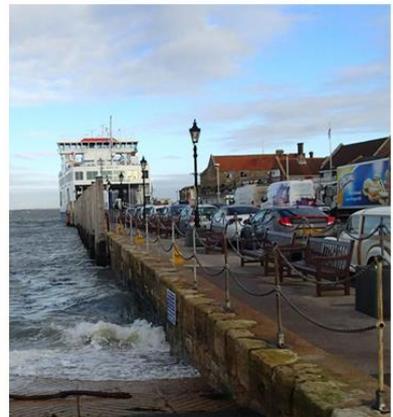
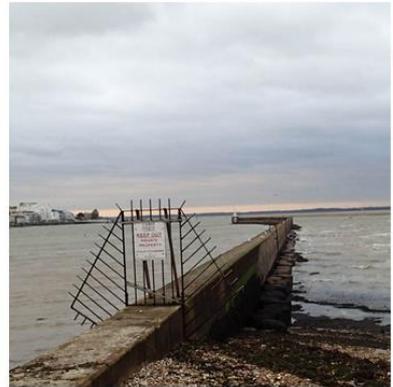
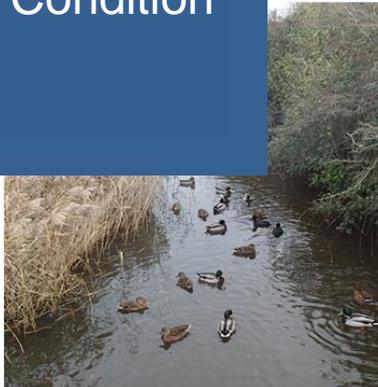


West Wight Coastal Flood and Erosion Risk Management Strategy

Appendix A - Defence Condition Review

March 2016



Document overview

Capita | AECOM was commissioned by the Isle of Wight Council in October 2014 to undertake a Coastal Flood and Erosion Risk Management Strategy. As part of this commission, a defence condition assessment was undertaken.

Document history

Version	Status	Issue date	Prepared by	Reviewed by	Approved by
1	Draft for comment	11/12/14	George Batt – Graduate Coastal Engineer	Jason Drummond – Principal Flood and Coastal Specialist	Tara-Leigh McVey – Associate
2	Revision after client comments	17/02/15	George Batt – Graduate Coastal Engineer	Jason Drummond – Principal Flood and Coastal Specialist	Tara-Leigh McVey – Associate
3	Revision after client comments	18/12/15	Ben Taylor – Graduate Coastal Engineer	Jonathan Short – Senior Coastal Specialist	Tara-Leigh McVey - Associate
4	Issue for consultation	09/03/16	Ben Taylor Assistant Consultant	Jonathan Short Principal Consultant	Tara-Leigh McVey - Associate

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1. Introduction

1.1 Project Background

Capita/AECOM has been appointed by the Isle of Wight Council to develop a coastal flood and erosion risk management strategy for the western coastline of the Isle of Wight (“West Wight”). The strategy will evaluate options for managing coastal flooding and erosion, including potential maintenance and capital works required. The strategy assessments will be based on technical issues, economics, stakeholder interests, and environmental impacts. Following a thorough evaluation of these different aspects, the strategy will facilitate the development of sustainable and adaptable coastal defence options with preferred implementation plans put forward. These options will reference the preferred policies outlined in the Isle of Wight Shoreline Management Plan (SMP) published in 2010.

1.2 Purpose of the Document

This document details the findings of the defence condition review undertaken by AECOM for the West Wight strategy frontage. This visual defence condition assessment has been carried out for the purpose of:

- Recording the condition of the defences through visual inspection;
- Reviewing the performance of the defences through estimating the residual life;
- Cross-referencing the Council’s defence appraisal undertaken in 2014;
- Developing the “Do Nothing” and “Do Something” scenarios for the Option Appraisal and;
- Communicating the state of defence assets at consultation exhibitions.

No intrusive surveys or material testing has been carried out as part of the assessment. The interpretation of information within this report is intended to inform strategic defence options for different frontages. It should not be used to make an assessment of specific defence sections without further observation and investigation of potential material, structural, and geotechnical defects which may be present.

2. Defence Condition Methodology

2.1 Isle of Wight Council Defence Appraisal

The Isle of Wight Council revised the original SMP2 defence appraisal (2010) in 2014 for the sections covered by the West Wight Strategy, including provision of additional details and new asset information i.e. previously undescribed elements of structures.

As well as a comprehensive photographic record of all assets with accompanying descriptions, assets were graded using the EA Condition Assessment Manual (2006). Based on the condition grade estimation of residual life has been made using SMP guidance derived from previous NADNAC (National Appraisal of Defence Needs and Costs) deterioration profiles (Table 2-1).

Table 2-1: Estimation of Residual Life (from SMP guidance)

Defence description	Estimation of Residual Life (years)				
	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
Seawall (concrete/masonry)	25 to 35	15 to 25	10 to 15	5 to 7	0
Revetment (concrete/rock)	25 to 35	15 to 25	10 to 15	5 to 7	0
Timber groynes/ timber structures	15 to 25	10 to 20	8 to 20	2 to 7	0
Gabion	10 to 25	6 to 10	4 to 7	1 to 3	0

Note that in this study, identification of assets by location is based on previous shoreline management units (“IW” units) from SMP1, rather than the SMP2 policy units.

Due to the extensive defence data provided by Isle of Wight Council in the 2014 appraisal, and to avoid repetition, Capita/AECOM has not undertaken a visual inspection of all the assets along the strategy frontage, but has assessed a selection of key assets in areas of interest i.e. prone to flooding and erosion. This information has been compared to the Isle of Wight Council's Defence Appraisal, to validate and supplement the data. The findings will be utilised in the option appraisal phase of the project, to underpin the assessment of options, and the basis of damages under the “Do Nothing” scenario.

2.2 Walk-over surveys

An on-foot visual inspection of defences along the strategy frontage was carried out in order to determine their condition, current effectiveness and estimated residual life. The surveys were undertaken by AECOM Coastal Engineers between the 2nd and 3rd December 2014. The areas visited were:

- Cowes and East Cowes;
- Newport;
- Yarmouth including Thorley Brook;
- Freshwater Causeway and;

- the Totland landslide.

The weather was overcast with sunny intervals with good visibility and a moderately northerly wind. Inspections were timed to coincide with low tide in order to maximise available viewing time.

The tidal conditions on the dates of inspection were midway between neap and spring (peak spring tide of the 6-7th December). Table 2-2 summarises the tidal elevation on the dates of inspection at Yarmouth.

Table 2-2: Tidal Conditions

Tide Level	2 nd December 2014		3 rd December 2014	
	Time	Height (mCD)	Time	Height (mCD)
High Water	07:23	2.9	08:09	2.9
Low Water	12:38	1.3	13:32	1.2
High Water	19:37	2.8	20:21	2.9

Note: Time in GMT

2.3 Condition Assessment

The condition of the defences was assessed in line with the Environment Agency Condition Assessment Manual (2006). The manual provides a condition grading scheme and description to aid a robust and consistent approach to evaluating the condition and residual life of coastal defences. The defensive structures along the Strategy frontage have been categorised into a condition grade (1-5) based on criteria set out in this manual (Table 2-3). This is the same manual as used by the Isle of Wight Council in their defence appraisal.

Table 2-3: Extracts from EA (2006) Condition Assessment Manual

Grade	Description of grade	Extent of defects
1	Very good	Cosmetic defects that will have no effect on performance
2	Good	Minor defects that will not reduce overall performance of asset
3	Fair	Defects that could reduce performance of asset
4	Poor	Defects that would significantly reduce performance of asset
5	Very poor	Severe defects resulting in complete performance failure

Estimation of residual life for the each asset has been determined using the latest Environment Agency guidance (2013). This guidance is more recent than the SMP guidance for residual life estimations as used in the Isle of Wight Council Defence Appraisal. This method uses probabilistic deterioration curves based on factors which influence the asset life and the predicted maintenance regime. The aforementioned condition grade for each asset is used to determine the location of that asset on the grading curve and subsequently used to determine the residual life of the structure. For the purposes of this study, the maintenance regime

selected for all assets is Maintenance Regime 1: Low/basic-do minimum. A medium deterioration scenario has been selected as the most likely deterioration curve. The residual life is said to be the time taken for the asset to go from its current condition to condition grade 5, where the asset has essentially failed.

Photos of the defence asset being assessed were also taken using a digital camera. The images provide a record of the current defence condition and will allow the rate of deterioration of the defence condition to be appraised more accurately in subsequent studies.

2.4 Shoreline Management Plan

The SMP2 used policy units to identify locations of assets. The policy units covered in the site visit are shown in Table 2-4 along with the preferred policy plan at these locations.

Table 2-4: Preferred Option for Policy Units

Policy Unit		Policy Plan		
		to 2025	to 2055	to 2105
PU1A.3	Gurnard to Cowes Parade	HTL	HTL	HTL
PU1A.4	Cowes	HTL	HTL	HTL
PU1A.5	East Cowes	HTL	HTL	HTL
PU1A.6	East Cowes Outer Esplanade	HTL	NAI	NAI
PU1B.4	Newport Harbour	HTL	HTL	HTL
PU6B.1	Totland and Colwell	HTL	HTL	HTL
PU6C.1	Norton Spit	HTL	HTL	HTL
PU6C.3	The Causeway	HTL	HTL	HTL
PU6C.4	Western Yar Estuary – eastern shore	NAI	NAI	NAI
PU6C.5	Thorley Brook and Barnfields Stream	HTL	MR	NAI
PU6C.6	Yarmouth to Port la Salle	HTL	HTL	HTL

Key: HTL – hold the line, NAI – no active intervention, MR – managed realignment

3. Results of Site Visit

Table 3-1 shows a selection of defences that have been assessed by Capita/AECOM. For each defence item, the Capita/AECOM and Isle of Wight observations on condition grades and residual lives are presented. Length and crest height have been taken from Isle of Wight council GIS defence data (*Defence Type_2014*).

Table 3-1: Results of Site Visit

Defence Description	IW Unit	Policy Unit	Length (m)/ Crest Height (mODN)	Photo from AECOM Site Visit	Assessed by	Condition Grade	Residual Life (years)
Concrete block masonry wall	56/010	PU1A.3	211/ unknown		Capita / AECOM	Grade 3	15
					IWC	Grade 3	10 to 15
Rock groynes	56/011	PU1A.3	n/a		Capita / AECOM	Grade 3/4	15
					IWC	Grade 3	10 to 15
Concrete block masonry wall	56/015	PU1A.3	140/ 2.4		Capita / AECOM	Grade 3	15
					IWC	Grade 3	10 to 15

Masonry block wall	57/001	PU1A.3	236/ 2.5		Capita / AECOM	Grade 2	30
					IWC	Grade 2	15 to 25
Stone masonry wall	59/002	PU1A.5	32/ unknown		Capita / AECOM	Grade 2	30
					IWC	Grade 2	15 to 25
Concrete groyne	59/012	PU1A.5	n/a		Capita / AECOM	Grade 2/3	20
					IWC	Grade 2	15 to 25
Concrete breakwater	59/013	PU1A.5	639/ 3.1		Capita / AECOM	Grade 2	30
					IWC	Grade 2	15 to 25

Concrete wall	58/048	PU1B.4	129/ unknown		Capita / AECOM	Grade 3	15
					IWC	Grade 3	10 to 15
Steel sheet piled toe with stepped concrete apron and concrete wall	45/005	PU6B.1	509/ 3.0		Capita / AECOM	Grade 5	0
					IWC	Grade 5	0
Timber boarded breastwork breakwater	50/004	PU6C.1	395/ 2.2		Capita / AECOM	Grade 3	5
					IWC	Grade 2	10 to 20
Stone masonry wall	50/036	PU6C.6	83/ 1.7		Capita / AECOM	Grade 2	30
					IWC	Grade 2	15 to 25

4. Summary

The asset condition grades assessed by the Isle of Wight Council and Capita/AECOM condition assessments largely agree thus adding confidence in the estimates. Where there are differences in residual life these are not significant (5 years or less) and some differences in residual life were expected due to the use of two different residual life assessment manuals. Out of the 11 defence assets compared, only one had a different grading (IW 50/004), which is the Yarmouth breakwater.

Yarmouth Harbour announced recently (November 2014; <http://www.yarmouth-harbour.co.uk>) that the existing breakwater that protects the harbour requires replacement, since it is approaching the end of its useful life. In that sense, the Capita/AECOM observations are probably more appropriate in this location and the “Do Nothing” erosion lines should be updated to reflect the shorter predicted residual life.

It should be remembered that residual life estimates are just that, and have been assigned purely on a visual inspections. The level of agreement has confirmed that the data included within the Isle of Wight Council Defence Appraisal is suitably up to date and can be used at a strategic level to inform the development of options.

5. References

Environment Agency (2006) Managing Flood Risk, Condition Assessment Manual – Doc Ref 166_03_SD01. Published by Environment Agency, Rio House, Waterside Drive, Bristol BS32 4UD

Halcrow (2013) Practical guidance on determining asset deterioration and the use of condition grade deterioration curves: Revision 1 Report – SC060078/R1 Published by: Environment Agency, Horizon House, Deanery Road, Bristol, BS1 5AH

Isle of Wight Council (2014) West Wight Strategy Study 2014 – Defence Appraisal