# **Medway Estuary and Swale Shoreline Management Plan SMP**

Appendix I – Metadatabase

### **Contents Amendment Record**

This report has been issued and amended as follows:

| Issue | Revision | Description   | Date     | Approved by |
|-------|----------|---|----------|-------------|
| 1     | 0        | Consultation Draft                                      | 01/05/07 | N Pontee    |
|       | 1        | Amendments following public consultation and QRG review | 31/10/08 | N Pontee    |
| 2     | 2        | Final   | 19/11/09 | N Pontee    |

Halcrow Group Limited

Burderop Park, Swindon, Wiltshire SN4 0QD

Tel +44 (0)1793 812479 Fax +44 (0)1793 812089

www.halcrow.com

Halcrow Group Limited has prepared this report in accordance with the instructions of their client, the Environment Agency, for their sole and specific use. Any other persons who use any information contained herein do so at their own risk.

© Halcrow Group Limited 2010

#### **The Supporting Appendices**

This appendix and the accompanying documents provide all of the information required to support the Shoreline Management Plan. This is to ensure that there is clarity in the decision-making process and that the rationale behind the policies being promoted is both transparent and auditable. The appendices are:

| A: SMP Development                                     | This reports the history of development of the SMP, describing more fully the plan and policy decision-making process.   |  |  |
|--|--|--|--|
| B: Stakeholder Engagement                              | All communications from the stakeholder process are provided here, together with information arising from the consultation process.  |  |  |
| C: Baseline Process<br>Understanding                   | Includes baseline process report, defence assessment, NAI and WPM assessments and summarises data used in assessments.   |  |  |
| D: SEA Environmental Baseline<br>Report (Theme Review) | This report identifies and evaluates the environmental features (natural environment, landscape character, historic environment, land use, infrastructure and material assets, and population and human health). |  |  |
| E: Issues & Objective Evaluation                       | Provides information on the issues and objectives identified as part of the Plan development, including appraisal of their importance.   |  |  |
| F: Initial Policy Appraisal & Scenario Development     | Presents the consideration of generic policy options for each frontage, identifying possible acceptable policies, and their combination into 'scenarios' for testing.  |  |  |
| G: Scenario Testing                                    | Presents the policy assessment and appraisal of objective achievement towards definition of the Preferred Plan (as presented in the Shoreline Management Plan document).   |  |  |
| H: Economic Appraisal and<br>Sensitivity Testing       | Presents the economic analysis undertaken in support of the Preferred Plan.  |  |  |
| I: Metadatabase and<br>Bibliographic database          | All supporting information used to develop the SMP is referenced for future examination and retrieval.   |  |  |
| J: Habitat Regulations<br>Assessment                   | Presents an assessment of the effect the plan will have on European sites.   |  |  |
| K: Strategic Environmental<br>Assessment               | Presents the Strategic Environmental Assessment of the Plan.   |  |  |
| L: Water Framework Compliance                          | Presents a retrospective Water Framework Directive Assessment.   |  |  |

## Appendix I: Metadatabase and Bibliographic database

This Appendix includes a list of the key reference materials used in the development of the Shoreline Management Plan. The list includes the documents reviewed and the websites used. The latter presents the web address and clarification of the content where necessary.

#### **Existing Documents:**

Ackers, D. (1992) Canal and River Regime Theory and Practice, 1979-1992. Gerabel Lacey Memorial Lecture, Proceedings of the Institution of Civil Engineer, Water, Maritime and Energy Paper 1019, Volume 96, p 167-178.

Admiralty (2006) Admiralty Tide Tables, United Kingdom and Ireland (including European Channel Ports). Volume 1, 2006.

Babtie, Brown and Root JV (BBR) (2001) North Kent Coast Scoping Study. Final Report. Report to the Environment Agency, September 2001. Project Reference K2A1 K04 02410, Assignment Number BR/SO/0021.

Bacon, S., and Carter, D.J.T. (1991) Wave climate changes in the North Atlantic and North Sea. Journal of Climatology 2, 545-558.

Bects, D. J., Van de Valk, L., Stive, M. J. F. (1992) Holocene evolution of the coast of Holland. Marine Geology, 103, 423-443.

Bowen, Rose, McCabe and Sutherland (1986) Correlation of Quaternary glaciations in England, Ireland, Scotland and Wales. Quaternary Science Reviews, 5, pp.299-340.

Burd, F.H. (1992) Erosion and Vegetation change on saltmarshes of Essex and North Kent between 1973 and 1988 (Research and survey in nature conservation No.42). Nature Conservation Council, Peterborough.

Burgess K.A., Jay H., Hutchison J., Balson P. and Ash J. (2001) Futurecoast: Assessing future coastal evolution. Proceedings Defra Conference of River and Coastal Engineers. Keele University, England, 9.3.1–9.3.10.

Canterbury City Council (CCC) (2004a) Faversham Creek to Whitstable Harbour. Coastal Defence Strategy Plan. Main Report. Engineering Services Canterbury City Council. Report for the Environment Agency. March 2004.

Canterbury City Council (CCC) (2004b) Whitstable Coast Protection Works. Project Appraisal Report. December 2004.

Centre for Coastal Management (CCM) (2002) Saltmarsh Change within North Kent estuaries between 1961, 1972, 1988 and 2000. Report produced by CCM at the University of Newcastle.

Davidson, N.C. (1991) Nature conservation and estuaries in Great Britain. Nature Conservancy Council, Peterborough.

Defra (2001) National Appraisal of Assets at Risk, from flooding and coastal erosion, including the

potential impact of climate change.

Defra (2002) Futurecoast CD. Produced by Halcrow Group Ltd, Swindon, UK, as part of the Futurecoast study for Defra 2002

Defra (2002a) Guidance notes for the assessing morphological change in estuaries. Technical report FD2110. 46pp.

Defra (2002b) Climate change scenarios for the United Kingdom: the UKCIP02 Scientific report. Authors: Hulme, M., Jenkins, G.J., Lu, X., Turnpenny, J.R., Mitchell, T.D., Jones, R.G., Lowe, J., Murphy, J.M., Hassell, D., Boorman, P., McDonald, R. and Hill, S. April, 2002.

Defra (2004) NADNAC National Appraisal of Defence Needs and Costs Study.

Defra (2005) Making Space for Water: Flood & Coastal Erosion Risk Management Innovation Fund. Project description available online at:

http://www.defra.gov.uk/environ/fcd/policy/strategy/innovfnd.htm

Defra (2005a) Making Space for Water: Taking forward a new Government strategy for flood & coastal erosion risk management – Introduction. Available online at:

http://www.defra.gov.uk/environ/fcd/policy/strategy.htm

Defra (2006) Flood and Coastal Defence Appraisal Guidance, FCDPAG3 Economic Appraisal, Supplementary Note to Operating Authorities – Climate Change Impacts, October 2006.

Devoy, R.J.N. (1977) Flandrian sea level changes in the Thames estuary and the implications for land subsidence in England and Wales. Nature, 270, 712-715.

Dines, H.G., Holmes, S.C.A., and Robbie, J.A. (1954) Geology of the country around Chatham. Mem. Geol. Surv., London: HMSO.

Dixon, MJ. and Tawn, J.A. (1995) Extreme sea levels at the UK Class A sites: Optimum site-by-site analyses and spatial analysis for the East Coast. Proudman Oceanographic Laboratory Internal Document 72. Proudman Oceanographic Laboratory, Birkenhead, 298pp.

D'Olier, B. and Maddrell, R.J. (1970) Buried channels of the Thames estuary. Nature, London., 226, 121-130.

Dronkers, J. (1986) Tidal asymmetry and estuarine morphology. Netherlands J. Sea Rseearch, 20, 117-131.

English Heritage (2006) Shoreline Management Plan Review and the Historic Environment: English Heritage Guidance

English Nature (2002) North Kent Coastal Habitat Management Plan: Final Report.

English Nature (2006) Internal communication with Ingrid Chudleigh. 1st September 2006.

EMPHASYS Consortium (2000) A Guide to Prediction of Morphological Change within Estuarine Systems Version 1B. HR Wallingford Report TR 114 for MAFF Project FD1401, Contract CSA 4938, December 2000. 53pp.

Environment Agency (2000) Isle of Sheppey, Kent – Northern Defences. Project Appraisal Report. Scheme Reference Number: R073/1009624 and R073/KK40161.

Environment Agency (2001) North Kent Coast Scoping Study: Draft Final Report.

Environment Agency (2006) Record of Daily Mean Flows - from 1956 to 2006 for Teston/Farleigh.

Evans, J.H. (1953) Archaeological horizons in the North Kent Marhses. Archaeolgia Cantiana, 280, 445-483.

Evans (1957) Reference unknown, taken from IECS, 1993.

Gibbard, P.L. (1977) Pleistocene history of the Vale of St. Albans. Phil.Trans.R.Soc. London. B. 280, 445-483.

Gordon, D.L. and Suthons, C.T. (1963) Mean sea level in the British Isles. Admty Mar. Sci. Publ., 7, 8.

Halcrow (1991) Hydrographic Study of the Medway Estuary. Report to British Gas plc.

Halcrow (1991) The Anglian Sea Defence Management Study – Stage III. Study Report. Report prepared for the NRA Anglian Region.

Halcrow (2003) Interim procedural guidance for production of Shoreline Management Plans, Interim Guidance. DEFRA. May 2003.

HR Wallingford (1975) Medway Estuary Investigation – Report on Lappel Bank and Approach Channel Studies. Report EX709. Hydraulics Research Station: Wallingford.

HR Wallingford (2001) Southern North Sea Sediment Transport Study, Phase 2. Inception Report. Report produced for Great Yarmouth Borough Council by HR Wallingford, CEFAS/UEA, Posford Duvivier and Dr Brian D'Olier. Report EX 4341.

HR Wallingford (2006) Faversham Creek Navigation Study: Draft Report for Consultation. Report EX5311.

Hulme, M. and Jenkins, G.J., 2002. Climate Change Scenarios for the United Kingdom: The UKCIP02 Scientific Report. Tyndall Centre for Climate Change Research, School of Environmental Sciences, University of East Anglia.

Institute of Estuarine and Coastal Studies (IECS) (1991) Essex Saltmarsh Erosion Unpublished Report No. 6.

Institute of Estuarine and Coastal Studies (IECS) (1993) The Medway Estuary. Coastal processes and Conservation. University of Hull. June 1993.

IPCC (2001) Climate change 2001: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Third Assessment Report of the Intergovernmental Panel on Climate Change. In: McCarthy, J.J., Canziani, O.F., Leary, N.A., Dokken, D.J. and White, K.S. (eds.) Cambridge University Press, Cambridge. 1032pp.

Jeremy Benn Associates (JBA) (2004) Updated Summary Report of Extreme Sea Level Analysis. December 2004.

Joint Nature Conservation Committee (JNCC) (1997) An inventory of UK estuaries. 5. Eastern England.

Kendall, P. (2006) Medway and Swale Shoreline Management Plan and Isle of Grain to South Foreland Shoreline Management Plan: Comments on the Issues and Objectives Table. Letter dated

25<sup>th</sup> January 2006.

Kent County Council (KCC) (1997) Kent Biodiversity Action Plan.

Kent County Council (KCC) (2002) North Kent Marsh Salt Marsh Survey.

Kirby, R. (1969) Sedimentary environment, sedimentary processes and river history in the Lower Medway Estuary, Kent. Unpublished Ph.D thesis, University of London.

Kirby, R. (1990) The Sediment Budget of the erosional intertidal zone of the Medway Estuary, Kent. Proceedings Geological Association., 101(1), 63-77.

Legget, I.M., Beiboer, F.L., Osbourne, M.J. and Bellamy, I. (1996) Long term Metocean measurements in the Northern North Sea. In: Climatic change offshore N.W. Europe. Society for underwater technology.

MAFF (1999) Flood and Coastal Defence Project Appraisal Guidance. MAFF flood and Coastal Defence Division.

Marsland, A. (1986) The flood plain deposits of the Lower Thames. Quat. J. Eng. Geolo., 19, 223-247.

Medway and Swale Estuary Partnership (MESP) (2000) Strategy for the Medway and Swale Estuary.

Medway and Swale Estuary Partnership (MESP) (2001) Sediment Matrix Mapping, Medway and Swale Estuary Partnership Steering Group.

O'Brien, M.P. (1931) Estuary tidal prism related to entrance areas, Civil Engineering, 1(8), 738-739.

O'Brien, M.P. (1969) Equilibrium flow areas of inlets on sandy coasts, Journal of the Waterway and Harbour Division, ASCE, 95(WW1), 43-52.

Pethick, J. (1993) Estuaries and wetlands: function and form. Pressures on Wetlands.

Pethick, J. S. and Lowe, J. (2000) Regime models in estuaries research. In: EMPHASYS Consortium. A guide to the prediction of morphological change within estuarine systems, HR Wallingford Report TR114 for MADD project FC1401. HR Wallingford Ltd, Oxfordshire, UK. Available from <a href="http://www.hrwallingford.co.uk/">http://www.hrwallingford.co.uk/</a>

Pethick, J.S. and Leggett, D. (In Press). The Geomorphology of the Anglian Coast. In R. Hilliard (Eds). Coasts of the Southern North Sea, ASCE.

Pontee, N. I. (2005) Management implications of macro and meso scale coastal change on the Suffolk Coast. Proceedings of the Institution of Civil Engineers, Maritime Engineering Journal, June 2005, Issue MA12, pp 69-83.

Pontee, N. I., Hayes, C.M., Whitehead, P.A. (2004) The effect of freshwater flow on siltation in the Humber estuary, N.E., U.K. Coastal, Estuarine and Shelf Science. Vol 60/2 pp 241-249.

Posford Duvivier (2000) Medway Approach Channel Deepening, Environmental Statement February 2000. Posford Duvivier, Peterborough.

Rose, J. (Ed). (1983) Diversion of Thames Field Guide. Cambridge: Quaternary Research Association.

Scott Wilson (1998a) Isle of Sheppey Strategy Plan. Phase 1 Report Northern Defences. Report to the

Environment Agency. First Issue, April 1998.

Scott Wilson (1998b) Isle of Sheppey Strategy Plan. Phase 1 Report Southern Defences. Report to the Environment Agency. First Issue, April 1998.

Shennan, I. (1989) Holocene crustal movements and sea-level changes in Great Britain. Journal of Quaternary Science 4: 77-89.

Shennan, I. and Horton, B. (2002) Holocene land- and sea-level changes in Great Britain. Journal of Quaternary Science 17: 511-526.

Shennan, I. and Woodworth, P.L. (1992) A comparison of late Holocene and twentieth-century sea level trends from the UK and North Sea region. Geophys. J. Int., 109, 96-105.

The North Kent Marshes Initiative (1997) Medway Estuary and Swale Management Plan: Consultation Draft.

Tooley M.J. and Shennan, I. (eds.) (1987) Sea-level changes. Blackwell, Oxford, 397pp.

Townend, I. (2006) An examination of empirical stability relationships for UK estuaries. Journal of Coastal Research. 21 (5), 1042-1053.

Townend, I and Pethick., J. (2002) Estuarine flooding and managed retreat. Phil. Trans. R. Soc. Lond. A. (360), 1-20.

UKCIP (2005) Updates to regional net sea-level change estimates for the UK UKCIP, November 2005.

Williams, G., Henderson., A., Goldsmith, L. and Spreadborough, A. (1983) The effects of birds of land drainage improvements in the North Kent Marshes. Wildfowl, 34, 33-47.

Woodworth, P.L. Shaw, S.M. and Blackman, D.L. (1991) Secular trends in mean tidal range around the British Isles and along the adjacent European coastline. Geophys. J. Int., 104, 593-609.

Wright, L.D., Coleman, J.M., and Thom, B.G. (1973) Process of channel development in a high-tide environment: Cambridge Gulf-Ord River Delta, W Australia. J Of Geol., 81, 15-41.

#### **Website Data Sources Used:**

#### **Environmental designations**

http://www.jncc.gov.uk/ (May 2006)

http://www.english-nature.org.uk/special/sssi/ SSSI Citations (May 2006)

http://www.kentbap.org.uk/ (May 2006)

http://www.naturalengland.org.uk/ (May 2006)

http://www.magic.gov.uk/ (May 2006)

#### **Local Authorities / Plans**

http://www.halling-pc.gov.uk/ (May 2006)

http://www.kent.gov.uk/ (May 2006)

http://www.kmsp.org.uk/ Kent and Medway Structure Plan (May 2006)

http://www.medway.gov.uk/ (May 2006)

http://www.swale.gov.uk/ (May 2006)

http://www.tmbc.gov.uk/ (May 2006)

http://www.southeast-ra.gov.uk/ Southeast Plan (May 2006)

http://www.seeda.co.uk/ (May, 2006)

#### Harbours / Sailing

http://www.medwayports.com/ (May 2006)

http://www.swalemarina.co.uk/ (May 2006)

#### **Environmental Groups**

http://www.kentwildlifetrust.org.uk/ (May 2006)

http://www.kentwildfowlers.co.uk/ (May 2006)

#### **Estuaries**

http://www.medway-swale.org.uk/ Environmental Atlas (May 2006)

#### Heritage

http://www.english-heritage.org.uk/ (May 2006)

#### **Environment Agency**

http://www.environment-agency.gov.uk/ (May 2006)

#### **AONB Management Plans**

http://www.countryside.gov.uk/ (May 2006)

#### **Directives**

http://www.defra.gov.uk/environment/water/wfd/index.htm Water Framework Directive (April 2007)

#### **Planning Policy Guidance**

http://www.planningportal.gov.uk/england/professionals/en/1021020428593.html PPG20: Coastal Planning (April 2007)

http://www.communities.gov.uk/index.asp?id=1504640 PPS25: Development and Flood Risk (April 2007)

http://www.planningportal.gov.uk/england/professionals/en/1021020427913.html PPG15: Planning and the Historical Environment (April 2007)

http://www.planningportal.gov.uk/england/professionals/en/1021020427943.html PPG16: Archaeology and Planning (April 2007)

#### **Additional data**

NFCDD: National Flood and Coastal Defence Database

Environment Agency Indicative Floodplain 2005

MAGIC Interactive Map: <a href="http://www.magic.gov.uk/website/magic">http://www.magic.gov.uk/website/magic</a>

National Statistics: Agricultural Land Sales and Prices in England: <a href="http://statistics.defra.gov.uk/esg/statnot/alp.xls">http://statistics.defra.gov.uk/esg/statnot/alp.xls</a> Defra (December 2006)

National Property Database

Property Prices: <a href="http://www.upmystreet.co.uk/">http://www.upmystreet.co.uk/</a>

Agricultural Land Prices: Defra (2006) National Statistics: Agricultural Land Sales and Prices in

England. <a href="http://statistics.defra.gov.uk/esg/statnot/alp.xls">http://statistics.defra.gov.uk/esg/statnot/alp.xls</a>

Other information and data has also been supplied to Halcrow by stakeholders throughout the SMP process