

# planning a sustainable approach



Minsmere Flood Risk Management Study  
January 2009

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Published by:

Environment Agency  
Kingfisher House  
Goldhay Way, Orton Goldhay  
Peterborough PE2 5ZR  
Tel: 08708 506 506 Fax 01733 231 840  
Email: [enquiries@environment-agency.gov.uk](mailto:enquiries@environment-agency.gov.uk)  
[www.environment-agency.gov.uk](http://www.environment-agency.gov.uk)

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# Introduction

The Suffolk coastline is a landscape of significant ecological, recreational and historical value.

Several areas along the Suffolk coastline are at risk of flooding from the sea and from rivers. One at-risk area lies behind the shingle ridge of Minsmere frontage.

Minsmere frontage stretches from Minsmere Cliffs in the north to the Sizewell power station in the south. The flood risk area is shown on Figure 1. It stretches inland from the coast to Middleton, along the Minsmere River valley, and to Leiston Common. The area supports a mix of habitats including dry heaths, freshwater reedbeds, grazing marsh and river banks, as well as shingle

banks on the beach and dunes that support plant life (vegetated shingle).

Some of these habitats and the species they support are of international importance. As such they are protected under a number of conservation listings, including being designated as a Site of Special Scientific Interest (SSSI). The area also includes the RSPB Minsmere nature reserve and Sizewell Marshes SSSI.



**Photo 1: Aerial view of Minsmere RSPB reserve**





Figure 1: The study area





**Photo 2: Vegetated shingle banks at Minsmere**

The area is of considerable archaeological interest and Leiston Abbey, a Scheduled Monument, is situated within the site. Minsmere also falls within the Suffolk Coast and Heaths Area of Outstanding Natural Beauty because of its landscape features.

Minsmere is important in terms of tourism and recreation, supporting activities such as walking, birdwatching and fishing - all of which all contribute to the local economy.

Under nature conservation legislation we are legally required to manage flood risk to protect the habitat and species of the site. To assess how we should do this, we need to consider the likely changes to the site through coastal processes and understand how this will affect the way we manage flood risk in the future.

The purpose of this document is to focus on immediate flood risk management issues at Minsmere.

# The present site

Minsmere is protected from coastal flooding by two types of defence.

The primary defence is the line of natural and modified sand dunes and shingle ridge. The secondary defence is a clay embankment along the back of the dunes at the northern part of the frontage.

Along with the current coastal flood defences, flood management is dependent on a network of ditches. These are drained via gravity by a sluice - a channel that carries off excess water. The sluice outfall is midway along the coastal frontage and flows into the sea.

Part of the site is managed by the RSPB, who maintain suitable water levels for wildlife. We have worked in the past with the RSPB, National Trust and Natural England to maintain the present line of coastal defence and the sluice outfall.

The coastal defences at the northern end of the site are under significant pressure from erosion by the sea, which is threatening their long-term stability.

In addition, climate change is causing sea levels to rise. This will increase erosion on the frontage and therefore increases the risk that the defences will be breached in the future.

We are already seeing the effects of this. In recent years the sand and shingle ridge at the northern end of the site has been breached on a number of occasions, and the ridge has rolled back onto the secondary defence. These events were caused by tidal surges, which led to flooding of the area between the dunes and secondary clay embankment in November 2006 and 2007.

As a consequence, the sluice outfall was blocked with shingle, triggering freshwater flooding of the site. At the same time seawater also entered the site close to the sluice, due to problems with one of the sluice gates.

Over the last decade there have also been many instances of flooding of parts of the RSPB reserve following heavy rainfall.

The flood risk predominantly applies to wildlife habitats and species. The surrounding settlements lie on higher ground on the edge of the floodplain and are only likely to be at risk from extreme flooding.



# Future change

To understand how to manage flood risk we need to understand how Minsmere is likely to evolve.

We have carried out a number of studies to predict any changes likely to occur at the Minsmere site if no action was taken to manage flood risk. We know that the primary coastal defences to the north of the sluice currently provide the lowest level of protection, and that future erosion is most likely to cause the defences north of Coney Hill to breach. The arrow shown on Photo 3 indicates where the defences are under greatest pressure.

Should breaching occur, the area behind will be flooded with seawater on an increasingly regular basis. Without further action, this is likely to happen within the next 20 years.

The defences south of the sluice are higher and less likely to be at risk from coastal erosion over the next 100 years. The soft cliffs to the north are eroding landward while the flood defences are fixed. This means that there is an increasing risk of floodwater outflanking the defences where the embankment and cliffs meet.

The tidal sluice outfall extends from the beach into the sea. This structure helps to stabilise the shoreline. Failure of this structure may affect local coastal processes, leading to potential erosion of the shoreline around the sluice and to the south.

Climate change and sea level rise will put increasing pressure on the existing defences and will also reduce the ability of the sluice and outfall to drain by gravity.

As the effectiveness of the sluice and outfall declines, freshwater flooding of the land behind the defences will become more frequent.



**Photo 3: The Minsmere Frontage and Area of Increased Risk of Breach**



# The need for the study

The coast and wetlands at Minsmere represent some of the most important natural habitats in the UK. These habitats are under threat and are likely to change as a result of coastal change and sea level rise.

Under nature conservation legislation we are legally obliged to manage flood risk for the internationally designated habitats and species at Minsmere.

Pressure on the shoreline presents a risk to the Special Area of Conservation (SAC) shingle habitat at the northern end of the site. Coupled with this is the increasing risk of seawater flooding and erosion of habitat that supports the species of bird, plants and invertebrates that are protected as part of the Special Protection Area and Ramsar conservation designations.

Recently, coastal surge events and periods of intense and sustained rainfall have also led to freshwater flooding of the site because of the limited drainage capacity of the sluice. This has an impact on the

bittern population which relies on stable freshwater water levels within the extensive area of reedbeds at Minsmere.

Flood management measures will focus on reducing the significant risks to protected species and habitats in the area.

**We aim to provide a short-term solution to the immediate problem of increased tidal flood risk to the north of the site and to consider issues associated with freshwater drainage.**

**Longer term issues associated with the coastal frontage, the tidal sluice outfall and freshwater drainage will be addressed in future studies.**



**Photo 4: Aerial view of the reedbed habitats at Minsmere**



# Project objectives

Our aim is to develop a sustainable solution which considers the needs of all local interests while meeting our legal duties.

## Nature Conservation

In line with Government policy, we aim to protect habitats and species within internationally designated sites where it is sustainable to do so. However, with rising sea levels, the building of new defences may be technically difficult and expensive on dynamic coastlines. Where it is not feasible to maintain sites and where designated habitats or species are at risk of being lost due to coastal change, then we aim to replace these in more sustainable locations elsewhere.

We will be flexible in our approach to this issue. We will identify a short-term solution that protects as much of the freshwater habitats as is sustainable, but will allow for future management changes as the habitats develop over the long term.

## Risks to people

The flood risk to people in the area is low. There are a few properties on the edge of the floodplain, the majority of which are only at risk from extreme events. We will continue to manage the risk to people and ensure that any works from this project do not increase the flood risk to people and property.

## Land Use

We will consider how flood risk management affects the surrounding land use, now and in the future. At Minsmere this means considering the interests of local landowners and the Sizewell power stations. We aim to find a solution that is acceptable to all parties involved.

# The options

We thoroughly examined potential options with the aim of selecting the most effective and sustainable approach to deal with the immediate risk from increased tidal flooding in the north of the site.



**Photo 5: The early morning beach with Sizewell on the horizon**

We have tested the sustainability of a number of potential options using four important questions, as shown in Table 1. We considered the effects of these options on the protected species and habitats

of Minsmere and identified whether the options are working with, rather than against, coastal processes. We also looked at whether the option is technically feasible and does not entail excessive cost.

## Table 1. Sustainability appraisal criteria

1. Will it adversely affect the international nature conservation features of the site?
2. Does it work with rather than against coastal processes?
3. Is it technically feasible?
4. Will it require excessive capital or maintenance costs disproportionate to the importance of the feature under threat?



The following summarises the options we have considered and their likely effects.

## Do the minimum

### *Continue existing management regime*

Under this approach we would carry out small scale works to repair minor breaches in the defences. We would also address health and safety concerns if damage occurs. There would be no capital investment in the defences, and the standard of protection will be reduced as sea levels rise. The defences would breach with increasing frequency and severity over time, until eventually repairing them would become unsustainable.

Repairing the defences will contribute to the continued protection of the freshwater habitats. However, when maintenance is no longer viable, breach events will adversely affect these habitats. Works to repair the defences may also lead to damage to the protected vegetation on the shingle banks and beach. Although this low cost option is potentially suitable for the very short term, it does not work with the natural coastal processes and will not provide a longer term solution. Therefore this option does **not meet the project objectives**.

## Hold the existing line

### *Take action to maintain the defences in their current position*

This approach would involve the construction of new structures to halt the erosion of the defences. The options considered were:

- **Beach recharge:** the addition of sediment to build up the height and width of the shingle beach. This option would protect the existing freshwater habitats by limiting the need for land-based construction, keeping large scale disturbance to a minimum. However, every time this work is carried out we would damage the protected shingle bank vegetation. Recharge events will be required every five years and re-profiling of the beach may be needed every year, leading to high capital and maintenance costs and repeated damage to the designated habitat. **This option does not meet the project objectives.**
- **Rock armour groynes:** construction of a series of rock groynes (banks) to reduce sediment movement and encourage retention of the beach. Regular recharge operations would be needed. Under this option there



**Photo 6: Aerial view of the beach and landward freshwater habitat**

would be no loss of freshwater habitat because the defence line would be held. However, the shingle vegetation will be damaged during construction and maintenance of the groynes and the necessary beach recharging. The option is also costly and will work against existing coastal processes, therefore **this option does not meet the project objectives.**

- **Secondary Defences:** strengthening, raising and armouring the secondary line of defence north of Minsmere Sluice. Construction of bunds (embankments) would tie in the defences to high ground. A small loss of reedbed will be inevitable because the defence will need to be widened, but overall it is considered that the loss of protected freshwater habitat will be smaller under this option in comparison to the others. However, future squeeze of the shoreline may adversely affect the shingle habitat, especially in locations where erosion pressure is high. This option is costly and does not allow the coastline to evolve naturally. **It does not meet the project objectives.**

## Retreat the existing line

*Allow the defences to retreat naturally to a new landward defence line.*

Two potential options were considered:

- **Full managed realignment:** the relocation of the existing defence line to higher ground surrounding the RSPB reserve, followed by withdrawal of maintenance of the primary and secondary defences. Additional flood barriers would be constructed to protect assets landward of the RSPB reserve and the sluice would be replaced with separate outlets for each river in the area. Realignment of the defence would allow the front line to roll back naturally. Protected freshwater habitats in front of the new alignment would be lost in time, and these would need to be recreated elsewhere. This loss, along with the construction of the new defence, will cause significant disturbance to the site and incur very large costs. **This option is not deemed necessary and was therefore rejected.**
- **Partial managed realignment:** maintenance would be withdrawn from the primary defence, but the secondary defences would be maintained. The existing embankment at Coney Hill would be improved to protect the vast majority of the freshwater wetland area from flooding. Any minor damage to the secondary defences north of Coney Hill may be repaired, but these are expected to be breached within the next 20 years, leading to occasional tidal flooding of freshwater habitats in this area. The freshwater habitat would therefore need to be recreated elsewhere. However, this regime will allow natural coastal processes to continue and the shingle bank would roll back gradually, to the benefit of the shingle vegetation. **On balance, this option best meets the project objectives.**



# Our solution

We have identified a sustainable solution to manage the immediate issue of tidal flood risk at Minsmere site.

We believe that partial managed realignment of the defences in the north of the site will provide the most sustainable solution to the management of coastal flood risk at Minsmere in the short term. We will allow the banks at the northern end of the site to breach and the vegetated shingle habitat to move inland under natural processes.

We will make improvements to Coney Hill cross bank (see Figure 1) to isolate the area to the north known as North Marsh from any flooding from the sea. We will also make minor improvements to the secondary defence and the sluice to ensure that the site is protected against flood risk in the short term.

The freshwater reedbed habitat within North Marsh will change and we will find replacement habitat for freshwater areas that are lost.

The conclusions of this project will be considered in the review of the Lowestoft to Harwich Shoreline Management Plan (SMP). Further studies will be carried out which will take into account the longer term recommendations of the SMP. These studies will address the longer term issues at the site associated with freshwater drainage, long-term coastal flood risk and habitat management.

To ensure that our solution effectively manages flood risk over the short term, works that are required in the near future need to be identified now and put into action.

We have formulated a plan of work, as illustrated on Figure 2. We will:

- Strengthen and raise the existing Coney Hill cross bank. This will contain the effects of flooding in the north of the site and protect freshwater habitats south of the bank.

- Construct two bunds connecting the primary and secondary defences just south of Coney Hill cross bank. This will control the drainage of overspill water and help ensure the stability of the defence.
- Identify and secure suitable replacement habitat for the eventual loss of freshwater habitat at North Marsh.
- Repair any breaches to the secondary defences if considered necessary in the short term. Various factors will be considered when assessing the need for repair, including the extent of the damage, the timing of the breach, the presence of protected habitats and species, and the status of replacement habitat.
- Monitor the condition of the defences and the sluice and the continued effects of coastal processes. This will help inform future decisions regarding management of the site.

We will continue to liaise with the Steering Group (who represent organisations and the interests of local parties and conservation) and local interest groups to identify further flood risk management opportunities as they arise.



**Photo 7: Minsmere reserve with North Marsh in the foreground**

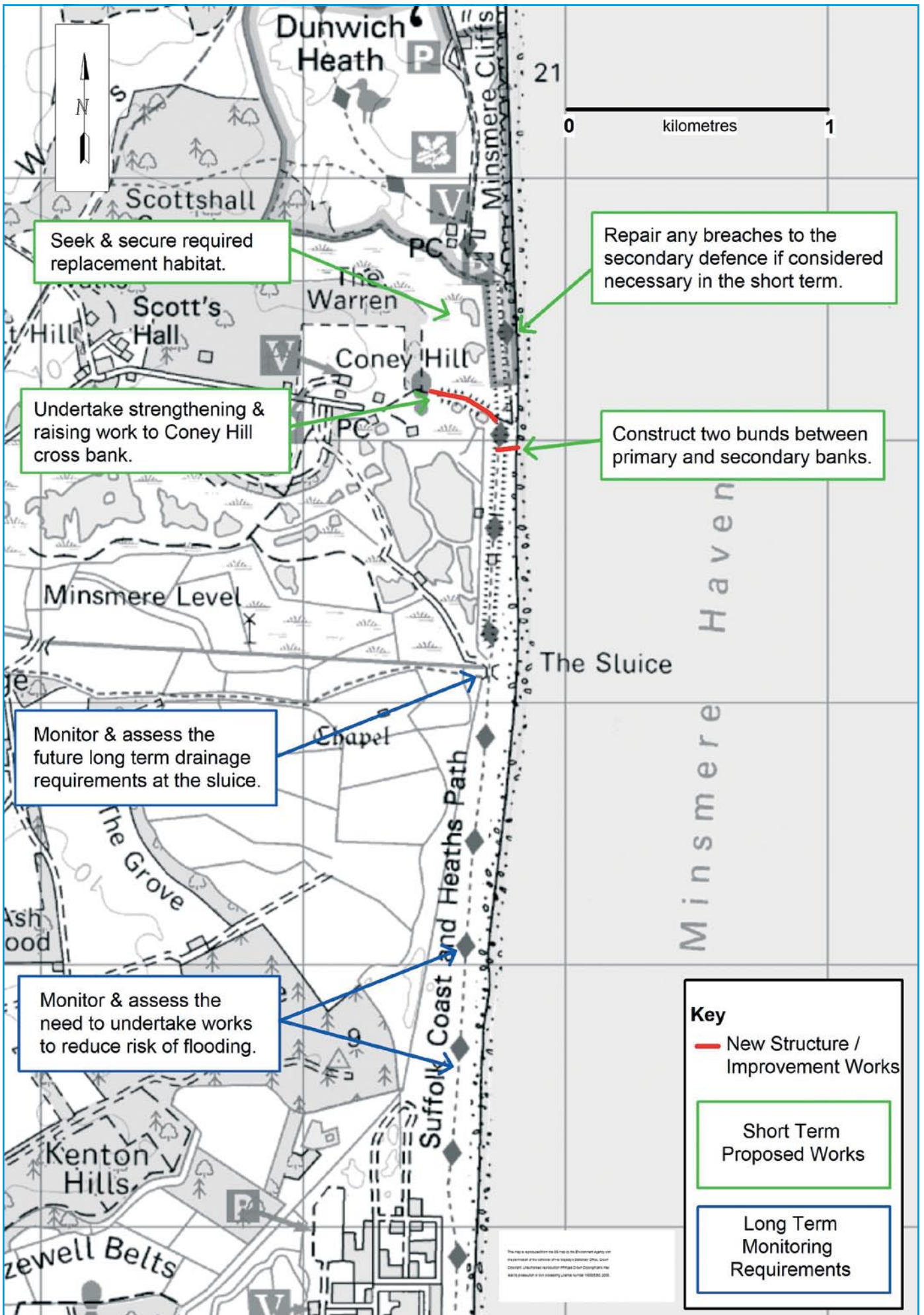


Figure 2: Proposed works



# What happens next?

We would like to hear your views on the proposed works shown on Figure 2.

You can contact us in writing or by e-mail - please see page xx for contact details.

After we've considered the responses received from this consultation, the next stages of the study are to:

- Complete the initial design of the short-term work.
- Undertake environmental assessment of the short-term work.
- Prepare a business case for the funding of construction works. This is subject to approval at national level by the Environment Agency.

These and future stages of the project are summarised in Table 2.

During the next stages of the project we will continue to work closely with the Steering Group. We will also consult with other statutory bodies, landowners, residents and any other interested parties who express an interest in response to this consultation.

The future progression of the study, and most importantly the implementation of the most sustainable solution, will depend on the success of our applications for funding, planning approval and other consents.

**Table 2. Key future stages of study**

Stage	Key Tasks	Formal Output	Timescale
Appraisal and scoping	Review of consultation feedback	Response letters and meetings as required	February 2009
	Completion of the initial design of the preferred works	Preparation and issue of initial design drawing and other reports	Spring 2009
	Environmental scoping of short term works	Preparation and issue of Scoping Report	Spring 2009
	Preparation of business case for the short term work	Preparation and issue of Project Appraisal Report	Spring 2009
<b>Application for funding approval</b>			
Detailed design and assessment (subject to funding approval)	Development of detailed design drawing	Preparation and issue of detailed design	Summer 2009 – Spring 2010
	Environmental impact assessment of preferred option	Preparation and issue of Environmental Statement (if required)	Summer 2009 – Spring 2010
Applications for planning permission and other consents (as required)			Winter 2009 – Summer 2010

# Consultees

The following organisations are being consulted as part of this consultation process.

Aldeburgh and District Angling Club

British Association for Shooting and Conservation  
Eastern England Centre

British Energy

British Nuclear Group

British Trust for Ornithology

Cliff House Holiday Park

Crown Estates

Defra

DCLG

Dunwich Parish Council

Dunwich Private Caravan Park

East Anglia Fishermen's Association

East of England Development Agency

Eastern Sea Fisheries Joint Committee

English Heritage

Essex and Suffolk Water

Leiston Parish Council

Marine and Fisheries Agency

Middleton Parish Council

Ministry of Defence

Minsmere Levels Stakeholder Group

National Trust

Natural England

Norfolk & Suffolk Anglers Consultative Association

Ramblers Association

Royal Yachting Association

RSPB

Sizewell Shoreline Management  
Group

Suffolk Biological Records Centre

Suffolk Coast and Heaths Project

Suffolk Coastal District Council

Suffolk County Anglers Association

Suffolk County Council

Suffolk Wildlife Trust

Theberton and Eastbridge Parish Council

Trinity House Lighthouse Service

Westleton Parish Council

Wildfowl and Wetlands Trust



# Contacts

We welcome your comments on the proposed works at Minsmere. We will take account of all comments received by Friday 13 February 2009 before finalising our proposals.

We would be grateful for your comments on the proposed preferred option. You can write to us:

Stuart Barbrook  
Minsmere Flood Risk Management  
Environment Agency  
Kingfisher House  
Goldhay Way  
Orton Goldhay  
Peterborough PE2 5ZR

or email:

[MinsmereFRM@environment-agency.gov.uk](mailto:MinsmereFRM@environment-agency.gov.uk)

**Would you like to find out more about us,  
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