**Infrastructure Group – Norfolk Strategic Framework**

**Coastal Evidence (Flooding and Coastal Erosion)**

**Introduction**

There is an important link between the certainty (or as much as is possible) of coastal protection and investment and the prosperity of coastal settlements. Without suitable coastal management measures there will be a long term background of blight and disinvestment in many cases.

**National Policy**

**Meeting the challenge of climate change, flooding and coastal change**

NPPF Paragraph 99: Local Plans should take account of climate change over the longer term, including factors such as **flood risk, coastal change**, water supply and changes to biodiversity and landscape. New development should be planned to avoid increased vulnerability to the range of impacts arising from climate change. When new development is brought forward in areas which are vulnerable, care should be taken to ensure that risks can be managed through suitable adaptation measures, including through the planning of green infrastructure.

NPPF Paragraph 156: Local planning authorities should set out the strategic priorities for the area in the Local Plan. This should include strategic policies to deliver:

* the homes and jobs needed in the area;
* the provision of retail, leisure and other commercial development;
* the provision of infrastructure for transport, telecommunications, waste management, water supply, wastewater, **flood risk and coastal change management**, and the provision of minerals and energy (including heat);
* the provision of health, security, community and cultural infrastructure and other local facilities; and
* climate change mitigation and adaptation, conservation and enhancement of the natural and historic environment, including landscape.

NPPF Paragraph 162: Local planning authorities should work with other authorities and providers to:

* assess the quality and capacity of infrastructure for transport, water supply, wastewater and its treatment, energy (including heat), telecommunications, utilities, waste, health, social care, education, **flood risk and coastal change management**, and its ability to meet forecast demands; and
* take account of the need for strategic infrastructure including nationally significant infrastructure within their areas.

**National Infrastructure Delivery Plan 2016 - 2021**

The Government’s National Infrastructure Delivery Plan includes the Flood and Coastal Erosion Management Programme within its priorities for infrastructure investments.

**Devolution**

The East Anglian devolution deal which was subsequently split into a Greater Cambridgeshire/Peterborough deal and a separate Norfolk/Suffolk deal has failed to secure endorsement from all of the local authorities. The Greater Cambridgeshire/Greater Peterborough deal has received the go ahead. A Suffolk devolution deal may still happen, possibly with the addition of Broadland and South Norfolk councils.

Any future devolution deal should seek to incorporate reference to coastal management and seek to manage and mitigate strategic risks by working with Government and relevant bodies to create a fully integrated approach to flood and coastal risk management.

**Local Policies**

**Shoreline Management Plans**

A Shoreline Management Plan (SMP) is a large-scale assessment of the risks associated with coastal processes and helps reduce these risks to people and the developed, historic and natural environments.

Shoreline Management Plans have been prepared for The Wash (SMP4); North Norfolk (Old Hunstanton to Kelling Hard) (SMP5); and Kelling Hard to Lowestoft Ness (SMP6).

**Marine Plans**

The East Inshore and East Offshore Marine Plans were adopted in April 2014. The East Inshore Marine Plan area includes the coastline stretching from Flamborough Head to Felixstowe, extending from mean high water out to 12 nautical miles, including inland areas such as the Broads and other waters subject to tidal influence, and covers an area of 6,000 square kilometres. The East Offshore Marine Plan area covers the marine area from 12 nautical miles out to the maritime borders with the Netherlands, Belgium and France, a total of approximately 49,000 square kilometres of sea.

The aim of marine plans is to help ensure the sustainable development of the marine area. Marine plans will contribute to economic growth in a way that benefits society whilst respecting the needs of local communities and protecting the marine ecosystem. They will help to reduce the net regulatory burden on applicants and users by acting as an enabling mechanism for those seeking to undertake activities or development in the future and providing more certainty about where activities could best take place.

**Other strategies/policy areas**

**The Wash East Coastal Management Strategy (WECMS) 2015**

The Wash East Coastal Management Strategy (WECMS) was prepared to take forward policies in The Wash Shoreline Management Plan (SMP). The WECMS covers the coast from Old Hunstanton to the River Ingol outfall at Wolferton Creek. It was a joint Environment Agency and Borough Council project to look at the whole frontage and develop an integrated plan for the future management of the sea defences and adjacent land. The Strategy set out options for coastal management for the short to medium term i.e. 25 to 50 years.

**North Norfolk District Council Area**

Weybourne to Cart Gap (Happisburgh) Defences Removal

Management and removal of redundant coastal defences, re-naturing beachscape.

|  |  |
| --- | --- |
| Location | Weybourne to Cart Gap, Norfolk |
| Lead Organisation | North Norfolk District Council |
| Completion Date | 31/12/2025 |
| Total Cost | **£2,910,000** |
| Funding Shortfall | £0 |
| CIL Contribution? | TBC |
| Directly Delivers | Health and safety and coastal access improvement, environmental benefits  |
| Indirectly Delivers | Economic benefits through improvement to visitor economy asset |
| Status | TBC |
| Further information available from  | Bill Parker & Rob Goodliffe, Coastal Partnership East |

Overstrand Coast Protection Scheme

Scheme to repair and upgrade existing coastal infrastructure in a town popular with visitors.

|  |  |
| --- | --- |
| Location | Overstrand, Norfolk |
| Lead Organisation | North Norfolk District Council |
| Completion Date | TBC |
| Total Cost | **£1,724,188** |
| Funding Shortfall | £750,000 |
| CIL Contribution? | TBC |
| Directly Delivers | Reduction of flood and erosion risk  |
| Indirectly Delivers | Economic benefits through preservation of assets essential to visitor economy and other key infrastructure assets |
| Status | TBC |
| Further information available from  | Bill Parker & Rob Goodliffe, Coastal Partnership East |

Mundesley Coast Protection Scheme

Scheme to repair and upgrade existing coastal infrastructure in town popular with visitors.

|  |  |
| --- | --- |
| Location | Mundesley, Norfolk |
| Lead Organisation | North Norfolk District Council |
| Completion Date | 01/03/2018 |
| Total Cost | **£1,868,000** |
| Funding Shortfall | £0 |
| CIL Contribution? | TBC |
| Directly Delivers | Reduction of flood and erosion risk  |
| Indirectly Delivers | Economic benefits through preservation of assets essential to visitor economy and other key infrastructure assets |
| Status | Anticipated start date 01/10/2017 |
| Further information available from  | Bill Parker & Rob Goodliffe, Coastal Partnership East |

Bacton Gas Terminal to Ostend (Walcott) Coastal Management Scheme

Major coastal defence scheme to reduce risk of erosion and flooding to major national asset and villages downstream

|  |  |
| --- | --- |
| Location | Bacton to Ostend, Norfolk |
| Lead Organisation | North Norfolk District Council |
| Completion Date | 01/03/2017 |
| Total Cost | **£36,330,000** |
| Funding Shortfall | £4,054,000 |
| CIL Contribution? | TBC |
| Directly Delivers | Reduction of erosion risk to national asset |
| Indirectly Delivers | National economic benefits through preservation key infrastructure assets |
| Status | Project in planning stage |
| Further information available from  | Bill Parker & Rob Goodliffe, Coastal Partnership East |

Eccles to Winterton Sea Defence Management Scheme

Beach re-nourishment scheme.

|  |  |
| --- | --- |
| Location | Eccles to Winterton, Norfolk |
| Lead Organisation | Environment Agency |
| Completion Date | 2035 (dependent upon monitoring data) |
| Total Cost | **£20,000,000** |
| Funding Shortfall | TBC |
| CIL Contribution? | TBC |
| Directly Delivers | Reduction of flood risk |
| Indirectly Delivers | Protection of designated sites and tourism benefits |
| Status | Long term future project |
| Further information available from  | Mark Johnson, Gary Watson & Kellie Fisher (Coastal PSO Team) |

**The Broadland Flood Alleviation Project (BFAP)**

The Broadland Flood Alleviation Project (BFAP) is a long-term project to provide a range of flood defence improvements, maintenance and emergency response services within the tidal areas of the Rivers Yare, Bure, Waveney and their tributaries.

Appointed by the Environment Agency, Broadland Environmental Services Ltd delivers these services and, in partnership with the Agency, it is now implementing the 20-year programme of works.

This contract was awarded in May 2001 as a Public Private Partnership Programme, and is the first of its kind to provide flood defences on this scale.

**The Project area**

Broadland includes both open water, The Broads themselves, and the low-lying marshland surrounding the tidal reaches of the River Yare, The Waveney, Thurne, Ant, Chet and the Bure. The rivers reach the sea at Great Yarmouth

Fifty percent of the land is given over to traditional farming with the remainder being used for residential, industrial, commercial and conservation purposes.

The rivers remain a major inland navigation, which, together with the Broads, provide access to 125 miles of waterway.

Recreation and tourism have become very important, with thousands of holiday makers visiting each year. Many of the visitors are here for the excellent angling and boating opportunities, with both activities making important contributions to the local economy.

This unique and environmentally sensitive area is home to plants and animals that are found in few other places in Britain. The Project Area contains around 28 sites of Special Scientific Interest. These amount to over 7,000 hectares in total, all of which benefit from protection under European Law, either as Special Protection Areas (SPAs) or Special Areas of Conservation (SACs). In 1988 the whole of Broadland was designated as having equivalent status to a National Park.

Conservation bodies own or manage some of these sites but most of Broadland is productive farmland. Much of the land is now used for traditional summer livestock grazing.

Following extensive drainage programmes during the 1970s and early 1980s, moves were undertaken to encourage more sustainable farming practices. Funded by DEFRA farmers are encouraged to undertake Environmental Stewardship (ES). This is a scheme designed to conserve and enhance the high environmental value of the area via improved farming practices.

**Why is flood alleviation needed in Broadland?**

Some 240km of floodbanks protect approximately 21,300 hectares of Broadland containing more than 1,700 properties of which more than 1,000 are residential. Most of the original material used for the construction of these floodbanks was silty clay and as a result many have deteriorated over time.

Combined with changes to river channels many of the banks have become susceptible to seepage and erosion which places them in danger of being undermined and/or subject to breaching. The erosion of riverbanks is caused by wind and waves, boatwash, normal river flows and the action of the tides.

Historically, timber and steel sheet piling was installed at the river’s edge to protect the flood banks from these erosive effects. Much of this piling in the Broads area has reached the end of its functional life and, besides being eyesore, could be hazardous to boat users.

Over time floodbanks settle, putting them at risk of being overtopped by even fairly small tidal surges. Continued sea level rise also presents a risk to settlements along the coast and within parts of the Broads. The combination of the effects of settlement and sea level rise works out to be the same as an average settlement rate of about 25mm/year.

**What are the Project's aims in Broadland?**

The main aim of project work has been to strengthen existing flood defences to reduce the risk of breaches occurring and restore them to a height that existed in 1995 (a level defined by the Environment Agency) while making additional allowances for sea level rise and future settlement of the floodbanks. Removal of long lengths of life-expired piling and replacing it with natural erosion protection has also resulted in a more sustainable flood defence system. The Broadland Flood Alleviation Project works will not prevent all future flooding as land that flooded in 1995 will still be subject to periodic flooding at the end of the Project.

The project has completed its programme of major improvements and is now focused on maintaining the improved system until the end of the contract in 2021. It is anticipated that the Broadland flood defences will only need maintenance attention and small scale capital works for the following 10 year period. It is difficult to say what approach will be needed beyond 2031 but, given the nature of the flood defences and ground conditions, and the effects of climate change, a further large scale intervention based on appropriate studies will likely be needed, if we wish to maintain flood defences in the area.

The project has also provided modest first time defences to several communities, such as Reedham, Brundall and Chedgrave. Separate from the project, the Environment Agency has identified other communities ‘at-risk’ within the Broadland area and is currently investigating whether there are viable measures that can be taken at these locations.

These improvements are maintained by:

* Monitoring crest levels (height of the floodbank) and raising banks again (crest raising) in places where further settlement has taken place;
* Monitoring the condition of existing and any new erosion protection and extend or replace if necessary.

The improvement works are being implemented through a phased programme through:

* Strengthening the existing floodbanks, restoring them to agreed levels where excessive settlement has occurred
* Replacing existing erosion protection that is in a poor condition using more environmentally acceptable methods wherever possible
* Providing new protection where erosion is currently threatening the integrity of the flood defences
* Carrying out works at undefended communities

**How will the project achieve its aims?**

Within the contract the solutions available to the Project are:

**Floodbank strengthening**

This is usually used where there is still a good band of rond between the river and the floodbank.

It involves strengthening the existing floodbanks in their present locations by putting material on the back and/or front slope.

The crest (top of the floodbank) is also raised to provide the agreed 1995 level. The increase in height can be between approximately 30 and 40 cm depending on how poor they are when compared to 1995 standards.

**Floodbank setback**

This is usually used where the river is already hard up against the floodbank and the flood defence is protected by erosion protection, such as piling. This solution involves building a new clay floodbank inland from the river edge with the floodbank set back far enough from the existing line of flood defence so that a new rond can be created and natural vegetation established. The existing erosion protection will then be removed once the new floodbank is in place and the new rond has become established.

This solution is similar to set-back; however, the distance the floodbank is moved inland is considerably less (dependent on position of existing soke dyke, ground conditions and width of folding).

It is the preferred solution when rond/erosion protection is insufficient to allow for just bank strengthening and where ground conditions do not permit full setback.

**Erosion protection**

Floodbank erosion protection is used in various locations to stabilise the floodbanks and the edges of the rond. Several types of erosion protection can be used depending on local circumstances these include asphalt matting, coir (coconut husk) rolls or matting, alder poles, reed based products and new sheet metal piling. Wherever possible the material required is found locally, e.g. by widening existing soke dykes close to where work is being carried out; by creating new marsh dykes or by using stockpiled, or new, dredgings.

**Hydraulic model**

A computer model of the Broadland river system has also been developed using detailed survey information of river channel shape, bank height etc., as well as predictions of sea-level rise. This hydraulic model is used to determine what effect, if any, a particular scheme of works might have on water levels, flows and the frequency of flooding in any other part of the Project area. It is an important tool to help the project decide exactly what to do, where and how their programme of works should be phased and to test other options, e.g. informal washlands. The predictions made by the model have been thoroughly checked throughout the Project and has proven to be extremely accurate.

**Project budget**

Another important aspect of the project is that it is cost limited. This cost ceiling means that all individual schemes within the project have to be strictly designed to be cost-effective and within the planned programme. Any excessive spending in one area will result in a shortfall elsewhere. With careful management the Project has improved the area security against flooding and significantly reduced the risk of damage to the Broadland environment as a whole.

**Great Yarmouth Borough Council Area**

Completion of Caister sea wall

Work to protect significant sea wall on seafront protecting the town from erosion.

|  |  |
| --- | --- |
| Location | Caister, Norfolk |
| Lead Organisation | Great Yarmouth Borough Council |
| Completion Date | TBC |
| Total Cost | £1,720,000 |
| Funding Shortfall | £1,235,000 |
| CIL Contribution? | TBC |
| Directly Delivers | Reduction of flood and erosion risk,  |
| Indirectly Delivers | Economic benefits (tourism ) |
| Status | TBC |
| Further information available from  | Bill Parker & Bernard Harris, Coastal Partnership East |

Gorleston Coast Protection Scheme

Work to recharge beach and build headland structure to retain sediment.

|  |  |
| --- | --- |
| Location | Gorleston, Norfolk |
| Lead Organisation | Great Yarmouth Borough Council |
| Completion Date | TBC |
| Total Cost | £5,891,801 |
| Funding Shortfall | £3,240,491 |
| CIL Contribution? | TBC |
| Directly Delivers | Reduction of flood and erosion risk  |
| Indirectly Delivers | Economic benefits through preservation of assets essential to visitor economy and other key infrastructure assets |
| Status | Work expected in 2022 and 2027 |
| Further information available from  | Bill Parker & Bernard Harris, Coastal Partnership East |

**Adjoining Areas**

**Suffolk**

**Waveney District Council area**

Lowestoft Flood Risk Management Project

Nationally significant project to significantly reduce the risks of all forms of flooding to the town, delivering significant economic benefits to the region.

|  |  |
| --- | --- |
| Location | Lowestoft, Suffolk |
| Lead Organisation | Waveney District Council |
| Completion Date | 31/03/2021 |
| Total Cost | £28,925,000 - has the cost increased? |
| Funding Shortfall | TBC – bids in process |
| CIL Contribution? | TBC |
| Directly Delivers | Reduction of flood and erosion risk  |
| Indirectly Delivers | Economic benefits through preservation of assets essential to visitor economy and other key infrastructure assets, enabling development and regeneration |
| Status | In final consultation phase  |
| Further information available from  | Bill Parker & Sharon Bleese, Coastal Partnership East |

Hopton to Corton scheme

Anticipated scheme to manage the rate of erosion to this undefended frontage and create a natural coastal asset – a new beach and bay. From Medium Term Plan (MTP) for removal of ruined defences. Possibly now superseded by Gorleston to Lowestoft Coastal Strategy (G2LCS).

|  |  |
| --- | --- |
| Location | Hopton to Corton, Suffolk |
| Lead Organisation | Waveney District Council |
| Completion Date | TBC |
| Total Cost | **£3,050,000** |
| Funding Shortfall | **£3,050,000** |
| CIL Contribution? | TBC |
| Directly Delivers | Health and safety and coastal access improvement, environmental benefits  |
| Indirectly Delivers | Economic benefits through creation to visitor economy asset |
| Status | Anticipated start date from 2022 |
| Further information available from  | Bill Parker & Sharon Bleese, Coastal Partnership East |

Corton Village

Anticipated coastal protection scheme to significantly reduce the rate of erosion and resulting loss of key businesses, homes and infrastructure assets. From the G2LCS.

Note (MTP) item to decommission defences after year 2025 is not included.

|  |  |
| --- | --- |
| Location. | Corton, Suffolk |
| Lead Organisation | Waveney District Council |
| Completion Date | TBC |
| Total Cost | **£15,299,168** |
| Funding Shortfall | **£14,993,185** |
| CIL Contribution? | TBC |
| Directly Delivers | Reduction of erosion risk  |
| Indirectly Delivers | Economic benefits through preservation of assets essential to visitor economy and other key infrastructure assets, enabling development and regeneration |
| Status | Anticipated start date from 2025, depending on beach levels |
| Further information available from  | Bill Parker & Sharon Bleese, Coastal Partnership East |

Lowestoft North Denes to Lowestoft Ness Scheme phase 1 of 2?

MTP entry is for two phases over 10 years totalling ~£8m. I believe that G2LCS shows 1 scheme within 5 years @ much higher cost. Need to clarify which option is taken forward.

Project to upgrade existing coastal defence infrastructure, to continue to significantly reduce the risk of sea flooding to private and public assets.

|  |  |
| --- | --- |
| Location | Lowestoft, Suffolk |
| Lead Organisation | Waveney District Council |
| Completion Date | 01/08/2024 |
| Total Cost | **£4,000,000** |
| Funding Shortfall | £3,000,000 |
| CIL Contribution? | TBC |
| Directly Delivers | Reduction of flood and erosion risk  |
| Indirectly Delivers | Economic benefits through preservation of assets essential to visitor economy and other key infrastructure |
| Status | TBC |
| Further information available from  | Bill Parker & Sharon Bleese, Coastal Partnership East |

Lowestoft Ness Scheme

A project to enhance the harbour entrance and Hamilton seawall, both key coastal defence and economic assets.

|  |  |
| --- | --- |
| Location | Lowestoft, Suffolk |
| Lead Organisation | Waveney District Council |
| Completion Date | 2028 |
| Total Cost | **£6,000,000** |
| Funding Shortfall | £5,000,000 |
| CIL Contribution? | TBC |
| Directly Delivers | Flood and erosion risk reduction |
| Indirectly Delivers | Key private and public assets are secured |
| Status | Anticipated start date from 2025 |
| Further information available from  | Bill Parker & Sharon Bleese, Coastal Partnership East |

Lowestoft South beach, Pakefield and Northern part of South Beach scheme

Beach management works to reduce loss of beach – a key natural tourism and coastal defence asset.

|  |  |
| --- | --- |
| Location | Lowestoft, Suffolk |
| Lead Organisation | Waveney District Council |
| Completion Date | TBC |
| Total Cost | **£1,500,000** |
| Funding Shortfall | £900,000 |
| CIL Contribution? | TBC |
| Directly Delivers | Reduction of flood and erosion risk  |
| Indirectly Delivers | Economic benefits through preservation of assets essential to visitor economy and other key infrastructure |
| Status | Anticipated start date from 2025 |
| Further information available from  | Bill Parker & Sharon Bleese, Coastal Partnership East |

Lowestoft South Beach to Pakefield Scheme

Beach management works to reduce loss of beach – a key natural tourism and coastal defence asset.

|  |  |
| --- | --- |
| Location | Lowestoft, Suffolk |
| Lead Organisation | Waveney District Council |
| Completion Date | TBC |
| Total Cost | **£2,000,000** |
| Funding Shortfall | £1,100,000 |
| CIL Contribution? | TBC |
| Directly Delivers | Reduction of flood and erosion risk  |
| Indirectly Delivers | Economic benefits through preservation of assets essential to visitor economy and other key infrastructure |
| Status | Anticipated start date from 2030 |
| Further information available from  | Bill Parker & Sharon Bleese, Coastal Partnership East |

Kessingland Levels FRM

Scheme to retreat the flood defence line south of Kessingland.

|  |  |
| --- | --- |
| Location | Kessingland, Suffolk  |
| Lead Organisation | IDB |
| Completion Date | 2022 |
| Total Cost | **£6,000,000** |
| Funding Shortfall | £5,500,000 |
| CIL Contribution? | TBC |
| Directly Delivers | Reduction of flood risk  |
| Indirectly Delivers | Economic benefits through preservation of assets essential to visitor economy and other key infrastructure |
| Status | Preliminary study complete; public consultation underway.  |
| Further information available from  | Karen Thomas, WLMA. Gary Watson EA & Coastal Partnership East |

Southwold & Easton Marsh Phase

A joint Environment Agency and Waveney District Council scheme to repair/upgrade key coastal defence infrastructure protecting crucial tourism assets, important habitat and the single road enabling access to the town.

|  |  |
| --- | --- |
| Location | Southwold, Suffolk |
| Lead Organisation | Waveney District Council |
| Completion Date | TBC |
| Total Cost | **£3,200,000** |
| Funding Shortfall | £1,650,000 |
| CIL Contribution? | TBC |
| Directly Delivers | Reduction of flood and erosion risk  |
| Indirectly Delivers | Economic benefits through preservation of assets essential to visitor economy and other key infrastructure |
| Status | Anticipated start date 18/04/2020. Ongoing study likely to show need for works in next 3 years. |
| Further information available from  | Bill Parker & Paul Patterson, Coastal Partnership East |

Southwold & Easton Marsh Phase

Scheme to repair/upgrade key coastal defence infrastructure protecting crucial tourism assets, important habitat and the single road enabling access to the town.

|  |  |
| --- | --- |
| Location | Southwold, Suffolk |
| Lead Organisation | Waveney District Council |
| Completion Date | TBC |
| Total Cost | **£3,300,000** |
| Funding Shortfall | £1,700,000 |
| CIL Contribution? | TBC |
| Directly Delivers | Reduction of flood and erosion risk  |
| Indirectly Delivers | Economic benefits through preservation of assets essential to visitor economy and other key infrastructure |
| Status | Anticipated start date from 2035. Repeat of 15 year works cycle. |
| Further information available from  | Bill Parker & Paul Patterson, Coastal Partnership East |

Southwold Frontage Scheme

Scheme to renew the coastal defence fender to River Blyth Harbour North Pier/terminal groyne.

|  |  |
| --- | --- |
| Location | Southwold, Suffolk  |
| Lead Organisation | Waveney District Council |
| Completion Date | 2020 |
| Total Cost | **£380,000** |
| Funding Shortfall | £220,000 |
| CIL Contribution? | TBC |
| Directly Delivers | Reduction of flood and erosion risk  |
| Indirectly Delivers | Economic benefits through preservation of assets essential to visitor economy and other key infrastructure |
| Status | TBC. Major works required in next 3 years. |
| Further information available from  | Bill Parker & Paul Patterson, Coastal Partnership East |

Southwold Frontage Scheme

Scheme to renew the Harbour South Pier/training wall.

|  |  |
| --- | --- |
| Location | Southwold, Suffolk  |
| Lead Organisation | Waveney District Council |
| Completion Date | 2025 |
| Total Cost | £2,000,000 PP guess |
| Funding Shortfall | TBC |
| CIL Contribution? | TBC |
| Directly Delivers | Sustains safe navigation of harbour and flood risk management.  |
| Indirectly Delivers | Economic benefits through preservation of assets essential to visitor economy and other key infrastructure, stabilises estuary mouth. |
| Status | TBC. Major works required in next 5 years.  |
| Further information available from  | Bill Parker & Paul Patterson, Coastal Partnership East |

**Suffolk Coastal District Council area**

Thorpeness erosion response works

Scheme to reduce the risks of erosion and flooding to homes and tourism assets

|  |  |
| --- | --- |
| Location | Thorpeness, Suffolk |
| Lead Organisation | Suffolk Coastal District Council |
| Completion Date | 31/05/2017 |
| Total Cost | **£507,000** |
| Funding Shortfall | £140,000 |
| CIL Contribution? | TBC |
| Directly Delivers | Reduction of flood and erosion risk  |
| Indirectly Delivers | Economic benefits through preservation of assets essential to visitor economy and other key infrastructure |
| Status | Anticipated start date 01/10/2016 |
| Further information available from  | Bill Parker & Paul Patterson, Coastal Partnership East |

Aldeburgh Town Frontage Works

Scheme to reduce the risk of flooding and erosion to a popular seaside town with a significant visitor economy.

|  |  |
| --- | --- |
| Location | Aldeburgh, Suffolk |
| Lead Organisation | Suffolk Coastal District Council |
| Completion Date | 18/06/2025 |
| Total Cost | **£3,000,000** |
| Funding Shortfall | £2,550,000 |
| CIL Contribution? | TBC |
| Directly Delivers | Reduction of flood and erosion risk  |
| Indirectly Delivers | Economic benefits through preservation of assets essential to visitor economy and other key infrastructure  |
| Status | Anticipated start date 18/12/2023 |
| Further information available from  | Bill Parker & Paul Patterson, Coastal Partnership East |

Aldeburgh Town Shingle Engine

Scheme to manage coast/estuary breach risk.

|  |  |
| --- | --- |
| Location | Aldeburgh, Suffolk |
| Lead Organisation | TBA |
| Completion Date | TBC |
| Total Cost | **£9,000,000** |
| Funding Shortfall | TBC |
| CIL Contribution? | TBC |
| Directly Delivers | Reduction of flood and erosion risk  |
| Indirectly Delivers | Economic benefits through preservation of assets essential to visitor economy and other key infrastructure  |
| Status | TBC |
| Further information available from  | TBC |

Alde/Ore River Management

Scheme to improve river banks.

|  |  |
| --- | --- |
| Location | Alde/Ore estuary to Snape. |
| Lead Organisation | OAEP |
| Completion Date | 2025 |
| Total Cost | **£5,000,000 tbc** |
| Funding Shortfall | TBC |
| CIL Contribution? | TBC |
| Directly Delivers | Reduction of flood and erosion risk  |
| Indirectly Delivers | Economic benefits through preservation of assets essential to visitor economy and other key infrastructure  |
| Status | Ongoing. |
| Further information available from  | Karen Thomas WLMA |

East Lane Bawdsey Defence Extension/Realignment Works

Scheme to reduce the risk of flooding and erosion to a popular seaside town with a significant visitor economy.

|  |  |
| --- | --- |
| Location | Aldeburgh, Suffolk |
| Lead Organisation | TBC |
| Completion Date | TBC |
| Total Cost | **TBC** |
| Funding Shortfall | TBC |
| CIL Contribution? | TBC |
| Directly Delivers | Reduction of flood and erosion risk  |
| Indirectly Delivers | Economic benefits through preservation of assets essential to visitor economy and other key infrastructure  |
| Status | TBC |
| Further information available from  | TBC |

Bawdsey Manor Private Works

Scheme to reduce risks of erosion and flooding to area at increasing risk from the sea

|  |  |
| --- | --- |
| Location | Bawdsey Manor Suffolk |
| Lead Organisation |  Private Landowner |
| Completion Date | 08/06/2021 Private works possible in 2016/17 |
| Total Cost | **£637,500 Likely** to be less than this. |
| Funding Shortfall | £535,000 |
| CIL Contribution? | TBC |
| Directly Delivers | Reduction of flood and erosion risk  |
| Indirectly Delivers |  |
| Status | Anticipated start date 08/06/2020 First phase could be 2016/17 |
| Further information available from  | Bill Parker & Paul Patterson, Coastal Partnership East |

Bawdsey and Deben Estuary Mouth Works

Scheme to reduce risks of erosion and flooding to area at increasing risk from the sea.

|  |  |
| --- | --- |
| Location | Bawdsey Manor and Deben Estuary Mouth, Suffolk |
| Lead Organisation | Suffolk Coastal District Council |
| Completion Date | 02/06/2025 |
| Total Cost | **£1,000,000** |
| Funding Shortfall | £750,000 |
| CIL Contribution? | TBC |
| Directly Delivers | Reduction of flood and erosion risk  |
| Indirectly Delivers |  |
| Status | Anticipated start date 02/01/2024. Is subject of study with RHDHV and cooperation with DEP.? Potential for works within 3 years.  |
| Further information available from  | Bill Parker & Paul Patterson, Coastal Partnership East |

Felixstowe North

Works to recharge beach with sediment and upgrade groynes and part of seawall Phase 1

|  |  |
| --- | --- |
| Location | Felixstowe, Suffolk |
| Lead Organisation | Suffolk Coastal District Council |
| Completion Date | TBC |
| Total Cost | **£1,495,000** |
| Funding Shortfall | £1,190,000 |
| CIL Contribution? | TBC |
| Directly Delivers | Reduction of flood and erosion risk  |
| Indirectly Delivers | Economic benefits through preservation of assets essential to visitor economy and other key infrastructure |
| Status | Anticipated start date 01/03/2022 There is potential for works here within 5 years but low BCR is a block. |
| Further information available from  | Bill Parker & Paul Patterson, Coastal Partnership East |

Felixstowe North

Scheme to improve beach assets via recharge, improve groynes and part seawall at a popular seaside town. Phase 2

|  |  |
| --- | --- |
| Location | Felixstowe, Suffolk |
| Lead Organisation | Suffolk Coastal District Council |
| Completion Date | TBC |
| Total Cost | **£1,500,000** |
| Funding Shortfall | £1,114,142 |
| CIL Contribution? | TBC |
| Directly Delivers | Reduction of flood and erosion risk  |
| Indirectly Delivers | Economic benefits through preservation of assets essential to visitor economy and other key infrastructure |
| Status | Anticipated start date from 2027 |
| Further information available from  | Bill Parker & Paul Patterson, Coastal Partnership East |

Central Felixstowe Coast Protection Works - Spa flood wall

Scheme to reduce the risk of flooding and erosion to a popular seaside town with a significant visitor economy.

|  |  |
| --- | --- |
| Location | Felixstowe, Suffolk |
| Lead Organisation | Suffolk Coastal District Council |
| Completion Date | 02/06/2027 |
| Total Cost | **£1,495,000** |
| Funding Shortfall | £1,450,000 |
| CIL Contribution? | TBC |
| Directly Delivers | Reduction of flood and erosion risk  |
| Indirectly Delivers | Economic benefits through preservation of assets essential to visitor economy and other key infrastructure |
| Status | Anticipated start date 02/01/2026 |
| Further information available from  | Bill Parker & Paul Patterson, Coastal Partnership East |

Felixstowe South

Works to renew and raise seawall on promenade – an important coastal defence and tourism asset.

|  |  |
| --- | --- |
| Location | Felixstowe, Suffolk |
| Lead Organisation | Suffolk Coastal District Council |
| Completion Date | TBC |
| Total Cost | **£3,000,000** |
| Funding Shortfall | £1,052,742 |
| CIL Contribution? | TBC |
| Directly Delivers | Reduction of flood and erosion risk  |
| Indirectly Delivers | Economic benefits through preservation of assets essential to visitor economy and other key infrastructure |
| Status | Anticipated start date from 2026. This is a marker from a 2008 strategy. |
| Further information available from  | Bill Parker & Paul Patterson, Coastal Partnership East |

Felixstowe South - Works to replace old timber/concrete groynes

Works to replace failed legacy assets with new structures to retain beach material.

|  |  |
| --- | --- |
| Location | Felixstowe, Suffolk |
| Lead Organisation | Suffolk Coastal District Council |
| Completion Date | TBC |
| Total Cost | **£2,000,000** |
| Funding Shortfall | £52,742 |
| CIL Contribution? | TBC |
| Directly Delivers | Reduction of flood and erosion risk  |
| Indirectly Delivers | Economic benefits through preservation of assets essential to visitor economy and other key infrastructure |
| Status | Anticipated start date from 2026 |
| Further information available from  | Bill Parker & Paul Patterson, Coastal Partnership East |

Felixstowe South and Central

Works to recharge Felixstowe Central and South beaches with sediment

|  |  |
| --- | --- |
| Location | Felixstowe, Suffolk |
| Lead Organisation | Suffolk Coastal District Council |
| Completion Date | TBC |
| Total Cost | **£2,300,000** |
| Funding Shortfall | £590,740 |
| CIL Contribution? | TBC |
| Directly Delivers | Reduction of flood and erosion risk  |
| Indirectly Delivers | Economic benefits through preservation of assets essential to visitor economy and other key infrastructure |
| Status | TBC. Recent ENBE study suggests beach losses to N and S will require next recharge in 10 years by 2025. |
| Further information available from  | Bill Parker & Paul Patterson, Coastal Partnership East |

**Ipswich**

£38M tidal barrier scheme, 1,600 properties better protected against tidal surges. Barrier to be operational Dec. 2017.

**Lincolnshire**

The coast of Lincolnshire is protected by 128km of raised sea defences. These defences protect the Fens and coastal plain which lie at or below sea level, and account for 40% of the total land area of the county. These areas are currently well protected from flooding, but future sea level rise could increase the risk of coastal flooding if the defences are not maintained.

Some 220,000 people live in the Lincolnshire coastal zone, amounting to 103,000 households.  The East Coast also contains about 200 caravan sites and nearly 25,000 static caravans (the largest concentration in Europe) with a permanent population of 6,600 people.

Lincolnshire as a whole is the largest single contributor to agricultural production in England, providing nearly 30% of the field vegetable crop in the country from its grade 1 arable land.

This highly productive land is maintained in cultivation by an extensive artificial drainage system, managed by Internal Drainage Boards. Across the Fens as a whole the Boards maintain 3,800 miles of watercourses and 286 pumping stations. These are necessary because the land is generally lower than the main rivers which discharge to the sea.

In turn, this means that the rivers themselves require raised embankments, 1,024km of which are managed in Lincolnshire by the Environment Agency.

The coastal zone also contains major environmental conservation sites of international, national and regional importance, as well as conservation areas, listed buildings, heritage features and a historic environment including archaeology and semi-natural historic landscapes.

The Lincolnshire coast, especially resorts such as Skegness and Mablethorpe generate £400m per year from tourism in the coastal zone alone.

The Greater Lincolnshire Devolution Agreement says the following “Housing provision, growth and water management are interdependent, particularly in the context of approximately 40% of the area being at some level of risk from coastal and fluvial flooding, as well as the need to manage surface water flood risk. Coastal flooding in particular represents a strategic scale of risk as well as significant ongoing opportunities for unlocking growth potential.”

**Wash Banks**

Funding for the first large-scale improvements to sea banks for over 30 years is now a step closer.

The announcement in December 2015 from the Wash Frontage Group (WFG) coincides with the second anniversary of the December 5 2013 storm surge, when over 300 houses and 500 acres of farmland were flooded.

The planned improvements along 5km of sea bank between Leverton and Wrangle in Boston Borough Council’s area are thanks to a working partnership between the Environment Agency (EA), Witham Fourth Internal Drainage Board (WFIDB), and local farmers.

The WFG is a voluntary organisation made up of the landowners and farmers who farm the land on the coast line of The Wash from Gibraltar Point in Lincolnshire to Wolferton Creek in Norfolk.

WFG chairman Stafford Proctor said: “The second anniversary of the terrible events has come around quickly. I am pleased that steps are being taken to carry out much-needed improvement works to the sea banks which protect South Lincolnshire and beyond from flooding.

“In particular the EA, WFIDB and the coastline farmers have developed a working partnership and we are hopeful that we will hear shortly that funding has been approved for improvements to the sea bank along 5km between Leverton and Wrangle. These will be the first substantial works to the sea banks for over 30 years.

“The WFG sees these works as an important step in a process which is critical to South Lincolnshire, West Norfolk, and East Midlands as a whole.

“The Wash Shoreline Management Plan of 2010 identified the need to carry out improvements to our sea defences to keep pace with climate change. The Wash Banks Performance Review in 2012 identified the Leverton to Wrangle section as the lowest bank, and that, in parts; it was the only line of defence.

**Boston Barrier**

The Boston Barrier partnership is between the Environment Agency, Lincolnshire County Council, Boston Borough Council and Black Sluice Internal Drainage Board, who are all working together to reduce the risk of tidal flooding to over 17,000 properties in Boston.

The £92.3million tidal flood alleviation barrier has been designed to reduce the risk of tidal flooding and will protect Boston from a repeat of the tidal surge that happened on 5 December 2013.

Subject to the necessary approvals being in place, the Boston Barrier is expected to be completed by December 2019.

**Lincshore**

Lincshore is the largest beach nourishment scheme in the country, covering beaches from Mablethorpe to Skegness. In 1994 the Environment Agency commissioned an integrated project team to manage and supervise the improvement works at Lincshore. Since then, following the main beach re-establishment in 1996 to 1998, yearly recharge campaigns have been delivered.  The project now in its fifth phase started in 2010 with Royal HaskoningDHV appointed as Engineering and Construction Contract (ECC) Project Manager for the five year programme and providing environmental monitoring expertise.

Every year contractors survey the beach, compare its existing condition to the target profile and plan the year’s replenishment work accordingly. For the past four years an average of more than 500,000 m3 of sand has been placed each year at an annual cost of about £6 million.

**Fact and Figures**

* The scheme protects against a one in 200 year tidal flood (0.5%) for 30,000 properties and 35,000 hectares of land along 24 km of coastline.
* 530,000 m3 of sand were pumped from licensed off-shore sites onto 20 km of beach in 2013.
* The average daily sand added to the beach has risen from 4,000 m3 in 2010 to over 11,000 m3 per day in 2013.

**Sea Defences as Infrastructure/Protecting Infrastructure**

An example of this is the Heacham Water Recycling Centre protected by ongoing maintenance of shingle ridge defences. It serves properties in Heacham, Snettisham, Hunstanton, Old Hunstanton, Sedgeford, Fring, Docking, Holme-next-the Sea, Thornham, and Titchwell; with a resident population of some 14,700 (much higher in the Summer of course). Anglian Water Services is allocating £25k in 2016/17 and £25k per annum from 2017/18 to 2019/20 (£100k in total) towards partnership funding of beach recycling works (as below) to protect it.

**Prevention of Coastal Erosion/Protection of Existing Infrastructure**

Examples are the Bacton Gas Terminal (as above); and the Sizewell Nuclear Power Stations.

Ports – King’s Lynn, Wells, Great Yarmouth, (Lowestoft, Felixstowe (Suffolk), Sutton Bridge, Boston (Lincs.).

**Other Bodies’ Investment Plans (Norfolk)**

Borough Council of King's Lynn & West Norfolk

The Borough Council is the authority responsible for the Cliffs and Promenade at Hunstanton.

The WECMS identified the need to pilot cliff toe protection measures costed at £1.6m (£650k plus £20k p.a. for maintenance/monitoring) to reduce the rate of cliff erosion and protect properties on the cliff top. The pilot would be likely to commence in the early 2020s.

The Borough Council has identified the need for £600k for Promenade and Seawall repairs at Hunstanton in the period to 2021 – this project was listed in the EA’s 6 year programme (Central Area – Cambs. & Beds.) for a total of £1.46m but has so far failed to receive funding, due to low partnership funding scores.

In the longer-term (15-20 years (northern section)/30-50 years (southern section)) promenade replacement/raising of the wave wall is likely to be needed at Hunstanton. This has been costed at £15m for the northern section by 2030/35 with only about £1m likely to come from Flood and Coastal Erosion Risk Management Grant in Aid (FCERM GiA) and, in the longer term, potentially £11m for the southern section. Beach recharge may be needed costing some £5m (in 2022). Under current funding arrangements 90% or more of the cost of these schemes would need to be found locally, leaving large funding gaps.

Between South Hunstanton and Wolferton Creek (Snettisham Beach) there is an ongoing annual beach recycling process (cost c. £150k pa) to be around 60% funded by external partners; Community Infrastructure Company, etc. The other 40% is likely to come from Government grants (FCERM GiA). There will be a need for beach recharge in the next few years and longer term replacement of hard defences. A partial beach recharge is likely to cost around £2.4m in year 6 (2023); a full recharge may be required after Year 15 (around 2032) which is currently estimated at some £6.3m.

The EA’s Great Ouse Tidal River Strategy identified a possible tidal barrier for King’s Lynn in the longer term (uncosted).

Other Bodies

The National Trust is a landowner at Blakeney and Brancaster.

The Crown Estate has interests in the coastal area.

Port Operators also have a role – ABP (King’s Lynn), Port of Wells – Wells Harbour Commissioners, Peel Ports Group (Gt. Yarmouth).

Great Yarmouth Borough Council

Great Yarmouth Borough Council invest approximately £130,000 revenue per annum in sea defence maintenance, this is supplemented by capital funding where it can be secured. Indicative figures are set out below.

North Norfolk District Council

North Norfolk District Council invest approximately £363,000 revenue per annum in sea defence maintenance, this is supplemented by capital funding where it can be secured. Indicative figures are set out below.

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Area/Source** | **2015/16** | **2016/17** | **2017/18** | **2018/19** | **2019/20** | **2020/21** | **2021/22** | **2022/23** | **2023/24** | **2024/25** | **10 Year Total (£000’s)** |
| North Norfolk District Council - Capital projects  | 735 | 102 | 3,725 | 10,078 | - | - | - | - | - | 150 | **14,790** |
| North Norfolk District Council - Revenue (R&M, Consultants)  | 363 | 363 | 363 | 363 | 363 | 363 | 363 | 363 | 363 | 363 | **3,630** |
| Great Yarmouth Borough Council - Capital projects  | 617 | - | - | - | - | 1600 | 1,600 | 1,600 | 1,620 | 1,746 | **8,783** |
| Great Yarmouth Borough Council - Revenue (R&M, Consultants)  | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 | **1,300** |

**Uncosted and Potential Projects**

The following projects are currently uncosted and with an undefined delivery date, but are likely to become necessary over the next 10 years:

|  |  |
| --- | --- |
| **Area/Source** | **Project Name** |
| **North Norfolk District Council**  | 1. Sheringham West Coast Protection Scheme (post- 2025) |
| 2. Overstrand Coast Protection Scheme (post- 2025) |
| 3. Removal of hazardous redundant remnant structures - Cley to Cart Gap Happisburgh (post-2025) |
| 4. Wider removal of hazardous redundant remnant structures  |
| 5. Communities adaptation works project |
| 6. Beach access project, pending funding |
| 7. On-site visitor coastal information project |
| 8. Mundesley scheme (2017-18) |
| 9. Happisburgh rock relocation |
| **Great Yarmouth Borough Council** | 1. Winterton - Yarmouth strategy works |
| 2. Winterton defence project (if experimental Hemsby defences successful) |
| 3. Potential work on assets north of Gt. Yarmouth (in addition to Caister)  |
| 4. Potential Caister defence works |
|  |

**Conclusion**

It must be noted that the investment is insufficient to deliver all the coastal management activities required. A number of necessary projects have large funding gaps which may or may not be filled by CIL. Not all authorities have adopted CIL or even intend to – current levels of investment remain below the levels necessary to deliver all the coastal management activities that have been identified and there are funding gaps.

In addition there is no clear funding mechanism to assist with the adaptation of the coastline and communities as the shoreline erodes. It is important that approaches and policies are developed and incorporated through the Local Plan process in order to clearly identify deliverable ways of delivering positive change rather than long term blight of communities.

The key strategic priorities across the districts that are identified in this paper as having large funding gaps or which are uncosted are as follows:

* Hunstanton cliff erosion reduction measures (£1.6m by 2022);
* Hunstanton Promenade and Sea Wall repairs (£1.46m by 2021), replacement (£15m by 2030/2035; a further £11m by 2045/2055) and beach recharge (£5m by 2022);
* South Hunstanton to Wolferton Creek beach recycling & recharge (ongoing funding need for recycling at £150k p.a.) (recharge funding shortfalls (£600k for partial recharge (2023); full recharge cost £6.3m (2030);
* Overstrand Coast Protection Scheme (shortfall £750k);
* Bacton Gas Terminal to Ostend Coastal Management Scheme (shortfall £4.054m);
* Eccles to Winterton Sea Defence Management Scheme (beach re-nourishment) (Total Cost £20m, 2035 onwards, shortfall TBC);
* Completion of Caister sea wall (shortfall £1.235m);
* Gorleston Coast Protection Scheme (shortfall £3.24m).

Along with the issue of coastal adaption it is for each local plan to set out its approach to addressing these strategic priorities - there is no one single approach or solution or funding mechanism.

Where necessary local plans should seek appropriate permissive policy responses to assist in community roll back or replacement to help facilitate the reduction in risk. Local plans should seek to identify key areas where coastal management is necessary.

Peter Jermany 17/1/17