



Broadland Flood Alleviation Project

Introduction

In May 2001 Broadland Environmental Services Limited (BESL) was awarded a long-term contract by the Environment Agency to improve and maintain flood defences in Broadland. The Agency's approach to flood alleviation in Broadland was adopted in the 1990's and is based on a strategy consisting mainly of bank strengthening and erosion protection. Over the next 12 months BESL will be working to develop and update the Environment Agency's strategy and this will set the scene for how future improvement works will be designed, programmed and carried out. We will be consulting widely on the strategy review over the coming months and we will write to you again separately.

Recent detailed surveys and monitoring confirm that improvements to flood defences for Halvergate Marshes and Haddiscoe Island are now urgently needed. BESL has therefore decided to bring forward its plans for this work.



Consultation

Our proposals need planning permission from the Broads Authority and a full assessment of their environmental impacts will also be carried out. This document has been prepared as part of the planning process so we can inform you about our proposals and to seek your views on them. We shall carefully consider any comments we receive before finalising our proposals.

This document has been sent to local organisations, groups, businesses, and landowners. BESL is keen to gauge public opinion on these proposals now, so we can address any local issues before the planning stages. We hope this will assist the planning process and ensure these urgent works can proceed as soon as possible.

The purpose of this consultation document is to:

- ▶ Explain the range of flood alleviation solutions that BESL is proposing;
- ▶ Outline the proposed improvement scheme;
- ▶ Invite your views on these proposals;
- ▶ Make BESL aware of specific local issues or relevant environmental information that ought to be considered when developing these proposals.

Throughout this document we ask questions about the proposals. These are intended to help you draw together any comments you may have. Of course, you may raise any other points that you feel are relevant. Further information about how to respond is found at the end of this document.

The need to improve flood alleviation

The existing flood defences in the lower reaches of the Rivers Yare and Waveney are mostly continuous clay floodbanks with reed ronds. The ronds vary in width and act as a natural form of erosion protection. In other areas, where excessive erosion has compromised the floodbank steel sheet piling provides a hard form of erosion protection.

The overall standard of protection against flooding has reduced over past years as a result of the floodbanks settling, their age and condition and the effects of sea level rise. In view of these effects, BESL needs to consider how to maintain flood protection in the Halvergate Marshes and Haddiscoe Island area. In many areas the floodbank is too narrow and the back slopes of the banks are too steep. These make the flood defences vulnerable to breaching when floodwater overtops them. Sea level rise and tidal surges add to this vulnerability.

Piling, such as that at Seven Mile Reach on the River Yare, was installed approximately 40 years ago to counteract erosion of the rond and provide stability to the floodbanks. The piling is now showing signs of ageing and it requires maintenance, replacement or removal. Piling along the river at Five Mile Reach for example is in a state of partial collapse following a breach of the defences in 1994.

If no improvements are carried out to the existing flood defences, the level of flood defence will fall, putting land behind the defences at risk. Part of Halvergate Marshes is of European importance for its ecological value and needs to be protected for this reason, too. Our proposals are designed to ensure that the agricultural and nature conservation value of different sites will be maintained, and protected from permanent loss or damage due to salt water flooding.

Question 1. In view of the deterioration affecting the existing defences, outlined above, do you agree that these are appropriate methods by which BESL could maintain the current level of flood protection?

BESL has taken every effort to ensure that the solutions presented here are practically and technically feasible, economically viable, socially acceptable and environmentally sound. These principles underpin BESL's approach to the project.

Solutions for flood alleviation

The range of flood alleviation solutions BESL is proposing follows the Environment Agency's overall strategy for Broadland. These are described briefly below and are illustrated on page XXXX

- ▶ Floodbank strengthening – This involves strengthening the existing clay embankment. The crest will be raised if necessary to counter the effect of floodbank settlement and sea level rise. After strengthening, the floodbanks will have a greater resistance to breaching. Strengthening does not involve moving the floodbanks.
- ▶ Floodbank setback – This involves building a new clay embankment inland from the river's edge, providing a new folding and soke dyke.
- ▶ Erosion protection – This stabilises the riverbank and the edge of the road. There are different types of erosion protection including steel sheet piling, but BESL will look to use softer engineered solutions such as proprietary asphalt matting.

Question 2. What do you think of each of these solutions as general methods by which BESL can achieve and maintain the agreed level of flood defence in Broadland?

BESL also needs to consider the consequences of not improving flood alleviation to these areas. Under the 'do nothing' option over a period of time, the existing piling and floodbanks would weaken and eventually fail completely, leading to large scale permanent damage. BESL does not consider that it is appropriate to 'do nothing' due to the scale of losses to the existing agriculture, infrastructure, protected ecological value and the landscape itself.

BESL is of the opinion that no single method meets all the flood alleviation requirements of Broadland. Different solutions have been developed for different lengths of floodbanks. The solutions have used up-to-date survey information to assess the condition of floodbanks, and evaluate the level of flood alleviation provided. BESL's proposals to improve the floodbanks at Halvergate Marshes and Haddiscoe Island is based on strengthening and setting back of floodbanks. A small proportion of steel sheet piling is proposed at Seven Mile House where existing buildings need protection.

Phasing of the work

The improvement works described in this document are Phase 1 of a larger programme of works for Halvergate Marshes and Haddiscoe Island. The map on page xxx identifies the current phases, and improvement works that will come forward in the future. By using up-to-date surveys, BESL has graded the floodbank condition and the standard of protection they afford. This has defined the urgency and therefore the phasing of improvement works. Floodbanks that do not need attention at present, including Haddiscoe Cut, will be in Phase 2. Detailed proposals for future works have not yet been developed and BESL will consult on them when they come forward.

Timing of Phase 1

August – November 2002

- ▶ first stages of all setback

April – November 2003

- ▶ all bank strengthening
- ▶ final stages of setback including removal of existing floodbanks when the new setback floodbanks are stable

Question 3. a) What do you think of the way in which BESL proposes to phase the improvement works?

The plan on page xxx shows which solution is proposed for different lengths of floodbank. This is a summary of the Phase 1 works:

Halvergate Marshes: The left (north) bank of the River Yare between Reedham and Berney Arms Mill.

- ▶ 3400m of banks to be strengthening on their existing alignment.
- ▶ 2300m of new setback floodbanks at Five Mile Reach and Upper Seven Mile Reach. New banks set back by between 20m and 30m.
- ▶ 500m of new sheet steel piling at Seven Mile to protect Seven Mile House, and Polkey's Mill and Cadge's Mill (listed buildings).

Question 4. What do you think of these three main components of the proposals for Halvergate Marshes in terms of their potential environmental, social and economic effects?

- ▶ The floodbank between North Breydon and Ashtree Farm was strengthened and the moorings replaced in 1998. No further work is needed and there will be no improvements to these sections.

Question 5. Although no new work is proposed in this area, BESL are interested in hearing any views that you might have on the work that was done here in 1998?

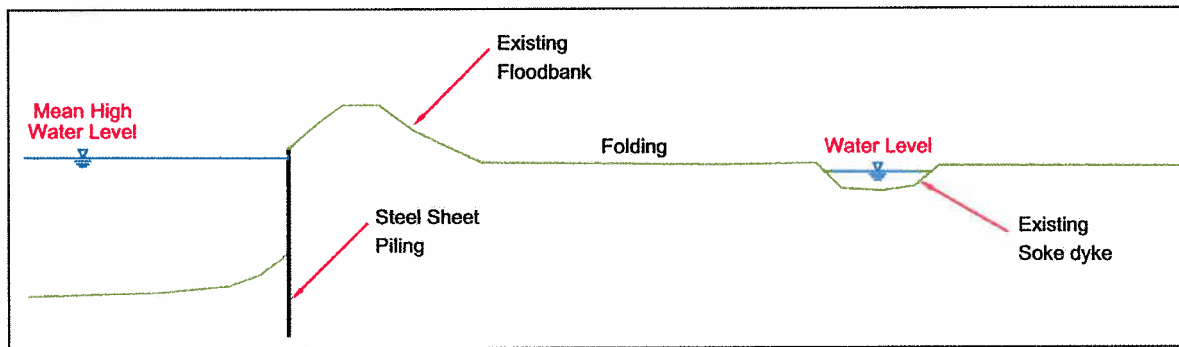
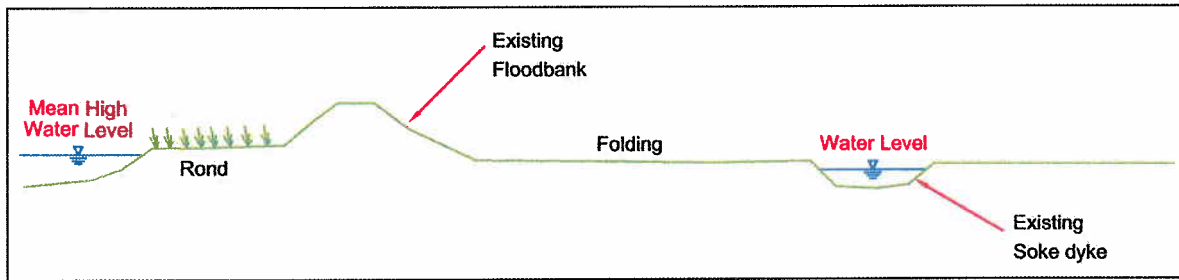
Haddiscoe Island: The right (south) bank of the River Yare, and the left (north) bank of the River Waveney between South Breydon and St Olaves.

- ▶ About one third of banks in Phase 1 will be strengthened. In several locations erosion protection is required in the form of asphalt matting.
- ▶ A short section of piling is required under the road bridge at St Olaves.
- ▶ 1500m of new setback floodbanks at Upper Seven Mile House and near Five Mile Reach. The floodbanks will be setback by between 20m and 30m.
- ▶ The floodbank at Raven Hall was strengthened and the moorings replaced in 1999. No further work is needed and there will be no improvements to these sections.

Question 6. What do you think of these three main components of the proposals for Haddiscoe Island in terms of their potential environmental, social and economic effects?

Existing floodbank

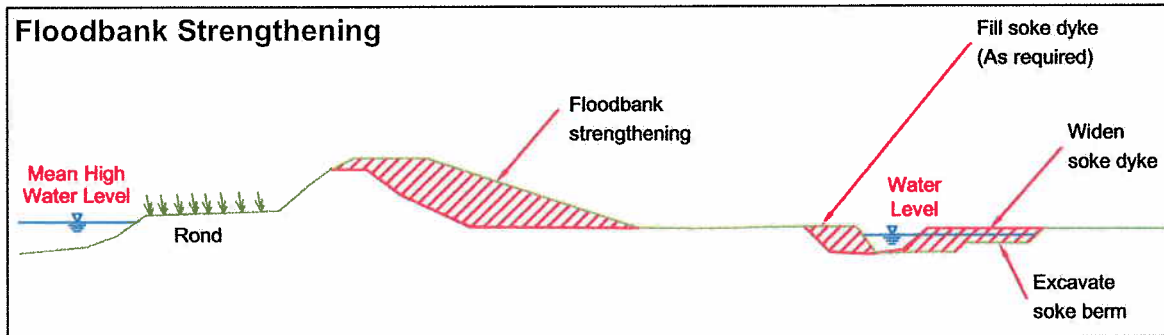
These drawings show typical cross-sections of the existing floodbanks.



Bank strengthening:

Strengthening floodbanks requires material to be placed on the back slope (landward side) and the crest (top) of the bank. The amount of strengthening needed depends on the overall condition and level of flood protection of each section of bank. Bank crests must be wide enough to allow maintenance access and further topping-up if necessary. Typically the banks will have a 2m crest width and a back slope of 1 in 2 to 1 in 3.

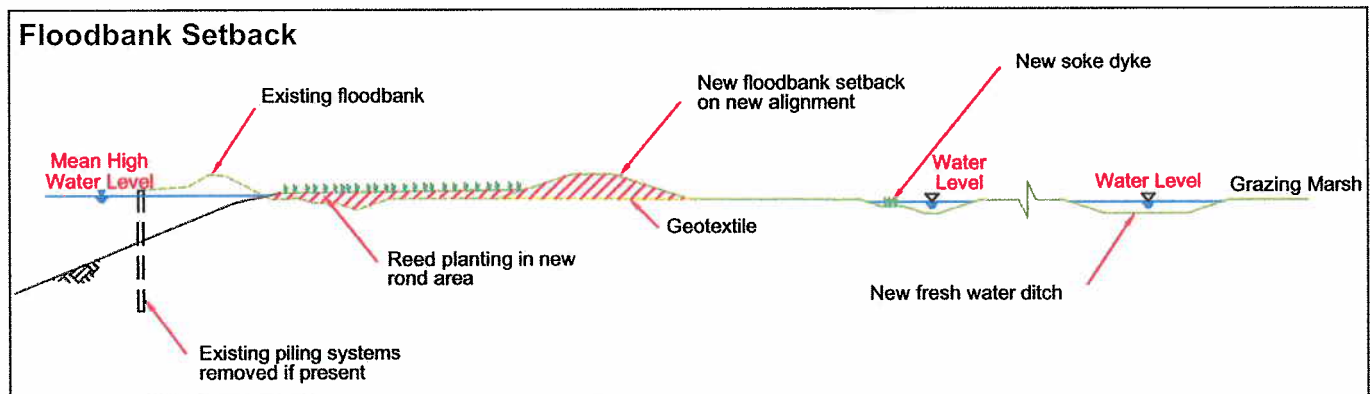
Material to strengthen the banks will be sourced from the adjacent soke dyke as necessary. Option 'A' will be chosen where the distance remaining between the toe of the back slope of the strengthened floodbank and the edge of the soke dyke/berm will be at least 5m. If this distance cannot be provided Option 'B' will be chosen.



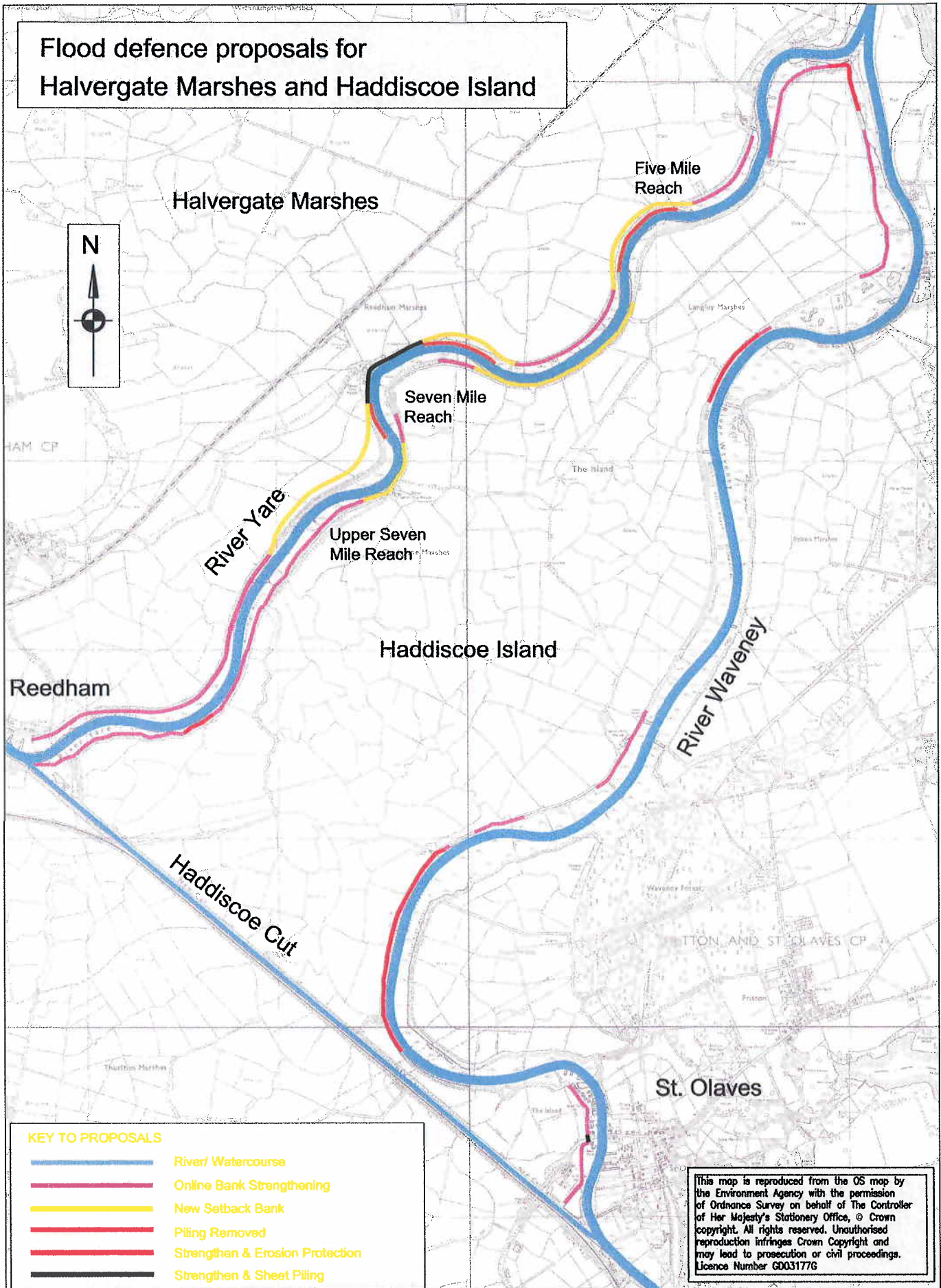
Setback:

Setting back a floodbank further away from the river is an option where the bank might become unstable due to failed piling or the reed rond eroding. A new floodbank will be constructed 20m – 30m behind the existing floodbank. The actual distance of setback will depend on local erosion rates.

Once the new bank has been constructed the existing floodbank is removed and the material levelled and profiled to promote the development of a new reed rond.



Flood defence proposals for Halvergate Marshes and Haddiscoe Island



KEY TO PROPOSALS

-  River/ Watercourse
-  Online Bank Strengthening
-  New Setback Bank
-  Piling Removed
-  Strengthen & Erosion Protection
-  Strengthen & Sheet Piling

This map is reproduced from the OS map by the Environment Agency with the permission of Ordnance Survey on behalf of The Controller of Her Majesty's Stationery Office, © Crown copyright. All rights reserved. Unauthorised reproduction infringes Crown Copyright and may lead to prosecution or civil proceedings. Licence Number GD031776

Identifying the main issues

BESL needs to examine a number of key issues in details as these proposals become more developed and the responses we receive to this consultation are an important part of that process. There will be significant positive benefits from improved flood defences, and BESL recognise that there will be other effects on the local environment. The main ones are summarised below, and are not in priority order:

Ecology issues include:

- ▶ Positive effects of protecting valuable habitats for nature conservation including against permanent long term damage.
- ▶ The opportunity to enhance existing habitats or create new ones.
- ▶ Measures taken to minimise, and where possible avoid, damage to habitats and species during construction work.
- ▶ Halvergate Marshes are protected for their nature conservation value. The ecological value of the site is recognised as being of European importance.

Question 7. Are there any other issues under the heading of 'ecology' that you feel BESL will need to address?

Landscape issues include:

- ▶ Temporary effects of works during construction.
- ▶ Effect of changes on the character of the Broads landscape.
- ▶ Attention to detailed features in the landscape such as fences, gates and stiles.

Question 8. Are there any other issues under the heading of 'landscape' that you feel BESL will need to address?

Recreation and navigation issues include:

- ▶ Temporary and permanent effects on public footpaths.
- ▶ Effects on navigation.

Question 9. Are there any other issues under the heading of 'recreation and navigation' that you feel BESL will need to address?

Cultural Heritage issues include:

- ▶ Effects on historic mills, including the small group at Seven Mile Reach.
- ▶ Effects of earth working on archaeological interest.

Question 10. Are there any other issues under the heading of 'cultural heritage' that you feel BESL will need to address?

Material sourcing issues include:

- ▶ The project requires material to be sourced locally.
- ▶ Effects of widening existing soke dykes.
- ▶ The potential to widen or create new internal ditches on the Marshes.
- ▶ The opportunity to create new habitats including reedbeds.
- ▶ Possible creation of local borrow pits if there are no reasonable alternatives.
- ▶ The use of dredgings.

Question 11. Are there any other issues under the heading of 'material sourcing' that you feel BESL will need to address?

Issues for undefended communities and landowners include:

- ▶ Ensure the timing and design of improvement works in Phase 1 does not increase flood risk to Reedham or St Olaves.
- ▶ Protecting agricultural land from permanent long term damage.

Question 12. Are there any other issues under the heading of 'undefended communities and landowners' that you feel BESL will need to address?

The next steps

Thank you for taking the time to read through this consultation document. We are keen to find out what you think of our proposals. We would also be grateful to hear about issues that you feel we should consider.

We are being assisted and advised on this public consultation by Dr Eliot Taylor from the Centre for Social and Economic Research on the Global Environment, at the University of East Anglia. He will be collating the replies and reporting to us on all responses received during the consultation period. BESL will then consider all comments made and these will help to inform us as we develop the proposals in more detail.

If you wish to reply, our freepost address is **Broadland Environmental Services Ltd, Freepost ANG20504, Norwich, NR1 1ZW**. You may also email your reply to Eliot Taylor at eliot.taylor@uea.ac.uk.

Please ensure your replies are received by Monday 18 February 2002.

Consultation list

Question 13. Are there any other organisations or individuals that you think BESL needs to consult with about these specific proposals?

In addition to landowners, local individuals and organisations, this consultation document is being sent to the following list of people and organisations.

Agricultural Advisory & Development Service	Transco - First Connect (East Area)
Anglian Water	Corvette Marine Ltd
Berney Arms Inn	Goodchild Marine Services
Broadland District Council	Johnsons Yacht Station
Broads Authority	Pearson W (Marine Craft) Ltd.
Country Landowners Association	South River Marine
Department of Environment, Food and Rural Affairs (DEFRA)	Sanderson's boatyard
East of England Development Agency	Burgh Castle Marina & Caravan Park
East of England Tourist Board	Waveney and Oulton Broad Yacht Club
English Heritage	Waveney One Design
English Nature	Yare Sailing Club
English Tourism Council	Yare Valley Sailing Club
Environment Agency	Royal Yachting Association
Great Yarmouth Borough Council	Broads Angling Strategy Group
Haddiscoe Parish Council	Broads Hire Boat Federation
Halvergate Parish Council	Waveney Valley Canoe Club
Reedham Parish Council	Norfolk and Suffolk Broads Yacht Owners Association
Fritton and St Olaves Parish Council	National Association of Boat Owners
King's Lynn Consortium of Internal Drainage Broads (IDBs)	Residential Boat Owners Association
Lower Yare IDB	Norfolk and Suffolk Pleasure Boat Owners Association
Yare and Waveney IDB	Norfolk Dayboat Operators Association
National Farmers Union – East Anglia	Broads Society
Norfolk County Council	Norfolk Wildlife Trust
The Broads Authority	British Dragonfly Society (Norfolk)
Railtrack	Anglian Otters and Rivers Project
Royal Society for the Protection of Birds	Suffolk Wildlife Trust
Regional Flood Defence Committee	RSPB (East Anglian Regional Office)
Regional Environment Protection Advisory Committee	Norfolk FWAG
Regional Fisheries, Ecology & Recreation Advisory Committee	The Ramblers Association
Norfolk and Suffolk Local Flood Defence Committee	Royal Yachting Association
Norfolk and Suffolk Area Environment Group	Royal Norfolk and Suffolk Yacht Club
Farming and Rural Conservation Agency	Suffolk Association of Local Councils
South Norfolk District Council	Broadland Owners Association
Council for the Protection of Rural England (Norfolk) & The Norfolk Society	Norfolk Tourism Management Partnership
	Norfolk County Association of Parish and Town Councils

