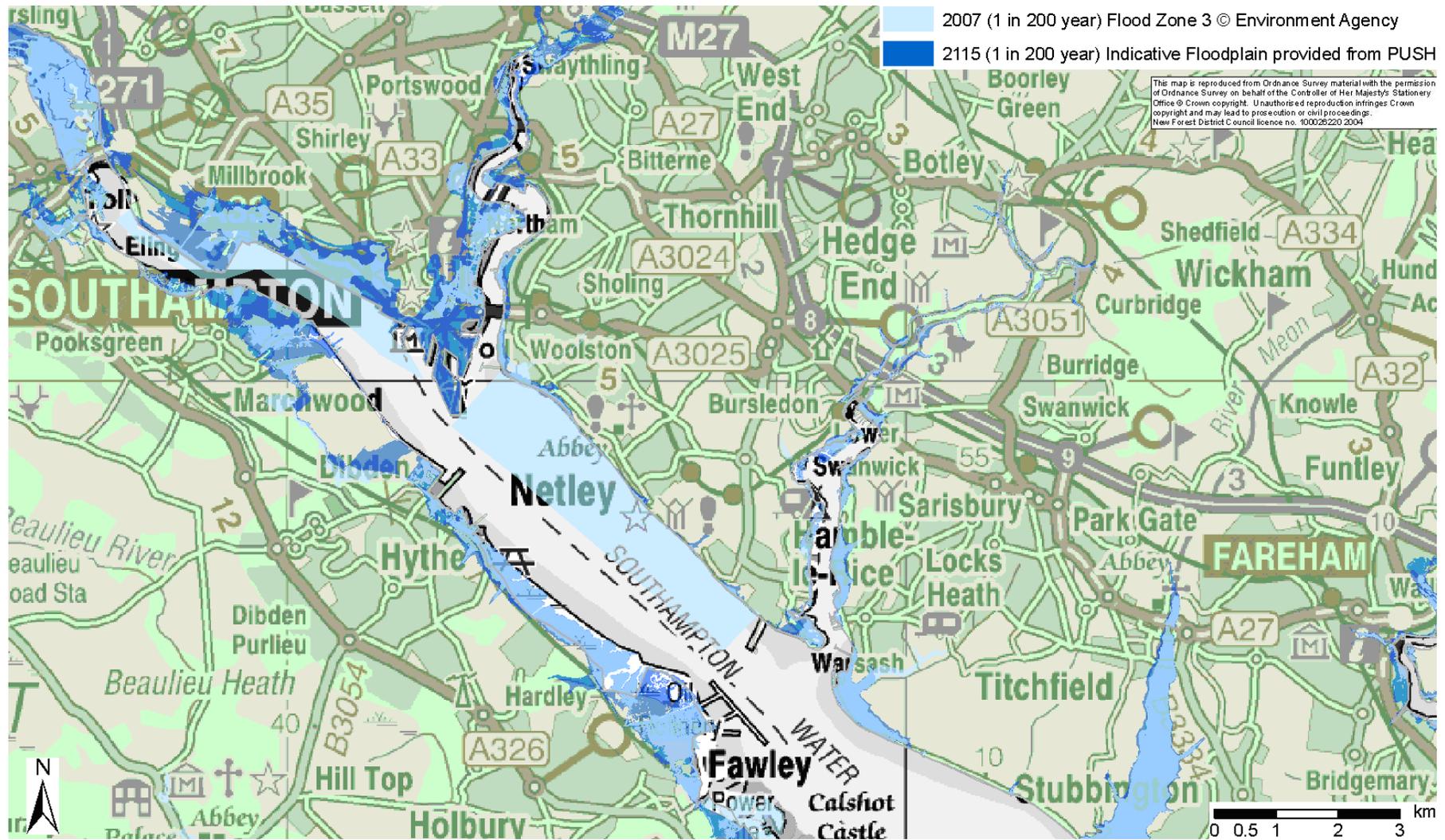


Figure 14: Increasing residual tidal flood risk over next 100 years –Southampton Water

North Solent Shoreline Management Plan

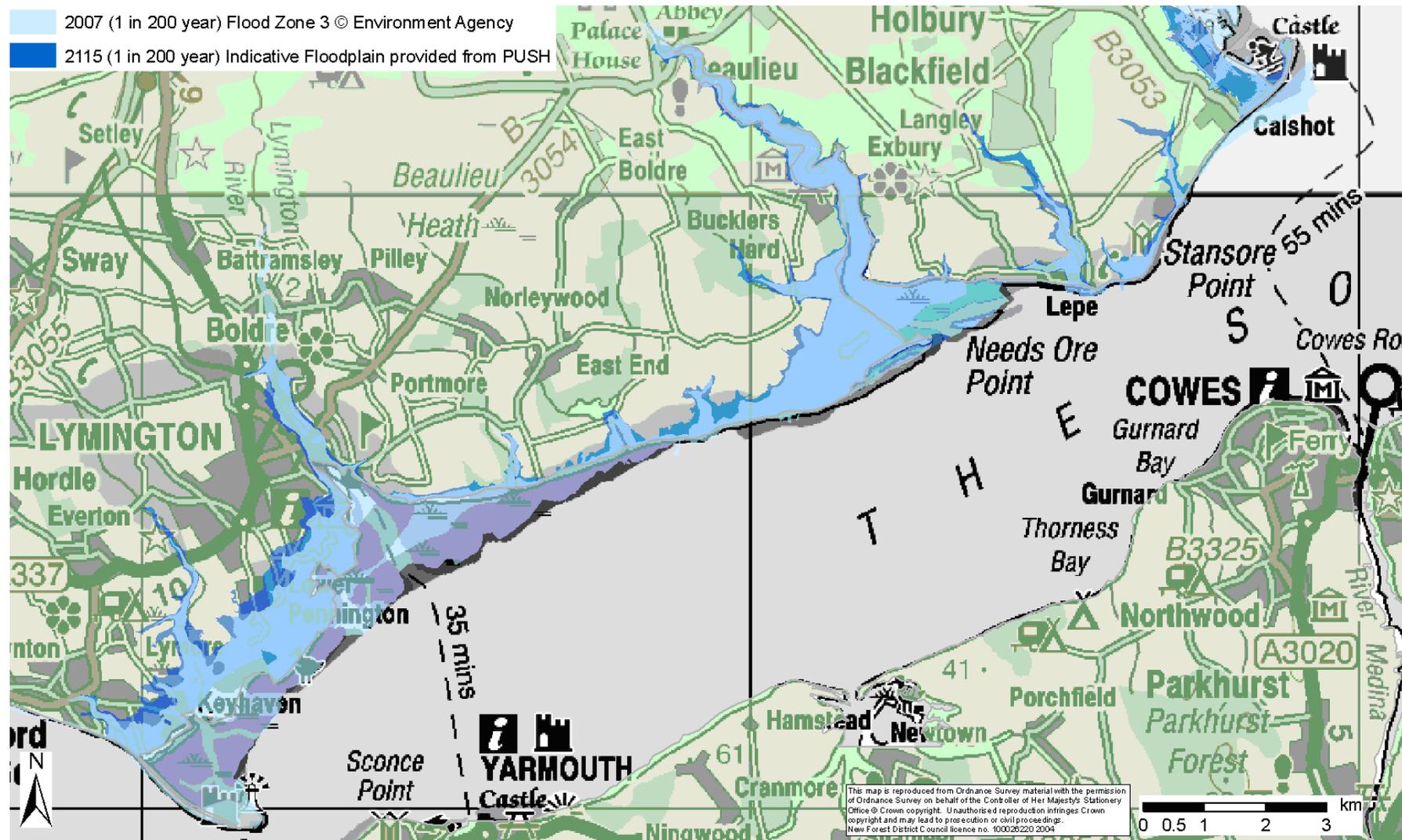


Figure 15: Increasing residual tidal flood risk over next 100 years – West Solent

## **Sediment movement**

The North Solent is a highly complex region, comprising open coast and harbours that are partially sheltered by the Isle of Wight. Beaches, vegetated shingle, low lying cliffs, sand dunes, inter-tidal habitats, lagoons and coastal grazing marsh comprise the geomorphological and ecological systems located on the open coast and in the harbours, the majority of which are designated for their nature conservation value. There are great variations in coastal morphology and processes operating over short distances due to changes in coastal orientation, exposure/sheltering, elevation and geology.

Beaches, saltmarshes and low lying coastal floodplains provide a natural form of defence that react to storm waves; they do not prevent further erosion or flooding but do help to limit and control the rate and extent at which this takes place by dissipating wave energy across their surface, thereby reducing the impact on the defences or shoreline. They also form environmentally important habitats. Depending on the sediment supply to a naturally-functioning coastline, the alongshore movement of sediment eroded from cliffs or transported onshore from offshore, may provide beaches and estuaries with material locally and further afield. A natural shoreline sediment system is one that is allowed to behave dynamically without any alongshore and cross-shore disruption due to coastal erosion and flood risk management; it may therefore be eroding, stable or accreting.

Flood and coastal defences constructed to protect developments, agricultural land and contaminated and landfill sites, particularly within the harbours, estuaries and tidal rivers have resulted in only limited sections of the shoreline being free to erode, providing little material to the estuary system. The extent of current defence structures means that substantial lengths of the north Solent shoreline are generally in an 'unnatural' form and position. It is likely that for much of the SMP frontage, the removal or failure of defences would result in considerable tidal flooding and erosion of the developed and agriculturally productive hinterland. On the large lengths of shoreline backed by low lying land this would cause inundation of the flood plain, creating a new shoreline and habitat in the process along the landward edge of the low lying area.

The majority of sediment input into the North Solent system is either locked up in rivers behind tidal sluice gates, behind coastal protection and flood defence works or has been reclaimed over the years. Some sediment sinks of the North Solent have undergone aggregate dredging for construction works. In the past, spoil from maintenance dredging would be dumped at the Nab Tower. These activities have contributed to a depleted sediment budget on the whole. Therefore beach renourishment and recycling are central to management on a number of beaches throughout the region to offset losses. Beach Management Plan sites within the North Solent SMP area include Hurst Spit, Lee-on-the-Solent and Hayling Island.

## **Defence impacts**

There is often a public perception that shoreline change can and should be halted through engineering works. There is often a demand to continue to hold the existing defence line to protect assets, but this is coupled with an expectation that the shoreline will continue to look exactly as it does now. However, the dynamic nature of our coasts and estuaries, mean that these expectations are unrealistic in many, if not all, instances. If shoreline defences are maintained in the same locations as at present, then the size and cost of maintaining or improving the defences will need to increase considerably.

Changes in climatic conditions may result in more severe and frequent storm-waves that are able to penetrate closer into shore under rising sea levels. Defences would need to be wider to remain stable against larger and more frequent storm waves. Rising sea levels and erosion, scour and loss of beach material would require defences to have deeper foundations to cope with undermining and narrowing of inter-tidal areas, and be greater in height to limit the amount of water passing over the top of them in storms. This would particularly be evident on the open shore, but would also apply to the more sheltered harbours and tidal reaches, which would become more exposed and vulnerable under rising sea levels.

Maintaining current defence lines will also result in increased loss of important inter-tidal habitats through coastal squeeze as sea levels rise. With high rates of sea level rise and low rates of sediment supply, inter-tidal saltmarsh and mudflat habitats would continue to suffer erosion where defences constrain the landward movement of the shoreline. This situation would also be caused if inter-tidal habitats are in front of high or rising land. The loss of inter-tidal habitats that acted as natural flood defences, is likely to lead to increased levels of wave and tidal energy impinging on defences, which will make them more expensive to maintain. It must therefore, be recognised that, in the very long term, continuing to defend long stretches of shoreline with increasing exposure and vulnerability may become technically and economically unsustainable.

There is also an increasing risk associated with holding the line and continuing to occupy and develop the backing hinterland. Should inundation take place during an extreme event for example, where assets and lives are at risk, the need to relocate, or mitigate, for the increased risk to assets, should be considered in the future. It is still very important to recognise that maintaining current alignments may not be possible indefinitely, and that a change in management may be required. This may be due to the uncertainty of the timing of such flood events, or the manner by which adaptation measures can be actioned, or it is likely that such changes need to be considered outside of the SMP timescale (i.e. beyond 100 years).

Theoretically the maximum extent of any realignment is limited by the extent of the floodplain. However, in reality there are a number of other constraints which mean that the extent of any realignment is likely to be less than this. Within the present SMP, indicative realignment extents have been identified using the available information (see applicable Policy Unit maps). The example extents identified have been chosen after considering:

- The avoidance of built assets, infrastructure and internationally designated habitats where practicable
- The provision of more economic, shorter and sheltered defences, incorporating high land where possible
- The creation of inter-tidal habitat

The actual realignment extent along any frontage where Managed Realignment has been proposed will be the subject of further studies before any realignment scheme is undertaken, and will be subject to landowner's consent and continuing consultation prior to a realignment of defences or commencement of a change in defence management. These studies will be required to:

- Identify the best alignment of defences on technical, social, economic and environmental grounds
- Define the exact standard and position of any realigned defences along these frontages
- Assess hydrodynamic impacts of Managed Realignment
- Investigate future morphological evolution

There should be detailed consideration of future land use, development and infrastructure improvements in all areas of flood and erosion risk, particularly where the policy is not Hold the Line, to enable the shoreline, and the assets affected by it, to adapt in a sustainable, controlled and balanced way.

### **3.2.2 Economic Sustainability**

The cost of continuing to protect shorelines to the extent and on the same alignment is a nation-wide issue. Many of the defences that exist today have been the result of reactive management without consideration of the long-term consequences, including financial commitment.

The cost of maintaining all existing defences will increase significantly compared to present expenditure levels. In simple terms this means that

either more money needs to be invested in coastal defence, or defence expenditure has to be prioritised. The cost to provide or rebuild defences that are both effective and stable currently averages between £2.7 million and £5.1 million per kilometre (for revetments, seawalls, beach recharge, etc.); the maintenance costs range from between £10,000/km for revetments, seawalls and groyne fields, to £20,000/km for beach management schemes.

Consequently those areas where the UK taxpayer is prepared to continue to fund a defence may well become even more selective. As a result, the threshold for when an area ceases to be considered nationally viable to continue to be sustainably defended could well shift. Whilst it is not known how attitudes might change, it is not unreasonable to assume that future policy-makers will be more inclined to resist investing considerable sums in protecting property in high risk areas, such as the coast, if there are substantially cheaper options, such as constructing new properties further inland. The implications of these national financial constraints are that protection is most likely to be focussed upon areas where there are large amounts of assets potentially at flooding or erosion risk, where the highest level of benefit would be achieved for the investment made i.e. more properties could be protected per pound of investment. The consequence is that rural communities and privately owned landholders will often be more affected.

It is extremely important that the long-term policies in the SMP recognise these future issues and reflect likely future constraints. Failure to do so would not ensure future protection; rather it would give a false impression of a future shoreline management scenario that could not be justified and would fail to be implemented once funding was sought.

Considering the high level, broad-scale level of the data available and taking into account the additional information from strategies and plans not specifically evaluated in the SMP, the proposed policies are believed to be cost effective in terms of economics. However, it should be noted that in many areas direct funding under coast protection or flood defence may not be available due to the need for prioritisation of this funding at a national level. It should be noted that, although the economic viability of the proposed policies has been assessed in this SMP, a proposed policy of Hold the Line or Managed Realignment does not guarantee funding for defence maintenance and/or capital works along these sections of the shoreline. Indeed, where defence works have been identified, but are unlikely to secure central government flood and coastal defence grant in aid, alternative sources of funding may be available to Local Authorities and County Councils.

In order to improve management of the overall flood and coastal erosion risk management programme, Defra have developed a suite of Outcome Measures, which will enable Government to set the balance of the programme

in a transparent and challengeable form. Further information on these Outcome Measures can be found at:

[www.defra.gov.uk/environment/flooding/policy/strategy/outcomemeasures.htm](http://www.defra.gov.uk/environment/flooding/policy/strategy/outcomemeasures.htm)

The Ministry of Defence (MOD) advised that they will continue to operate from their existing sites, which includes a number of coastal frontages, and they will manage their flood defence assets accordingly in order to maintain the required operational capabilities of their facilities. Therefore, funding through MOD budgets will need to be secured to undertake the necessary maintenance and improvements works that have been identified.

As stated previously, and elsewhere in the supporting documents, the majority of the North Solent's coastal defences are privately owned, maintained and funded, and these private landowners have a key role in the way the shoreline is and will be managed. The North Solent SMP recognises that there are private individuals and organisations that have rights or powers to protect their own property and to continue to maintain existing defences on a like-for-like basis without the need for planning permission.

There may be the requirement for new or additional defences on currently undefended frontages in response to sea level rise or flood risk increases; this could be applicable to undefended frontages within a frontage with a proposed Hold the Line or No Active Intervention policy. Planning permission would be required for new or additional defences and each application would be considered individually on its merits, looking at the relevant planning policies for the area. The SMP policies relating to currently undefended frontages would therefore not prevent an application from being approved, as the SMP is only one of the material considerations taking into account in reaching a decision by the planning authority along with any formal views from the statutory agencies involved in coastal issues.

During the development of the SMP it has been clearly stated that no public funding (in the form of Flood and Coastal Defence Grant In Aid) is available for the maintenance of privately owned defences, as is currently the case. There is therefore, a risk that if defences are not maintained by the landowner, flood risk to landholdings, properties and environmentally important sites could increase. Landowners and coastal communities will need to be engaged with subsequent flood and erosion risk management strategy studies to identify scale of risks and possible alternative sources of funding.

It must be recognised that the justification for a particular policy is not necessarily dependant on economic viability alone, as impacts on other benefits may be considered more important e.g. holding and maintaining existing defences to sustain a designated habitat. Such sites may not be considered economically viable under current Treasury guidance; this is particularly applicable to privately owned and maintained defences where the owner may consider the costs of maintenance of defences or maintaining

existing defences to a lower standard of protection affordable, but under national Treasury criteria would be deemed not economically viable.

The potential for collaborative partnership working e.g. between Local Authorities and private landowners, will be an essential component of delivering the agreed plan. This approach would be in line with the Government's strategy "Making Space for Water" that states that alternative and co-funding options for coastal management and defence projects should be considered.

### ***3.2.3 Environmental Sustainability***

Environmental sustainability is difficult to define as it depends upon social attitudes, which are constantly changing. Historically, communities at risk from coastal erosion relocated, recognising that they were unable to resist change. However, in more recent times, many coastal defences have been built without regard for the impacts upon the natural environment. Today, because we have better technology, we are less prepared to accept change, in the belief that we can resist nature. Inevitably, attitudes will continue to alter; analyses of possible 'futures' are already taking place (e.g. Foresight Future Flooding, 2004 and 'Making Space for Water'), considering the implications for many aspects of life, including approaches to flooding and erosion under different scenarios. It is not possible to predict how attitudes will change in the future; therefore the SMP is based upon existing criteria and constraints, whilst recognising that these may alter over time to accommodate changing social attitudes.

## Natural environment

The North Solent SMP shoreline contains a variety of landforms and habitats. The special quality of the natural habitats and geological/geomorphological features is recognised in a number of international, European, national and local designations, protected under statutory international and national legislation, as well as regional and local planning policies.

There is a legal requirement to consider the implications of any 'plan or project' that may impact on a Special Protection Area (SPA) or Special Area of Conservation (SAC), through the European Union Habitats Directive (Council Directive 92/43/EEC) and Birds Directive (Council Directive 79/409/EEC).

The EU Water Framework Directive also requires that water bodies such as estuaries reach at least 'good status' by 2015. A key requirement for the SMP is therefore to promote the maintenance or enhancement of biodiversity, through identifying biodiversity opportunities.

Coastal management can have significant impact on habitats and landforms, both directly and indirectly. In places, coastal defences may be detrimental to nature conservation interests, e.g. coastal squeeze of internationally designated inter-tidal habitats in front of defences. However, in other locations the presence of defences sustains, albeit temporally, the present interests of a site e.g. coastal grazing marshes at Farlington Marshes, Keyhaven and Pennington Marshes, and high tide roost sites within Portsmouth, Langstone and Chichester Harbours and Southampton Water.

However, one must recognise that the preservation of freshwater habitat, coastal grazing marshes and saline lagoons may be at the 'expense' of alternative habitats i.e. saltmarsh, which are considered to be more dynamic and able to respond to changes in coastal conditions and processes. Coastal habitats may also form the coastal defence e.g. Hurst Spit, Calshot Spit, Hook Spit, Black Point, East Head. Therefore coastal management decisions need to be made through consideration of both nature conservation and coastal flood and erosion risk management.

Although the conservation of ecological features in a changing environment remains key in terms of environmental sustainability, future management of the coast needs to allow habitats and features to respond and adjust to change, such as accelerated sea level rise. It is recognised that coastal habitats cannot always be protected *in situ* because a large element of their ecological interest derives from their dynamic nature and this is important to ensure the continued functionality of any habitat. This poses a particular challenge for nature conservation and shifts the emphasis from 'preservation' to 'conservation'.

Natural England (formerly English Nature) are actively seeking to ensure that coastal erosion and flood risk management proposals are designed to ensure that all designated sites are conserved and, wherever possible, enhancement opportunities that benefit ecology and geology are implemented, whilst also allowing the coast to remain naturally dynamic. Under Section 28G of the Countryside and Rights of Way Act 2000, Natural England is provided with the responsibility and power to safeguard England's finest and most vulnerable wildlife and geological features. Therefore, accommodating the objectives of environmental bodies, such as Natural England, requires flexibility in the assessment of nature conservation issues, possibly looking beyond the designation boundaries to consider wider scale, or longer-term, benefits.

There are other potential opportunities for localised managed realignment or environmental enhancements where biodiversity opportunities could be achieved, and also serves to highlight where future development in the flood plain would be inappropriate. Again, the majority of these sites are on privately owned land.

### **Human (Socio-Economic) Environment**

The human environment covers such aspects as land use (both current and future), heritage and landscape (which may be both natural and man-made).

#### **Land-use**

Historically, development of the coast has taken place unconstrained

Planning Policy Guidance 20 (PPG20: Coastal Planning) identified that approximately 30% of the coastline of England and Wales is developed, with much of this development taking place before the introduction of the Town and Country Planning Act 1947. In the North Solent, the proportion of the coastal zone that is developed is considerably higher, with pressures for increased development in the future. Growth of built development, both commercial and residential, within the coastal zone over the centuries has increasingly required engineering works to defend properties and assets against the risk of erosion and flooding. However, continued construction of hard-engineered coastal and flood defences to protect development may not be economically sustainable in the long-term. Local Development Frameworks now identify the need for 'sustainable development' (section 39 of the recently reformed Planning and Compulsory Purchase Act, 2004), which recognises that opportunities for development on the coast are limited due to risk of flooding, erosion, land instability and conservation policies. PPG20 states that in the coastal zone, development plan policies should not normally permit development that does not require a coastal location.

The South East Plan (2009) builds upon this, adopting a catchment wide approach to water management and acknowledging the links between

biodiversity, water quality and flood and erosion risk management. Policies NRM4 (sustainable flood risk management) and NRM8 (coastal management), in particular, require local planning authorities to take account of Shoreline Management Plans, with the former advocating an integrated approach to coastal planning and management.

Planning Policy Statement 25 (PPS25: Development and Flood Risk) sets out the Government's policies for planning authorities to ensure that flood risk is properly taken into account at all stages in the planning process and to prevent and direct development away from areas at high risk of flooding. Where new development is, exceptionally, necessary in such areas, policy aims to make it safe, without increasing flood risk elsewhere, and, where possible, reducing flood risk overall. The new planning policy supplement Development and Coastal Change (March 2010) aims to strike the right balance between economic prosperity and reducing the consequences of coastal change on communities and sets out a planning framework for the continuing economic and social viability of coastal communities and to deliver appropriate sustainable development in the right places, taking full account of coastal change. PPS25 and its Supplement are part of the holistic approach to managing risk set out in the Government's strategy for flood and coastal erosion management, *Making Space for Water* (Defra 2005) and Defra's *Adapting to Coastal Change – Developing A Policy Framework*.

The Government is committed to managing the impact of coastal erosion and flooding in a sustainable manner, and this includes ensuring that our spatial planning policies shape sustainable communities to adapt to the risks presented by climate change. Coastal change, as exacerbated by climate change, has implications for development on the coast and is, therefore, a major consideration for spatial planning in shaping places that are resilient to climate change. Positive planning has an important role in helping communities to manage risk and adapt to an ever changing coastline.

Within the Solent region port activity and marine industries are important to the national, regional and local economy; the marine industry ranges from large-scale operations in Southampton and Portsmouth to small boatyards on the River Hamble and in Chichester Harbour. The Solent Waterfront Strategy (SEEDA, 2008) has revealed that the Solent marine sector contributes significant economic benefits to the local area (£5.5 billion), providing 25,000 direct jobs and makes up around 25% of the Solent economy. The Port of Southampton is owned by Associated British Ports (ABP) and is the UK's second largest container port and cruise passenger port (with over 1 million passengers in 2009). The Port handled some 40 million tonnes of cargo during 2009, over 21% of all the UK's non-EU seaborne trade; in addition the Port handled over 500,000 units of ro-ro traffic, some 14% of UK total. The Ports has been identified as a key international gateway and critical component of the nation's transport system (ABP, 2009). Southampton City Council's Core Strategy recognises that the Port is a vital part of the city's

economy, the regional economy and of national importance. The medium to long-term strategic plans for the Port are outlined in the Port of Southampton Master Plan 2009 which proposes to double the container capacity of the port by 2020. Other proposals that need to be considered are the reconstruction of container berths and a channel deepening of Southampton Water and the eastern Solent approach. Portsmouth Commercial Port is owned by Portsmouth City council and is the second largest passenger terminal in Britain. Portsmouth is also the home to two-thirds of the Royal Navy's surface ships. Southampton, Portsmouth and Lymington provide essential ferry services to the Isle of Wight. In addition to commercial ports, there are industrial and MOD sites requiring waterside locations for operational reasons, access or transportation. These include:

- Exxon Mobil Oil Refinery in Fawley;
- Oil Terminal in the River Hamble;
- power stations at Fawley and Marchwood;
- incinerators, waste and renewal energy plants;
- MOD facilities and operational assets at Portsmouth and Marchwood;
- marinas, sailing clubs, boat yards, and moorings in Chichester, Langstone and Portsmouth, Lymington and Beaulieu Rivers in the west Solent, and in Rivers Itchen and Hamble);
- sewage treatment infrastructure, such as Budds Farm, Apuldram
- recreational sites and amenities (e.g. Calshot Activity Centre, sailing and wind surfing schools, etc.).

Regionally important transport links at risk from coastal flooding and erosion protected by current defences include mainline railway links from Lymington, Southampton and Portsmouth, main roads including M27, M275, A35, A33, A27 in addition to smaller limited connections to rural areas around Chichester Harbour and the west Solent. Important infrastructure services located close to the coast include Eastney pumping station, Budd farm sewage works at Langstone, Southern water pumping station at Portchester and sewage treatment works at Apuldram, Bosham and Thorney.

The Solent is one of the busiest water recreation resources in the UK, hence water based recreation and the shoreline are important components to the recreational and amenity resource; the area attracts a diverse range of recreational pursuits in addition to water based activities, including bird watching, wildfowling, walking and cycling.

The North Solent shorelines are an important area for tourism and recreation use. Recreational facilities within the North Solent area include extensive and popular coastal and riverside paths used for cycling and walking (e.g. Solent Way), water based activities including sailing, windsurfing and angling (e.g. Calshot, West Witterings beach, Chichester Harbour, Hamble River) and

areas of open amenity space and parks (Lepe Country Park, New Forest National Park).

Tourism plays an important role in the region and is increasingly valuable for the local economy in terms of visitor spending and providing employment opportunities. The North Solent area has a diverse range of activities and attractions and includes the nationally important New Forest National Park and Chichester Harbour. An estimated 25,000 people use Chichester harbour for water-related activities each year and 640,000 visitors used the three car parks in Itchenor, Bosham and East Head in 2001 (CHC, 2009). The New Forest National Park receives more than 13 million visitor days each year (NFNP, 2008).

Assets landward of current defences, such as access routes to the shoreline and public rights of way may be protected through maintaining existing defences; it must be recognised that modifications, improvements, realignment or abandonment of existing defences will require adaptive measures to be investigated and perhaps incorporated with defence works if appropriate. The continuation of these industrial, commercial, tourist and recreational activities is essential to sustain the economy of the region as a whole. Further information is provided in the Theme Review Appendix D5.1.

The majority of high grade land (grades 1-2) is concentrated around Chichester Harbour, along the west Solent and upper reaches of the Hamble River. Land classified as grades 1–3a is often protected for agricultural uses. Areas of productive agricultural land around Chichester Harbour and on Hayling Island lie within the predicted coastal flood risk area and are protected by privately owned and maintained defences.

There are several former and current landfill sites at risk from coastal flooding and erosion that are currently protected by coastal defences. Despite the continued maintenance of existing defences, these areas of contaminated land could potentially cause pollution to coastal waters. Long-term management of such sites will need to be determined following detailed investigations that address the socio-economic, technical feasibility and environmental implications of management options. The key areas containing former and current landfills include Pennington, Dibden Bay, Southampton docks, Esso Refinery land, Stokes Bay, Horsea Island, several sites on Portsea Island and Brockhampton Quay.

## **Heritage**

Heritage features are valuable for a number of reasons (English Heritage, 2006) as they:

- are evidence of past human activity
- provide a sense of place (or roots) and community identity

- contribute to the landscape aesthetics and quality
- may represent an economic asset due to their tourism interest
- are unique and if destroyed they cannot be recreated

Whilst they are vulnerable to any coastal erosion, the very process of erosion is also uncovering sites of historical interest. Only a few sites are protected by statutory law, but many more are recognised as being of high importance.

Government advice in PPS5 Planning for the Historical Environment promotes the preservation of important heritage sites, wherever practicable. However, due to the dynamic nature of our coastlines, this is not always possible or sustainable. Once they have been damaged or destroyed they cannot be recovered or re-created. However, there are a great many other features which shoreline management policy could potentially affect, such as the preserved artefacts contained in buried landscapes. Therefore each site must be considered individually and balanced against other objectives at that location; relocation of heritage features is unlikely, recording and documenting of heritage features would be a more realistic management approach.

The historic environment of the North Solent coastline includes evidence of past environments, archaeological sites, historic buildings and the historic aspects of the wider landscape. The long maritime history of this part of the South East coastline has resulted in a large number of important heritage sites, and areas with heritage potential, being present. Major heritage features include historic fortifications, harbours and dockyards, military installations, wreck sites, coastal settlements and industry. Such sites include Beaulieu (conservation areas and listed buildings); Southampton City (including mid Saxon town of Hamwic); Hamble River (historic wreck site Grace Dieu); Portsmouth City; Hayling Island (Turner Bury Hill fort & Sinah Common); and historic villages in Chichester Harbour (Bosham, Fishbourne, Emsworth, Dell Quay, West Itchenor). Details of heritage features covered by statutory and local planning designations and non-designated assets are listed and mapped in Theme Review under Historic Environment Appendix D4.

## **Landscape**

At the SMP level it is difficult to predict the impact that implementing the SMP policies will have on the existing landscape and visual amenity. Further details on how the policies will be implemented will be addressed at the strategy and scheme level with additional assessments.

Parts of the SMP shoreline are designated and protected for their landscape quality; these include the New Forest National Park, the Chichester Harbour Area of Outstanding Natural Beauty, Special Landscape Areas and Character Areas. Further details are provided in Theme Review under Landscape Appendix D3. However, in general, landscape is difficult to value objectively as it is a mixture of the natural environment and social and cultural history.

The general trend in England over the last century has been a change in landscape character resulting in a decline in diversity, distinctiveness and ecological richness (NE, 2009).

Coastal defences in some parts of the North Solent will potentially influence the landscape character as well as urban development on floodplains. Degraded landscapes may also be enhanced by restoring the character of the land with restoration, retreat or realignment schemes.