



Severn Estuary Shoreline Management Plan Review

Appendix H: Economic Appraisal



ATKINS



Shoreline Management Plan Review (SMP2)

Appendix H: Economic Appraisal

September 2009

Notice

This report was produced by Atkins for the Severn Estuary Coastal Group for the specific purpose of the Severn Estuary Shoreline Management Plan Review

This report may not be used by any person other than the Severn Estuary Coastal Group without The Severn Estuary Coastal Group's express permission. In any event, Atkins accepts no liability for any costs, liabilities or losses arising as a result of the use of or reliance upon the contents of this report by any person other than the Severn Estuary Coastal Group.

Document History – Issues and Features

JOB NUMBER: 5078599			DOCUMENT REF: 5078599/21/DG/023			
023	For PMG review	AMC	PJC	JMcC	RGS	3 Sept 2009
Revision	Purpose Description	Originated	Checked	Reviewed	Authorised	Date

Contents

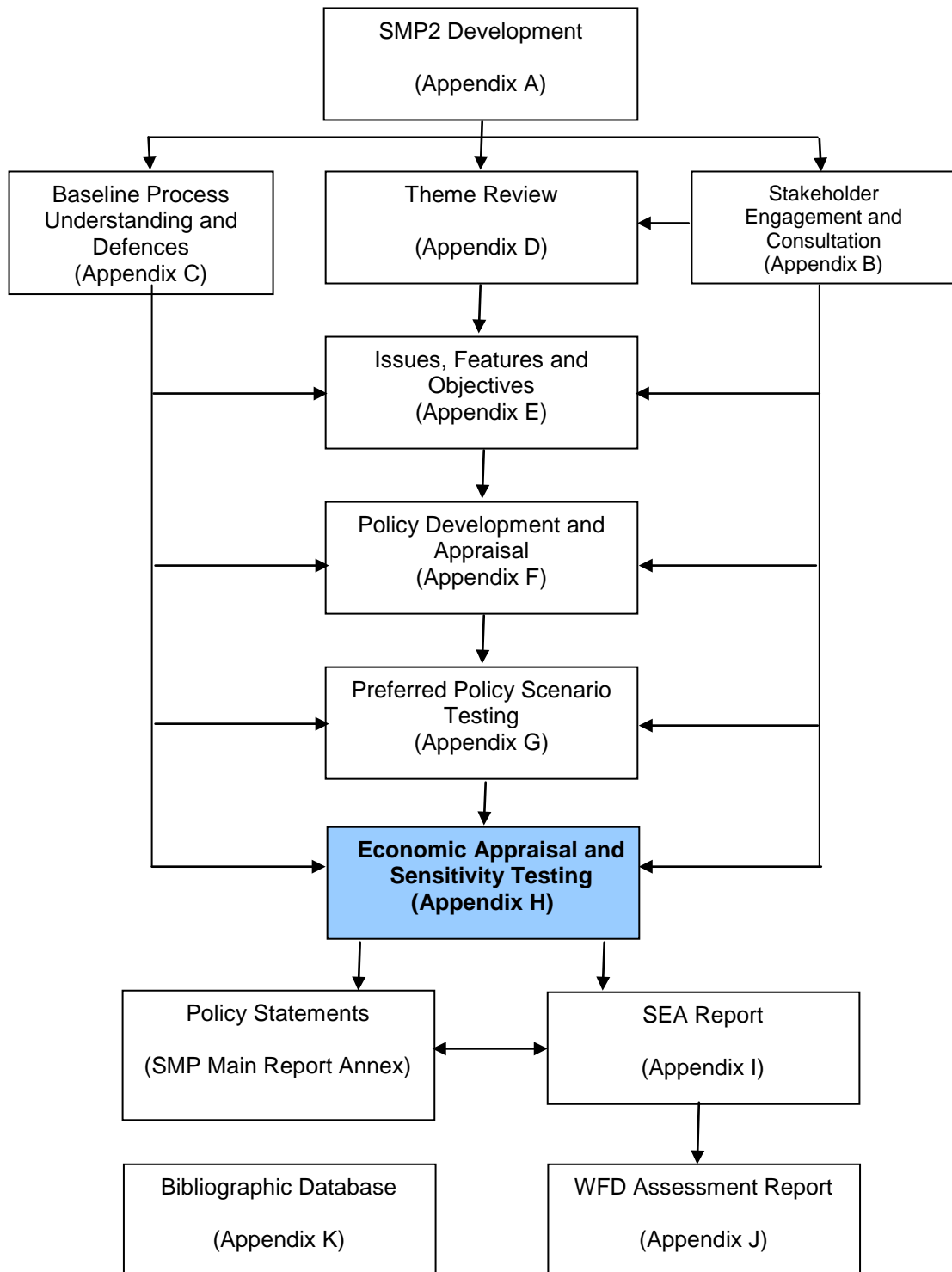
Section	Page
Supporting Appendices	iv
Acronyms and Abbreviations	vi
1. Introduction	1
2. No Active Intervention Damage Assessment	2
2.1 Methodology and Assumptions	2
2.2 Policy Unit Interactions	2
2.3 Assets at Risk	4
2.4 Valuation of Assets at Risk	7
2.5 Economic Damages	10
2.6 Sensitivity Analysis	11
2.7 Risks to people and social vulnerability to flooding	12
2.8 Summary	13
3. Preferred Plan Cost Assessment	14
3.1 Methodology and Assumptions	14
3.2 Cost Estimates	14
4. Comparison of Costs and Benefits	16
4.1 Methodology and Assumptions	16
4.2 Benefit – Cost Assessment	16
Annex A: Economic Damage Spreadsheets	18
List of Tables	
Table 1 - Shoreline interactions between Policy Units	4
Table 2 – Number of properties at risk.	5
Table 3 – Agricultural Land Classification in the study area.	5
Table 4 – Transport Infrastructure at risk.	6
Table 5 – Retail Price Index.	8
Table 6 – Market value of agricultural land.	9
Table 7 – Variable discount rate.	10
Table 8 – Do Nothing Present Value damages.	11
Table 9 – Threshold level sensitivity test.	12
Table 10 – SoP sensitivity test: % change in PVd.	12
Table 11 – Social Flood Vulnerability Index.	13
Table 12 – Summary of damages.	13
Table 13 – Summary of costs.	15

Supporting Appendices

Information required to support the Severn Estuary Shoreline Management Plan Review (SMP2) is provided in the following appendices. These supporting documents offer transparency to the decision making process that is undertaken, leading to explanations and reasoning for the promoted policies.

A: SMP2 Development	The history, structure and development of the SMP are detailed in this report. The investigation and decision making process are explained more fully to outline the procedure to setting policy.
B: Stakeholder Engagement and Consultation	Stakeholder communication is continuous through the SMP2 process, comments on the progress of the management plan are recorded within Appendix B.
C: Baseline Understanding of Coastal Behaviour and Dynamics, Coastal Defences and Baseline Scenario Report	This report includes detail of coastal dynamics, defence data and shoreline scenario assessments of NAI (No Active Intervention – defences are not maintained, repaired or replaced allowing the shoreline to evolve more naturally) and With Present Management (WPM) i.e.: SMP1 Policy.
D: Theme Review	The identification and evaluation of the natural landscape and conservation, the historic environment and present and future land use of the shoreline.
E: Issues, Features and Objectives	The features of the shoreline are listed within this report. A series of strategic objectives are then set along with commentary on the relative importance of each feature identified.
F: Policy Development and Appraisal	Presents the consideration of generic policy options for each frontage identifying possible acceptable policies and their combination into 'Management Approaches' for testing. Also presents the appraisal of impacts upon shoreline evolution and the appraisal of objective achievement.
G: Preferred Policy Scenario Testing	Presents the policy assessment of appraisal of objective achievement towards definition of the Preferred Plan (as presented in the Shoreline Management Plan document).
H: Economic Appraisal and Sensitivity Testing	Presents the economic analysis undertaken in support of the Preferred Plan.
I: Strategic Environmental Assessment Report	Presents the various items undertaken in developing the Plan that specifically relate to the requirements of the EU Council Directive 2001/42/EC (the Strategic Environmental Assessment Directive), such that all of this information is readily accessible in one document. This includes work to help towards a Habitat Regulatory Assessment (HRA).
J: Water Framework Assessment Report	Provides a retrospective assessment of the policies defined under the Severn Estuary SMP2 highlighting future issues for consideration at policy implementation stage.
K: Bibliographic Database	All supporting information used to develop the SMP is referenced for future examination and retrieval.

The information presented in each appendix is supported and guided by other appendices; the broad relationships between the appendices are illustrated overleaf.



Acronyms and Abbreviations

Term	Definition
AA	Appropriate Assessment.
AONB	Area of Outstanding Natural Beauty.
ASERA	Association of Severn Estuary Relevant Authorities
ATL	Advance the Line
BCCPA	Bristol Channel Counter Pollution Association
CAPE	Community Adaptation Planning and Engagement
CCW	Countryside Council for Wales
CD	Chart Datum.
CFMP	Catchment Flood Management Plan
CPSE	Coast Protection Survey England
CSG	Client Steering Group, principal decision-making body for the Shoreline Management Plan = Severn Estuary Coastal Group (SECG)
CV	Capital Value. The actual value of costs or benefits.
DEFRA	Department for Food, Environment and Rural Affairs.
EA	Environment Agency, may also be referred to as 'The Agency'
EH	English Heritage
EMF	Elected Members Forum (SMP2), comprising an Elected Member from each of the Local Authorities
FCDPAG3	Flood and Coastal Defences Project Appraisal Guidance
FCS	Favourable Conservation Status
FRMS	Flood Risk Management Strategy
GCR	Geological Conservation Review site
GIS	Geographic Information System
HAT	Highest Astronomical Tide
HER	Historic Environment Record
HLT	High Level Target
HRA	Habitats Regulations Assessment
HTL	Hold the Line

Term	Definition
ICZM	Integrated Coastal Zone Management
IROPI	Imperative Reasons of Over-riding Public Interest
JAC	Joint Advisory Committee (of the Severn Estuary Partnership)
KSG	Key Stakeholder Group, which acts as a focal point for discussion and consultation through development of the SMP
LAT	Lowest Astronomical Tide
MAFF	Ministry of Agriculture Fisheries and Food (now DEFRA)
MHWN	Mean High Water Neap tide
MHWS	Mean High Water Spring tide
MLWN	Mean Low Water Neap tide
MLWS	Mean Low Water Spring tide
MR	Managed Realignment
MSL	Mean Sea Level
MU	Management Unit
NAI	No Active Intervention
NE	Natural England
NFDCC	National Flood and Coastal Defence Database
NMR	National Monuments Record
NT	National Trust
ODPM	Office of the Deputy Prime Minister
PMG	Project Management Group
PPG	Planning Policy Guidance
PSA	Public Service Agreement
PU	Policy Unit
QRG	Quality Review Group
RBMP	River Basin Management Plan
RCZAS	Rapid Coastal Zone Assessment Survey
SAC	Special Area of Conservation
SCOPAC	Standing Conference on Problems Associated with the Coast

Term	Definition
SEA	Strategic Environmental Assessment
SECG	Severn Estuary Coastal Group = Client Steering Group (CSG)
SEP	Severn Estuary Partnership
SESMP2	Severn Estuary Shoreline Management Plan Review
SMP	Shoreline Management Plan
SMP1	A first-round Shoreline Management Plan
SMP2	A second-round Shoreline Management Plan
SMR	Sites and Monuments Record
SoP	Standard of Protection
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
WAG	Welsh Assembly Government
WFD	Water Framework Directive
WPM	With Present Management

1. Introduction

A review of the economic viability of the preferred plan for each policy unit has been carried out. This economic analysis adheres to the approach recommended in the SMP2 Procedural Guidance.

It should be noted that further detailed economic analysis will be undertaken as part of the Severn Estuary Flood Risk Management Study (SEFRMS) to help justify any specific scheme. This shall be in line with the principles as set out in Defra's Flood and Coastal Defence Project Appraisal Guidance Note 3: Economic Appraisal (FCDPAG3), which has also been adopted by WAG.

This economic review is a top level economic assessment which aims to assess whether or not each policy is:

- Clearly economically viable;
- Clearly not economically viable;
- Of marginal viability.

The aim of this review is to determine to what degree the preferred policy may be justified in economic terms relating to coast protection or flood defence. It must also be recognised that the justification for a particular policy is not necessarily dependant on economic viability alone, as impacts on other benefits may be considered more important (i.e. internationally / nationally designated habitats). Any policies where this is the case may not be considered economically efficient under current treasury guidance.

The following sections detail how the economic assessment was undertaken. This is followed by a series of economic statements for each policy unit or linked policy units, and spreadsheets providing the numerical analysis performed as part of the SMP.

A discussion of sensitivity is provided together with an identification of the approach to assessing the future costs of schemes or maintenance.

2. No Active Intervention Damage Assessment

2.1 Methodology and Assumptions

The economic damage assessment has been produced in accordance with the HM Treasury Guidance, FCDPAG3 and related addendums, the Flood Hazard Research Centre's Multi-Coloured Manual (2005) and the latest Defra guidance. Performance and residual life of the flood and coastal protection defences was based on the findings of SMP2 Task 2.2 (see Appendix C).

It is assumed that for No Active Intervention (NAI), once the weakest section of defence fails, total progressive failure occurs as all flood and coastal risk management activities are abandoned. No costs are incurred. Flooding (for eight Annual Exceedance Probability (AEP) events ranging from 100% to 0.1% AEP) and erosion extents (based on Task 2.2) have been used to determine damages over time, using four points in time (years 2005, 2025, 2055 and 2105). Flood extent was estimated by projecting the relevant extreme water level across the floodplain and carrying out a check on the physical limitation of flooding volumes. The damages related to erosion and flooding were assessed in a combined manner, although flooding is by far the predominant source of damage within the Severn Estuary.

2.2 Policy Unit Interactions

Some stretches of shoreline (**Policy Unit**) are linked to adjacent Policy Units because they fall within a similar shoreline behaviour unit (possessing similar landforms or coastal processes, have similar geology and have similar patterns of erosion). Some Policy Units are linked because coastal flooding in one Policy Unit would have an impact on another. **Appendix G** describes this inter-linked relationship in more detail.

For the purpose of the Economics assessment linked policy units have been grouped together as the impact of flooding/erosion would impact on all units within that group. When assessing the economic implications of a selected policy option for linked Policy Units, the way in which they are linked needs to be taken into account so that the choice of policy option in one does not have a negative impact on the other Policy Units to which it is linked. **Table 1** shows all the Policy Units in the SMP2 area and which ones are linked.

Policy Unit	Geomorphological Process Linkage	Flood Cell Linkage	Combined Processes	Comments
PEN1	PEN1-2 linked	No linkages	PEN1-2 linked	The cliff frontage supplies sediment to Penarth beach.
PEN2		No linkages		
CAR1	No linkages	CAR1-2 linked	CAR1-3, WEN1-2 linked	The Cardiff Flats and right bank of the River Rhymney are linked floodplains. The River Rhymney banks interact geomorphologically. The left bank of River Rhymney connects to the Wentlooge floodplain.
CAR2	CAR2-3, WEN1-2 linked.	CAR3, WEN1-2 linked		
CAR3				
WEN1				
WEN2				
NEW1	NEW1-2 linked	NEW1-2 linked	NEW1-2 linked	Tidally dominated River Usk with linkage through to the Wentlooge floodplain. River Usk left bank throughout this reach is linked due to fluvial-tidal sediment transport processes.
NEW2				
NEW3	No linkages	No linkages	No linkages	Fluvial River Usk region.

Policy Unit	Geomorphological Process Linkage	Flood Cell Linkage	Combined Processes	Comments
NEW4	NEW4-5 linked	NEW4-5, CALD1 linked	NEW4-5, CALD1 linked	Tidally dominated River Usk with floodplain linkage through to the Caldicot floodplain. River Usk left bank throughout this reach is linked due to fluvial-tidal sediment transport processes.
NEW5				
CALD1	No linkages	No linkages	No linkages	
CALD2	No linkages	No linkages	No linkages	High ground and rocky promontories.
CALD3	No linkages	No linkages	No linkages	Self contained floodplain with promontories.
WYE1	No linkages	WYE1, 3-4 linked	WYE1, 3-4 linked	Tidally dominated River Wye with connected floodplains and hard geology banks.
WYE3	No linkages			
WYE4	No linkages			
WYE2	No linkages	No linkages	No linkages	Fluvial River Wye with no floodplain and hard geology banks..
TID1	No linkages	No linkages	No linkages	Self contained floodplains, with promontories at Beachley Point and Guscar Rocks.
TID2	No linkages	TID2, LYD1 linked	TID2, LYD1 linked	Lydney Harbour connected to Lydney floodplain.
LYD1	No linkages			
GLO1	GLO1-2 linked	No linkages	GLO1-2 linked	Tidal-fluvial region of the Severn Estuary, with left and right bank geomorphological interaction and significant meanders. Due to the increasing dominance of fluvial processes, management of flood risk has the potential to have wider impacts.
GLO2		No linkages		
GLO3	GLO3-5, SHA3-5 linked	No linkages	GLO3-5, SHA3-7 linked	
GLO4		No linkages		
GLO5		No linkages		
SHA3		SHA3-7 linked		
SHA4				
SHA5				
SHA6		SHA6-7 linked		
SHA7				
GLO6	No linkages	GLO6-8, SHA1-2 linked	GLO6-8, SHA1-2 linked	
GLO7	No linkages			
GLO8	No linkages			
SHA1	No linkages			
SHA2	No linkages			
MAI1	MAI1-6 linked	MAI1-6 linked	MAI1-6 linked	
MAI2				
MAI3				
MAI4				
MAI5				
MAI6				
SHA8	No linkages	No linkages	No linkages	Hard coastline and high ground.
SEV1	SEV1-3 linked	SEV1-6 linked	SEV1-6 linked	Upper Avon Levels floodplain is all inter-linked. Sediment transport processes are partially constrained by rocky outcrops and man-made features (Sharpness Docks, Oldbury Power Station tidal reservoir and Severn Road Bridge).
SEV2				
SEV3	No linkages			
SEV4	SEV5-6 linked			
SEV5				
SEV6				
BRIS1	No linkages	BRIS1-5	BRIS1-5	Lower Avon Levels floodplain is all inter-linked.

Policy Unit	Geomorphological Process Linkage	Flood Cell Linkage	Combined Processes	Comments
BRIS2	BRIS2-3 linked	linked	linked	Sediment transport processes are partially constrained by rocky outcrops and man-made features (Severn Road Bridge, Second Severn Crossing and Avonmouth Docks jetties).
BRIS3				
BRIS4	BRIS4-5 linked			
BRIS5				
BRIS6	No linkages	No linkages	No linkages	Self-contained floodplain with promontories.
PORT1	No linkages	No linkages	No linkages	Hard coastline and high ground.
PORT2	PORT2-4 linked	No linkages	PORT2-4 linked	Hard coastline with sediment transport links. High ground.
PORT3		No linkages		
PORT4		No linkages		
KIN2	No linkages	No linkages	No linkages	Hard coastline and high ground.
KIN1	No linkages	KIN1, 3 linked	KIN1, 3-4 linked	Somerset Levels floodplain is all inter-linked. Sediment transport processes within bays are interrupted by hard geology promontories.
KIN3	KIN3-4 linked			
KIN4		No linkages		
HOL1	No linkages	No linkages	No linkages	Hard coastline with sediment transport links. High ground.
HOL2	No linkages	No linkages	No linkages	Hard coastline with sediment transport links. High ground.

Table 1 - Shoreline interactions between Policy Units

2.3 Assets at Risk

2.3.1 Property

Within the SMP2 study boundaries there are approximately 80,000 properties at risk. These comprise of an estimated 72,000 residential properties and 8,000 non-residential properties. Table 2 shows the breakdown of these properties.

Linked Policy Units	Number of residential properties	Number of non-residential properties	Total
PEN1-2	Minimal	Minimal	Minimal
CAR1-3, WEN1-2	8,683	528	9,211
NEW1-2	2,599	730	3,329
NEW3	50	Minimal	50
NEW4-5, CALD1	8,944	1,170	10,114
CALD2	Minimal	Minimal	Minimal
CALD3	4,349	181	4530
WYE1, 3, 4	Minimal	Minimal	Minimal
WYE2	Minimal	Minimal	Minimal
TID1	Minimal	Minimal	Minimal
TID2, LYD1	1635	233	1868

Linked Policy Units	Number of residential properties	Number of non-residential properties	Total
GLO1-2	Minimal	Minimal	Minimal
GLO3-5, SHAR3-7	981	120	1,101
GLO6-8, SHAR1-2	102	9	111
MAI1-6	51	75	126
SHAR8	Minimal	Minimal	Minimal
SEV1-6	1,043	149	1,192
BRIS1-5	3,654	924	4,578
BRIS6	5,186	546	5,732
PORT1	Minimal	Minimal	Minimal
PORT2-4	Minimal	Minimal	Minimal
KIN2	Minimal	Minimal	Minimal
KIN1, 3-4	35,441	3,077	38,518
HOL1	Minimal	Minimal	Minimal
HOL2	Minimal	Minimal	Minimal

Table 2 – Number of properties at risk.

2.3.2 Agricultural land

The land use for over 69% of the study area is agricultural, of which the vast majority is of Grade 3 quality, with very small areas of land of Grade 1 and 5 quality; as shown in Table 3.

Agricultural Land Grade	Area at risk (km ²)
1	2
2	27
3	347
4	56
5	1
Total	433

Table 3 – Agricultural Land Classification in the study area.

2.3.3 Transport links

There are a number of major transport links at risk, as displayed in Table 4. There are also a number of smaller but critical local routes such as the B4239 and B4071 which, despite being minor roads which carry relatively low traffic volumes are locally important, the loss of which would cause a significant level of disruption to local communities.

Transport link at risk	Potential length affected (km)
Mainline railway between Cardiff and Newport	24.8
B4239 (critical local route)	12.5
A455	3.8
M4	6.5
Local railway link between Chepstow and Caldicot	8.0
A48	1.3
B4071 (critical local route)	1.0
Local railway to Severn Beach	8.1
Mainline railway to Wales	2.4
A403	10.6
A5	2.2
M49	7.6
M48	1.9
A369	3.4
Mainline railway between Bristol and Exeter	6.9
A370	11.5
A371	1.3
M5	4.1

Table 4 – Transport Infrastructure at risk.

2.3.4 Recreation and Environmental Sites

Recreational benefits or losses will not be calculated since these are thought to contribute only a very small proportion of the total damages within the study area. The impact of flooding and erosion on environmental sites will be analysed in the Strategic Environmental Assessment.

2.3.5 Receptors Vulnerable to Flooding

The Environment Agency's Receptors Vulnerable to Flooding Database was interrogated to assess the potential impact on key infrastructure assets such as water treatment plants, electricity sub stations and schools. This analysis indicated that at the 0.1% AEP event in 2005 the following assets would be at risk:

- 18 telephone exchanges;
- 20 water and sewage treatment works;
- 139 schools;
- 25 railway stations;
- 538 electricity sub-stations;

- 7 hospitals;
- 43 emergency response centres; and,
- 122 care homes.

2.3.6 Other

There are a number of other significant assets within the study area at risk of flooding and erosion, these include:

- The Severn Railway Tunnel;
- Major power transmission lines (275kV and 400kV) across the Gwent Levels and Somerset Levels. The Gwent Levels transmission lines provide electricity to much of South Wales from Newport to Swansea. The Somerset Levels transmission lines form part of the Hinkley Point – Melksham system.
- Avonmouth, Portbury, Portishead, Lydney, Newport and Gloucester docks.

It should also be noted that whilst the Oldbury and Hinkley Point Nuclear Power Stations are at risk of becoming isolated under the NAI scenario as defences fail and the surrounding land becomes flooded and erodes.

2.4 Valuation of Assets at Risk

2.4.1 Identification of property type

The National Property Database (NPD), provided by the Environment Agency in 2008, has been used to identify all of the residential and non-residential (NRP) properties within the flood risk area. Although a more recent edition of the NPD has been produced, this was not made available in time for inclusion in this assessment. We have therefore used the NPD provided in 2008.

Using the FOCUS property type code provided in the NPD, the property use could be looked up in the FOCUS-MCM Indicative depth-damage spreadsheet to determine its equivalent MCM code. Where no FOCUS property type code was provided for NRP a weighted average for NRP was applied.

2.4.2 Depth-damage calculations

Residential Properties

Damages for residential properties have been taken from the Flood Hazard Research Centre's (FHRC) Multi-Coloured Manual (MCM). The MCM contains depth-damage data for a range of residential and non-residential property types. This enables specific depth-damage calculations to be made according to the type and age of a property. It was considered most appropriate to use the weighted average of residential properties to represent all residential properties in the at risk areas and to avoid the issue of social distributional impacts, as this is a high level study.

Non-Residential Properties

The depth-damage data for the NRP's is based on the figures published in the MCM. MCM data for NRP's is provided in damages per m². As a high level study, and due to the large number of properties in the study area, an average floor area for each NRP type has been calculated using statistics from the Communities and Local Government, rather than using property areas specific to each NRP provided in the NPD. The depth-damage statistics are quoted at 2005 prices; these

have therefore been increased to reflect 2008 prices using the Retail Price Index (RPI) over the past 12 months (see Table 5).

Month / Year	RPI (CHAW)	Month / Year	RPI (CHAW)
08 / 2007	207.3	02 / 2008	211.4
09 / 2007	208	03 / 2008	212.1
10 / 2007	208.9	04 / 2008	214
11 / 2007	209.7	05 / 2008	215.1
12 / 2007	210.9	06 / 2008	216.8
01 / 2008	209.8	07 / 2008	216.5
		Average	211.7

Table 5 – Retail Price Index.

2.4.3 Capital Value of residential and non-residential properties

Property capital values have been derived from those provided in the NPD, with the exception of approximately 20% of NRPs for which no capital value was provided. Capital values for these properties are based on average floorspace and rateable value figures for the south-west published by Communities and Local Government, and equivalent yields published by the Environment Agency.

2.4.4 Transport Infrastructure

Costs associated with damage to the transport network will be confined to estimating write-off values for key transport links under No Active Intervention. Given the scale of the study it was not felt appropriate to estimate losses associated with temporary disruption of transport networks. Where No Active Intervention results in significant or permanent flood or erosion risk to a traffic route, this will result in write-off of the road. It has been assumed that the cost of building a new motorway is £14 million per kilometre, and a new dual carriageway £7 million per kilometre (Hansard, 2005). The write-off value for railway lines has been derived from Chapter 6 of the MCM, a case study of damages associated with the Paddington to South Wales Inter-City rail link and Midlands regional railway which cross the Gwent Levels. In this case study it is argued that the option for re-laying the track away from flood or erosion risk would take at least 20 years and include a convoluted process of negotiating wayleaves and Acts of Parliament. Therefore, the logical response to No Active Intervention is to raise the track and armour the embankments against future slippage, and protect against wave scour. This was estimated to cost £3.6 million per kilometre to include for track, earthworks, structures, signalling and telecommunications equipment. This study has applied the value of £3.6 million per kilometre; although it is accepted this value may underestimate the true cost at today's prices.

2.4.5 Agricultural Land

Agricultural damages have been calculated following Defra guidance, and applying average market values by agricultural grade provided in the MCM. Under NAI we have assumed that agricultural land is written off since the progressive ingress of saline water would make the land

unsuitable for agriculture. Table 6 contains the market and write-off values applied in this assessment.

Agricultural Land Grade	Approximate market value (£/ha)	Write-off value (£/ha)
1	6,890	6,290
2	6,890	6,290
3	7,650	7,050
4	5,100	4,500
5	5,100	4,500

Table 6 – Market value of agricultural land.

2.4.6 Other Assets

Avonmouth and Royal Portbury Docks

This assessment has utilised the Avonmouth to Aust Tidal Defence Scheme (2006) analysis to provide a write-off value for the Avonmouth and Royal Portbury Docks. Bristol Port Authority has invested over £330 million in Royal Portbury and Avonmouth Docks. It is estimated that as Royal Portbury is the newer of the two docks two-thirds of this value will have been invested there. Of the £110 million that is invested in the Avonmouth Dock it is estimated that approximately £70 million is already accounted for in the values provided by the NPD. The assumption, consequently, is that the value in the dock infrastructure is in the region of £40 million.

Major electricity transmission lines

Damages incurred from flooding of the electricity transmission lines on the Gwent levels which supply electricity to much of South Wales have been derived from Chapter 6 of the MCM, and applied in the same manner as in the Gwent Levels Foreshore Management Plan (Atkins, 2004). Damages can be separated between costs associated with disruption in the supply of electricity, and the cost of re-routing the lines under a permanent flooding scenario. For each repeat flood event (assuming an outage of 28 days), the cost to consumers in South Wales is estimated to be £49.1 million (2005 prices), whilst re-routing costs are estimated at £140 million. The total damages that would be generated across a 100 year time horizon, following a breach event, would be above the write-off value of the assets. Consequently this study has capped losses for NAI at the costs of re-routing the transmission lines. A nominal figure to cover any disruption damages has also been included in the write-off damages, assuming that supply will be disrupted for a period of 3 months at a cost of approximately £1.8 million a day, equalling to £147.3 million. The total write-off value of £287.3 million has been split equally between the Wentlooge and Caldicot Levels.

2.4.7 Calculation of Average Annual Damages, Write-off and capping

Average annual damage (AAD) figures were calculated across the 100 year appraisal period, based on the four time horizons (2005, 2025, 2055 and 2105) with AAD's interpolated between these years. The AAD's were used to determine present value damages (PVDs) over the 100 year appraisal period. Where properties are shown to have damages above their capital value, based on the discounted value of the property specific AAD over the 100 year time horizon, it has been assumed that the property should be abandoned and has been written off. The year of write-off has been taken at the point where the probability of breach or being eroded is 1 (i.e. it is a certainty).

2.4.8 Discounting

Damages were discounted using the HM Treasury recommended rates, as published in the Green Book and given in Table 7. Discounting will have the effect of reducing the value of damages that are incurred in the future.

Year	Discount Rate (%)
0-30	3.5
31-75	3
76-100	2.5

Table 7 – Variable discount rate.

2.5 Economic Damages

The Present Value economic damages are summarised in Table 8. The following assumptions have been made in calculating the economic damages:

- Property threshold levels have been derived by adding 0.3m to the LiDAR ground levels;
- Flood event duration has been assumed to be less than 12 hours;
- The cost to emergency services has been included at 10.7% of the property event damages;
- A 10% increase in damages to residential building fabric has been included due to the increased costs associated with saltwater damage, as recommended by the MCM;
- Temporary accommodation costs are based on the average time out of a flooded property of 22 weeks, as stated in the MCM. The average rental value for the south-west of £495 per month, derived from the Communities and Local Government website was applied; and,
- No measure of non-residential temporary accommodation has been included.

Linked Policy Units	Residential PVd (£k)	NRP PVd (£k)	Property Write-off (£k)	Total Write-off (£k)	Total PVd (£k)
PEN1-2	Minimal	Minimal	Minimal	Minimal	Minimal
CAR1-3, WEN1-2	194,852	46,795	871,440	1,157,213	568,415
NEW1-2	25,191	20,264	215,261	215,303	176,688
NEW3	Minimal	Minimal	Minimal	Minimal	1,072
NEW4-5, CALD1	53,438	92,644	1,185,865	1,462,374	1,134,868
CALD2	Minimal	Minimal	Minimal	Minimal	Minimal
CALD3	42	5,585	1,509	17,250	9,738
WYE1, 3, 4	Minimal	Minimal	Minimal	Minimal	Minimal
WYE2	Minimal	Minimal	Minimal	Minimal	Minimal
TID1	Minimal	Minimal	Minimal	Minimal	Minimal
TID2, LYD1	903	2,274	10,212	31,876	10,005
GLO1-2	Minimal	Minimal	Minimal	Minimal	Minimal

Linked Policy Units	Residential PVd (£k)	NRP PVd (£k)	Property Write-off (£k)	Total Write-off (£k)	Total PVd (£k)
GLO3-5, SHAR3-7	75,222	5,998	64,784	135,862	123,763
GLO6-8, SHAR1-2	10,198	394	7,842	54,132	23,519
MAI1-6	2,675	4,917	3,235	18,287	18,037
SHAR8	Minimal	Minimal	Minimal	Minimal	Minimal
SEV1-6	16,023	1,300	63,093	101,648	45,722
BRIS1-5	147,901	72,916	529,116	923,709	460,533
BRIS6	206,968	19,514	45,123	78,814	268,297
PORT1	Minimal	Minimal	Minimal	Minimal	Minimal
PORT2-4	Minimal	Minimal	Minimal	Minimal	Minimal
KIN2	Minimal	Minimal	Minimal	Minimal	Minimal
KIN1, 3-4	119,195	110,310	4,554,114	4,756,904	3,172,358
HOL1	Minimal	Minimal	Minimal	Minimal	Minimal
HOL2	Minimal	Minimal	Minimal	Minimal	Minimal

Table 8 – Do Nothing Present Value damages.

2.6 Sensitivity Analysis

The critical uncertainties with respect to policy are highlighted and discussed in the Main Report of the SMP2. With respect to the economics, there is recognised uncertainty particularly in relation to erosion rates and possible timing of required works. Such uncertainty affects both the timing of the occurrence of damages and when works might be required. As such these aspects tend to balance in the economics.

Certainly within the scope of the SMP2, to assess the likely affordability and overall sustainability of policies such issues of timing are already accounted for. Clearly in terms of actual loss and hence planning of individual situations, timing may be quite important and the SMP2 has recommended monitoring to improve information.

Where the preferred policy changes from present management, the tables that follow allow comparison of the economics associated with this change. This highlights, purely from an economic perspective, the sensitivity of decisions being made.

2.6.1 Property threshold levels

Property threshold levels have been based on ground levels extracted from filtered LiDAR data for the area with an average increase of 0.3m. To test the sensitivity of the results to this assumption we have increased and decreased threshold levels by 0.3m for an example group of policy units. Table 9 contains the results of this test.

Linked Policy Units	Total PVd (£k) Baseline	Total PVd (£k) -0.3m threshold level	% Change	Total PVd (£k) +0.3m threshold level	% Change
TID2, LYD1	10,005	13,363	34%	8,150	-19%
BRIS6	268,297	301,945	13%	240,209	-10%

Table 9 – Threshold level sensitivity test.

2.6.2 Standard of Protection

The Standard of Protection (SoP) of defences (i.e. the extreme event under which they would breach) can vary significantly dependent on detailed geometry and climate change predictions. To assess the likely range of variation, the SoP was varied by $\pm 50\%$. The effect of the variation is summarised in Table 10 for an example group of policy units. It is apparent that the estimated economic damages are not sensitive to this level of variation in SoP.

Linked Policy Units	50% reduction in SoP	50% increase in SoP
CAR1-3, WEN1-2	8	0
CALD1-3	-4	0
TID2, LYD1	-3	0
SEV1-6	6	0
BRIS1-5	9	-3
BRIS6	0	0
KIN1, 3-4	0	0

Table 10 – SoP sensitivity test: % change in PVd.

2.7 Risks to people and social vulnerability to flooding

The potential impact of flooding and erosion on communities in this study area is significant. In the 0.1% AEP event in 2008 there are an estimated 80,000 residential properties at risk of flooding, putting approximately 189,000 people at risk (based on the average of 2.36 people per household derived from the 2001 census).

As well as the distress experienced during and following flooding, people have to cope with the time, effort and cost of cleaning up and making repairs. Some people may also have the disruption of living in temporary accommodation. This can cause people to suffer from extreme stress and can result in illness. Specific groups of people will be more vulnerable than others to these effects of flooding. We have assessed how vulnerable the population is to flooding incidents by using the Flood Hazard Research Centre's Social Flood Vulnerability Index (SFVI).

The SFVI is a national dataset that covers the whole of England and Wales, and categorises vulnerability by output areas based on the latest survey information and aims to identify communities that are most vulnerable to the adverse health and social effects associated with floods. A SFVI of 1 is very low social vulnerability to flooding, whilst a SFVI of 5 is very high social vulnerability to flooding.

The factors used to define vulnerability to flooding are:

- people aged 75 and over;

- people suffering from long term limiting illnesses;
- lone parent households; and,
- financially deprived households (unemployment, overcrowding, non-car ownership, non-home owning).

The first three variables are directly available from census data. The financial deprivation is represented by the Townsend Index, which uses unemployment, overcrowding, non-car ownership and non home ownership as indicators. This index was created in the context of a “broad-scale” approach to the assessment of vulnerability and cannot be used for more detailed applications. Five resulting categories of risk are defined ranging from very low to very high vulnerability. From Table 11 there are clearly a number of areas in the study area with an SFVI rating of 4 or 5; these are predominantly found in Weston-Super-Mare, Newport, Cardiff, Aylburton, west of Gloucester and Avonmouth.

Social Flood Vulnerability Index (SFVI)	Number of Wards	Approximate total population
1	2	725
2	82	26,086
3	611	183,224
4	298	82,263
5	6	1348

Table 11 – Social Flood Vulnerability Index.

2.8 Summary

Under the NAI policy a large part of the study area would suffer significant flooding with some erosion and would no longer be a viable centre for business and habitation.

The Present Value damage associated with this option over a hundred year horizon is estimated at £6 billion. Table 12 summarises the economic damage assessment. Further details of the economic damage assessment are given in Annex A.

Economic Damage Summary	
PVd	£6,011,942k
Total write-off value	£8,953,373k
Property write-off	£7,551,594k
Infrastructure and agriculture write-off	£1,401,778k
Number of residential properties written off	41,085
Number of non-residential properties written off	5,392

Table 12 – Summary of damages.

3. Preferred Plan Cost Assessment

3.1 Methodology and Assumptions

Several assumptions have been made in the estimation of defence costs, as set out in the SMP2 guidance:

- Costs are calculated in line with SMP2 Procedural Guidance, Appendix C.
- An allowance for increase in maintenance and construction costs due to climate change was applied: for epoch 20-50 years costs were factored up by 1.5; for epoch 50-100 years costs factored up by 2.0.
- A 60% optimism bias has been applied to all costs to reflect uncertainty in broad level analysis at the SMP scale.
- Estimates of coastal erosion risk and coastal flood risk are made from current best knowledge and understanding (using published data up to June 2009 only).

3.2 Cost Estimates

The following Table 13 outlines the preferred plan indicative costs for the study area. Further details of the cost assessment are given in Annex B.

Linked Policy Units	Indicative Present Value Costs (£k)
PEN1-2	0
CAR1-3, WEN1-2	24,259
NEW1-2	9,469
NEW3	417
NEW4-5, CALD1	36,673
CALD2	0
CALD3	4,763
WYE1, 3, 4	0
WYE2	0
TID1	0
TID2, LYD1	1,589
GLO1-2	842
GLO3-5, SHAR3-7	15,967
GLO6-8, SHAR1-2	5,915
MAI1-6	4,483
SHAR8	0
SEV1-6	15,132

Linked Policy Units	Indicative Present Value Costs (£k)
BRIS1-5	58,379
BRIS6	5,954
PORT1	0
PORT2-4	0
KIN2	0
KIN1, 3-4	3,855
HOL1	0
HOL2	0

Table 13 – Summary of costs.

4. Comparison of Costs and Benefits

4.1 Methodology and Assumptions

This SMP does not offer a full economic assessment, a formal benefit – cost ratio assessment has not been undertaken; rather, the information available has been used to review the ‘robustness’ of the preferred plan. It is however still useful, in comparing likely benefits and likely costs for the policies over the full 100 year period, to be able to consider these in terms of Present Value (PV). It has been assumed that

- NAI incurs no costs, although there would be some minimal expenditure required to address health and safety requirements.
- Maximum benefits are achieved i.e. all damages are avoided.

The SEFRMS will provide more specific economic detail to support any future implementation approach.

4.2 Benefit – Cost Assessment

The following Table 14 outlines the preferred plan indicative costs for the study area. It is apparent that for the majority of linked policy units, the preferred plan is clearly economically viable. However, the linked policy units of NEW3, CALD3, GLO6-8, SHAR1-2, MAI1-6 and SEV1-6, have indicative benefit cost ratios of below 5, which is close to marginal economic viability.

Linked Policy Units	Indicative Benefit-Cost Ratio
PEN1-2	NA
CAR1-3, WEN1-2	23
NEW1-2	19
NEW3	2
NEW4-5, CALD1	31
CALD2	NA
CALD3	2
WYE1, 3, 4	NA
WYE2	NA
TID1	NA
TID2, LYD1	6
GLO1-2	NA
GLO3-5, SHAR3-7	8
GLO6-8, SHAR1-2	4
MAI1-6	4
SHAR8	NA
SEV1-6	3

Linked Policy Units	Indicative Benefit-Cost Ratio
BRIS1-5	8
BRIS6	45
PORT1	NA
PORT2-4	NA
KIN2	NA
KIN1, 3-4	823
HOL1	NA
HOL2	NA

Table 14 – Summary of BCR.

Annex A: Economic Damage Spreadsheets

Client/Authority										Sheet Nr.		CAR1-3, WEN1-2					
SECC																	
Project name										Option:							
SEMP2										No Active Intervention							
Project reference										AAD Year 0		AAD Year 19		AAD Year 49		AAD Year 99	
5078599										0		19		49		99	
Q3 2008										439		857		11,158		60,275	
Ek										221		442		3,604		5,968	
Residential property										648		1,296		10,006		14,855	
Ind/commercial (direct)										0		0		0		0	
Temp Acc + Clean Up										71		139		1,579		7,088	
Traffic related										0		0		0		0	
Emergency services										0		0		0		0	
Agricultural										1,379		2,734		26,347		88,185	
PV Total Damage										568,415						Ek	
Property Write-off										1,157,214						Ek	
										E		1,157,214		E		- E 568,415	
Year	Discount Factor	Residential property AAD	Ind/commercial AAD	Temp Acc + Clean Up	Traffic related AAD	Emergency services AAD	Property Write-off			PV damages							
0	1.000	194,852	46,795	64,195	-	27,451	-	-	-	-							
1	0.996	439	221	648	-	71	-	-	0	1379							
2	0.994	436	233	662	-	74	-	-	0	1377							
3	0.992	434	245	676	-	78	-	-	0	1375							
4	0.990	435	256	750	-	81	-	-	0	1374							
5	0.871	438	268	785	-	85	-	-	0	1373							
6	0.842	445	279	819	-	89	-	-	0	1373							
7	0.814	453	291	853	-	92	-	-	0	1374							
8	0.786	465	303	887	-	96	-	-	0	1376							
9	0.759	479	314	921	-	99	-	-	0	1378							
10	0.734	497	326	955	-	103	-	-	0	1380							
11	0.709	517	338	989	-	107	-	-	0	1383							
12	0.685	541	349	1,023	-	110	-	-	0	1386							
13	0.662	568	361	1,057	-	114	-	-	0	1390							
14	0.639	598	372	1,092	-	117	-	-	0	1394							
15	0.618	632	384	1,126	-	121	-	-	0	1398							
16	0.597	670	396	1,160	-	125	-	-	0	1403							
17	0.577	711	407	1,194	-	128	-	-	0	1407							
18	0.557	756	419	1,228	-	132	-	-	0	1412							
19	0.538	804	430	1,262	-	135	-	-	0	1417							
20	0.520	857	442	1,296	-	139	-	-	0	1422							
21	0.503	1,002	547	1,592	-	174	-	-	0	1666							
22	0.486	1,160	653	1,888	-	209	-	-	0	1898							
23	0.469	1,330	758	2,183	-	246	-	-	0	2119							
24	0.453	1,514	864	2,478	-	283	-	-	0	2329							
25	0.438	1,711	969	2,772	-	322	-	-	0	2529							
26	0.423	1,921	1,074	3,066	-	361	-	-	0	2718							
27	0.409	2,144	1,180	3,360	-	401	-	-	0	2897							
28	0.395	2,381	1,285	3,653	-	442	-	-	0	3066							
29	0.382	2,631	1,391	3,946	-	484	-	-	0	3226							
30	0.369	2,895	1,496	4,238	-	527	-	-	0	3377							
31	0.356	3,173	1,601	4,530	-	571	-	-	0	3518							
32	0.346	3,464	1,707	4,822	-	616	-	-	0	3670							
33	0.336	3,769	1,812	5,113	-	662	-	-	0	3814							
34	0.326	4,088	1,918	5,404	-	708	-	-	0	3951							
35	0.317	4,421	2,023	5,695	-	756	-	-	0	4082							
36	0.307	4,768	2,128	5,985	-	804	-	-	0	4206							
37	0.298	5,130	2,234	6,274	-	854	-	-	0	4324							
38	0.290	5,505	2,339	6,564	-	904	-	-	0	4436							
39	0.281	5,895	2,445	6,853	-	955	-	-	0	4543							
40	0.273	6,300	2,550	7,141	-	1,008	-	-	0	4642							
41	0.265	6,719	2,655	7,430	-	1,061	-	-	0	4736							
42	0.257	7,152	2,761	7,717	-	1,115	-	-	0	4825							
43	0.250	7,601	2,866	8,005	-	1,169	-	-	0	4908							
44	0.243	8,064	2,972	8,292	-	1,225	-	-	0	4986							
45	0.236	8,542	3,077	8,579	-	1,282	-	-	0	5059							
46	0.229	9,035	3,182	8,865	-	1,340	-	-	0	5127							
47	0.222	9,543	3,288	9,151	-	1,398	-	-	0	5191							
48	0.216	10,066	3,393	9,436	-	1,458	-	-	0	5249							
49	0.209	10,604	3,499	9,721	-	1,518	-	-	0	5304							
50	0.203	11,158	3,604	10,006	-	1,579	1,157,214	-	0	240477							
51	0.197	11,727	3,651	-	-	1,667	-	-	0	3362							
52	0.192	12,311	3,699	-	-	1,756	-	-	0	3402							
53	0.186	12,911	3,746	-	-	1,845	-	-	0	3440							
54	0.181	13,527	3,793	-	-	1,936	-	-	0	3476							
55	0.175	14,159	3,840	-	-	2,027	-	-	0	3510							
56	0.170	14,806	3,888	-	-	2,119	-	-	0	3542							
57	0.165	15,469	3,935	-	-	2,212	-	-	0	3571							
58	0.160	16,148	3,982	-	-	2,307	-	-	0	3599							
59	0.156	16,844	4,029	-	-	2,402	-	-	0	3624							
60	0.151	17,555	4,077	-	-	2,498	-	-	0	3648							
61	0.147	18,283	4,124	-	-	2,594	-	-	0	3670							
62	0.143	19,027	4,171	-	-	2,692	-	-	0	3690							
63	0.138	19,788	4,219	-	-	2,791	-	-	0	3708							
64	0.134	20,565	4,266	-	-	2,890	-	-	0	3724							
65	0.130	21,358	4,313	-	-	2,991	-	-	0	3738							
66	0.127	22,169	4,360	-	-	3,092	-	-	0	3751							
67	0.123	22,996	4,408	-	-	3,195	-	-	0	3761							
68	0.119	23,840	4,455	-	-	3,298	-	-	0	3771							
69	0.116	24,701	4,502	-	-	3,402	-	-	0	3778							
70	0.112	25,579	4,549	-	-	3,507	-	-	0	3784							
71	0.109	26,474	4,597	-	-	3,613	-	-	0	3788							
72	0.106	27,387	4,644	-	-	3,720	-	-	0	3791							
73	0.103	28,316	4,691	-	-	3,828	-	-	0	3792							
74	0.100	29,263	4,739	-	-	3,937	-	-	0	3792							
75	0.097	30,228	4,786	-	-	4,047	-	-	0	3790							
76	0.094	31,210	4,833	-	-	4,157	-	-	0	3787							
77	0.092	32,210	4,880	-	-	4,269	-	-	0	3802							
78	0.090	33,227	4,928	-	-	4,381	-	-	0	3814							
79	0.087	34,263	4,975	-	-	4,495	-	-	0	3826							
80	0.085	35,316	5,022	-	-	4,609	-	-	0	3836							
81	0.083	36,387	5,069	-	-	4,724	-	-	0	3846							
82	0.081	37,476	5,117	-	-	4,840	-	-	0	3854							
83	0.079	38,584	5,164	-	-	4,957	-	-	0	3860							
84	0.077	39,710	5,211	-	-	5,075	-	-	0	3866							
85	0.075	40,854	5,258	-	-	5,194	-	-	0	3871							
86	0.074	42,016	5,306	-	-	5,314	-	-	0	3874							
87	0.072	43,197	5,353	-	-	5,435	-	-	0	3876							
88	0.070	44,397	5,400	-	-	5,557	-	-	0	3878							
89	0.068	45,615	5,448	-	-	5,679	-	-	0	3878							
90	0.067	46,852	5,495	-	-	5,803	-	-	0	3877							
91	0.065	48,108	5,542	-	-	5,927	-	-	0	3876							
92	0.063	49,383	5,589	-	-	6,052	-	-	0	3873							
93	0.062	50,677	5,637	-	-	6,178	-	-	0	3869							
94	0.060	51,990	5,684	-	-	6,306	-	-	0	3865							
95	0.059	53,322	5,731	-	-	6,434	-	-	0	3859							
96	0.057	54,674	5,778	-	-	6,563	-	-	0	3853							
97	0.056	56,045	5,826	-	-	6,693	-	-	0	3846							
98	0.055	57,435	5,873	-	-	6,823	-	-	0	3838							
99	0.052	58,845	5,920	-	-	6,955	-	-	0	3829							
		60,274	5,968	-	-	7,088	-	-	0	3820							
		1792355.72	309376.83	194201.86	0.00	236409.22	0		0	568415.42							

Client/Authority		SECC		Project name		Option:		No Active Intervention		AAD Year 0		AAD Year 19		AAD Year 49		AAD Year 99		Prepared (date)		Printed		Prepared by		Checked by		Checked date	
SEMP2		5078599		Q3 2008		0		19		49		99		17,579 Ek		5,970 Ek		01/07/2009		03/09/2009		AMC		PJC		01/08/2009	
Basic date for estimates (year 0)		5078599		Q3 2008		0		19		49		99		17,579 Ek		5,970 Ek		01/07/2009		03/09/2009		AMC		PJC		01/08/2009	
Scaling factor (e.g. Em, Ek, £)		0%		0%		0%		0%		0%		0%		0%		0%		0%		0%		0%		0%		0%	
Discount rate		0%		0%		0%		0%		0%		0%		0%		0%		0%		0%		0%		0%		0%	
						Residential property		85		161		2,998		17,579 Ek													
						Ind/commercial (direct)		1,638		2,611		4,703		5,970 Ek													
						Temp Acc + Clean Up		11,106		18,544		20,349		21,712 Ek													
						Traffic related		0		0		0		0 Ek													
						Emergency services		184		297		824		2,520 Ek													
						Agricultural		0		0		0		0 Ek													
						PV Total Damage		1,134,868		21,612		28,873		47,781 Ek													
						Property Write-off		1,462,374						Ek													
				</																							

Client/Authority		Option:				Sheet Nr.	
SECC		No Active Intervention				TYD2, LYD1	
Project name		Option:					
SEMP2							
Project reference		AAD Year 0				AAD Year 19	
5078599		AAD Year 49 <td colspan="2">AAD Year 99 </td>				AAD Year 99	
Q3 2008		0				1	
Ek		0				24	
0%		0				67	
		0				2	
		0				0	
		0				10	
		0				0	
		0				2	
		10,005				Ek	
		31,876				Ek	
		Residential property				Prepared (date)	
		Ind/commercial (direct)				Printed	
		Temp Acc				Prepared by	
		Traffic related				Checked by	
		Emergency services				Checked date	
		Agricultural				01/07/2009	
		PV Total Damage				03/09/2009	
		Property Write-off				AMC	
						PJC	
						01/08/2009	

		AAD Post Breach					E 31,876 E		- E 10,005	
Year	Discount Factor	Residential property AAD	Ind/commercial (direct) AAD	Temp Acc	Traffic related AAD	Emergency services AAD	Property Write-off			PV damages
0	1.000	903	2,274	12	-	340	-	-	-	0
1	0.986	0	0	0	-	0	-	-	-	0
2	0.974	0	0	0	-	0	-	-	-	0
3	0.962	0	0	0	-	0	-	-	-	0
4	0.951	0	0	0	-	0	-	-	-	0
5	0.940	0	0	0	-	0	-	-	-	0
6	0.929	0	0	0	-	0	-	-	-	0
7	0.919	0	0	0	-	0	-	-	-	0
8	0.909	0	0	0	-	0	-	-	-	0
9	0.899	0	0	0	-	0	-	-	-	0
10	0.890	0	0	0	-	0	-	-	-	0
11	0.881	0	1	0	-	0	-	-	-	0
12	0.872	0	1	0	-	0	-	-	-	0
13	0.863	1	1	0	-	0	-	-	-	0
14	0.854	1	1	0	-	0	-	-	-	0
15	0.846	1	1	0	-	0	-	-	-	0
16	0.837	1	1	0	-	0	-	-	-	0
17	0.829	1	1	0	-	0	-	-	-	0
18	0.821	1	1	0	-	0	-	-	-	0
19	0.813	1	1	0	-	0	-	-	-	0
20	0.805	2	3	0	-	0	-	-	-	0
21	0.797	2	5	0	-	1	-	-	-	0
22	0.789	3	7	0	-	1	-	-	-	0
23	0.781	4	10	1	-	1	-	-	-	0
24	0.773	5	12	1	-	2	-	-	-	0
25	0.765	5	14	1	-	2	-	-	-	0
26	0.757	6	16	1	-	2	-	-	-	0
27	0.750	7	18	1	-	3	-	-	-	0
28	0.742	8	21	1	-	3	-	-	-	0
29	0.734	8	23	1	-	3	-	-	-	0
30	0.726	9	25	1	-	4	-	-	-	0
31	0.718	10	27	1	-	4	-	-	-	0
32	0.710	11	29	1	-	4	-	-	-	0
33	0.702	11	32	1	-	5	-	-	-	0
34	0.694	12	34	1	-	5	-	-	-	0
35	0.686	13	36	1	-	5	-	-	-	0
36	0.678	14	38	1	-	6	-	-	-	0
37	0.670	15	40	1	-	6	-	-	-	0
38	0.662	15	43	1	-	6	-	-	-	0
39	0.654	16	45	1	-	7	-	-	-	0
40	0.646	17	47	1	-	7	-	-	-	0
41	0.638	18	49	1	-	7	-	-	-	0
42	0.630	18	51	1	-	7	-	-	-	0
43	0.622	19	54	1	-	8	-	-	-	0
44	0.614	20	56	2	-	8	-	-	-	0
45	0.606	21	58	2	-	8	-	-	-	0
46	0.598	21	60	2	-	9	-	-	-	0
47	0.590	22	62	2	-	9	-	-	-	0
48	0.582	23	65	2	-	9	-	-	-	0
49	0.574	24	67	2	-	10	31,876	-	6497	
50	0.566	30	82	-	-	12	-	-	24	
51	0.558	36	97	-	-	14	-	-	28	
52	0.550	43	113	-	-	17	-	-	32	
53	0.542	49	128	-	-	19	-	-	35	
54	0.534	55	143	-	-	21	-	-	38	
55	0.526	61	159	-	-	24	-	-	41	
56	0.518	68	174	-	-	26	-	-	44	
57	0.510	74	189	-	-	28	-	-	47	
58	0.502	80	204	-	-	30	-	-	49	
59	0.494	87	220	-	-	33	-	-	51	
60	0.486	93	235	-	-	35	-	-	53	
61	0.478	99	250	-	-	37	-	-	55	
62	0.470	105	266	-	-	40	-	-	57	
63	0.462	112	281	-	-	42	-	-	58	
64	0.454	118	296	-	-	44	-	-	60	
65	0.446	124	312	-	-	47	-	-	61	
66	0.438	131	327	-	-	49	-	-	62	
67	0.430	137	342	-	-	51	-	-	63	
68	0.422	143	357	-	-	54	-	-	64	
69	0.414	149	373	-	-	56	-	-	65	
70	0.406	156	388	-	-	58	-	-	66	
71	0.398	162	403	-	-	60	-	-	66	
72	0.390	168	419	-	-	63	-	-	67	
73	0.382	175	434	-	-	65	-	-	67	
74	0.374	181	449	-	-	67	-	-	68	
75	0.366	187	465	-	-	70	-	-	68	
76	0.358	193	480	-	-	72	-	-	69	
77	0.350	200	495	-	-	74	-	-	69	
78	0.342	206	510	-	-	77	-	-	69	
79	0.334	212	526	-	-	79	-	-	70	
80	0.326	219	541	-	-	81	-	-	70	
81	0.318	225	556	-	-	84	-	-	70	
82	0.310	231	572	-	-	86	-	-	70	
83	0.302	237	587	-	-	88	-	-	71	
84	0.294	244	602	-	-	91	-	-	71	
85	0.286	250	618	-	-	93	-	-	71	
86	0.278	256	633	-	-	95	-	-	71	
87	0.270	263	648	-	-	97	-	-	71	
88	0.262	269	663	-	-	100	-	-	71	
89	0.254	275	679	-	-	102	-	-	70	
90	0.246	281	694	-	-	104	-	-	70	
91	0.238	288	709	-	-	107	-	-	70	
92	0.230	294	725	-	-	109	-	-	70	
93	0.222	300	740	-	-	111	-	-	70	
94	0.214	307	755	-	-	114	-	-	69	
95	0.206	313	771	-	-	116	-	-	69	
96	0.198	319	786	-	-	118	-	-	69	
97	0.190	325	801	-	-	121	-	-	68	
98	0.182	332	816	-	-	123	-	-	68	
99	0.174	338	832	-	-	125	-	-	67	
		9586.81	23900.39	36.37	0.00	3583.13				10005.34

Client/Authority		SECC		Option:				No Active Intervention		Prepared (date)		01/07/2009											
Project name		SEMP2		AAD Year 0				AAD Year 19				AAD Year 49				AAD Year 99				Printed		03/09/2009	
Project reference		5078599		0				19				49				99				Prepared by		AMC	
Base date for estimates (year 0)		Q3 2008		13				28				908				1,247				Checked by		PJC	
Scaling factor (e.g. £m, £k, £)		Ek		1				1				35				50				Checked date		01/08/2009	
Discount rate		0%		2				5				184				216							
				0				0				0				0							
				1				3				101				139							
				0				0				0				0							
				18				38				1,228				1,652							
				22,189				53,133				Ek				Ek							
				53,133				Ek				Ek											
				9,898				394				-				1,101				53,133		22,189	
Year	Discount Factor	Residential property AAD	Ind/commercial (direct) AAD	Temp Acc	Traffic related AAD	Emergency services AAD	Property Write-off														PV damages		
0	1.000	13	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15		
1	0.986	14	1	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16		
2	0.974	15	1	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16		
3	0.962	16	1	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16		
4	0.951	16	1	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	17		
5	0.940	17	1	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	17		
6	0.930	18	1	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	17		
7	0.920	19	1	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	17		
8	0.910	19	1	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	17		
9	0.900	20	1	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	17		
10	0.890	21	1	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	17		
11	0.880	22	1	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	17		
12	0.870	23	1	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	17		
13	0.860	23	1	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	17		
14	0.850	24	1	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	17		
15	0.840	25	1	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	17		
16	0.830	26	1	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	17		
17	0.820	26	1	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	17		
18	0.810	27	1	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	17		
19	0.800	28	1	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	17		
20	0.790	28	1	-	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	33		
21	0.780	27	2	-	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	33		
22	0.770	27	2	-	-	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	49		
23	0.760	116	5	-	-	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	63		
24	0.750	145	6	-	-	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	76		
25	0.740	175	7	-	-	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	88		
26	0.730	204	8	-	-	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	99		
27	0.720	233	9	-	-	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	110		
28	0.710	263	10	-	-	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	119		
29	0.700	292	12	-	-	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	128		
30	0.690	321	13	-	-	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-	136		
31	0.680	351	14	-	-	39	-	-	-	-	-	-	-	-	-	-	-	-	-	-	144		
32	0.670	380	15	-	-	42	-	-	-	-	-	-	-	-	-	-	-	-	-	-	151		
33	0.660	409	16	-	-	46	-	-	-	-	-	-	-	-	-	-	-	-	-	-	158		
34	0.650	439	17	-	-	49	-	-	-	-	-	-	-	-	-	-	-	-	-	-	165		
35	0.640	468	18	-	-	52	-	-	-	-	-	-	-	-	-	-	-	-	-	-	170		
36	0.630	497	20	-	-	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	176		
37	0.620	527	21	-	-	59	-	-	-	-	-	-	-	-	-	-	-	-	-	-	181		
38	0.610	556	22	-	-	62	-	-	-	-	-	-	-	-	-	-	-	-	-	-	185		
39	0.600	585	23	-	-	65	-	-	-	-	-	-	-	-	-	-	-	-	-	-	189		
40	0.590	615	24	-	-	68	-	-	-	-	-	-	-	-	-	-	-	-	-	-	193		
41	0.580	644	25	-	-	72	-	-	-	-	-	-	-	-	-	-	-	-	-	-	196		
42	0.570	673	26	-	-	75	-	-	-	-	-	-	-	-	-	-	-	-	-	-	199		
43	0.560	703	28	-	-	78	-	-	-	-	-	-	-	-	-	-	-	-	-	-	202		
44	0.550	732	29	-	-	81	-	-	-	-	-	-	-	-	-	-	-	-	-	-	204		
45	0.540	761	30	-	-	85	-	-	-	-	-	-	-	-	-	-	-	-	-	-	206		
46	0.530	791	31	-	-	88	-	-	-	-	-	-	-	-	-	-	-	-	-	-	208		
47	0.520	820	32	-	-	91	-	-	-	-	-	-	-	-	-	-	-	-	-	-	209		
48	0.510	849	33	-	-	94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	211		
49	0.500	879	34	-	-	98	-	-	-	-	-	-	-	-	-	-	-	-	-	-	211		
50	0.490	908	35	-	-	101	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11008		
51	0.480	915	36	-	-	102	-	-	-	-	-	-	-	-	-	-	-	-	-	-	208		
52	0.470	921	36	-	-	102	-	-	-	-	-	-	-	-	-	-	-	-	-	-	203		
53	0.460	928	36	-	-	103	-	-	-	-	-	-	-	-	-	-	-	-	-	-	199		
54	0.450	935	37	-	-	104	-	-	-	-	-	-	-	-	-	-	-	-	-	-	194		
55	0.440	942	37	-	-	105	-	-	-	-	-	-	-	-	-	-	-	-	-	-	190		
56	0.430	949	37	-	-	105	-	-	-	-	-	-	-	-	-	-	-	-	-	-	186		
57	0.420	955	38	-	-	106	-	-	-	-	-	-	-	-	-	-	-	-	-	-	182		
58	0.410	962	38	-	-	107	-	-	-	-	-	-	-	-	-	-	-	-	-	-	178		
59	0.400	969	38	-	-	108	-	-	-	-	-	-	-	-	-	-	-	-	-	-	174		
60	0.390	976	38	-	-	109	-	-	-	-	-	-	-	-	-	-	-	-	-	-	170		
61	0.380	982	39	-	-	109	-	-	-	-	-	-	-	-	-	-	-	-	-	-	166		
62	0.370	989	39	-	-	110	-	-	-	-	-	-	-	-	-	-	-	-	-	-	162		
63	0.360	996	39	-	-	111	-	-	-	-	-	-	-	-	-	-	-	-	-	-	159		
64	0.350	1,003	40	-	-	112	-	-	-	-	-	-	-	-	-	-	-	-	-	-	155		
65	0.340	1,010	40	-	-	112	-	-	-	-	-	-	-	-	-	-	-	-	-	-	152		
66	0.330	1,016	40	-	-	113	-	-	-	-	-	-	-	-	-	-	-	-	-	-	148		
67	0.320	1,023	40	-	-	114	-	-	-	-	-	-	-	-	-	-	-	-	-	-	145		
68	0.310	1,030	41	-	-	115	-	-	-	-	-	-	-	-	-	-	-	-	-	-	141		
69	0.300	1,037	41	-	-	115	-	-	-	-	-	-	-	-	-	-	-	-	-	-	138		
70	0.290	1,044	41	-	-	116	-	-	-	-	-</												

Client/Authority							Sheet Nr.						
SECC							MA11-6						
Project name			Option:										
SEMP2			No Active Intervention										
Project reference			AAD Year 0	AAD Year 19	AAD Year 49	AAD Year 99							
5078599			0	23	113	341							
Q3 2008			6	19	49	99							
Basic date for estimates (year 0)			Residential property	6	23	113	341	Prepared (date)	01/07/2009				
Scaling factor (e.g. £m, £k, £)			Ind/commercial (direct)	1	11	19	22	Printed	03/09/2009				
Discount rate			Temp Acc	6	20	40	62	Prepared by	AMC				
0%			Traffic related	0	0	0	0	Checked by	PJC				
			Emergency services	1	4	14	39	Checked date	01/08/2009				
			Agricultural	0	0	0	0						
			PV Total Damage	14	57	185	464						
			Property Write-off	11,156									
				15,577									
			AAD Post Breach					£	15,577	£	-	£	11,156
Year	Discount Factor	Probability of breach in year	Residential property AAD	Ind/commercial (direct) AAD	Temp Acc	Traffic related AAD	Emergency services AAD	Property Write-off				PV damages	
0	1.000	1.00	1,895	324	118	-	237	-	-	-	-	-	
1	0.996	1.00	6	1	2	-	1	999	-	-	-	1010	
2	0.994	1.00	7	2	3	-	1	-	-	-	-	12	
3	0.992	1.00	8	2	4	-	1	-	-	-	-	14	
4	0.971	1.00	9	3	4	-	1	-	-	-	-	16	
5	0.871	1.00	10	3	5	-	1	-	-	-	-	17	
6	0.842	1.00	11	4	6	-	2	-	-	-	-	18	
7	0.814	1.00	11	4	6	-	2	-	-	-	-	19	
8	0.796	1.00	12	5	7	-	2	-	-	-	-	20	
9	0.759	1.00	13	5	7	-	2	-	-	-	-	21	
10	0.734	1.00	14	6	8	-	2	-	-	-	-	22	
11	0.709	1.00	15	6	9	-	2	-	-	-	-	23	
12	0.685	1.00	16	7	10	-	2	-	-	-	-	24	
13	0.662	1.00	17	7	10	-	3	-	-	-	-	25	
14	0.639	1.00	18	8	11	-	3	-	-	-	-	25	
15	0.618	1.00	19	8	12	-	3	-	-	-	-	26	
16	0.597	1.00	20	9	12	-	3	-	-	-	-	26	
17	0.577	1.00	20	9	13	-	3	-	-	-	-	26	
18	0.557	1.00	21	10	14	-	3	-	-	-	-	27	
19	0.538	1.00	22	10	14	-	3	-	-	-	-	27	
20	0.520	1.00	23	11	15	-	4	14,577	-	-	-	7610	
21	0.503	1.00	26	11	-	-	4	-	-	-	-	21	
22	0.486	1.00	29	11	-	-	4	-	-	-	-	22	
23	0.469	1.00	32	11	-	-	5	-	-	-	-	23	
24	0.453	1.00	35	12	-	-	5	-	-	-	-	23	
25	0.438	1.00	38	12	-	-	5	-	-	-	-	24	
26	0.423	1.00	41	12	-	-	6	-	-	-	-	25	
27	0.409	1.00	44	12	-	-	6	-	-	-	-	26	
28	0.395	1.00	47	13	-	-	6	-	-	-	-	26	
29	0.382	1.00	50	13	-	-	7	-	-	-	-	27	
30	0.369	1.00	53	13	-	-	7	-	-	-	-	27	
31	0.356	1.00	56	14	-	-	7	-	-	-	-	27	
32	0.346	1.00	59	14	-	-	8	-	-	-	-	28	
33	0.336	1.00	62	14	-	-	8	-	-	-	-	28	
34	0.326	1.00	65	14	-	-	8	-	-	-	-	29	
35	0.317	1.00	68	15	-	-	9	-	-	-	-	29	
36	0.307	1.00	71	15	-	-	9	-	-	-	-	29	
37	0.298	1.00	74	15	-	-	10	-	-	-	-	29	
38	0.290	1.00	77	15	-	-	10	-	-	-	-	30	
39	0.281	1.00	80	16	-	-	10	-	-	-	-	30	
40	0.273	1.00	83	16	-	-	11	-	-	-	-	30	
41	0.265	1.00	86	16	-	-	11	-	-	-	-	30	
42	0.257	1.00	89	17	-	-	11	-	-	-	-	30	
43	0.250	1.00	92	17	-	-	12	-	-	-	-	30	
44	0.243	1.00	95	17	-	-	12	-	-	-	-	30	
45	0.236	1.00	98	17	-	-	12	-	-	-	-	30	
46	0.229	1.00	101	18	-	-	13	-	-	-	-	30	
47	0.222	1.00	104	18	-	-	13	-	-	-	-	30	
48	0.216	1.00	107	18	-	-	13	-	-	-	-	30	
49	0.209	1.00	110	18	-	-	14	-	-	-	-	30	
50	0.203	1.00	113	19	-	-	14	-	-	-	-	30	
51	0.197	1.00	117	19	-	-	15	-	-	-	-	30	
52	0.192	1.00	122	19	-	-	15	-	-	-	-	30	
53	0.186	1.00	126	19	-	-	16	-	-	-	-	30	
54	0.181	1.00	131	19	-	-	16	-	-	-	-	30	
55	0.175	1.00	135	19	-	-	17	-	-	-	-	30	
56	0.170	1.00	140	19	-	-	17	-	-	-	-	30	
57	0.165	1.00	145	19	-	-	18	-	-	-	-	30	
58	0.160	1.00	149	19	-	-	18	-	-	-	-	30	
59	0.156	1.00	154	19	-	-	19	-	-	-	-	30	
60	0.151	1.00	158	19	-	-	19	-	-	-	-	30	
61	0.147	1.00	163	19	-	-	19	-	-	-	-	30	
62	0.143	1.00	167	19	-	-	20	-	-	-	-	29	
63	0.138	1.00	172	19	-	-	20	-	-	-	-	29	
64	0.134	1.00	177	20	-	-	21	-	-	-	-	29	
65	0.130	1.00	181	20	-	-	21	-	-	-	-	29	
66	0.127	1.00	186	20	-	-	22	-	-	-	-	29	
67	0.123	1.00	190	20	-	-	22	-	-	-	-	29	
68	0.119	1.00	195	20	-	-	23	-	-	-	-	28	
69	0.116	1.00	199	20	-	-	23	-	-	-	-	28	
70	0.112	1.00	204	20	-	-	24	-	-	-	-	28	
71	0.109	1.00	209	20	-	-	24	-	-	-	-	28	
72	0.106	1.00	213	20	-	-	25	-	-	-	-	27	
73	0.103	1.00	218	20	-	-	25	-	-	-	-	27	
74	0.100	1.00	222	20	-	-	26	-	-	-	-	27	
75	0.097	1.00	227	20	-	-	26	-	-	-	-	27	
76	0.094	1.00	232	20	-	-	27	-	-	-	-	26	
77	0.092	1.00	236	20	-	-	27	-	-	-	-	26	
78	0.090	1.00	241	20	-	-	28	-	-	-	-	26	
79	0.087	1.00	245	20	-	-	28	-	-	-	-	26	
80	0.085	1.00	250	20	-	-	29	-	-	-	-	26	
81	0.083	1.00	254	21	-	-	29	-	-	-	-	25	
82	0.081	1.00	259	21	-	-	30	-	-	-	-	25	
83	0.079	1.00	264	21	-	-	30	-	-	-	-	25	
84	0.077	1.00	268	21	-	-	31	-	-	-	-	25	
85	0.075	1.00	273	21	-	-	31	-	-	-	-	25	
86	0.074	1.00	277	21	-	-	32	-	-	-	-	24	
87	0.072	1.00	282	21	-	-	32	-	-	-	-	24	
88	0.070	1.00	286	21	-	-	33	-	-	-	-	24	
89	0.068	1.00	291	21	-	-	33	-	-	-	-	24	
90	0.067	1.00	296	21	-	-	34	-	-	-	-	23	
91	0.065	1.00	300	21	-	-	34	-	-	-	-	23	
92	0.063	1.00	305	21	-	-	35	-	-	-	-	23	
93	0.062	1.00	309	21	-	-	35	-	-	-	-	23	
94	0.060	1.00	314	21	-	-	36	-	-	-	-	22	
95	0.059	1.00	318	21	-	-	36	-	-	-	-	22	
96	0.057	1.00	323	21	-	-	37	-	-	-	-	22	
97	0.056	1.00	328	21	-	-	37	-	-	-	-	22	
98	0.055	1.00	332	22	-	-	38	-	-	-	-	21	
99	0.053	1.00	337	22	-	-	38	-	-	-	-	21	
	0.052	1.00	341	22	-	-	39	-	-	-	-	21	
			13834.33	1573.01	175.16	0.00	1648.59	0				11155.81	

Client/Authority		Option:		AAD Year 0				AAD Year 19				AAD Year 49				AAD Year 99				Prepared (date)		Printed		Prepared by		Checked by		Checked date	
SECC		No Active Intervention		0				19				49				99				01/07/2009		03/09/2009		AMC		PJC		01/08/2009	
Project name		SEMP2		5078599				Q3 2008				Ek				0%													
Project reference		5078599		Q3 2008				Ek				0%																	
Basic date for estimates (year 0)		Q3 2008		Ek				0%																					
Scaling factor (e.g. £m, £k, £)		Ek		0%																									
Discount rate		0%																											
				Residential property				144				286				12,215				24,372 Ek									
				Ind/commercial (direct)				60				119				6,674				9,871 Ek									
				Temp Acc				98				100				6,132				6,951 Ek									
				Traffic related				0				0				0				0 Ek									
				Emergency services				22				43				2,021				3,664 Ek									
				Agricultural				0				0				0				0 Ek									
				PV Total Damage				460,533				549				27,042				44,859									
				Property Write-off				923,709												Ek									
																				E 923,709		E -		E 460,533					
Year	Discount Factor	Residential property AAD	Ind/commercial (direct) AAD	Temp Acc	Traffic related AAD	Emergency services AAD	Property Write-off	PV damages																					
0	1.000	144	60	98	-	23,627	-	324																					
1	0.996	151	63	99	-	23	-	324																					
2	0.994	159	66	99	-	24	-	324																					
3	0.992	166	69	99	-	25	-	324																					
4	0.971	174	72	99	-	26	-	324																					
5	0.842	181	76	99	-	27	-	323																					
6	0.814	189	79	99	-	29	-	321																					
7	0.786	196	82	99	-	30	-	320																					
8	0.759	204	85	99	-	31	-	318																					
9	0.734	211	88	99	-	32	-	316																					
10	0.709	219	91	99	-	33	-	314																					
11	0.685	226	94	99	-	34	-	311																					
12	0.662	234	97	100	-	35	-	309																					
13	0.639	241	101	100	-	37	-	306																					
14	0.618	249	104	100	-	38	-	303																					
15	0.597	256	107	100	-	39	-	300																					
16	0.577	264	110	100	-	40	-	296																					
17	0.557	271	113	100	-	41	-	293																					
18	0.538	279	116	100	-	42	-	289																					
19	0.520	286	119	100	-	43	-	286																					
20	0.503	294	122	100	-	44	-	282																					
21	0.486	302	125	100	-	45	-	278																					
22	0.469	310	128	100	-	46	-	274																					
23	0.453	318	131	100	-	47	-	270																					
24	0.438	326	134	100	-	48	-	266																					
25	0.423	334	137	100	-	49	-	262																					
26	0.409	342	140	100	-	50	-	258																					
27	0.395	350	143	100	-	51	-	254																					
28	0.382	358	146	100	-	52	-	250																					
29	0.369	366	149	100	-	53	-	246																					
30	0.356	374	152	100	-	54	-	242																					
31	0.346	382	155	100	-	55	-	238																					
32	0.336	390	158	100	-	56	-	234																					
33	0.326	398	161	100	-	57	-	230																					
34	0.317	406	164	100	-	58	-	226																					
35	0.307	414	167	100	-	59	-	222																					
36	0.298	422	170	100	-	60	-	218																					
37	0.290	430	173	100	-	61	-	214																					
38	0.281	438	176	100	-	62	-	210																					
39	0.273	446	179	100	-	63	-	206																					
40	0.265	454	182	100	-	64	-	202																					
41	0.257	462	185	100	-	65	-	198																					
42	0.250	470	188	100	-	66	-	194																					
43	0.243	478	191	100	-	67	-	190																					
44	0.236	486	194	100	-	68	-	186																					
45	0.229	494	197	100	-	69	-	182																					
46	0.222	502	200	100	-	70	-	178																					
47	0.216	510	203	100	-	71	-	174																					
48	0.209	518	206	100	-	72	-	170																					
49	0.203	526	209	100	-	73	-	166																					
50	0.197	534	212	100	-	74	-	162																					
51	0.192	542	215	100	-	75	-	158																					
52	0.186	550	218	100	-	76	-	154																					
53	0.181	558	221	100	-	77	-	150																					
54	0.175	566	224	100	-	78	-	146																					
55	0.170	574	227	100	-	79	-	142																					
56	0.165	582	230	100	-	80	-	138																					
57	0.160	590	233	100	-	81	-	134																					
58	0.156	598	236	100	-	82	-	130																					
59	0.151	606	239	100	-	83	-	126																					
60	0.147	614	242	100	-	84	-	122																					
61	0.143	622	245	100	-	85	-	118																					
62	0.138	630	248	100	-	86	-	114																					
63	0.134	638	251	100	-	87	-	110																					
64	0.130	646	254	100	-	88	-	106																					
65	0.127	654	257	100	-	89	-	102																					
66	0.123	662	260	100	-	90	-	98																					
67	0.119	670	263	100	-	91	-	94																					
68	0.116	678	266	100	-	92	-	90																					
69	0.112	686	269	100	-	93	-	86																					
70	0.109	694	272	100	-	94	-	82																					
71	0.106	702	275	100	-	95	-	78																					
72	0.103	710	278	100	-	96	-	74																					
73	0.100	718	281	100	-	97	-	70																					
74	0.097	726	284	100	-	98	-	66																					
75	0.094	734	287	100	-	99	-	62																					
76	0.092	742	290	100	-	100	-	58																					
77	0.090	750	293	100	-	101	-	54																					
78	0.087	758	296	100	-	102	-	50																					
79	0.085	766	299	100	-	103	-	46																					
80	0.083	774	302	100	-	104	-	42																					
81	0.081	782	305	100	-	105	-	38																					
82	0.079	790	308	100	-	106	-	34																					
83	0.077	798	311	100	-	107	-	30																					
84	0.075	806	314	100	-	108	-	26																					
85	0.074	814	317	100	-	109	-	22																					
86	0.072	822	320	100	-	110	-	18																					
87	0.070	830	323	100	-	111	-	14																					
88	0.068	838	326	100	-	112	-	10																					
89	0.067	846	329	100	-	113	-	6																					
90	0.065	854	332	100	-	114	-	2																					
91	0.063	862	335	100	-	115	-	-2																					
92	0.062	870	338	100	-	116	-	-6																					
93	0.060	878	341	100	-	117	-	-10																					
94	0.059	886	344	100	-	118	-	-14																					
95	0.057	894	347	100	-	119	-	-18																					
96	0.056	902	350	100	-	120	-	-22																					
97	0.055	910	353	100	-	121	-	-26																					
98	0.053	918	356	100	-	122	-	-30																					
99	0.052	926	359	100	-	123	-	-34																					
				1118530.60				522210.26				98492.72				0.00		175559.27						460533.47					

Client/Authority										Sheet Nr.							
SECC										KINI, 3, 4							
Project name										Option:							
SEMP2										No Active Intervention							
Project reference										5078599							
Base date for estimates (year 0)										Q3 2008							
Scaling factor (e.g. £m, £k, £)										£k							
Discount rate										0%							
										AAD Year 0		AAD Year 19		AAD Year 49		AAD Year 99	
Residential property										305		917		5,094		46,644	
Ind/commercial (direct)										203		3,634		5,000		13,058	
Temp Acc										2,336		65,066		66,178		70,226	
Traffic related										0		0		0		0	
Emergency services										54		487		1,080		6,388	
Agricultural										0		0		0		0	
PV Total Damage										3,172,358		77,353		136,315		Ek	
Property Write-off										4,756,904		Ek		Ek		Ek	
										E 4,756,904		E -		E 3,172,358			
Year	Discount Factor	Residential property AAD	Ind/commercial AAD	Temp Acc	Traffic related AAD	Emergency services AAD	Property Write-off	PV damages									
0	1.000	119,195	110,310	440,613	-	27,910	-	-	2899								
1	0.996	305	203	2,336	-	54	-	-	6219								
2	0.994	337	384	5,638	-	77	-	-	9310								
3	0.992	369	565	8,939	-	100	-	-	12185								
4	0.990	402	745	12,241	-	123	-	-	14856								
5	0.987	434	926	15,542	-	145	-	-	17331								
6	0.984	466	1,106	18,844	-	168	-	-	19623								
7	0.981	498	1,287	22,145	-	191	-	-	21739								
8	0.978	530	1,467	25,447	-	214	-	-	23680								
9	0.975	563	1,648	28,748	-	237	-	-	25484								
10	0.972	595	1,828	32,050	-	259	-	-	27130								
11	0.969	627	2,009	35,351	-	282	-	-	28635								
12	0.966	659	2,190	38,653	-	305	-	-	30007								
13	0.963	691	2,370	41,954	-	328	-	-	31254								
14	0.960	723	2,551	45,256	-	350	-	-	32382								
15	0.957	756	2,731	48,557	-	373	-	-	33398								
16	0.954	788	2,912	51,859	-	396	-	-	34309								
17	0.951	820	3,092	55,160	-	419	-	-	35119								
18	0.948	852	3,273	58,462	-	441	-	-	35836								
19	0.945	884	3,453	61,763	-	464	-	-	36461								
20	0.942	917	3,634	65,065	-	487	4,756,904	-	2510795								
21	0.939	805	3,679	-	-	507	-	-	2508								
22	0.936	711	3,725	-	-	526	-	-	2410								
23	0.933	634	3,771	-	-	546	-	-	2323								
24	0.930	574	3,816	-	-	566	-	-	2247								
25	0.927	532	3,862	-	-	586	-	-	2181								
26	0.924	507	3,907	-	-	606	-	-	2124								
27	0.921	489	3,953	-	-	625	-	-	2076								
28	0.918	509	3,998	-	-	645	-	-	2035								
29	0.915	536	4,044	-	-	665	-	-	2002								
30	0.912	580	4,089	-	-	685	-	-	1974								
31	0.909	641	4,135	-	-	704	-	-	1953								
32	0.906	720	4,180	-	-	724	-	-	1946								
33	0.903	816	4,226	-	-	744	-	-	1943								
34	0.900	929	4,271	-	-	764	-	-	1945								
35	0.897	1,060	4,317	-	-	784	-	-	1950								
36	0.894	1,208	4,363	-	-	803	-	-	1959								
37	0.891	1,373	4,408	-	-	823	-	-	1971								
38	0.888	1,556	4,454	-	-	843	-	-	1985								
39	0.885	1,755	4,499	-	-	863	-	-	2002								
40	0.882	1,972	4,545	-	-	882	-	-	2020								
41	0.879	2,207	4,590	-	-	902	-	-	2041								
42	0.876	2,458	4,636	-	-	922	-	-	2063								
43	0.873	2,727	4,681	-	-	942	-	-	2087								
44	0.870	3,014	4,727	-	-	961	-	-	2111								
45	0.867	3,317	4,772	-	-	981	-	-	2137								
46	0.864	3,638	4,818	-	-	1,001	-	-	2163								
47	0.861	3,976	4,863	-	-	1,021	-	-	2189								
48	0.858	4,332	4,909	-	-	1,041	-	-	2216								
49	0.855	4,704	4,955	-	-	1,060	-	-	2243								
50	0.852	5,094	5,000	-	-	1,080	-	-	2270								
51	0.849	5,502	5,161	-	-	1,186	-	-	2337								
52	0.846	5,926	5,322	-	-	1,292	-	-	2402								
53	0.843	6,368	5,484	-	-	1,399	-	-	2464								
54	0.840	6,827	5,645	-	-	1,505	-	-	2523								
55	0.837	7,304	5,806	-	-	1,611	-	-	2580								
56	0.834	7,798	5,967	-	-	1,717	-	-	2634								
57	0.831	8,309	6,128	-	-	1,823	-	-	2686								
58	0.828	8,837	6,289	-	-	1,929	-	-	2736								
59	0.825	9,383	6,450	-	-	2,036	-	-	2783								
60	0.822	9,946	6,612	-	-	2,142	-	-	2827								
61	0.819	10,526	6,773	-	-	2,248	-	-	2869								
62	0.816	11,123	6,934	-	-	2,354	-	-	2909								
63	0.813	11,738	7,095	-	-	2,460	-	-	2946								
64	0.810	12,370	7,256	-	-	2,566	-	-	2981								
65	0.807	13,020	7,417	-	-	2,672	-	-	3014								
66	0.804	13,686	7,578	-	-	2,779	-	-	3044								
67	0.801	14,370	7,740	-	-	2,885	-	-	3073								
68	0.798	15,072	7,901	-	-	2,991	-	-	3099								
69	0.795	15,790	8,062	-	-	3,097	-	-	3123								
70	0.792	16,526	8,223	-	-	3,203	-	-	3145								
71	0.789	17,279	8,384	-	-	3,309	-	-	3164								
72	0.786	18,050	8,545	-	-	3,416	-	-	3182								
73	0.783	18,838	8,707	-	-	3,522	-	-	3198								
74	0.780	19,643	8,868	-	-	3,628	-	-	3212								
75	0.777	20,465	9,029	-	-	3,734	-	-	3224								
76	0.774	21,305	9,190	-	-	3,840	-	-	3235								
77	0.771	22,162	9,351	-	-	3,946	-	-	3259								
78	0.768	23,036	9,512	-	-	4,053	-	-	3282								
79	0.765	23,927	9,673	-	-	4,159	-	-	3303								
80	0.762	24,836	9,835	-	-	4,265	-	-	3323								
81	0.759	25,762	9,996	-	-	4,371	-	-	3342								
82	0.756	26,706	10,157	-	-	4,477	-	-	3358								
83	0.753	27,666	10,318	-	-	4,583	-	-	3374								
84	0.750	28,644	10,479	-	-	4,690	-	-	3388								
85	0.747	29,640	10,640	-	-	4,796	-	-	3400								
86	0.744	30,652	10,801	-	-	4,902	-	-	3412								
87	0.741	31,682	10,963	-	-	5,008	-	-	3422								
88	0.738	32,729	11,124	-	-	5,114	-	-	3430								
89	0.735	33,794	11,285	-	-	5,220	-	-	3438								
90	0.732	34,875	11,446	-	-	5,326	-	-	3444								
91	0.729	35,974	11,607	-	-	5,433	-	-	3449								
92	0.726	37,091	11,768	-	-	5,539	-	-	3452								
93	0.723	38,224	11,929	-	-	5,645	-	-	3455								
94	0.720	39,375	12,091	-	-	5,751	-	-	3456								
95	0.717	40,543	12,252	-	-	5,857	-	-	3457								
96	0.714	41,729	12,413	-	-	5,963	-	-	3456								
97	0.711	42,932	12,574	-	-	6,070	-	-	3454								
98	0.708	44,152	12,735	-	-	6,176	-	-	3451								
99	0.705	45,389	12,896	-	-	6,282	-	-	3447								
		46,644	13,058	-	-	6,388	-	-	3442								
		1199768.04	624035.62	674010.14	0.00	218572.70			3172358.30								

Annex B: Preferred Policy Cost Estimates

Policy Unit	Maintenance	Replacement	0-20 Policy Costs	0-20 Policy Costs (with 60% OB)	Maintenance	Replacement	20-50 Policy Costs	20-50 Policy Costs (with 60% OB)	Maintenance	Replacement	50-100 Policy Costs	50-100 Policy Costs (with 60% OB)	TOTAL policy costs	TOTAL policy costs with 60% OB
	0-20	0-20			20-50	20-50			50-100	50-100				
	1				1.5				2					
CAR1-3, WEN1-2	£ 3,573,020	£ 2,412,482	£ 5,985,502	£ 9,576,803	£ 3,565,335	£ 3,028,204	£ 6,593,539	£ 10,549,662	£ 2,583,115		£ 2,583,115	£ 4,132,984	£ 15,162,156	£ 24,259,449
NEW1, 2	£ 1,222,093	£ 2,592,872	£ 3,814,966	£ 6,103,945	£ 1,219,465		£ 1,219,465	£ 1,951,144	£ 883,513		£ 883,513	£ 1,413,620	£ 5,917,943	£ 9,468,709
NEW3	£ -		£ -	£ -			£ -	£ -	£ 164,462	£ 96,666	£ 261,128	£ 417,805	£ 261,128	£ 417,805
NEW4, 5, CALD1	£ 4,329,105		£ 4,329,105	£ 6,926,568	£ 4,319,795	£ 11,141,815	£ 15,461,610	£ 24,738,575	£ 3,129,727		£ 3,129,727	£ 5,007,564	£ 22,920,442	£ 36,672,707
CALD3	£ 750,937		£ 750,937	£ 1,201,500	£ 749,322	£ 933,513	£ 1,682,836	£ 2,692,537	£ 542,890		£ 542,890	£ 868,624	£ 2,976,663	£ 4,762,661
TID2, LYD1	£ -		£ -	£ -	£ 355,995	£ 443,503	£ 799,498	£ 1,279,197	£ 193,441		£ 193,441	£ 309,506	£ 992,939	£ 1,588,703
GLO1-2	£ -		£ -	£ -	£ 188,762	£ 235,161	£ 423,923	£ 678,277	£ 102,570		£ 102,570	£ 164,111	£ 526,492	£ 842,388
GLO3-5, SHAR3 7	£ 2,009,364		£ 2,009,364	£ 3,214,982	£ 2,727,210	£ 3,397,586	£ 6,124,796	£ 9,799,674	£ 1,845,082		£ 1,845,082	£ 2,952,131	£ 9,979,242	£ 15,966,787
GLO6-8, SHAR1 2	£ 636,936	£ 533,680	£ 1,170,616	£ 1,872,985	£ 976,492	£ 903,829	£ 1,880,320	£ 3,008,513	£ 645,726		£ 645,726	£ 1,033,161	£ 3,696,662	£ 5,914,659
MAI1-6	£ 448,650	£ 951,885	£ 1,400,535	£ 2,240,856	£ 673,240	£ 280,999	£ 954,239	£ 1,526,782	£ 446,914		£ 446,914	£ 715,062	£ 2,801,688	£ 4,482,701
SEV1	£ 379,514		£ 379,514	£ 607,222	£ 378,698	£ 471,785	£ 850,483	£ 1,360,773	£ 274,370		£ 274,370	£ 438,991	£ 1,504,366	£ 2,406,986
SEV2-4	£ 1,444,506		£ 1,444,506	£ 2,311,210	£ 1,441,399	£ 1,795,710	£ 3,237,110	£ 5,179,375	£ 1,044,306		£ 1,044,306	£ 1,670,889	£ 5,725,922	£ 9,161,474
SEV5	£ 561,916		£ 561,916	£ 899,065	£ 560,707	£ 698,535	£ 1,259,242	£ 2,014,788	£ 406,237		£ 406,237	£ 649,979	£ 2,227,395	£ 3,563,832
BRIS1-5	£ 6,461,590	£ 1,853,835	£ 8,315,425	£ 13,304,680	£ 6,447,694	£ 17,052,115	£ 23,499,809	£ 37,599,694	£ 4,671,408		£ 4,671,408	£ 7,474,252	£ 36,486,641	£ 58,378,626
BRIS6	£ 887,003	£ 1,307,671	£ 2,194,675	£ 3,511,479	£ 885,096		£ 885,096	£ 1,416,153	£ 641,259		£ 641,259	£ 1,026,015	£ 3,721,029	£ 5,953,647
KIN1-4	£ -		£ -	£ -	£ 863,763	£ 1,076,085	£ 1,939,848	£ 3,103,757	£ 469,353		£ 469,353	£ 750,964	£ 2,409,201	£ 3,854,722