

Orkney Islands Causeway Design - Orkney Island Council

Orkney Islands, Scotland

We are currently working on a project developing coastal defence designs and investigating the potential for tidal energy generation through the Churchill Barriers in Orkney, Scotland. The project has included design of four new causeway coastal defences options including new rock armour, beach re-charge, offshore breakwater and bridge options. The options are being appraised and include design of tidal energy capture systems, detailed financial planning and economic analysis. The designs have been supported with wave, tide and sediment transport numerical and physical modelling.



West Bay Coastal Defence Design - Environmental Agency

Dorset, UK

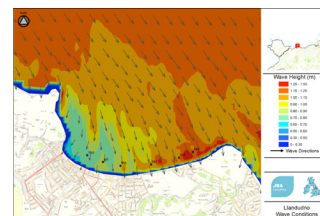
Our team are currently completing the outline design for new coastal defence structures to ensure the long term future of the amenity beach and limit wave overtopping at West Bay, Dorset, UK. The design stage has followed an extensive wave overtopping and sediment transport study to determine the coastal flood risk to the community and the required crest level for defence to provide adequate overtopping protection. The scheme involved the engineering design of structures including rock armour breakwaters and revetments, concrete sea walls and beach recharge options. Our designs are supported by numerical coastline modelling to calculate the required pre-storm 'emergency' beach profile that will initiate re-charge works.



RNLI Coastal Processes Study - Llandudno Lifeboat Station

North Wales

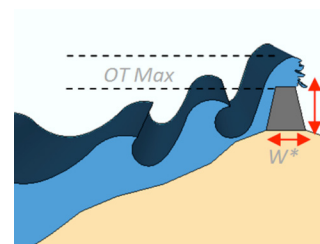
We have recently completed a coastal processes study for the RNLI in north Wales. The study included an assessment of the coastal process affecting Llandudno Bay including coastal erosion, sediment transport rates, wave transformation and wave overtopping. The study provided the RNLI with advice on the preferred location of a proposed new lifeboat station in order to minimise its impact on the existing coastal processes and ensure that it was resilient to the impacts of wave overtopping.



Spey Bay Coastal Defence Design - Moray Council

Moray Firth, Scotland

Our coastal engineers are currently developing coastal defence and beach stabilisation options to protect the town of Kingston on Spey, Moray Firth, Scotland. The options being designed include rock armour beach control structures, concrete wave walls and concrete blockwork revetment. The designs developed will ensure that an amenity beach is maintained at Kingston on Spey and that the town is protected against the risks of coastal flooding. The design phase has included breach analysis modelling to determine the impacts of wave propagation in a post storm event.



Coastal Asset Management Plan - Network Rail

North Wales

We are currently assessing the coastal assets along Network Rail's north Wales coastline in terms of their exposure to coastal flood and erosion risk. The project will act as a template for a national coastal asset management plan for Network Rail, and is being developed with stakeholders such as the Environment Agency. The JBA team will be working with the EA R&D team to provide an enhanced method of asset condition assessment considering a number of additional factors that have not previously been included within the EA appraisal method. The project required identification of assets, asset condition inspection analysis of flood and coastal risk, and asset inspections to allow the development of appropriate mitigation and planning solutions.



Coastal Asset Risk Plan - Yorkshire Water

North Yorkshire

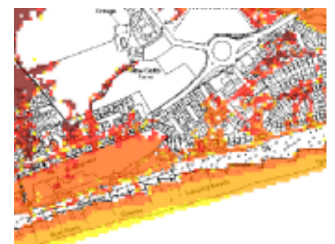
We evaluated and prioritised the coastal assets along the Yorkshire coastline in terms of their exposure to coastal flood and the cost of failure of each of the assets. We applied broad scale GIS mapping techniques to evaluate, at a high level, the risk of coastal flooding to Yorkshire Water assets and produced an asset risk register of the assets under current and climate change risk scenarios. The project required identification of assets, asset flood and coastal risk analysis and cost of asset failure. This has allowed Yorkshire Water to prioritise their coastal assets by greatest risk and cost of failure.



Coastal Defence Appraisal and Design Development - Shoreham Harbour Regeneration Partnership

West Sussex, UK

Our Coastal Engineering Team assessed the current risk of wave overtopping and the performance of the existing beach control structures and coastal defence assets at Shoreham. We then developed conceptual designs for the redevelopment of the coastal frontage surrounding the port considering different redevelopment scenarios and management options. Key aspects of the scheme were the review of existing coastal defences, modelling of nearshore wave and tidal currents, modelling of beach morphological response, multi-criteria analysis of beach management options and the concept design for coastal defence structures.



Nethertown Rock Armour Revetment - Network Rail

Cumbria, UK

JBA coastal engineers are currently developing the detailed design of rock armour coastal defence structures at Nethertown, Cumbria, UK, these structures will provide coastal protection for the main railway line that runs along the coast at Nethertown and also protect the local residents from the risks posed by coastal erosion. This project includes the development of a construction tender and supervision of the construction works. This is the second phase of the project following the successful design and installation of phase 1 which was also designed and supervised by JBA.



Coastal protection at Seascale foreshore - Network Rail Cumbria, UK

This project involved a study of a frontage at risk of coastal erosion and the development of detailed design coastal engineering solutions. Key elements of the project were:

- Asset condition assessment of existing coastal defence measures.
- Review of coastal processes.
- Coastal defence option development.
- Detailed design of rock armour revetment.



Coastal protection to Old Colwyn Sea Wall. Network Rail Conwy, Wales

This project involved a study of a seawall that was becoming undermined due to coastal processes and the development of detailed design coastal engineering solutions. Key elements of the project were:

- Condition survey of existing seawall.
- Review of coastal processes.
- Seawall repair options development.
- Detailed design of seawall toe protection measures.



Coastal protection at Mostyn Embankment - Network Rail Flintshire, Wales

This project involved a study of a frontage at risk of coastal erosion and the development of detailed design coastal engineering solutions. Key elements of the project were:

- Asset condition assessment of existing coastal defence measures.
- Review of coastal processes.
- Coastal defence option development.
- Detailed design of embankment protection measures.



Coastal Erosion Studies - Copeland Borough Council

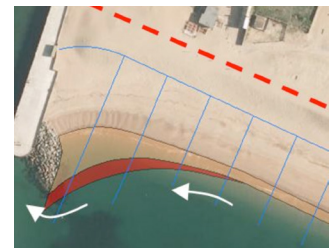
Cumbria, UK

Our team have completed coastal erosion studies at four frontages on the Cumbrian coast, UK. The studies were completed for Silecroft, Bootle, Braystones and Nethertown based on concerns raised by Copeland Borough Council about the long-term implications of erosion at a number of sites along its shoreline, where the general policy for future management was identified in the Shoreline Management Plan as "Do-Nothing".



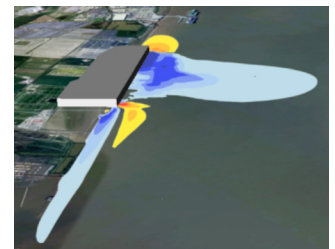
West Bay Coastal Defence Design – Environmental Agency Dorset, UK

Our team are currently completing the outline design for new coastal defence structures in West Bay, Dorset, UK. The project also involves an extensive wave overtopping study to determine the coastal flood risk to the community and the required crest level for defence to provide adequate overtopping protection. Longshore and cross-shore modelling has been undertaken for the project, supporting the engineering design of structures including rock armour breakwaters and revetments, concrete sea walls and beach recharge options. Our designs are supported by further numerical coastline modelling to calculate the required pre-storm 'emergency' beach profile that will initiate re-charge works.



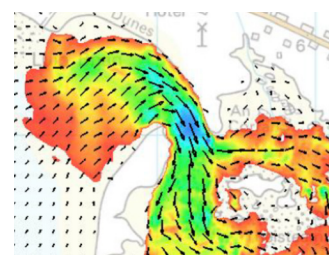
Marine Energy Park Development – Able UK Humber Estuary

Our team have been the lead modellers for wave, flow and morphologic impact modelling for a major land reclamation project on the Humber estuary for a new manufacturing facility capable of loading and transporting offshore wind turbines. We developed a range of numerical models for the project including sediment transport, flow and wave models, overtopping models, sediment plume and morphologic change models which were used to inform the design of the facility and an environmental impact assessment submitted for planning approval. The aim of the modelling and design process was to minimise any impacts on local and estuary wide flood risk, geomorphological impacts and environmental affects whilst maximising the production capacity associated with the development.



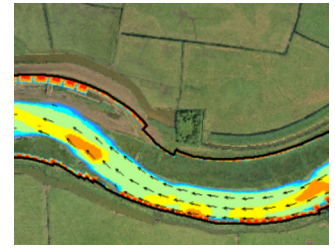
Hydrodynamic and Sediment Transport Modelling Study – Comhairle nan Eilean Siar Western Isles, Scotland

We have conducted a hydrodynamic and sediment transport modelling study investigating coastal flooding at the South Ford, Western Isles. In particular our modelling investigated the influence of a constructed causeway linking Benbecula to South Uist, leading to significant geomorphological change since construction, has contributed to the observed flooding during the January 2005 storm event. The study determined the local hydrodynamic and resultant sediment transport regimes of the region, and how the flood risk may change after 20 years of continued geomorphological change.



Hydromorphic and Engineering Assessment – Broads Authority Breydon Water, Norfolk

We are currently completing a hydromorphic and engineering structure design project for the Broads Authority in Breydon Water, Norfolk, UK. The project has involved a geomorphic assessment, hydrodynamic modelling, sediment transport modelling and forecasting of the future morphology due to proposed new waterway structures. The project has also assessed the structural degradation of river training walls and undertaken an impact assessment to provide engineering construction advice to repair, remove or alter the waterway structures



Coastal Flood Modelling Pilot Study – Environmental Agency Cornwall, UK

Our coastal modellers undertook a pilot study investigating new methodologies to assess coastal flood risk, ranging from numerical modelling and wave overtopping to analytical runup calculations. Work included joint probability analysis, wave transformation modelling, wave overtopping modelling and flood inundation modelling. The approach included a variety of innovations including ensemble modelling for forecasting purposes, where approximately 1500 wave/surge combinations and overtopping rates were pre-computed with discharge rates and expected inundation maps prepared. The risk of overtopping was then tabulated within our Risk Rose – allowing a simple lookup of coastline wave/wind conditions to find the probability of overtopping.

