Coastal Partners

Report 2020

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Message from Head of Service

I'm delighted to share our latest Coastal Partners Report with you...

"Our vision for the future: to manage coastlines, improve community resilience and enhance the natural environment

Lyall Cairns *Coastal Partners*

2020 sees the evolution of Eastern Solent Coastal Partnership (ESCP) with a rebranding and the launch of our new name **Coastal Partners**. The organisation's new name reflects our intention to build on the original partnership formed between four local authorities by sharing our expertise, skills and services beyond the Eastern Solent and by working with new partners.

Our new name, Coastal Partners, is also supported by a new organisational vision for the future:

To manage coastlines, improve community resilience and enhance the natural environment.

As Coastal Partners, we intend to move forward by building on our founding principles – namely that by working collaboratively, we achieve more for the coastal communities we serve than would be achieved by working individually and in isolation.

As we continue to evolve, I'm honoured to lead a passionate and diverse team of professionals, who work together to achieve our vision and deliver on objectives. I'm proud that we're a successful, growing organisation, which makes important contributions to wider society. At a time of uncertainty in the global economy, social divisions and unprecedented concern about the environment, we continue to deliver projects that have multiple outcomes for society, going beyond flood protection to achieve the goal of enhancing the lives of those who live on the coast. ▶

It's an exciting and challenging time to be a coastal engineer. Our industry is having to respond rapidly to changes whilst ensuring that we balance the needs of our communities with the challenge that climate change presents. We're committed to delivering projects that increase community resilience and embrace the shifting national policy from the narrow concept of protection, to a broader vision of building flood resilience with a nation ready to respond and adapt to coastal change.

This report gives an insight into the work of our engineers, scientists, surveyors, project managers, environmental and finance experts. We hope to show you what makes us who we are, what drives us forward and why we're industry leading.

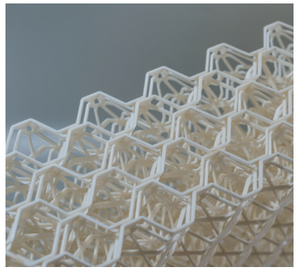
Lyall Cairns *Head of Service*

Highlights from the past year...

- The Tipner Lake phase of the **North Portsea Island defence scheme** was completed and opened to the public in October 2019. The design delivers both enhanced coastal flood defences and improves public spaces. This makes the area a destination for residents to visit enjoying enhancements such as improved seating areas, landscaping, bird hides and play equipment for children.

- Funding and consents have been secured in order to start the construction of the next generation of **flood defences in Southsea** in September 2020. This scheme has been designated as a Major Project nationally and is the largest local authority led coastal defence project in the country.

- Our ongoing commitment to **engaging with communities** where flood defence work is being planned continues to be a top priority for all our coastal engineers. We have held multiple face to face meetings and actively listen to the feedback, altering our designs when appropriate.



- Installation of **innovative trial products**, the first use of their kind in the UK. Environmentally sensitive tidal pools (ECOnrete) which increase the biodiversity of local ecosystems and biodegradable potato starch grids (BESE) used to regenerate lost saltmarsh vegetation.

- The creation of a **Geomatics Division** who use pioneering drone technology to survey environmentally sensitive or difficult to access locations.

Engineering Excellence

Coastal Partners' Capital Projects Team consists of highly experienced civil engineers and construction management professionals who deliver project, commercial and design management for capital projects.

The coast is a dynamic environment, rich in natural resources and popular for development; in fact, most of the world's population live close to coastal areas. Despite being considered prime real estate, human impact and climate change have created unprecedented challenges for coastal communities who are now experiencing accelerated coastal erosion and the increasing risk of flooding.

At Coastal Partners, our Coastal Engineers are responsible for designing and delivering preservation work that helps to protect coastal communities from flooding and erosion. It's not possible to prevent all flooding or erosion but there are actions that can be taken to manage these risks and reduce the impact on coastal communities. Coastal defences can take the form of defence structures, such as breakwaters, seawalls, groynes and revetments or softer defences techniques such as beach renourishment and beach recycling.

Ensuring the selection of the right coastal management technique or defence structure is critical in achieving the goal of effective management of the coastline.

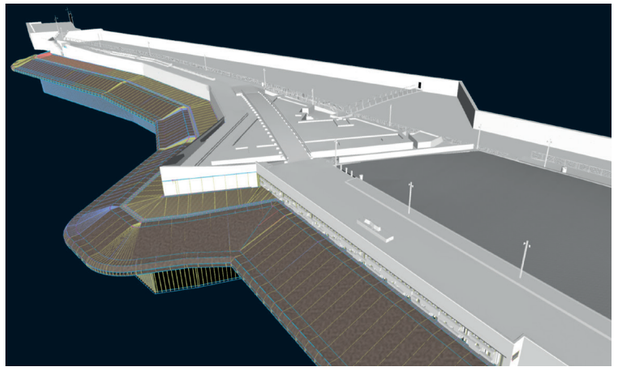
The team that leads this work for Coastal Partners is the **Capital Projects team**. The team consists of highly experienced civil engineers and construction management professionals who deliver project management and engineering design services for capital projects. Experience of complex projects in the coastal environment has led the Capital Team to have extensive experience in:

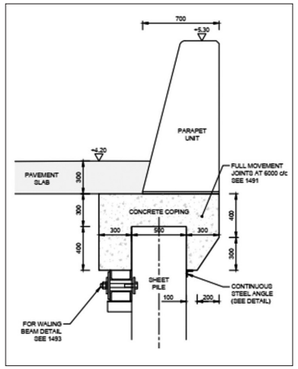
- Project management
- Commercial & design management
- Site supervision
- Contract management
- Procurement

The Capital Team lead on several major projects, including the **Southsea Coastal Defence Scheme**, the largest local authority-led coastal defence project in the country. In September 2020, the first of six phases of construction started following consents being secured and the UK Government committing nearly £100 million of funding. The scheme, when complete, will reduce flood risk to 10,119 homes and 704 non-residential properties in Southsea and offer protection for the next 100 years. It will also enjoy wider benefits including regeneration, improved access and facilities all while maintaining the area's unique heritage.

North Portsea Island is another major project, delivered by the Capital Team, covering 8.4km of coast. The scheme replaces coastal defences coming to the end of their serviceable life and reduces the risk of flooding from the sea to over 4,200 homes, 500 non-residential properties and protects critical infrastructure including the Eastern Road over the next 100 years, while also delivering public realm improvements for the community.

Fig. 1 & 2 CGI and sectional drawing of Long Curtain Moat, a highly sensitive development owing to the major historical importance of the site. (CGI courtesy of Royal Haskoning DHV UK)





PARTNERS WITH

Royal HaskoningDHV
Enhancing Society Together

CASE STUDY

Client ***Portsmouth International Port (Portsmouth City Council)***

Challenge A complex engineering project to reconfigure the port's cruise berth. The original berth was on two different levels, meaning that the arrangements for passenger access and loading were inefficient. The length of the berth also prevented larger cruise ships mooring, and the works had to be delivered in a busy, operational international port with adjacent berths and shipping approaches remaining open.

Solution Coastal Partners provided Portsmouth City Council's project team with technical engineering and contractual project management support, including an accredited NEC4 Supervisor and NEC4 Project Manager. They assisted with the delivery of the work with technical recommendations and quality inspections, NEC4 ECC contract management and general project management advice. The berth was lowered by 2.4m and extended by 40m via a deck extension including a new 18m dolphin, which is a fixed, permanent structure, separate to the berth which acts as an extension for mooring.

Benefit Loading and passenger access is now much more efficient, improving operational efficiency. The berth can also now accommodate ships up to 300m in length, making it possible for larger cruise ships to visit. More ships and passengers create more income for the city to support essential services. It also leads to an overall positive impact on Portsmouth's tourist industry.

By reconfiguring and improving the loading and passenger access to Portsmouth Harbour's cruise berth much larger cruise ships can now be accommodated. To demonstrate scale, this image shows the 268 metre Royal Caribbean Cruises' Majesty of the Seas.

PARTNERS WITH

Portsmouth CITY COUNCIL

Portsmouth INTERNATIONAL Port

nec4

Fareham

PARTNERS WITH

FAREHAM BOROUGH COUNCIL

Regional Monitoring Baseline and Topographic Surveys

Coastal Partners surveyors undertook regional monitoring baseline and topographic surveys of the beaches in Fareham including Hill Head and Chilling Cliffs. Surveyors collected data using a variety of methods including GPS attached to backpacks and quad bikes. The data was then processed and used to investigate the effects of seasonal changes around the coast and to gain a better understanding of the coastline and its processes. This data was shared with the Channel Coastal Observatory website and made freely available.

Cador Drive Seawall Maintenance Works

Coastal repair work was carried out to 20 metres of concrete foundations fronting Cador Drive Seawall. The seawall acts as a primary coastal erosion and flood defence protecting nearby residential properties. The existing concrete bagwork* foundations were removed, new piles installed, and concrete placed to form the new foundations. These repairs afford greater protection to the seawall.

Hill Head Sailing Club Capped Beam Repairs

Repair work was carried out to the concrete capping beam** fronting Hill Head Sailing Club. The capping beam forms part of the quay wall and acts as a primary coastal flood defence protecting recreational and commercial land, a coastal footpath and service infrastructure. Multiple sections were repaired by removing loose debris and erecting timber shuttering before the concrete was poured. These repairs will aid the longevity of the flood defences for the coastal communities.


Hill Head


Cador Drive

"Residents continue to benefit from the shared expertise, skills and services that the collaborative partnership formed by Coastal Partners offers and the increasing focus in Fareham on habitat creation presents exciting opportunities for enhancing the environment

Cllr Keith Evans
Executive Member for Planning & Development

** A revetment, consisting of heavy material sewn into bags, for protecting embankments against scour.*

*** A steel and concrete beam that ties piling together, creates the foundation for the suspended slab and helps to hold the earth back.*

Gosport

PARTNERS WITH

GOSPORT Borough Council


Stokes Bay Saling Club

The River Hamble to Porchester Flood & Coastal Erosion Risk Management Strategy recommends three priority coastal defence schemes in Gosport – at Alverstoke, Forton and Seafield – as these areas are considered 'vulnerable' and at significant risk of tidal flooding.

"The challenge of building flood resilience, especially in times of climate change, continues to be of increasing importance for our community so that the risk of flooding is reduced and our ability to bounce back after floods is strengthened. The success of Coastal Partners is key to achieving this.

Cllr Piers Bateman *Gosport Councillor*

Alverstoke

This scheme covers approximately 150m of coastal frontage. The plan is to retain and maintain the existing seawall, with the benefit of a new reinforced concrete wall to the new flood wall height. A flood gate across Little Anglesey Road will tie into higher ground to provide further protection. Licensing and consent work for the scheme is in progress. Detailed design has been completed, procurement has started for appointment of the contractor and works are programmed to start on site early 2021, to complete by autumn 2021.

Seafield

The proposed scheme covers approximately 800 metres of coastal frontage, with the tidal flood risk area located north of the Haslar Lake and Workhouse Lake confluence, between Old Road and Mariners Way. An 'Enhanced Outline Design' has been completed but a funding gap of circa £3M exists which needs to be addressed before detailed design and construction can be progressed. All options for this scheme are being explored. Subject to planning being secured by the end of Summer 2021, construction is planned for 2026-2028.

Forton

The detailed design for Forton has been completed, and includes a new reinforced concrete flood wall, raised road sections and one set of flood boards for vehicle crossover. Licensing and consents for Forton are ongoing. The planned construction period for Forton is summer of 2021.

Portsmouth

NORTH PORTSEA COASTAL DEFENCE SCHEME (NPI)

PARTNERS WITH

Portsmouth City Council

Royal HaskoningDHV
Enhancing Society Together

LDĀDESIGN

KNIGHTS BROWN

MACKLEY

On 7th October 2019, the Tipner Lake section of the **North Portsea Island Coastal Defence Scheme (NPI)** opened to the public. This section represents the third of five phases to be completed in the overall scheme and restores two kilometres of coastal paths, linking together the southern section of the flood defences from the Mountbatten Centre to the Hilsea roundabout in the north.

The design of the scheme was created in collaboration between Coastal Partners, Portsmouth City Council, designers Royal Haskoning DHV and LDA Design. The primary purpose of the scheme was to build flood defences which offer protection to more than 4000 homes and 490 non-residential properties from the risk of flooding. A secondary, and equally important purpose was to realise a wider vision, to shape and enhance the existing landscape, with the creation of inspiring, open spaces, where people and nature co-exist in harmony.

The shaping and enhancing of the landscape was achieved by transforming the site with safe routes for cyclists and pedestrians and creating social areas, making it a leisure destination as well as a commuter route through to the city. The previously exposed cycle path, which would frequently flood during storms, was replaced by a four metre wide shared cycle and pedestrian route which provides uninterrupted views of the harbour. An additional cycle path was added to create an interesting and varied experience for cyclists along the frontage.

The inclusion of seating, landscaping and play equipment creates 'social spots' which encourage people to stop and enjoy their surroundings, while children play on steppingstones and climb posts. The path includes way-marker totems and interpretation boards which give information on the locality, and a bird interpretation hide, which encourages visitors to watch the wildlife which feeds on the estuary mudflats.

Representing their first use in the UK, three trial ECOncrete tidal pools were installed. The pools create local ecosystems that mimic rock pools and encourage biodiversity whilst providing robust protection from the force of water. The pre-cast structures retain water at low tide, offering a welcoming environment to species which would otherwise be absent.

Fig. 3 *The map shows the location of the some of the diverse projects which form part of the North Portsea Island programme.*

This site sees another UK first, in the trial use of Biodegradable Elements for Starting Ecosystems (BESE) grids, a naturally biodegradable mesh, made entirely from potato starch, and planted with saltmarsh plants. The grids should bio-degrade within five to 10 years leaving behind 200 square metres of restored saltmarsh in an area which has formerly experienced serious decline in this vital habitat.

This scheme embodies what can be achieved when coastal engineering incorporates public realm improvements when building flood defences, to fully benefit the communities they serve.

Phase 4 of NPI started in 2019 and is planned for completion in 2023. The project is on the Eastern side of Portsmouth and involves 2km construction of seawall, with road raising at the entrance to Kendall's Wharf. Phase 5, which will see 2km of raised earth embankments, is scheduled for 2024-2025 and will be the final phase of the scheme, completing the 8.4km of coastal defences, and delivering the gold-mark 1-in-500 year standard of protection to the city.

The Lookout

BESE grids

Hilsea Lagoon

"I've really enjoyed the Tipner development and the difference it's made to the area. Everything, from the greenery, seating and lighting, is really well done and it's bringing such a diverse character to the city.

Ellis Hampton, *Local Resident*

Climbing posts

Portsmouth

SOUTHSEA COASTAL SCHEME

PARTNERS WITH

Portsmouth City Council

ATKINS

Environment Agency

Royal HaskoningDHV
Enhancing Society Together

LDĀ DESIGN

VolkerStevin

Boskalis Westminster

What?

The Southsea Coastal Scheme is responsible for delivering new flood defences along 4.5km of seafront, from Old Portsmouth to Eastney. The Scheme will reduce the risk of flooding to more than 10,000 homes and 700 non-residential properties. It is the UK's largest ever local authority-led coastal defences project. Phase one of six for the Scheme started on 7 September 2020.

Why?

The current coastal defences do not offer a sufficient level of protection from the risk of flooding and furthermore they are at the end of their serviceable life. Recent failures, such as at Long Curtain Moat, demonstrated this. The predicted effects of climate change will increase this risk further over the next century. The Environment Agency recognises the need and have committed nearly £100 million to build the Southsea Coastal Scheme.

Who?

The Scheme is a Portsmouth City Council project being delivered by an integrated delivery team led by Coastal Partners with the backing of the Environment Agency and the UK Government. Leading the detailed engineering design stage is Royal HaskoningDHV supported by Atkins and LDA Design for landscaping and public realm. The contractor for the scheme is VSBW, a joint venture between VolkerStevin and Boskalis Westminster. The partnership brings together two of the world's leading maritime contractors: VolkerStevin focusing on marine civil engineering and Boskalis Westminster on dredging and land reclamation.

How?

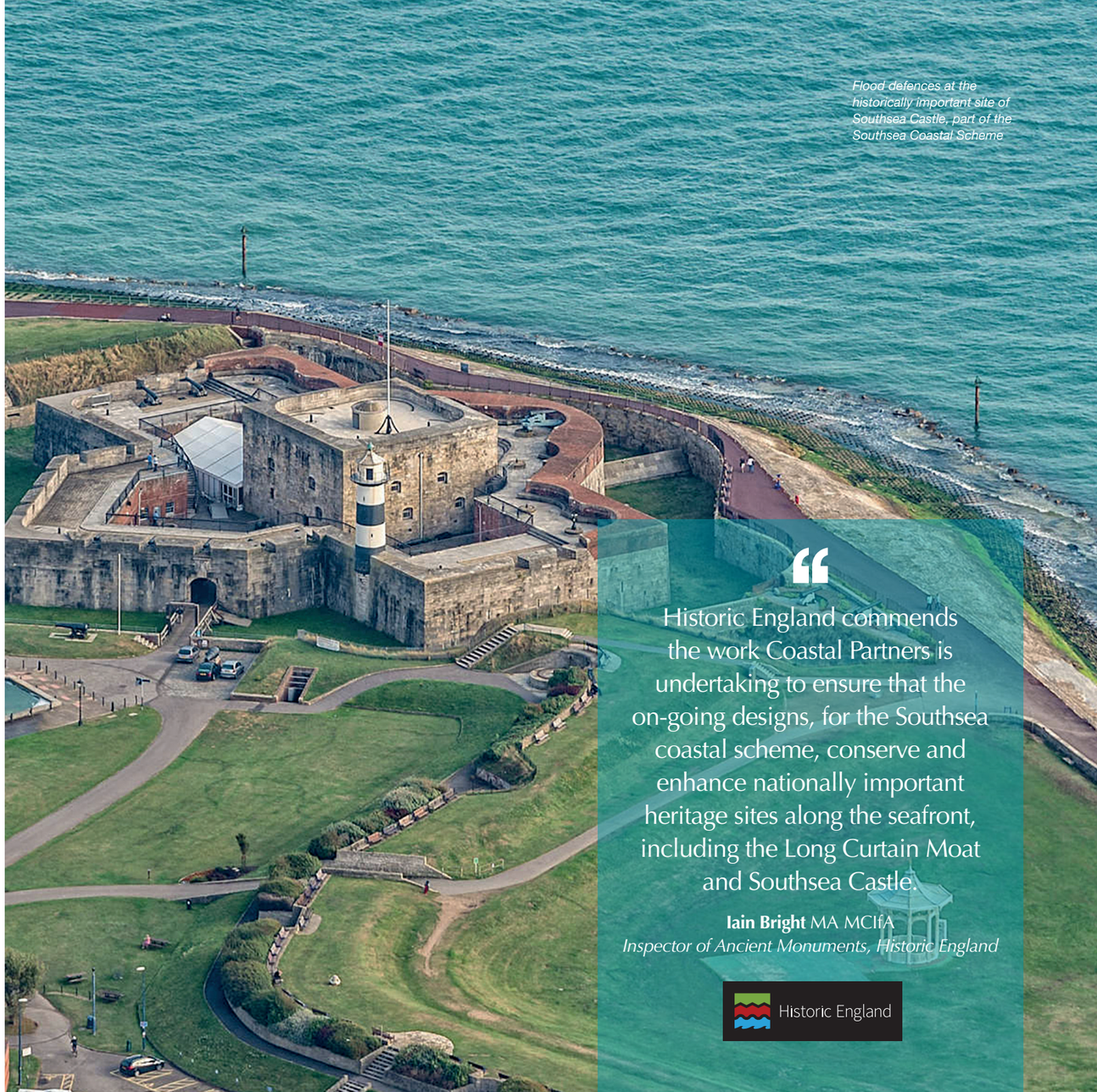
The Scheme is the culmination of ten years of work including wide-ranging public consultation. A continuing commitment to engage with the Portsmouth community means that public consultation is ongoing to ensure that ideas are shared for enhancements along the seafront. Most recently, consultations have focused on disability/accessibility considerations and opportunities for art, enhancements and regeneration along the seafront.

> "Coastal Partners enables the eastern Solent councils to be far more effective than we could be as individual authorities by working together to manage a shoreline which we all share
>
> **Cllr Hugh Mason**
> *Cabinet Member for Planning Policy and City Development*

Latest News...

southsea COASTAL SCHEME

- In summer 2020 the UK Government committed nearly £100 million to fund the project. The first of six phases of work are scheduled to start in September 2020 by Long Curtain Moat and Clarence Pier.
- Portsmouth's Southsea Coastal Scheme got underway on 7 September 2020 with the construction of coastal defences beginning between Long Curtain Moat and Clarence Pier.



Flood defences at the historically important site of Southsea Castle, part of the Southsea Coastal Scheme

> "Historic England commends the work Coastal Partners is undertaking to ensure that the on-going designs, for the Southsea coastal scheme, conserve and enhance nationally important heritage sites along the seafront, including the Long Curtain Moat and Southsea Castle.
>
> **Iain Bright** MA MCIfA
> *Inspector of Ancient Monuments, Historic England*

Historic England

Havant

PARTNERS WITH

Havant BOROUGH COUNCIL

HAYLING ISLAND COASTAL MANAGEMENT STRATEGY 2120

Rising sea levels will increase the prospect of coastal flooding and the risk of erosion for Hayling Island. As a result, the way this risk is managed needs to change and to achieve this a new strategy for Hayling Island is being developed to respond to future changes and outline a programme of investment to reduce risk to the Hayling Island community now and for the next 100 years.

The journey to develop the Hayling Island coastal management strategy was secured in 2019 with both Environment Agency funding and Havant Borough Council Community Infrastructure Levy Funding. Funding from the Local Authority shows the commitment from the council to look at wider benefits that can be achieved alongside coastal flood and erosion risk management, for the benefit of the Hayling Island community.

South Hayling Island

After successfully securing funding from the Environment Agency, Havant Borough Council carried out a beach recycling campaign along the Eastoke frontage. Beach recycling is the movement of shingle from areas of downdrift build-up, back to the up-drift areas experiencing erosion. Tracer pebbles were deployed along the beach and have been continually surveyed to identify the rate and direction that material is moving along the coastline. The evidence gathered from the tracer pebbles allowed the team to plan the extraction of excess shingle from the areas of build-up and recycle it back to Eastoke, therefore replenishing the shingle that was lost through natural erosion. Recycling shingle restores beach levels and increases the level of protection against flooding at Eastoke.

West Beach

The timber sea defences in West Beach were constructed in 1976 in response to beach erosion. Despite regular maintenance, the timber structures suffered irreparable damage from severe storms over the 2019/20 winter and the decision was taken to remove a 140 metre section of revetment. A 50 metre length of revetment remains along with functioning groynes. As the beach adjusts to its natural profile, the frontage will be subject to localised erosion.

An aerial view of West Beach, Hayling Island, captured by one of Coastal Partners' drones.

LANGSTONE

Langstone Coastal Defence Study

Coastal Partners continues to work closely with the Langstone community to agree the most environmentally sustainable, technically feasible and socially acceptable option for their coastal risk management. Community engagement remains key for the project, ensuring that residents are informed of the project progress and design developments and where possible influence the choices for their local area. Our collaborative approach demonstrates the value of community engagement and has resulted in alternative options being generated for consideration.

In January 2020, two public events were held to share the leading defence options. In March, a further collaborative workshop with members of the community and residents met to discuss the drivers for a scheme and to revisit the coastal defence options.

Coastal Partners is committed to supporting Havant Borough Council manage the flood and coastal erosion risk to Langstone and is promoting and progressing the project for the community at Langstone and the benefit of the whole of the borough.

Current and Future Capital Projects

A Capital Project helps to improve an asset through construction, expansion, renovation, or replacement.

Fig. 4 Map of the region indicating the four local authorities and major current and future Capital projects.

These are subject to UK Government funding and/or external contributions. Figures are cash costs as published in the Environment Agency sanction list and are subject to ongoing re-profiling.

1 **Hook Lake Coastal Management Scheme**
From 2019 to 2028 Estimated value £8.4 million

2 **Stokes Bay Sea Wall Study**
From 2021 Estimated value £300K

3 **Alverstoke Flood & Coastal Erosion Risk Management Scheme**
From 2016 to 2021 Estimated value £1.1 million

4 **Seafield Flood & Coastal Erosion Risk Management Scheme**
From 2016 to 2028 Estimated value £4.5 million

5 **Forton Flood & Coastal Erosion Risk Management Scheme**
From 2016 to 2021 Estimated value £900K

6 **Portsea Island – Flood Cell 4: North Portsea Island Flood & Coastal Erosion Risk Management Scheme**
From 2015 to 2025 Estimated value £58.7 million

7 **Portsea Island – Flood Cell 1: Southsea Coastal Scheme**
From 2016 to 2027 Estimated value £116.8 million

8 **Broadmarsh Coastal Park Scheme**
From 2018 to 2027 Estimated value £4.3 million

9 **Langstone Flood & Coastal Erosion Risk Management Scheme**
From 2017 to 2024 Estimated value £3.5 million

10 **Hayling Island Coastal Management Strategy 2120**
From 2018 to 2022 Estimated value £600K

11 **South Hayling Island Beach Management Plan**
From 2017 to 2022 Estimated value £2.7 million

Flood Resilience

Flood resilience in our communities

Global climate change is upon us and one of the effects, predicted by scientists, happening now is extreme weather. The winter of 2019/20 experienced four named storms that caused significant damage to defences across the coastline that Coastal Partners serve and widespread damage across the country. The Met Office confirmed that the UK experienced the windiest and wettest February on record since 1862, which contributed to a total of 40 flood responses from Coastal Partners over the winter, compared to 23 the previous year.

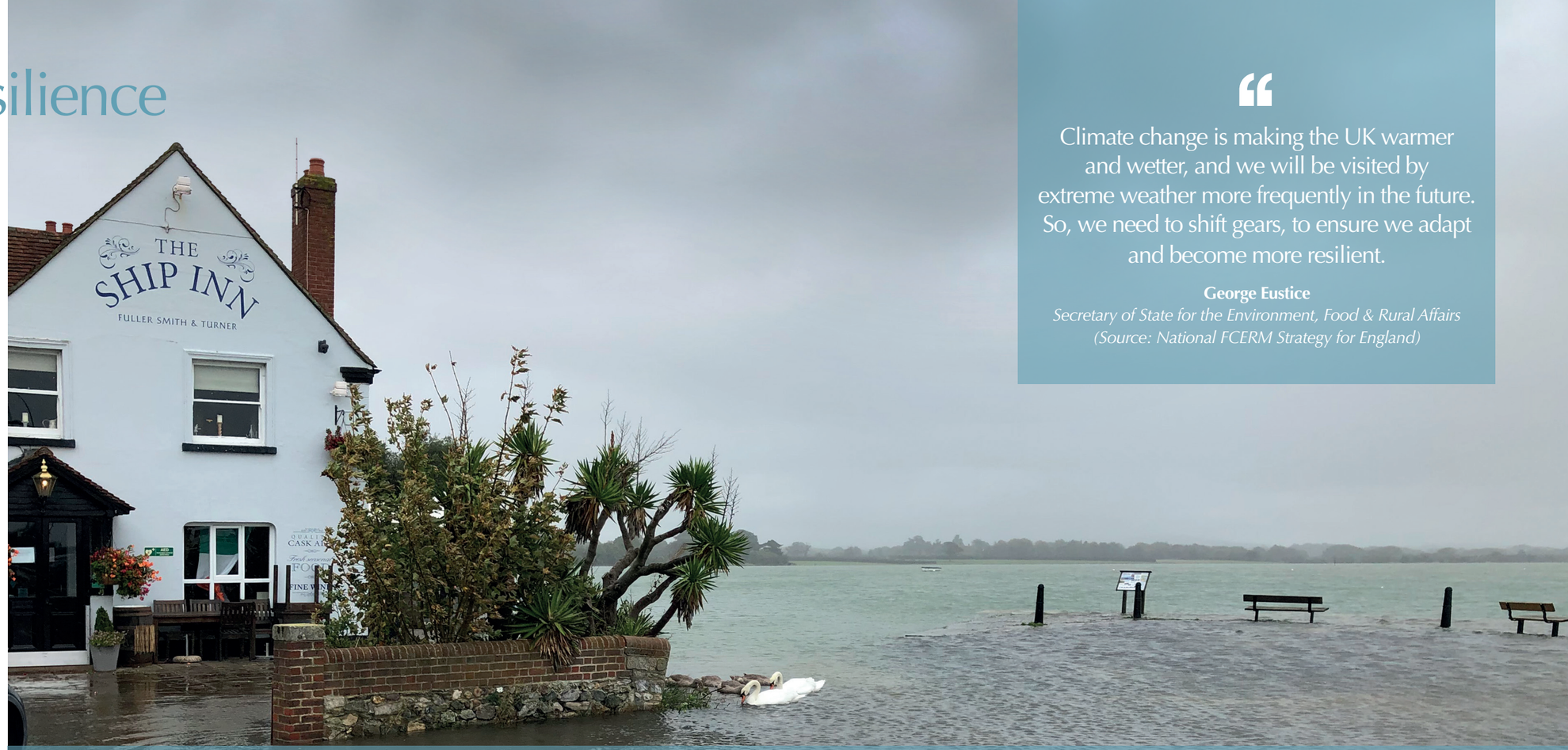
Future projections suggest a trend towards increasing storms which means more homes and businesses will suffer the effects of coastal flooding and erosion. Now more than ever, there is a need to build greater resilience within our communities in order to reduce the risk of flooding happening in the first place and when flooding does occur, reduce damage and shorten recovery times.

There is no question that flood defences work to reduce risk; in fact, they're getting better at offering protection as building technology advances. They will continue to be invested in, built and maintained but where possible, now is the time to move from a narrow concept of protection (building walls around places we want to protect) to a broader vision of built-in flood resilience.

...there is a need to build greater resilience within our communities in order to reduce the risk of flooding happening in the first place and when flooding does occur, reduce damage and shorten recovery times.

Sources:

- *Defusing the 'Weather Bomb': The Future of Flood Defence, Speech by Sir James Bevan, Chief Executive of the Environment Agency, at the World Water-Tech Innovation Summit*
- *Defra: Evidence Review of the Concept of Flood Resilience. Final Report FD2716 May 2020*



> "Climate change is making the UK warmer and wetter, and we will be visited by extreme weather more frequently in the future. So, we need to shift gears, to ensure we adapt and become more resilient.
>
> **George Eustice**
> *Secretary of State for the Environment, Food & Rural Affairs*
> *(Source: National FCERM Strategy for England)*

How do we achieve flood resilience?

- Resilience means designing places to cope with flooding. It means building back better after a flood, not simply replacing what was there before, so that homes, businesses and infrastructure are more resilient to future events.
- It means encouraging homeowners and businesses at risk of flooding to install their own flood resilience measures, such as flood doors, raised electrics and sealed floors.
- By planning for resilience, right from the start with policy creation and ensuring resilience continues to be at the forefront of all schemes when they're rolled out.
- By working in partnership, with coastal engineers educating and informing local communities about the best methods to mitigate flood risk so that collaboratively decisions can be made that ensure the best possible outcomes for communities over the next 50-100 years.
- Recognising that prevention isn't always possible and that change may be the only option. This is the case for some people living on rapidly eroding parts of the coastline where their only option may be relocation.

It isn't possible to create defences that are able to stop all possible extreme flood events, and this isn't the goal. Only by mitigating flood risk and making places more 'flood friendly' can we ensure resilience to flooding along the coastline. By improving community resilience, we reduce the consequences of flooding and ensure that homes and businesses bounce back quicker from floods ready for whatever Mother Nature has in store next.

Flooding at Langstone

Delivering Wider Benefits

Concrete 'stepping stones' add sculptural interest as well offering a place to play.

Waymarkers and information points enhance public experience of the area.

ECOncrete tidal pools increase natural diversity.

PARTNERS WITH

ECOncrete®

Coastal Partners delivers more than flood protection and erosion defences to the communities that it serves.

Flood and erosion protection will always be the starting point of all coastal projects to ensure the protection of homes and non-residential properties, but Coastal Partners sees projects as an opportunity to deliver more to coastal communities by integrating wider benefits that can be achieved during construction with additional planning and funding.

The wider benefits for communities can include regeneration, growth, tourism and recreation, transport, food security, agriculture, social mobility, environmental enhancements and public health improvements.

To deliver wider benefits additional funding is often required and Coastal Partners undertakes a detailed analysis of funding opportunities available by investigating over 60 different funding sources including; government, charity, community and grants. Time is invested to establish networks, identify opportunities and secure funding to be able to deliver wider benefits to projects.

The goal to create the best possible outcome for schemes and provide wider benefits to coastal communities can be in seen in the case study.

By working together with partners wider benefits can be delivered to the community which improve the natural environment, protect historical sites and create places which improve the well-being of the local community.

Coastal Partners continues to improve the quality of the life of those living by the coast by taking advantage of opportunities presented during construction projects to deliver more through effective partnerships.

CASE STUDY

North Portsea Island

This £58 million scheme covers 8.4km and protects 4000 homes from flooding over the next 100 years. By integrating wider benefits into the scheme, it has helped to redefine and shape the area which prior to construction was no more than a concrete walkway.

Enhancements include

- Play areas, seating, social spots and way markers.
- Bird hides, roosting islands and information totems.
- Innovative trial products, such as an eco-formliner on the sea wall which encourages ecological growth of local species, ECOncrete rock pools to improve biodiversity and encourage colonisation and the installation of potato starch grids which promote regeneration of saltmarshes.
- Protection of Tudor and Georgian military fortifications.

Historic Coastal Landfill

The UK has approximately 1200 coastal landfill sites currently at risk of erosion and flooding, with the potential to release vast amounts of waste and pollutants into the sea and on the coastline.

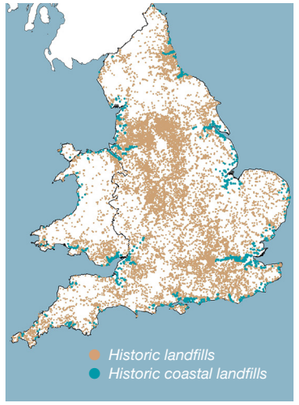
It's difficult to predict levels of flooding or erosion at coastal landfill sites over the next century: as climate change is likely to cause ever more powerful storms and sea-levels to rise, the once-hidden waste could be exposed, leading to significant pollution. This problem is compounded at sites where existing coastal defences are ageing or were never built.

Mark Stratton of Coastal Partners states: ***"One of the biggest risks is that the defences will fail, and you'll potentially have former landfill either eroding out onto the foreshore or leaching into the water. Alongside that, there's a potential impact on human health depending on what's contained within the sites."***

A previous study carried out by Coastal Partners flagged up the need to fund the protection of former coastal landfill sites, particularly where Shoreline Management Plans (SMP) recommend 'holding the line'* but where, despite the risks, no Flood and Coastal Erosion Risk Management (FCERM) funding currently exists.

Research from Queen Mary University, London assessed the risk of pollution from historic coastal landfills and found sites to be a 'significant contamination risk'. Further research carried out by Coastal Partners, on behalf of SCOPAC, found 144 coastal landfill sites along the 750km shore between Lyme Regis and Shoreham-by-Sea alone. Of these 75% had hold-the-line SMP policies and no access to funding to protect them.

The cost of protection of those 144 sites alone is estimated at £200 million or £1 billion to move the sites,



as 'new' landfill is taxed at £100 per square metre. Apply that to 1,200 sites in England and Wales and the funding implications are eye-watering.

Mark continues: ***"We're on a journey in terms of raising the profile of the issue but what we don't have at the moment is a funding mechanism that deals directly with protecting former landfill sites."***

Funding for the prevention of flood and erosion is focused on the protection of homes and businesses. So, at coastal landfill sites, where there is limited development, it is very difficult to justify the funding required to tackle this issue.

Over the past few years, it has become more widely accepted that FCERM schemes should deliver benefits beyond flood and erosion risk mitigation and act as catalysts for broader benefits for communities. Re-framing coastal projects and how they are funded will be key to solving the risks presented by historic coastal landfill sites. Protecting these sites and re-purposing them as safe public spaces present a win-win for society and the natural environment.

While the Government continues to review coastal and flooding erosion policy concerning disused landfill sites, Coastal Partners will continue to carry out research and lobby for change, so that the restriction on the use of funding can be broadened, allowing for action to be taken to clean up the historic landfill sites and avoid risking the health of future generation and enhance the natural environment.

**Building or maintaining coastal defences to protect the coastline against the impacts of flooding or erosion.*

Fig. 5 *Historic landfill sites in England and Wales (not to scale).*

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PARTNERS WITH

SCOPAC
STANDING CONFERENCE ON PROBLEMS ASSOCIATED WITH THE COASTLINE

Community Engagement

We aim to build deep, strong and trusting relationships with our coastal communities

Engaging with communities where flood and erosion risk management projects are planned matters to us. It's not just lip service, we really listen to what communities have to say and adapt our schemes where possible to reflect their input.

When we engage with communities, we get to understand what's important to them and ensure they feel empowered to have a say over decisions that affect their lives, their homes or businesses and the coast that they love.

Community engagement takes many different forms including – questionnaires, one-to-one meetings in homes, workshops, drop-in sessions and public exhibitions, all of which provide opportunities for community members to contribute to the decision-making process. These engagements also help Coastal Partners to inform and educate communities on flood and erosion risk management options, national flood policy on funding, and how future projects may impact their lives.

From feedback received through community engagement, Coastal Partners is able to listen and, in turn, demonstrate the impact of community contribution. We aim to build deep, strong and trusting relationships with our coastal communities, so that collaboratively our schemes provide the best possible outcome for the next 50 to 100 years.

2020 sees a move to online engagement tools, including the launch of new email newsletters which provide residents and business owners with relevant information for their local authority. Sign up to our newsletters at our website coastalpartners.org.uk

We share project updates across our social media platforms, so follow us on Facebook, Instagram, Twitter and YouTube for regular updates.

Receive updates from Coastal Partners into your inbox about projects in your area. Sign up at coastalpartners.org.uk

govDelivery

YouTube

SCOPAC & SCG

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Southern Coastal Group

The Southern Coastal Group (SCG) and Standing Conference on Problems Associated with the Coastline (SCOPAC) are now one organisation

Based in central southern England, they provide a network for neighbouring Local Authorities and organisations that are involved in coastal management.

Originally formed as separate groups, they now work as one organisation to share and develop research, best practice and resources within the region.

Lyall Cairns, Head of Service at Coastal Partners is the current Chairman of SCG and Dr Samantha Cope, Coastal Partners is Research Chair. This involves running the group, co-ordinating the research programme and providing technical assistance to councillors for SCOPAC.

The benefits of collaboration are more important now than ever as the coastal management sector experiences increasing pressures from climate change, public sector cuts, shifting government policy and the retirement of senior engineers.

By supporting and leading the SCG and SCOPAC, Coastal Partners is contributing to the continuation and reinvigoration of the groups, ensuring their longevity and continued benefit to members.

> "The SCG and SCOPAC research provides a mechanism for local and region-wide issues to be investigated, that may not ordinarily be undertaken by a single Local Authority. The knowledge shared not only benefits officers and members but can lead to much larger research projects being commissioned by central government.
>
> **Dr Samantha Cope**
> *Coastal Partners*

Dr. Samantha Cope and Lyall Cairns of Coastal Partners. Samantha is Research Chair of SCG and Lyall is Chairman.

The Team

Enhancing the Natural Environment Through our Work

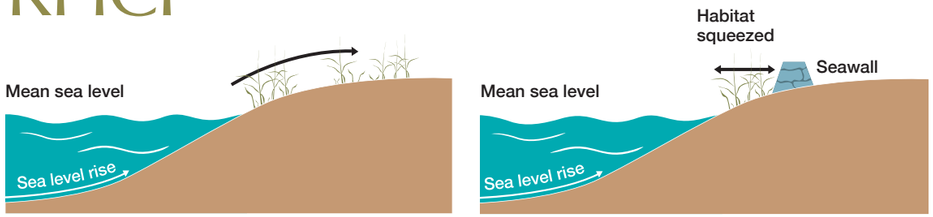
Balancing the need to protect our communities from coastal flooding with protecting our natural and historic environment from our works is a significant challenge

Coastal Partners operates within a naturally diverse, complex and beautiful coastal environment that is internationally recognised for the habitats and species it supports. All 162km of the coastline we manage is protected by law for its ecological importance. In addition, large areas of our coastline include nationally significant heritage and archaeological assets, including Scheduled Ancient Monuments and listed historic buildings and structures. Therefore, we aim to manage our coastline with a great deal of care and respect for our natural and historic environment.

Protecting coastal communities from the risks of flooding and erosion can significantly impact our natural and historic environment, which is why at every stage of the coastal management process, from the development of coastal policy to carrying out construction works, care is taken to prevent harm and identify opportunities for improvement. Our vision is to enhance the natural and historic environment through our work.

Balancing the need to protect our communities from coastal flooding with protecting our natural and historic environment from our works is a significant challenge, and Coastal Partners has invested heavily in its environmental team to give every opportunity to getting the balance right.

RHCP



No seawall present: natural habitat migration
Saltmarsh erodes at the seaward edge but migrates landward maintaining the extent and function

Seawall present: coastal squeeze
Saltmarsh cannot migrate landward due to seawall. Saltmarsh squeezed against seawall, reducing extent and function

Fig. 6: Coastal Squeeze
Vital to protecting the shoreline from erosion by buffering wave action, saltmarsh is predicted to suffer the greatest loss over the next 100 years.

The Regional Habitat Compensation Programme (RHCP) is a strategic programme run by the Environment Agency which seeks to replace habitats that are lost due to coastal squeeze or tidal inundation effects* that arise from the management of coastal defences.

Coastal Partners co-ordinates the RHCP in the Solent and South Downs area with the Environment Agency, covering an area between Hurst Spit in Hampshire to Beachy Head in East Sussex, including the north coast of the Isle of Wight.

The RHCP reviews, implements and monitors habitat compensation targets arising from the relevant Shoreline Management Plans and meeting those targets is a legal requirement. Since 2010 there have been several habitat schemes already completed in the Solent and South Downs area: however, there is still an urgent need for habitat compensation to meet the outstanding requirements for the area. Completed schemes are:

- **Lymington Water Level Management Plan**
- **Medmerry Managed Realignment Scheme**
- **Manor House Farm**

There are three types of habitat that require compensation along our shoreline – saltmarsh, coastal grazing marsh and freshwater habitats. Saltmarsh is predicted to have the greatest area of loss over the next 100 years, so the immediate focus of the RHCP is on creating saltmarsh habitat.

Saltmarsh protects the shoreline from erosion by buffering wave action and trapping sediments. Saltmarsh thrives along protected shorelines and is essential for maintaining healthy fisheries, coastlines and communities. Saltmarshes provide essential food, refuge and nursery habitat for many different species including rare invertebrates and are an important feeding ground for birds.

Potential sites in the Solent and South Downs area have been identified for saltmarsh habitat creation. These sites have been prioritised based on how likely it is that they could be implemented as there are many barriers to managed realignment, such as the physical characteristics of the site, landowner concerns, opposition, presence of infrastructure or utilities and the potential loss of important landward freshwater habitats and bird roosting sites.

Coastal Partners has carried out stakeholder engagement throughout the investigation of potential saltmarsh habitat creation sites, including holding a facilitated workshop with the aim of collecting information from delegates on their views about potential habitat creation sites.

In 2019, funding bids were approved for the top two priority intertidal habitat creation schemes (Hook Lake, Warsash and Marker Point on Thorney Island). This funding is to commence work on detailed studies, site assessments and options appraisal work to confirm future habitat creation and management opportunities at these sites. Coastal Partners is committed to enhancing the natural environment through delivery of schemes such as the RHCP.

***Coastal squeeze**
occurs when a hard defence structure prevents the landward migration of intertidal mudflat and saltmarsh habitats with sea level rise and the habitat is therefore 'squeezed' against the hard defence and eventually lost.

***Tidal inundation**
of coastal and freshwater habitats occurs when sea level rise over-tops or breaches a defence and floods a site with salt water.

For more information on the Solent & South Downs RHCP, visit
southerncoastalgroup.org.uk/regional-habitat-creation-programme

Tidal Pools

Fig. 6 *Before and after: mimicking the natural habitat of a wide variety of indigenous species, the pools significantly increase local bio-diversity.*

It is crucial to design and build marine and coastal infrastructure in a responsible manner that not only serves to protect, but ultimately enhances, vulnerable marine ecosystems and communities.

Andrew Rella PhD,
ECOncrete

PARTNERS WITH

In collaboration with Knights Brown, three trial ECOncrete tidal pools were installed in the North Portsea Island Defence Scheme, the first of their kind in the UK. The pools create local ecosystems that mimic rock pools and encourage an important variety of plant and animal life to thrive in a habitat protected from the elements.

ECOncrete is a multi-award winning product. In 2019, it was recognised by *Time* magazine in its annual Top 100 list of ground-breaking inventions; and in the same year it won Richard Branson's *Pitch to Rich* innovation award which recognised ECOncrete's pioneering use of eco-engineering to enhance biodiversity and protect coastlines.

Instead of building the tidal pools from smooth concrete blocks, ECOncrete uses a technique known as biomimicry, which emulates the natural environment. These 'designed' tidal pools have similar shapes and textures to those found in natural rock pools and like them, they retain water at low tides.

Within a week of installation, fish (gobies) were found in the tidal pools and the growth of seaweed offers a vital habitat to a wider variety of species than would be present in rock pools alone. Coastal Partners are working with Bournemouth University to develop a monitoring regime to determine how effective these tidal pools are in their location.

Speaking of the project, ECOncrete's Dr. Andrew Rella said: *"Considering the continual development of the UK's coastal and riverine areas due to the ever-increasing threat from climate, it is crucial to design and build marine and coastal infrastructure in a responsible manner that not only serves to protect but ultimately enhances vulnerable marine ecosystems and communities.*

ECOncrete is proud to provide environmentally sensitive solutions, such as the ecologically enhanced concrete tidal pools, that help bridge the gap between the needs of development and sustaining marine resources".

BESE Grids

Biodegradable Elements for Starting Ecosystems (BESE) grids are another UK trial first, also installed in the Tipner Lake phase of the North Portsea Island Defence Scheme.

The three-dimensional mesh grid structures are used for habitat improvement and act as a temporary structure to start ecosystem restoration. The grids are made entirely out of a waste product, potato starch, and give damaged ecosystems the structure needed to support the colonising and growth of saltmarsh plants.

Once established, the ecosystem provides its own structure and the grids break down, fully biodegrading within five to ten years, leaving fully-established saltmarsh plants.

Saltmarsh vegetation can be found on the margins of the harbour, where they are exposed at low tide. They are home to a rich variety of fish and invertebrates and provide essential feeding, breeding and habitat for many species of birds within the harbour.

In recent years, saltmarsh plants have been declining within the harbour and the introduction of BESE grids kick-starts the restoration of 200 square metres of this vital habitat. The effectiveness of this small trial area is being monitored with a view to learn from and adapt it for future use on a larger scale.

Tracer Pebbles

Designed in-house by our coastal engineers, this innovative technology tracks the movement of coarse sediment along beaches.

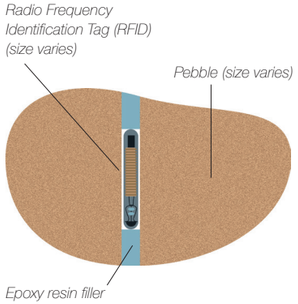


Fig. 7 *Developed by the Coastal Partners team, the innovative use of RFID tagged pebbles enables our engineers to visually map the shifting of beach material.*

Having collected pebbles from a site of interest, small Radio Frequency Identification (RFID) tags are embedded within them and secured with a waterproof resin. The pebbles are returned to the collection site and tracked at set internals using a specialised scanner and Global Positioning System (GPS).

The RFID tags broadcast a unique identification number which, when detected by the scanner, is logged together with the GPS data to establish an accurate position. The information gathered from the movement of the tracer pebbles gives details on rates, direction and patterns of drift along shingle beaches, which is then used to make decisions for future coastal management strategies.

After successful trials, the first tracer pebble project was rolled out along the South Hayling Island frontage in 2010 – 2011. The results from this study were used to inform the management strategies for both the 2012 and 2017 South Hayling Beach Management Plans.

The evidence gathered, along with regional monitoring topographic surveys, showed that two thirds of shingle is naturally transported westwards from the Eastoke frontage towards Gunner Point. This enabled the team to plan to extract shingle from Gunner Point and recycle it back to Eastoke, replenishing what was lost through natural erosion. These recycling campaigns have resulted in an efficiency as it reduced the frequency at which imported shingle is brought in.

In January 2019 around 500 pebbles were deployed along Eastney Beach and Spit as part of a feasibility study. Part-sponsored by SCOPAC, the study continues into 2020. The NFDC study was funded by Local Levy and the Preston study by the Environment Agency and SCOPAC.

> Understanding the coastal processes has led to efficiencies on the Beach Management Plans...

CASE STUDY 1

Client: *New Forest District Council*

Challenge: *To build upon current understanding of sediment transport rates and pathways along Hurst Spit frontage, which is an important coastal feature with complex coastal processes.*

Solution: *A year long tracer pebble project started in 2019 at Hurst Spit in the New Forest using 1,300 pebbles deployed across 10 sites along the frontage between Milford on Sea and North Point on Hurst Spit. Retrieval surveys will be carried out over a 12-month period.*

Benefit: *The data collected will provide valuable information on the rates, direction and patterns of littoral drift along the frontage. Results from this study will be used to aid the development of a new Beach Management Plan and provide future input into developing the options for beach management by the New Forest District Council and the Environment Agency.*

New Forest District Council

CASE STUDY 2

Client: *Environment Agency*

Challenge: *To understand the movement of sediment between Weymouth's Preston Beach rock groynes and Bowleaze Cover, to investigate whether there is any evidence of change to the littoral drift pathways along Preston beach and to explore the location of any transient drift divides.*

Solution: *Approximately 600 pebbles were distributed along Preston Beach between January and October 2019, with retrieval surveys carried out over the 2019-2020 period to ascertain longshore drift rates and direction between Preston Beach and Overcombe and to understand whether material is accumulating down-drift at Bowleaze Cove.*

Benefit: *Findings from the tracer pebbles confirm sediment transport pathways which will inform future beach management activities at Preston Beach.*

Environment Agency

Coastal Partners' use of innovative technologies is increasingly being adopted by local authorities beyond Hampshire, as is clearly demonstrated by the two Case Studies above.

BBC COUNTRYFILE

Tracer pebbles' innovative design and use caught the eye of CountryFile, the BBC's flagship show. In 2018 coastal engineers Sacha Neill and Dr Samantha Cope were interviewed on Hayling Island by presenter Ellie Harrison where they demonstrated how the tracer pebbles help to improve the understanding of longshore drift patterns along the Hayling beach frontage.

Geomatics

Geomatics deals with the collection, interpretation and visualisation of data relating to the built and natural environment

***Geomatics** or land surveying is the technique, profession, art and science of determining the terrestrial or three-dimensional positions of points and the distances and angles between them. These points are usually on the surface of the Earth, and they are often used to establish maps and boundaries for ownership, locations, such as building corners or the surface location of subsurface features, or other purposes required by government or civil law, such as property sales.*

Pressure on governments and planners today is driving rapid changes in mapping and spatial data management by demanding the use of geomatics expertise and technologies. This requires the use of detailed survey information to inform decisions and ensure the most accurate, financial and socially beneficial outcomes for projects.

Coastal Partners Geomatics Division leads in public service innovation, using pioneering technology to support local authorities and private industries to conduct surveys safely and cost-effectively, with rapid deployment to inaccessible or environmentally sensitive locations, with immediate results.

Our Geomatics surveyors use the most up-to-date techniques for providing the information needed in the most suitable format including:

- Point cloud imaging
- Complex geomatic detailing
- High definition survey imaging
- 3D visualisation and modelling software

Coastal Partners Geomatics division isn't only about the coast: they are capable of planning, executing and delivering a range of surveys including land based and building surveys to client specifications.

The image on the opposite page shows a DJI Inspire 2

Drone technology allows high risk and complex surveys to be safely carried out in locations such as...

- High rise building inspections
- Historic or heritage sites
- Environmentally sensitive areas
- Inaccessible locations
- Construction sites

Decision making is guided using the very latest technology available including Robotic Total Station, Global Positioning Systems (GPS), Unmanned Aerial Vehicles (UAVs), 3D laser scanners and All-Terrain Vehicles (ATVs).

Coastal Partners work in any environment to achieve high accuracy resolution for:

- Land surveys
- Coastal surveys
- Measured Building Surveys
- Highway surveys
- 2D/3D topographic surveys
- Construction surveys
- Laser scan surveys
- ATV surveys
- UAV inspections & aerial photos

CASE STUDY

Client: *RegenCo*

Area: *Broadstairs, Kent*

Project: *The purpose of the survey was to establish the site boundary for RegenCo, who were acting on behalf of Homes England, as the land was earmarked for future development.*

The site consisted of farmland bisected by the A256, the total site area was approximately 36 acres. Existing control, that had been provided, was verified on site using GPS. Once the control was accepted, setting out of the boundary, using a combination of GPS and robotic total station commenced. These points were set out to an accuracy of ±20mm horizontally with a combination of wooden stakes and survey pins. Drone footage was taken to give the client a better understanding of the site layout. From quote to delivery of the project was a two week turn around.

RegenCo

"EHDC-RegenCo have used the Geomatics Division of Coastal Partners for topographic surveys and boundary demarcation work for housing sites we have been working on in Kent and the south Midlands. We've found them responsive and very competitive and they've met some quite exacting timescales which is always a bonus.The drone footage has proved particularly illuminating. We've been completely satisfied with everything they've done and have never had reason to question the qualityor accuracy of the survey information.

Steve Pearce *EHDC-RegenCo*

Purple Sandpipers

The engineering work required to protect communities from coastal flooding and erosion can impact wildlife and cause unavoidable habitat loss. Comprehensive assessments are undertaken to minimise the impact of work, including exploring habitat creation opportunities such as improving existing habitats, or creating new habitats at alternative sites.

A rare visitor to Hampshire, the Purple Sandpiper is found only between December and April of each year, close to Southsea Castle.

The planned work on the Southsea coastal defences increased the awareness of a small population of rare wading birds – Purple Sandpipers – whose only regular location in Hampshire is found beside Southsea Castle, between December and April each year.

These small shorebirds are subject to two specific threats in this location: increasing sea levels and the imminent build of the new Southsea flood defences. As part of the scheme, a research project was undertaken to study the wintering population of the Purple Sandpiper to ensure their habitat was preserved

As a result of the research, enhancements to the Southsea scheme are being put in place, for the specific purpose of improving and protecting the Purple Sandpiper population. Increasing the area of exposed rocks and creating an artificially textured surface not only give the birds more space to feed, but also ensures that the species they feed on enjoy optimal conditions for colonisation.

Construction around Southsea castle will be scheduled to accommodate the impact on the overwintering birds. The structure will also be built in stages, ensuring sufficient time for the species that the birds feed on to colonize and thus provide enough food for the Purple Sandpipers over the winter months.

Bat Surveys

Coastal Partners carries out bat surveys to fully understand the impact our construction projects have on bat roosts and habitats suitable for foraging bats. Bats are protected under UK and EU laws and it is a requirement to understand if construction works will have an impact upon the species and avoid causing an impact, where possible, or if not to support a licence application

The data collected from bat surveys are analysed and an impact assessment is undertaken. Data can then be used to obtain a license, if required, from Natural England before any work proceeds. The data from the surveys are also shared with the county bat recorder and Biological Records Centre which is available for other parties considering undertaking work in the same areas.

Bat surveys are carried out using specialist equipment which detects bats. Different levels of bat surveys can be undertaken, including preliminary bat surveys, ground level inspections of trees and structures for potential bat roost features, emergency/re-entry surveys and bat activity surveys.

Coastal Partners specialist knowledge in carrying out bat surveys is central to its commitment to enhancing the natural environment.

A brown long-eared bat (Plecotus auritus) in flight

Coastal Partners

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FAREHAM BOROUGH COUNCIL

GOSPORT Borough Council

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Portsmouth CITY COUNCIL