

**WORCESTERSHIRE COUNTY COUNCIL**

**Worcestershire Local Flood Risk Management Strategy  
Strategic Environmental Assessment Environmental Report**

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**December 2015**

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## 1. Non-Technical Summary

### 1.1 Introduction

- 1.1.1 This non-technical summary has been produced to accompany the Strategic Environmental Assessment (SEA) of the draft Worcestershire Local Flood Risk Management Strategy (LFRMS).
- 1.1.2 The LFRMS is subject to Strategic Environmental Assessment (SEA), which is intended to assess the likely significant effects on the environment of implementing the LFRMS. The SEA process is governed by legislation.
- 1.1.3 The purpose of this summary is to provide an accessible account of the SEA process and to set out how far the LFRMS will protect and improve Worcestershire's environment.

### 1.2 The Local Flood Risk Management Strategy

- 1.2.1 The draft Local Flood Risk Management Strategy sets out how local flood risk will be managed in Worcestershire. Preparation of the strategy is the responsibility of Worcestershire County Council in its role as Lead Local Flood Authority (LLFA), and is a requirement under Section 9 of the Flood and Water Management Act 2010 ('the Act'). The aims of the draft strategy are set out below.

#### Local Flood Risk Management Strategy: Aims

- 1: Understand and appropriately prioritise flood risk.
- 2: Manage and minimise the likely impact of flooding.
- 3: Develop and manage effective partnerships.
- 4: Inform, develop and implement relevant plans, policies and strategies.
- 5: Secure, maximise and prioritise the appropriate allocation of funding and other resources.
- 6: Deliver sustainable environmental and economic benefits and contribute to the wellbeing of Worcestershire's communities and residents.
- 7: Develop, maintain and implement the LFRMS action plan.

- 1.2.2 The strategy seeks to provide a framework for targeting future capital and operational investment to manage flood risk in Worcestershire. The measures identified in the strategy are designed to complement other works undertaken by the County Council (in its role as the Highways Authority) and also by its partners. In addition, the measures in the strategy complement the work being undertaken by emergency planners who are developing plans to deal with emergency events including flooding. During flooding, emergency management will provide leadership in response to, and recovery from, the incidents. The strategy will

complement this work and be used to pro-actively plan and implement measures in communities to reduce the probability or consequence of flood risk.

- 1.2.3 Strategy preparation began with evidence gathering, drawing upon the associated Surface Water Management Plan, which provides a comprehensive and up-to-date picture of flooding hotspots in Worcestershire. An 'informal draft' strategy was subject to a targeted consultation with partners in June/July 2015. Following this, feedback was considered and a revised, formal draft of the strategy was published for consultation alongside this SEA Environmental Report. The next stage will be to finalise the LFRMS, which is likely to be published and adopted in early 2016.
- 1.2.4 Throughout all these stages, there have been opportunities for people to get involved and share their views. Each iteration of the LFRMS has been accompanied by an SEA document (in the form of a Scoping Report at the earliest stage, an informal draft SEA Report at early, targeted consultation stage, and this final SEA Environmental Report at draft LFRMS stage). Once adopted, a further SEA statement will be produced to explain the process and to record how the SEA has been taken into account in LFRMS development.

### **1.3 Strategic Environmental Assessment: Background and Process**

- 1.3.1 Guidance states that Strategic Environmental Assessment (SEA) of the emerging LFRMS is required under the SEA Regulations<sup>1</sup>. The Regulations transpose the European Directive 2001/42/EC (known as the Strategic Environmental Assessment Directive).
- 1.3.2 SEA is a means of measuring the high-level environmental effects (both positive and negative) of the strategy. It helps authors to avoid, reduce or mitigate potentially negative impacts of the strategy during its development, and allows for positive impacts to be maximised. SEA can also help to demonstrate how the LFRMS contributes to the achievement of wider environmental objectives.
- 1.3.3 The strategy is high-level, with insufficient detail to allow for a full, in-depth assessment of likely environmental effects. This SEA report should avoid spurious accuracy and, as such, more detailed analysis may only be possible once the strategic direction of the LFRMS has been translated through more locally-specific plans and projects.
- 1.3.4 This SEA report is the third stage in the SEA process, following the Scoping Report and Informal Draft SEA Report that accompanied earlier iterations of the strategy. It is a high-level assessment of the aims and objectives of the draft Local Flood Risk Management Strategy. The approach of this SEA is informed by the Scoping Report that was consulted upon during the earliest stages of LFRMS preparation in 2013. The Scoping Report was amended to reflect consultation comments, with the final version setting an 'SEA framework' that provides a clear way of measuring the likely impact of the strategy on a range of environmental receptors.

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<sup>1</sup> Local Government Association, Framework to assist the development of the Local Strategy for Flood Risk Management 'A Living Document' 2nd Edition, November 2011.

1.3.5 The SEA objectives which form the SEA framework are shown below:

**1: Landscape**

Safeguard and strengthen landscape character and quality.

**2: Biodiversity, Geodiversity, Flora and Fauna**

Conserve and enhance Worcestershire's biodiversity and geodiversity.

**3: Historic environment**

Conserve and enhance the historic environment, heritage assets and their settings. Protect, enhance and manage the character and appearance of townscapes, maintaining and strengthening local distinctiveness and sense of place.

**4: Material assets**

Ensure efficient use of land through safeguarding of mineral reserves, the best and most versatile agricultural lands, land of green belt value, maximising use of previously-developed land and reuse of vacant buildings, whilst safeguarding open space/green infrastructure, biodiversity and heritage interests.

**5: Natural Resources**

Protect and enhance water, soil and air quality.

**6: Climate Change**

Reduce causes of and adapt to the impacts of climate change.

**7: Flooding**

Ensure inappropriate development does not occur in high-risk flood-prone areas and does not adversely contribute to fluvial flood risks or contribute to surface water flooding in all other areas.

**8: Population**

Improve the quality of, and equitable access to, local services and facilities, regardless of age, gender, ethnicity, disability, socio-economic status or educational attainment.

**9: Health**

Improve the health and well-being of the population and reduce inequalities in health.

## 1.4 Environmental profile of Worcestershire

1.4.1 The SEA has been informed by the identification, at Scoping Report stage, of a series of significant environmental issues for Worcestershire, including environmental 'problems' requiring identification under the SEA Directive. These issues can be summarised as:

- There are localised areas where SSSIs are in poor condition, especially in Bromsgrove district, where a majority of sites remain classified as 'unfavourable no change'.
- Too few local wildlife and geological sites are under appropriate management, which generally means their condition is poor.
- Recorded populations of breeding birds are falling, particularly in the case of the bullfinch. This situation reflects the pattern nationally, and is largely occurring as a result of agricultural practices.
- Water bodies are not of good quality, and their condition in Worcestershire is significantly worse than the overall picture in the region and in the country as a whole.
- Following year-on-year falls since 2005, CO<sub>2</sub> emissions increased in 2010. Per capita CO<sub>2</sub> emissions remain above both the regional and national figures.
- Per capita road transport emissions are especially high in more rural areas of the county (in Malvern Hills, Bromsgrove and Wychavon districts, these emissions are over twice the national average).
- Worcestershire has the second largest percentage of land area at risk of flooding in the West Midlands (although it should be noted that, in terms of numbers of households at risk, Worcestershire is performing better than the national average).
- The number of Air Quality Management Areas in Worcestershire is increasing.
- Worcestershire's landscape character is high quality.
- Worcestershire's two Special Areas of Conservation are in favourable condition, but are sensitive to various impacts, including water quality and water levels, recreational pressure/disturbance and diffuse air pollution.
- The overwhelming majority of Sites of Special Scientific Interest in the county are now in 'favourable' or 'unfavourable recovering' condition.
- The majority of Worcestershire's undesignated heritage is in good or intermediate condition. Indications suggest that Worcestershire is broadly equivalent to its neighbours in terms of risk to, and loss of, undesignated heritage.

- Worcestershire has a relatively large resource of high-quality agricultural land, but there is a risk that an increasing national focus on economic growth could lead to some of this land being lost to development.
- There has been a major reduction in the amount of household waste produced over the last six years.

1.4.2 These issues, together with those identified through a review of plans, policies and programmes relevant to the LFRMS, have informed the 'SEA framework' set out above.

## 1.5 Alternatives

1.5.1 A key part of the SEA process is to compare the environmental performance of alternative approaches to delivering a desired outcome. The LFRMS has not put forward alternative approaches to the proposed aims and objectives and, as such, it is open to the SEA to identify alternatives and consider how they perform. One approach to alternatives is to compare the environmental performance of the proposals with a 'business as usual' approach; this means comparing the impacts of the proposed LFRMS against the impacts likely to arise without the LFRMS. But this has limitations, as the alternatives must be realistic; the fundamental requirements of the LFRMS are defined by legislation and, as such, a failure to produce an LFRMS that satisfies these requirements is not considered realistic.

## 1.6 Secondary, cumulative, and synergistic effects

1.6.1 Some flood risk management interventions could result in secondary effects, which "occur away from the original effect or as a result of a complex pathway". Government guidance<sup>2</sup> provides a useful example in the context of the LFRMS: "development that changes a water table and thus affects the ecology of a nearby wetland; and construction of one project that facilitates or attracts other developments". Cumulative effects occur as a result of otherwise minor effects being amplified when considered together. Synergistic effects arise due to the specific interaction of separate effects to produce an overall effect greater than the sum of its parts. Due to the strategic nature of the LFRMS and the absence of detail, it has not generally been possible to identify specific likely effects falling within these categories, but where these effects have been judged possible, this has been recorded.

## 1.7 Short, medium, and long-term/permanent and temporary/positive and negative effects

1.7.1 Many of the effects of the LFRMS could differ over the short, medium and long term. The strategy objective to develop flood alleviation schemes, for example, may result in significant localised negative impacts in the short term while schemes are constructed, but may then have significant positive effects in the longer term through preventing the flooding of sensitive receptors.

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<sup>2</sup> ODPM (September 2005) A Practical Guide to the Strategic Environmental Assessment Directive

- 1.7.2 Depending on the nature of the intervention, effects resulting from implementation of the LFRMS could be permanent or temporary. Permanent effects are likely to arise from, for example, fixed infrastructure such as flood defences. But effects of maintenance schemes (such as the de-silting of watercourses) may only be temporary unless these actions can be guaranteed to be repeated as and when required.
- 1.7.3 Implementing the LFRMS could lead to positive and negative effects. The framework has been designed to show how each part of the LFRMS will impact on the SEA objectives, including positive, negative and unknown impacts.

## 1.8 Difficulties encountered

### ➤ Lack of policy direction

- 1.8.1 The vast majority of the strategy amounts to information on current and likely future arrangements for managing flood risk, rather than setting out an approach to how things will be done. As such, there is little direct policy within the strategy, meaning that the scope of this assessment is limited.

### ➤ Lack of detail

- 1.8.2 Many of the impacts of the LFRMS will not be known until more detail is available through specific plans and projects. Whilst the accompanying Action Plan does set out some proposed interventions in certain locations, there is insufficient detail on what sort of project, at what scale, will be completed to judge the likely impacts. The LFRMS, however, is by definition a *strategic* document, and the nature of SEA is to identify *significant* effects; many of the impacts will not be known until site-specific proposals are developed and implemented, and there is a valuable role for more detailed assessment regimes (such as Environmental Impact Assessment) to ensure development is truly sustainable.

### ➤ Lack of alternatives

- 1.8.3 In order to identify the most environmentally-sustainable options for incorporation within the LFRMS, the SEA would ideally compare the relative environmental performance of a range of options either put forward as part of strategy preparation, or proposed separately through the SEA. This comparison of alternatives is an essential part of the SEA process; where no clear alternatives are set out in the strategy, the SEA is free to propose them. Because the LFRMS does not propose alternatives, the SEA has sought to draw conclusions based on the comparison (stated or implicit) of that option against a business-as-usual 'baseline'. This helps to identify whether it would be better, in environmental terms, to not have the strategy in place. Government guidance<sup>3</sup> states that "*Only reasonable, realistic and relevant alternatives need to be put forward*". As such, the assessment has avoided considering alternatives which would clearly not happen for technical, political or other reasons (a proposal which is clearly contrary to national policy, for instance, would not be considered acceptable). In

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<sup>3</sup> (The then) Office of the Deputy Prime Minister, A Practical Guide to the SEA Directive, Appendix 6 (2005)



some cases, the core elements of the LFRMS will not have a reasonable alternative, because they are required by legislation. Even here, however, it is recognised that there may be different ways of satisfying the legal requirements, which could have different environmental consequences.

## 1.9 Summary of SEA findings and recommendations

1.9.1 The main findings of the SEA, including key issues which the LFRMS should take account of and recommendations for changes, are set out below. These are explored further in the relevant sections in the main SEA report below. The issues are drawn from the review of plans, policies and programmes, analysis of baseline data, responses to consultation on the SEA Scoping Report, and the main assessment itself. Only main issues are summarised here; many other more minor comments on improving the SEA are made throughout the report.

### 1.9.2 Thematic recommendations:

- Birds associated with wetland habitats, such as snipe, curlew, redshank, etc. have seen massive declines in numbers across the county, largely as a direct result of land drainage and loss of habitat. Any FRM programme has the potential to have particular impacts on this group of species. FRM work should be carefully considered to avoid the further decline of these species. An integrated approach to FRM should be applied to encourage a significant restoration of appropriate habitat and reverse the declining populations. Where relevant, wetland birds should therefore be considered in FRM as part of a holistic environmental approach.
- Some SSSIs in the county are dependent on flooding for their special interest. The wetland habitat of the Wilden Marsh and Meadows SSSI, for example, is dependent on the site's location in the floodplain, and any development which could alter this floodplain could have a negative impact on the site. FRM approaches should recognise these special qualities.
- The Landscape Character Guidance advocates that, where property would not be at risk, a return to annual flooding cycles of wetland habitats could be considered.
- The LFRMS should engage with the Worcestershire's Archive and Archaeology Service's research programme on flooding and the historic environment to understand the opportunities offered by the historic environment for sustainable flood management, and effective methodologies for incorporating the historic environment into flood management plans.
- The Worcestershire Green Infrastructure (GI) Strategy is clear that investment in GI in Worcestershire can deliver a broad range of benefits. It can offer, inter-alia, an alternative to grey infrastructure; provide flood and water management; and facilitate climate change adaption & mitigation. The LFRMS should recognise and promote multi-functional measures to achieve flood risk management and satisfy wider green infrastructure objectives (including landscape enhancement, accessible open space, biodiversity corridors, etc).
- The LFRMS can help to ensure that flood risk management measures reduce the likelihood of transport disruptions, and the resultant risk of increased temporary emissions from lengthy diversions.

- Flood risk management has a major role to play in climate change adaptation, as projections indicate a likelihood of increased severe weather events which could lead to greater numbers of properties and other critical series being at risk of flood.
- Research into the health impacts of flooding found that "those people who are already vulnerable ... are particularly at risk in terms of reacting appropriately to flood warnings and suffering adverse effects of flood event. Members of low income groups, frail older people, families with young children, those living in mobile homes, people with disabilities and members of minority ethnic groups were reported to have experienced particular difficulties" and that "single householders were less likely to be able to take action than households with two or more adults, and that new residents were less likely to act promptly or take appropriate action on receipt of warning". Local approaches to flood risk management should seek to minimise risk to these groups through identifying specific needs and making appropriate provision.
- The Surface Water Management Plan (SWMP) has not been subject to SEA, but this approach is under review. The SWMP states that "The floodspot prioritisation process should be updated to include criteria which reflect the impact of flooding on the natural and historic environment" and that "All flood risk management schemes should be put through an appropriate environmental impact assessment process". These safeguards are essential to ensuring success against the SEA objectives, and it is strongly recommended that these measures are put in place.

### 1.9.3 Section-specific recommendations:

- Delete objective 1.1, which is superfluous.
- Objective 2.1 should make clear that FRM should be taken into account at the earliest possible stage, to help ensure FRM is integrated into designs from the outset. The word 'planning' allows ambiguity over exactly when consideration should begin to be given to these issues, and could theoretically lead to important issues being overlooked until the formal planning application process, which may be too late.
- Objective 2.4 should be revised to make specific reference to a green infrastructure approach.
- Consideration should be given to strengthening the wording of objective 2.5 to give a firmer commitment to maintaining those watercourses for which WCC has direct control.
- Objectives 3.2, 3.3 and 3.4 should be amalgamated. As the LLFA is also an RMA, objective 3.3 is superfluous, as this is already covered by 3.2. Suggested wording: "Engage and work in partnership with communities and RMAs in Worcestershire and related areas"
- Objective 4.1 should refer to "legislation and policy".
- Table 3 of the strategy should not list the National Planning Policy Framework as a piece of legislation; this is national policy, but is not law. Suggest amending the column title to "Legislation or policy" and amending the title of the table to "Other legislation and policy".
- Consideration should be given to the key messages identified from the plans, policies and strategies reviewed as part of the SEA Scoping Report.

- Objective 4.2 should be amended to "Work with Local Planning Authorities and local communities to ensure surface water flooding is taken into account in Local Plans, Neighbourhood Plans, and supporting evidence".

## 1.10 Monitoring

1.10.1 The environmental impacts arising from implementation of the LFRMS will be monitored through existing processes. This SEA does not recommend the introduction of any additional monitoring, as this may not be deliverable without additional resources and would be likely to duplicate existing regimes. Future SEA work - in particular new or revised Scoping Reports - will update the SEA evidence base to ensure that indicators and environmental issues are reflected in the assessment. Amendments to the SEA framework are not anticipated, because the framework has been designed to take account of all relevant issues that may arise, but changes will be considered if supported by evidence.

### ➤ SEA Framework Indicators

- Percentage of Total New Homes Built on Brownfield Land
- Condition of the Landscape
- Planted ancient woodland sites restored to native woodland
- Status of European nature conservation sites
- Condition of SSSIs
- Management Status of Local Sites
- Key Breeding Birds Population Numbers
- Proportion of undesignated heritage assets at risk
- Number of Grade I and II\* listed buildings at risk
- Amount of land falling within Agricultural Land Classifications (hectares)
- Hectares of Green Belt land
- Number of Air Quality Management Areas (AQMAs) in Worcestershire
- Water quality
- Water resource availability
- Contaminated Land
- Annual production of land-won aggregates (sand and gravel)
- Annual production of land-won aggregates (crushed rock)
- CO<sub>2</sub> emissions per head
- Ecological Footprint (Global Hectares per Person)
- Properties at risk of flooding
- Access to information: Satisfaction rates regarding Minerals & Waste planning policy
- Accessibility to Worcestershire acute hospitals
- Health ACORN categories
- Female life expectancy at birth
- Male life expectancy at birth
- Household waste produced per

### ➤ Relevant potential Local Flood Risk Management Strategy indicators

- Level of grant funding to deliver Flood & Water Management Act
- Proportion of floodspots investigated
- Number of Surface Water Management Plans produced

### **1.11 Next steps**

1.11.1 The final LFMRS is expected to be adopted in early 2016, alongside an SEA statement explaining the difference that the SEA process has made.

## 2. BACKGROUND

### 2.1 The Local Flood Risk Management Strategy in context

2.1.1 Worcestershire County Council (WCC) is producing the first Worcestershire Local Flood Risk Management Strategy (the "strategy" or the "LFRMS"). The LFRMS will assist in the understanding and management of flood risk in the county. The strategy is one of a number of policies, plans and proposals being developed as part of a more integrated approach to flood risk. This approach includes better working between responsible organisations to manage flood risk for the benefit of the county's communities and businesses.

2.1.2 The emerging strategy is being developed through co-operation with partner organisations.

2.1.3 The LFRMS seeks to reflect and complement relevant legislation, policy and guidance. The following is a non-exhaustive list of some of the key documents which continue to influence the strategy's development:

- The Flood and Water Management Act 2010 designated upper tier/unitary local authorities as Lead Local Flood Authorities and gave them and other Risk Management Authorities a number of duties and powers. These included a duty on the LLFA to maintain, apply and monitor a strategy for local flood risk management of the area (discharged in part through the publication of a Local Flood Risk Management Strategy).
- The National Flood and Coastal Erosion Risk Management Strategy, prepared by the Environment Agency with input from the Department for Environment, Food and Rural Affairs, sets out a national framework for managing the risk of flooding and coastal erosion. Localism is at the heart of the National Strategy, recognising that there is a limit to what Government and national bodies can achieve alone, and that national priorities are only part of the picture.
- River Basin Management Plans seek to guide delivery of the Water Framework Directive by improving the ecological status of water bodies.
- Catchment Flood Management Plans produced by the Environment Agency identify and agree policies for sustainable flood risk management.
- Surface Water Management Plans (SWMP) provide assessments of local flood risk and an action plan. A draft Worcestershire SWMP has been produced by WCC and partners to identify historical and potential future flooding locations in the county.
- Multi Agency Flood Plans provide plans for emergency responses to incidents of flooding.

In addition to the core documents listed above, many other related plans and strategies are being taken into account in producing the LFRMS. These include:

- Worcestershire Green Infrastructure Strategy
- Worcestershire Local Transport Plan
- Worcestershire Climate Change Strategy
- Worcestershire Strategic Economic Plan
- Worcestershire County Council Corporate Plan

- 2.1.4 The LFRMS will play an important role in formalising an integrated approach to local flood risk management in Worcestershire by setting out short, medium and long-term goals and aspirations, which will build on existing knowledge, experience and procedures.
- 2.1.5 The strategy has been designed to be accessible to public and private sector organisations, as well as to the general public.

## 2.2 Strategy Aims and Objectives

### **Aim 1: Understand and appropriately prioritise flood risk**

#### Objectives

- 1.1 Develop a County-wide flood risk management strategy.
- 1.2 Develop a County-wide surface water management plan.
- 1.3 Review and record relevant Risk Management Authority data in a register and make available to the public and partners subject to data sharing and confidentiality agreements.
- 1.4 Develop a County-wide protocol and on-going performance milestones to populate the register and record of flood assets.
- 1.5 Develop a protocol for undertaking the Duty to Investigate.
- 1.6 Develop a County-wide protocol and implementation plan for the designation of flood risk assets.

### **Aim 2: Manage and minimise the likelihood and impact of flooding**

#### Objectives

- 2.1 Ensure that FRM is fully taken into account by those planning new infrastructure and developments.
- 2.2 Develop flood alleviation schemes.
- 2.3 Work with partners, residents and businesses to install appropriate property level protection measures.
- 2.4 Work with landowners, NGOs and other public bodies to reduce surface water run-off.
- 2.5 Monitor ordinary watercourses and encourage appropriate maintenance.

### **Aim 3: Develop and manage effective partnerships**

#### Objectives

- 3.1 Identify and communicate FRM roles and responsibilities to stakeholders.
- 3.2 Work in partnership with the other RMAs in Worcestershire.
- 3.3 Work in partnership with neighbouring and other LLFAs.
- 3.4 Engage and work in partnership with Worcestershire's communities.
- 3.5 Develop local partnership groups around priority flood locations to develop and co-ordinate joint working.

**Aim 4: Inform, develop and implement relevant plans, policies and strategies**

Objectives

- 4.1 Take into consideration relevant plans, policies and strategies in the development of the LFRMS.
- 4.2 Work with Local Planning Authorities to ensure surface water flooding is taken account in Local Plans and supporting evidence.
- 4.3 Influence other plans, policies and strategies, through partnership working where appropriate, to ensure the consideration of FRM.

**Aim 5: Secure, maximise and prioritise the appropriate allocation of funding and other resources**

Objectives

- 5.1 Identify and maintain awareness of potential sources of FRM funding.
- 5.2 Maximise opportunities for funding.
- 5.3 Utilise the Defra capacity grant to deliver the LFRMS and other statutory responsibilities.
- 5.4 Undertake a review of the structure and deployment of FRM resources and identify potential efficiencies.
- 5.5 Review and appropriately develop skills and knowledge amongst FRM staff.

**Aim 6: Deliver sustainable environmental and economic benefits and contribute to the wellbeing of Worcestershire's communities and residents**

Objectives

- 6.1 Protect, enhance and conserve Worcestershire's built and natural environment.
- 6.2 Adapt to future projected climate change.
- 6.3 Work with the Worcestershire and Greater Birmingham and Solihull LEPs to maximise the benefits to Worcestershire's economy and infrastructure from FRM.
- 6.4 Reduce the negative impact of flooding on health and wellbeing.

**Aim 7: Develop, maintain and implement the LFRMS action plan**

Objectives

- 7.1 Ensure that all owners of actions within the plan and listed partners are aware of their role in delivery of the LFRMS.
- 7.2 Regularly monitor progress with delivery of the action plan and update the status column accordingly.
- 7.3 Review and update the action plan every 12 months.

## 2.3 Geographical extent of the Strategy

- 2.3.1 The LFRMS applies to the administrative area of Worcestershire. However, watercourses and flood pathways do not respect administrative boundaries; the nature and extent of flood risk management mean that cross-boundary liaison is essential to ensure that neighbouring LFRMSs both shape and are shaped by the situation in Worcestershire. The county's neighbouring Lead Local Flood Authorities are Herefordshire, Warwickshire, Gloucestershire, Shropshire, Staffordshire, Birmingham, Solihull, and Dudley.
- 2.3.2 The LFRMS recognises that Worcestershire is part of a wider context and hierarchy of flood risk management. The Severn and Wye Regional Flood and Coastal Committee covers the county and WCC has an appointed member of cabinet who sits on the committee, which meets on a quarterly basis. The committee brings together members appointed by LLFAs and independent members with relevant experience for three purposes:
- to ensure there are coherent plans for identifying, communicating and managing flood and coastal erosion risks across catchments and shorelines
  - to promote efficient, targeted and risk based investment in flood and coastal erosion risk management that optimises value for money and benefits for local communities
  - to provide a link between the Environment Agency, Lead Local Flood Authorities (LLFAs), other Risk Management Authorities (RMAs) and other relevant bodies to promote a mutual understanding of flood and coastal erosion risks in its area.

## 2.4 Time period of the Strategy

- 2.4.1 The strategy will be reviewed and updated periodically, with the first review envisaged for 2021 "to align with a review of the Worcestershire Preliminary Flood Risk Assessment and subsequently every five years".

## 2.5 Limitations of the Strategy

- 2.5.1 Worcestershire County Council, as the Lead Local Flood Authority, is only responsible for the management of local flood risk. Local flood risk is defined as surface water flooding, ordinary water course and groundwater flooding, as defined by the Flood and Water Management Act. The strategy therefore only addresses local flood risk and the interactions it might have with other forms of flood risk. Reference is, however, made to national strategies, policies and approaches where relevant and beneficial to understanding local flood risk issues.



## 2.6 The need for Strategic Environmental Assessment

- 2.6.1 European Directive 2001/42/EC on the Assessment of the Effects of Certain Plans and Programmes on the Environment (known as the Strategic Environmental Assessment or SEA Directive) has the following objective<sup>4</sup>:

***“To provide for a high level of protection of the environment and to contribute to the integration of environmental considerations into the preparation and adoption of plans and programmes with a view to promoting sustainable development.”***

- 2.6.2 It is not absolutely clear whether or not SEA is required under Article 3(2)(a) of the Directive; although *“an environmental assessment shall be carried out for all plans and programmes [which, inter alia] are prepared for ... water management”*, these plans must also *“set the framework for future development consent of [certain] projects...”*. It is debateable whether or not the LFRMS does set such a framework. However, undertaking SEA provides an additional form of scrutiny that, regardless of legislative necessity, benefits the LFRMS process and may lead to a more environmentally-sound final document.
- 2.6.3 The SEA process is designed to make sure that plans take environmental and certain social considerations into account, and that where there is the potential for negative effects, these effects are avoided, reduced, or mitigated. Undertaking the assessment should allow for negative impacts to be minimised and for positive impacts to be maximised.
- 2.6.4 The SEA Directive requires the consideration of *“likely significant effects on the environment, including on issues such as biodiversity, population, human health, fauna, flora, soil, water, air, climatic factors, material assets, cultural heritage including architectural and archaeological heritage, landscape and the interrelationship between the above factors”*.
- 2.6.5 This SEA Environmental Report builds upon an earlier informal consultation SEA report, which itself was guided by an SEA Scoping Report that was consulted upon in 2013, during the early stages of LFRMS preparation.
- 2.6.6 As part of a quality assurance process, a checklist is included in [Appendix 2](#) signposting to where the SEA requirements are addressed within the SEA process.

## 2.7 Related assessments

### Habitats Regulations Assessment

- 2.7.1 The Habitats Directive<sup>5</sup> requires a Habitats Regulations Assessment (known as Appropriate Assessment or ‘AA’) to be undertaken, when necessary, in preparing a project or plan. The aim of the HRA process is to demonstrate that the strategy will not have an adverse effect on the integrity of a European-designated site.

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<sup>4</sup> Article 1, European Directive 2001/42/EC

<sup>5</sup> Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora

- 2.7.2 A Habitats Regulation Assessment (HRA) Screening Report was produced to assess the draft LFRMS and attempt to identify any potential effects on international sites. The Screening Report concludes that *"with the additional mitigation proposed ... the Worcestershire Local Flood Risk Management Strategy is not likely to have any significant negative effects on any European sites, alone or in combination with other plans or projects. Given this conclusion, there is no requirement to progress to the next stage of the Habitats Regulations Assessment"*.
- 2.7.3 The Screening Assessment Report was provided to the Government's advisor, Natural England, which accepted the report's conclusions that there is no need to undertake a further 'Appropriate Assessment' of the strategy. However, as the LFRMS is a 'living document', if the LFRMS or its associated Action Plan objectives are 'materially' revised and/or the analysis is no longer considered to be 'up-to-date' (i.e. the competent authority – in this case Worcestershire County Council - determines that the rationale which underpins reasoning for a significant adverse effect on a European site being ruled out is no longer sound), an updated HRA will be required.

### **Equality**

- 2.7.4 In exercising its functions, Worcestershire County Council is bound by the public sector equality duty found in Section 149 of the Equality Act 2010. This means that regard must be had to the need to eliminate discrimination, harassment, victimisation and any other prohibited conduct; to advance equality of opportunity between persons who share a relevant protected characteristic and persons who do not share it; and to foster good relations between persons who share a relevant protected characteristic and persons who do not share it. In this context, 'protected characteristics' are age, disability, gender reassignment, pregnancy and maternity, race, religion or belief, sex, and sexual orientation.
- 2.7.5 As part of strategy preparation, an Equality Impact Assessment screening exercise to identify whether any potential equality impacts are likely to arise from the LFRMS is being undertaken.

### 3. THE STRATEGIC ENVIRONMENTAL ASSESSMENT PROCESS SO FAR

#### 3.1 The SEA Scoping Report

- 3.1.1 The SEA process began with a Scoping Report, produced at the earliest evidence-gathering stage of LFRMS preparation. The Scoping Report established the environmental and certain social issues of importance for Worcestershire upon which the LFRMS could have an influence. The issues were identified through an extensive review of policies, plans, and programmes, and an analysis of the best available baseline data.
- 3.1.2 Policies, plans and programmes at the European, national, regional and local level were considered, although it was assumed that national and European PPPs had been incorporated into the content and strategic direction of more locally-based documents. Only European and national documents of greatest relevance to the emerging strategy and to SEA were reviewed. The purpose of the review was not to highlight every detail from every document, but to identify the key implications for the SEA. The date of publication/period of validity, key objectives/targets, and potential implications for the LFRMS were recorded for each document reviewed. As the review is a dynamic process, revisions have been made as new documents have emerged or have been revised, and as new plans are adopted.
- 3.1.3 The list below shows those documents that were reviewed for the draft Scoping Report.

##### **European**

Habitats Directive (92/43/EEC)  
Birds Directive (2009/147/EC)  
Water Framework Directive (2000/60/EC)  
Groundwater Directive (2006/118/EC)  
Air Quality Directive (2008/50/EC)  
Floods Directive (2007/60/EC)  
European Landscape Convention (2000)  
Convention for the Protection of the Architectural Heritage of Europe (1985)  
Convention on the Protection of the Archaeological Heritage (1992)  
A Sustainable Europe for a Better World: A European Union Strategy for Sustainable Development (2001)

##### **National**

Wildlife and Countryside Act 1981  
Natural Environment and Rural Communities Act 2006  
Guidance for Local Authorities on Implementing the Biodiversity Duty, DEFRA (2007)  
Climate Change Act 2008  
Localism Act 2011  
Flood and Water Management Act 2010  
Natural Environment White Paper (2011)  
Making Space for Water: Taking forward a new Government strategy for flood and coastal erosion risk management in England (March 2005)  
Managing Flood Risk, DEFRA Committee (2013)

National Flood and Coastal Erosion Risk Management Strategy (2011)  
Spatial Planning for Sport and Active Recreation: Guidance on Sport England's Aspirations and Experience (2005)  
Strategic Environmental Assessment, Sustainability Appraisal and the Historic Environment, English Heritage (2013)  
Planning (Listed Buildings and Conservation Areas) Act 1990  
Ancient Monuments and Archaeological Areas Act 1979  
National Planning Policy Framework, DCLG (2012)  
Technical Guidance to the National Planning Policy Framework, DCLG (2012)  
Securing the Future: UK Sustainable Development Strategy (2005)  
A Strategy for England's Trees, Woods and Forests, DEFRA (2007)  
Flooding and Historic Buildings, English Heritage (2010)  
Developing the evidence base to describe the flood risk to agricultural land in England and Wales: Joint Defra/EA Flood and Coastal Erosion Risk Management R&D Programme (August 2011)

### **Regional**

West Midlands Historic Environment Strategy (2009)  
Regional Sustainable Development Framework (2005)

### **County**

Worcestershire Preliminary Flood Risk Assessment Report (2011)  
Worcestershire Surface Water Management Plan (2013)  
Draft Worcestershire Green Infrastructure Strategy May 2013  
Worcestershire Single Sustainable Community Strategy (2011)  
Draft Worcestershire Climate Change Strategy 2011-20 (2012)  
Worcestershire Landscape Character Assessment Supplementary Guidance (2011)  
Worcestershire Historic Environment Characterisation (2013)

### **Other**

River Basin Management Plan for Severn River Basin District (2009)  
River Severn Catchment Flood Management Plan, Summary Report (2009)  
District-level Strategic Flood Risk Assessment Level 2 Final Reports (South Worcestershire, Wyre Forest, Bromsgrove & Redditch)  
Cotswolds AONB Management Plan 2013-18  
Cotswolds Conservation Board Position Statement: Development in the setting of the Cotswolds AONB  
Malvern Hills AONB Management Plan

3.1.4 The key points emerging from the document review that the LFRMS may be able to positively influence (either directly or indirectly) are outlined below:

- There is a need to conserve and enhance biodiversity, and avoid any significant impacts on Natura 2000 sites. In determining site-specific interventions, account should be taken of the particular sensitivities of each Natura 2000 site that could potentially be affected, and advice from Natural England should be sought where necessary.
- Potential harmful impacts of flood risk management on protected and notable species, as well as on non-designated habitats, should be avoided.

- Strict requirements should be in place to prevent water pollution and to contribute to Water Framework Directive objectives.
- Air quality should be protected.
- Waste should be minimised. The aims of the Waste Framework Directive, including the 'polluter pays principle' and 'extended producer responsibility' should guide the approach to waste.
- Noise from flood risk management interventions should be minimised.
- Landscape should be protected from harmful development. Development should be informed by, and sympathetic to, the landscape character of the locality, whilst recognising that some operations will be temporary and could result in landscape benefits in the longer term. This will be especially crucial in and within the setting of designated landscapes (the Cotswolds and Malvern Hills Areas of Outstanding Natural Beauty). Development in protected areas should be guided by the overarching aim of conserving and enhancing the natural beauty of these areas. Full consideration should be given to AONB Management Plans and to the Worcestershire Landscape Character Assessment Supplementary Guidance.
- Heritage assets (designated and undesignated) and the wider historic environment should be conserved and enhanced. This includes avoiding adverse impacts through location and design, and protecting vulnerable heritage. Policy should be informed by an understanding of the significance of a heritage asset, including its setting. Where loss of significance is unavoidable, assessment and recording should be required where appropriate.
- All public bodies have a duty to have regard to biodiversity conservation when carrying out their functions (the 'biodiversity duty'). The conservation of biodiversity should become properly embedded in all relevant policies and decisions. Consideration should be given to how biodiversity enhancement can be used to bring about more sustainable development, through integration with other policy objectives and other land uses, for example housing and economic development, health, education and social inclusion.
- Carbon emissions should be minimised through lower-carbon practices in construction, operation and transport. Where possible, flood risk management should contribute to the transition towards a low-carbon economy. Across Worcestershire the local target is to reduce total county-wide carbon emissions by 30% from 2005 levels by 2020 and to put in place measures to enable an 80% emissions reduction by 2050.
- Opportunities to contribute to a linked green infrastructure network should be maximised.

- The value of trees should be recognised, and loss of trees should be avoided where practicable through location and design policies. The potential contribution of trees in flood risk management schemes should be explored and maximised.
- The most significant pressures which need to be dealt with in the river basin district are: abstraction and other artificial flow regulation; non-native species; nitrates; pesticides; phosphates; physical modification; sediment; and urban and transport pollution.

3.1.5 The above points, drawn from the review of plans, policies and programmes, were then expanded through a consideration of baseline data. Baseline data plays a fundamental role throughout the assessment, providing the evidence base from which to predict and monitor the effects of the LFRMS. In particular, the SEA Directive requires that *"the relevant aspects of the current state of the environment and likely evolution thereof without implementation of the plan"* be considered. The Directive also requires a summary of *"any existing environmental problems"*, especially those relating to European sites.

3.1.6 The process of data collection focuses on producing datasets that can provide the relevant evidence base and upon which the emerging strategy could have a significant effect (although recognising in some cases this may be remote).

3.1.7 Those issues on which Worcestershire is performing poorly (environmental problems) can be summarised as:

- There are localised areas where SSSIs are in poor condition, especially in Bromsgrove district, where a majority of sites remain classified as 'unfavourable no change'.
- Too few local wildlife and geological sites are under appropriate management, which generally means their condition is poor.
- Recorded populations of breeding birds are falling, particularly in the case of the bullfinch. This situation reflects the pattern nationally, and is largely occurring as a result of agricultural practices.
- Water bodies are not of good quality, and their condition is significantly worse than the overall picture in the region and in the country as a whole.
- Following year-on-year falls since 2005, CO<sub>2</sub> emissions increased in 2010. Per capita CO<sub>2</sub> emissions remain above both the regional and national figures.
- Per capita road transport emissions are especially high in more rural areas of the county (in Malvern Hills, Bromsgrove and Wychavon districts, these emissions are over twice the national average).
- Worcestershire has the second largest percentage land area at risk of flooding in the West Midlands (although it should be noted that, in terms of numbers of

households at risk, Worcestershire is performing better than the national average).

- The number of Air Quality Management Areas in Worcestershire is increasing.

3.1.8 Alongside identification of environmental problems required by the SEA Directive, a series of additional issues (both positive and negative) have emerged, which can be summarised as follows:

- Worcestershire's landscape character is high quality.
- Worcestershire's two Special Areas of Conservation are in favourable condition, but are sensitive to various impacts, including water quality and levels, recreational pressure/disturbance and diffuse air pollution.
- The overwhelming majority of Sites of Special Scientific Interest in the county are now in 'favourable' or 'unfavourable recovering' condition.
- The majority of Worcestershire's undesignated heritage is in good or intermediate condition. Indications suggest that Worcestershire is broadly equivalent to its neighbours in terms of risk to, and loss of, undesignated heritage.
- Worcestershire has a relatively large resource of high-quality agricultural land, but there is a risk that an increasing national focus on economic growth could increase the chance of such land being lost to development.
- There has been a major reduction in the amount of household waste produced over the last six years.

3.1.9 These issues, together with those identified through the review of plans, policies and programmes informed the 'SEA framework' proposed in the Scoping Report. This framework sets the approach used to test the environmental performance of the LFRMS in the SEA report. The framework includes objectives and decision-making questions under a variety of topics covering the LFRMS's environmental and social impacts.

3.1.10 The draft Scoping Report was originally consulted on in the autumn of 2013. Consultation responses were received from each of the statutory bodies (the Environment Agency, Natural England and English Heritage (now Historic England)). The responses led to various changes to the Scoping Report, which are set out in [Appendix 1](#). A summary of the main changes is provided below:

- The list of key issues was amended to better reflect the potential for FRM to affect both designated and non-designated habitats and to refer to protected and notable species.
- A reference to the risk of cost limiting FRM's ability to improve the environment or mitigate unavoidable environmental impact was added.

- Additional text from the Water Framework Directive, as well as information from the Joint Nature Conservation Committee, was added to the review of plans, policies and programmes.
- A revised version of English Heritage's guidance on SEA/SA and the Historic Environment was included in the review of plans, policies and programmes.

3.1.11 As well as changes made as a result of consultation, changes may be required if there are significant changes in the state of Worcestershire's environment, including environmental problems. Such changes could require the framework to be revised. Because the original Scoping Report was produced almost two years ago, it has been necessary to revisit the evidence on which it is based to ensure that it remains up-to-date and that the SEA framework it sets out remains fit for purpose.

3.1.12 A review of the SEA Scoping Report has been carried out, to reflect the best available data and evidence as at October 2015. These changes have been incorporated in an updated Scoping Report, and are summarised below.

3.1.13 Updates to plans, policies and programmes:

- In March 2014 the government launched the online Planning Practice Guidance (PPG). The resource is extensive and includes a wide range of guidance which could potentially influence flood risk management. The most relevant content is that within the 'Flood Risk and Coastal Change' section, which provides guidance for applicants and decision-makers on locating development to reduce the risk of flooding.
- In April 2014, the Malvern Hills AONB Partnership published a new Management Plan for the period 2014-2019. The plan recognises that climate change is likely to lead to a greater need for water management, and that regular flooding may lead to the reintroduction of water meadow management. It also recognises that protecting soil and water can reduce flood risk.

3.1.14 Many of the indicators used to inform the Scoping Report have been updated since 2013. The full revised review of baseline data - including the ways in which the LFRMS may be able to positively influence the issues and problems identified - is provided in an updated Scoping Report, which is available on request. A summary of the updated data is given below.

3.1.15 Updates to baseline data:

- **Brownfield land**  
During 2012/13 (the latest year for which all Worcestershire districts have published data), 55% of new housing completions in Worcestershire were built on previously-developed land (PDL). This is significantly below the proportion in 2010/11 (76%), and continues a falling trajectory.
- **Sites of Special Scientific Interest (SSSIs)**  
Following a period of steady increase in the proportion of SSSIs within the county in 'favourable' or 'unfavourable recovering' (i.e. returning to



favourable) condition, the past two years show a reversal of this trend. 91.75% of SSSIs were in favourable or unfavourable recovering condition in 2015, slightly down on 2014's proportion (92.85%).

- **Buildings at Risk**

There has been a slight increase in the proportion of grade I and II\* listed buildings at risk, from 2.6% in 2013, to 4.4% in 2015. This may, however, be linked to changes in monitoring and recording methods, and the way in which the data is published, and may not necessarily reflect a dramatic worsening in the condition of the historic environment.

- **Undesignated heritage assets**

46% of Worcestershire's sampled undesignated heritage assets were considered to be in 'good' condition in 2014, which is the same as 2013 and a slight fall on 2012 (when the proportion was 50%). Over the same period, there has been a minor increase in those assets considered to be at high risk (15% in 2014, compared to 14% in 2013), but this is an overall reduction since 2011, when the proportion was 16%.

- **Green Belt**

In 2015, Worcestershire had 41,630ha of land within the Green Belt. This is a decrease of 20ha since 2011 (a 10ha reduction in each of Bromsgrove and Wychavon districts). The extent of the designated Green Belt in England as at 31st March 2015 was estimated at 1,636,620 hectares, around 13% of the land area of England. This shows a minor decrease in area of 2,910ha since 2011 (0.18% of the 2011 area).

- **AQMAs**

The number of Air Quality Management Areas in Worcestershire has increased by one (in Worcester city). This continues the trend of the number of AQMAs increasing, and suggests that traffic emissions are continuing to rise.

- **Contaminated land**

In 2014, there were considered to be 7,513.66 hectares of potentially contaminated land in Worcestershire. This is a reduction of 428.28ha on the figure from 2011. Local authorities have addressed a number of sites that are no longer considered to be potentially contaminated land through the planning regime and other investigations. Following this inspection, investigation or remediation work, 0.39% of land that was potentially contaminated is no longer considered to be so. Whilst this is an improvement, it is less of an improvement than that achieved during previous years. This is because fewer large sites were addressed through voluntary remediation or investigation due to the economic climate; there has been an increase in the number of significant developments of 'greenfield' sites across the county in line with Local Plans; and national funding opportunities for contaminated land projects have been significantly reduced by central government. This will likely increase the burden of funding future investigations and remediation projects on local authorities at a time of reduced resources.

- **Sand and gravel sales/production**  
Sand and gravel sales/production continue to increase following the recession, with latest figures (from 2014) suggesting an upward trend, reflecting the performance of the wider economy. If there is an increase in construction and housebuilding, then it is likely that levels of extraction will increase.
- **Crushed rock**  
There has been a small increase in crushed rock sales, but the county's target is still not being met.
- **CO<sub>2</sub> emissions**  
CO<sub>2</sub> emissions per capita continue a downward trajectory, despite minor increases from 2011 to 2012 in every Worcestershire district except Malvern Hills. However, the county's CO<sub>2</sub> emissions per capita (7.4 tonnes) remain above both the regional (6.9 tonnes) and national averages (7.1 tonnes).
- **Properties at risk of flooding**  
Latest Environment Agency data show that there are 6,300 properties at risk of a 1 in 100 year fluvial flood, and 11,200 at risk of a 1 in 1000 year fluvial flood in Worcestershire. Although these figures have increased since 2012, this is as a result of a revised monitoring methodology rather than any absolute increase in properties at risk. But the data continue to demonstrate the need for robust flood risk management processes to be in place.
- **Population**  
The county's population has increased from 566,600 (2011 mid-year estimate) to 569,000 (2012 mid-year estimate, and the latest data available). This continues the established upward trend. By 2021 Worcestershire is projected to have a population of almost 594,000, representing an increase of over 27,000 on the 2011 census figure, or almost 5%. This is a lower proportional increase than projected in the West Midlands region as a whole (almost 7%), and a smaller projected increase than the national average of just over 8.5%.
- **Deprivation**  
Worcestershire's deprivation ranking relative to other upper-tier authority areas in England has steadily worsened since 2004, from 117 to 110. Neighbouring upper-tier authorities have tended to fluctuate, with only Herefordshire following the pattern of Worcestershire's continual, consistent decline, although most authorities remain broadly similar.
- **Life Expectancy**  
Life expectancy for males and females continues to increase.

3.1.16 The full SEA Scoping Report is available on request.

**4. METHODOLOGY**


**4.1 Structure of the SEA and links to the LFRMS**

- 4.1.1 A variety of guidance has been used to inform the preparation of this SEA report, including the *Practical Guide to Strategic Environmental Assessment*, DCLG's online *Plan-Making Manual*, and the Local Government Association's *Framework to assist the development of the Local Strategy for Flood Risk Management*. The guidance provides a structure for the SEA and divides the process into distinct elements, which are then further broken down into specific tasks (see Figure 1, below). This SEA report falls under stages B and C of the process: 'Developing and refining alternatives and assessing effects' and 'Preparing the Environmental Report', respectively.
- 4.1.2 The SEA process co-ordinates with production of the strategy. This helps to ensure that the SEA plays a valid role, and ensures there are opportunities for its findings to influence the strategy.

**4.2 Timetable**

4.2.1 This SEA Environmental Report has been produced to accompany the formal consultation draft Local Flood Risk Management Strategy. Alongside any responses received on this SEA, responses to the LFRMS consultations may also be relevant to the SEA and will be taken into account as appropriate. The current programme for LFRMS preparation is as follows:

**Table 2: Local Flood Risk Management Strategy and SEA co-ordination**

What?	When?	SEA Stage
Early consultation	2013	SEA Scoping Report
Informal partner consultation	Summer 2015	Initial Informal SEA
 Formal consultation draft	Late 2015	This SEA Environmental Report
Adoption	Early 2016	Post-adoption statement
Monitoring & review	Ongoing	SEA monitoring

4.2.2 Although the process has a series of separate stages, the actual undertaking of SEA leads to continuous review and refinement as further baseline information is obtained and as more sustainable issues and options are identified.

**Figure 1: The SEA Process (adapted from *A Practical Guide to the SEA Directive*)**

**Stage A: Setting the context and objectives, establishing the baseline and deciding on the scope**

A1: Identifying other relevant policies, plans and programmes, and environmental protection objectives

A2: Collecting baseline information

A3: Identifying environmental problems

A4: Developing SEA objectives

A5: Consulting on the scope of the SEA

**Stage B: Developing and refining alternatives and assessing effects**

B1: Testing the LFRMS objectives against the SEA objectives

B2: Developing strategic alternatives

B3: Predicting the effects of the draft LFRMS, including alternatives

B4: Evaluating the effects of the draft LFRMS, including alternatives

B5: Considering ways of mitigating adverse effects

B6: Proposing measures to monitor the environmental effects of LRFMS implementation

**Stage C: Preparing the Environmental Report**

C1: Preparing the Environmental Report

**Stage D: Consulting on the draft LFRMS and the Environmental Report**

D1: Consulting on the draft LFRMS and Environmental Report

D2: Assessing significant changes

D3: Decision making and providing information

**Stage E: Monitoring implementation of the LFRMS**

E1: Developing aims and methods for monitoring

E2: Responding to adverse effects

4.2.3 The Strategic Environmental Assessment is not a formal part of the draft strategy, but nevertheless plays a valuable role in informing its development.

### 4.3 Level of detail in the SEA

4.3.1 Where possible, the effects of the LFRMS upon each of the SEA objectives is considered in terms of short, medium and long-term impacts, as well as their

secondary, cumulative and synergistic<sup>6</sup> effects. It must be recognised, however, that the level of detail provided in the strategy is not always sufficient to allow for a full, in-depth assessment.

- 4.3.2 When reaching judgements on the likely impact of the LFRMS, it is reasonable to consider the safeguards provided by existing legislation, policy and best practice. As such, it is reasonable to assume that implementation will not be carried out in a way contrary to such safeguards.
- 4.3.3 The limitations of SEA as a strategic tool to aid policy-making are clear; SEA cannot provide a full, site-level consideration of likely impacts. Because the LFRMS is a strategic document - with even the associated Action Plan not describing the detail of schemes - the exact nature of delivery is not clear at this stage. More localised assessments, such as those made through the planning application process (including Environmental Impact Assessments where required) will be crucial in making sure that the impact upon the environment of any particular development is given due consideration. Other regulatory regimes (for example Environment Agency permitting, sustainable drainage approval, etc.) will also play a role in ensuring that development is appropriately located, planned and managed.

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<sup>6</sup> 'Synergistic effects' refers to the interaction or cooperation of two or more outcomes to produce a new or enhanced effect compared to their separate effects

## 5. THE STRATEGIC ENVIRONMENTAL ASSESSMENT FRAMEWORK

### 5.1 Developing the SEA Framework

5.1.1 The SEA Framework is at the heart of the SEA process. Through the development of a set of objectives and decision-making criteria, the framework provides the means through which environmental effects of the emerging strategy can be described, analysed and compared. The SEA objectives are critical in assessing the potential environmental effects of the strategy and in prompting consideration of alternative approaches.

5.1.2 The selection of SEA objectives has derived from a combination of the following considerations, all of which are based on the best information available at the time:

- Review of the issues of relevance to Worcestershire as described within plans, policies and programmes;
- Review of the environmental characteristics, issues, and problems; and
- Analysis of baseline data.

More detail on these issues is provided in Section 3 of this report.

5.1.3 Due to the breadth of issues included within the SEA, the emerging strategy may only have limited scope to influence some of the objectives. There remains a crucial role for other plans, programmes and policies to secure environmental benefits for Worcestershire.

## 5.2 The SEA Objectives

5.2.1 The objectives for each of the SEA issues are set out below:

### **Objective 1: Landscape**

Safeguard and strengthen landscape character and quality.

### **Objective 2: Biodiversity, Geodiversity, Flora and Fauna**

Conserve and enhance Worcestershire's biodiversity and geodiversity.

### **Objective 3: Historic environment**

Conserve and enhance the historic environment, heritage assets and their settings. Protect, enhance and manage the character and appearance of townscapes, maintaining and strengthening local distinctiveness and sense of place.

### **Objective 4: Material assets**

Ensure efficient use of land through safeguarding of mineral reserves, the best and most versatile agricultural lands, land of green belt value, maximising use of previously-developed land and reuse of vacant buildings, whilst safeguarding open space/green infrastructure, biodiversity and heritage interests.

### **Objective 5: Natural Resources**

Protect and enhance water, soil and air quality.

### **Objective 6: Climate Change**

Reduce causes of and adapt to the impacts of climate change.

### **Objective 7: Flooding**

Ensure inappropriate development does not occur in high-risk flood-prone areas and does not adversely contribute to fluvial flood risks or contribute to surface water flooding in all other areas.

### **Objective 8: Population**

Improve the quality of, and equitable access to, local services and facilities, regardless of age, gender, ethnicity, disability, socio-economic status or educational attainment.

### **Objective 9: Health**

Improve the health and well-being of the population and reduce inequalities in health.

5.2.2 The following sections set out the combined environmental problems and issues of importance for Worcestershire arising from the review of plans, policies and programmes, and the analysis of baseline data. Later sections of this report set out the possible role the LFRMS could play in helping to deliver against each objective.

**Landscape: Safeguard and strengthen landscape character and quality.**

The condition of the landscape in Worcestershire was last assessed in 2009, at which time it was considered that, overall, condition of the landscape was good and stable. This survey was based on assessment of 'Land Cover Parcels' according to the condition of field boundaries, enclosure pattern, tree cover pattern, character, land use and settlement pattern. The current 'good' condition status does not mean that all areas of the county enjoy the best landscape condition possible; 4% of areas surveyed were ranked as 'poor' and 26% as 'moderate'.

Worcestershire's Landscape Character Assessment Supplementary Guidance<sup>7</sup> provides information on the evolution of the county's landscape and sets out how landscape considerations need to be considered when development is planned.

Worcestershire's landscape has evolved as a result of both the physical structure of the landscape, and people's impact upon it. The cultural patterns of Worcestershire's landscape have been heavily influenced by, among other factors, physical restraints such as the occurrence of seasonal flooding. Worcestershire's 22 rural landscape types include 'Riverside Meadows', which are linear riverine landscapes associated with a flat, generally well-defined alluvial floodplain, in places framed by steeply rising ground. These are secluded pastoral landscapes, characterised by meandering, tree-lined rivers, flanked by alluvial meadows which are defined by hedge and ditch boundaries. Settlement is typically absent. The Guidance notes that wetland habitats are nationally scarce today and opportunities to restore or re-create them should be encouraged. In areas where property would not be at risk, a return to annual flooding cycles could be considered in order to achieve this.

Works to contain unpredictable flash flooding and, conversely, to provide irrigation during summer droughts, will impact on the landscape, initially at a local level, but more widely as these features become more commonplace.

The landscape guidelines for the Riverside Meadows landscape type that are most relevant to the LFRMS are:

- Conserve existing wetland habitats and seek opportunities for further wetland habitat creation.
- Avoid building or road construction works.
- Avoid further drainage of waterside meadows.
- Explore opportunities to return to patterns and processes of natural flooding cycles.

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<sup>7</sup> Worcestershire County Council, Landscape Character Assessment Supplementary Guidance (2011)



**Biodiversity, Geodiversity, Flora and Fauna: Conserve and enhance Worcestershire's biodiversity and geodiversity.**

The quality and condition of Worcestershire's biodiversity and geodiversity is impossible to quantify in one single overall measure; baseline data show, for example, that while the condition of SSSIs is fair, the population of certain key breeding birds continues to decline. Flood risk management measures may have a role to play in maintaining the positive condition of sites.

Birds associated with wetland habitats, such as snipe, curlew, redshank, etc. have seen massive declines in numbers across the county, largely as a direct result of land drainage and loss of habitat. Any FRM programme has the potential to have particular impacts on this group of species. Poorly considered FRM work could cause the further decline of these species, whereas an integrated approach to FRM could see a significant restoration of appropriate habitat that has the potential to reverse the declining populations.

SSSI condition in the county overall is fair. In the past two years, there has been a very slight decrease in the overall proportion of sites meeting either 'favourable' or 'unfavourable recovering' standard, down from 93.21% in 2013, to 92.85% in 2014 and 91.75% in 2015. The DEFRA target for 2010 was for 95% of SSSIs to reach such status. Some SSSIs in the county are dependent on flooding for their special interest. The wetland habitat of the Wilden Marsh and Meadows SSSI, for example, is dependent on the site's location in the floodplain, and any development which could alter this floodplain could have a negative impact on the site.

**Historic environment: Conserve and enhance the historic environment, heritage assets and their settings. Protect, enhance and manage the character and appearance of townscapes, maintaining and strengthening local distinctiveness and sense of place.**

Worcestershire's historic environment includes designated and non-designated assets. There are some 6,362 listed buildings (107 Grade I, 326 Grade II\*, and 5,929 Grade II); 136 Conservation Areas; 178 Scheduled Monuments; and 16 designated parks and gardens (two Grade I, six Grade II\*, and eight Grade II). 4.4% of Worcestershire's Grade I and II\* listed buildings, and 8% of scheduled monuments are categorised as being 'at risk'. In addition to statutorily-protected sites, there are locally-important heritage assets on Local Lists, and a vast range of other heritage features; the Historic Environment Record lists 45,031 known assets, and this record continues to grow as new discoveries are made and recorded. A sample of 71 undesignated assets showed that, in May 2014, 15% were in poor condition, 38% were in intermediate condition and 46% were in good condition. These proportions have remained broadly similar since monitoring began in 2011.

Flooding, and the measures put in place to manage flooding, can have serious impacts – both positive and negative - on the historic environment. English Heritage commissioned Worcestershire's Archive and Archaeology Service to research these impacts, and this project is currently ongoing. One of the aims of the project is to produce guidance for other local authorities and heritage practitioners on the opportunities offered by the historic environment for

sustainable flood management, and effective methodologies for incorporating the historic environment into flood management plans.

**Material assets: Ensure efficient use of land through safeguarding of mineral reserves, the best and most versatile agricultural lands, land of green belt value, maximising use of previously-developed land and reuse of vacant buildings, whilst safeguarding open space/green infrastructure, biodiversity and heritage interests.**

Figures suggest that Worcestershire's agricultural land is of high quality, with a total of 82.9% falling within grades 1, 2 and 3 of the agricultural land classification. Unsurprisingly, much of the best-quality agricultural land is in the vicinity of the flood plains and fertile surrounds of the rivers Severn, Avon and Teme. Flooding can, however, seriously damage agricultural production. Environment Agency research<sup>8</sup> notes that the average cost of agricultural flood damage across Yorkshire and Humberside, Worcestershire, Gloucestershire, and Oxfordshire resulting from the 2007 floods was about £1,150 per flooded hectare when weighted by land use.

In 2015, Worcestershire had 41,630ha of land within the Green Belt. This is a decrease of 20ha since 2011 (a 10ha reduction in each of Bromsgrove and Wychavon districts). Green belt land is protected from inappropriate development under national and local planning policy. Development facilitating flood risk management is not necessarily inappropriate in the Green Belt providing the development preserves the openness of the Green Belt. Whether or not any specific flood risk management development is contrary to Green Belt policy will need to be determined on the merits of the scheme and whether or not it constitutes inappropriate use.

The best available record of the amount of previously-developed land (also known as 'brownfield' land) in Worcestershire is the National Land Use Database (NLUD). The most recent NLUD release is based on data from 2012. This shows there was a total of 207.512 hectares of such land in the county (40.75ha in Bromsgrove, 19.5ha in Malvern Hills, 8ha in Redditch, 18.4ha in Wychavon and 120.8ha in Wyre Forest). The database is intended to be comprehensive, recording "*all previously developed land and buildings in England that may be available for development, whether vacant, derelict, or still in productive use*". The database's figures must be treated with a degree of caution, as they are reliant on returns from individual local authorities as resources allow, and only 50% of authorities provided returns for the 2012 report. The database may therefore not accurately reflect the actual situation. Worcester City is not shown as having any previously-developed land on the database, but this is probably inaccurate. National planning policy seeks the re-use of brownfield land that it is not of high environmental value, but as flood risk management works are generally limited in where they can be sited to be most effective, this may not

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<sup>8</sup> Environment Agency: The costs of the summer 2007 floods in England (January 2010)

always be an option and some greenfield development will be unavoidable. Opportunities to reuse vacant buildings for flood risk management purposes may be limited, given the specialist and site-specific nature of such developments, and the fact that some flood risk infrastructure will be in land that will not have been built on specifically because it is at risk of flooding.

National Planning Practice Guidance recognises that "*mineral deposits have to be worked where they are (and sand and gravel extraction is defined as 'water-compatible development', acknowledging that these deposits are often in flood risk areas)*". It also states that "*Sequential working and restoration can be designed to reduce flood risk by providing flood storage and attenuation. This is likely to be most effective at a strategic (county) scale*". The LFRMS should inform and be informed by the emerging Worcestershire Minerals Local Plan through ongoing liaison, to ensure opportunities for minerals workings to contribute to flood risk management are identified and explored.

The Worcestershire Green Infrastructure (GI) Strategy is clear that investment in GI in Worcestershire can deliver a broad range of benefits. It can offer, inter-alia, an alternative to grey infrastructure; provide flood and water management; and facilitate climate change adaptation & mitigation. One of the defining features of GI is its multi-functionality. This means that measures put in place to achieve flood risk management can also satisfy other objectives through, for example, providing landscape enhancement, accessible open space, a biodiversity corridor, etc.

#### **Natural Resources: Protect and enhance water, soil and air quality.**

Assessment under the Water Framework Directive shows that the quality of Worcestershire's water courses is poor compared to overall performance across the region and across the Severn river basin district. Measures are in place to help ensure that Worcestershire's 18 'artificial' and 'heavily modified' water bodies meet 'Good Ecological Potential', and its 64 'natural' water bodies meet 'Good Ecological Status'. Only 10 of these water bodies currently meet the 'good' standard, with 56 classed as 'moderate', 11 'poor' and 5 'bad'. The Local Flood Risk Management Strategy has the potential to help improve water quality through setting a framework for the use of appropriate natural flood management.

Soil quality is generally considered in terms of its ability to support various types of agricultural production. Background information on soil quality is given in the commentary for Objective 4, above.

The best measure of air quality within Worcestershire is the number and extent of Air Quality Management Areas (AQMAs), which are designated when pollutants exceed certain levels. In Worcestershire, the only exceedances are for nitrogen dioxide (AQMAs are designated if concentrations are above the annual mean objective of 40µg/m<sup>3</sup>.) The main source of nitrogen dioxide is emissions from road vehicles in busy and congested streets. AQMAs have been declared in Bromsgrove (Kidderminster Road, Hagley; Worcester Road, Bromsgrove; Redditch Road, Stoke Heath; and M42 Junction 1 at Lickey End); Worcester City (Bridge Street/Dolday and Lowesmoor/Rainbow Hill); Wychavon (Port Street, Evesham); and Wyre Forest (Welch Gate, Bewdley and Horsefair, Kidderminster).

Alongside declared AQMAs, there are several areas of the county where levels of emissions are being monitored to determine whether or not further designations may be required. These areas are the A38 in Wychbold; areas of Upton-on-Severn; Other Road, Redditch; and Foregate Street/Shaw Street, the Sidbury end of London Road, and the Tything/Castle Street junction, all in Worcester City. Flood risk management measures could impact on air quality. Some infrastructure, such as flooding pumps, will lead to an increase in carbon dioxide and other emissions. But the proactive provision of some flood risk infrastructure will reduce the need for reactive interventions in times of flood and for the duration of its aftermath (such as short-term diesel pumps, dehumidifiers, transport, etc.). When parts of the transport network are compromised by flooding, emissions can increase. If parts of the strategic road network are closed as a result of flooding (as happened with the M5 south of Worcestershire in 2007), lengthy diversions are required which can increase traffic on local roads, with consequent increases in journey times, queues and vehicular emissions. If flood risk management measures can help reduce the likelihood of such transport disruptions, then the risk of increased temporary emissions can be reduced.

**Climate Change: Reduce causes of and adapt to the impacts of climate change.**

There is a strong belief among the scientific community that rising concentrations of greenhouse gases, such as carbon dioxide, from the burning of fossil fuels in homes, power stations, vehicles, business and industry, are contributing to climate change. Climate change is a global phenomenon, but it can be felt locally. In Worcestershire, over the last century there has been a lengthening in the growing season by a month, and over the last few decades there have been a number of incidences of severe flooding and drought, causing damage to property and habitats alike. These trends are set to accelerate unless action is taken to reduce greenhouse gas emissions.

Data on carbon dioxide emissions is available through DEFRA at a two-year time lag. The latest available data therefore dates from 2012. The reporting methodology means that it excludes motorway emissions and emissions from energy intensive industries included in the European Emissions Trading scheme. The latest CO<sub>2</sub> figures for 2012 show that despite some slight fluctuations, Worcestershire's per capita emissions have reduced by 1.2 tonnes since 2007, from 8.6 tonnes per annum (tpa) to 7.4 tpa. This equates to a 13.95% overall reduction between 2007 and 2012. The Worcestershire Partnership had a target to reduce emissions in the county by 11% by 2011. This target had been achieved by 2010, and exceeded by 2011. The Worcestershire Partnership now has a target to reduce the county's emissions by 30% by 2020. The CO<sub>2</sub> reduction for Worcestershire (14%) is lower than the West Midlands (15.9%) and national reductions (16.5%), and overall emissions per capita for Worcestershire are greater than the regional and national figures. The largest proportional reduction in Worcestershire over this period was seen in Redditch (21.2%). The smallest reduction was in Wychavon (12.5%).

Slightly more emissions (38%) came from the industrial and commercial sector than from the domestic sector (36%); the road transport sector (26%) produced the smallest emissions.

Some infrastructure, such as flooding pumps, will lead to an increase in carbon dioxide and other emissions. But the proactive provision of some flood risk infrastructure will reduce the need for reactive interventions in times of flood and for the duration of flood aftermath (such as short-term diesel pumps, dehumidifiers, transport, etc.). When parts of the transport network are compromised by flooding, emissions can increase. If parts of the strategic road network are closed as a result of flooding (as happened with the M5 south of Worcestershire in 2007), lengthy diversions are required which can increase traffic on local roads, with consequent increases in journey times, queues and vehicular emissions. If flood risk management measures can help reduce the likelihood of such transport disruptions, then the risk of increased temporary emissions can be reduced. Reducing emissions will help to address the causes of climate change.

Flood risk management also has a major role to play in climate change adaptation, as projections indicate a likelihood of increased severe weather events which could lead to greater numbers of properties and other critical series being at risk of flood.

Neither the National Flood Risk Assessment nor the Update Flood Map for Surface Water take into account future climate change. This makes it all the more important that local strategies recognise the potential risk posed by increased flooding linked to a changing climate. Ensuring buildings and infrastructure are resilient to increased flooding is essential, and requires coordinated actions cross agencies and professions. A green infrastructure approach to drainage is well suited to providing adaptation benefits not just for flooding, but for overheating and air quality.

**Flooding: Ensure inappropriate development does not occur in high-risk flood-prone areas and does not adversely contribute to fluvial flood risks or contribute to surface water flooding in all other areas.**

Flooding in Worcestershire occurs as a result of rivers such as the Severn, Avon and Teme bursting their banks, and through surface water flooding following intense rainfall. As the climate is expected to change and bring with it an increased frequency and intensity of extreme weather events such as heavy rainfall, it is likely that Worcestershire will see more flooding incidents.

In Worcestershire, approximately 10% of the land area is at risk of fluvial flooding.

Data provided by the Environment Agency for properties at risk of flooding accounts for properties that appear in the relevant flood zones and represents the situation without flood defences. Worcestershire currently has 283,572 domestic and commercial properties and 2012 figures show that 3.2% of properties are at risk from fluvial flooding (a 1 in 1,000 year event). 1.7% of properties are at risk from a smaller 1 in 100 year flood.

Currently, 7% of properties in Worcestershire are at risk of surface water flooding. Worcestershire County Council, as Lead Local Flood Authority, is finalising a Surface Water Management Plan, which may reveal updated figures as more detail becomes available. There are more than twice as many properties at risk of surface water flooding than there are at risk of fluvial flooding in Worcestershire; in 2007 there were 4,784 households at risk of fluvial flooding.

Wychavon and Wyre Forest had the greatest percentage of properties (residential and non-residential) at risk of flooding, at 29% and 23% respectively. Not all properties at risk of flooding are expected to receive water damage during a flood. For example, widespread summer flooding in 2007 resulted in lower numbers of flooded properties than were classed as being at risk. The exception to this is Malvern Hills district, where around 300 more properties were flooded than were classed as being at risk.

In England and Wales, 9% of people live or work in properties at risk of flooding. It is estimated that in the West Midlands, 6.5% of land has a 1% chance of flooding in any one year. This puts around 4% of properties in the region at risk of flooding.

**Population: Improve the quality of, and equitable access to, local services and facilities, regardless of age, gender, ethnicity, disability, socio-economic status or educational attainment.**

Mid-2012 estimates suggest Worcestershire's total population is around 569,000, which shows a steady increase from the mid-2001 (542,200) and mid-2011 (566,600) estimates, at an average rate of around 2,400 persons per annum. There are 94,300 people in Bromsgrove; 75,000 in Malvern Hills; 84,400 in Redditch; 99,600 in Worcester City; 117,700 in Wychavon; and 98,100 in Wyre Forest.

The pattern in Worcestershire is one of an increasingly ageing population; in just a single year the number of children has fallen by around 100, while the number of people aged 65 and over has risen by around 4,500. A decline of 1,900 persons is estimated to have occurred in the 18-64 age group since mid-2011.

In terms of total population the proportion of males and females in Worcestershire is very similar, at 49.25% and 50.75% respectively. However, there are some age groups where the proportion of males to females is skewed. The greatest difference between the number of males and females is in the older age groups, particularly those aged 80+, where females predominate. This is particularly noticeable in the 85+ age group, in which the ratio of females to males is at least 2 to 1.

The largest ethnic group in Worcestershire is "White; English/Welsh/Scottish/Northern Irish/British", comprising at 92.36% of the population. Whilst the proportions of other ethnic groups are very small relative to this (the next largest group is "White; Other White", at 2.56%, with no other group making up more than 0.88% of the population), there are significant numbers people from a wide range of backgrounds who may have specific needs and customs which impact on their vulnerability to flooding. Research into this issue by DEFRA and the Environment Agency<sup>9</sup> included alliterative review which found that:

- Older people have a disproportionate vulnerability to the effect of disasters with frail or disabled older people being particularly at risk.
- Women tend to recover more slowly than men from natural disasters and play a key role in the work of recovery after flood events. As primary

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<sup>9</sup> Defra/Environment Agency (May 2005) Flood and Coastal Erosion Risk Management R&D Programme: Technical Summary W5C-018/TS, 'Flood Warning for Vulnerable Groups'

care-givers women are more likely than men to have responsibility for dependants in the event of a flood and conversely are also more likely to be the sole adult householder (as lone parents or lone older people).

- Language differences may obstruct reception of flood warnings and cultural differences may exacerbate the impact of floods.
- Socio-economic factors – poorer people are less likely to be adequately insured for flood damage, more likely to live in homes at particular risk of flooding (i.e. caravans) and to have lower levels of education which may impede the reception of warnings.
- Disability and illness – those with physical or mental disability or long term illness may have particular difficulties receiving warnings and being able to respond to them.
- Special needs populations – residential care homes, hospitals, schools etc. may experience particular difficulty in evacuation.

The research also cites a study into six sites where severe flooding had occurred (including Bewdley), which found that *"those people who are already vulnerable ... are particularly at risk in terms of reacting appropriately to flood warnings and suffering adverse effects of flood event. Members of low income groups, frail older people, families with young children, those living in mobile homes, people with disabilities and members of minority ethnic groups were reported to have experienced particular difficulties"* and that *"single householders were less likely to be able to take action than households with two or more adults, and that new residents were less likely to act promptly or take appropriate action on receipt of warning"*. Local approaches to flood risk management can help to minimise risk to these groups through identifying specific needs and making appropriate provision.

#### **Health: Improve the health and well-being of the population and reduce inequalities in health.**

Results from the 2011 census show that 46.5% of Worcestershire residents consider their health to be 'very good', 34.9% 'good', 13.5% 'fair', 4% 'bad', and 1.2% 'very bad'. These proportions are very similar to those in the West Midlands and across England as a whole, but there are significant differences within Worcestershire. Those rating their health as 'very good', for example, account for 49.1% of residents in Bromsgrove, but just 43.6% in Wyre Forest. More marked differences in health become apparent at local levels (such as individual wards or super output areas).

The physical and mental impacts of flooding are well-documented. The Health Protection Agency (now part of Public Health England) has stated that *"Flooding presents a number of risks to health, drowning being the most obvious. Serious injury can be caused by falling into fast flowing water or from hidden dangers under the water, such as missing manhole covers. There is also a serious danger posed by carbon monoxide fumes from the use of generators and other fuel-powered equipment brought indoors to dry out buildings"*. It also states that *"The general risk to health from exposure to contaminated flood water is low, although local risk assessment may be needed to identify higher contamination risks"*.

Flooding can have profound effects on people's mental health and well-being that may continue over extended periods of time. Distress is a common reaction for people following a flood. The HPA note that, whilst distress is usually temporary, a minority of people are at risk of going on to develop a mental disorder.

The Environment Agency has stated that *"Surveys by the Health Protection Agency of flood victims reported that between one third and a half of over 2,200 respondents in areas affected by flooding reported health concerns, especially relating to depression and anxiety. A comparative survey within and adjacent to flood areas, suggested that flood victims were about six times more likely to exhibit psychiatric distress than those who had not experienced flooding"* and that *"With respect to the appraisal of flood defence schemes, a study commissioned by Defra (2004) suggested that households were, on average, willing pay £200 per year to avoid the negative intangible, mainly health related impacts of flooding"*.

Access to the natural environment can reduce stress levels and encourage people to become more active, helping to tackle obesity, coronary heart disease and mental health problems. During and/or following construction, flood risk management schemes may impact on public rights of way, including footpaths and bridleways. Depending on these public rights of way, it may be possible in some cases to work around them. In other cases this will not be possible and diversion or closure of public rights of way may be more appropriate.

There are significant opportunities for new or revised flood management schemes to improve public access to the natural environment, through inclusion of public footpaths and nature trails, bird hides and other recreational facilities, such as fishing and water sports. However, the potential to achieve such gains will often depend on the specific site and the landowner, and there will be sites which are dangerous to the public, to which access must be prohibited.

### **5.3 Testing the LFRMS through assessment matrices**

- 5.3.1 The LFRMS has been tested by considering how each proposed element could affect the objectives listed above. Some of the approaches will have a major impact, whilst others may be of limited relevance, or of such a small scale as to produce no significant effects. For some parts of the LFRMS, it has not been possible to identify the likely impact(s), due to insufficient information being available. Where this is the case, it has been stated.

### **5.4 What has the SEA assessed?**

- 5.4.1 The SEA has assessed the main LFRMS. This is the overall strategic direction of flood risk management for Worcestershire, and is therefore the right level at which to apply the SEA, which is concerned with significant environmental affects at the strategic level.



## 5.5 What has the SEA not assessed?

- 5.5.1 Various documents have informed the LFRMS and are related to it. There is a particularly close relationship with the Worcestershire Surface Water Management Plan (SWMP) - a strategic, county-wide assessment of flood risk from all sources, not just surface water. Developed in partnership with other risk management authorities, the SWMP identifies priority locations for action (both 'quick win' projects and longer-term strategic interventions). The SWMP has not been subject to SEA, but this approach is under review and, if considered appropriate, an SEA of the SWMP may be carried out. It is worth observing that the SWMP recognises the need for the environment to play a bigger role in determining which schemes should be taken forward, stating in section 6.4 that *"The floodspot prioritisation process should be updated to include criteria which reflect the impact of flooding on the natural and historic environment"*. This would accord with LFRMS Objective 6.1 to "Protect and enhance Worcestershire's natural environment". The SFRA also notes, in section 6.12, that *"All flood risk management schemes should be put through an appropriate environmental impact assessment process"*. **These safeguards are essential to ensuring success against the SEA objectives, and it is strongly recommended that these measures are put in place.**
- 5.5.2 This SEA has not assessed any of the supporting and related documents which make a valued contribution to the overall approach to flood risk. The lack of assessment of these elements in this SEA does not infer that they will have no environmental impacts; a thorough consideration of how each document relates to the environment is needed, and they should wherever possible be informed by environmental data and policies. This SEA Environmental Report, alongside the SEA Scoping Report and HRA reports, may provide some useful information to draw upon in any other environmental assessment.
- 5.5.3 As an appendix to the LFRMS, the Action Plan has been considered at a high level in this SEA. The Action Plan *"sets out the actions planned by the LLFA and the other Risk Management Authorities in Worcestershire over the next 6 years [which] define how the FRM approaches described in the Strategy will be implemented"*. The Action Plan identifies 'actions' (either desk-based work to drive forward the evidence base/policy on flooding, or actual projects on the ground). For each action, the plan identifies, at a summary level: the lead partners in its delivery; the date by which the action will be completed; the estimated cost; and the potential funding sources. In so doing, the Action Plan translates the LFRMS's broad strategic overview into more tangible outputs. The reasoning/justification for each project is not always clear, as the Action Plan does not explain the specific circumstances (such as environmental constraints or opportunities) of each project. The absence of information makes environmental assessment difficult, as it is impossible to judge environment effects without knowing more about the schemes and the environmental context in which they sit. As such, this SEA has necessarily adopted a high-level, precautionary approach. Further assessment, including through project-level Environmental Impact Assessment where required, and/or through the statutory

planning process or other formal processes, will be needed to determine the likely impacts of each action.

## 5.6 Limitations of the LFRMS

5.6.1 Because there are other related documents influencing Worcestershire's approach to flood risk (including the Surface Water Management Plan, discussed above) the LFRMS cannot be read in isolation, and does not necessarily make sense on its own. As an example, the LFRMS presents a very high-level, strategic overview of how flood risk will be managed and, without consulting associated documents, it is not clear how the site-specific projects in the Action Plan have been chosen. There is a gap in the narrative that requires an understanding of the SWMP to provide the missing information (such as the prioritisation criteria used to determine which projects will be taken forward and when).

## 5.7 How the assessment is presented

5.7.1 The detailed assessment is recorded through a series of matrices which use symbols to identify the likely effects of each proposal (and any further alternatives) on each SEA objective. This allows the performance of each proposal to be easily understood and highlights any approaches which are particularly beneficial or damaging in SEA terms. To avoid repetitive, empty matrices, only those parts of the LFRMS likely to have effects on most SEA objectives are assessed through matrices; others have a written commentary in the sections which follow.

### Symbols and colours used in the SEA matrices

Significant positive impact	++
Minor positive impact	+
No impact	0
Unknown impact	?
Minor negative impact	-
Significant negative impact	--

5.7.2 A significant positive impact against an SEA objective does not imply that the LFRMS approach is the best it can be. The SEA seeks to identify opportunities to optimise the environmental performance of the LFRMS, and it is therefore possible to award a very positive rating where further improvement is still possible (or, conversely, a very poor rating where some elements of an SEA objective are fully met, but others may be lacking).

## 6. INITIAL ASSESSMENT FINDINGS

### 6.1 Introduction

6.1.1 This section of the SEA considers the environmental implications of each of the LFRMS sections in turn. These findings are mainly taken from the more detailed assessment matrices found in [Appendix 3](#), which records the application of the SEA framework to the emerging options. Where the LFRMS section does not include specific options (for example, the more contextual commentary), the SEA is restricted to more general observations.

6.1.2 This SEA has sought to test all the main components of the emerging LFRMS. The current LFRMS is at draft stage and, as such, presents proposed approaches that may be strengthened and refined as a result of consultation responses and further development. The SEA has assessed all key elements of the strategy, but has not considered the more 'contextual' sections in detail, although the SEA does provide observations or recommendations on such sections where relevant.

### 6.2 Compatibility testing of the LFRMS draft Aims

6.2.1 An important part of the SEA is appraising the compatibility of the LFRMS's draft aims. It is important that the adopted LFRMS presents a unified, coherent strategy for flood risk management. As such, no part of the LFRMS should directly conflict with any other. In line with the SEA's role in identifying *significant* effects, this SEA has considered whether any of the draft aims could conflict to such a degree as to be incompatible.

6.2.2 The summary diagram overleaf indicates that the draft aims are likely to be largely compatible with each other, but that potential exists for some degree of incompatibility depending on how each aim is achieved. No aims have been identified as likely to be clearly incompatible. As the LFRMS is strategic in nature, there is insufficient certainty to establish the nature and extent of potential conflicts, meaning that the assessment must necessarily be high-level.

6.2.3 Potential compatibility issues with aim 6 have been identified for aims 1, 5 and 7. These could arise because it may not always be possible to deliver the broad range of environmental, social and economic benefits sought in aim 6 if flood risk management decisions are not based on these considerations. The duration of any disturbance arising from flood risk schemes is also important; while many flood risk management interventions may be effective without delay, others may take years to complete, and so the full environmental opportunities may only be realised well into the future. Similarly, potential incompatibilities may be short term in nature.

### Compatibility matrix of emerging Local Flood Risk Management Strategy aims

		Draft aims							
		1	2	3	4	5	6		
Draft aims	1	Understand and appropriately prioritise flood risk							
	2	Manage and minimise the likelihood and impact of flooding	✓						
	3	Develop and manage effective partnerships	✓	✓					
	4	Inform, develop and implement relevant plans, policies and strategies	✓	✓	✓				
	5	Secure, maximise and prioritise the appropriate allocation of funding and other resources	✓	✓	✓	✓			
	6	Deliver sustainable environmental and economic benefits and contribute to the wellbeing of Worcestershire's communities and residents	?	✓	✓	✓	?		
	7	Develop, maintain and implement the LFRMS action plan	✓	✓	✓	✓	✓	?	

#### Key to symbols and colours

Compatible	✓	Potentially compatible	?	Incompatible	*	No significant linkages	-
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### 6.3 Observations on the contextual parts of the LFRMS

- 6.3.1 The introductory sections of the LFRMS define its purpose as being to *"manage flood risk for the benefit of communities and businesses in the county"*. While not expressly excluded, this could be seen to ignore emergency services, transport, visitors, etc. It may be better to say *"all those who live, work in or visit the county"*.
- 6.3.2 Recognition of the Worcestershire Green Infrastructure Strategy in section 10.1 and the *"Need for and delivery of green infrastructure of which sustainable drainage can be part"* is welcomed.
- 6.3.3 There is a concern that, as noted in section 3.1.3, the divided responsibility between the LLFA and others risks creating a lack of joined-up approach. In this context, it is especially important to develop effective partnerships, and commitments to this are welcomed.

### 6.4 Assessment of Draft LFRMS Aims and Objectives

- 6.4.1 The LFRMS has seven aims and 31 objectives. This has increased from 28 objectives in the summer of 2015, when the previous, informal SEA was carried out. The additions are a new objective 3.5, a new objective 4.2 (with the former objective 4.2 becoming 4.3) and a new objective 5.4 (with the former objective 5.4 becoming 5.5).
- 6.4.2 The aims and objectives vary in scope and detail. Several of the LFRMS aims and objectives are very broad, or of a procedural nature. Such proposals will either have no impact, or will have impacts that are impossible to judge before being translated into more specific measures at a lower level. Objective 1.1, for example (Develop a County wide flood risk management strategy) is too broad to allow for a meaningful assessment. The environmental impacts of Objective 1 are therefore considered through assessment of the constituent parts that make up the FRMS, including the other aims and objectives. It is reasonable, for the avoidance of repetition, to group together these broad or procedural aims and objectives for assessment purposes.

### **Aim 1. Understand and appropriately prioritise flood risk**

#### **6.4.3 SEA issues common to Objectives 1.1 - 1.6**

- 6.4.4 All of the objectives under Aim 1 can be considered as 'administrative' in nature, and are concerned with the overarching approach to be taken, and documentation to be produced, in managing flood risk. These objectives include elements required under the LLFA's statutory duties.
- 6.4.5 As might be expected, objectives 1.1 – 1.6 perform well against SEA objective 7 (flooding), as each of the LFRMS objectives is designed to reduce flood risk. However, these objectives are high-level in nature and much will depend on how they are implemented.
- 6.4.6 Those LFRMS objectives that deal with evidence-gathering (namely objectives 1.2 - 1.6) can make positive contributions to all SEA objectives. Partners seeking to deliver each of the SEA objectives rely on accurate data being available to inform their own plans, strategies and guidance. Knowing where flooding has happened, and may happen again, is useful in guiding management and interventions in landscape, biodiversity, geodiversity, flora and fauna, natural resources and health. These issues are also considered holistically, alongside flood risk and water management, in the green infrastructure work taking place in Worcestershire.
- 6.4.7 More specifically, the historic environment (SEA objective 3) can be conserved and enhanced through considering how it affects, and is affected by, flooding; the Worcestershire Historic Environment Floods Project being delivered by the Worcestershire Archive and Archaeology Service (WAAS) relies on accurate flood data to provide advice to householders, businesses and agencies on how to approach the historic environment when seeking to prevent and recover from flooding.

#### **Commentary on specific LFRMS Objectives under Aim 1**

#### **6.4.8 Objective 1.1: Develop a County wide flood risk management strategy**

6.4.9 It is unnecessary to include this objective in the strategy itself, as the strategy's existence demonstrates that this objective is already being addressed. The contextual background within the LFRMS makes clear why the strategy is being developed.

#### **6.4.10 Alternatives to Objective 1.1**

Developing the FRMS is a statutory requirement under the Flood and Water Management Act 2010. As such, the only alternative – to not develop a strategy – is not considered realistic and has therefore not been assessed.

- **Recommendation: Delete this objective, which is superfluous.**

**6.4.11 Objective 1.2 Develop a County wide surface water management plan.**

6.4.12 As with objective 1.1, this objective is too broad to allow for meaningful assessment. The development of an SWMP is not a requirement of the FWMA 2010, although it will help to discharge some of the LLFA's duties, including the duty to investigate flooding and the duty to produce an Asset Register.

6.4.13 Alternatives to Objective 1.2

Flood risk management interventions are reliant on an effective evidence base, and if the SWMP was not produced, the evidence would need to be gathered through an alternative format. Relying on the combined sum of more localised flood risk evaluations would be administratively complex and would risk losing the joined-up overview of a comprehensive county-wide approach to evidence gathering and evaluation.

**6.4.14 Objective 1.3 Review and record relevant Risk Management Authority data in a register and make available to the public and partners subject to data sharing and confidentiality agreements.**

6.4.15 The RMA data falls outside the scope of the "local services and facilities" that SEA objective 8 seeks to improve the quality of and equitable access to<sup>10</sup>. However, part of the purpose of all the LFRMS objectives under aim 1 is to ensure that key facilities such as transport, education and healthcare remain accessible in times of flood. It would be going too far to assign a major positive impact to these objectives, as they are too broad; specific impacts can only be judged through more detailed proposals.

6.4.16 Alternatives to objective 1.3

No alternatives have been identified.

**6.4.17 Objective 1.4 Develop a County wide protocol and ongoing performance milestones to populate the register and record of flood assets.**

6.4.18 This is considered to be a procedural/administrative issue, and the substantive impacts of the register and record are considered elsewhere in this SEA. It is not clear to what degree this objective overlaps with objective 1.3.

6.4.19 Alternatives to objective 1.4

No alternatives have been identified.

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<sup>10</sup> Although separate to this assessment, it is nevertheless worth noting that the Environmental Information Regulations 2004, which implement European Council Directive 2003/4/CE, require public authorities to provide access to environmental information. It is likely that much, if not all, of the data on flood risk and its management will fall within the definition of environmental information and, as such, this objective will help to satisfy the requirement of the Regulations to "make environmental information available proactively, using easily accessible electronic means whenever possible".

**6.4.20 Objective 1.5 Develop a protocol for undertaking the duty to investigate.**

6.4.21 This is considered to be a procedural/administrative issue, and as such no direct or indirect environmental impacts have been identified as likely to arise from its implementation.

6.4.22 Alternatives to Objective 1.5

No alternatives have been identified.

**6.4.23 Objective 1.6 Develop a County wide protocol and implementation plan for the designation of flood risk assets.**

6.4.24 This is considered to be a procedural/administrative issue, and as such no direct or indirect environmental impacts have been identified as likely to arise from its implementation.

6.4.25 Alternatives to Objective 1.6

No alternatives have been identified.



## **Aim 2. Manage and minimise the likelihood and impact of flooding**

### **6.4.26 Objective 2.1 Ensure that FRM is fully taken into account by those planning new infrastructure and developments.**

6.4.27 This objective is welcomed, as it seeks to encourage best practice. Greater clarity may be needed to ensure that FRM is considered at the earliest possible stage.

6.4.28 A more detailed assessment of the environmental impacts of objective 2.1 can be found in the matrix in Appendix 3.

#### 6.4.29 Alternatives to Objective 2.1

No alternatives have been identified.

- **Recommendation: Objective 2.1 should make clear that FRM should be taken into account at the earliest possible stage, to help ensure FRM is integrated into designs from the outset. The word 'planning' allows ambiguity over exactly when consideration should begin to be given to these issues, and could theoretically lead to important issues being overlooked until the formal planning application process, which may be too late.**

### **6.4.30 Objective 2.2 Develop flood alleviation schemes.**

6.4.31 As with LFRMS Objective 2.1, whilst this objective will contribute to reducing the negative impacts of flooding, it is not specific enough to allow firm conclusions to be reached on its likely performance against the SEA objectives. The environmental impacts of the objective will depend on the nature and location of specific schemes, and may only become apparent once lower-level assessment (for example Environmental Impact Assessment) has taken place. The likelihood of negative effects can be reduced through the use of 'softer' FRM, working through a green infrastructure approach.

6.4.32 A more detailed assessment of the environmental impacts of objective 2.2 can be found in the matrix in Appendix 3.

#### 6.4.33 Alternatives to Objective 2.2

No alternatives have been identified.

### **6.4.34 Objective 2.3 Work with partners, residents and businesses to install appropriate property level protection measures.**

6.4.35 Objective 2.3 represents a positive approach to flood risk management that affected communities will identify with.

6.4.36 A more detailed assessment of the environmental impacts of objective 2.3 can be found in the matrix in Appendix 3.

6.4.37 No alternatives have been identified.

**6.4.38 Objective 2.4 Work with landowners, NGOs and other public bodies to reduce surface water run-off.**

6.4.39 This partnership approach is crucial not only in securing buy-in and increased education among those impacted upon by flooding, but also in better understanding local concerns and opportunities.

6.4.40 A more detailed assessment of the environmental impacts of objective 2.4 can be found in the matrix in Appendix 3.

6.4.41 Alternatives to Objective 2.4

No alternatives have been identified.

- **Recommendation: the objective should be revised to make specific reference to a green infrastructure approach.**

**6.4.42 Objective 2.5 Monitor ordinary watercourses and encourage appropriate maintenance.**

6.4.43 This objective should help to reduce the risk of flooding through effective monitoring, with action being taken where required. The efficacy of the objective cannot, however, be guaranteed, as this will inevitably depend upon available resources. The word "encourage" suggests that maintenance may not necessarily happen even where identified, but this is a recognised limitation of the LFRMS to influence partners' working methods. Within those areas for which WCC has responsibility, the LFRMS could consider making a more definite commitment to implementing recommended maintenance.

6.4.44 Alternatives to Objective 2.5

A strengthened commitment to undertake maintenance where WCC has direct control would improve the likelihood of positive environmental benefits being delivered.

- **Recommendation: consideration should be given to strengthening the wording of the objective to give a firmer commitment to maintaining those watercourses for which WCC has direct control.**

### **Aim 3. Develop and manage effective partnerships**

#### **6.4.45 Objective 3.1 Identify and communicate FRM roles and responsibilities to stakeholders.**

6.4.46 This objective will help to ensure awareness of the varying roles and responsibilities that occur in flood risk management. This is especially important due to the range of geographies and sectors involved in FRM.

#### 6.4.47 Alternatives to Objective 3.1

No alternatives have been identified.

#### **6.4.48 Objective 3.2 Work in close partnership with the other RMAs in Worcestershire.**

6.4.49 Partnership working is critical to successful delivery of the LFRMS. This objective links very closely with objectives 3.3 and 3.4.

#### 6.4.50 Alternatives to Objective 3.2

No alternatives have been identified.

#### **6.4.51 Objective 3.3 Work in close partnership with neighbouring and other LLFAs.**

6.4.52 Partnership working is critical to successful delivery of the LFRMS. This objective links very closely with objectives 3.2 and 3.4.

#### 6.4.53 Alternatives to Objective 3.3

No alternatives have been identified.

#### **6.4.54 Objective 3.4 Engage and work in partnership with Worcestershire's communities.**

6.4.55 Partnership working is critical to successful delivery of the LFRMS. This objective links very closely with objectives 3.2 and 3.3.

#### 6.4.56 Alternatives to Objective 3.4

No alternatives have been identified.

- **Recommendation: Objectives 3.2, 3.3 and 3.4 should be amalgamated. As the LLFA is also an RMA, objective 3.3 is superfluous, as this is already covered by 3.2. Suggested wording: "Engage and work in**

partnership with communities and RMAs in Worcestershire and related areas"

**6.4.57 Objective 3.5 Develop local partnership groups around priority flood locations to develop and co-ordinate joint working.**

6.4.58 Partnership working is critical to successful delivery of the LFRMS. This objective links very closely with objectives 3.2 – 3.4.

6.4.59 Alternatives to Objective 3.5

No alternatives have been identified.

**Aim 4. Inform, develop and implement relevant plans, policies and strategies**

**6.4.60 Objective 4.1 Take into consideration relevant plans, policies and strategies in the development of the LFRMS.**

6.4.61 The environmental effects of this objective are difficult to assess. Section 2 of the draft LRFMS sets out a range of legislation and policy that influences the strategy. This list is necessarily limited in scope to those most directly relevant to flood risk management at the county scale.

6.4.62 Alternatives to Objective 4.1

No alternatives have been identified.

**Recommendations:**

- **This objective should refer to "legislation and policy".**
- **Table 3 of the strategy should not list the National Planning Policy Framework as a piece of legislation; this is national policy, but is not law. Suggest amending the column title to "Legislation or policy" and amending the title of the table to "Other legislation and policy".**
- **Consideration should be given to the key messages identified from the plans, policies and strategies reviewed as part of the SEA Scoping Report.**

**6.4.63 Objective 4.2 Work with Local Planning Authorities to ensure surface water flooding is taken account in Local Plans and supporting evidence.**

6.4.64 The Local Plan-making process has a major role to play in helping to guide development to locations which are less susceptible to flooding. If the LLFA works with planners as part of this process, this should help to ensure that plans are informed by the best available evidence and expertise. Whilst this objective could potentially be covered by a slightly revised objective 4.3, isolating the role of Local Plans and evidence is justified because of their ability to guide development away from areas of flooding. The objective should, however, go further by including Neighbourhood Plans, which are prepared in the main by local communities.

6.4.65 Alternatives to Objective 4.2

No alternatives have been identified.

**Recommendation:**

- **This objective should be amended to "Work with Local Planning Authorities and local communities to ensure surface water flooding is taken into account in Local Plans, Neighbourhood Plans, and supporting evidence".**

**6.4.66 Objective 4.3 Influence other plans, policies and strategies, through partnership working where appropriate, to ensure the consideration of FRM.**

6.4.67 This objective is positive and wide-ranging, and should help to ensure that flood risk is given due consideration. The objective could attempt to identify which specific plans, policies and strategies will be influenced, but this would inevitably be time-limited and lead to some being overlooked.

6.4.68 Alternatives to Objective 4.3

No alternatives have been identified.

**Aim 5. Secure, maximise and prioritise the appropriate allocation of funding and other resources**

**6.4.69 Objective 5.1 Identify and maintain awareness of potential sources of FRM funding.**

6.4.70 This is an administrative consideration and will be an important part of ensuring delivery of the rest of the LFRMS. No significant environmental effects are likely to arise from this objective.

6.4.71 Alternatives to Objective 5.1

No alternatives have been identified.

**6.4.72 Objective 5.2 Maximise opportunities for funding.**

6.4.73 No strong direct results on any of the SEA objectives are expected to arise as a result of this LFRMS objective, as it is concerned with securing resources, rather than how those resources will be allocated. However, funding of FRM will be crucial if the other positive effects identified elsewhere in this SEA Report are to be realised, and as such it does offer indirect positive benefits across all SEA objectives.

6.4.74 Alternatives to Objective 5.2

No alternatives have been identified.

**6.4.75 Objective 5.3 Utilise the Defra capacity grant to deliver the LFRMS and other statutory responsibilities.**

6.4.76 This is an administrative consideration and will be an important part of ensuring delivery of the rest of the LFRMS. No significant environmental effects are likely to arise from this objective.

6.4.77 Alternatives to Objective 5.3

No alternatives have been identified.

**6.4.78 Objective 5.4 Undertake a review of the structure and deployment of FRM resources and identify potential efficiencies.**

6.4.79 Because this objective is administrative in nature, and does not concern specific approaches to land use or policy, no significant environmental effects are predicted to arise for any SEA objective. Nevertheless, the objective is important

in ensuring delivery of the LFRMS overall and, as such, minor indirect benefits can be predicted across all the SEA objectives.

6.4.80 Alternatives to Objective 5.4

No alternatives have been identified.

**6.4.81 Objective 5.5 Review and appropriately develop skills and knowledge amongst FRM staff.**

6.4.82 Because this objective is administrative in nature, and does not concern specific approaches to land use or policy, no significant environmental effects are predicted to arise for any SEA objective. Nevertheless, the objective is important in ensuring delivery of the LFRMS overall and, as such, minor indirect benefits can be predicted across all the SEA objectives.

6.4.83 Alternatives to Objective 5.5

No alternatives have been identified.



**Aim 6. Deliver sustainable environmental and economic benefits and contribute to the wellbeing of Worcestershire's communities and residents**

**6.4.84 Objective 6.1 Protect, enhance and conserve Worcestershire's built and natural environment.**

6.4.85 This objective is extremely broad, but the effects on the built and natural environment should be positive.

6.4.86 Alternatives to Objective 6.1

No alternatives have been identified.

**6.4.87 Objective 6.2 Adapt to future projected climate change.**

6.4.88 This is another broad objective, with insufficient detail to allow for confident assessment of likely environmental effects. It is important that flooding interventions consider all aspects of climate change, and not just the likely increased frequency and severity of flooding. An integrated approach to adaptation means that flood risk interventions can often fulfil multiple roles as part of a green infrastructure approach; use of natural solutions such as swales and sustainable drainage instead of hard engineering can not only meet flood risk aims, but can also provide a valuable recreational resource which fits within the landscape and provides habitat for biodiversity.

6.4.89 Alternatives to Objective 6.2

No alternatives have been identified.

**6.4.90 Objective 6.3 Work with the Worcestershire and Greater Birmingham and Solihull LEPs to maximise the benefits to Worcestershire's economy and infrastructure from FRM.**

6.4.91 In general terms this objective should help to deliver the SEA objectives, as both LEPs recognise the importance of ensuring economic growth is not at the expense of the environment or social issues.

6.4.92 Partnership working is crucial to effective flood risk management, and engaging with LEPs will help to align flood risk management with wider economic goals. The Worcestershire LEP's Strategic Economic Plan (SEP)<sup>11</sup> identifies "*vulnerability of key infrastructure and resources to flooding and climate change*" as one of the threats to the county's economic prosperity, and one of the key infrastructure issues "*the need for improved flood defences and flood reduction activity across the county*". The SEP also makes reference to the LFRMS.

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<sup>11</sup> Worcestershire Local Enterprise Partnership (2012) World Class Worcestershire: Our Strategic Economic Plan

6.4.93 Alternatives to Objective 6.3

No alternatives have been identified.

**6.4.94 Objective 6.4 Reduce the negative impact of flooding on health and wellbeing.**

6.4.95 This LFRMS objective recognises the serious impacts that flooding can have on people's physical and mental health and wellbeing. Flooding, fear of flooding, and the aftermath of flooding can have profound consequences on those affected. Delivery of the LFRMS should help to ensure that negative health impacts of flood schemes are minimised, by preventing floodwater reaching homes and other sensitive receptors. Effective flood risk management can also help to ensure that access to services essential to maintaining good health is maintained in times of flood (for example, keeping roads passable to allow access to hospitals and doctors' surgeries, as well as allowing people to pick up prescriptions, etc).

6.4.96 Adopting a green infrastructure approach to flood risk management wherever possible should help to maximise the multi-functional benefits of flood projects; a sustainable drainage scheme may be able to provide enhanced greenspace for recreation and mental wellbeing.

6.4.97 There is a risk that, as with any development/infrastructure project, construction of flood alleviation schemes could involve some short-term noise and air pollution which could adversely affect people's quality of life.

6.4.98 Alternatives to Objective 6.4

No alternatives have been identified.

**Aim 7. Develop, maintain and implement the LFRMS action plan**

**6.4.99 Objective 7.1 Ensure that all owners of actions within the plan and listed partners are aware of their role in delivery of the LFRMS.**

6.4.100 This LFRMS objective is more administrative in nature, and therefore no direct impacts on the SEA objectives are envisaged. It is debateable whether or not such an objective actually warrants inclusion in the strategy, as this is a standard part of the strategy-making process, rather than a policy objective. If it is considered necessary, reference to these roles and responsibilities could be made in the main body of the strategy.

6.4.101 Alternatives to Objective 7.1

No alternatives have been identified.

**6.4.102 Objective 7.2 Regularly monitor progress with delivery of the action plan and update the status column accordingly.**

6.4.103 As with LFRMS objective 7.1, this LFRMS objective is more administrative in nature, and therefore no direct impacts on the SEA objectives are envisaged. It is debateable whether or not such an objective actually warrants inclusion in the strategy, as this is a standard part of the strategy-making process, rather than a policy objective. If it is considered necessary, reference to monitoring could be made in the main body of the strategy.

6.4.105 Alternatives to Objective 7.2

No alternatives have been identified.

**6.4.106 Objective 7.3 Review and update the action plan every 12 months.**

6.4.107 As with LFRMS objectives 7.1 and 7.2, this LFRMS objective is more administrative in nature, and therefore no direct impacts on the SEA objectives are envisaged. It is debateable whether or not such an objective actually warrants inclusion in the strategy, as this is a standard part of the strategy-making process, rather than a policy objective. If it is considered necessary, reference to reviewing and updating the action plan could be made in the main body of the strategy.

6.4.108 Alternatives to Objective 7.3

No alternatives have been identified.

## 6.5 Assessment of Draft Action Plan 2015-2021

- 6.5.1 The action plan accompanying the strategy seeks to give a more specific focus to the broader aims and objectives that the strategy sets out. The action plan makes clear that "Demand for schemes and works will exceed available resources, so the LLFA and partners must be able to clearly define which action or scheme has the highest priority and this document should therefore be read in conjunction with the LFRMS and SWMP" and that "flexibility about priorities will be needed during the delivery period of the LFRMS to allow for such changes. To this end the action plan will be reviewed on an annual basis to assess any material changes which may have impacted upon the LFRMS; progress against the LFRMS objectives; successful delivery in accordance with the action plan; and priorities and measures for the next period".
- 6.5.2 Comments are not being made in this SEA on every single action, as many of them are procedural and/or administrative in nature, and are unlikely to lead to significant direct or indirect environmental effects.
- 6.5.3 The actions under LFRMS Objective 1.2 to "Develop a County wide Surface Water Management Plan (SWMP)" include not only "Develop a countywide SWMP", but also the development of local SWMP for both Bromsgrove and Droitwich town centres, respectively. The Action Plan should give more detail to the objectives; having an action which simply repeats the objective adds little value. The action should break down the objective into its constituent parts to set out what actually needs to happen to bring about its completion. This same issue (the supposedly more detailed 'action' failing to expand on the objective) also applies to the actions under Objectives 1.3, 1.4 and 1.7.
- 6.5.4 The actions under Objective 1.2 to develop local SWMPs fall outside the scope of the Objective (which refers only to a county-wide SWMP). The objective should therefore be amended. Possible wording could be "Develop a county-wide Surface Water Management Plan (SWMP) and local-level SWMPs where required".
- 6.5.5 Objective 2.2 is to "develop flood alleviation schemes", but the first action under this objective is to "Produce and implement a plan for the procurement, installation, management and interpretation of a network of weather stations". This action would not appear to be part of an alleviation approach, as the weather stations would provide evidence to inform actions, rather than reduce the effects of flooding. It is recommended that this action would sit more naturally under Objective 6.2, "Adapt to future projected climate change".
- 6.5.6 The action relating to SuDs under objective 2.1 ("Develop local SuDS guidance that will promote the concept of multifunctional spaces as part of the master planning process") should have positive environmental effects. This report has already noted in earlier sections that sustainable drainage schemes can fulfil multiple green infrastructure objectives, and these actions are therefore positive in SEA terms.

6.5.7 Similarly, the action under objective 2.5 to "Provide guidance on riparian ownership responsibilities" should have positive environmental effects because it should help to guide more appropriate land management and reduce the risk of unintentional pollution of watercourses through, for example, poaching and agricultural run-off.

**6.5.8 Commentary on actions in specific locations**

6.5.9 There is insufficient detail to assess the likely environmental impacts arising from the various interventions in any level of detail. This applies to both the locations (which are often not specific, such as "Sedgeberrow") and the nature of the actions (which are also described in generic terms, such as "Improve Hewell Lake").

6.5.10 Notwithstanding the above, it is useful to provide a high-level commentary on the main environmental designations within or close to the locations. National-level designations have therefore been identified. This does not amount to an assessment of likely impact; this will be dependent on the nature, scale, and specific location of operations, which the action plan does not specify at this stage. However, these constraints should inform the delivery of these projects and should be taken into account in relevant processes, including the development management process and Environmental Impact Assessment process, where required. The term "constraint" is used here to highlight particular designations, and does not imply that any particular scheme is actually constrained; this, again, will depend on the specific nature of each scheme and should be assessed as each scheme is planned and delivered.

6.5.11 The Habitats Regulations Assessment Screening Report for the LFRMS concluded that "the Draft Worcestershire LFRMS is unlikely to cause a likely significant effect on European Sites either Alone or In Combination". European sites (Worcestershire's two Special Areas of Conservation, as well as relevant sites in surrounding areas) are therefore not considered in the summaries below.

Action	High-level constraints
Install flood storage, Callow Brook, Rubery	This location is within an established residential and commercial area. No national-level environmental designations are within close proximity.
Investigate and develop scheme at Bournheath Village	The only national-level environmental designation in Bournheath village is the Grade II-listed Yew Tree Farmhouse. Pepper Wood ancient semi-natural woodland is some 500m to the north-west. The Dodford, Holborne Wood, and Valley Wood ancient semi-natural woodlands are a similar distance away to the south-west.

<p>Carry out investigations and modelling at Bromsgrove Town Centre</p>	<p>Bromsgrove town centre is surrounded on all sides by commercial and residential development. There are no national-level environmental designations within close proximity. There are significant historic environment assets in the form of the Bromsgrove Town Centre conservation area and numerous listed buildings.</p>
<p>Raise New Road, Worcester</p>	<p>Being almost in central Worcester, this location is within and close to numerous historic environment assets. New Road falls wholly within the Riverside Conservation area, as well as being within close proximity to the Historic City conservation area, which it faces to the east of the River Severn. The St John's conservation area begins some 100m to the west of New Road. Worcester Bridge is a grade II listed building, as is the fountain in Cripplegate Park, some 40m north of the road itself.</p>
<p>Carry out highway adaptation scheme, Wood Norton, Evesham</p>	<p>Wood Norton and surroundings include numerous natural and historic environment assets. This includes Wood Norton Hall registered park and garden and ancient semi-natural woodland to the north-west (Cold Knap Wood) and north-east (part of Tunnel Hill Wood) of Wood Norton Hall itself. There are scheduled ancient monuments to the west of Wood Norton (enclosures NE of Fernhill Farm, and Settlement site NNE of Fernhill Farm), but these are beyond 500metres away, the other side of the River Avon. The Highclere Site of Special Scientific Interest is some 1km north of Wood Norton.</p>
<p>Carry out highway adaptation scheme, Marina Rd, Upton</p>	<p>The Upton-on-Severn conservation area extends right up to the marina. The majority of the historic environment assets, including numerous listed buildings, are in the town itself the other side of the river. The Upton Ham SSSI is also opposite this location immediately south of the Severn.</p>
<p>Carry out highway adaptation scheme, Powick roundabout, Worcester</p>	<p>The most distinctive feature here is probably the registered battlefield of the 'Battle of Worcester 1651, with Powick Bridge 1642', which runs right up the roundabout and extends outwards to the north and east over some 3,524 hectares. The River Teme SSSI is in very close proximity to the north of the roundabout, being within 50m of the carriageway. The Riverside Conservation area begins a similar distance away, and stretched sot the north and east. Powick Old Bridge is a scheduled ancient monument to the north, within 250m of the roundabout.</p>

<p>Repair Perdiswell Culvert, Worcester</p>	<p>This location is within an established residential area, and is surrounded by urban land uses including a recycling centre, a school and a sports centre. The only nationally-designated environmental assets in the vicinity of this location are the grade II listed 66 Bilford Road.</p>
<p>Investigate possible Tenbury flood alleviation scheme</p>	<p>Around half of the town is covered by the Tenbury Wells conservation area, within which there are 54 listed buildings. At the northern entrance to the town, Tenbury bridge is a scheduled ancient monument. The River Teme runs along the town's northern and western extents. A further scheduled ancient monument, Castle Tump, is just beyond the north of the town, on the other side of the Teme. There are no national-level natural environment designations within close proximity of the town.</p>
<p>Investigate possible flood alleviation scheme, Severn Stoke</p>	<p>There are 13 listed buildings in the village, all of which are listed at Grade II, except the Church of St Denys, which is listed at Grade II*. Part of Croome Court registered park and garden abuts the village to the east. Severn Bank Wood is a linear area of ancient semi-natural woodland which just touches the south west of the village.</p>
<p>Carry out modelling and possible feasibility study at Lower Moor</p>	<p>This location includes the Lower Moor conservation area, and the village itself contains 13 Grade II listed buildings. The scheduled ancient monument 'Settlement site north of Spring Hill' abut the eastern end of the village. There are no national-level natural environment designations within close proximity.</p>
<p>Install flood storage area on Badsey Brook, Broadway</p>	<p>There are more than 100 listed buildings in and around Broadway, and the whole of the historic centre is a conservation area. Almost the entire village falls within the Cotswolds Area of Outstanding Natural Beauty. An area of ancient semi-natural woodland abuts the southern extent of the conservation area, but there are no other national-level natural environment designations in close proximity.</p>

<p>Improve existing flood alleviation scheme, Uckinghall</p>	<p>Part of the existing alleviation scheme extends into the Uckington conservation area, which covers most of the village and some of its surrounding hinterland. There are numerous listed buildings in the village, the closest of which is the grade II listed Ferry Lane Cottage, some 60m to the north east (although the curtilage may mean that this distance is much smaller). The only scheduled ancient monument within the vicinity is Uckinghall Cross, approximately 100m to the north east.</p>
<p>Install PLP at Himbleton</p>	<p>There are no national-level natural environment designations in or immediately around Himbleton, with the nearest feature of note being Hornhill Wood ancient semi-natural woodland, some 500m north east of the village. There are 15 listed buildings within Himbleton, all of which are grade II, with the sole exception of the Grade I Church of St Mary Magdalene.</p>
<p>Implement flood alleviation measures Kemerton</p>	<p>Kemerton falls within the Cotswolds area of Outstanding Natural Beauty. Overbury Court registered park and garden is outside Kemerton itself, being some 400m to the east. The closest SSSI is Bredon Hill, approximately 500m north of the village. There are 29 listed buildings within the village, all of which are Grade II, except the Grade II* Church of St Nicholas and Kemerton Court. The nearest scheduled ancient monuments are the 'Settlement site NE of Kinsham' approximately 550m south of the village, and the 'Double ditched enclosures S of Robin Mill', approximately 650m east of the village.</p>
<p>Install by-pass culvert at Broadway Culvert</p>	<p>There are more than 100 listed buildings in and around Broadway, and the whole of the historic centre is a conservation area. Almost the entire village falls within the Cotswolds Area of Outstanding Natural Beauty. An area of ancient semi-natural woodland abuts the southern extent of the conservation area, but there are no other national-level natural environment designations in close proximity.</p>
<p>Implement PLP scheme at Wribbenhall, Bewdley</p>	<p>Part of Wribbenhall falls within the Bewdley conservation area, where there are also hundreds of listed buildings. There are no national-level natural environment designations within close proximity.</p>



<p>Implement PLP scheme at Fountain Cottages, Stourport PLP</p>	<p>There are no national-level environmental designations in or immediately around this location, with the closest being Hartlebury Common and Hilditch Coppice SSSI, some 200m to the east and the 'Stourport-on-Severn (No.1)' conservation area, which begins approximately 250m to the north.</p>
<p>Implement PLP scheme at Road, Stourport Business PLP</p>	<p>Unable to identify this location within Stourport, but the town itself includes conservation areas (Stouport-on-Severn (No.1); Stourport-on-Severn (No.2); Stourport-on-Severn (Gilgal); Staffs and Worcs Canal). The Arely Kings conservation area is also in close proximity, being just south of the river. Hartlebury Common and Hilditch Coppice SSSI extends from the east side of the town.</p>
<p>Implement PLP scheme at East Waterside, Upton PLP</p>	<p>This location falls within the Upton-on-Severn conservation area. The Upton Ham SSSI is some 300m to the southeast, on the opposite side of the Severn. There are no listed buildings or scheduled ancient monuments on the east side of the river, but there are a large number of listed buildings within the historic town, as well as two scheduled ancient monuments.</p>
<p>Implement PLP scheme at Wick</p>	<p>Almost all of Wick is a conservation area, within which there are 17 listed buildings, all of which are Grade II except the Grade II* Church of St Mary. Wick House registered park and garden abuts the village to the west, between the houses and Pershore bridges. The Lower Hill registered park and garden is just south of the village, beginning immediately over the B4084. There are no national-level natural environment designations within close proximity.</p>
<p>Implement PLP scheme at Hunters Way, Droitwich</p>	<p>There are no national-level environmental designations along Hunters Way itself, which is within an established residential area. Westwood Park registered park and garden begins the other side of Westwood Road, just beyond the western end of Hunters Way. The Grade II listed Boycott Farmhouse is less than 100m south of the road. Westwood Great Pool SSSI begins some 350 west of Hunters Way.</p>

Implement PLP scheme at Lickhill Meadows, Stourport	There are no national-level environmental designations within Lickhill Meadows. The Areley Kings conservation area, containing numerous listed buildings, is the nearest asset, within 200m, but this is separated from Lickhill Meadows by the River Severn.
Implement PLP scheme at Evesham	National-level designations in and around Evesham relate to the historic environment, namely the Evesham conservation area, numerous listed buildings, and many scheduled ancient monuments. The 'Battle of Evesham 1265' registered battlefield extends over part of the northern extent of the town.
Implement PLP scheme at Waterworks Road & Diglis Terrace, Worcester	These two areas are also some distance apart, so it is unclear why they are treated as one action. The north/west side of Waterworks Road falls within the Riverside Conservation area. The nearest listed building is the Gehulvelt Park bandstand, listed at Grade II, approximately 100m east of the eastern-most end of Waterworks Road. There are no national-level natural environment designations within close proximity of this location.

#### 6.5.12 Recommendations for minor clarifications in the Action Plan

- 6.5.13 Each Action should have a specific number or letter, as this would make reference easier.
- 6.5.14 The action under Objective 1.4 and the first action under Objective 1.7 both seek to develop a "policy", whereas the objectives call for a "protocol". If a difference in meaning is intended by these words, this should be explained.
- 6.5.15 The actions under objective 2.2 include "Install flood storage, Callow Brook, Rubery" and "Install flood storage area on Badsey Brook, Broadway". Any difference between a "storage area" and simply "storage" should be explained.
- 6.5.16 The action under objective 2.2 to "Carry out highway adaptation scheme, Marina Rd, Upton" should specify where "Marina Road" is (and what part of the road it applies to, if appropriate), as it does not appear on standard OS maps.
- 6.5.16 Similarly, under objective 2.2, it is unclear where "Diglis Terrace" is. It is assumed to be the terrace of houses at Diglis Avenue, but this needs to be clarified.
- 6.5.17 Also under objective 2.2, it is unclear where "Road, Stourport Business" is. This should be clarified.

## **Appendix 1:**

### **Changes made to Scoping Report following consultation**

The table below summarises the comments provided on the LFRMS draft Scoping Report, and how they have been taken into account in its revision.

Respondent	Summary of comments made	How comments have been addressed in revised Scoping Report
Natural England	Welcome breadth of information being collated.	Breadth of information will not be reduced.
Natural England	Under 'biodiversity, geodiversity, flora and fauna', we would welcome the inclusion of baseline data on flora and fauna outside of designated sites.	Indicators on 'Management status of local sites' and 'Key breeding bird population numbers' are included, which do include data beyond nationally-designated sites. Whilst further information not drawn from specific designated sites would help to provide a more comprehensive picture of the condition of the county's flora and fauna, this data is not readily available. An enquiry has been made to Butterfly Conservation to find out if Worcestershire data is available.
Natural England	Under 'natural resources' we would recommend giving further consideration to soil quality.	The issue of soil quality is partly considered through the indicator 'Amount of land falling within Agricultural Land Classifications (hectares)' within the Material Assets section of the baseline. There is also a measure of 'Contaminated land' in the Natural Resources section. We are not aware of any further datasets giving a county-wide picture of the quality of soils in Worcestershire.
Environment Agency	Natura 2000 sites are most important, but other habitats of significance are not mentioned in section 4.8. Numerous local wildlife sites and water-related SSSIs in the county have the potential to be significantly affected by FRM policies. Whilst there is a bullet point on conservation of Biodiversity there should be specific mention of protected and notable species and the need to take adequate measure to prevent their harm when carrying out the functions of the LLFA.	The list of key issues has been amended to better reflect the potential for FRM to affect both designated and non-designated habitats and to refer to protected and notable species.

<p>Environment Agency</p>	<p>The compatibility matrix in section 6.6 is simplistic. Whilst there is often the potential to incorporate ecological enhancement measures there is a tendency not to incorporate these where there is a cost implication.</p>	<p>As stated in the draft Scoping Report, the matrix is necessarily high level and makes a number of assumptions. The purpose of the matrix is to identify any obvious conflicts that could call into question the fundamental compatibility of the objectives. A reference to the risk of cost limiting FRM's ability to improve the environment or mitigate unavoidable environmental impact is now included.</p>
<p>Environment Agency</p>	<p>There is a need to identify how environmental measures can be suitably incorporated into the FRM Strategy.</p>	<p>The Scoping Report identifies a range of issues upon which the LFRMS can have a positive influence. This issue will be strengthened through the SEA Environmental Report.</p>
<p>Environment Agency</p>	<p>References to the Water Framework Directive in Appendix 2 fail to reflect its full scope, which is wider than just water quality. There is a need to ensure that all elements of the WFD are considered, including habitat, ecology, hydromorphology, barriers to fish movement, water quality, flow, sediment, etc.</p>	<p>Whilst the fundamental purpose of the WFD is to protect and improve water quality and all the issues associated with it, additional text from the Directive itself, as well as information from the Joint Nature Conservation Committee, has now been included.</p>
<p>Environment Agency</p>	<p>The recovery of some SSSIs is directly aligned with flood risk implications, for example Stourvale and Puxton, Wilden, Wyre Forest and Ipsley Alders SSSIs. Measures that would restore the SSSI may have a detrimental impact upon flood risk elsewhere. It is essential that adequate resource is given to address these issues to ensure that the SSSIs achieve their highest possible condition.</p>	<p>Site-specific issues will need to be considered through individual planning applications and, where relevant, Environmental Impact Assessments. At the level of the SEA, the overarching objectives, including 'To conserve and enhance Worcestershire's biodiversity and geodiversity', are designed to assess how the FRMS as a whole or in part could impact upon nature conservation, including SSSIs.</p>

<p>Environment Agency</p>	<p>Whilst Local Wildlife Sites receive less protection and are frequently in sub-optimal condition they provide a vital component of our natural environment, acting as the last refuges of habitat for many species locally, linking habitats, providing stepping stones and corridors and providing the natural resources essential to the re-establishment of a sustainable environment across the county. Their protection and enhancement as part of a FRM strategy and programme should be an essential component.</p>	<p>The value of local sites is recognised, and they form part of the overall biodiversity considerations of the SEA.</p>
<p>Environment Agency</p>	<p>Appendix 3 - Breeding Bird Population Numbers Whilst it is broadly appropriate to use indicator species to determine the general health of the bird population specific consideration is needed for birds associated with wetland habitats. These species, such as snipe, curlew, redshank, etc. have seen massive declines in numbers across the county, largely as a direct result of land drainage and loss of habitat. Any FRM programme has the potential to have particular impacts on this group of species. Poorly considered FRM work could cause the further decline of these species, whereas an integrated approach to FRM could see a significant restoration of appropriate habitat that has the potential to reverse the declining populations.</p>	<p>The importance of these specific wetland species should be recognised in further SEA work.</p>
<p>English Heritage</p>	<p>Due to limited resources EH is unable to comment in detail on the Scoping Report, however EH's recently-updated guidance 'SEA/SA and the Historic Environment' (English Heritage, June 2013) should help to inform SEA/SA practice: <a href="http://www.helm.org.uk/guidance-library/strategic-environment-assessment-sustainability-appraisal-historic-environment/SA_SEA_final.pdf">http://www.helm.org.uk/guidance-library/strategic-environment-assessment-sustainability-appraisal-historic-environment/SA_SEA_final.pdf</a></p>	<p>Noted. Revised version of document has now been considered and has replaced the former version in review of PPPs. For the purposes of this SEA, the key issues remain the same.</p>

## **Appendix 2:**

### **SEA Directive requirements and where they have been met**

SEA Directive Requirements	Location in this SEA Report (or Scoping Report, where relevant)
a) An outline of the contents, main objectives of the plan or programme, and relationship with other relevant plans and programmes.	Sections 2.1 – 2.5
b) The relevant aspects of the current state of the environment and the likely evolution thereof without implementation of the plan or programme.	Section 3.1 and SEA Scoping Report
c) The environmental characteristics of areas likely to be significantly affected.	Section 3.1 and SEA Scoping Report
d) Any existing environmental problems which are relevant to the plan or programme including, in particular, those relating to any areas of particular environmental importance, such as areas designated pursuant to Directives 79/409/EEC and 92/43/EEC.	Section 3.1 and SEA Scoping Report
e) The environmental protection objectives, established at international, Community or national level, which are relevant to the plan or programme and the way those objectives and any environmental, considerations have been taken into account during its preparation.	Section 3.1 and SEA Scoping Report
f) The likely significant effects on the environment, including on issues such as biodiversity, population, human health, fauna, flora, soil, water, air, climatic factors, material assets, cultural heritage including architectural and archaeological heritage, landscape and the interrelationship between the above factors.	Sections 5.22, 6.3 – 6.5 and Appendix Three
g) The measures envisaged to prevent, reduce and as fully as possible offset any significant adverse effects on the environment of implementing the plan or programme.	Sections 6.3 – 6.5 and Appendix Three
h) An outline of the reasons for selecting the alternatives dealt with, and a description of how the assessment was undertaken including any difficulties (such as technical deficiencies or lack of know-how) encountered in compiling the required information.	Sections 1.5, 1.8, 6.3 – 6.5
i) a description of measures envisaged concerning monitoring in accordance with Art. 10.	Section 1.10
j) a non-technical summary of the information provided under the above headings.	Section 1



## **Appendix 3:**

### **Strategic Environmental Assessment Matrices**

**Appendix 3a: Initial Strategic Environmental Assessment Matrix: Assessment of LFRMS Objective 2.1: Ensure that FRM is fully taken into account by those planning new infrastructure and developments.**

Minor positive impact	+	Neutral/no impact	0	Minor negative impact	-
Significant positive impact	++	Unknown impact	?	Significant negative impact	--

Strategic Environmental Assessment Objectives	SEA rating	Comments
<p><b>1: Landscape</b> Safeguard and strengthen landscape character and quality.</p>	+	This should lead to positive impacts, as an awareness of the need for flood risk management at an early stage can allow for any necessary measures to be designed to be sensitively accommodated within the site and its surroundings. However, there is a risk that flood risk management measures may not fit in with the local landscape and could constitute an inappropriate addition in landscape terms. This will depend on the specific FRM measures and their location, and this objective is too broad for any detail here to be known.
<p><b>2: Biodiversity, Geodiversity, Flora and Fauna</b> Conserve and enhance Worcestershire's biodiversity and geodiversity.</p>	+	For similar reasons as above, impacts on objective 2 should be positive. Knowing the issues around FRM means that those involved in development and infrastructure can plan how it can be integrated with natural processes (especially through SuDs measures), and can identify any possible conflicts at an early stage. But without knowing more detail on each specific FRM measure, potential impacts are difficult to judge.
<p><b>3: Historic environment</b> Conserve and enhance the historic environment, heritage assets and their settings. Protect, enhance and manage the character and appearance of</p>	+	For similar reasons as above, impacts on objective 3 should be positive.

townscapes, maintaining and strengthening local distinctiveness and sense of place.		
<b>4: Material assets</b> Ensure efficient use of land through safeguarding of mineral reserves, the best and most versatile agricultural lands, land of green belt value, maximising use of previously-developed land and reuse of vacant buildings, whilst safeguarding open space/green infrastructure, biodiversity and heritage interests.	?	Depending on the nature and location of the FRM measures, objective 4 could potentially be negatively impacted upon, as FRM may require the use of valuable land and/or other resources. However, the LFRMS objective is too broad to reach a definitive view on this.
<b>5: Natural Resources</b> Protect and enhance water, soil and air quality.	+	For similar reasons to those noted in relation to SEA objectives 1 to 3 (above), impacts on objective 5 should be positive.
<b>6: Climate Change</b> Reduce causes of and adapt to the impacts of climate change.	+	Impacts on SEA objective 6 should be positive, especially in terms of adaptation, as planning for FRM can help to avoid the negative effects of flooding, the extent and frequency of which is likely to increase as a result of climate change.
<b>7: Flooding</b> Ensure inappropriate development does not occur in high-risk flood-prone areas and does not adversely contribute to fluvial flood risks or contribute to surface water flooding in all other areas.	+	There are clear direct benefits from this objective.
<b>8: Population</b> Improve the quality of, and equitable access to, local services and facilities, regardless of age, gender, ethnicity, disability, socio-economic status or educational attainment.	+	Impacts on objective 8 should be positive, as FRM measures should help to maintain access to services and facilities that would otherwise be inaccessible during flood events.
<b>9: Health</b> Improve the health and well-being of the population and reduce inequalities in health.	+	Any measures to ensure that FRM is taken into account should help to prevent or reduce flooding, and therefore reduce the negative physical and mental health impacts associated with flooding. As such, it is likely that impacts on SEA objective 9 will be positive.

**Appendix 3b: Initial Strategic Environmental Assessment Matrix: Assessment of LFRMS Objective 2.2: Develop flood alleviation schemes.**

Minor positive impact	+	Neutral/no impact	0	Minor negative impact	-
Significant positive impact	++	Unknown impact	?	Significant negative impact	--

Strategic Environmental Assessment Objectives	SEA rating	Comments
<p><b>1: Landscape</b> Safeguard and strengthen landscape character and quality.</p>	?	Impacts on SEA objective 1 could vary; flooding is a characteristic of some landscape types (for example 'Riverside Meadows'), and this characteristic should be maintained. It is the specific localised impacts arising from design, massing and materials that could potentially have negative impacts on the landscape, and so it will be important to ensure that local landscape is taken into account in any scheme.
<p><b>2: Biodiversity, Geodiversity, Flora and Fauna</b> Conserve and enhance Worcestershire's biodiversity and geodiversity.</p>	+/-	SEA objective 2 may be partly served by LFRMS objective 2.2, as flood alleviation schemes should help to ensure the destructive impact of flooding on sensitive receptors is reduced. However, a bigger concern is the risk to biodiversity as a result of changes to the amount and/or frequency of water reaching a particular area; Worcestershire holds an array of important wetland habitats and these in turn support important assemblages of protected species which are dependent on these wetland habitats to survive. For example, Worcestershire holds regionally if not nationally important resources of wet grassland, wet woodland and standing water habitats (including ephemeral features like field-ponds and wet-flushes). These in turn support specialist invertebrate communities, amphibians and reptiles, bird species and mammals such as water voles, otters and bats. These habitats can be particularly vulnerable to operations which cause de-watering, drying-

		<p>out or inundation, meaning that where Biodiversity Action Plan habitats occur, careful consideration is needed to ensure appropriate safeguards for designated species and habitats (as designated in accordance with Section 41 of the Natural Environment and Rural Communities Act 2006). Furthermore, localised impacts may occur as a result of the construction of alleviation schemes, which may disrupt or even destroy habitats and features of geodiversity value.</p>
<p><b>3: Historic environment</b>                  Conserve and enhance the historic environment, heritage assets and their settings. Protect, enhance and manage the character and appearance of townscapes, maintaining and strengthening local distinctiveness and sense of place.</p>	<p>+/-</p>	<p>As with objective 2, impacts on SEA objective 3 could be positive, if the flood alleviation schemes prevent flood incidents that could damage irreplaceable heritage assets. But there is a risk that, conversely, FRM could negatively affect the historic environment through its construction and/or operation. It is important to recognise the wide-ranging scope of the historic environment covered under SEA objective 3, which does not focus solely on buildings and above-ground monuments, but also includes buried archaeology.</p>
<p><b>4: Material assets</b>                  Ensure efficient use of land through safeguarding of mineral reserves, the best and most versatile agricultural lands, land of green belt value, maximising use of previously-developed land and reuse of vacant buildings, whilst safeguarding open space/green infrastructure, biodiversity and heritage interests.</p>	<p>+/-</p>	<p>SEA objective 4 is broad in its coverage and, depending on what is developed and where, flood alleviation schemes could either meet or undermine the objective. Green belt land may need to be lost if schemes on such land are found to be necessary and satisfy the relevant planning tests. Best and most versatile agricultural land could also be lost to the development, either through the land-take of a specific piece of infrastructure, or through additional land being deliberately flooded as sacrificial floodplain. This is a real risk in Worcestershire, as there is a high proportion of good-quality agricultural land, and much of this is fertile land in the immediate vicinity of rivers and water courses, which could well be considered areas for intervention when considering fluvial flooding.</p>

<p><b>5: Natural Resources</b> Protect and enhance water, soil and air quality.</p>	+	<p>SEA objective 5 could be enhanced through flood alleviation schemes. In preventing flooding, alleviation schemes can prevent the need to deal with the consequences of flooding both at the time of the event, and during recovery.</p> <p>Flooding can lead to increased air pollution from, for example, increased emissions (road and rail closures from flooding may require lengthy diversions and additional mileage; rescue operations and provisions of supplies lead to extensive carbon emissions; drying out and recovery can require pumps running 24/7, etc.).</p> <p>There is also a risk of watercourses being polluted from sewage works flooding, or public sewers and foul drainage being overwhelmed (particularly from surface water flooding), which can compromise water quality. Water treatment works can also be at risk from flooding, as floodwater could contaminate supplies of clean drinking water (Severn Trent Water's report 'Gloucestershire 2007: The impact of the July floods on the waster infrastructure and customer service, final report' notes how flooding of the Mythe water treatment works in 2007 led to the loss of a piped water supply to approximately 140,000 properties in Gloucestershire).</p> <p>Soil quality can be diminished through excessive run-off from fields in times of flood, as valuable nutrients can be swept away. Evidence shows parts of Worcestershire are at risk of soil erosion from water (Parliamentary Office of Science and Technology (July 2006, number 265) Postnote: UK spoil degradation).</p>
<p><b>6: Climate Change</b> Reduce causes of and adapt to the impacts of climate change.</p>	+	<p>LFRRMS Objective 2.2 is likely to have a generally positive impact on SEA objective 6, in particular the adaptation element. The Worcestershire Partnership's Climate Change Strategy 2012-2020 cites projections which indicate milder but wetter winters, warmer but drier summers and more frequent and intense extreme weather.</p>

		<p>By 2020, winter precipitation on the wettest day could increase by as much as 20% (projection for medium emissions scenario for 2020s using 90% probability level). The provision of flood alleviation schemes should help to adapt to the impacts of such climate change.</p>
<p><b>7: Flooding</b>                  Ensure inappropriate development does not occur in high-risk flood-prone areas and does not adversely contribute to fluvial flood risks or contribute to surface water flooding in all other areas.</p>	<p>+</p>	<p>SEA objective 7 should be well-served by this LFRMS objective. One possible negative impact of flood alleviation schemes would be the alteration of existing flows such that flooding in other areas could be worsened, but careful modelling and consultation should ensure that this risk is minimised.</p>
<p><b>8: Population</b>                  Improve the quality of, and equitable access to, local services and facilities, regardless of age, gender, ethnicity, disability, socio-economic status or educational attainment.</p>	<p>+</p>	<p>SEA objective 8 should be positively impacted by this LFRMS objective.</p>
<p><b>9: Health</b>                  Improve the health and well-being of the population and reduce inequalities in health.</p>	<p>+</p>	<p>The LFRMS objective should make a positive contribution to SEA objective 9. Flood alleviation schemes should help reduce the incidence or severity of flooding, and therefore reduce the negative mental and physical health impacts which flooding can cause or exacerbate. Public Health England lists a wide range of health impacts associated with flooding (Public Health England's August 2014 publication 'Using routine health data for surveillance of the health effects of floods' lists the following potential health outcomes of floods: mortality; cardiopathies and cerebrovascular accidents; drowning; electrocution; hypothermia; injury/physical trauma; carbon monoxide poisoning; smoke inhalation; burns from fires/chemicals; effects of chemical exposure; suicide and self-harm; stress; post-traumatic stress disorder; anxiety; depression; gastroenteritis; diarrhoea, vomiting; soft-tissue infections (wounds)/cellulitis; leptospirosis; fungal infections; respiratory symptoms; and insect bites/stings). The provision of flood alleviation schemes can not only</p>

		improve health and wellbeing, but can help reduce the inequality between those at risk of flooding and those not at risk.
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**Appendix 3c: Initial Strategic Environmental Assessment Matrix: Assessment of LFRMS Objective 2.3: Work with partners, residents and businesses to install appropriate property level protection measures**

Minor positive impact	+	Neutral/no impact	0	Minor negative impact	-
Significant positive impact	++	Unknown impact	?	Significant negative impact	--

Strategic Environmental Assessment Objectives	SEA rating	Comments
<p><b>1: Landscape</b> Safeguard and strengthen landscape character and quality.</p>	+/-	<p>Impacts of LFRMS objective 2.3 on SEA objective 1 are likely to be limited, as most property-level protection measures are likely to be relatively small scale and unlikely to compromise landscape character. Special consideration will be needed in Conservation Areas and Areas of Outstanding Natural Beauty However, there is a risk that cumulative impacts could arise from a large number of minor changes that, combined, could begin to change the appearance of larger areas. Landscape impacts could also arise if the nature and extent of the "property level protection measures" are such that they begin to change the landscape character of an area (for example, extensive bunds around larger properties and/or businesses). The Landscape Institute recommends consideration is given to <i>"soft options first, to obtain the multi-functional benefits of green infrastructure"</i>. (Landscape Institute briefing (December 2014) Landscape, water and flooding).</p>
<p><b>2: Biodiversity, Geodiversity, Flora and Fauna</b> Conserve and enhance Worcestershire's biodiversity and geodiversity.</p>	+/-	<p>SEA objective 2 should not be significantly affected, provided the measures are small-scale. As noted above in relation to landscape impacts, 'soft options' which employ a green infrastructure approach to protection measures, could secure gains for biodiversity, flora and</p>

		fauna. There is the potential for negative impacts on geodiversity through loss or degradation as a result of physical works; this risk should be minimal if only minor works are involved, but larger projects would need to consider impacts on geodiversity.
<p><b>3: Historic environment</b>                  Conserve and enhance the historic environment, heritage assets and their settings. Protect, enhance and manage the character and appearance of townscapes, maintaining and strengthening local distinctiveness and sense of place.</p>	-/?	SEA objective 3 could potentially be negatively impacted by LFRMS objective 2.3, if protection measures are unsympathetic to their historic setting. However, this must be balanced against the reduced risk of flood damage to the historic environment (both building fabric, and internal contents) that protection measures can provide. It should also be noted that a report for English Heritage (Atkins for English Heritage (November 2013) Assessment of Heritage at Risk from Environmental Threat: Key Messages Report) noted that <i>"insurance requirements to weatherproof houses can require property owners to adapt heritage assets within their care – particularly historic buildings – in ways that are at odds with heritage requirements, for example insurance companies can insist on PVC flood resistant doors"</i> .
<p><b>4: Material assets</b>                  Ensure efficient use of land through safeguarding of mineral reserves, the best and most versatile agricultural lands, land of green belt value, maximising use of previously-developed land and reuse of vacant buildings, whilst safeguarding open space/green infrastructure, biodiversity and heritage interests.</p>	0	No impacts on SEA objective 4 have been identified as likely to occur as a result of this LFRMS objective.
<p><b>5: Natural Resources</b>                  Protect and enhance water, soil and air quality.</p>	0	No direct impacts on SEA objective 5 have been identified as likely to occur as a result of this LFRMS objective.
<p><b>6: Climate Change</b>                  Reduce causes of and adapt to the impacts of climate change.</p>	++	This LFRMS objective is likely to perform very well against the adaptation part of SEA objective 6. There are no identified impacts on the causes of climate change (aside from some indirect positive impacts from a reduction in the emissions which contribute to climate change arising from flood recovery activity that would be required or

		increased in the absence of property level protection). A predicted increase in extreme weather events and winter rainfall means that the risk to the historic environment from climate change-related flooding is set to increase. Property level protection will help to ensure that homes and businesses are adapted to these consequences.
<p><b>7: Flooding</b>                  Ensure inappropriate development does not occur in high-risk flood-prone areas and does not adversely contribute to fluvial flood risks or contribute to surface water flooding in all other areas.</p>	0	Although this LFRMS objective will, naturally, make a valuable contribution to flood prevention, it will not have a particularly strong impact on this SA objective.
<p><b>8: Population</b>                  Improve the quality of, and equitable access to, local services and facilities, regardless of age, gender, ethnicity, disability, socio-economic status or educational attainment.</p>	++	SEA objective 8 should be well-served by this LFRMS objective, as flood alleviation schemes can help to ensure that local services and facilities remain accessible to all.
<p><b>9: Health</b>                  Improve the health and well-being of the population and reduce inequalities in health.</p>	++	Property-level protection should help to prevent flooding and the consequent health impacts that can arise. This should therefore have a positive impact on SEA objective 9. It is not simply the immediate risk of physical harm from floodwater that can arise, but also the ongoing psychological harm as a result of property damage; this objective should help to reduce the risk of such harm arising.

**Appendix 3d: Initial Strategic Environmental Assessment Matrix: Assessment of LFRMS Objective 2.4 Work with landowners, NGOs and other public bodies to reduce surface water run-off.**

Minor positive impact	+	Neutral/no impact	0	Minor negative impact	-
Significant positive impact	++	Unknown impact	?	Significant negative impact	--

Strategic Environmental Assessment Objectives	SEA rating	Comments
<p><b>1: Landscape</b> Safeguard and strengthen landscape character and quality.</p>	+/-	<p>Impacts of LFRMS objective 2.4 on SEA objective 1 may vary, depending on the nature, scale and location of specific measures to reduce run-off. Whilst naturalistic green infrastructure measures can have a beneficial impact on the local landscape (especially when replacing harder engineering solutions and areas of built development/hardstanding), some approaches may not be appropriate within the local and wider landscape context. As an example, areas of tree planting can make an effective contribution to reducing run-off, as <i>"the action of riparian and floodplain woodland in encouraging out-of-bank flows and slowing down flood flows promotes sediment deposition and retention, reducing downstream siltation"</i> (Nisbet, T, et al, for the Forestry Commission (2011): Woodland for Water: Woodland measures for meeting Water Framework Directive objectives). However, large areas of planting may not be appropriate within some land cover parcels.</p>
<p><b>2: Biodiversity, Geodiversity, Flora and Fauna</b> Conserve and enhance Worcestershire's biodiversity and geodiversity.</p>	+	<p>Impacts on SEA objective 2 are likely to be positive, as run-off is recognised as a major cause of pollution. <i>"Habitats such as ... woodlands, wetlands and species-rich grasslands act as giant sponges, absorbing and holding water and slowing down water run-off into</i></p>

		<p><i>rivers"</i> (<a href="http://www.wildlifetrusts.org/floods">http://www.wildlifetrusts.org/floods</a>). Reducing surface water run-off through appropriate methods will improve the quality of water and hence the biodiversity living in and around the water, as well as creating net gains to habitats on land. Tree planting can also help to meet WFD objectives <i>"by improving thermal regulation and oxygenation of the water"</i> (Environment Agency (September 2013) Water Framework Directive State Aid - Agricultural Block Exemption Regulation).</p>
<p><b>3: Historic environment</b>                  Conserve and enhance the historic environment, heritage assets and their settings. Protect, enhance and manage the character and appearance of townscapes, maintaining and strengthening local distinctiveness and sense of place.</p>	<p style="text-align: center;">+</p>	<p>Impacts on SEA objective 3 are likely to be positive, as measures to reduce surface water run-off will generally lead to softer, greener solutions that are more likely to complement the setting of heritage assets. Run-off can lead to erosion of historic fabric, and reducing run-off will help to maintain irreplaceable assets. Worcestershire's historic water meadows (riverside areas that have features for the managed flooding (or floating) of land, as opposed to just fields next to a river) offer some potential to be partially restored as a means of capturing and attenuating flood water. As with any construction or landscaping operations, works to reduce run-off that could potentially impact upon the historic environment should be carefully assessed and controlled.</p>
<p><b>4: Material assets</b>                  Ensure efficient use of land through safeguarding of mineral reserves, the best and most versatile agricultural lands, land of green belt value, maximising use of previously-developed land and reuse of vacant buildings, whilst safeguarding open space/green infrastructure, biodiversity and heritage interests.</p>	<p style="text-align: center;">++</p>	<p>Positive outcomes on SEA objective 4 are predicted from this LFRMS objective. Reducing run-off can help to preserve the quality of soils, and therefore help to safeguard Worcestershire's best and most versatile agricultural land. DEFRA state (Department for Environment, Food and Rural Affairs (2009) Safeguarding our Soils: A Strategy for England) that <i>"Compaction of soil reduces agricultural productivity and water infiltration and, through higher levels of run-off, increases flood risk. Unlike soil erosion it is reversible through changes to land management practices"</i>. This highlights the key role that farmers and</p>

		<p>land managers can play in reducing run-off. Open space/green infrastructure can also be furthered by this objective, as new habitats designed to reduce run-off can often fulfil multiple green infrastructure roles, including providing new space for access and recreation.</p>
<p><b>5: Natural Resources</b> Protect and enhance water, soil and air quality.</p>	<p>++</p>	<p>As with SEA objective 4, impacts on SEA objective 5 are expected to be positive. Improving land management to reduce soil compaction will help to protect and enhance soil quality. Water quality will be improved through reducing sediment and agricultural/industrial run-off, a key ambition of the Water Framework Directive. Improvements to air quality are likely to be more limited, but new areas of habitat, including tree planting, can make a contribution here.</p>
<p><b>6: Climate Change</b> Reduce causes of and adapt to the impacts of climate change.</p>	<p>+</p>	<p>Reducing run-off will help to achieve SEA objective 6, as predictions of heavier rainfall as a result of climate change mean that, without intervention, problems of run-off will be exacerbated.</p>
<p><b>7: Flooding</b> Ensure inappropriate development does not occur in high-risk flood-prone areas and does not adversely contribute to fluvial flood risks or contribute to surface water flooding in all other areas.</p>	<p>++</p>	<p>Actions to reduce run-off can help to reduce the risk of flooding, by storing more water in appropriate locations rather than allowing it to flow downstream and potentially flood vulnerable areas. The Environment Agency recognises (Environment Agency (July 2014) Working with natural processes to reduce flood risk, R&amp;D framework: science report SC130004/R2) that surface flows can be held back or slowed to reduce local flood peaks through a range of measures, including <i>"Field-scale land and soil management (tree shelter-belt planting, reduced stocking levels, cover crops, contour ploughing, soil retention, manage tracks, fencing/stock access); Land use change (for example, arable to pasture) or buffer strips; Floodplain woodlands; Changes to vegetation and sediment management (maintenance); Floodplain reconnection (remove, set back or lower embankments); and Scrapes, swales and wetlands/ rural sustainable drainage"</i>.</p>

		<p>The LFRMS objective recognises the importance of working with landowners, and this should help to ensure SEA objective 7 is delivered; indeed, the EA note that <i>"there is often little or no incentive for a landowner to take the required action. Engagement with landowners is therefore critical to the success of projects"</i>. (Environment Agency (September 2013) Water Framework Directive State Aid - Agricultural Block Exemption Regulation).</p>
<p><b>8: Population</b>          Improve the quality of, and equitable access to, local services and facilities, regardless of age, gender, ethnicity, disability, socio-economic status or educational attainment.</p>	<p style="text-align: center;">+</p>	<p>SEA objective 8 should be well-served by this LFRMS objective, as flood alleviation schemes can help to ensure that local services and facilities remain accessible to all.</p>
<p><b>9: Health</b>          Improve the health and well-being of the population and reduce inequalities in health.</p>	<p style="text-align: center;">+</p>	<p>There should be a positive impact on SEA objective 9, as reducing the risk of flooding should reduce the risk of the health impacts arising from flood events. It is not simply the immediate risk of physical harm from floodwater that can arise, but also the ongoing psychological harm as a result of property damage; this objective should help to reduce the risk of such harm arising.</p>

**Appendix 3e: Initial Strategic Environmental Assessment Matrix: Assessment of LFRMS Objective 2.5 Monitor ordinary watercourses and encourage appropriate maintenance.**

Minor positive impact	+	Neutral/no impact	0	Minor negative impact	-
Significant positive impact	++	Unknown impact	?	Significant negative impact	--

Strategic Environmental Assessment Objectives	SEA rating	Comments
<b>1: Landscape</b> Safeguard and strengthen landscape character and quality.	0	Due to the nature of most watercourse maintenance (clearing blockages, de-silting, etc.), objective 2.5 is unlikely to lead to significant impacts on landscape character and quality.
<b>2: Biodiversity, Geodiversity, Flora and Fauna</b> Conserve and enhance Worcestershire's biodiversity and geodiversity.	+/-	Environment Agency guidance for riparian owners states that "Work must not damage wildlife and wherever possible you should try and improve the habitat" (Environment Agency (2014) Living on the edge: A guide to your rights and responsibilities of riverside ownership, 5th edition). This does not, however, remove the risk of damage to the environment; unsympathetic maintenance, such as the clearance of wet woodland, could potentially lead to loss or degradation of habitat. Similarly, whilst the removal of foliage could expose geodiversity for educational benefit, it also risks damaging that geodiversity if not carried out responsibly. Whilst objective 2.5 seeks to safeguard against the risk of improper maintenance through encouraging approaches that are "appropriate", it is unlikely that resources will exist to allow this to be monitored in every case.
<b>3: Historic environment</b> Conserve and enhance the historic environment, heritage assets and their settings. Protect, enhance and manage the character and appearance of	+/-	As above, whilst sensitive maintenance works should not lead to environmental damage, there is no guarantee that this will not occur. The Environment Agency's guidance does not mention the historic



<p>townscapes, maintaining and strengthening local distinctiveness and sense of place.</p>		<p>environment, but there is a risk that historic structures, including walls and bridges, could be damaged by insensitive methods of clearing watercourses. Conversely, maintaining watercourses can help to ensure that the setting of the historic environment is maintained or enhanced.</p>
<p><b>4: Material assets</b> Ensure efficient use of land through safeguarding of mineral reserves, the best and most versatile agricultural lands, land of green belt value, maximising use of previously-developed land and reuse of vacant buildings, whilst safeguarding open space/green infrastructure, biodiversity and heritage interests.</p>	<p>0</p>	<p>Due to the nature of most watercourse maintenance (clearing blockages, de-silting, etc.), objective 2.5 is unlikely to lead to significant impacts on the material assets SEA objective.</p>
<p><b>5: Natural Resources</b> Protect and enhance water, soil and air quality.</p>	<p>++</p>	<p>Objective 2.5 should have positive effects on this SEA objective, in particular on the water element. EA guidance notes that "under the Water Framework Directive, a riparian owner who harms a watercourse may be required to put it right".</p>
<p><b>6: Climate Change</b> Reduce causes of and adapt to the impacts of climate change.</p>	<p>+</p>	<p>The likely impacts of climate change include period of increased heavy rainfall. Removing obstructions and de-silting watercourses will help to allow the resultant increased levels of water to flow unimpeded and thereby reduce the risk of flooding through overtopping. Watercourse maintenance also includes the clearing of culverts and grilles/covers to further reduce the risk of flooding.</p>
<p><b>7: Flooding</b> Ensure inappropriate development does not occur in high-risk flood-prone areas and does not adversely contribute to fluvial flood risks or contribute to surface water flooding in all other areas.</p>	<p>0</p>	<p>Although this objective is likely to have a positive impact on reducing the risk and severity of flooding, there are no specific linkages to this SEA objective.</p>

<b>8: Population</b> Improve the quality of, and equitable access to, local services and facilities, regardless of age, gender, ethnicity, disability, socio-economic status or educational attainment.	+/0	Objective 2.5 should help to reduce the risk and severity of flooding, and as such could have indirect benefits under this SEA objective through keeping access to services open at times of flood.
<b>9: Health</b> Improve the health and well-being of the population and reduce inequalities in health.	0	No significant impacts on this SEA objective are predicted.

**Appendix 3f: Initial Strategic Environmental Assessment Matrix: Assessment of LFRMS Objective 6.1 Protect, enhance and conserve Worcestershire's built and natural environment.**

Minor positive impact	+	Neutral/no impact	0	Minor negative impact	-
Significant positive impact	++	Unknown impact	?	Significant negative impact	--

Strategic Environmental Assessment Objectives	SEA rating	Comments
<b>1: Landscape</b> Safeguard and strengthen landscape character and quality.	++	Objective 6.1 should provide significant direct benefits to this SEA objective. There is little detail on the specific approaches that will be taken to deliver what is a very broad objective, but the wording is positive and inclusive.
<b>2: Biodiversity, Geodiversity, Flora and Fauna</b> Conserve and enhance Worcestershire's biodiversity and geodiversity.	++	Objective 6.1 should provide significant direct benefits to this SEA objective. There is little detail on the specific approaches that will be taken to deliver what is a very broad objective, but the wording is positive and inclusive.
<b>3: Historic environment</b> Conserve and enhance the historic environment, heritage assets and their settings. Protect, enhance and manage the character and appearance of townscapes, maintaining and strengthening local distinctiveness and sense of place.	++	Objective 6.1 should provide significant direct benefits to this SEA objective. There is little detail on the specific approaches that will be taken to deliver what is a very broad objective, but the wording is positive and inclusive.
<b>4: Material assets</b> Ensure efficient use of land through safeguarding of mineral reserves, the best and most versatile agricultural lands, land of green belt value, maximising use of previously-developed land and reuse of vacant	+	Whilst objective 6.1 should make a positive contribution towards meeting this SEA objective, there can be tensions between some policy designations – such as Green Belt land – and environmentally-sensitive areas. The two do not always coincide. Within the specific

<p>buildings, whilst safeguarding open space/green infrastructure, biodiversity and heritage interests.</p>		<p>context of the LFRMS, it is considered likely that objective 6.1 will have largely positive environmental effects on this SEA objective.</p>
<p><b>5: Natural Resources</b> Protect and enhance water, soil and air quality.</p>	<p>++</p>	<p>Objective 6.1 should provide significant direct benefits to this SEA objective. There is little detail on the specific approaches that will be taken to deliver what is a very broad objective, but the wording is positive and inclusive.</p>
<p><b>6: Climate Change</b> Reduce causes of and adapt to the impacts of climate change.</p>	<p>?</p>	<p>The exact impacts of objective 6.1 on climate change are difficult to predict. There is little detail on the specific approaches that will be taken to deliver what is a very broad objective, but the wording is positive and inclusive. Some flood risk management measures which could have positive impacts on climate change mitigation and adaptation could potentially have negative impacts on the natural and historic environment if they were not appropriately designed or located. Objective 6.1 should help to reduce the likelihood of these negative impacts occurring.</p>
<p><b>7: Flooding</b> Ensure inappropriate development does not occur in high-risk flood-prone areas and does not adversely contribute to fluvial flood risks or contribute to surface water flooding in all other areas.</p>	<p>0</p>	<p>No specific linkages with this SEA objective have been identified.</p>
<p><b>8: Population</b> Improve the quality of, and equitable access to, local services and facilities, regardless of age, gender, ethnicity, disability, socio-economic status or educational attainment.</p>	<p>0</p>	<p>No specific linkages with this SEA objective have been identified.</p>
<p><b>9: Health</b> Improve the health and well-being of the population and reduce inequalities in health.</p>	<p>+</p>	<p>Protecting and conserving Worcestershire's environment (both built and, particularly, natural) should help to safeguard the role played by this valuable resource in terms of promoting physical and mental health and well-being.</p>

**Appendix 3g: Initial Strategic Environmental Assessment Matrix: Assessment of LFRMS Objective 6.2 Adapt to future projected climate change.**

Minor positive impact	+	Neutral/no impact	0	Minor negative impact	-
Significant positive impact	++	Unknown impact	?	Significant negative impact	--

Strategic Environmental Assessment Objectives	SEA rating	Comments
<p><b>1: Landscape</b> Safeguard and strengthen landscape character and quality.</p>	-/?	At the wider landscape scale, changes arising from flood risk management interventions to adapt to future projected climate change are unlikely to be significant, but there is the potential for some localised negative landscape impacts if schemes are poorly-designed. Other objectives in the LFRMS, including objective 6.1, should help to reduce the likelihood of this occurring.
<p><b>2: Biodiversity, Geodiversity, Flora and Fauna</b> Conserve and enhance Worcestershire's biodiversity and geodiversity.</p>	?	Worcestershire's biodiversity is under threat from the impacts of climate change, but the impact on biodiversity that might result from flood risk management measures to adapt to future climate change are unclear.
<p><b>3: Historic environment</b> Conserve and enhance the historic environment, heritage assets and their settings. Protect, enhance and manage the character and appearance of townscapes, maintaining and strengthening local distinctiveness and sense of place.</p>	+/-	The historic environment is vulnerable to future projected climate change, and the LFRMS's objective to adapt to these changes should have a positive impact on this SEA objective. If carried out correctly, flood risk management can help to ensure the historic environment is protected. There is evidence that this does not always happen, and some insensitive adaptation measures have damaged the historic environment in the past. The Worcestershire Archive and Archaeology Service's Historic Environment Floods Project will set out the opportunities offered by the historic environment for sustainable

		flood management.
<p><b>4: Material assets</b>                  Ensure efficient use of land through safeguarding of mineral reserves, the best and most versatile agricultural lands, land of green belt value, maximising use of previously-developed land and reuse of vacant buildings, whilst safeguarding open space/green infrastructure, biodiversity and heritage interests.</p>	0	No significant impacts on this SEA objective are predicted to arise as a result of objective 6.2.
<p><b>5: Natural Resources</b>                  Protect and enhance water, soil and air quality.</p>	0	No significant effects are predicted to arise on water, soil and air quality as a result of flood risk management measures to adapt to future projected climate change.
<p><b>6: Climate Change</b>                  Reduce causes of and adapt to the impacts of climate change.</p>	++	Objective 6.2 completely supports the adaptation element of this SEA objective.
<p><b>7: Flooding</b>                  Ensure inappropriate development does not occur in high-risk flood-prone areas and does not adversely contribute to fluvial flood risks or contribute to surface water flooding in all other areas.</p>	++	Objective 6.2 complements this SEA objective, as the location of future development should be informed by current and future flood risk, including under climate change scenarios. It is important to note that, for surface water, the Environment Agency's updated Flood Map for Surface Water "presents the surface water flood risk for a 'current day' scenario" and "does not take into account possible 'future' scenarios such as climate change." This may therefore require more localised assessments and mapping to be informed by the best available predictions of likely future climate change.
<p><b>8: Population</b>                  Improve the quality of, and equitable access to, local services and facilities, regardless of age, gender, ethnicity, disability, socio-economic status or educational attainment.</p>	+	Adaptation to future projected climate change will be essential in ensuring that access to local services is maintained. This includes locating and designing new facilities and access routes (and potentially re-locating and/or re-designing existing services and access routes) to remain available in times of flood, under future climate change scenarios.

<p><b>9: Health</b>          Improve the health and well-being of the population and reduce inequalities in health.</p>	<p>+</p>	<p>The impact of objective 6.2 on this SEA objective should be positive, as health and wellbeing could be critically affected by climate change. Flood risk management that takes account of predicted climate change should improve resilience and help to avoid the serious health and well-being impacts that can arise as a result of flooding, including those documents in the Health Protection Agency's 'Flooding – Advice to healthcare professionals' and discussed in the SEA Scoping Report.</p>
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