



COASTAL AND FLOOD PROTECTION

A selection of our experience





COVER: CLEVELEYS COASTAL DEFENCE
THIS PAGE: PRECAST CONCRETE UNITS BEING LIFTED INTO PLACE AT BLACKPOOL

Across the UK we are a leading provider of the infrastructure that society relies on. We work in collaboration with our customers to understand their needs and aspirations and use our knowledge and experience to produce the best solutions.

AN EXPERIENCED PARTNER

Working for local authorities and the Environment Agency, we have delivered over 70 coastal and flood protection projects. From each project, we capture best practice and lessons learnt and use this information to inform the design and construction of future projects. This approach drives continual improvement and delivers savings for our customers.

AWARD WINNING

Our constant drive to be the best construction contractor means we challenge the norm and produce new solutions that are better quality, faster to construct and are developed with the environment in mind.

Through aiming to be the best every time, the projects that we have worked on have received awards from a number of industry bodies. Further details of these projects and some of the awards we have received are contained throughout this document.

BEST VALUE PROCUREMENT

Balfour Beatty are the National Civil Engineering and Infrastructure Partner for Scape. Scape is a publicly owned efficiency organisation that operates UK wide and is best known for the large framework arrangements it procures on behalf of the public sector.

The framework delivers added value for Customers and follows a proven process that delivers projects quicker, reduces risk and improves quality by providing direct access to Balfour Beatty. It is fully OJEU compliant and all costs are 100% market tested to ensure robustness.

WE ARE BALFOUR BEATTY

We are Balfour Beatty, a global infrastructure group operating around the world – designers and planners, engineers, builders, project and facilities managers, analysts and more.

WHAT WE DO

For more than 100 years we have created and cared for the vital assets that enable societies and economies to grow: road and rail; airports, seaports, tunnels and bridges; health and education facilities; heat, light, power and water; places to live and places to work – the infrastructure that underpins all our lives and drives progress.

From our beginnings in 1909 we have grown to employ 36,000 people across the UK, US, Middle East and South East Asia, in emerging and mature economies alike. We are now one of few companies with the skills to deliver complex projects of huge scale and take advantage of the growth in long-term infrastructure markets.

Our impact is in iconic structures and bold engineering feats, hidden innovation and buried pipes and pumps, and all the joined-up thinking, financing and partnerships that make up the world's great infrastructure projects today.

The combined breadth of our capabilities and depth of our technical expertise makes us a true global leader in infrastructure. The dedication of our people and the shared values that unite us give our many stakeholders the confidence to trust us and do business with us. We have a collective commitment to operate sustainably and safely across our business.

We operate in increasingly diverse markets so a common set of values offers clear business benefits and helps support the challenges of future growth. Our four Group-wide values of Integrity, Teamwork, Excellence and Respect are essential in helping to guide our employees.

OUR VALUES

Excellence

Means we strive to improve and exceed expectations.

Integrity

Means we always do what is right.

Teamwork

Means we are better together.

Respect

Means we appreciate others and care about the wider community.

THE FUTURE FOR THE GROUP

The longer term goals for the Group are to leverage three key strengths: local presence, asset knowledge and our skills as an investor and developer. Looking to the future, we will continue to build on these differentiators.

We look to the effectiveness and reliability of our processes, the lifecycle and technical expertise that we have built on years of experience operating across the world, together with the strength of our people, and the great relationships we have with our customers, to set us apart from the competition.

We will innovate and target continuous improvement to make a difference to our projects.

Our teams expect to place significant emphasis on these areas over the coming years. Creating leading local presence, harnessing the knowledge we have of the assets we create and manage and combining our skills as investor and developer are critical in enabling this.

THE INFINITY BRIDGE IN TEESIDE,
PART OF THE NORTH SHORE
REDEVELOPMENT PROJECT



“Small businesses create local jobs and apprenticeships and they are the innovators, engineers and exporters of the future. We are committed to supporting them so that we can build a better Britain together; leaving a lasting legacy in the communities we touch across the UK.”

Nicholas Pollard
Chief Executive Officer
Balfour Beatty Construction Services UK

INTO NEWCASTLE STUDENT
ACCOMMODATION PROJECT

ABOUT OUR UK CONSTRUCTION BUSINESS

Balfour Beatty’s UK construction business is the largest in the UK. We have around 9,000 employees and 8,000 supply chain partners active on our projects at any one time. We have the potential to make a real difference. That means that, for every project, we’re thoughtful about our approach – whether we’re building a national power station or making improvements to a local school.

Our customers rely on our thinking to help them meet their toughest challenges. That’s because we’re passionate about applying our ingenuity to everything from major projects that improve the UK’s national infrastructure, to local and regional projects that help build lasting communities.

We meet these challenges by sharing our knowledge and expertise and by adopting a thoughtful approach to how we work. We pride ourselves on our attention to detail, learning from experience and ensuring excellence in everything we do. We lead by example, engaging and encouraging our people and partners to add value for our customers and the communities that we serve.

We create sustainable supply chains rooted in local communities providing local investment, local jobs, apprenticeships and creating the innovators, exporters and engineers of the future. We are building a better Britain and leaving a lasting legacy for the communities we touch.

OUR STRUCTURE AND PRIORITIES

THREE INTEGRATED BUSINESS STREAMS:

- ▶ **Major Projects**
Focused on larger projects aligned to our key sectors including Highways, Power and Infrastructure
- ▶ **Regional**
Delivering flexible civil engineering and construction services from our regional hubs and UK-wide local delivery units, aligned to our chosen sectors
- ▶ **Engineering Services**
Providing mechanical and electrical building services across all regions in our chosen sectors

OUR FIVE CORE PRIORITIES:

- ▶ **Zero Harm**
All our people home safe every day
- ▶ **Customer relationships**
Recognised for great customer focus and collaboration
- ▶ **Operational excellence**
Jobs that deliver on our promises and teams that finish every job stronger

- ▶ **Becoming more sustainable**
Developing a truly sustainable business through our Blueprint
- ▶ **People and performance**
Dedicated, accountable people that create high performing teams that deliver for our customers

COASTAL AND FLOOD PROTECTION

We have extensive experience of coastal and flood protection works and a reputation for technical excellence and outstanding service delivery, especially in popular tourist areas.

Our impressive portfolio is a testament to the partnering approach we take with our customers and designers early on, enabling us to establish a strong track record of delivering to time and to budget. Balfour Beatty has a reputation for technical excellence and continuous improvement, with many project challenges overcome through innovative solutions, including the UK's first use in the coastal environment of glass fibre reinforced plastic [GFRP] as concrete reinforcement.

We are well recognised as the UK's leading provider of high quality precast concrete coastal defence structures and we were the first to introduce vacuum lifting in the marine environment, using technology imported from the Netherlands.

Alongside our technical excellence, we also believe that service delivery is equally important – irrespective of the size or value of the project. Our approach of working closely in partnership, aligning projects and engineering services to the aspirations of customers and stakeholders, and engaging with local communities, has been key to our success.

Over the last 15 years, we have delivered more than 75 coastal protection and flood defence projects amounting to over £500 million for clients including local authorities and the Environment Agency. This includes projects delivered by our Regional Offices located across the country from Aberdeen to Southampton. Our current portfolio of coastal protection schemes includes the £80 million projects at Rossall and Anchorholme, for the Wyre Coastal Partnership and the £15.6 million Lyme Regis scheme for West Dorset Borough Council, which includes significant cliff stabilisation.

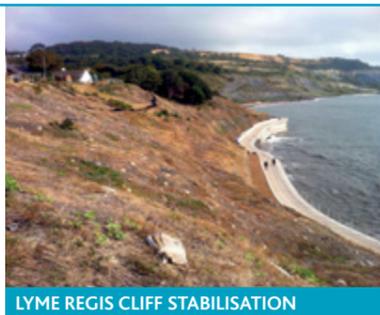
We are in the process of finishing off the Environment Agency's £22 million 'Package' of defence works in the Humber Estuary and have commenced the Thames Estuary Asset Management ten year programme of schemes for the Environment Agency at an estimated value of £280 million.

"What impresses me the most is the co-operation and support from the project team on site."

Mike Pomfret
Project Manager
Fylde Peninsula
Coastal Programme



BLACKPOOL COASTAL DEFENCE



LYME REGIS CLIFF STABILISATION



MORECAMBE BAY ROCK ARMOUR



RIVER MERSEY FLOOD DEFENCE SCHEME

CONCRETE

Where coastal protection is required in areas with high levels of amenity value, in addition to being robust defences, they must also work to safeguard the local economy and associated tourism industry. Balfour Beatty is experienced in constructing concrete defence structures such as sea walls and revetments that are integral to a wider regeneration programme.

Benefiting from a high quality finish, they can be used to create attractive access points to the beach. Careful design is important to ensure the solution meets the requirements of stakeholders and the local community.



CASE STUDY: FYLDE COASTAL DEFENCES

Balfour Beatty delivered the multi award winning £26 million contract from Wyre Borough Council to protect the coastline and enhance the promenade at Cleveleys. We are now delivering the £19.6 million Anchorsholme coastal protection scheme at Blackpool.

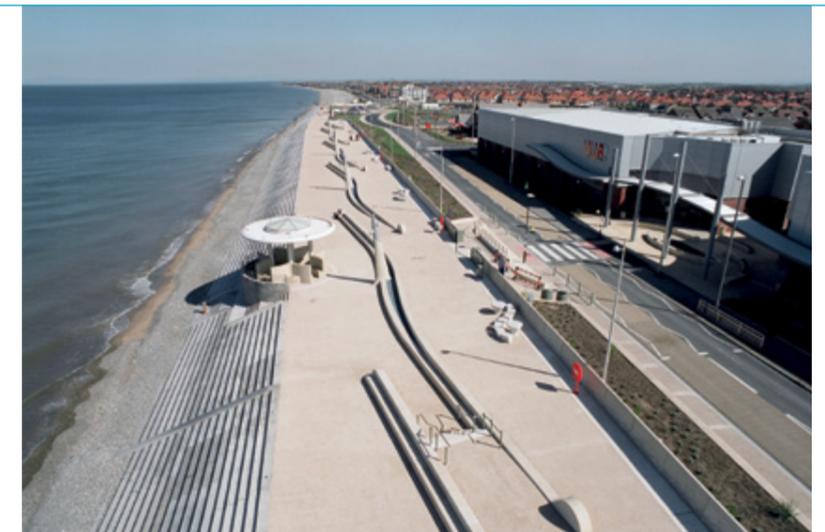
PROTECTING HOMES

The project replaced Cleveleys' dilapidated sea defences, raising the standard of flood protection to 7,700 properties whilst creating a valuable public space for the seaside town to encourage inward investment and boost tourism.

ANCHORSHOLME COAST PROTECTION SCHEME

This project involves the reconstruction of approximately 1km of coastal seawall comprising revetment with a smooth lower part and stepped upper part and a two-tier promenade with landscaping set behind.

Construction includes placing 3,300 pre-cast units using two 180 tonne crawler cranes. There will be significant construction interface with United Utilities due to the presence of a UU pumping station forming part of the sea wall. The works will protect around 5,500 homes from flooding.



THE COMPLETED PROMENADE AT CLEVELEYS

IN-HOUSE CAPABILITY

Precast units were first used on the Blackpool North Shore (St Stephens Avenue) Coast Protection scheme back in 2002. These were basic facing units, 'stitched' onto the front of the existing defences with a sloping in-situ concrete revetment.

Since then, the precast system has been developed and refined to meet today's standards; which are exceptionally high quality sea defences which can be made in numerous shapes and sizes and in different colours and textures.

VALUE ENGINEERING

The project team were able to deliver innovative savings through value engineering throughout the scheme. For example, the intermediate wave wall precast structure was split into smaller structural components enabling overall concrete volumes to be reduced by 30%. This detail allowed for more aesthetically pleasing curved alignments and meant the precast units could be placed using smaller plant and equipment via a more flexible working method.

Standardisation of design principles for precast concrete units enabled significant cost savings to be made

at Cleveleys without sacrificing quality. Savings were reinvested into the scheme to generate design enhancements.

The project was programmed to meet the defined council objectives 72 weeks ahead of target and achieved a £1 million saving on budget.

ACHIEVEMENTS

The project received a number of awards including the prestigious Institution of Civil Engineers Brunel Medal for a team that made a valuable contribution to industry.



CONCRETE CASE STUDIES

PROJECT: Dymchurch Sea Defences

Initially valued at £30 million, Balfour Beatty delivered this project for the Environment Agency on the South Coast for £26.4 million. The project included the installation of a wave return wall and access steps, precast revetment units and integrated in-situ concrete decking and promenade.

Preparatory works included the haulage and placing of imported fill to the underside of the new revetment profile. This was placed in the intertidal zone and used for plant access. Steel sheet piling with concrete caps were installed to the toe of the revetment along the length of the works.

EFFICIENCY THROUGH OFF-SITE MANUFACTURE

Balfour Beatty utilised off-site manufacture for the nine different types of pre-cast revetment units and wave return wall units with associated access steps. Manufactured over a 22 month period the units were then cargo shipped to Rye Harbour in three week intervals. Each unit was craned into position with a specially designed vacuum operated lifting device which gripped the units on their upper face.

PROJECT: Grimsby Coastal Defence Refurbishment

The scheme for the Environment Agency, completed in 2014, involved the refurbishment of 2km of existing coastal defences within Grimsby Docks. The £13.6 million project included the removal of 2km of existing defences, gabion baskets and concrete floodwalls. In their place, Balfour Beatty installed 2km new, precast concrete wave return walls consisting of approximately 800 22 T units and reinforced concrete heel beams to the rear of the precast units for the length of the wall.

IN-HOUSE SPECIALIST CAPABILITIES

Through Balvac, our in-house concrete repair business, we undertook extensive repairs along the entire length of the existing revetment whilst our plant hire company, BPH, provided the specialist heavy machinery for these projects including a 180-tonne crawler crane, one of the largest in use in the UK.

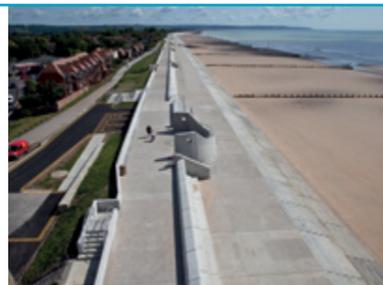
PROJECT: Redcar Sea Defences

This £21 million project for the Environment Agency delivered protection for local residents and businesses against predicted sea level rises of around 85cm over the next 100 years. The new defences feature a 2.7km long wall of 5.5m high blocks, with steps on the sea facing slope

SPECIALIST GROUND ENGINEERING CAPABILITY

Balfour Beatty had to undertake extensive ground engineering work, delivered through our in-house specialists Balfour Beatty Ground Engineering, to accommodate the heavy machinery required for the lifting phase. As well as the civil engineering, we supplied all plant and machinery including the 32m high crane used to fit the blocks together.

The scheme has reduced the immediate flood risk to 978 homes and 209 businesses and longer term risk to a further 184 homes and 98 commercial properties nearby. In addition it has also safeguarded highways and underground utilities. Additional benefits included the upgrade of the adjacent promenade area, creating an opportunity for local businesses in the area.



DYMCHURCH SEA DEFENCES



GRIMSBY COASTAL DEFENCE REFRUBISHMENT



REDCAR SEA DEFENCES

“We’re delighted to see the Redcar project recognised at the CECA awards. A model of partnership working, with exemplar health and safety performance; the behaviours shown by the delivery team throughout construction was a credit to all involved.”

James Mead
Project Manager at the Environment Agency

ROCK ARMOUR

Suitable for highly exposed locations, rock armour is a cost effective solution that can be used to absorb wave energy and reduce the likelihood of water overtopping defences. Balfour Beatty has also used rock armour in combination with sea walls to protect the base of the wall from the energy of the waves. Although there are initial environmental considerations during the installation phases, with rock sourcing and the requirement of plant operating on the beach or at sea, longer term it is more easily maintained.



ROCK ARMOUR CASE STUDIES

PROJECT: Rossall Scheme

The £53 million Rossall Scheme for Wyre Council forms part of the wider Fylde Peninsula Coastal Programme and will renew existing structures constructed and developed through the last century. Majority funded by the Environment Agency, the rock armour element will incorporate 409,080 tonnes of primary and underlayer rock onto the beach to create the lower section of the defences, with pre-cast and in-situ concrete elements forming the upper section. Commencing in 2014, Balfour Beatty is installing the rock over a three year period ready for completion in the Autumn of 2017.

DELIVERING SUSTAINABILITY AND VALUE

Working with our design team, we were able to identify local rock sourced in the North West of England suitable to form the rock armour. This negated the need to import rock from overseas, significantly decreasing the cost of the rock whilst providing a boost to the local economy.

PROJECT: Morecambe Bay

The natural environment of Morecambe Bay is highly valued with many regulatory designations for its protection from development damage, including:

- ▶ Site of Special Scientific Interest (SSSI)
- ▶ Special Protection Area (SPA)
- ▶ RAMSAR Convention
- ▶ Special Area of Conservation (SAC)

The environmentally sensitive nature of the area necessitated construction works being designed in sympathy with these requirements. As a result of the extensive environmental management measures implemented on site, in consultation with Natural England, the project has delivered many achievements:

- ▶ **Minimising disturbance to local wildlife**
Works have been targeted to minimise disturbance of wintering waterfowl, breeding waders and migratory birds covered by the Special Protection Area.

- ▶ **A new estuarine wetland reserve has been created as part of the scheme**

The wetland is one of the largest natural environment coastal schemes in Europe, providing an improved habitat for breeding waders, making a major contribution towards national targets for coastal saltmarsh creation.

- ▶ **Mitigation habitat creation works**

A unique aspect of this scheme involved the recreation of a glacially formed cobble skear (or marine/biomass) habitat. It is the first time a skear of this kind has been successfully translocated in the UK.



ROSSALL SCHEME



MORECAMBE BAY



MORECAMBE BAY

BEACH NOURISHMENT

Beach nourishment is the addition of shingle or sand to the beach in order to reduce foreshore erosion. To do it successfully requires an understanding of the coastal processes and the sand movement in the area. It is vitally important to have long-term stable partners like Balfour Beatty who can implement work on a seasonal basis. Delivered well, the widened beach provides an attractive environment for tourism and protected communities. In some cases it's possible to use recycled materials rather than importing new materials.



CASE STUDY: HIGHTOWN COASTAL DEFENCES PROJECT

This £1.1 million project for Sefton Council improved coastal sea defences around Hightown on the Sefton coast.

Working within a Site of Special Scientific Interest, all works had to be carefully planned and programmed according to the tidal cycles of the Irish Sea. The project restored sand dunes that had been eroded through tidal action by taking sand from behind Crosby promenade and transporting it 7km along the beach by a convoy of off-road trucks.

In addition to restoring the sand dunes, works also included the construction of an additional 150 linear metres of hard defences in the form of a sloping revetment.



HIGHTOWN COASTAL DEFENCES PROJECT

ATTENTION TO HEALTH AND SAFETY

One of the key challenges of the project was working on a beach with a high level of public access. With this in mind we developed and implemented a health and safety plan including a robust traffic management plan for the beach. This involved the dump trucks following in convoy with an escort at both front and back to minimise the number of vehicle movements on the beach.

There were a variety of stakeholders in the local community including the parish council, a sailing club, coastal rangers as well as Her Majesty's Coastguard and RNLI. We created open and direct communication with each group that continued throughout each stage of the works, ensuring the views of all stakeholders were taken into account and they were fully aware of the project and its progress.



BEACH NOURISHMENT CASE STUDIES

PROJECT: Pevensey Bay

Pevensey Bay's Sea Defences PPP is a contract managed by Pevensey Coastal Defence Ltd, of which Balfour Beatty is one of four shareholders. The defences consist of a naturally formed shingle bank that extends for 9km between Eastbourne and Bexhill in East Sussex. It is supported by a timber groyne field that in the late 1990s was reaching end of its useful life.

A permanent breach in the shingle bank would result in a 50 square kilometre area behind the defences flooding at high tide. Over 10,000 properties and important road and rail links would be affected, as would Pevensey Levels, an important ecological site that has Ramsar Convention status as a Wetland of International Importance.

The 25 year, £30 million contract to improve and maintain the defences started in 2000, and despite its undoubted success remains the only PPP/PFI sea defence contract in the world. The defence standard is achieved by annual importation of off-shore marine aggregates, to replace that lost to longshore drift, and managing excessive drift by recycling sediment along the frontage during and after storms. As remnant groynes fail they are removed to form a more open beach that facilitates the recycling process.

PROJECT: Lincshore

Balfour Beatty has recently completed a £31 million five-year beach re-nourishment project on the Lincolnshire coast for the Environment Agency which commenced in 2010.

Lincshore reduces the risk of flooding between Mablethorpe and Skegness by covering the clay that lies beneath the beach with sand. This prevents erosion at the base of the hard flood defences and maintains a level of protection against a one in 200 chance (0.5%) of flooding in any one year.

DELIVERING VALUE THROUGH WORKING PARTNERSHIPS

The Environment Agency surveyed the beaches in January of each year assessing which areas of beach need to be replenished and how much sand would be required.

Balfour Beatty then re-nourished the beaches during the spring/summer months, with approximately 500,000m³ of sand with supply chain partner, Dredging International.

The offshore dredged material, sourced from licensed dredge areas in the North Sea, raised beach levels on the most eroded sections of the 20km frontage.

The licensed site is approximately 16 miles from shore and the dredged material was pumped ashore using a highly specialised dredger.

“The key success on this contract was to build a highly motivated, skilled integrated team with people that have the right knowledge and culture to deliver the works efficiently whilst embracing innovation, SHE matters and the changing environment through technical solutions. To do this, the team required the correct information to be delivered at the right time through strong communication to allow the right decisions to be made.”

Andrew Rouse
Project Executive
Environment Agency



PEVENSEY BAY



LINCASHORE



LINCASHORE



COASTAL CLIFF STABILISATION

Balfour Beatty are experts at installing cliff stabilisation in difficult terrain. Used to hold the cliff in place, the work involves reducing the slope angle of the cliff and installing soil nails and wire netting to hold it in place and then planting vegetation. It is used to prevent the loss of infrastructure and homes in close proximity to the cliff and to prevent further erosion of the cliff face.

“The Lyme Regis Phase IV East Cliff scheme is one of the largest and most complex coastal stabilisation schemes attempted in the UK. Thirty years in planning, the ground engineering, environmental, community and financial challenges of the scheme provide an exemplar that will be followed by the industry for decades to come.”

Neil Watson
Environment Agency



CASE STUDY: LYME REGIS

Working with West Dorset District Council, the £15.6 million works comprised building 390 metres of sea wall and carrying out extensive slope stabilisation measures to the east of the town to safeguard 480 properties and other infrastructure.

Additional elements included deep cut off drainage and diversions, bored concrete piling up to 1200mm diameter, ground anchors, welded gravity drainage, drilled subhorizontal drains, extensive landscaping and habitat improvements for protected species.

We managed several specialist subcontractors including our own ground engineering company as they carried out detailed site investigations, installed automated ground monitoring equipment and carried out site testing of proposed techniques before the permanent works commenced.

WORKING AS A TEAM

By working together closely as a team within the challenging physical constraints in an exceptionally unstable, exposed and environmentally sensitive site, we ensured that not only the geotechnical risks, but also environmental and Health and Safety risks were managed efficiently.



SOIL NAILING FOR THE FOOTPATH

MINIMISING ENVIRONMENTAL IMPACT

With much of the work taking place within the Dorset and East Devon Coast World Heritage Site as well as a Site of Special Scientific Interest and a Special Area of Conservation, the scheme was designed to keep environmental impacts to a minimum. Daily GPS surveys allowed early warning of landslide events and informed decisions on plant size selection. We used sectional mini-piles to reduce the size of plant used on the unstable slopes and gamma logging to check the rock strata during the bored pile construction. Invasive plant species growing on the coastal slopes were

removed so the natural vegetation and habitat could be restored. Through our design approach we were able to standardise the design of the sea wall radii to allow a modular formwork system to be used for the sea wall stem to deliver additional efficiencies.

We stabilised the failing coastal cliffs by installing over 2,500 soil nails using a variety of techniques including rope access, A-frames and large, long reach excavators. To complete the operation, heavy duty wire mesh was laid on the slopes and the nails tensioned using purpose made head plates and nuts.

Over 700 native plant species were collected from the site prior to site clearance. These were propagated off site in a local nursery for incorporation in the final landscaping scheme. The hydroseed mix includes seeds from rare native plants collected from the site, the surrounding area and from off site. Existing groyne timbers from the foreshore have been reused as seat back rests on the seawall walkway.

The major civil engineering works were completed in summer 2014, with landscaping completed in November 2014.

FLOOD ALLEVIATION

Flood Alleviation works are targeted at protecting populated areas through the construction of flood defence walls, embankments and flood storage capability. As well as reducing the risk of flooding, they also have the potential to significantly impact local residents and businesses. At Balfour Beatty we take a proactive approach to community engagement and liaison as both are vitally important in ensuring works are viewed by the community in a positive way.

“This community led project provides vital flood protection for homes and businesses in Warrington. Balfour Beatty was able to understand and deliver on the community’s vision for flood protection that both enhances the local landscape as well as reduces the risk of flooding.”

Mark Garrett
Flood and Coastal Risk Manager
Environment Agency



CASE STUDY: MERSEY FLOOD RISK MANAGEMENT SCHEME

Warrington is at risk from tidal and river flooding, with records of flooding in the area dating back to 1767. Following the works the chances of properties flooding have been reduced to less than 1% in any one year.

The project involved piling work, construction and placing of a precast flood wall, the creation of a new entrance to Victoria Park as well as utilities, demolition and site clearance work.

DELIVERING VALUE THROUGH EFFICIENCY

We worked closely with the Environment Agency, designers and our supply chain specialists to explore options for precast flood walls. The precast units allowed for greater quality control and improved detail, resulting in a high quality finished product. Quicker installation meant less disruption to the community and removed any risk of contaminating the water.

The project is held as an example of best practice within the Environment Agency and despite significant high-risk activities, including working adjacent to water and complex piling operations, the project was successfully delivered with no accidents demonstrating our commitment to Zero Harm.



THE WINNING WALL DESIGN

ENGAGING THE COMMUNITY

Detailed newsletters were delivered to over 1,500 homes supported by community presentations, school visits and weekly drop-in clinics. Project members also carried out voluntary work at a local nursery garden centre and allotments while on-call taxi services were provided for residents affected by bus shelter closures. Artwork created by local school children was built into the wall's design.

ACHIEVEMENTS

The project was recognised by winning the overall Project of the Year at the 2014 North West Regional Construction Awards amongst major competition with schemes valued at over £100 million.

CASE STUDY: MORPETH FLOOD ALLEVIATION SCHEME

Completed in autumn 2014 and featuring an upstream storage dam, the construction of floodwalls throughout the town centre and the extension and refurbishment of existing flood defences, this £21 million project was designed to protect the community along the River Wansbeck.

“We have a long standing relationship with Balfour Beatty and we have done some great work together in the past. The Morpeth Flood Alleviation Scheme is a brilliant example of our successful working relationship and the project will stand as a benchmark against which all other projects can be measured.”

Anthony Myatt
Commercial Services Manager
Environment Agency

Spanning along the river banks, much of the work crossed through local residents' gardens, public open spaces and conservation areas.

DELIVERING SUSTAINABILITY AND VALUE

During the preconstruction period, we worked closely with the Environment Agency, project designers and our supply chain specialists to explore how we could deliver savings to the project and take a more sustainable approach. All aggregates and concrete used on the project were supplied from within a mile radius and all timber was Forestry Stewardship Council certified while sand and gravel excavated from the dam area was used for site access roads.

By carefully surveying the site we discovered that there was a source of clay suitable for the dam construction available which saved around 552T CO₂e as well as reducing the project cost by £150,000.

We also contributed to local employment by taking on 11 apprentices as well as providing work experience placements for two people.

Further savings totalling £80,000 were made through alternative designs for the trench detail and the piling.

ENGAGING THE COMMUNITY

Working within multiple town centre locations meant extensive community liaison was required for the schemes so we set up an information centre in Morpeth town centre to provide details and answer any queries from the community.

Wherever possible, work was done to benefit local people. Mulch chippings were donated to an allotment association and felled trees were used to construct benches for the public.

Morpeth has experienced two extreme floods in the last 50 years and following the works these flood events are now estimated to have a 0.73% chance of occurring in any given year.

ACHIEVEMENTS

- ◆ Environment Agency Outstanding Customer Service Award
- ◆ Considerate Constructors Scheme Gold Award

REPAIRING AND STRENGTHENING EXISTING FLOOD PROTECTION AND COASTAL DEFENCES

Risk Management Authorities have shown that there are many flood defences in the country that are in need of improvement, repair and maintenance to ensure they continue to provide the required protection to reduce the risks to local communities.

OUR EXPERTISE

We undertake all specialist works associated with the repair, strengthening, stabilisation and preservation of flood protection and coastal defences.

OUR KEY CAPABILITIES INCLUDE:

- ◆ Increasing the height of existing flood defences
- ◆ Construction of new flood defences earthworks, reinforced concrete works and sheet piles
- ◆ Concrete repairs and protection to existing flood defences
- ◆ Spray concrete repairs to existing flood defences
- ◆ Structural strengthening
- ◆ Stabilisation and void grouting
- ◆ Waterproofing
- ◆ Cathodic protection of steel flood defences

DELIVERY

We provide bespoke technically innovative ideas to produce cost effective solutions. This, combined with our in-house management and delivery of works by our skilled workforce, ensures high quality repairs and minimal disruption.

SUPPLY CHAIN

To support our in-house team we have long standing relationships with supply chain partners to deliver:

- ◆ Specialist coastal and flood defence systems
- ◆ Hydraulic structural design of flood defences
- ◆ Feasibility studies and business cases for new and improved defences

ACCREDITATIONS

- ◆ ISO 9001, ISO 14001 and BS OHSAS 18001
- ◆ Achilles UVDB – 061593
- ◆ Constructionline – 24407
- ◆ CHAS

MEMBERSHIPS

- ◆ Concrete Repair Association
- ◆ Spray Concrete Association
- ◆ Corrosion Prevention Association



GRIMSBY REVETMENT REPAIRS





CASE STUDY: GRIMSBY SEA DEFENCE REPAIR

Balvac were approached to provide specialist advice on the repair options for a 1.9km length of coastal revetment sea defence in Grimsby.

The wall had deteriorated through the persistent attack and erosion of the sea and posed a threat to the new flood defences protecting the Grimsby Docks.

Through early involvement with the Environment Agency we were able to understand their key requirements. We reviewed the existing repair proposals, and were able to propose an innovative, alternative approach that provided safer access, a higher quality finish and considerable cost savings. Balvac secured the £900,000 project on a fixed price basis and completed four weeks ahead of programme.



GRIMSBY SEA DEFENCE REPAIR

“After 80 years it had sustained some serious damage and a great deal of erosion. The work that Balvac has done has significantly extended the life of this structure and saved a considerable amount of costs to the scheme. The innovative access system meant that work could be done between tides and without disturbance to the internationally important nature conservation site.”

John Pygott
Project Manager, Environment Agency

AN INNOVATIVE APPROACH

Innovative roped access systems were installed for the water jetting and stainless steel reinforcement was introduced to areas where large repairs were required. Spray concrete was then applied to the revetment wall sections.

Working during the low tide periods meant limited working windows in which to carry out the high pressure water jetting to clean the revetment and undertake the spray concrete repairs. Balvac maximised efficiency by using two teams. Initially both undertook the water jetting to clean a leading section of the revetments. Once a sufficient lead was established, one of the teams switched to the installation of stainless steel reinforcement and application of spray concrete.

The final design reduced the overall quantity of concrete required to repair the revetment and provide a more aesthetically pleasing finish. The use of less concrete provided considerable savings and a more sustainable solution with optimal technical performance.

BECOMING MORE SUSTAINABLE

The Blueprint



We want and need to be a truly sustainable business and our ambition is to position sustainability at the heart of what we do, and therefore, the solutions we provide to our clients.

OUR GOALS	PROFITABLE MARKETS	HEALTHY COMMUNITIES	ENVIRONMENTAL LIMITS
Client focused	Client service programme	Client satisfaction	Agreed sustainability goals
Local	Charitable fundraising	Community engagement	Ecology
Efficient	Projects to programme Projects to bid margin Overhead	Supply chain management	Scope 1 and 2 emissions Waste Water
Innovative	Innovation	Innovation	Innovation
Responsible	Ethics	Health & safety	Responsible sourcing Environmental compliance
Growing	Profit Margin in the order book	Staff satisfaction Diversity	CDP score

OUR BLUEPRINT ENCOMPASSES SIX SUSTAINABILITY GOALS:

- Client focused**
 Our goal is to achieve an in-depth understanding of what characterises success from the standpoint of our clients and to ensure that we deliver against that throughout the project.
- Local**
 Wherever we operate we aspire to be integrated within the neighbourhood, supporting the local community, local businesses and local workforce.
- Efficient**
 We seek to continually improve the value we deliver to clients through a relentless focus on resource efficiency and through best practice in supply chain management.
- Innovative**
 To us, innovation is primarily about solving our clients' problems. This involves actively reaching out to our clients, connecting the innovators in our business and applying a consistent innovation pathway to identify, assess, implement and share ideas.
- Responsible**
 We conduct business responsibly in all our geographies. Our ethics, values and compliance programme are designed to help embed ethical behaviour and integrity across our business. Health and safety standards, our environmental performance and responsible sourcing are all manifestations of such integrity.
- Growing**
 For Balfour Beatty 'success' means supporting the prosperity of our clients, our own financial growth and ensuring that our people grow and enjoy challenging careers. It also means achieving a diverse workforce, providing the variety of perspectives and skills on which a 21st century business depends.

The Blueprint provides a common language and a practical set of measures against which we can monitor progress. This framework drives sustainability into every aspect of our business. What sets our strategy apart is the rigour with which it is applied and monitored.

Our model is based on three pillars, which follow the classical three-dimensional sustainability model: economic, social and environmental. In our interpretation of this model they are named Profitable Markets, Healthy Communities and Environmental Limits.

The model also maps to six fundamental and strategic business goals: client focus, local presence, efficient operations, innovative thinking, responsible behaviour and growth. In this way our vision for sustainability links directly to our strategic business objectives and supports our vision of becoming a leading global infrastructure company.

THE BLUEPRINT IS BASED ON THREE CENTRAL PILLARS:

- Profitable markets**
 Working with our customers to create sustainable outcomes.

 By understanding our customers' needs and the capabilities of our supply chain we are working towards our 2020 vision of being a sustainable business.

 Through close collaboration with our supply chain we are helping our customers to choose sustainable solutions.
- Healthy communities**
 Creating positive lasting legacies.

 Engaging with our people, our supply chain and the communities in which we work makes sustainability a collective responsibility.

 Through engagement we ensure that the work we do immediately improves the quality of people's lives while supporting the needs of future generations.
- Environmental limits**
 Sustainable development means making better use of finite natural resources, as well as managing environmental risk and biodiversity.

 By leading on environmental issues such as energy use and waste production and treatment, we are reducing both our customers and our own environmental impact and long-term costs.



HERE TO HELP

Jim Hutchison
Balfour Beatty
2200 Century Way
Thorpe Park
Leeds
LS15 8ZB

t: +44(0)113 821 3400
e: jim.hutchison@balfourbeatty.com
w: balfourbeattysuk.com



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