

# 1997-2025

## From Hold the Line to Adaptive Management

**A History of the East Head Coastal Issues Advisory Group**



East Head Spit summer 2015

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### 1 Purpose of the report

The purpose of the report is to provide a history of the East Head Coastal Issues Advisory group from the issues that led to its inception, how it has operated and took decisions in the past up to 2025. The first edition was created in 2017 when it was felt by the group that this largely anecdotal and undocumented history should be documented to help present and future members as well as other groups around the country facing similar issues to understand how the group has achieved adaptive management along a stretch of coastline and how the coastline has changed as a consequence.

### 2 Background

East Head is a sand dune and shingle spit familiar to many different groups of people and is treasured for a variety of reasons. Local residents and tourists love it for its natural beaches, uncluttered by defences. Yachtsmen, because it provides shelter and protection to the main harbour channel leading to Itchenor, as well as Chichester and Birdham Marinas. Dog walkers are attracted because it provides a flat, open space where animals can be let off the lead without too much fear of straying. Local residents also value it for the protection it provides against erosion of the land on the east side of Snow Hill Creek. Environmentally this is one of the most highly prized sites on the south coast and has many national and international designations (SAC, SPA, Ramsar, SSSI, SNCI, AONB and GCRS to identify the more important ones). **Appendix B** contains a glossary and links to further information. The area is treasured because it represents one of the few “natural” coastal environments on the south coast between Southampton and Brighton and is within relatively easy reach of London.

The spit is located on the east side of Chichester Harbour entrance at the eastern end of the Solent, the channel between the mainland and the Isle of Wight, that provides access to the major ports of Portsmouth and Southampton.

The spit itself is formed on a wide gently sloping foreshore of sand, that narrows at its southern end. The dunes are, at present, relatively large especially at the northern end but narrow dramatically at the southern end to a point known as “The Hinge”.

There has been a long history of coastal change, particularly with regard to East Head itself. The open coastline to the South has retreated considerably over the past 200 years (Figure 1) and whereas the spit used to be on an alignment that represented an extension of the coastline from the east towards Hayling Island it has rotated clockwise by approximately 90 degrees and now points towards the North. The point at which the bend occurred is known as “The Hinge” (Figure 2) for obvious reasons.

The reasons for constructing hard defences, comprising timber breastworks, groynes and gabions in the vicinity of the Hinge, and which authority constructed them, are questions beyond the scope of this document which seeks to deal with the change in management approach between the mid-1990s and the present day (2025), however, groynes are marked on Ordnance Survey Maps published since 1899.

At the time of the 1997 East Solent Shoreline Management Plan (SMP) the policy for this frontage was Hold the Line (HtL) and Chichester District Council maintained the defences having taken over from West Wittering Estate Plc. sometime in the early 1980s.

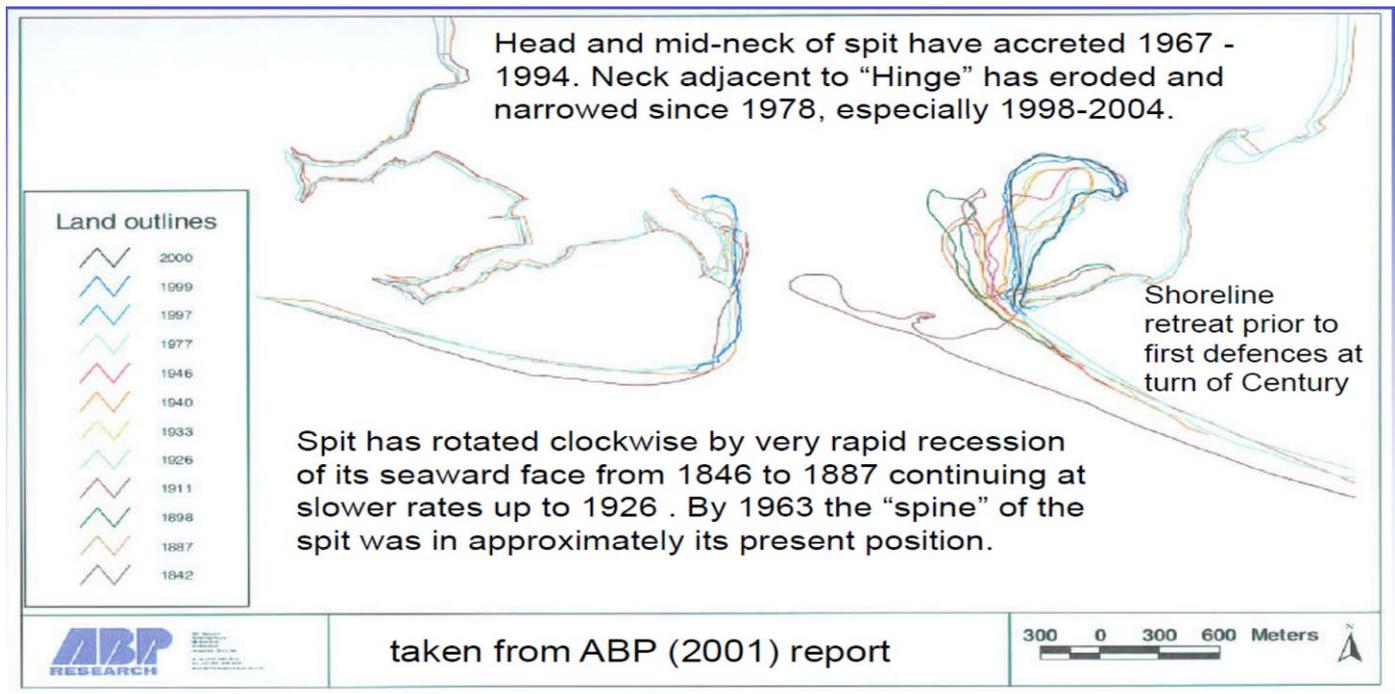


Figure 1: Changes to coastline of East Head 1842 to 2000.

Nationally, most of the first-generation Shoreline Management Plans (SMPs) indicated a preferred option of HtL and this maintaining the status quo which resulted in a prediction of unaffordable costs and possible environmental losses for future maintenance of this approach. The SMP process itself was a very broad-brush approach which was not able to consider individual frontages in depth.

The Pagham to East Head Coastal Defence Strategies (PEHCDS) that were to follow (PEHCDC-1: 1998-2003; PEHCDC-2: 2005-2008) took a much more detailed look over a 50 year time period and concluded that, for several frontages in the study area, continued investment in hard defences was not justified on either economic or environmental considerations.

As the PEHCDS-1 progressed it became clear that maintaining the hard defences at The Hinge would not be sustainable. Major investment to replace the ageing defences was not financially viable and, more importantly, the existence of hard defences was, in the view of the managing authorities, detrimental to the long-term sustainability of East Head.

The narrowness of the Hinge also raised concern that it was vulnerable to a breach that could result in the loss of the dunes at the Hinge, exposure of West Wittering frontage on the East side of Snow Hill Creek to wave attack, erosion and consequent flooding of the village itself. The potential loss of parts of the dunes for their amenity value and environmental importance together with the loss of access to the main dune areas of East Head was also a major issue.

The threat of a breach also raised the issue of whether it would result in a second channel opening into the harbour which could lessen the flow in the current channel and result in silting up of the harbour entrance and loss of navigable access. This could cause significant damage to the harbours marine and leisure industry, estimated to be worth £60m/yr (values at time of strategy).



Figure 2: Layout and features of East Head as visible in 2015.

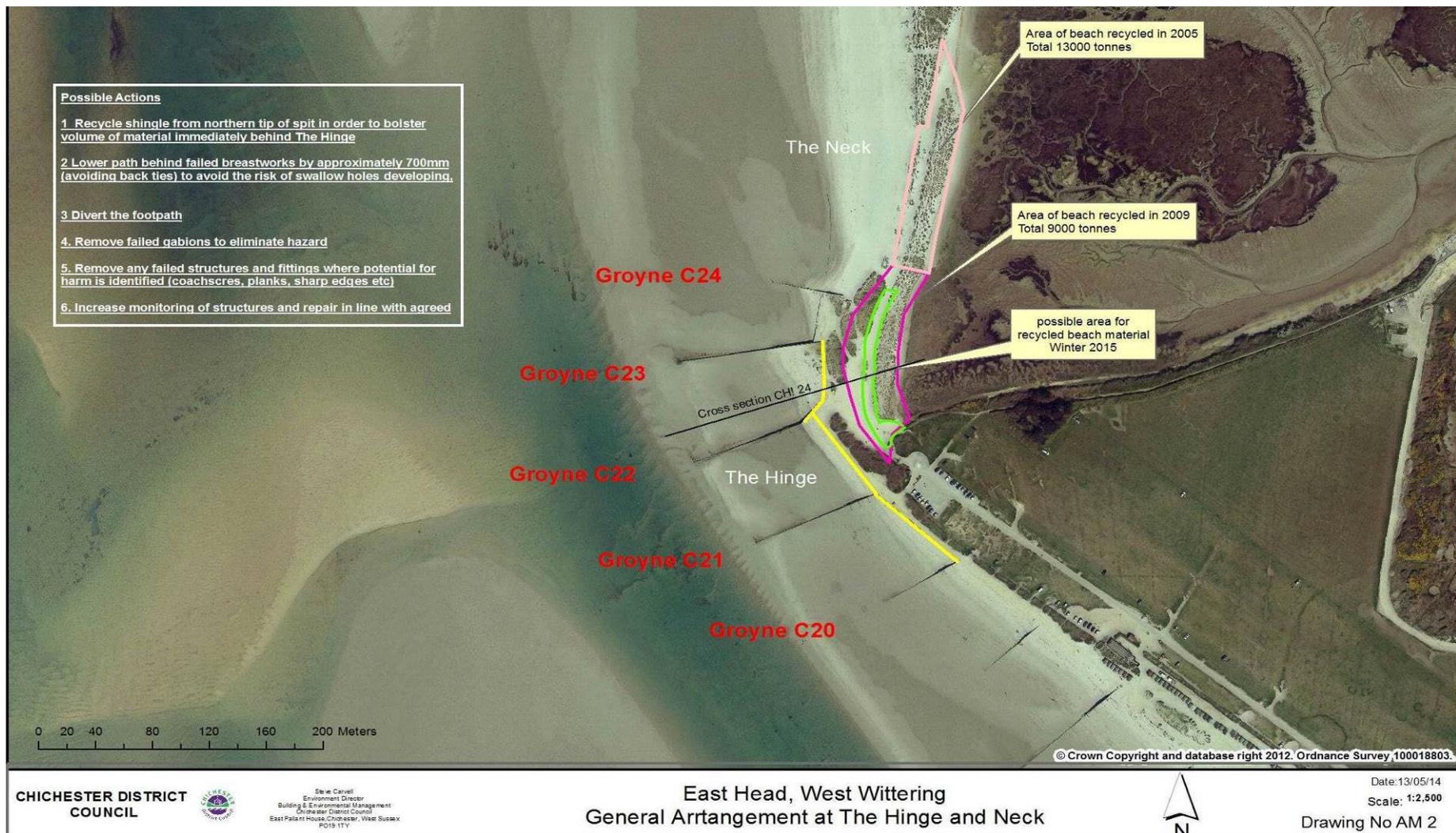


Figure 3: Details of structures and works at The Hinge and Neck.

### 3 1997 to 2003, PEHCDS-1 and narrowing of The Neck

During 1998/9, at the time the PEHCDS-1 was first being discussed, significant narrowing of East Head immediately north of the last groyne (C24, see Figure 3) at “The Neck”, gave rise to serious concerns of a tidal breach. Chichester Harbour Conservancy (CHC), with support from others sought planning permission to install a rock berm with a maximum height of 2.8m above Ordnance datum or 700mm above MHWs on the Snow Hill Creek side of the spit.



*Figure 4: Aerial photography of the dune just north of groyne C24 on 15 July 1999 showing an erosion scarp on the western side.*

The plan was granted temporary (6 years) planning permission and on the understanding that its purpose was to prevent a tidal breach being scoured out and that if the beach in front lowered to the point where the berm became an exposed revetment it would be removed. This was because of the increased risk of a breach posed by continued lowering of the foreshore. The berm construction was project managed by CHC, constructed in 2000 and funded by CHC, Woodger Trust, Cakeham Manor Estate and public subscription.

The PEHCDS-1 that started in 1998 was finished in 2003 but not fully completed and approved due to changes in central government guidance on the timescale of the appraisal (increased from 50 to 100 years) and changes to the treasury discount rate, both of which had a major impact on the economic appraisal and thus required significant reappraisal work that led to PEHCDS-2.

## 4 2004 to 2008, PEHCDS-2 and overwashing of The Neck and the East Head Working Group (EHWG)

There was agreement among all parties, with a management role in the area, that improved understanding and better communication would assist the PEHCDS -2 consultation and a working group was proposed to take the matter forward.

The East Head Working Group (EHWG) was set up under the independent chairmanship of Mr Richard Young. It was made clear from the outset that, although paid for by the EA as part of the consultation process, Mr Young was truly independent and would set the tone of meetings as he saw fit. The agenda for meetings was to be set by the participants and running costs would come directly from members.

The working group comprised:-

**Chairman**, Richard Young (Richard Young Associates) appointed as independent chair by EA.

**Chichester Harbour Conservancy**, Harbour Master John Davis was a leading exponent of hold the line. CHC has statutory duties to manage navigation within the harbour and across the open coast frontage of W Wittering

**West Wittering Parish Council**, Jim Robertson, representing the local community and liaise between the group and the public.

**West Wittering Estate Plc**, Managing Director Peter Morton. The Estate own and manage the car park immediately adjacent to the site together with foreshore and East Head south of last Groyne (C24) including "The Hinge"

**Cakeham Manor Estate**, MD John McKerchar. The Estate own and manage the open coast frontage immediately adjacent to the site to the east.

**F G Woodger Trust**. Richard Shrubbs (also a Parish Council member). This is a local charitable trust, which, along with the rest of the community offered a degree of financial support in the likely event that central Government funding was unavailable.

**Chichester District Council** Senior Engineer David Lowsley. Coast Protection Authority with permissive powers to carry out coast protection works to manage erosion. Partner with EA in production of CDS.

**Environment Agency** Andrew Gilham & Joe Pearce with authority to manage flood risk from fluvial and tidal sources and lead authority for production of CDS.

**National Trust** Glyn Jones, Mark Wardle as owners of East Head from the last groyne (C24) northwards. National policy of non-intervention and promotion of natural process led to conflict with community.

**Natural England** (English Nature up to October 2006). Bob Edgar, National statutory body with a duty to protect SSSIs. East Head is covered by national and international designations. One of these is a Geological Conservation Review Site (GCRS) which indicates the spit is a dynamic feature which was in poor condition because it was constrained at the southern end.

West Wittering Residents Association was not represented on the EHWG as it was considered by all parties that the elected members of West Wittering Parish Council were capable of liaising with the community and the group was in danger of becoming unwieldy with too many parties.

The first meeting of the East Head Working Group (EHWG) took place on 1<sup>st</sup> April 2004 at Chichester Yacht Club. A note taken at the meeting by the National Trust representative was "that all parties agreed there were no immediate issues causing concern but that things may be different in the long term".

The meetings were conducted in an open and even-handed manner. The rules were that only one person spoke at a time and were to be listened to without interruption unless comment was invited. No question was considered "stupid" or undeserving of a proper response. Any topic was admissible provided it had a direct bearing on the discussion of managing East Head and the West Wittering frontage.

The neck continued to narrow and in October 2004 the spit and berm were overwashed (Figure 5). There was no indication that a tidal breach was threatened as the rock berm was only overwashed at high tide to a maximum depth of about 500mm and the wave energy was quickly dissipated by the still water in Snow Hill Creek. As a result, an overwash fan quickly developed (Figure 6) as the transport capacity of waves declined and the sediment settled out. In the following weeks the fan on the east side of the berm began to build up through both wind-borne sand deposits and occasional overwashing waves.

15<sup>th</sup> October 2004

18<sup>th</sup> October 2004

28<sup>th</sup> October 2004



*Figure 5: Photographs of rapid changes that occurred at “The Neck”. Note the water level on the landward side. Photos were taken at high tide.*



*Figure 6: Overwash fan created by waves losing momentum and dropping sediment when they met the still waters of Snow hill Creek. Photo taken just before works were undertaken in March 2005.*

It was recognised that this situation was delicately balanced, and a proposal was put forward to build up the overwash fan and upper foreshore over the rock berm with material taken from the north end of East Head. The planning conditions attached to permission made it clear that continued monitoring of the volume of sediment replenishment at the donor site would be required.

All parties of the EHWG agreed to this action and in March 2005 some 13000 tonnes (about 7,200 m<sup>3</sup>) of material, mainly sand with some shingle, was placed in the area of the overwashing. There was discussion over whether marram grass should be planted to “stabilise” the freshly deposited material, and National Trust undertook some minor planting of relocated marram grass plugs on both the seaward and harbour sides of the access path located along the top of the deposited material. Natural England accepted the planting that had been done but would not sanction further attempts to fix the dune in place with further planting because the mobility of the sand dune system is a feature of both the SSSI and SAC.

Ideas about how to manage the area in respect of coastal erosion, flooding and environmental matters have met strong opposition during PEHCDS-1. At the outset of discussions on future management positions fell, broadly speaking, into two groups. Whilst all parties wished to see a sustainable outcome, one group wanted to maintain the status quo with hard defences, either replacing the existing breastworks or upgrading them by constructing other forms of hard defence. This view was initially held by the Chichester Harbour Conservancy with clear support from the local community i.e. West Wittering PC, West Wittering Estate, Cakeham Manor Estate, FG Woodger Trust and West Wittering Residents Association.

The alternative view of wishing to restore the flexibility of the spit, albeit with safeguards in respect of access, amenity and environmental issues, was held by Chichester District Council (CDC), the Environment Agency (EA), National Trust (NT) and Natural England (NE). This group believed the existing defences were one of the causes of erosion north of C24 and a more sympathetic alignment would allow material to move west and north round the Hinge and restore the beach to the north.

The detailed studies carried out by the operating authorities are covered in the two PEHCDS reports, consultation January 2001 & final strategy report 2008, so it is not intended to replicate them here. Suffice to say that the original studies, proposals and documents were clearly not accepted by the community, particularly some of the more vociferous residents and there was danger of a prolonged impasse that would be damaging both to the management of the coast and relationships between the parties. There was a clear loss of trust between the community and the management authorities.

It became clear that parts of organisations and community were not convinced by the arguments put forward by the managing authorities, primarily because there was so little certainty in the outcome and nobody was able to give a guarantee that the coast would evolve as expected.

Except for the recycling, from 2004-2006 action within the EHWG was very slow due to conflicting views, policies and very strong personalities. In 2006 only one meeting took place as negotiations faltered. This was largely due to lack of confidence in the change of policy away from Hold the Line.

The turning point came in January 2007 when a key workshop was set up with an independent chairman. During the workshop the first mention of the term “adaptive management” was made.

The Group agreed that an independent panel of geomorphologists who had worked on East Head in the past for different organisations, should be asked to provide answers to questions raised by the community. The questions and answers are available on the West Wittering Parish website under Local directory, where the whole Appendix E to the final PEHCDS report contains the details. [PEHCDS Appendix E](#).

The expert advice was well received but still left some outstanding points requiring clarification so a further round of questions was submitted. The outcome of this process towards the end of 2007 was that a much clearer understanding of the issues was achieved and a clear direction on which to base future management decisions was established. This was in particular in relation the risk of a breach forming a new channel into Chichester Harbour.

The panel agreed that an “Adaptive Management” process was the appropriate way to progress. The term was first used by Peter Jones, a District councillor, who recognised that because of the

uncertainties and variable processes involved in this coast it was undesirable to fix the defence line at a predetermined point. *The EHWG defined the aim of Adaptive Management and included the following statement in their Terms of reference:*

*“The aim of Adaptive Management will be to preserve the social, economic, environmental, navigation and amenity value of East Head to the community for the life of the Strategy. The emphasis will not be on trying to lock the feature in its present size, shape and location, nor should it be encouraging orientation in a pre-determined direction”*

The group recognised such an approach would satisfy most of the outstanding queries but that safeguards would need to be built into any strategy. The panel recommended a strengthening of the Hinge area by importing more material from the north end of the spit, but that it should be placed at a level capable of being overwashed and rolling back once the breastworks had failed. The group was helped to understand the concept by two of its members, Richard Shrubbs and Jim Robertson taking a site visit to Spurn Head on Humberside where similar problems were being faced and suggested an “Action Plan” with trigger points would help build confidence.

The expert panel also recommended the installation of a sill, on a far retreated alignment that would allay the fears of an uncontrolled tidal breach forming a secondary channel. Although accepted at the time, subsequent discussion led the EHWG to the conclusion that the retreated sill could damage the fragile salt marsh and was not required at this time. The idea is still a possibility if erosion at the hinge becomes unmanageable and a tidal breach is threatened. The group has acknowledged the option may become necessary in future.

With the agreement of all parties of the EHWG, a meeting was held in public on 18<sup>th</sup> July 2008, when questions from West Wittering Residents Association and others were answered by the Group. The minutes of the meeting, which amounted to a public examination of the work done by the Group are available on [EHWG Minutes 18.07.2008](#). Given the positive response from the community to the meeting, the PEHCDS was able to progress to its final stages with a policy of “Adaptive Management” for West Wittering and was adopted by CDC at the Executive Board meeting in November 2008.

## 5 2009 to 2017, Adaptive Management post-strategy and the East Head Coastal Issues Advisory Group (EHCIAG)

There were still many issues to be agreed in respect of future management and the members of the EHWG, formed as part of the consultation phase of the PEHCDS-2, recognised the value of continuing communication. Discussions among group members led to the formation of the East Head Coastal Issues Advisory Group (EHCIAG) whose intention is :-

*“To implement strategic, long term and sustainable coastal defence policy for the Area of East Head at the entrance to Chichester Harbour and the adjoining or potentially affected frontages”.*

The first meeting was on 2<sup>nd</sup> December 2008. (Minutes of all the Group meetings are held on the W. Wittering PC website. [EHCIAG Minutes & Terms of Reference](#))

The EHCIAG recognised that continual monitoring of the Hinge area was required and identified a series of “trigger points” which if reached, would result in action being taken to ensure the safety of the public and security of the benefits for which East Head is valued.

The suggestion from the expert panel was followed up by a second recharge exercise in March 2009 of moving 9000 tonnes (~5,000 m<sup>3</sup>) of beach material from the North end of the Spit and placing it behind the Hinge to a height of 3.5 m Above Ordnance Datum (see purple area in Figure 3). The recharge was contiguous with the recharge carried out in 2005 and the increased volume created a far more resilient beach in the area of the Hinge and the Neck of East Head.

In the meantime, the Environment Agency with substantial funding support from the local community completed the West Wittering Flood Bank scheme in 2012, alleviating any concerns on the impact of future changes to East Head on people and properties.

Monitoring continued and when the gabions between C23 and C24 failed over the northern half in 2013 they were removed. Contrary to expectation from some that the beach would retreat rapidly the frontage was managed by removing planks from updrift groynes, C22 and C23 and increasing the

height of C24, the beach actually relaxed into a gentle slope which was able to absorb wave energy better than the gabions.

When the Northern portion of the gabions failed there was no hesitation and they were removed. Even during the severe winter storms of 2013/14 this groyne bay showed few signs of distress (Figure 7).



*Figure 7: Area between groynes C23 and C24; top November 2013, bottom November 2014. Red and green dots show corresponding locations in both photos.*

In contrast to the groyne bay C23-C24, the breastworks between C21 and C22 suffered damage during the February 2014 storm. West Wittering Estate Plc. undertook repairs which led to Natural England pointing out that consent is a legal requirement. Subsequent discussions resolved the issue in that works are recognised as a temporary measure only and will not affect the overall strategy of adaptive management.

It was apparent that there were still reservations about removing the breastworks as they failed and in order to reassure the wider community a public exhibition was held, at which members of EHCIAG were available to answer questions. The Group dedicated a considerable amount of time to producing exhibition materials which included an [Action Plan 2015](#), with the intention of explaining how the adaptive management process will evolve. The supporting documents are available on the following link. [Exhibition 22nd May 2015](#).

The response to the exhibition was positive and supportive and the Group felt encouraged to proceed with the next steps. To provide additional reassurance that when the breastwork finally fails and the tamarisk ridge rolls back a project to build up the sediment store behind the Hinge was initiated at the end of 2014 which was implemented in early 2016 when 2,000 tonnes (~1,100 m<sup>3</sup>) of sand and shingle taken from the tip of East Head were placed along a stretch of bare surface (see green polygon in Figure 3). This provided reassurance to allow for the removal of temporary repairs of the breast work to take place and the process of beach evolution to proceed. The cost of £16000 was covered by contributions from group members



*Figure 8: View north along the newly placed sand and shingle bund, 4 February 2016.*

The process of community engagement, gaining support and confidence from the West Wittering community by ECHIAG should not be underestimated as it also brought a high level of awareness regarding the flood risk from Snowhill Creek to the village. The EA addressed this issue with enormous financial support and enthusiasm from the village community.

The placing of information boards on site has improved understanding of how Adaptive Management is being implemented and continued monitoring will indicate when further action is required.

The understanding amongst the group is good with all parties seeking to understand the concerns and fears of others. West Wittering community has demonstrated a high level of engagement on coastal issues and at the same time as discussion about East Head were continuing, the flood risk to the village itself was addressed by the EA with enormous financial support from the village.

Since spring 2016, small temporary repairs to make the area safe for the public during the summer months have alternated with removal of the repairs in autumn so that the winter storms can further shape the area to a more natural alignment with a group assessment at the end of the winter in relation to removal and repair works for the following summer.

The organisational set-up of the group has not changed since the EHWG, but the people sitting round the table has. These changes have been small and gradual which meant that the trust within the group has been maintained.

One fundamental benefit the group and the management of East Head has is that funding is available from sources other than the public purse. While Chichester DC maintain the groyne from their revenue budget, the gradual removal of the breastwork and repairs for the summer season are generally

covered by West Wittering Estate Plc and the placement of shingle is funded by a combination of West Wittering Estate, West Wittering Parish, Woodger Trust, Cakeham Manor and Chichester Harbour Conservancy.

## 6 2017 to 2025, Implementing Adaptation

Since the original document was written, a number of more severe storm events have impacted East Head. Notable ones that had conditions with return periods of more 1 in 20 were storm Ciara in February 2020 and storm Pierrick in April 2024; none of these led to any unforeseen changes.

Removal of failing breastwork followed a pattern of lowering to allow the beach to move landwards and eventually removing of piles to form a continuous beach (Figure 9). By 2021 the beach had reformed in front of the 2016 beach bund and the removal of timber between groyne 21 and 20 started to impact the car park area (Figure 10). Following the success of the 2016 beach bund another recycling campaign from East Head brought beach material to build the 2022 bund with associated relocation of the car park. As the land rises from The Hinge eastwards, the 2022 bund feathered into the higher ground at 3 mOD (Figure 11) which is sufficient to maintain any flood risk into Chichester Harbour. The last section of timber breastwork was removed in spring 2022.



Figure 9: Looking east from groyne 22, 12-10-2020



*Figure 10: Top: Removed breastwork between groynes 22 and 20 (25-01-2021) with impact on the car park area. Bottom: the new 2022 beach bund with relocated car park area and open access to East Head*

East of groyne 20 the timber breastwork changes to an approximately 2 m high wall of gabions, and being exposed to the abrasion of moving shingle and corrosion of the steel basket these have started to fail and have been gradually removed over the last three years up to towards groyne 19,



*Figure 11 Gabion wall east of groyne 20 on 07-03-2024 located on the brown and grey clay substrate. The flint in the gabions are a welcome addition to the beach. David Lowsley at his last EHCIAG 8 years after his retirement.*

Figure 12 provides an overview of the more recent changes using contour lines using 2.5 mOD at the seaward and landward side together with the 3 mOD at the landward side only. It shows that at the Hinge the distance between the seaward 2.5 m and landward 3.5 m contours in 2009 was 20 metres, and that the distance in 2024 has increased to 30 metres despite the seaward contour having moved landwards. The same can be seen further east across the car park area following the recharge to create the beach bund in 2022.

Figure 13 shows changes since 1974 using just aerial photographs.

Eight years on, the adaptive approach of removing failed structures and providing sediment support to the roll-back of the beach is a successful approach, that maintains amenity and access at a significantly lower cost than rebuilding failing structures.

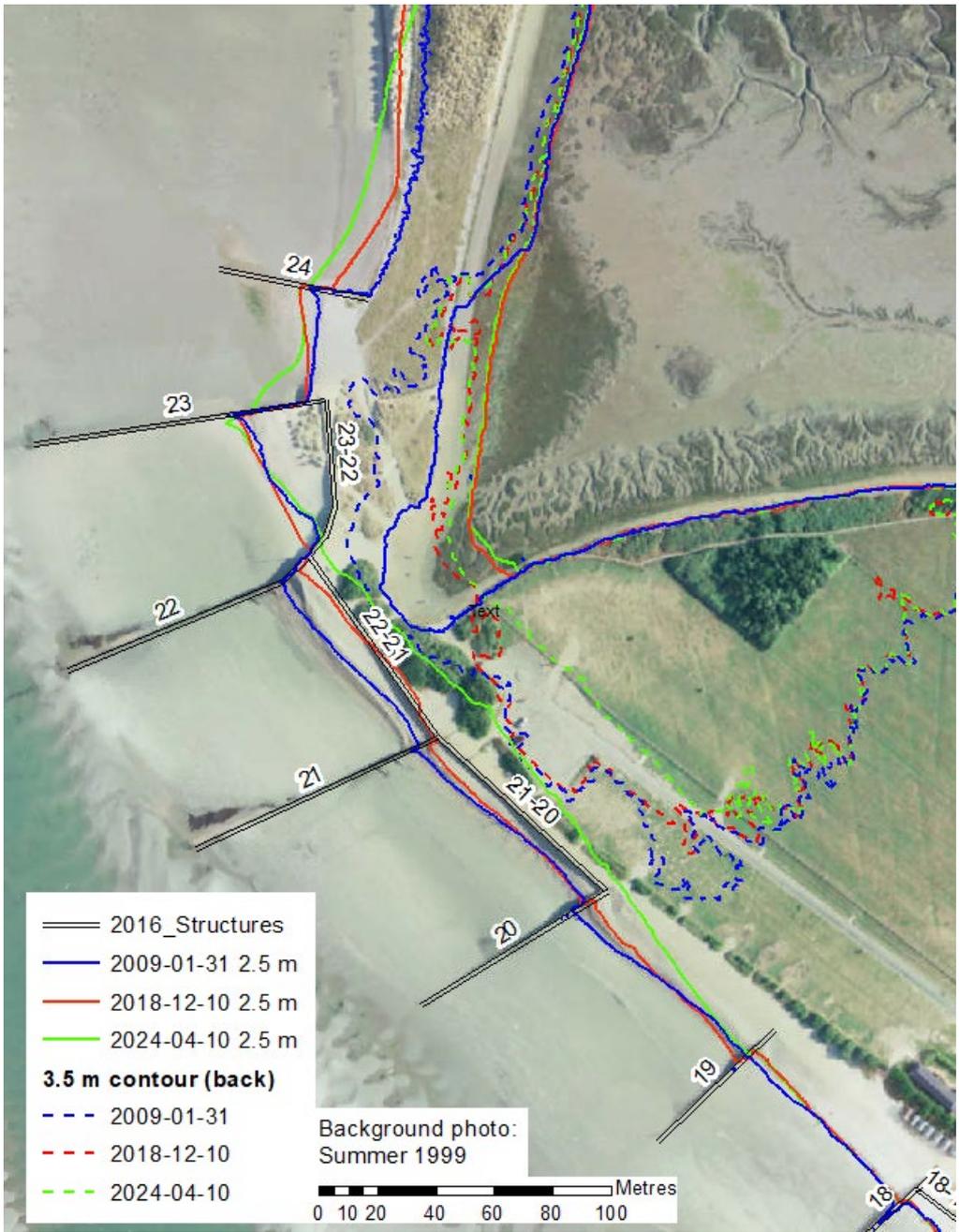
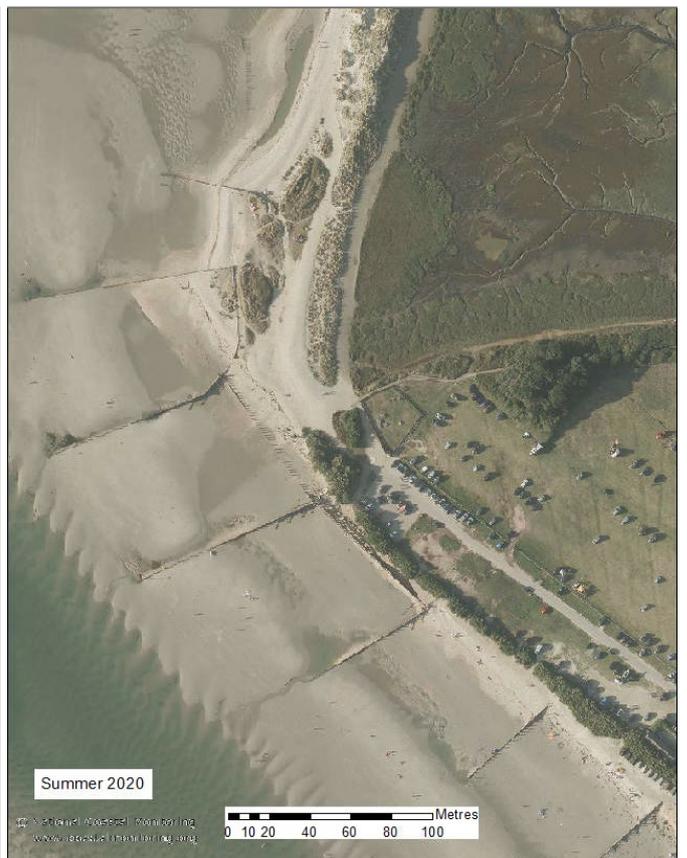


Figure 12: Overview of changes over 25 years from 1999 to 2024 illustrating the managed roll back by maintaining the width between the 2.5 m contour on the seawards side and the 3.5 m contour on the landward side.



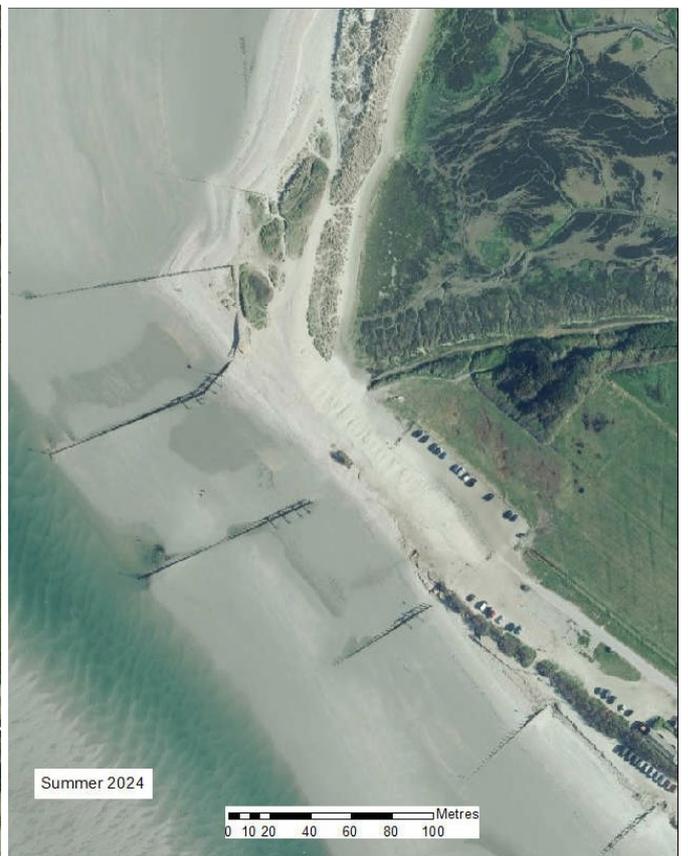


Figure 13: Overview of changes 1974 to 2024.

## Summary Table of EHCIAG Actions

## APPENDIX A

Date	Source	Management Action	Outcome
1950	CRDC report on Coast protection . Lewis and Duvivier p17	West Wittering open coast frontage Repairs to groynes and defences carried out in 1946,47 & 48. by Ecclesiastical Commissioners (owners of the foreshore)	Stabilised beaches after wartime neglect and damage to structures.
1963-74 onward	"The Tidal Threat" published by National Trust; Sidney Searle 1975	This document is a thorough investigation of the overtopping events in early 1960s. It describes the remedial action taken in building dunes on East head by trapping wind borne sand.	Work carried out by volunteers established a dune system that grew with the available material.
1992	Chichester Harbour Conservancy (CHC)	Erosion immediately north of Groyne C24 addressed by beach nourishment sourced from lower foreshore immediately in front of area	New beach material removed by storms within a few weeks of completion.
1997	East Solent Shoreline Management Plan (SMP)	Study of Coastal processes and viability of various management options in the eastern Solent from Pagham Harbour to Southampton Water. This was a broad-brush approach and was based on a 50year time frame.	Recommendations for the most part were "Hold the Line" including W. Wittering open coast but "Do Nothing" on East side of East Head (Snow Hill Creek). The SMP also lead to more detailed studies.
1998-2003	Pagham to East Head Coastal Defence Strategy (PEHCDS -1)	More detailed study covering Eastern end of SMP frontage. This was the first attempt at creating a sustainable management policy for our coastline. It was never fully completed because central government. in 2003, increased the time frame which the CDS covered from 50 Years to 100 years. The treasury discount rate, on which whole life costs are based, also changed. This led to a significant reappraisal, particularly of the economic benefits for various management options.	Originally the Contentious frontages were Pagham, open coast, Selsey urban frontage, Medmerry and W Wittering. It was immediately clear that greater resources were required for the consultation phase and both the EA and District councils committed themselves to thorough public engagement
1998/9	CHC et al	During the time the CDS was being discussed, significant narrowing of East Head immediately north of C24 at "The Neck" gave rise to serious concerns of a tidal breach. CHC with support from others sought planning permission to install a rock berm with a maximum height of 2.8m or 700mm	A plan was approved with Temporary planning permission and on the clear understanding that it's purpose was to prevent a tidal breach being scoured out and that if the beach in front lowered to the point where

		<p>above MHWS. On the Snow Hill Creek side of the spit.</p>	<p>the berm became an exposed revetment it would be removed immediately because of the increased risk of further beach erosion. Permission also required continued monitoring of the donor site to ensure it was not adversely affected.</p> <p>The berm was constructed in 2000 and funded by CHC, Woodger Trust and Public subscription.</p>
2005-2008	PEHCDS-2 restarted with new Defra guidelines.	Much more intense public consultation which led to selection of preferred options for all frontages.	<p>With regard to West Wittering, a working group was set up under the independent Chairmanship of Richard Young. This allowed all parties to have an equal say which went a long way to building confidence in the community that the arguments they put forward were considered seriously. and a new option of “Adaptive Management” (AM) was identified. After further investigation and discussion, this option was accepted as an appropriate way to manage this section of coast. In particular the EHWG commissioned a panel of three well respected geomorphologists to consider questions raised by the community. The question sought to clarify the likely outcomes in respect of differing management approaches.</p> <p>The first round of answers inevitably raised further queries and points requiring clarification. After a second round of questions the group agreed that there was sufficient confidence to progress the AM approach.</p>
2004 - 2008	Various studies on East head interpret	Throughout the consultation the East Head Working Group continued to investigate coastal processes in the	EHWG agreed that an ongoing involvement was required and committed to

	monitoring data and form an	area and studies were commissioned from Professor Malcolm Bray at Portsmouth university in order to understanding of the changes in process.	support the strategy with the AM policy option at it's core.
2004/5		The overwashing of the neck led to a proposal to move 13000 tonnes of beach material from the northern tip of spit	Work carried out in 2005 and resulted if a solid foundation for new dunes to grow behind the line of the Berm
2008		Following public meeting, PEHCDS adopted EHCIAG established	Allowed progress to be made on implementation of strategy
2009		Expert Panel recommendation acted on and further 9000t of material placed behind Hinge	Created a more resilient beach behind ageing breastworks
2011/12		Ongoing monitoring studied, Gabions removed C23-C24	Stable beach established
2014		Storm damage, temporary repairs to breastworks	Contrary to agreed process but acted in good faith.
2015		Group prepared an Action Plan on implementing AM and with supporting documents held a public exhibition on 22 <sup>nd</sup> May	Positive feedback from the public allowed the group to proceed with implementation of AM plan
2015		Information boards created and placed on site	Public better informed, increased understanding of process.
2016		Improved beach behind Hinge, temporary repairs to breastwork removed, allowing gradual deterioration to take place.	Additional 2000t of material placed to provide raised access to East Head.  Changes will be monitored and access maintained as far as safely practical.
2016 onward		Monitoring continuing, action taken when required to remove failing structures (timber groynes and breastwork, gabions) and keep safe access.	Changes can be gradual or occur in single events. Importance is attached to monitoring and reacting to asset deterioration in relation to allowing natural processes to shape a more natural and more sustainable alignment of East Head while maintaining its social, economic, environmental, navigation and amenity value

## **GLOSSARY OF TERMS**

## **APPENDIX B**

This glossary is intended to provide the reader with definitions of some coastal terminologies which may have been encountered in this document, or which may be useful for coastal zone management.

### **Accretion**

The deposition of sediment, sometimes indicated by the seaward advance of a shoreline indicator such as the water line, the berm crest, or the vegetation line.

### **Active Beach**

The portion of the littoral system that is frequently (daily or at least seasonally) subject to transport by waves and currents.

### **Longshore**

Parallel to and near the shoreline

### **Beach Crest**

Highest point on a beach face, breakwater, or seawall.

### **Beach Face**

The section of the beach normally exposed to the action of the wave uprush.

### **Beach Loss**

A volumetric loss of sand or shingle from the active beach.

### **Beach Nourishment**

The technique of placing sand and shingle fill along the shoreline to widen the beach or raise its elevation.

### **Beach Profile**

A cross-sectional plot of a shore-normal topographic and geomorphic beach survey, usually in comparison to other survey dates to illustrate seasonal and longer-term changes in beach volume.

### **Beach Width**

The horizontal dimension of the beach measured normal to the shoreline and in the case of Neck at East Head the distance between Mean High Water Marks on the open coast and harbour sides.

### **Berm**

A geomorphological feature usually located at mid-beach and characterized by a sharp break in slope, separating the flatter backshore from the seaward-sloping foreshore.

### **Boardwalk**

Light construction that provides pedestrian access without trampling dune vegetation.

### **Breach**

The definition of breach is varied and ranges from a small scale local lowering of the crest of a defence (beach or hard structure) that allows locally larger amounts of water to reach the land behind at high tide during a storm event to a substantial opening in the defence that would allow tidal flow through the gap created for at least half the tidal cycle (ie the breach sill level would be at or below 0 mOD).

### **Breastwork**

Timber structure of piles and planks similar to groynes but parallel to the shoreline forming a type of hard defence.

### **Bund**

A raised bank of shingle or other material such as clay.

### **Coastal Defence**

General term used to encompass both coast protection against erosion and sea defence against flooding.

### **Coastal Erosion**

The wearing away of coastal lands, usually by wave attack, tidal or littoral currents, or wind. Coastal erosion is synonymous with shoreline (vegetation line) retreat. It can be permanent, as in the case of cliff erosion, or temporary when accretion and erosion alternate as does happen on beaches.

### **Coastal Plain**

The low-lying, gently-sloping area landward of the beach often containing fossil beach material deposited during previously higher sea levels.

### **Coastal Processes**

Collective term covering the action of natural forces such as wind, tide, current and waves on the shoreline, and near shore seabed

### **Conservation**

The management of a natural resource for the protection, maintenance, rehabilitation, restoration, and/or enhancement of populations and ecosystems.

### **Current, Coastal**

One of the offshore currents flowing generally parallel to the shoreline in the deeper water beyond and near the surf zone; these are not related genetically to waves and resulting surf, but may be related to tides, winds, or distribution of mass.

### **Current, Littoral**

Any current in the littoral zone caused primarily by wave action; e.g., longshore current, rip current.

### **Current, Longshore**

The littoral current in the breaker zone that moves essentially parallel to the shore. Usually generated by waves breaking at an angle to the shoreline.

### **Downdrift**

Flow in the direction of net longshore sediment transport.

### **Downstream**

Along coasts with obliquely approaching waves there is a longshore (wave-driven) current.

### **Dredging**

The practice of excavating or displacing the bottom or shoreline of a water body.

### **Dune**

A landform characterized by an accumulation of wind-blown sand, often vegetated

### **Dynamic Equilibrium**

A system in flux, but with influxes equal to outfluxes.

### **Environmental Impact Assessment (EIA)**

A process by which the consequences of planned development projects are evaluated as an integral part of planning the project. The analysis of biological, physical, social and economic factors to determine the environmental and social consequences of a proposed development action. The goal of the EIA is to provide policy makers with the best available information in order to minimize economic costs and maximize benefits associated with a proposed development.

**Erosion**

The loss of sediment, sometimes indicated by the landward retreat of a shoreline indicator such as the water line, the berm crest, or the vegetation line.

**Foreshore**

The seaward sloping portion of the beach within the normal range of tides.

**Gabion**

Steel wire-mesh basket to hold stones or crushed rock to protect a bank or bottom from erosion. Structures composed of masses of rocks, rubble or masonry held tightly together usually by wire mesh so as to form blocks or walls. Sometimes used (although not recommended) on heavy erosion coastal areas to retard wave action.

**Geotextile sill**

Large sand-filled geotextile tubes used in coastal protection projects.

**Groyne**

Narrow, roughly shore-normal structure built to trap and retain beach material. Most groynes are of timber and extend from the backshore, well onto the foreshore and rarely even further offshore.

**Groyne Field**

A series of groynes acting together to protect a section of beach.

**Habitat**

The physical space where an organism, population or species lives. Habitats are usually categorized by particular physical or biological characteristics.

**Hard Defences**

General term applied to impermeable coastal defence structures of concrete, timber, steel, masonry, etc., which reflect a high proportion of incident wave energy.

**Intertidal zone (often called littoral zone)**

The part of the shoreline that is submerged at high tide and exposed at low tide.

**Littoral**

Of or pertaining to a shore, especially of the sea. Often used as a general term for the coastal zone influenced by wave action, or, more specifically, the shore zone between the high and low water marks.

**Littoral Budget**

The sediment budget of the beach consisting of sources and sinks.

**Littoral Transport**

The movement of beach material in the littoral zone by waves and currents. Includes movement parallel (longshore drift) and sometimes perpendicular (cross-shore transport) to the shore; Also referred to as littoral drift.

**Littoral Zone**

In beach terminology, an indefinite zone extending seaward from the shoreline to just beyond the breaker zone.

**Longshore**

Parallel to and near the shoreline; Also referred to as alongshore.

**Longshore Drift**

Movement of (beach) sediments approximately parallel to the coastline.

**Longshore Transport**

Sediment transport down the beach (parallel to the shoreline) caused by longshore currents and/or waves approaching obliquely to the shoreline.

**Monitoring**

Periodic collection of data to study changes in an environment over time.

**Nearshore**

In beach terminology an indefinite zone extending seaward from the shoreline well beyond the breaker zone.

The zone which extends from the swash zone to the position marking the start of the offshore zone, typically at water depths of the order of 20m.

**Nourishment**

The process of replenishing a beach. It may occur naturally by longshore transport, or be brought about artificially by the deposition of dredged material or materials trucked in from upland sites.

**Offshore**

The portion of the littoral system that is always submerged.

**Overtopping**

Passing of water over the top of a structure as a result of wave run-up or surge action.

**Overwash**

Passing of larger quantities (than overtopping) of water and possibly sediment landward of the active beach by coastal flooding during a severe storm event with extreme waves.

The part of the uprush that runs over the crest of a berm of a structure and does not flow directly back to the ocean or lake.

**Overwash Fan**

Sediment deposited inland of a beach by overwash processes.

**Pebbles**

Beach material usually well-rounded and between about 4mm to 64mm diameter.

**Pile**

A long, heavy timber or section of concrete or metal that is driven or jetted into the earth or seabed to serve as a support or protection.

**Protected Area**

A geographically defined area that is designed and managed to achieve specified environmental objectives.

**Reflected Wave**

That part of an incident wave that is returned seaward when a wave impinges on a steep beach, barrier, or other reflecting surface.

**Reflection**

The process by which the energy of the wave is returned seaward.

**Refraction (of water waves)**

The process by which the direction of a wave moving in shallow water at an angle to the contours is changed: the part of the wave advancing in shallower water moves more slowly than that part still advancing in deeper water, causing the wave crest to bend toward alignment with the underwater contours.

**Revetment**

A sloping type of shoreline armouring often constructed from large interlocking boulders. Revetments tend to have a rougher (less reflective) surface than seawalls.

**Ridge, beach**

A nearly continuous mound of beach material that has been shaped by wave or other action. Ridges may occur singly or as a series of approximately parallel deposits.

**Riprap**

A protective layer or facing of quarry stone, usually well graded within wide size limit, randomly placed to prevent erosion, scour, or sloughing of an embankment or bluff; also the stone so used. The quarry stone is placed in a layer at least twice the thickness of the 50 percent size, or 1.25 times the thickness of the largest size stone in the gradation.

**Rock**

An aggregate of one or more minerals; or a body of undifferentiated mineral matter. The three classes of rocks are: (a) igneous - crystalline rocks formed from molten material (e.g. granite and basalt); (b) sedimentary - resulting from the consolidation of loose sediment that has accumulated in layers (e.g. sandstone, shale and limestone); (c) metamorphic - formed from pre-existing rock as a result of burial, heat and pressure.

**Salt Marsh**

A marsh periodically flooded by salt water.

**Sand**

Sediment particles, often largely composed of quartz, with a diameter of between 0.062mm and 2mm, generally classified as fine, medium, coarse or very coarse. Beach sand may sometimes be composed of organic sediments such as calcareous reef debris or shell fragments.

**Scarping**

The erosion of a dune or berm by wave attack during a storm or a large swell, to leave a near vertical face.

**Scour**

The removal of underwater material by waves and currents, especially at the base or toe of a shore structure.

**Scour Protection**

Protection against erosion of the seabed in front of the toe.

**Sediment Sink**

Point or area at which beach material is irretrievably lost from a coastal cell, such as an estuary, or a deep channel in the seabed.

**Sediment Store**

Point or area at which beach material is temporarily held within a coastal cell.

**Sediment Source**

Point or area on a coast from which beach material is supplied, such as an eroding cliff, or river mouth.

**Shingle**

Type of material that is found commonly on the Southeast Coast of England consisting of mixture of varying parts of sand and flint gravel and pebbles.

**Shore**

The narrow strip of land in immediate contact with the sea, including the zone between high and low water lines. A shore of unconsolidated material is usually called a beach.

Also used in a general sense to mean the coastal area (e.g. to live at the shore).

Also sometimes known as the littoral.

**Shoreline Management**

The development of strategic, long-term and sustainable coastal defence and land-use policy within a sediment cell.

**Spring Tide**

A tide that occurs at or near the time of new or full moon and which rises highest and falls lowest from the mean sea level.

**Stakeholders**

Individuals, groups of individuals and non-governmental and government entities that have either a direct or indirect interest or claim which will, or may, be affected by a particular decision or policy.

**Storm Surge**

A temporary rise in sea level associated with a storm's low barometric pressure and onshore winds.

**Survey, topographic**

A survey which has, for its major purpose, the determination of the configuration (relief) of the surface of the land and the location of natural and artificial objects thereon.

**Swash Zone**

The zone of wave action on the beach, which moves as water levels vary, extending from the limit of run-down to the limit of run-up.

**Toe**

Lowest part of sea and portside breakwater slope, generally forming the transition to the seabed.

**Updrift**

The direction opposite that of the predominant movement of littoral materials.