



**The River Arun to Pagham Flood and
Coastal Erosion Risk Management
Strategy**

Statement of Environmental Particulars

Final for publication: October 2015



We are the Environment Agency. We protect and improve the environment and make it a better place for people and wildlife.

We operate at the place where environmental change has its greatest impact on people's lives. We reduce the risks to people and properties from flooding; make sure there is enough water for people and wildlife; protect and improve air, land and water quality and apply the environmental standards within which industry can operate.

Acting to reduce climate change and helping people and wildlife adapt to its consequences are at the heart of all that we do.

We cannot do this alone. We work closely with a wide range of partners including government, business, local authorities, other agencies, civil society groups and the communities we serve.

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Statement of environmental particulars for the River Arun to Pagham Flood and Coastal Erosion Risk Management Strategy

Introduction This statement of particulars indicates how environmental and consultee considerations were taken into account during the preparation of the plan and how the Environment Agency selected the approach adopted in the final plan. The statement goes on to set out the monitoring procedures that have been set in place to monitor the significant environmental effects of the implementation of the plan/programme.

The environment during the development of the plan

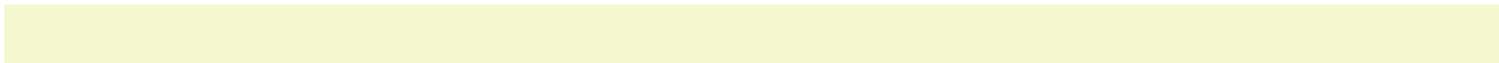
Integration of environmental considerations

Environmental considerations were integrated throughout the development of this plan by following the Environment Agency's SEA operational instruction. This document ensures the potential significant effects of the plan on the environment are considered throughout its development.

Influence of the environmental report

The environmental report that was open to public consultation influenced the development of the plan by identifying environmental enhancements and setting out requirements for mitigation, where significant negative effects were identified.

| Environmental Topic | Agreed Mitigation/Enhancement activity | Responsibility for implementation |
|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|
| Population and Human Health | Flood warning systems Emergency response plans Evacuation plans Advice for residents on flood proofing properties Develop and/or promote schemes to maintain access to Climping beach in the long term | Environment Agency / Arun District Council |
| Flora and Fauna | Good construction practice Plan beach management works to avoid vegetated areas of the beach as far as possible Agree methods for working within designated sites with Natural England or the County Ecologist Beach management at Climping will involve beach topographical surveys and measures to monitor and minimise impacts the SSSI's designated features resulting from shingle recycling and patch repairs. | Environment Agency / Arun District Council |
| Land Quality | Agree work methods with Natural England to avoid damage to geological designated | Environment Agency / Arun District Council |



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| | <p>features</p> <p>Work with landowners to minimise damage or loss of productive land</p> | |
| Water Quality | Minor effects predicted, no measures identified | N/A |
| Flood Risk | Continued programme of beach monitoring and management to ensure the risk of defence failure is minimised | Environment Agency / Arun District Council |
| Air Quality | Minor effects from construction mitigated by good construction practice. | Environment Agency / Arun District Council |
| Climate Change | <p>Use of materials from local and sustainable sources as far as possible.</p> <p>Seek opportunities to reuse and use recycled materials and consider carbon offsetting schemes</p> | Environment Agency / Arun District Council |
| Economic Assets | Work with the relevant authorities to plan for the future risks on economic assets and developments | Environment Agency / Arun District Council |
| Cultural Heritage | Provide advice to property owners and the relevant authorities on flood proofing historic features such as listed buildings, or Scheduled Monuments | Environment Agency / Arun District Council |
| Landscape Character and Visual Amenity | <p>Selection of materials and design to ensure a smart appearance of defences</p> <p>Future works to be planned and designed to fit with the character of the area</p> <p>Seek opportunities to conserve and enhance landscape features and public spaces as part of the implementation of the Strategy</p> | Environment Agency / Arun District Council |

Consultation responses

Responses to consultation period - June 2009 to January 2010 (whole strategy) and November 2015 to January 2016 (Climping Frontage update only)

Over 200 consultation responses were received during the 6 months consultation on the **draft plan** and accompanying **Environmental Report**. (Environment Agency, 2009) A further 39 responses were received during the 8 weeks of consultation on the Climping Frontage update and accompanying **Environmental Report** (Environment Agency, 2009) and **Addendum** (Environment Agency, 2014).

The majority of consultation responses related to provision of further information that the Environment Agency may wish to take into account during the finalisation of the plan. A summary of these responses can be found in the **Consultation Summary Reports** (Environment Agency, 2010 and 2015). Such issues were updated as appropriate.

The table below indicates where consultation responses led to wider changes to the plan.

| Consultee | Summary of comments | Action taken to finalise Plan |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Various consultees | Community feedback challenged us to take a more detailed look at the coastal issues and management options for the section of coast at Climping. | As a result of this reassessment, we changed from our previous recommendation requiring that we cease maintenance right away, to select a 'do minimum' option. This means that we can justify maintaining the existing defences as long as possible to prolong their life, a process called 'patch and repair'. |

Trans-boundary consultation responses

The SEA did not identify any significant environmental effects that required trans-boundary consultation on this plan. Due to this, no consultation responses were received via this consultation route.

Reasons for selecting the adopted plan in light of reasonable alternatives

The approach adopted in the final plan was considered against a number of reasonable alternatives during its development. The major reasons for selecting the adopted plan over the reasonable alternatives were:

Climping:

The selected option of Do-Minimum was the economically preferred option. A Sustain option was environmentally preferred due to the standard of protection afforded to receptors and the opportunity to allow some local landward expansion of coastal habitats. However, the high capital cost of implementing this option was found to be disproportionate to the potential ecological and economic benefits and therefore this option was not taken forward.

River Arun West Bank:

The selected option, Sustain, was the economically preferred option. The environmentally preferred option was Improve as this minimises the impact of flooding on a number of receptors. Sustain was the next environmentally favoured option, as this would ensure flood protection is sustained, although at a lower standard. There are opportunities for contribution to WFD objectives under the Sustain option, but these would require contributions from other sources.

Elmer:

The environmentally preferred option was the same as the economic preferred option of Maintain, as it maintains a high standard flood and erosion risk protection and minimises adverse effects on the amenity value of the beach and its character.

Middleton:

The selected option, Maintain, was the economically preferred option. The environmentally preferred option was Sustain, since this protects the highest number of receptors from flood and erosion risk over time. However, the Maintain option is still considered to provide adequate protection over the short term, and of the three possible Maintain sub options, the most environmentally preferred was selected.

Bognor Regis and Felpham:

The selected option, Maintain, was the economically preferred option. The environmentally preferred option was Sustain. The selected Maintain option is still considered to provide adequate protection, and of the possible Maintain sub options the one which does not involve rock structures has been selected as it minimises adverse effects on the beach character and habitat and maintains amenity and safety.

Aldwick:

The selected option, Maintain, was the economically preferred option. The environmentally preferred option for Aldwick was Sustain since this protects the highest number of receptors from flood and erosion risk. Maintain is still considered to provide adequate protection over the short term and was preferred over Do Minimum since beach profiles would be maintained protecting amenity value and habitats.

Further details on the selection of the preferred option, which was developed into the adopted plan, are presented in its **Environmental Report** and **Addendum**. Information on how to access a copy of the Environmental Report and Addendum can be found in the post-adoption statement, which can be found at <https://www.gov.uk/government/publications/aron-to-pagham-flood-risk-strategy>

Environmental monitoring measures during Plan implementation

The table below sets out the indicators that will be monitored to ensure that unforeseen significant environmental effects are not generated during implementation. These indicators will also monitor the success of mitigation measures and environmental enhancements in the adopted plan. Developments implemented as a result of the plan will be assessed for environmental impacts at a project level using the Environment Agency’s internal Environmental Impact Assessment (EIA) operational instruction.

| Environmental effect/mitigation/enhancement | Indicator | Monitoring method | Responsibility |
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| <p>Mitigation measures to minimise effects on population and human health are listed above. Impacts include:</p> <p>Flooding of foul water systems, contamination of clean water supplies and standing flood water poses a threat of water pollution related ill health in the population.</p> <p>Flooding may increase the risk of injury and loss of life, while the perceived risk of flooding may cause anxiety or stress related illness.</p> <p>Flooding of recreational facilities and amenities to the rear of the frontage and the riverside path may result in damages and periodic loss of use.</p> <p>Introduction of additional structures to the beach are expected to have localised effects on recreation and beach access by acting as a physical obstruction to users.</p> | <p>Hospital admissions related to environmental pressures e.g. number of days of water pollution-related ill health.</p> <p>Injuries due to flooding. Area of recreational and amenity facilities. Number of users of recreational and amenity facilities.</p> <p>Change in area and quality of public open spaces.</p> <p>Number of visitors to beaches.</p> | <p>Maintenance of a “Flood Risk Register”.</p> <p>Review of climate change and sea level rise predictions.</p> <p>Maintenance of a register of potentially polluting features in flood risk zones.</p> <p>Maintain a register of viable recreation and amenity features per flood cell, to include beach access and amenity, footpaths, recreation grounds, etc.</p> | <p>Environment Agency / Arun District Council</p> |
| <p>Mitigation measures to minimise effects on flora and fauna are listed above. Impacts include:</p> <p>Designated and BAP habitats may be</p> | <p>Reported damage to designated sites.</p> <p>Condition assessment of international and national sites.</p> <p>Reported condition of</p> | <p>Long term monitoring of habitat area and condition by means of:</p> <p>Review condition assessments (e.g. Natural England) to understand changes in</p> | <p>Environment Agency / Arun District Council</p> |

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| <p>disturbed and damaged by beach management and construction activities.</p> <p>Opportunities to enhance biodiversity and provide opportunities for people to come into contact with and appreciate wildlife exist along the whole frontage.</p> <p>Flooding and salt spray of acid grassland may alter soil chemistry and is potentially damaging to halophobic grassland species.</p> | <p>national sites.</p> <p>Achievement of biodiversity action plan objectives and targets.</p> <p>Levels of recreation activity associated with biodiversity.</p> <p>Area of land actively managed for nature conservation.</p> <p>Reported fish populations.</p> | <p>quality and quantity of relevant habitats within the flood risk zones.</p> <p>Review of SSSI area accounting for newly designated sites within the study area.</p> <p>Review monitoring data e.g. UK Biodiversity Partnerships</p> <p>Maintain a balance sheet for protected sites and BAP habitats, accounting for scheme losses and compensatory habitat creation.</p> <p>Review of beach monitoring data to identify losses and/or gains and potential threats to vegetated shingle.</p> <p>Review protected species inventory (Sussex Biodiversity Record Centre)</p> | |
| <p>Mitigation measures to minimise effects on land quality are listed above. Impacts include:</p> <p>Flooding may result in physical and chemical damage to crops and reduced soil quality.</p> <p>Increases in soil salinity could lead to reduced productivity in the long term.</p> <p>Beach management and construction operations have the potential to damage geological features along the frontage.</p> | <p>Change in Agricultural Land Classification Grade (Defra).</p> <p>% change in the proportion of different Land Cover typologies (Cranfield University).</p> <p>Change in the total area or % of contaminated land; (Agency State of the Environment).</p> <p>Condition of geological SSSI and RIGS.</p> | <p>Periodic review of Agricultural Land Classifications represented in each flood cell.</p> <p>Review condition assessments (e.g. Natural England) to understand changes in quality, quantity and area of geological sites.</p> <p>Review of newly designated sites within the study area.</p> <p>Balance sheet at scheme level for geological SSSI.</p> | <p>Environment Agency / Arun District Council</p> |
| <p>The Strategy did not identify any mitigation measures to minimise effects on Water Quality. Impacts include:</p> <p>Increased frequency of saline inundation of fresh waters by flooding behind the frontage is</p> | <p>Deterioration of WFD quality elements.</p> <p>% or number of bathing waters complying with the Bathing Waters Directive.</p> <p>Change in River habitat classification.</p> | <p>Periodic review of the Environment Agency monitoring data against the targets for waterbodies and resources in the study area.</p> <p>Review of WFD risk assessments for waterbodies in the study</p> | <p>Environment Agency / Arun District Council</p> |

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| <p>predicted to have minor adverse effects on water chemistry in the long term.</p> <p>Saline influx is likely to affect a number of licensed surface and ground water abstractions in the area.</p> | <p>Changes to the River Ecosystem Grade.</p> | <p>area.</p> <p>Incorporate changes in monitoring objectives brought about by implementation of WFD Objectives in the future.</p> | |
| <p>Mitigation measures to minimise effects related to flood risk are listed above. Impacts include:</p> <p>The risk of flooding by breach and wave overtopping is expected to increase over the duration of the strategy as a predicted effect of climate change</p> <p>The risk of flooding is expected to increase the risk of damages or periodic loss of use to infrastructure.</p> | <p>Number of properties at risk of flooding.</p> <p>Standard of flood protection taking into account predicted sea level rise and climate change.</p> <p>Reported damage to communication links, transportation, infrastructure, services and resources.</p> <p>Rate of coastal erosion</p> | <p>Use information from the Flood Risk Register</p> <p>Review data produced by the adjacent strategies.</p> | <p>Environment Agency / Arun District Council</p> |
| <p>No significant effects or opportunities have been identified for air quality</p> | <p>N/A</p> | <p>Review of baseline data to identify likelihood of effects.</p> | <p>Environment Agency / Arun District Council</p> |
| <p>Mitigation measures to minimise effects related to climate change are listed above. Impacts include:</p> <p>The strategy will not address the predicted effects of climate change. The frontage remains vulnerable to the effects of climate change.</p> <p>The carbon footprint associated with implementation will contribute to the production of green house gases.</p> | <p>CO2 emissions per person and per sector.</p> <p>Indicative flood plains.</p> | <p>Review of climate change and sea level rise predictions.</p> | <p>Environment Agency / Arun District Council</p> |
| <p>Mitigation measures to minimise effects on economic assets are listed above. Impacts include:</p> <p>Economic assets including visitor attractions will be at an increasing risk of flooding.</p> | <p>Number of businesses associated with the frontage and marina adversely affected.</p> <p>Number of craft using the marina and coast.</p> <p>Number of tourist visitors to Arun.</p> | <p>Use information from the Flood Risk Register</p> | <p>Environment Agency / Arun District Council</p> |

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| <p>Mitigation measures to minimise effects on cultural heritage are listed above. Impacts include:</p> <p>The increased risk of flooding is likely to result in damages to cultural heritage features.</p> | <p>Percentage of designated heritage features at risk.</p> <p>Number of archaeological assessments and other studies that have been produced as a result of implementing the strategy.</p> | <p>Use information from the Flood Risk Register.</p> <p>Monitoring review to examine the register and recalculate % of features at risk.</p> <p>New designated features must be reviewed and added to the register on each review cycle.</p> <p>Monitoring plan to record no. of archaeological studies carried out for each stage of implementation.</p> | <p>Environment Agency / Arun District Council</p> |
| <p>No significant effects have been identified for landscape.</p> | <p>Qualitative indicator required to monitor changes in landscape character.</p> | <p>No monitoring planned, but this objective must be subject to review at the next cycle.</p> <p>The potential effect on landscape quality must be considered at the scheme level.</p> | <p>Environment Agency / Arun District Council</p> |