

Christchurch Bay and Harbour Flood and
Coastal Erosion Risk Management Study
Technical Annex 8 – Assessment of Standards of Service

Prepared by
New Forest District Council

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Contents Amendment Record

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1 Methodology

The National Flood and Coastal Defence Database (NFCDD) project is a single, easily accessible and definitive store for all data on flood and coastal defences in England and Wales. The development of NFCDD is a requirement under DEFRA's High Level Targets (Target 4A) for Flood and Coastal Defence, published in November 1999.

The referencing of Coastal Data will allow identification of the Environment Agency region and area for a given asset. It has been agreed that Frontage Units and Frontage Sub Units should be numbered clockwise around the coast. The Frontage Units correlate with Shoreline Management Plan Management Units, and have been cross-referenced within the database. It has been identified that in many cases coastal frontages can be managed by more than one Local Authority. NFCDD makes provision for this through the individual ownership and management of Frontage Units and Sub Units.

Table 1 details the format used for coastal references:

NFCDD Reference Coding Format	Example
Region Number	7
Area Number	1
Sub-area Number	blank
Frontage	R906
Frontage Unit	02
Frontage Sub-unit	1
Coastal Indicator	C
Defence Number	04
Structure Reference	001

Table 1. NFCDD reference code format

2 STANDARDS OF SERVICE ASSET ASSESSMENT PROCEDURE

1. Field apparatus

Camera plus spare camera cards and batteries
Aerial photograph map book
Fieldwork note sheets

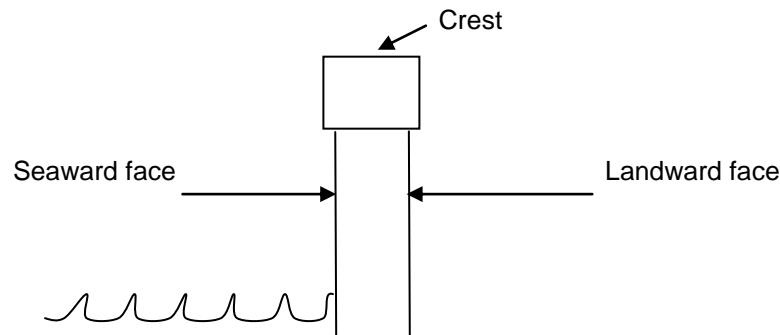
2. Asset inspections

Using fieldwork sheets, a detailed description of the types of structure are made in the field. For example a typical linear groyne, a typical Y-shaped groyne or a typical section of revetment.

Combined with the structural description, in order to assess the condition of the asset, an example will be identified for each condition level (from very good condition to very poor condition). Using fieldwork sheets a description of these examples will be made in the field. The examples of the various condition levels will be used as the standard in order to compare with similar structures to assess the condition of all structures (of the same type) in the field.

For linear structures (such as groynes) the structure will be assessed and scored as a single unit. For multiple structures (such as seawalls) which are composed of more than one element, the components will be assessed and scored individually. For example a section of seawall might be composed of a seaward face comprised of sheet piling, a concrete capping along the crest and a landward face comprised of sheet piling or a sloping bank. Each of these will be taken as individual elements and assessed and scored according the condition.

Example:



The condition of the asset, or element of the asset, will be assessed using the following scoring system:

- 1 – very good
- 2 – good
- 3 – fair
- 4 – poor
- 5 – very poor

When multiple elements make up an asset, the overall score is taken from the worst scoring element within the asset. Where possible, photographs are taken of each of the assets. If this is not possible a photograph should be taken of an example of each type of asset, together with an example of each type of asset displaying each type of condition (from very good to very poor).

3. Asset location

The location of each structure will be surveyed using GPS. During the period of low water, the assets that exist along the lower section of the coastal strip will be measured and assessed during the first transect. On the second transect the assets that exist along the upper section of the coastal strip will be measured and assessed.

For groynes a point will be measured at the most landward point of the structure. For Y-shaped groynes the centre of the Y will be measured. For linear sections of revetment, a point will be measured at either end of the structure and points taken at a spacing of 20m along the structure in order to define the asset. For multiple sections of seawall a point will be measured at either end of the structure and at a spacing of 20m for each element of the asset. Each structure will be referenced with a feature code according to type as follows:

Seawall

SWL – seawall (linear)

SWM – seawall (multiple)

In addition:

SWSF – seawall multiple seaward face

SWC – seawall multiple crest

SWLF – seawall multiple landward face

SWLB – seawall multiple landward bank

Groynes

GL – groyne (linear)

GY – groyne Y-shaped

GZ – groyne Z - shaped

Revetment

RL – revetment (linear)

RM – revetment (multiple)

In addition:

RMSF – revetment multiple seaward face

RMC – revetment multiple crest

RMLF – revetment multiple landward face

RMLB – revetment multiple landward bank

The condition of the asset will be added at the end of the feature code

For example, a Y shaped groyne with a condition of 2 will therefore be GY2

The landward face of a seawall with a condition 4 will therefore be SWLF4

On completion of the inspection survey, the information is downloaded and the location of each structure plotted onto an aerial photograph using GIS. Each asset is then referenced in accordance to the existing classification.

3 Results

During August 2003 when the asset inspections were conducted the Christchurch Bay frontage, extending from Hengistbury Head to Hurst Spit Castle Point, contained 114 along-shore defences and 94 cross-shore structures. Table 2 details the condition of the assets.

Asset Elements	Condition Status					Total
	New / very good 1	good 2	OK 3	poor 4	Derelict / very poor 5	
Defences (revetments)	16	69	27	2	0	114
Structures (groynes)	21	47	21	5	0	94

Table 2. Condition Status of assets inspected.

Of the 94 Structures (e.g. groynes), 89 were of condition 3 or better (95%), and 5 were of condition 4 or 5 (9%).

The general condition for the majority of the defences and structures are OK to new/very good

Table 3 details the combination of the defence and structure condition rating. For example, there were only 2 records of both defence and structure being awarded condition 1 status, and 12 records where defences were of condition 2 and structures of condition 3.

		Defences					
		1	2	3	4	5	None
Structures	1	2	14	5			
	2	7	26	10			4
	3	2	12	4	1		2
	4		2	2	1		
	5						
none		5	15	6			

Table 3. Condition matrix for assets inspected.

The combination of structures and defences in condition 1 or 2 totalled 49

The combination of structures and defences in condition 4 or 5 totalled 1

25% of defences will need replacing between 2003 (year of inspection, and year 0 of strategy study) and 2023 whereas only 6% of structures will need replacing before 2023.

The cross-section profiles within Christchurch Bay with the longest historical record of measurements have been analysed.

The position of the Mean Low Water contour

The position of the Mean Low Water (MLW) contour (-0.78mOD) for each survey on each of the selected profile line has been measured relative to the zero of the profile line. Analysis of these measurements produces an annual trend of MLW position movement for each profile line. By also recording the chainage of the toe of the cross-shore defences, it has been possible to extrapolate the number of years before which the MLW contour will reach the toe of the defences, i.e. there will be no beach to provide toe protection to the defences. This prediction has then been compared to the residual life estimated during the asset inspection process.

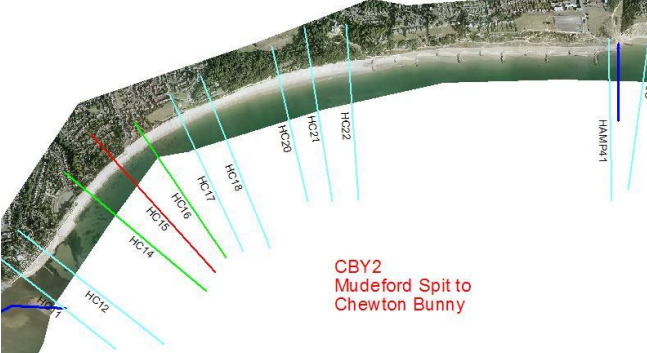
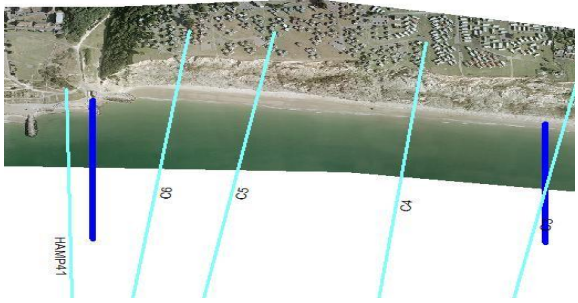
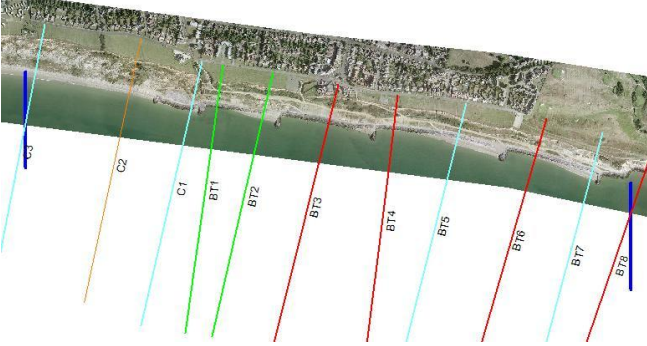
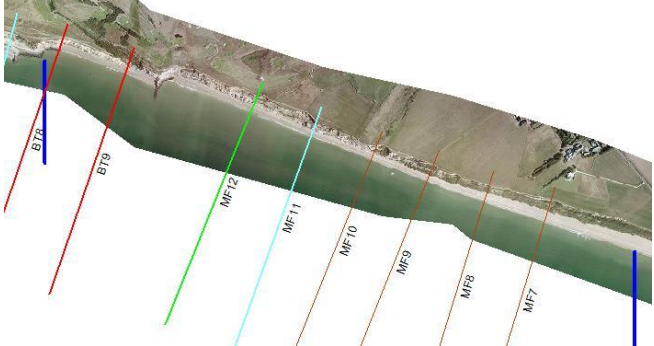

Beach gradient

The gradient of the beach, measured between Mean High Water (0.67mOD) and Mean Low Water (-0.78mOD) has been measured and an annual trend determined.

Cross-sectional Area

The cross-sectional area measured between MHW and MLW has been calculated for each survey on each profile line. Linear trends have been determined.




Profile Line	MLW position trend	Beach Gradient	Cross-sectional Area m2
MF1	Stable / no change	steepening	No change
MF2	MLW reach toe of defences between 2024-2053	No change	decreasing
MF3	MLW reach toe of defences between 2003-2023	steepening	decreasing
MF4	MLW reach toe of defences between 2003-2023	steepening	decreasing
MF5	Stable / no change	No change	decreasing
MF6	MLW reach toe of defences between 2003-2023	No change	decreasing
MF7	MLW reach toe of defences between 2024-2053	No change	decreasing
MF8	MLW reach toe of defences between 2024-2053	No change	decreasing
MF9	MLW reach toe of defences between 2024-2053	shallowing	decreasing
MF10	MLW reach toe of defences between 2024-2053	No change	decreasing
MF11	Accretionary trend	No change	No change
MF12	Stable / no change	No change	decreasing
BT9	MLW reach toe of defences between 2003-2023	shallowing	decreasing
BT8	MLW reach toe of defences between 2003-2023	No change	decreasing
BT7	Accretionary trend	No change	Slight increase
BT6	MLW reach toe of defences between 2003-2023	steepening	decreasing
BT5	Accretionary trend	No change	Slight increase
BT4	MLW reach toe of defences between 2003-2023	No change	Slight increase
BT3	MLW reach toe of defences between 2003-2023	steepening	increasing
BT2	Stable / no change	shallowing	decreasing
BT1	Stable / no change	steepening	increasing
C1	Accretionary trend	shallowing	Increasing
C2	MLW reach toe of defences between 2054-2103	No change	decreasing
C3	Accretionary trend	shallowing	increasing
C4	Accretionary trend	shallowing	increasing
C5	Accretionary trend	shallowing	No change
C6	Accretionary trend	shallowing	increasing
Hamp41	Accretionary trend	No change	No change
HC22	Accretionary trend	steepening	increasing
HC21	Accretionary trend	steepening	No change
HC20	Accretionary trend	No change	No change
HC18	Accretionary trend	No change	increasing
HC17	Accretionary trend	shallowing	No change
HC16	Stable / no change	No change	No change
HC15	MLW reach toe of defences between 2003-2023	No change	decreasing
HC14	Stable / no change	shallowing	decreasing
HC12	Accretionary trend	steepening	decreasing
HC11	Accretionary trend	shallowing	increasing

<p>CBY2</p>  <p>CBY2 Mudford Spit to Chewton Bunny</p>	<p>CBY3</p> 
<p>The western end of the bay, between Mudford Quay and Naish is predominantly accreting except for a section along Avon Beach (HC15) where the alignment of the seawall has caused the beach to decline. Maintenance works are planned / in progress</p>	
<p>CBY4</p> 	<p>CBY5</p> 
<p>The beaches in the central section of the bay from Barton (BT1) to Hordle (MF10) exhibit a narrowing trend with the MLW reaching the toe of the defences between year 1 and 20 of the strategy.</p>	
<p>CBY6</p> 	<p>The general trend of the MLW position for the Milford frontage indicates that the defences will receive a level of protection by a width of beach until between 2024 to 2053.</p>

4 Asset Inspections per Management Unit



4.1 CHB1 Harbour side of Mundeford Spit

Limits of unit – western boundary is east of Lobbs Hole, eastern boundary Foot Passenger Ferry

	<p>View looking approximately north from Hengistbury Head to Mundeford Quay. Christchurch Harbour on the west side of spit, rock groynes on east side of spit.</p>
	<p>View looking approximately south from harbour-side of Mundeford Spit.</p>
	<p>View looking approximately north to the Black House, Mundeford Spit.</p>


4.2 CHB2 South side of Christchurch Harbour

Limits of unit – western boundary of Grimbury Point, eastern boundary is east of Lobbs Hole

	View looking approximately northwest from Hengistbury Head over Christchurch Harbour.
	View looking approximately north from Hengistbury Head over Christchurch Harbour.

4.3 CHB3 Stanpit & Grimbury Marshes

Limits of unit – western boundary is Opposite Grimbury Point, eastern boundary is start of Developed Frontage

	View looking approximately east across Christchurch Harbour towards Mudeford Spit.
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4.4 CHB4 Mundeford Town frontage

Limits of unit – western boundary is start of defences, eastern boundary is end of defences



View looking approximately northwest from Mundeford Spit towards Mundeford CHB4 frontage.

4.5 CHB5 Mundeford Quay

Limits of unit – western boundary is end of defences, eastern boundary is Mundeford Quay





View looking approximately north from Mundeford Spit towards Mundeford Quay.



View looking approximately north of harbour side on the north side of Mundeford Quay.

4.6 CBY1 Hengistbury Head to tip of Mundeford Spit

Strategic Management Unit	CBY1A&B
Boundaries of Management Unit	Hengistbury Long Groyne to tip of Mundeford Sandbank
Total frontage length (m)	1860
Defended frontage length (m)	1860
Current SMP policy	Hold the Existing Defence Line
Current beach condition	Stable sand spit, profile maintained through maintenance. No change or slight erosion in cross-sectional area. No change in MHW contour position. Seaward face dynamic and mobile. Spit sheltered from prevailing south westerlies waves by Hengistbury Head. Beach recycling programme
Existing Management Schemes	This Management Unit has 6 sections of along-shore defences- Mundeford Sandbank Management Plan details the maintenance of the entire spit for a 50-year period.
Along Shore Defences	There are 19 cross-shore defences - Portland limestone revetment, comprising 2-4ton rock units, residual life ranges from 30 to 10 years, and wooden revetment section, residual life ranges from 30 years
Cross Shore Structures	The Portland limestone rock groynes comprising 2-4ton rock units have residual life ranges from 20 to 10 years
Asset owned by	Christchurch Borough Council
Asset maintained by	Christchurch Borough Council
Hinterland	Mundeford Spit is a natural geomorphological feature that extends north/northeast from the eastern end of Hengistbury Head promontory. The combination of the headland and spit provides protection to the towns of Christchurch and Mundeford, and the low-lying land bordering the shallow harbour and the banks of the Rivers Stour and Avon. To the east of the Spit is Christchurch Bay, with a dynamic shallow sandbank at its northern end; this is often exposed, and restricts navigation to a single channel (the 'Run') which experiences significant tidal current velocities. There are approximately 350 beach huts located on the spit.
Health and Safety Issues	None identified
Current Maintenance Programme	

	View looking approximately south of concrete revetment on west side of beach frontage.
	View looking approximately south of wooden revetment on east side of dunes.

	<p>View looking approximately south of rock groynes at the southern end of Mundeford Spit.</p>
	<p>View looking approximately south of rock groyne, Mundeford Spit.</p>

4.7 CBY2 Mundeford Quay to Chewton Bunny

Strategic Management Unit	CBY2
Boundaries of Management Unit	Mundeford Quay to Chewton Bunny
Total frontage length (m)	4489
Defended frontage length (m)	3804
Current SMP policy	Hold the Existing Defence Line
Current beach condition	Stable sand and shingle beach. No change or slight erosion in cross-sectional area. No change in MHW contour position. Seaward face dynamic and mobile. Spit sheltered from prevailing south westerlies waves by Hengistbury Head.
Existing Management Schemes	Mundeford Spit beach management programme details the maintenance of the entire spit for a 50-year period. Beach recycling programme
Along Shore Defences	This Management Unit has 8 sections of along-shore defences visible and one that was buried when structures were inspected - concrete wave return walls (residual life ranges from 30 to 20 years) and Portland limestone rock revetments (residual life ranges from 30 years) protect cliffed frontage, except the section fronting Highcliffe Castle which is undefended.
Cross Shore Structures	There are 37 cross-shore defences - Portland limestone rock groyne (residual life ranges from 10 to 15 years) that are progressively replacing the hardwood pile and board groyne (residual life ranges from 10 to 2 years).
Asset owned by	Christchurch Borough Council
Asset maintained by	Christchurch Borough Council
Hinterland	The area around Mundeford Quay is low-lying whilst the remainder of this frontage is cliffed and includes the settlements of Highcliffe and Friars Cliff. Chewton Bunny drainage stream is boundary between CBY3 and 4
Health and Safety Issues	None identified
Current Maintenance Programme	

	View looking approximately northeast of concrete seawall on Avon Beach.
	View looking approximately east of wooden groyne on Avon Beach.



View looking approximately west of rock strong point on Highcliffe Beach.

4.8 CBY3 Chewton Bunny to start of defences at Barton-on-Sea

Strategic Management Unit	CBY3
Boundaries of Management Unit	Chewton Bunny to start of Defences at Barton-on-Sea
Total frontage length (m)	1270
Defended frontage length (m)	0
Current SMP policy	Managed Retreat
Current beach condition	Dynamic and mobile mixed shingle and sand beach.
Existing Management Schemes	
Along Shore Defences	None
Cross Shore Structures	None
Asset owned by	Beach and cliffs - New Forest District Council
Asset maintained by	Beach and cliffs - New Forest District Council
Hinterland	The undefended, geologically important soft mud cliffs are approximately 30m in height. There is a Holiday Village (caravan and chalets) on the cliff top. Cliffs respond rapidly to rainfall and storm wave events exhibiting rotational slumping, collapsing and significant erosion
Health and Safety Issues	Public walking over cliff surface
Current Maintenance Programme	




4.9 CBY4 start of defences at Barton-on-Sea to Barton Golf Course

Strategic Management Unit	CBY4
Boundaries of Management Unit	Start of Defences at Barton-on-Sea to Barton Golf Course
Total frontage length (m)	1887
Defended frontage length (m)	1887
Current SMP policy	Hold the Existing Defence Line
Current beach condition	Shingle and sand beaches of limited extent have formed within some groyne cells. Results from analysis of beach profiles measured over the period 1989 to 2004 indicate that the beach width (from MLW contour position) has varied by 3 to 4m, and the beach slope trend over this period indicates slight steepening.
Existing Management Schemes	
Along Shore Defences	This Management Unit has 2 sections of along-shore defences - Mendip limestone rock revetment comprising 3-6 ton rock units with residual life ranges from 30 to 5 years
Cross Shore Structures	There are 6 sections of cross-shore defences - Mendip limestone rock strong point groynes comprising 2-4 ton rock units with residual life ranges from 15 to 10 years
Asset owned by	New Forest District Council
Asset maintained by	New Forest District Council
Hinterland	The majority of the residential and commercial properties are set back from the cliff edge by a fringe of open recreational space. Due to continuing cliff erosion a number of properties are now located nearer to the cliff edge Extensive cliff stabilisation measures have been installed within this unit including re-profiling of the cliff slope and the installation of sheet pile cut-off walls and drainage. Much of these works have been affected by cliff movements and erosion processes and their functionality and performance may not be effective now.
Health and Safety Issues	
Current Maintenance Programme	

	View looking approximately northeast of rock revetment and cliff stabilisation structures at Barton-on-Sea.
	View looking approximately east of rock revetment and groynes at Barton-on-Sea.

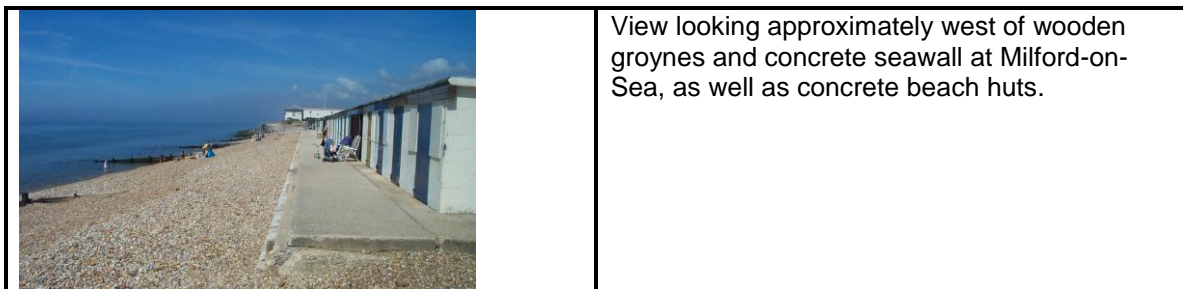
4.10 CBY5 Barton Golf Course to Hordle Cliff

Strategic Management Unit	CBY5
Boundaries of Management Unit	Barton Golf Course to Hordle Cliff
Total frontage length (m)	2461
Defended frontage length (m)	0
Current SMP policy	Do Nothing (observe and monitor)
Current beach condition	Generally stable shingle and sand beach, wide and gently sloping to cliff toe Results from analysis of beach profiles measured over the period 1989 to 2004 indicate that the beach width (from MLW contour position) has varied by 6m, with an annual trend of beach cross-section area reduction. The beach slope trend over this period indicates no change.
Existing Management Schemes	
Along Shore Defences	None
Cross Shore Structures	None
Asset owned by	New Forest District Council
Asset maintained by	New Forest District Council
Hinterland	The cliff top land is used primarily for agriculture and golf course. The only development, located at the eastern end of the frontage, is set back from the cliffs near Milford. The Becton Bunny outfall used to behave in a similar manner to a groyne, but this was removed recently in Autumn 2004 and repositioned within the rock strong points of CBY4. The shoreline will continue to readjust to reach an equilibrium alignment.
Health and Safety Issues	Access across/around Becton Bunny Golf Course land and footpath repositioning
Current Maintenance Programme	

	View looking approximately east of undefended frontage at Becton, east of Strong Point 25 at Barton-on-Sea.
	View looking approximately east of Strong Point 25 at Barton-on-Sea.

4.11 CBY6 Hordle Cliff to Hurst Beach

Strategic Management Unit	CBY6
Boundaries of Management Unit	Hordle Cliff to Hurst Beach
Total frontage length (m)	2347
Defended frontage length (m)	2347
Current SMP policy	Hold the Existing Defence Line
Current beach condition	Shingle and sand beach, dynamic. Results from analysis of beach profiles measured over the period 1987 to 2004 indicate that the beach width (from MLW contour position) has varied by 13m, with an annual trend of beach cross-section area reduction. The beach slope trend over this period indicates no change.
Existing Management Schemes	
Along Shore Defences	This Management Unit has 12 sections of along-shore defences - concrete wave return walls with Mendip limestone rock toe revetments, with residual life ranges from 20 to 10 years, which protect cliffed frontage. Concrete Wave Return walls (residual life ranges from 20 to 5 years) in combination with hardwood groynes.
Cross Shore Structures	There are 27 cross-shore defences - Mendip and Portland limestone rock groynes with residual life ranges from 30 to 5 years and hardwood pile and board groynes with residual life ranges from 10 to 2 years.
Asset owned by	New Forest District Council
Asset maintained by	New Forest District Council
Hinterland	The predominantly residential village of Milford-on-Sea is fronted by a strip of undeveloped open space, recreational land. The coastal land towards the east of this unit is mainly low-lying with a flood risk area on the west side of Sturt Pond. There are approximately 140 beach huts (concrete and timber) along this frontage.
Health and Safety Issues	None identified
Current Maintenance Programme	Milford Promenade Improvements Works. Groyne maintenance programme
Future condition and life of beach	Extrapolating the average annual change in MLW from the 2004 position indicates that the average







View looking approximately west of concrete seawall and wooden groynes at Milford-on-Sea, as well as timber beach huts.

4.12 CBY7 Hurst Spit

Strategic Management Unit	CBY7
Boundaries of Management Unit	Hurst Spit
Total frontage length (m)	2893
Defended frontage length (m)	2893
Current SMP policy	Hold the Existing Defence Line
Current beach condition	Shingle spit, profile managed through maintenance, and periodic recycling of shingle from tip of recurve (North Point). No change in cross-sectional area as Spit maintained. No change in MHW contour position. Seaward face experiences dynamic volumetric changes due to storm wave events and is therefore beach sediment is highly mobile. Leeward face stable.
Existing Management Schemes	Hurst Spit Beach Management Plan details the maintenance of the entire spit for a 50-year period.
Along Shore Defences	Hurst Castle receives protection from a mixture of defences including Hardwood pile and board revetments with residual life ranges from 20 to 5 years, and Mendip armour and Portland limestone rock revetments with residual life ranges from 50 to 10 years. At the foot of the Spit an offshore breakwater and 400m section of revetment, each with a residual life of 50 years, were constructed in 1996 comprising Norwegian Larvic 6-10 ton and 3-6 ton rock units, respectively
Cross Shore Structures	In addition to the defences described above the castle also receives protection from Hardwood pile and board groynes with residual life of 25 to 1 years.
Hinterland	Christchurch Bay is to the south and west of Hurst Spit, with Hurst Narrows immediately offshore of Hurst Castle. The Spit protects the entire West Solent. In the lee of the Spit (the eastern side) is the Keyhaven estuary, containing saltmarshes, inter-tidal mudflats and creek/channel networks.
Health and Safety Issues	
Current Maintenance Programme	

	View looking approximately west of offshore rock breakwater, Hurst Spit.
	View looking approximately northeast of wooden revetment and groynes west of Hurst Castle, Hurst Spit.



View looking approximately northwest of wooden groynes and rock revetment on south side of Hurst Castle, Hurst Spit.