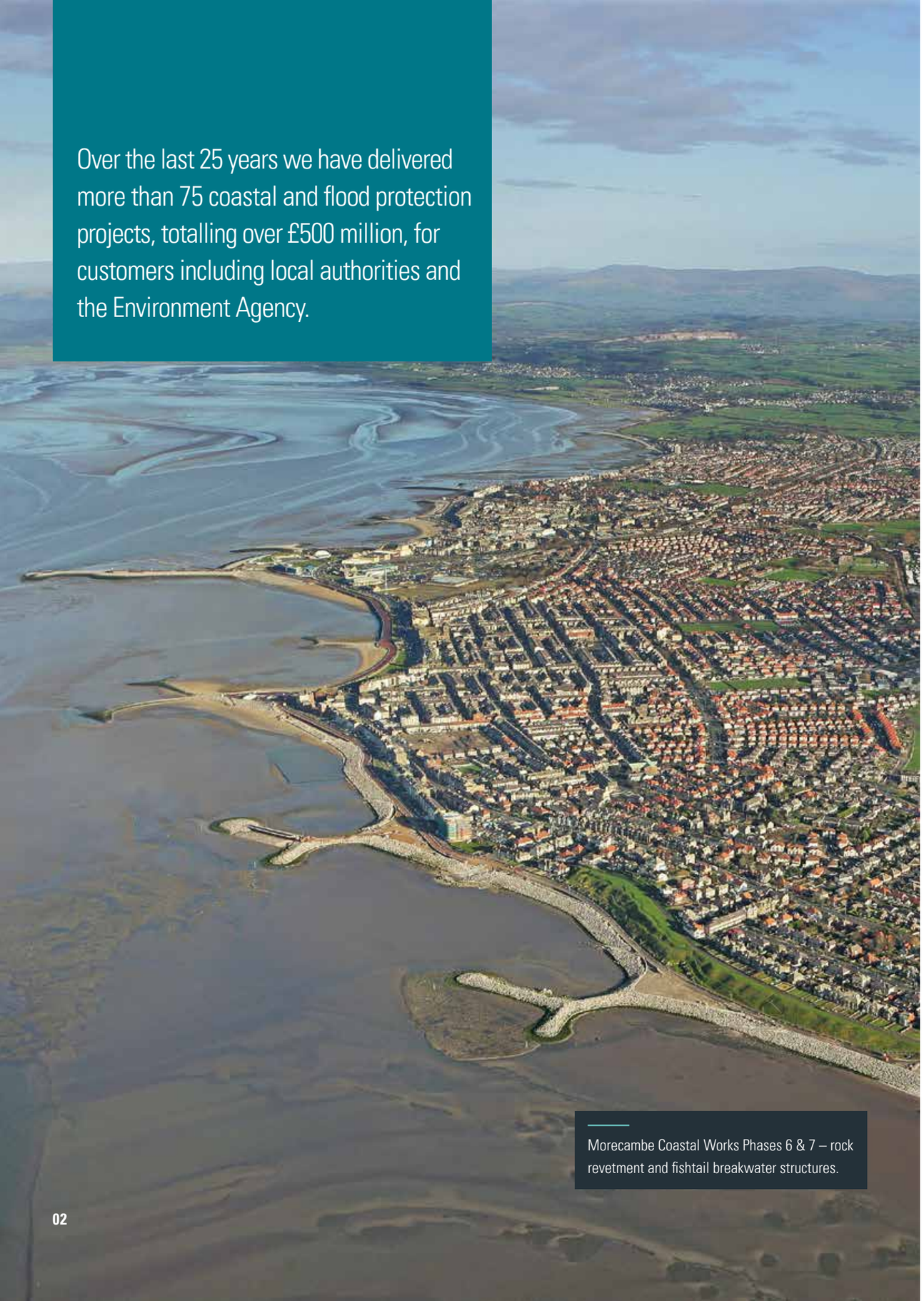
Coastal and flood protection

Our expertise

Balfour Beatty

Over the last 25 years we have delivered more than 75 coastal and flood protection projects, totalling over £500 million, for customers including local authorities and the Environment Agency.



Morecambe Coastal Works Phases 6 & 7 – rock revetment and fishtail breakwater structures.

Coastal and flood protection

We are the UK's largest contractor with the skills and expertise to make every project a success. Our broad capabilities coupled with our proven track record for delivering expert engineering solutions makes us an ideal partner to develop and deliver your coastal and flood protection project.

Market-leading delivery

Our impressive portfolio of projects, delivered on time and to budget, is a testament to the partnering approach we take with our customers and designers. This approach underpins our technical excellence and drives continuous improvement that leads to innovative solutions including the first use of glass fibre polymer as a concrete reinforcement in a coastal environment.

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.

Our approach of working in close partnership, aligning projects and engineering services to the aspirations of customers and stakeholders and engaging with local communities is key to excellent service delivery, regardless of the size or value of the project.

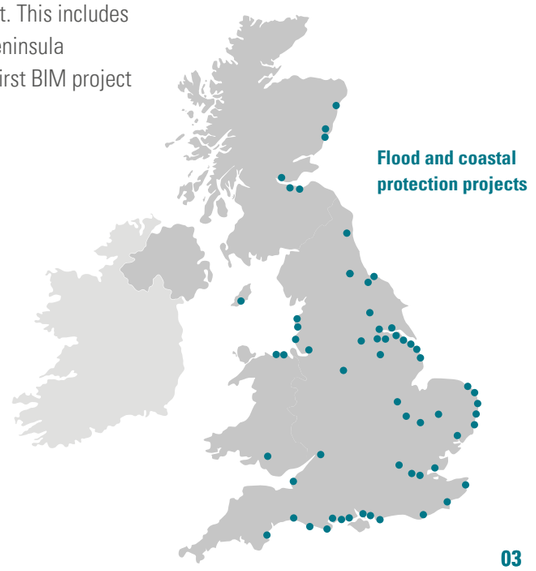
In-house capability

The overall strength and diversity of Balfour Beatty means we have in-house specialist skills and equipment that we can deploy as part of our solution. This includes the self-delivery of piling and foundation works, specialist structural repair and maintenance of concrete defences as well as our own fleet of crawler cranes, piling vibrators and hydraulic impact hammers.

We are BIM Level 2 compliant and are at the forefront of using BIM in the coastal and flood protection market. This includes the delivery of the Fylde Peninsula Coastal Programme – the first BIM project in the sector.

BIM

Balfour Beatty leverages BIM in the flood and coastal sector to enhance project efficiency and collaboration. As one of the first in the industry to achieve accreditation to BS/PAS 1192 and later ISO 19650, and maintaining it ever since, Balfour Beatty demonstrates its capabilities to successfully deliver projects in accordance with industry standards and the UK BIM Framework, supporting the design and construction of resilient flood and coastal defences.



Delivering value and certainty through SCAPE

Together, Balfour Beatty and SCAPE deliver projects at the heart of local communities and critical national infrastructure via rapid access civil engineering frameworks. Since the start of our partnership in 2015, we have added over £404 million of social value to local communities and economies through projects procured via SCAPE's Civil Engineering frameworks.

At Balfour Beatty, we're more than just a partner – we seamlessly integrate the expertise of our teams, customers, designers and supply chain partners from the inception of every project. Together, we develop a shared understanding of the project's vision and critical success criteria. This collaborative approach ensures the best decisions are made at every stage of the project lifecycle, from validating business cases and securing funding to optimising design, programme and budget.

SCAPE

The benefits of using the framework:

Speed and certainty – Direct award to a trusted contractor accelerates procurement, typically saving up to six months, while ensuring projects are delivered on time and to budget.

Transparency and assurance – All costs are independently validated and 100% market tested, giving you confidence in value for money and full auditability.

Collaborative expertise – Early contractor involvement enables better design, risk management and innovation, reducing carbon, improving buildability and driving efficient delivery.

High performance – Projects are measured against clear KPIs, with outcomes and benefits evidenced through robust data, supporting investment decisions and business case approvals.

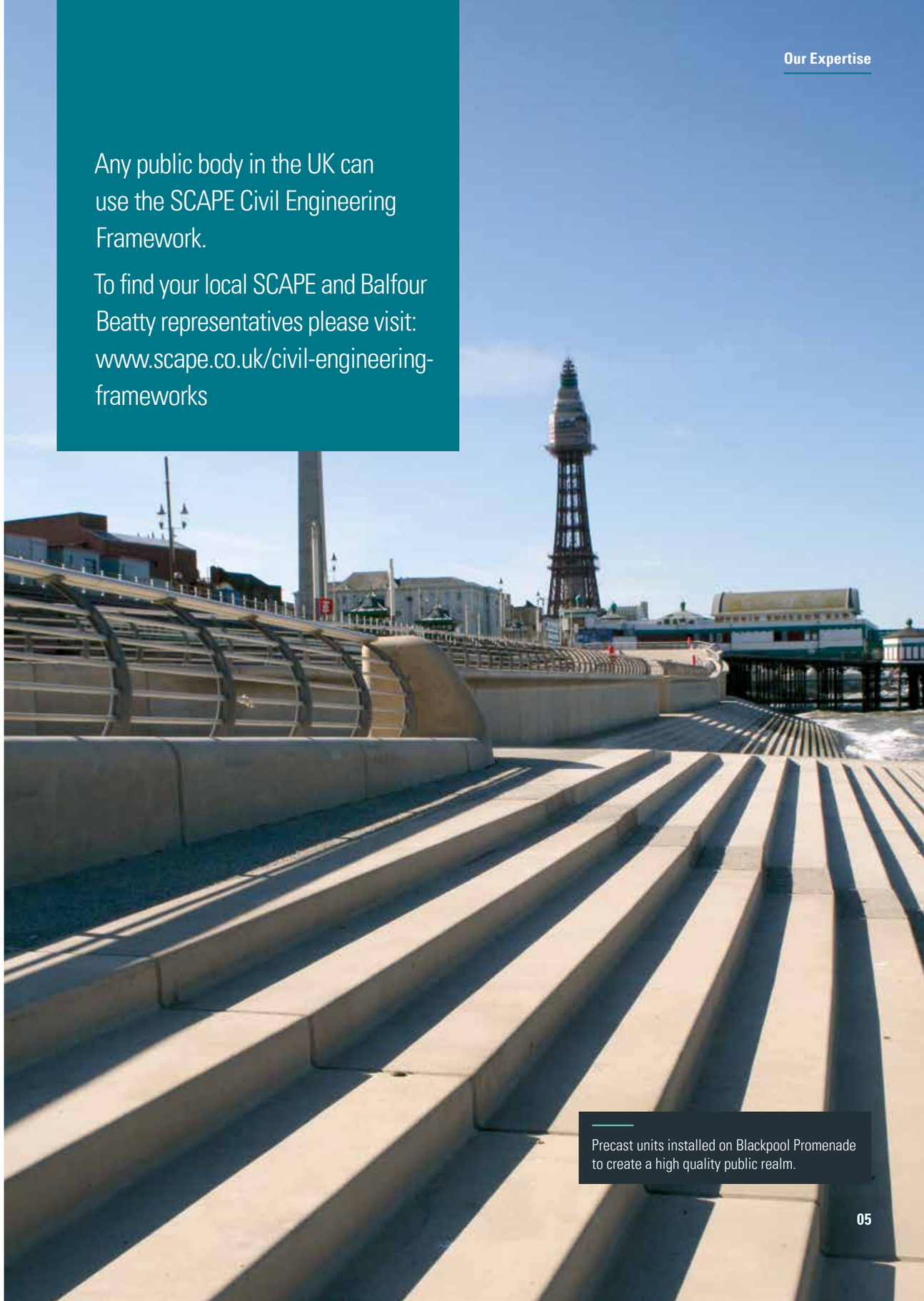
Community impact – Delivered locally using a trusted regional supply chain, the framework maximises social value and economic impact, supporting jobs, skills and growth across the UK.

All SCAPE frameworks are:

- OJEU compliant
- 100% market tested
- 100% claim free
- Fully open book
- Gold Standard framework
- Construction Playbook aligned

Any public body in the UK can use the SCAPE Civil Engineering Framework.

To find your local SCAPE and Balfour Beatty representatives please visit: www.scape.co.uk/civil-engineering-frameworks



Precast units installed on Blackpool Promenade to create a high quality public realm.

A History of innovation

Our expertise in water-related infrastructure dates back to the early 20th century, with landmark hydroelectric schemes in the Scottish Highlands laying the foundations for today's innovation. From pioneering vacuum lifting techniques in marine environments to leading the market in high-quality precast concrete coastal defence structures, we bring technical excellence, trusted partnerships, and a deep commitment to sustainable coastal resilience.

2002

Introduction of the first precast sea wall at St Stephens Avenue in Blackpool. The sea wall was constructed three times faster than on previous schemes.

2005

Extensive in-sea concrete trials at Cleveleys to develop optimum mix for precast elements.

2003

Turning architectural visions into reality using precast at Blackpool Gateway.

2005

A UK first – a bespoke full scale vacuum lifting device is used at Blackpool & Cleveleys.

2004

Development of a precast methodology on a larger scale than ever before in the UK.

2006

Dowelled movement joints in promenade designed out by utilising a cement bound material to manage any differential settlement.

2004

Development of the steel pile and macrofibre concrete capping beam to eliminate steel reinforcement and reduce construction risk.

2006

Macrofibre reinforced concrete developed for revetment units to limit corrosion. This eliminates the need for steel reinforcement.

2007

First use of glass fibre reinforced polymer (GFRP) as concrete reinforcement in a coastal environment for extended durability.

2008

Architectural developments in precast to enhance the seafront including decorative techniques, acid etching and exposed aggregate. Large scale coloured and curved wave wall units realised.

2009

Value engineering through the introduction of stainless and carbon steel cages for wave walls.

2009

Standardisation of precast unit design reduces waste, minimises vehicle movements and leads to more efficient utilisation of plant and lifting equipment.

2009

Innovative push pull delivery vehicle eliminates the need to reverse delivery vehicles.

2011

Grout wastage is reduced by 30% through the development of a new placement chute. Testing of a thicker grout mix also leads to more cost effective batching and more accurate levels of tolerance.

2012

A storage frame is developed for the vacuum lifter to extend the life of the lifting pads.

2012

The thickness of precast units is reduced by the development of a new micro silica concrete product that has superior strength and abrasion resistance.

2014

Use of drones to carry out visual inspections of the rock armour at Rossall.

2015

MULE innovation – mobile lifting technology capable of transporting and placing precast units overcomes access constraints and significantly reduces risk to the workforce.

2016

Innovative precast concrete screw plug eliminates the need for insitu concrete patch repairs and provides a consistent high quality finish.

2017

The first large scale coastal scheme to use BIM, the Fylde Peninsula Coastal Programme, is completed.

2022

Precast concrete revetments lifted into place using a vacuum lifting system and hydraulic rams at Central Rhyl.

2024

Cromer and Mundesley project utilised 3D modelling for rock placement. The model was imported onto the GPS machine control.

Concrete

In areas of high amenity value, coastal defences need to be robust whilst safeguarding or enhancing the local economy and benefiting the local tourist industry. Balfour Beatty is experienced in constructing concrete defence structures such as sea walls and revetments that are integral to wider regeneration programmes.

Benefiting from the highest quality finish, precast concrete steps create an attractive access to the beach. Careful design is important to ensure the solution meets the requirements of stakeholders and the local community.

First use of precast concrete in a coastal setting

Precast wall 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 insitu concrete revetment. The project received more than 25 awards including the prestigious Institution of Civil Engineers Brunel Medal for a team that made a valuable contribution to industry.

Since then, the precast system has been developed and refined to create today's high-quality sea defences that can be made in numerous shapes and sizes and in different colours and textures. To date, we have placed more than 40,000 precast concrete units.

Case study: Cleveleys Promenade

We delivered the multi award-winning £26 million contract from Wyre Borough Council to protect the coastline and enhance the promenade at Cleveleys.

The project replaced dilapidated sea defences, reducing the risk of flooding to 7,700 properties and creating valuable public space for the seaside town to encourage inward investment and boost tourism. Through the standardisation of design principles for precast concrete units, we achieved significant cost savings without sacrificing quality. These savings were reinvested in the project, paying for shelters, architectural seating and lighting.

Case study: Central Rhyl

The project, delivered for Denbighshire County Council, addressed sea defences that were at the end of their life and no longer providing adequate protection. The solution included 740m of concrete stepped revetment with raised promenade and rock scour protection, significantly reducing flood risk to 550 properties.

The stepped revetment was delivered as precast units. The unit weight, size, handling, logistics and lifting arrangements were considered at an early design stage with thorough buildability reviews. They were vacuum lifted into place using hydraulic rams which allowed the units to be picked from the horizontal transport position and dropped to the required angle for installation – improving productivity and safety.

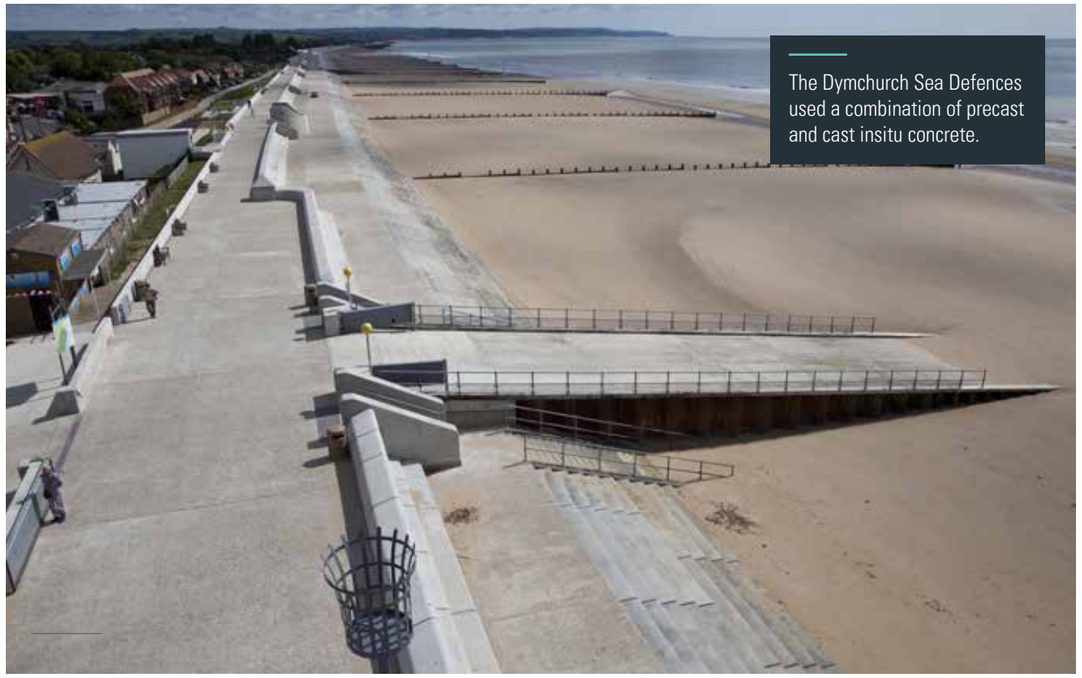
We installed the first precast concrete coastal protection solution in Blackpool in 2002.

Precast concrete units formed part of the works for Cleveleys Promenade.

The Redcar Sea Defences, shown here under construction, protect residents and businesses from a projected 85cm rise in sea levels.

"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
Environment Agency



The Dymchurch Sea Defences used a combination of precast and cast insitu concrete.

Case study: Redcar Sea Defences

This £26 million project for the Environment Agency delivered protection for 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

We utilised our ground engineering expertise to undertake extensive work required to accommodate the heavy machinery required for the lifting phase. As well as delivering the civil engineering works, 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 the longer term risk to a further 184 homes and 98 commercial properties nearby. It has also safeguarded highways and underground utilities with further benefits including the upgrade of the adjacent promenade area to create an opportunity for local businesses in the area.

Case study: Dymchurch Sea Defences

Initially valued at £30 million, we delivered this project for the Environment Agency for £26.4 million. It included the installation of a wave return wall and access steps, precast revetment units and integrated insitu concrete decking and promenade.

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

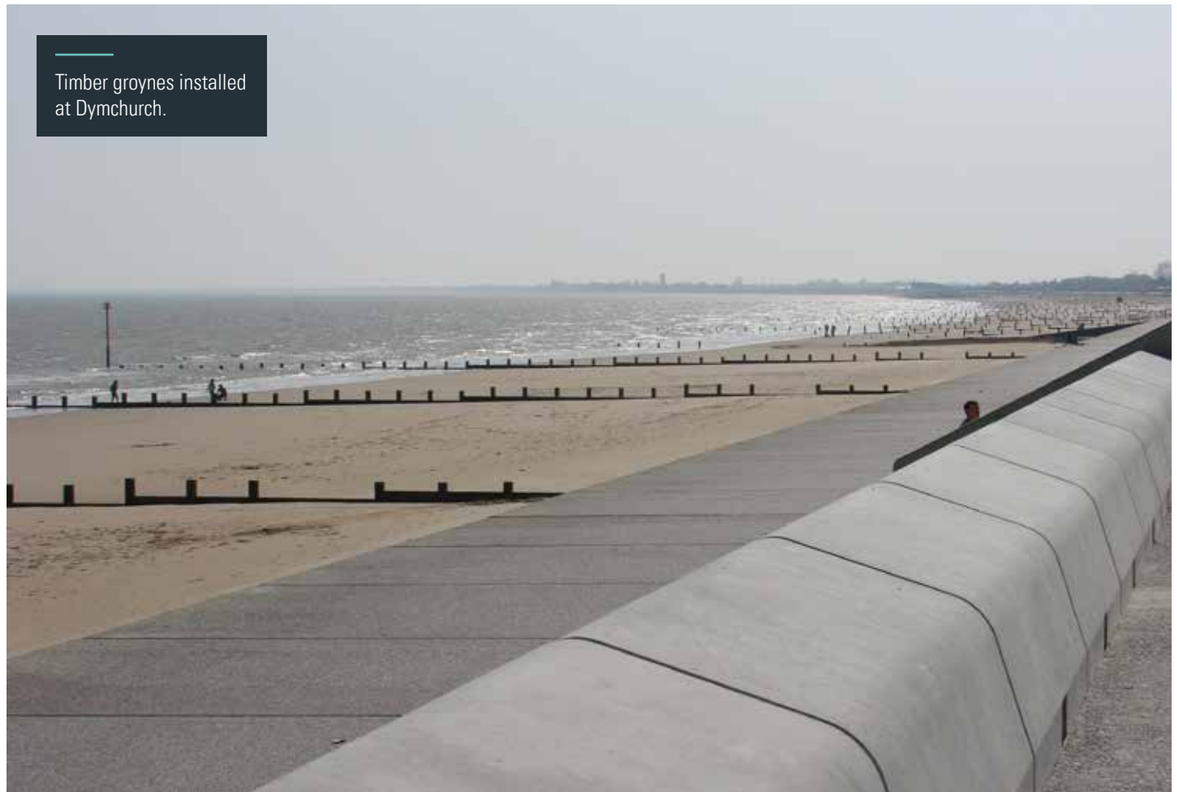
Off-site efficiency

We utilised off-site manufacture for the nine different types of precast revetment units and wave return wall units with associated access steps. Manufactured over a 22-month period, the units were 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.

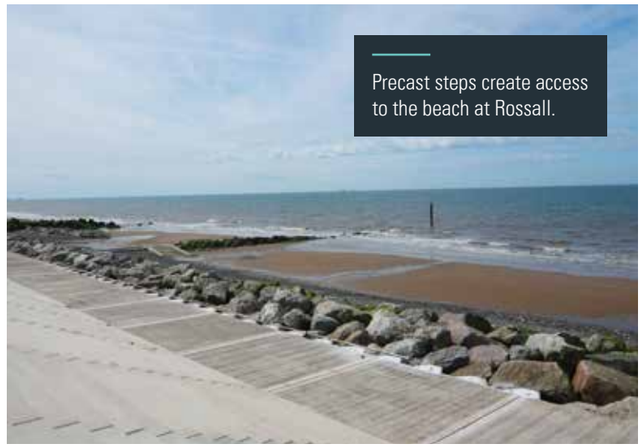
Groynes

Normally constructed as cross-shore structures, groynes are designed to reduce longshore transport of materials on open beaches allowing for beach levels to rise. They are often combined with revetments to provide a high level of protection against erosion whilst creating larger beach areas to be used by tourists. Our recent projects include both timber and rock groyne structures.

The refurbished timber groynes at Redcar.



Timber groynes installed at Dymchurch.



Precast steps create access to the beach at Rossall.

A sustainable approach to renewing timber groynes

As part of the Redcar Coastal Defences project, we undertook a full refurbishment of the existing timber groyne field.

In order to endure the harsh shoreline conditions, groynes are normally constructed from hardwood timber which mostly comes from tropical sources. This means its use can be costly and have a higher environmental impact. To mitigate these impacts, we repaired all of the groynes that were in reasonable condition and only replaced those that were completely dilapidated.

Creating access using rock groynes

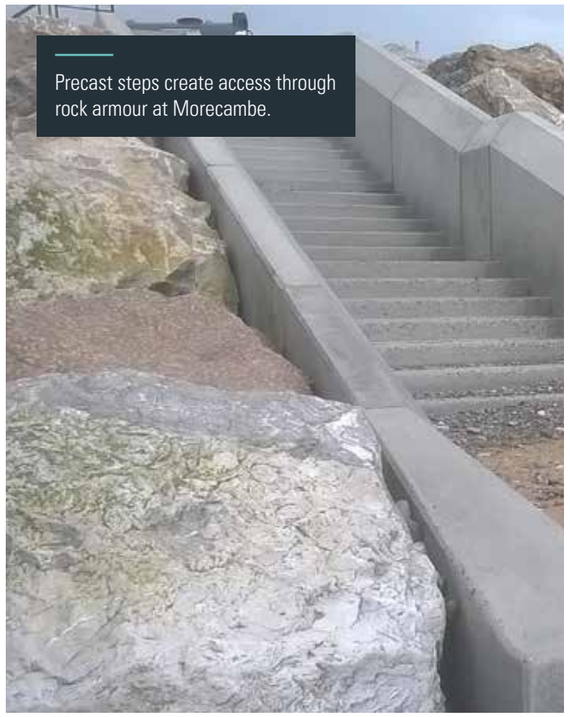
As part of the Fylde Peninsula Coastal Programme, the solution at Rossall used rock groynes to allow simple construction, provide long-term durability and to absorb wave energy, ultimately reducing the chances of water breaching the concrete defences behind and reaching the coastal pathway.

To provide easy access and egress from the beach, we used an innovative design solution that included crossover ramps from the public pathway to the beach. These are used by beach patrols and members of the public and help to make the area more accessible.

Rock armour being placed at Rossall, the UK's largest coastal works at the time.

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. It can also be used to protect the base of sea walls from the energy of waves. Its long-term durability and ease of maintenance help to compensate the need for plant to operate at sea or on the beach during installation and the environmental impact of sourcing the rock.



Precast steps create access through rock armour at Morecambe.

Case study: Rossall – Fylde Peninsula Coastal Programme

The £63 million Rossall Scheme for Wyre Council renewed century-old coastal defence structures to better protect over 7,500 properties from the risk of flooding.

Majority-funded by the Environment Agency, the scheme used 270,000 tonnes of locally sourced rock armour to form the lower defences, with specially manufactured precast and in-situ concrete elements forming a stepped revetment.

Delivering sustainability and value

Our design team identified a suitable local rock source to form the rock armour, avoiding the need to import from overseas. This significantly reduced cost, minimised environmental impact, and supported the local economy.

Minimising disturbance to local wildlife

Works were carefully programmed to reduce disruption to wintering waterfowl, breeding waders, and migratory birds within the Special Protection Area.

The scheme included a new estuarine wetland reserve – one of the largest natural environment coastal schemes in Europe. It has improved the habitat for breeding waders, contributing to national targets for coastal saltmarsh creation.

Habitat creation works

A UK-first, the project successfully translocated a glacially formed cobble skear – a rare marine/biomass habitat – helping preserve and enhance local biodiversity.

Case study: Cromer and Mundesley

This scheme for North Norfolk District Council combined works at both Cromer and Mundesley. This provided several project efficiencies and resulted in a total of 600 properties being better protected.

Over 50,000 tonnes of rock was delivered to site by barge, using a designated offshore transhipment zone and continuous 24/7 operations.

The rock revetments comprised of a three-layer structure: a bedding filter layer, a core layer, and a primary layer, ensuring robust coastal protection.

Both locations are prominent tourist destinations; however, we were able to deliver throughout the summer season. This was thanks to a collaborative stakeholder management plan and strong engagement before and during the project.

At Pevensey Bay, we are a long-term partner, on the worlds only PPP sea defence contract, delivering works to a seasonal calendar.

Shingle arrives on-site for beach nourishment works at Pevensey 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. Delivered well, the widened beach attracts tourists whilst protecting the local area from flooding. In some instances it is possible to use recycled materials to reduce impact on natural resources.

Shingle is offloaded ready to be placed.

Dredged materials from the North Sea are used to protect coastal defences as part of the Lincshore project.

Case study: Hightown Coastal Defences

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.

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.

In the local community, there was a variety of stakeholders 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.

Case study: Lincshore

We delivered the £32 million five-year beach re-nourishment project on the Lincolnshire coast for the Environment Agency.

The project reduces the risk of flooding between Mablethorpe and Skegness by placing sand on the beach to act as a natural buffer against the sea overtopping or undermining existing sea defence assets. This nourishment prevents erosion at the base of the hard flood defences and maintains a level of protection against a 0.5% chance of flooding in any one year.

Delivering value through 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.

We then re-nourished the beaches during the spring and summer months with approximately 500,000m^3 of materials. 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 dredge site was approximately 16 miles from shore and the dredged material was pumped ashore using a highly specialised dredger. Over the five year programme, we delivered significant year-on-year costs savings on the sand

Case study: Pevensey Bay

Pevensey Bay's Sea Defences PPP is a contract managed on behalf of the Environment Agency 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 50km^2 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 defence standard is achieved by annual importation of off-shore marine aggregates replacing those 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 better facilitates the recycling process.

The 25 year, £30 million contract to improve and maintain the defences started in 2000. Despite its undoubted success, it remains the only PPP/PFI sea defence contract in the world.

Vehicles working on the Hightown coastal defences were segregated from the public.

"The key success on this Lincshore 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

Sand nourishment as part of the Lincshore project.

Coastal cliff stabilisation

We 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.

Case study: Scarborough Spa Slope Stabilisation

Working on behalf of Scarborough Borough Council, we delivered a £16 million slope stabilisation scheme to safeguard the historic Grade II listed Scarborough Spa and the surrounding community. Completed in February 2020, the 20-month project significantly reduced the risk of both deep-seated and shallow surface landslides on the steep coastal slope directly behind the iconic building.

With approximately 450 properties at risk in the event of a major landslide, our design and delivery approach focused on long-term resilience and sensitive integration into the coastal landscape. The solution included the installation of 206 contiguous bored piles – reaching depths of up to 38 metres – and over 4,500 soil nails varying from 4 to 20 metres in length. These were combined with a specialist slope-facing system and horizontal drainage to stabilise the cliff and manage water infiltration.

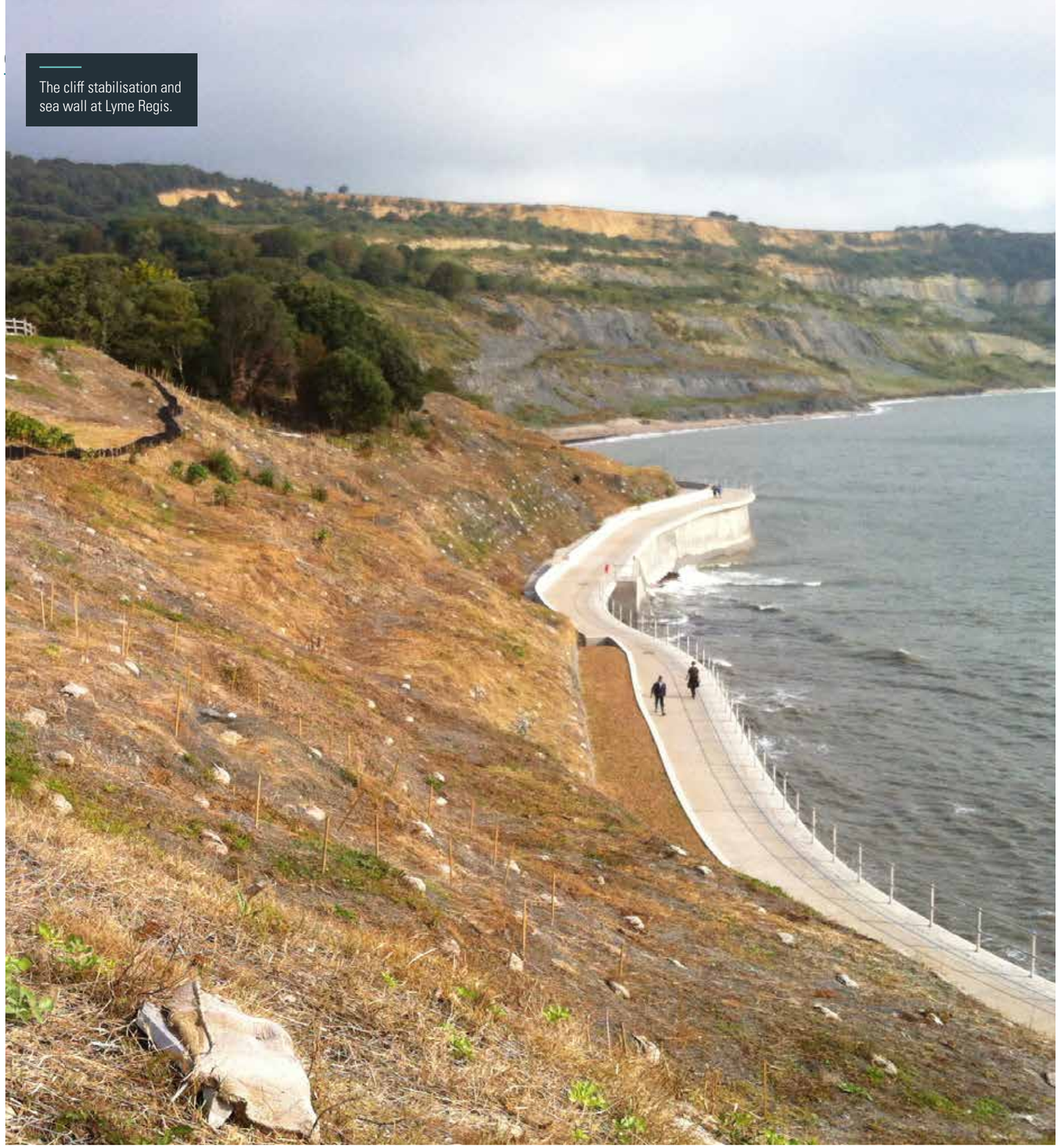
As principal contractor, Balfour Beatty worked closely with designer Coffey to overcome the technical challenges presented by the steep terrain and proximity to the live public space and historic structure. All works were delivered with a strong focus on minimising disruption to the local community and preserving the character of the heritage site.

The project also included new footpaths and landscaping, ensuring the area was both safer and more accessible for residents and visitors. The stabilisation of the coastal slope now provides long-term protection for the Spa complex and surrounding properties, helping to preserve Scarborough's cultural heritage and coastal economy for generations to come.

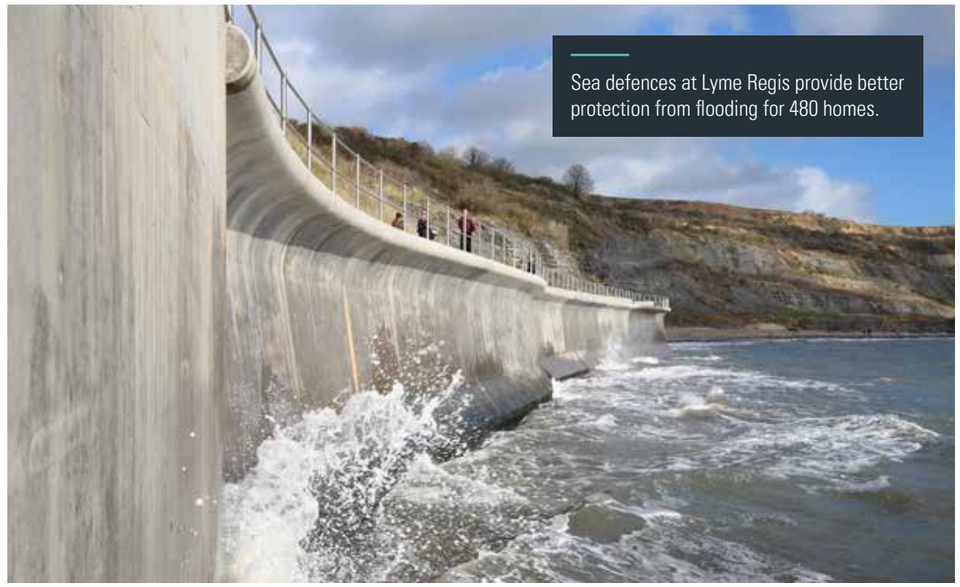
Aerial view of Scarborough Spa Stabilisation works.

Scarborough walkway improvements.

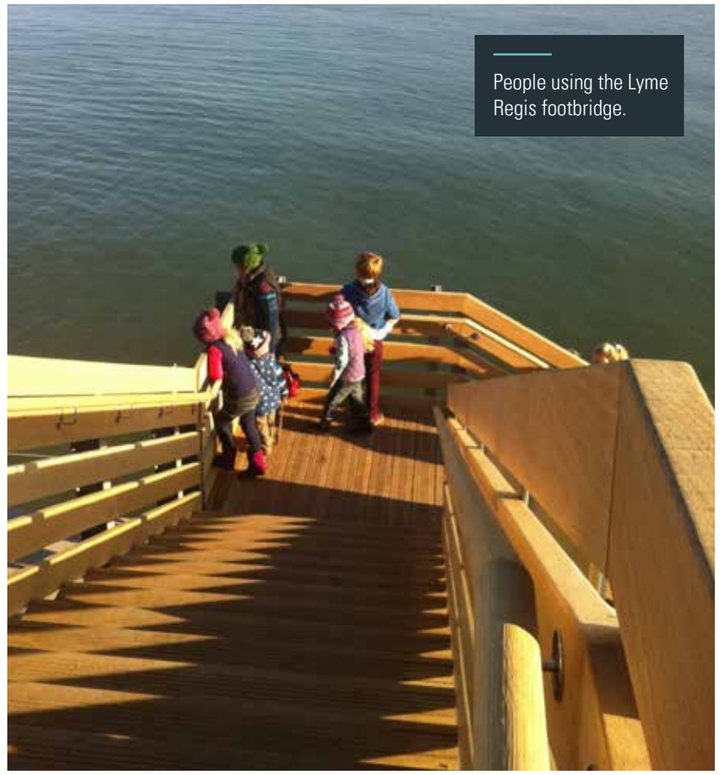
View of Scarborough cliff and seafront.



The cliff stabilisation and sea wall at Lyme Regis.



Sea defences at Lyme Regis provide better protection from flooding for 480 homes.



People using the Lyme Regis footbridge.

Flood alleviation

Flood alleviation works are targeted at protecting populated areas through the construction of flood defence walls, embankments and flood storage. Before, during and after construction, our proactive engagement with local communities and businesses is key to making sure the project leaves a positive legacy and is delivered with minimal disruption.

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, 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.

Engaging the community

Detailed newsletters were delivered to over 1,500 homes supported by community presentations, school visits and weekly drop-in clinics. Project team 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 North West Regional Construction Awards amongst major competition with schemes valued at over £100 million.

One of our own fleet of crawler cranes working on the River Mersey.

"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

Flood alleviation works at Morpeth reduce the chance of flooding for communities 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

The Almondbank flood protection project utilised a variety of flood defences.

Case study: Morpeth Flood Alleviation

The £21 million project protects the community along the River Wansbeck. It features an upstream storage dam, the construction of flood walls throughout the town centre and the extension and refurbishment of existing flood defences.

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

Delivering sustainability and value

All aggregates and concrete used on the project were sourced 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. This saved the production of around 552 T/CO_2e as well as reducing the project cost by £150,000. Further savings totalling £80,000 were made through alternative designs for the trench detail and the piling.

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

Engaging the community

Working within multiple town centre locations meant extensive community liaison was essential. As part of this, 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
- Environment Agency Managing Health, Safety & Environmental Risk Award
- Considerate Constructors Scheme Gold Award and Constructing Excellence Award, Project of the Year 2016
- The scheme is widely acknowledged as an example of 'Natural Flood Management'

Case study: Almondbank Flood Protection

This £14 million scheme reduces the risk of flooding to the village of Almondbank in eastern Scotland. Set-back and in-channel flood defences provide the local area with protection from flood waters originating from the nearby River Almond and East Pow Burn.

The scheme, promoted by Perth and Kinross Council, was awarded through the Scape Civil Engineering and Infrastructure Framework and incorporated a variety of flood prevention techniques. These included the installation of approximately 1,000 linear metres of sheet piled flood walls, 1,500m of reinforced concrete flood walls, 750m of earth embankments and over 2,000m of erosion protection measures. We also replaced two vehicle access bridges and relocated an existing pedestrian bridge.

To ensure the village and surrounding areas were fully protected, we improved the existing highway drainage system and created additional drainage facilities nearby. We also installed a temporary flood water storage reservoir to further increase the level of protection during the works.

Minimising environmental impact

The River Almond is a tributary of the River Tay and is designated a Special Area of Conservation. As this is an environmentally sensitive area, the team put in place stringent management plans in consultation with government bodies to ensure the works met legal and contractual requirements for protecting the local area.

Habitat schemes

The impacts of rising sea levels mean that developers need to ensure new sea defences comply with legislation, this is particularly important in areas where improvements have led to the loss of protected habitats.

We have constructed new habitat areas in many estuarine areas including the Thames, Tees and Humber.

Case study: 140 hectares of new wetland habitat

Working for the Environment Agency on the East Lincolnshire coast, we have completed the £4.5 million Donna Nook project to create 140 hectares of new wetland habitat.

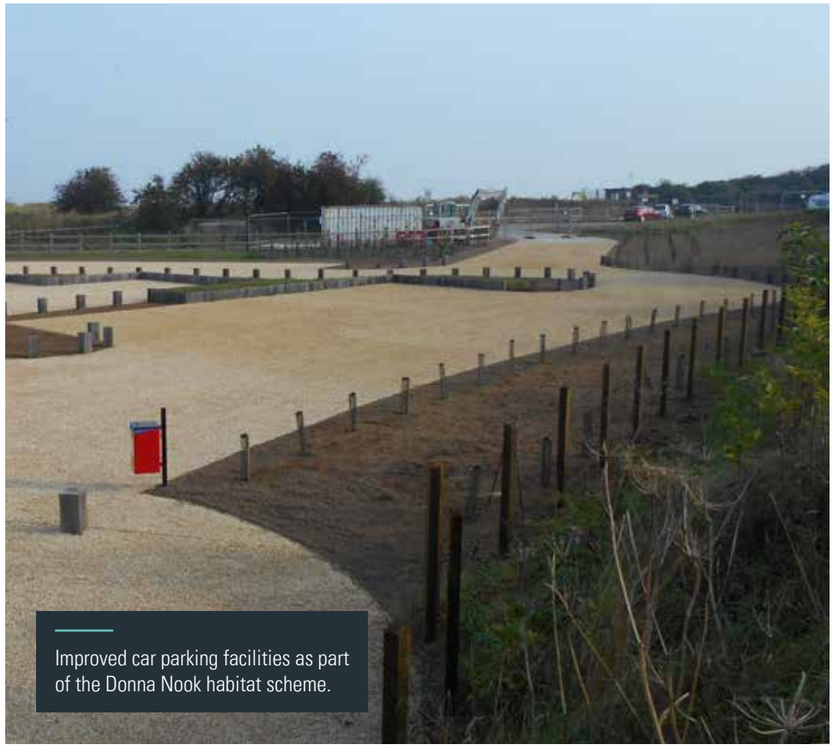
The project is an integral component of the Humber Flood Risk Management Strategy programme of works that was developed to maintain sustainable flood defence policies within the estuary and ensure compliance with the Habitats Regulations. It has replaced the wetland habitat lost to flood defence improvements and coastal squeeze within the outer estuary by creating inter-tidal habitat through the managed re-alignment and improvement of the existing coastal defences. Other freshwater habitats have also been created inland.

The works involved the construction of a new, setback flood embankment and breaching of the existing defences by the removal of the Somercoates Haven sluice and lowering sections of the surrounding banks. The land was then re-profiled and the existing Porter's sluice pumping station upgraded.

The project was part of the award winning Humber Package and was delivered by our 'Humber team' who worked with the Environment Agency to take it through planning and public consultation. Packaging of the work achieved savings in excess of £5 million.

Creating new habitat areas is often an important condition of receiving planning permission for infrastructure.

Creating new habitat areas in Greatham.



Improved car parking facilities as part of the Donna Nook habitat scheme.

Realigned flood bank at Donna Nook.

Repairing and strengthening existing flood defences and marine structures

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, coastal defences and marine structures.

Our capabilities

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

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

Delivery

We use the 4D's approach – Detect, Diagnose, Develop and Deliver – to create bespoke, technically innovative, and cost-effective solutions. Combining this with our in-house management and delivery by our skilled workforce, we ensure high-quality repairs, minimal disruption, and efficient project outcomes.

Accreditations

- ISO 9001, ISO 14001 and ISO 45001
- Constructionline – 24407
- CHAS

Memberships

- Concrete Repair Association
- Spray Concrete Association
- Corrosion Prevention Association
- British Institute of Non-Destructive Testing

Our in-house team of experts deliver repair, strengthening, stabilisation and preservation works.

Spray concrete is used to repair defences in Grimsby.

Detect

Provide structural health monitoring through in-depth surveys and digital solutions to assess asset conditions.

Develop

Leverage expert knowledge and experience, combined with survey insights and data, to create bespoke and innovative solutions.

Diagnose

Address structural concerns through expert analysis and specialist services.

Deliver

Structural repair, strengthening and protection services to sustainably extend the life of infrastructure assets.

Grimsby concrete repairs.

Case study: Grimsby Sea Defence Repair

Winner of the CECA Yorkshire & Humber Contract of the Year award, the project required repairs to a 1.9km length of revetment sea defence in Grimsby.

The wall had deteriorated through persistent attack from the sea causing erosion 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 proposed an innovative, alternative approach that provided safer access, a higher quality finish and considerable cost savings. This helped us to secure the £900,000 project on a fixed price basis and completed it four weeks ahead of programme.

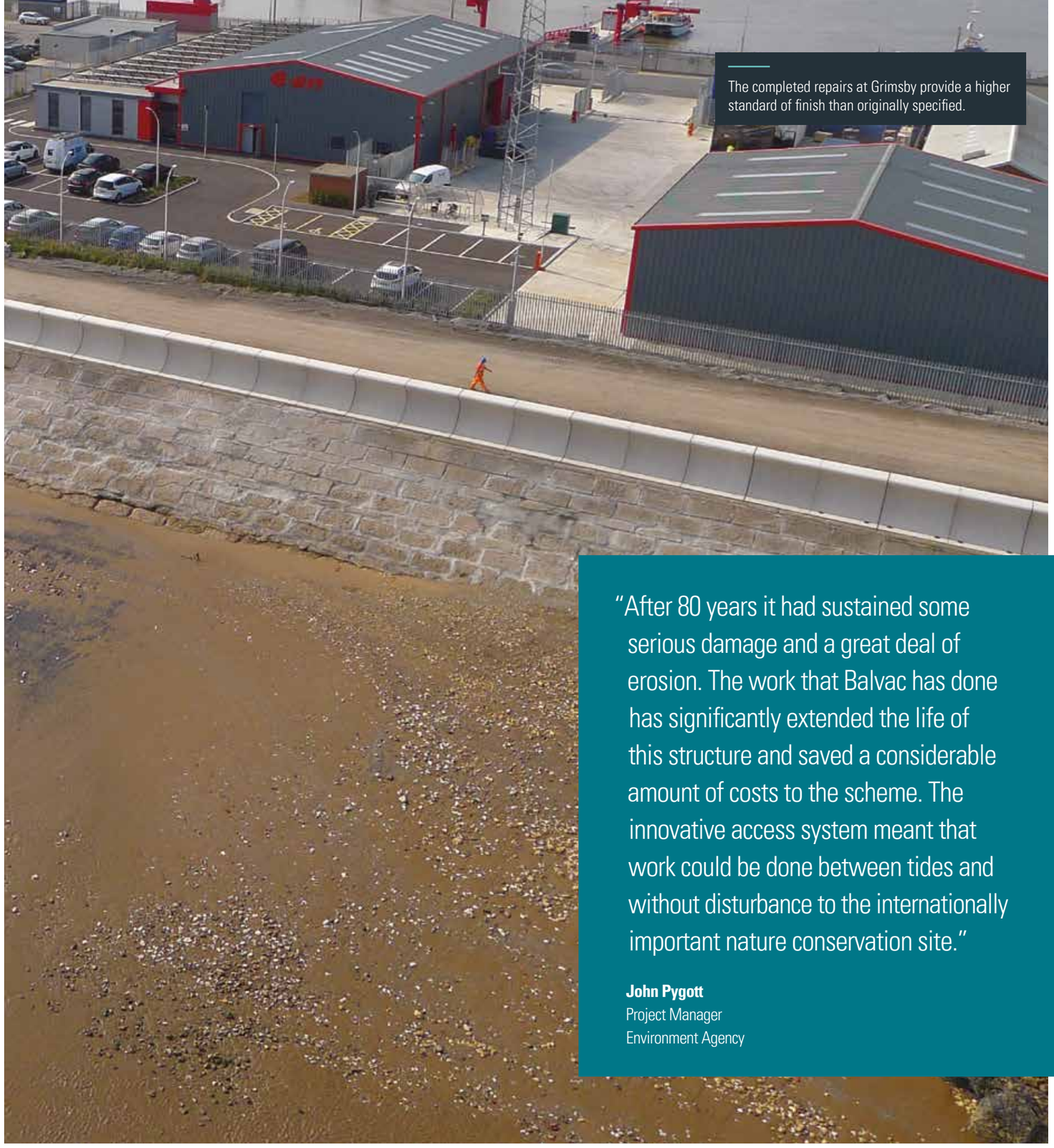
An innovative approach

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.

To maximise efficiency we used two teams of operatives. 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.



The completed repairs at Grimsby provide a higher standard of finish than originally specified.

"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

Asset management

The management of coastal and flood protection assets requires a long-term partner who can work as part of an integrated delivery team. Our team inspects and monitors the performance of assets and plans routine maintenance to ensure they continue to perform as required.

The Thames Barrier is one of the key assets that we will manage as part of TEAM 2100.

Managing flood assets on the Thames

Thames Estuary Programme 1 (TEP1) was the first phase of the Thames Estuary Asset Management plan (TEAM2100) and took place between 2015 – 2025. The Environment Agency, Balfour Beatty, Jacobs, and several specialist suppliers worked as an integrated delivery team (IDT). They completed over £400m of asset repair and refurbishment works to the existing tidal flood defences between the Sheerness and Shoeburyness in the East to Teddington Locks in the West.

The project involved upgrading and repairing the Thames Barrier, identifying ways to extend its life to 2070, and extending the life of 350 kilometres of flood walls and embankments. Additionally, improvements and repairs were made to smaller active barriers, pumping stations, and flood gates. These defences, included in the TEP1 remit, are crucial for protecting an estimated 1.25 million people and over £200 billion worth of property from flooding.

Many of the defences were over 30 years old, and in some cases over 100 years old. The investigations and repair works carried out provided the Environment Agency with a wealth of information not only about the condition of individual defences but also about London's tidal flood defence system as a whole. This information can be used to inform the ongoing asset management approach, and the management of the system for the next 100 years.

At the time TEP1 was one of the UK Government's top 40 National infrastructure projects and one of the largest flood risk management programmes of works. The focus was on collaboration, shared values, innovation and integration of asset owners, design, and delivery teams. The team achieved the ISO 55001 accreditation for asset management.

To date, TEAM2100 has delivered over 34,000 OM2s (Outcome Measure 2's), with the Canvey Island Project alone delivering just under 7,000.

Over £99 million of efficiencies

The Environment Agency's investment in an IDT approach promoted lean ways of working and collaboration throughout a project lifecycle. Project development from inception to detail design incorporated site investigations, early contractor engagement, early delivery planning, and stakeholder and third-party engagement. This allowed TEP1 to deliver over £99m of efficiencies in a complex urban environment.

"Having such a competent team on site makes the construction phase a relative pleasure. Thank you for your professionalism and unfailing patience dealing with the tenants!"

James Kennedy
Project Manager
Environment Agency

Jim Hutchison
Sector Director Resilience and Adaptation

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