

List of Tables

Chapter	Reference	Title
Executive Summary	i	The range of policies selected in the Thames CFMP
1	1.1	Generic CFMP flood risk management policy options
	1.2	Review of other policies, plans and programmes and their relevance to the CFMP
	1.3	Summary of consultation during the development of the Thames CFMP
	1.4	Key concerns raised during consultation on the Draft Thames CFMP and how they have been addressed
	1.5	Geographical scales used in the Thames CFMP
2	2.1	National and regional comparison
	2.2	Hierarchy of designated sites
	2.3	Number and area of SSSIs within each policy unit
	2.4	Number and area of SACs and SPAs within each policy unit
	2.5	Area of BAP wetland habitat in the plan area and within the 0.1% AEP fluvial floodplain
	2.6	Regional share of UK export and import trade, 2002. Source: HM Customs and Excise
3	3.1	Historic flood events in Thames region
	3.2	Percentage coverage of MDSF outputs per policy unit
	3.3	People at risk per policy unit
	3.4	Levels of flood hazard across the Thames CFMP area (not considering the presence of defences)
	3.5	Properties at risk per policy unit
	3.6	Flood damages per policy unit
	3.7	Transport infrastructure at risk
	3.8	Vulnerable infrastructure within the 0.1% AEP fluvial floodplain (Flood Zone 3)
	3.9	Highly vulnerable infrastructure within the 10% and 1% AEP fluvial floodplain (MDSF)
	3.10	Less vulnerable infrastructure within the 10% and 1% AEP fluvial floodplain (MDSF)
	3.11	The number and area of SSSIs, SACs and SPAs within the 10% and 1% AEP floodplain (MDSF) and the percentage of the total area this represents
	3.12	Hydrological regimes of water dependent internationally designated sites in Thames region
	3.13	Summary of hydrological management requirements for water-dependent SSSIs in Thames region
	3.14	Summary of flood risk for the 1% AEP event (using MDSF data)
	3.15	Details of the maintenance work carried out in each policy unit in Thames region
	3.16	Length and type of defence assets per policy unit (data taken from NFCDD)
	3.17	Number of third party assets per policy unit and approximate replacement costs

	3.18	Flood warning, awareness and forecasting activities planned for 2008-09
4	4.1	Increase in the number of people at risk at a result of climate change
	4.2	Social flood vulnerability under the climate change scenario
	4.3	Increase in the number of properties at risk as a result of climate change
	4.4	Increase in economic damages as a result of climate change
	4.5	Potential impact of a 0.1% AEP future event
	4.6	Extreme future event calculations
	4.7	Highly vulnerable infrastructure within the 10% and 1% AEP fluvial floodplain (MDSF)
	4.8	Less vulnerable infrastructure within the 10% and 1% AEP fluvial floodplain (MDSF)
	4.9	Increase in the number and area of designated sites in the 10% and 1% AEP floodplain as a result of climate change
	4.10	Summary of flood risk for the 1% AEP event under the climate change scenario (using MDSF data)
5	5.1	Thames CFMP policy appraisal objectives and indicators
6	6.1	Generic CFMP flood risk management policy options
	6.2	Thames CFMP flood risk management policies and messages
	6.3	Key messages and conclusions
	6.4	Key actions to be taken forward (developed in detail in the action plans in Chapter 7)
	6.5	Policy units contributing less than 2% to the economic, social or environmental assets in Thames region
	6.6	Thames CFMP – uncertainties and data gaps
7	7.1	Upper Thames policy unit action plan
	7.2	Swindon policy unit action plan
	7.3	Oxford policy unit action plan
	7.4	Abingdon policy unit action plan
	7.5	Ock policy unit action plan
	7.6	Sandford to Cookham policy unit action plan
	7.7	Thame policy unit action plan
	7.8	Aylesbury policy unit action plan
	7.9	Kennet policy unit action plan
	7.10	Reading policy unit action plan
	7.11	Loddon policy unit action plan
	7.12	Basingstoke policy unit action plan
	7.13	Upper and Middle Blackwater policy unit action plan
	7.14	Addlestone Bourne, Emm Brook and The Cut policy unit action plan
	7.15	Rural Wey policy unit action plan
	7.16	Guildford policy unit action plan
	7.17	Hoe Stream policy unit action plan
	7.18	Byfleet and Weybridge policy unit action plan
	7.19	Windsor and Maidenhead policy unit action plan

	7.20	Lower Thames policy unit action plan
	7.21	Lower Mole policy unit action plan
	7.22	Middle Mole policy unit action plan
	7.23	Upper Mole policy unit action plan
	7.24	Colne tributaries and Wye policy unit action plan
	7.25	Colne policy unit action plan
	7.26	Pinn policy unit action plan
	7.27	Luton policy unit action plan
	7.28	Upper Lee policy unit action plan
	7.29	Middle Lee and Stort policy unit action plan
	7.30	Lower Lee policy unit action plan
	7.31	Lower Lee tributaries policy unit action plan
	7.32	Lower and Middle Roding policy units action plan
	7.33	Upper Roding policy unit action plan
	7.34	Beam policy unit action plan
	7.35	Ingrebourne policy unit action plan
	7.36	Ravensbourne policy unit action plan
	7.37	Wandle policy unit action plan
	7.38	Graveney policy unit action plan
	7.39	Beverley Brook policy unit action plan
	7.40	Hogsmill policy unit action plan
	7.41	Crane policy unit action plan
	7.42	Brent policy unit action plan

List of Figures

Chapter	Reference	Title
Executive Summary	i	The 43 policy units within the Thames CFMP and their selected policies
1	1.1	Mechanisms for managing flood risk
	1.2	Context of the CFMP within wider planning framework
	1.3	Location of Thames CFMP area
	1.4	Relationship between the four scales considered when producing the Thames CFMP
	1.5	The 43 policy units identified in the Thames CFMP
2	2.1	Thames region location plan
	2.2	Location of major urban areas in Thames region
	2.3	Overview of topography and the three main river basins in Thames region
	2.4	Thames region elevation
	2.5	River gradients in Thames region
	2.6	Thames region geology
	2.7	Indicative map of combined erosion pressures (natural & man-made) in Thames region
	2.8	Map of the level of morphological pressure in Thames region
	2.9	Indicative map of major soil types within Thames region
	2.10	Land use across Thames region (Land Cover Map 2000)
	2.11	Overview of regional land use and land use within the floodplain
	2.12	Long term average annual rainfall, soil moisture deficit and effective rainfall in the Thames region
	2.13	Annual average rainfall in Thames region (1961-1991)
	2.14	Potential levels of runoff generation across Thames region
	2.15	The impact of catchment characteristics on flood hydrographs
	2.16	The river system in Thames region
	2.17	Historical overview of the daily mean flow of the River Thames at Kingston
	2.18	Location of selected flow gauging stations and corresponding rain gauges in the Thames basin
	2.19	Rainfall data and hydrographs for selected locations in the Thames basin, during the Easter 1998 flood event
	2.20	Rainfall data and hydrographs for selected locations in the Thames basin, during the Autumn 2000 flood event
	2.21	Rainfall data and hydrographs for selected locations in the Thames basin, during the New Year 2003 flood event
	2.22	Modelled 1% AEP flows on the River Thames
	2.23	1% AEP flows on the River Thames (at Oxford and Reading) and its major tributaries (upstream of Reading only)
	2.24	1% AEP flows on the River Thames (at Windsor and Kingston) and its major tributaries
	2.25	Catchment area (as a percentage of the total BSM area) plotted against contribution to volume at Kingston (as a percentage of the total volume) for the 1% AEP event

	2.26	Breakdown by source of volume at Kingston for the 1% AEP modelled event (relative volumes for comparison)
	2.27	Maps showing the contribution of the catchments to the 1% AEP modelled flood volumes at Kingston for the four main time intervals
	2.28	The river system of the Lee basin
	2.29	Schematic diagram of the River Lee system
	2.30	Location of selected flow gauging stations and corresponding rain gauges in the Lee basin
	2.31	Rainfall data and hydrographs for selected locations in the Lee basin, during the October 1993 flood event
	2.32	Rainfall data and hydrographs for selected locations in the Lee basin, during the Autumn 2000 flood event
	2.33	Rainfall data and hydrographs for selected locations in the Lee basin, during the October 2001 flood event
	2.34	1% AEP design event flows on the Lee flood relief channel and navigation channel
	2.35	Flows on the major tributaries in the Lee basin for a 1% AEP design flood event
	2.36	Catchment area (as a percentage of the total BSM area) plotted against contribution to volume at the A406 (as a percentage of the total volume) for the 1% AEP event
	2.37	Breakdown by source of volume at Kingston for the 1% AEP modelled event (relative volumes for comparison).
	2.38	Maps showing the contribution of the catchments to the 1% AEP modelled flood volumes at Kingston for the 4 main time intervals
	2.39	The London rivers
	2.40	Location of selected flow gauging stations and corresponding rain gauges in the London rivers basin
	2.41	Rainfall data and hydrographs for selected locations in the London rivers basin, during the October 1993 flood event
	2.42	Rainfall data and hydrographs for selected locations in the London rivers basin, during the Autumn 2000 flood event
	2.43	A comparison of the 1% AEP modelled flows for rivers in the Thames, Lee and London basins
	2.44	Water dependent conservation areas (Sacs and SPAs) considered in the Thames CFMP and areas of strategic opportunity for wetland creation
	2.45	Location of existing BAP wetland habitat in Thames region
3	3.1	Extent of the 1947 flood
	3.2	Extent of the 1968 and 2000 floods
	3.3	Extent of the 1998 and 2003 floods
	3.4	Fluvial flood defences in the Thames CFMP area
	3.5	Likelihood of surface water flooding occurring in each policy unit in the Thames CFMP
	3.6	Occurrence of groundwater flooding in Thames region (January 2001)
	3.7	Regional coverage of the MDSF analysis work
	3.8	Population density within the floodplain
	3.9	Variation in social flood vulnerability across Thames region
	3.10	Properties within the 1% AEP flood extent that also lie within enumeration districts with an SFVI of 4 or 5
	3.11	Variation in flood warning lead times across Thames region
	3.12	Regional depth map for the 1% AEP flood event

	3.13	Properties at risk from flooding within the Thames CFMP area
	3.14	Total properties within the 1% AEP flood event outline, split between commercial and residential (based on MDSF results)
	3.15	Concentrations of properties at risk (greater than 500) from a 0.1% AEP fluvial flood event
	3.16	Damages for the Thames and Lee basins and the London rivers for a range of % AEP
	3.17	AAD split between commercial and residential properties
	3.18	Critical infrastructure within fluvial Flood Zone 3 (1% AEP)
	3.19	Projected 1% AEP damages per policy unit
	3.20	Chronology of flood risk management in Thames region
	3.21	Annual maintenance expenditure per length of main river in each policy unit
	3.22	Annual average maintenance costs per property at risk in each policy unit
	3.23	Location of flood defence assets in the upper Thames including the Ock and Thame
	3.24	Location of flood defence assets in the middle Thames, Kennet, Loddon, Wey and Colne
	3.25	Location of flood defence assets on the Mole and the London rivers
	3.26	Location of flood defence assets in Lee catchment including the upper Colne and Roding
4	4.1	Future proposed major development in Thames region
	4.2	Proposed development areas identified in the London Plan
	4.3	Impact of land use and land management change on 1% AEP flood event peak flows at Feildes weir on the Lee catchment
	4.4	Comparison of the 1% AEP flood event flows at Oxford
	4.5	Increase in the 1% AEP flood extent in the Upper Thames area as a result of climate change
	4.6	Increase in the 1% AEP flood extent in the Thame catchment and the Thames: Sandford to Cookham as a result of climate change
	4.7	Increase in the 1% AEP flood extent in the Kennet and Loddon catchments as a result of climate change
	4.8	Increase in the 1% AEP flood extent in the Wey catchment as a result of climate change
	4.9	Increase in the 1% AEP flood extent in the Lower Thames, Colne, Brent and Crane catchments as a result of climate change
	4.10	Increase in the 1% AEP flood extent in the Lower Lee and Lower and Middle Roding as a result of climate change
	4.11	Increase in the 1% AEP flood extent in the Middle Lee as a result of climate change
	4.12	Increase in the 1% AEP flood extent in the Upper Lee as a result of climate change
	4.13	Increase in the 1% AEP flood extent in the Upper Roding and Stort catchments as a result of climate change
	4.14	Increase in the 1% AEP flood extent in the Beam and Ingrebourne catchments as a result of climate change
	4.15	Increase in the 1% AEP flood extent in the Wandle and Ravensbourne catchments as a result of climate change
	4.16	Increase in the 10% AEP flood extent in the Lower Thames as a result of climate change
	4.17	Increase in the 1% AEP flood extent in the Lower Thames as a result of urbanisation
	4.18	Regional depth map for the 1% AEP flood event

	4.19	1% AEP flood depths (baseline and climate change) for Oxford
	4.20	1% AEP flood depths (baseline and climate change) for Reading
	4.21	1% AEP flood depths (baseline and climate change) for the Lower Thames
	4.22	1% AEP flood depths (baseline and climate change) for Hertford (Upper Lee)
	4.23	Increases in AAD as a result of climate change, in relation to the baseline (present day)
	4.24	Properties within the Thames 1% AEP flood extent that are also in areas of greater than 1m flood depth
	4.25	Properties within the Lee 1% AEP flood extent that are also in areas of greater than 1m flood depth
	4.25	Social flood vulnerability under the climate change scenario (represented by the 0.1% AEP baseline flood event)
5	5.1	Land use within the 0.1% AEP fluvial floodplain
6	6.1	The 43 policy units within the Thames CFMP and their selected policies
	6.2	Floodplain characterisation in Thames region
	6.3	The contribution of each policy unit to the environmental, social and economic assets at risk
	6.3.1a	Properties at risk from a 0.1% AEP flood event in the Upper Thames policy unit
	6.3.1b	Wetland BAP habitat in the Upper Thames
	6.3.2	Properties at risk from a 0.1% AEP flood event in the Swindon policy unit
	6.3.3a	Properties at risk from a 0.1% AEP flood event in the Oxford policy unit
	6.3.3b	Proposed development sites and Greenbelt in Oxford
	6.3.4	Properties at risk from a 0.1% AEP flood event in the Abingdon policy unit
	6.3.5	Properties at risk from a 0.1% AEP flood event and wetland BAP habitat in the Ock policy unit
	6.3.6	Properties at risk from a 0.1% AEP flood event in the Sandford to Cookham policy unit
	6.3.7	Wetland BAP habitat in the Thame catchment
	6.3.8	Properties at risk from a 0.1% AEP flood event and proposed development sites in Aylesbury
	6.3.9a	Properties at risk from a 0.1% AEP flood event in the Kennet policy unit
	6.3.9b	Wetland BAP habitats and SACs in the Kennet catchment
	6.3.10	Properties at risk from a 0.1% AEP flood event in the Reading policy unit
	6.3.11a	Properties at risk from a 0.1% AEP flood event in the Loddon policy unit
	6.3.11b	Wetland BAP habitat in the Loddon catchment
	6.3.12a	Flood management assets in the Basingstoke policy unit
	6.3.12b	Proposed development sites in Basingstoke
	6.3.13	Flood management assets in the Upper and Middle Blackwater policy unit
	6.3.14a	Properties at risk from a 0.1% AEP flood event in the Addlestone Bourne, Emm Brook and The Cut policy unit
	6.3.14b	Proposed development sites in the Addlestone Bourne, Emm Brook and The Cut catchments
	6.3.15a	Properties at risk from a 0.1% AEP flood event in the Rural Wey

		policy unit
	6.3.15b	Wetland BAP habitat in the Wey catchment
	6.3.16a	Property damages from a 1% AEP flood event in the Guildford policy unit
	6.3.16b	Proposed development sites in Guildford
	6.3.16c	Flood management assets in the Guildford policy unit
	6.3.16d	Flood warning levels of service in Guildford
	6.3.17	Properties at risk from a 0.1% AEP flood event in the Hoe Stream policy unit
	6.3.18a	Properties at risk from a 0.1% AEP flood event and S105 modelled flood extents in the Byfleet and Weybridge policy unit
	6.3.18b	Properties at risk from a 0.1% AEP flood event and location of proposed flood bunds identified in the River Wey strategy
	6.3.19a	Flood management assets in the Windsor and Maidenhead policy unit
	6.3.19b	Modelled flood extents for the Windsor and Maidenhead policy unit
	6.3.19c	Properties at risk from a 0.1% AEP flood event in the Windsor and Maidenhead policy unit
	6.3.20a	Properties at risk from a 0.1% AEP flood event in the Lower Thames policy unit
	6.3.20b	5% AEP flood extent in the Lower Thames policy unit
	6.3.20c	1% AEP flood extent plus 20% climate change in the Lower Thames policy unit
	6.3.21	Flood management assets in the Lower Mole policy unit
	6.3.22	Wetland BAP habitat in the Middle Mole
	6.3.23	Flood management assets in the Upper Mole policy unit
	6.3.24a	Properties at risk from a 0.1% AEP flood event in the Colne tributaries and Wye policy unit
	6.3.24b	Proposed development sites in the middle and upper Colne area
	6.3.25a	Properties at risk from a 0.1% AEP flood event in the Colne policy unit
	6.3.25b	Proposed development sites in the lower Colne area
	6.3.26	Properties at risk from a 0.1% AEP flood event in the Pinn policy unit
	6.3.27a	Properties at risk from a 0.1% AEP flood event in the Luton policy unit
	6.3.27b	Proposed development sites in Luton
	6.3.27c	The location of potential structural options in the Luton policy unit, identified in the Upper Lee strategy
	6.3.28a	Properties at risk from a 0.1% AEP flood event in the Upper Lee policy unit
	6.3.28b	Proposed development sites in the Upper Lee
	6.3.28c	The location of potential structural options in the Upper Lee policy unit identified in the Upper Lee strategy
	6.3.29a	Properties at risk from a 0.1% AEP flood event in the Middle Lee and Stort policy unit
	6.3.29b	Wetland BAP habitat in the Middle Lee and Stort
	6.3.30a	Lower Lee strategy flood modelled outlines (including Lower Lee tributaries)
	6.3.30b	Proposed development sites in the Lower Lee (including Lower Lee tributaries)
	6.3.31	Properties at risk from a 0.1% AEP flood event and the location of trashescreens and culverts in the Lower, Middle and Upper Roding

		policy units
	6.3.32	Properties at risk from a 0.1% AEP flood event in the Upper Roding policy unit
	6.3.33a	Properties at risk from a 1% and a 0.1% AEP flood event in the Beam policy unit
	6.3.33b	Location of the Washlands Flood Storage Area within the Beam policy unit
	6.3.34	Properties at risk from a 0.1% AEP flood event in the Ingrebourne policy unit
	6.3.35a	Properties at risk from a 0.1% AEP flood event in the Ravensbourne policy unit
	6.3.35b	Location of culverted channel and trashescreens within the Ravensbourne policy unit
	6.3.35c	Proposed development sites in the Ravensbourne catchment
	6.3.36a	Properties at risk from a 0.1% AEP flood event in the Wandle and Graveney policy units
	6.3.36b	Flood management assets in the Wandle and Graveney policy units
	6.3.37a	Properties at risk from a 0.1% AEP flood event in the Beverley Brook policy unit
	6.3.37b	Location of culverts and trashescreens in the Beverley Brook policy unit
	6.3.38a	Sources of fluvial flooding in Kingston upon Thames (Hogsmill policy unit)
	6.3.38b	Properties at risk from a 0.1% AEP flood event and flood management assets in the Hogsmill policy unit
	6.3.39	Properties at risk from a 0.1% AEP flood event in the Crane policy unit
	6.3.40a	Properties at risk from a 1% AEP flood event in the Brent policy unit
	6.3.40b	Location of culverts, trashescreens and the Welsh Harp Reservoir, in the Brent policy unit
	6.3.40c	Properties at risk from a 0.1% AEP flood event in the Brent policy unit
	6.3.40d	Proposed development sites in the Brent catchment
7	7.1	Increase in fluvial flood risk across Thames region
	7.2	Increase in fluvial risk in Thames region with strategic application of PPS25
	7.3	Representation of the impact and dependencies of approaches to managing risk