

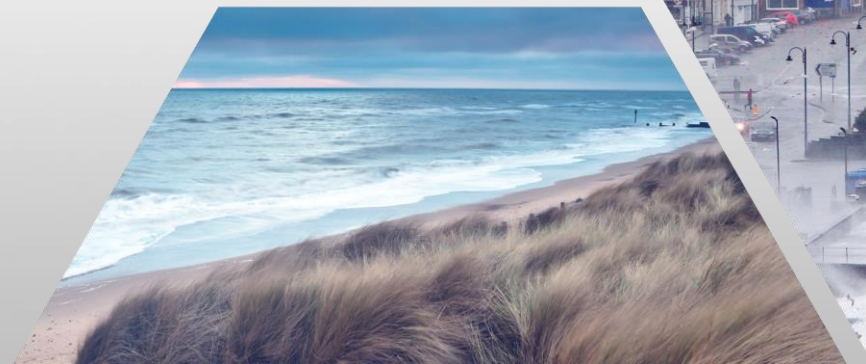
Interreg



2 Seas Mers Zeeën SARCC

European Regional Development Fund

Work Package 3



WP Summary

The activities delivered in this WP are designed to engage directly with **local communities** (citizens and businesses) that would be directly impacted by the investment of a **nature-based solution (NBS)** as part of the coastal flood defence system in their urban area. This is to ensure that local communities can be **fully informed** of the reasons why NBS are an integral part in the future coastal landscapes of urban areas and enable them to understand the **benefits of NBS**.



- Its purpose is to demonstrate why NBS should be chosen and deployed, highlighting to communities the **future impacts** of climate change and sea level rise, the financial impact, and highlighting the **added value** that could include increased economic activity.
- Output: A **Visualisation Toolkit** for local stakeholders (citizens, businesses) to support the approval of Nature-Based Solutions for Coastal Management (O3)



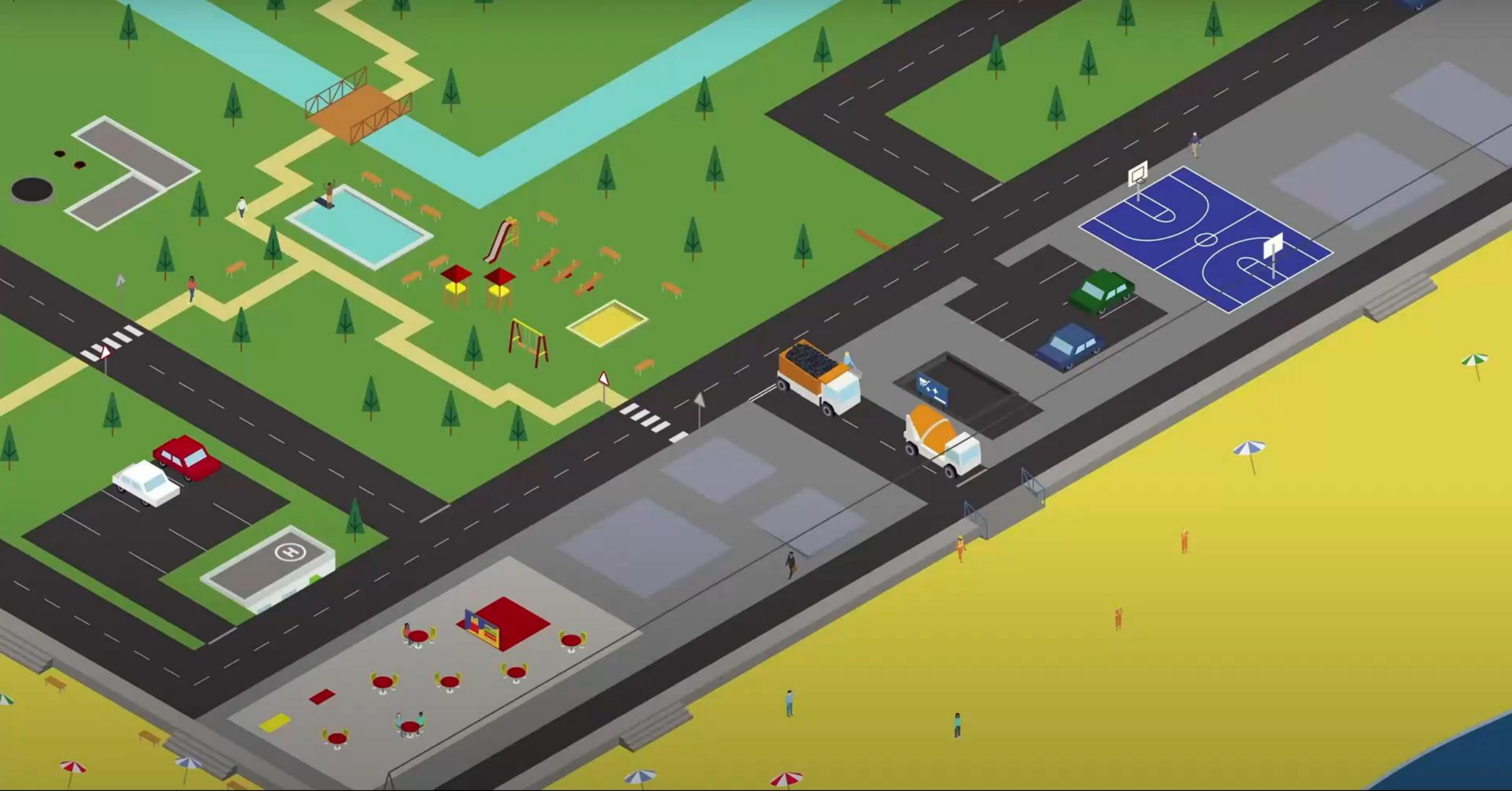
Visualisation Toolkit

Not just a website with downloads, but an interactive tool.

Using pilots as examples to inform and promote NBS by using maps, historic images, art and animated videos.

All partners contributed to the toolkit and still improving and updating now that pilots are finishing up.





Roadshow

- Roadshow from April to October 2022 to events near all pilots and lots of other places in the 2 seas area.
- Inform about climate change and benefits of NBS





Oostende 185,000 visitors reported, Blankenberge 80.000, Cornwall 120.000, Southend-on-Sea 10.000

Learning about Nature Based solutions through chatting or reading posters/banners

Scanning QR codes to visit the visualization tool

Completing the mindscapes surveys

Handling artefacts and learning about the past





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**2 Seas Mers Zeeën
SARCC**

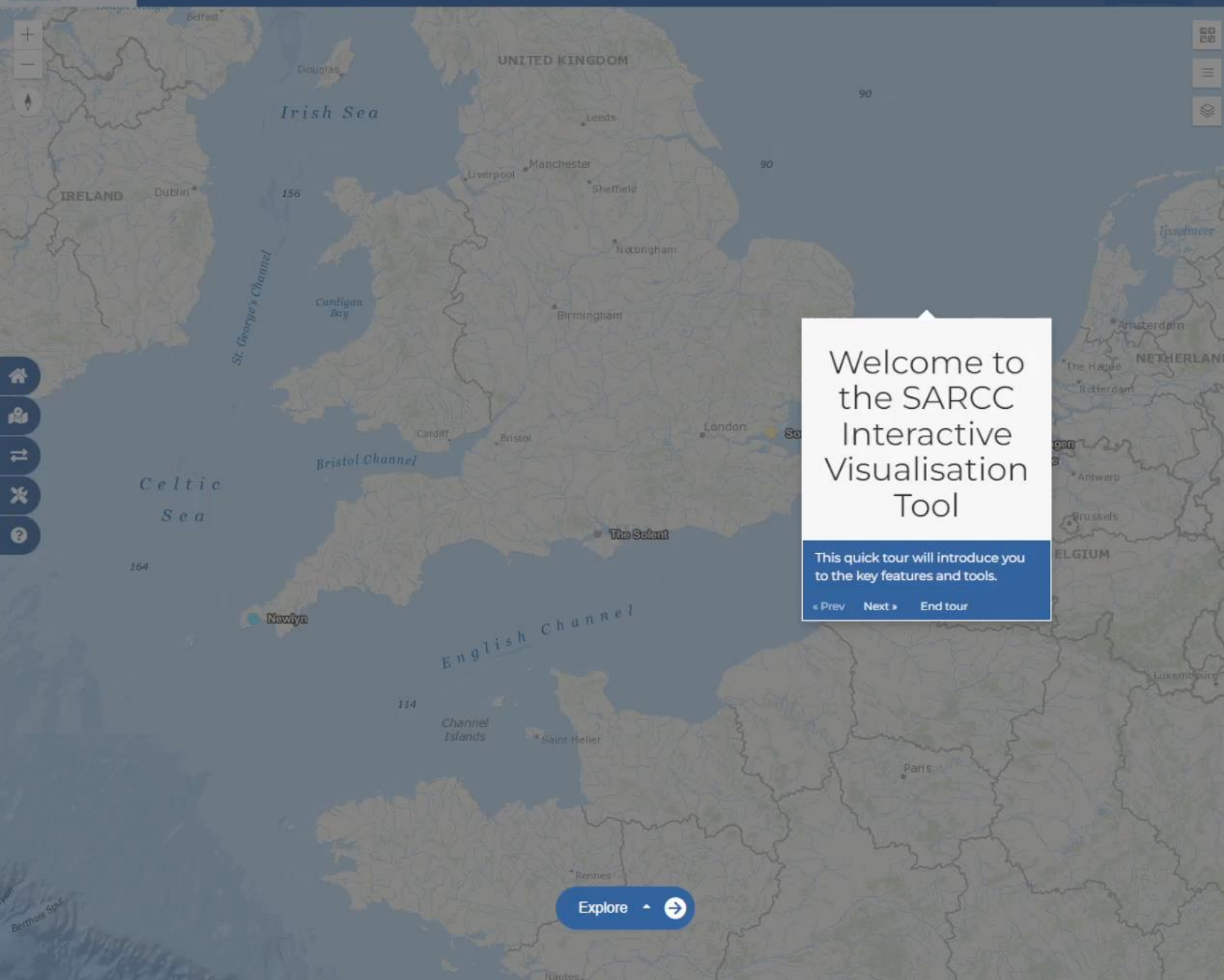
European Regional Development Fund

WP3 Visualisation toolkit demo

Brandon Mason

Maritime Archaeology, Southampton





Welcome to the SARCC Interactive Visualisation Tool

This quick tour will introduce you to the key features and tools.

« Prev Next » End tour



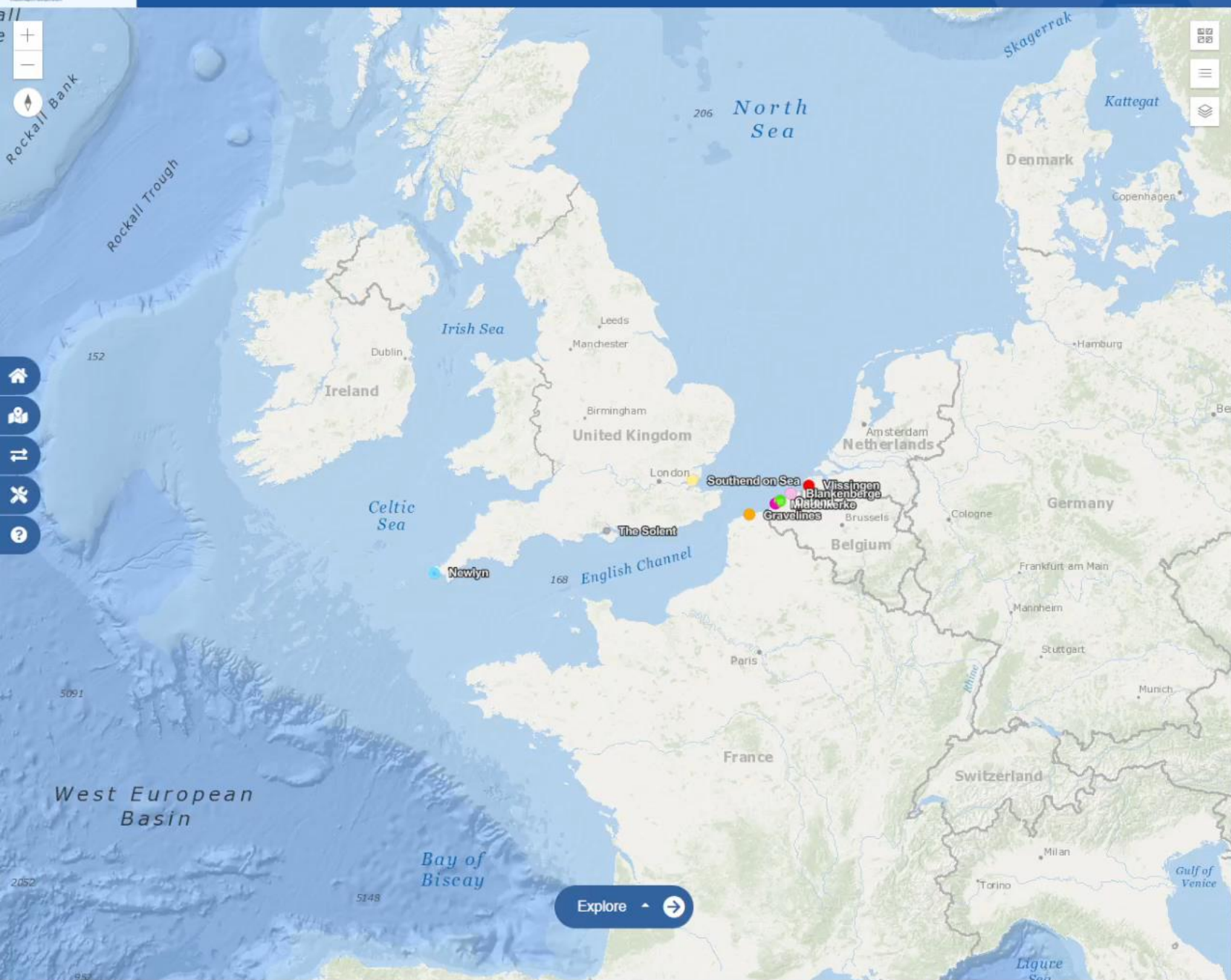
Improving the understanding of Nature-Based Solutions in coastal cities

Why is this project required?

Mean sea level rise (SLR) could increase by **1.5m-2.5m by 2100**, which would see damage caused by coastal flooding in Europe increase from €1.25bn per annum currently to **€961bn** in just over 80 years (European Commission, 2018). Urban areas situated along the 2 Seas coastline are particularly vulnerable to extreme SLR (a combination of SLR, tide and storm surges). Coastal flood plans and policies focus predominantly on deploying traditional grey infrastructure/heavy engineering and ignore the use of **nature-based solutions (NBS)**, despite the overwhelming evidence of their potential to reduce flood risk and provide multiple benefits.

NBS are often not considered by policy-makers in detail due to the perceived risks around costs, potential for success, requirements for immediate protection / improvement and uncertainties regarding future change. A clear knowledge gap exists across coastal local authorities to deploy NBS as a means to reduce future coastal flood risk and economic damage.





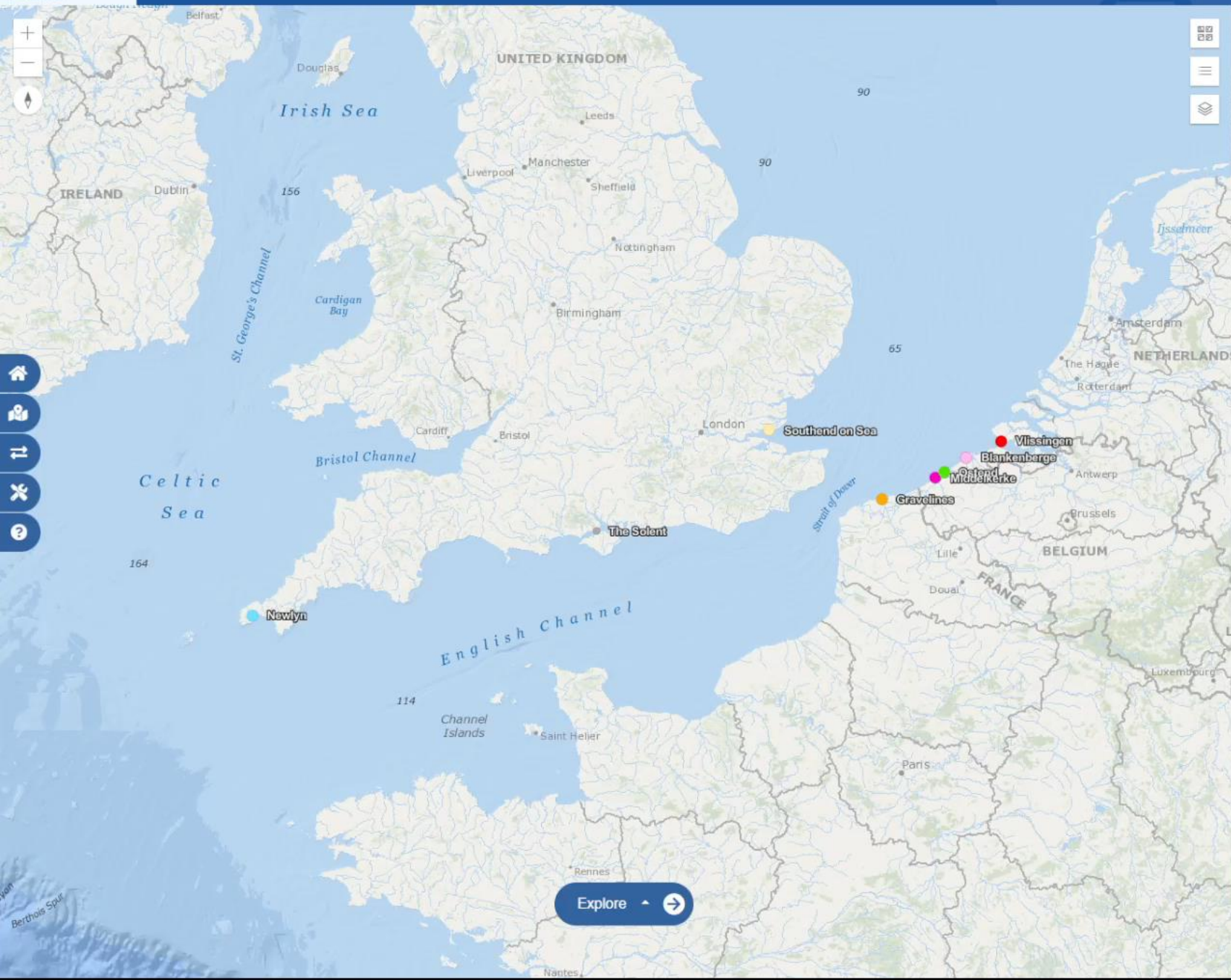
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Improving the understanding of Nature-Based Solutions in coastal cities

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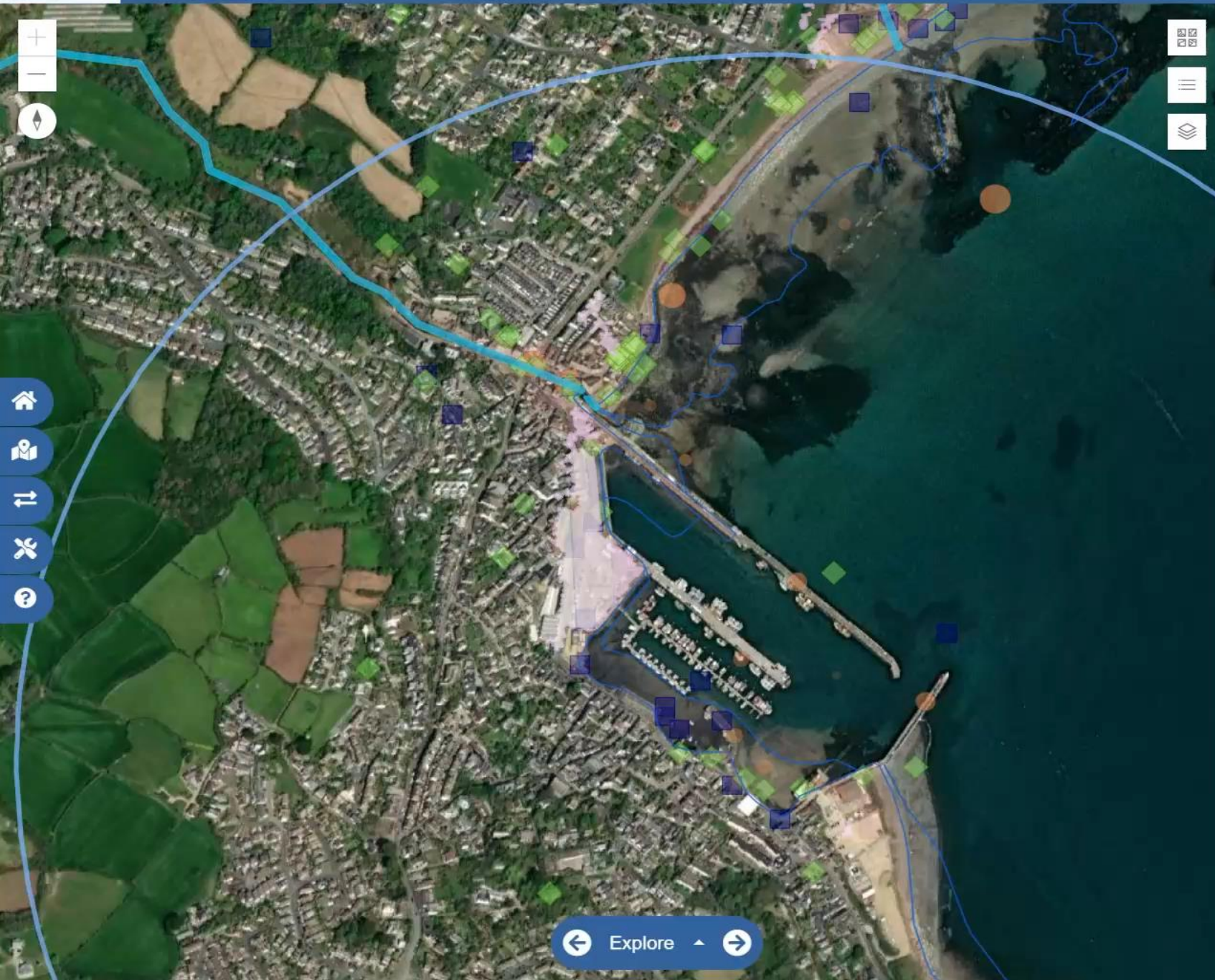
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Nature-Based Solutions in Coastal Cities - The SARCC Project

Share

NATURE BASED SOLUTIONS



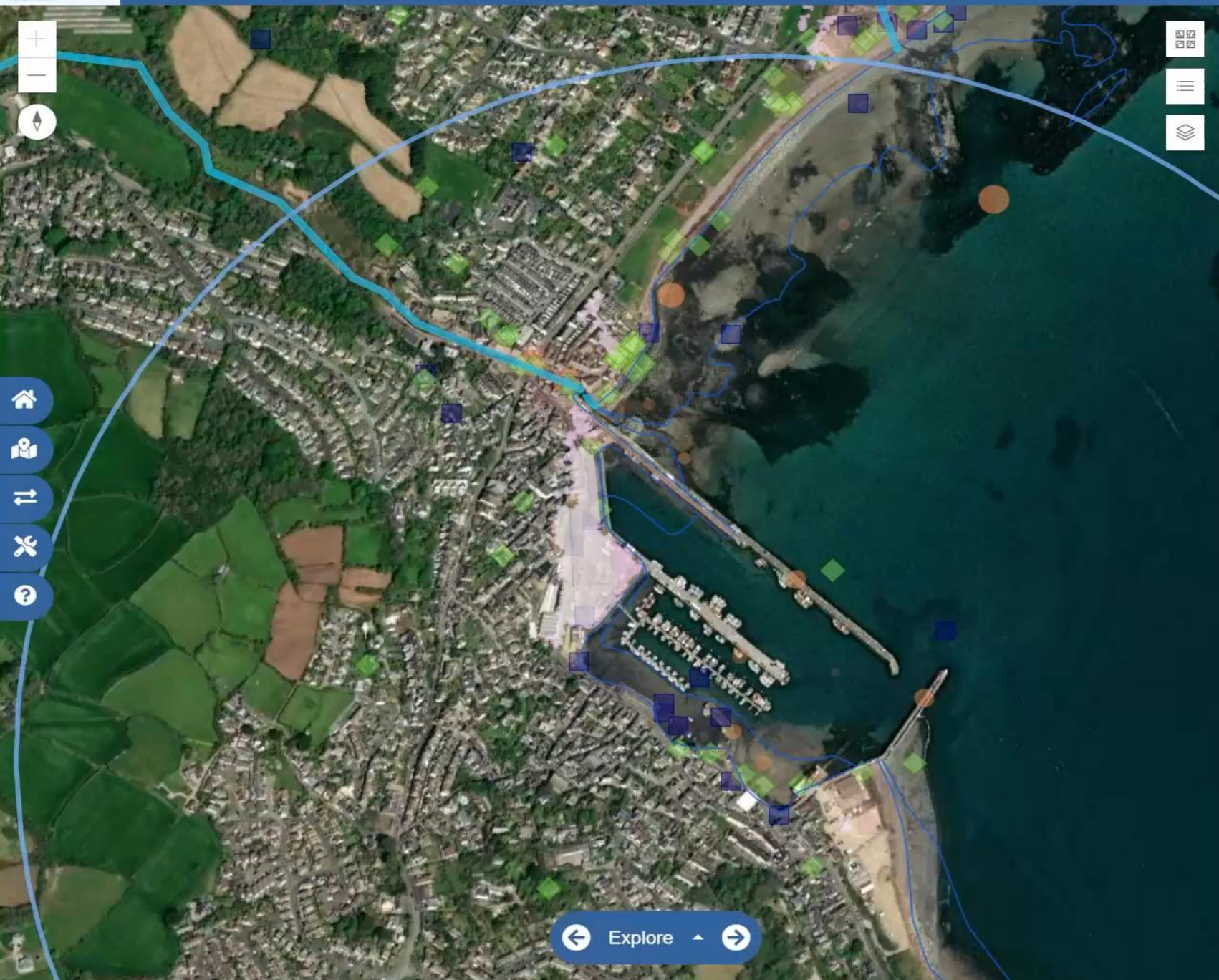
Newlyn: Background



What/where is the pilot? -

The Newlyn Eco-Reef pilot is located adjacent to Newlyn Harbour, Mount's Bay in Cornwall, UK. The pilot project involves the design and construction of an intertidal structure which will hybridise an existing smaller breakwater to provide a more nature-based solution, delivering multiple benefits. It is anticipated that the new structure will measure roughly 60m long and will assist in managing climate change-induced risks from coastal erosion and flooding. It is proposed that the eco-reef will primarily consist of custom-made blocks of locally-sourced inert material, which will provide a bespoke substrate for marine organisms to colonise and develop a living structure.

Why is the pilot needed and what are the benefits? +



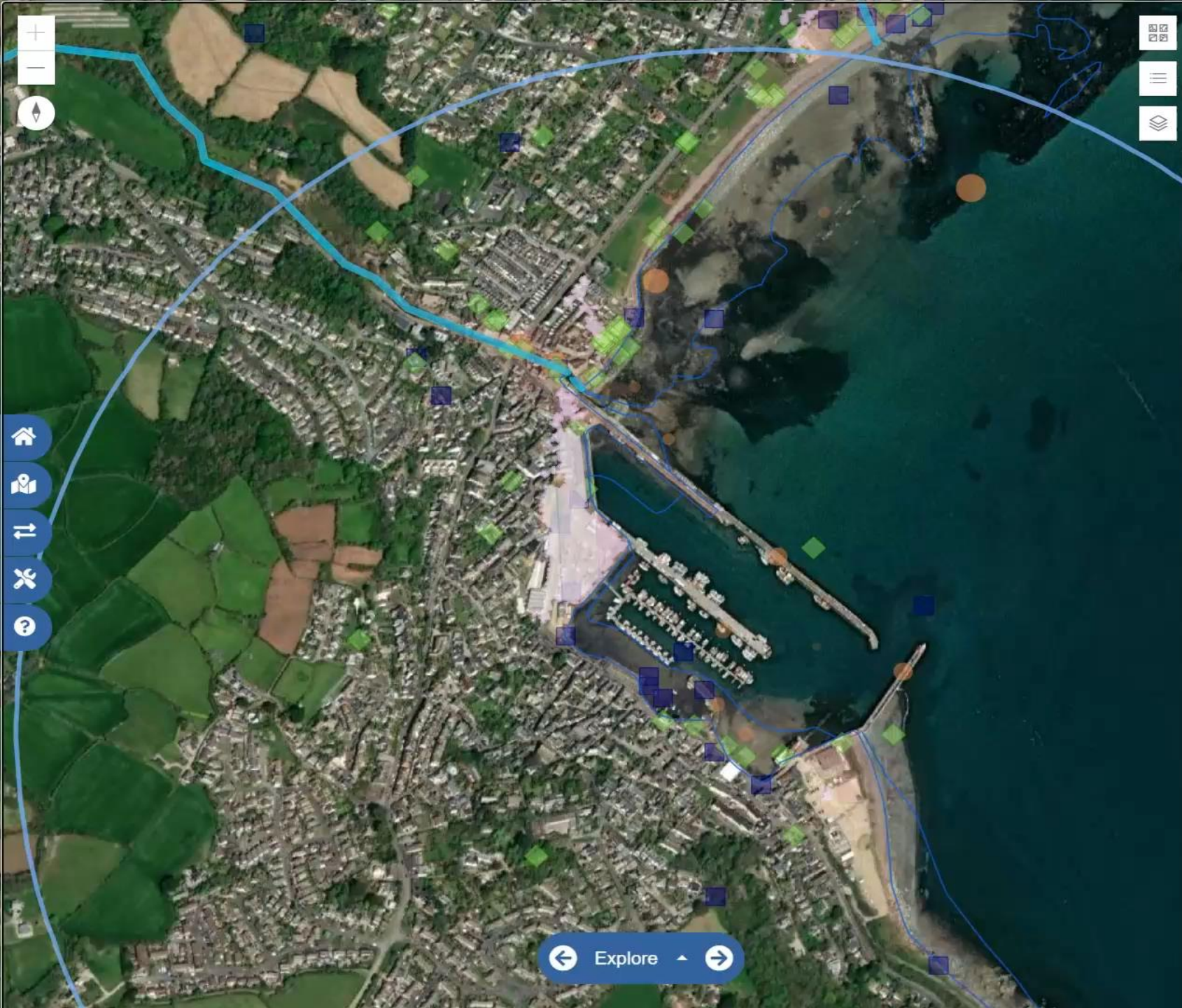
Newlyn: Analysing Change

- Current Risks +
- Recent Major Events -

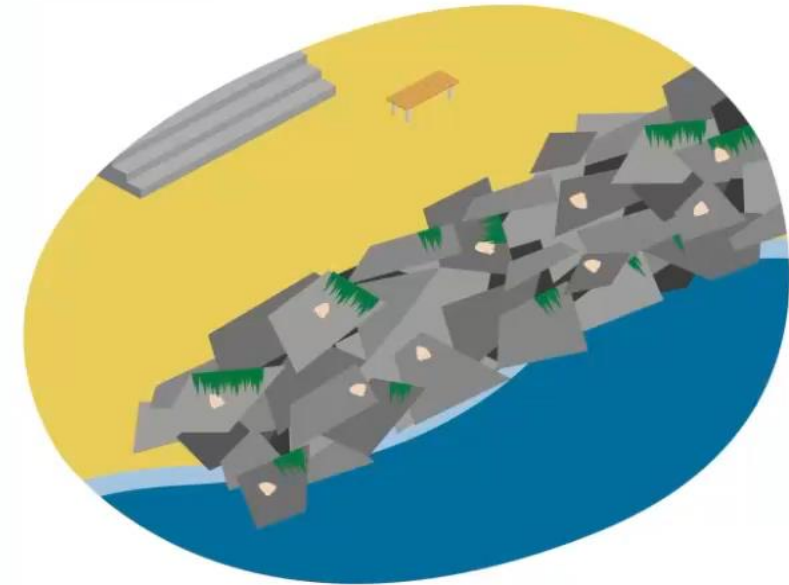
Coastal flooding in Newlyn has occurred frequently with major events including the 14th February 2014 Valentine's Day storm and the October 2004 event. Both of these events resulted in the issuing of severe flood warnings. The 2004 storm event is suggested to have a slightly larger flood extent compared to the Valentine's Day storm, most likely caused by the high water levels recorded in 2004. Video footage of the October 2004 event was used to suggest that the breakwater at the mouth of the river was overwhelmed during this event, which subsequently caused flooding along the frontage. Both events caused property damage, with overtopping waves and airborne debris colliding with infrastructure and development. In 2004, 10 residential and 2 commercial properties were flooded. In addition to the residential properties around Tolcarne Terrace and Lower Art Gallery Terrace which are affected, commercial properties including the Newlyn Harbour Offices, The Tolcarne Inn, Tolcarne Garage, The Fisherman's Mission, Warrens Bakery, Co-op supermarket, Newlyn Surgery, Newlyn Pharmacy and Harbour Hairdressers are examples of the commercial property at risk from tidal flooding. All of these are located within the impacted area. Similar impacts were observed during the 2014 event. Some of these events have been used as baselines for the Environment Agency hydraulic and numerical models and have supported building the case for this project.

The St Valentine's Day Storm - Newlyn Bridge

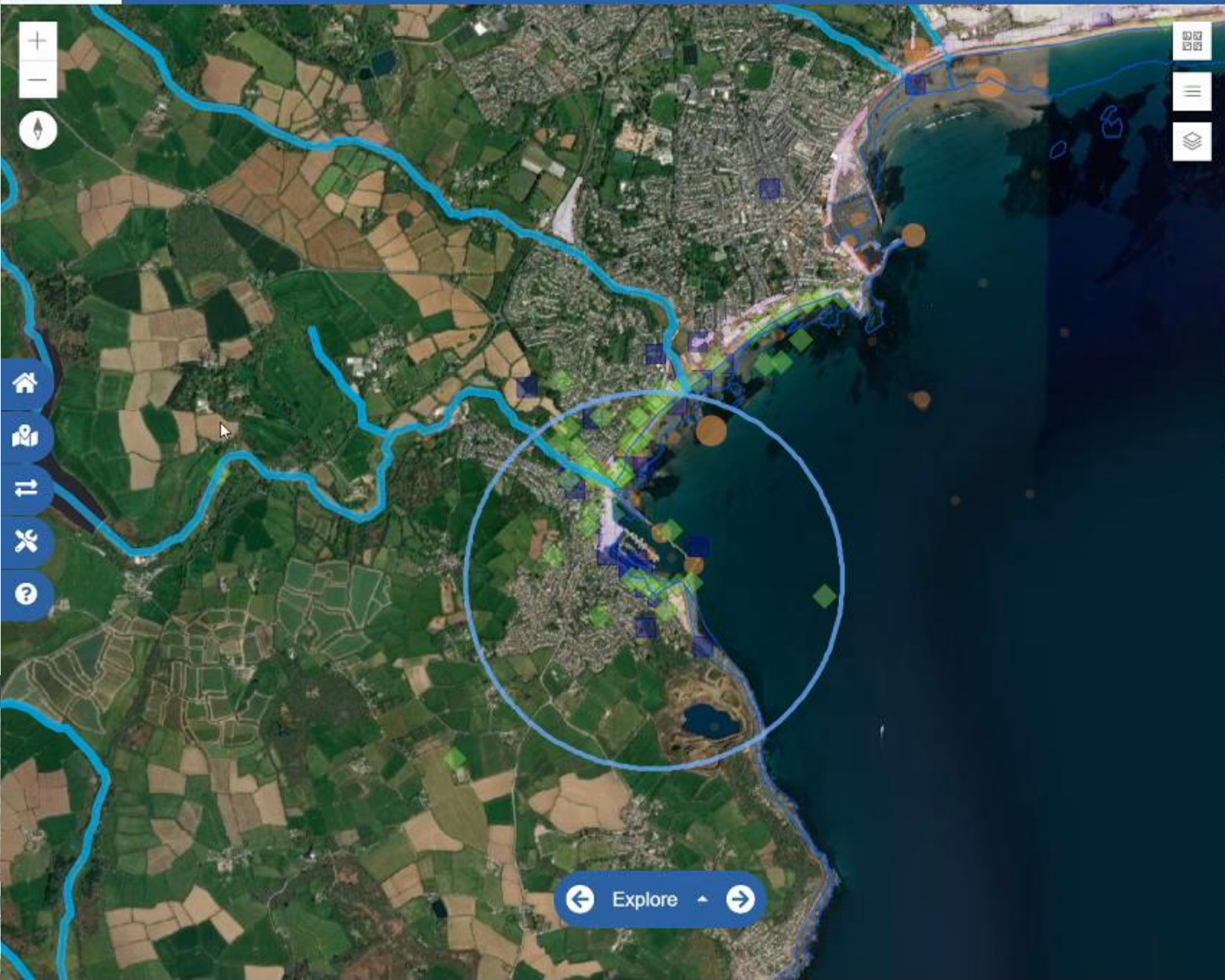




A Nature-Based Solution



The existing breakwater is a hard engineered structure which comprises of rock armour. This structure currently reduces the wave energy along the coastal frontage behind it. The whole of the coastal frontage is heavily developed and modified, with minimal natural environment here. The solution intends to demonstrate a method which mimics and compliments the natural nearshore rock outcrops which exist in this area. It will demonstrate a situation where hard structures are still required to attenuate wave energy, whilst facilitating the implementation of complimentary softer, natural protection behind them. These modifications to the existing breakwater will promote growth of the natural beach behind, creating a wider risk management zone. Part of the approach is to promote colonisation by marine organisms, including kelp growth, to develop a living structure, harnessing the adaptive capacity of natural coastal processes. Innovative materials and design will also test emerging ideas on 'greening-up' more traditional types of hard coastal protective infrastructure. It presents an opportunity to deliver a pilot that gains experience of how nature-based solutions can address high wave energy environments. At present, the project is currently trialling the colonisation of marine organisms on test blocks deployed approximately 6 months ago. After 6 months, they have already proven to colonise marine algae.



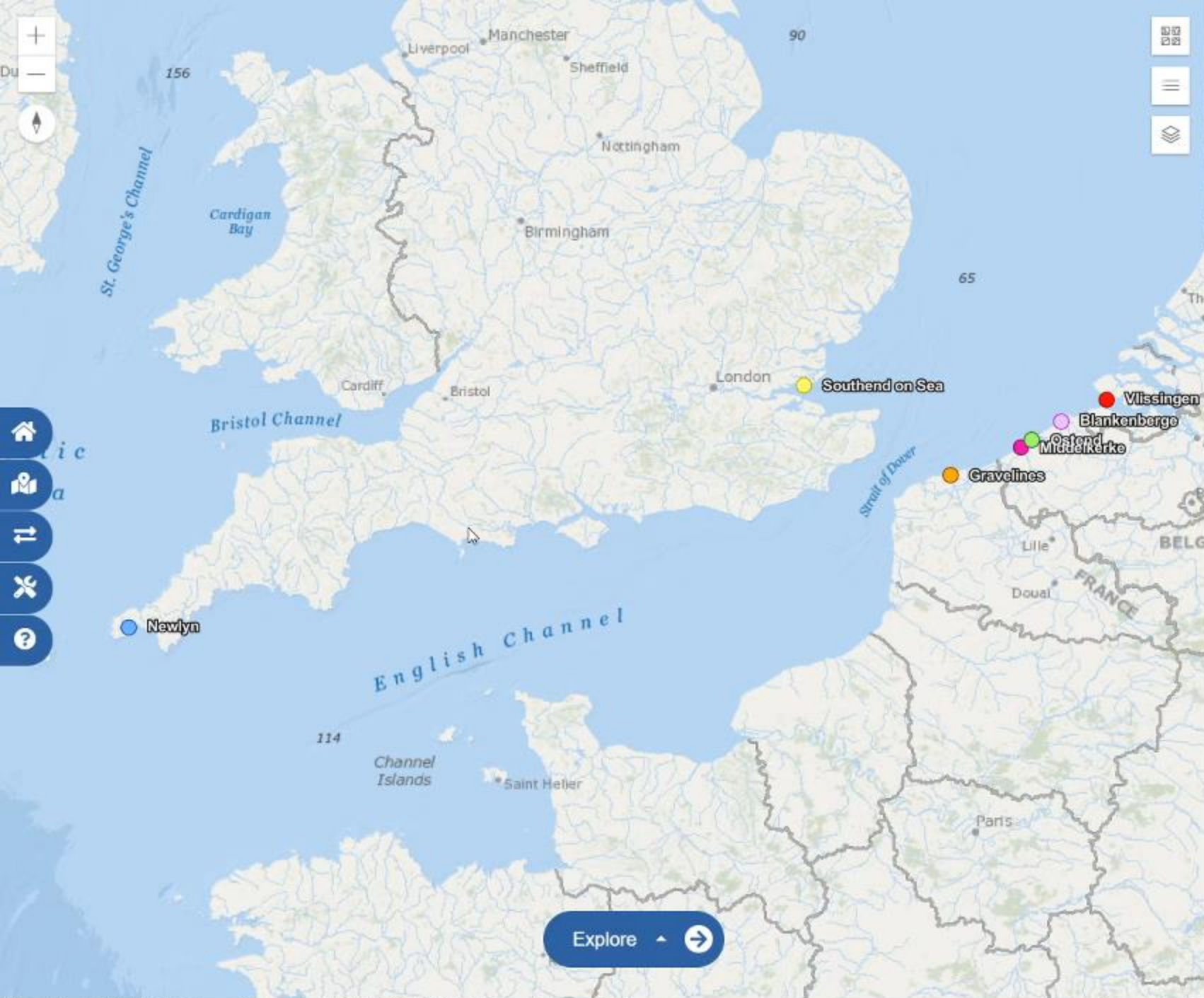
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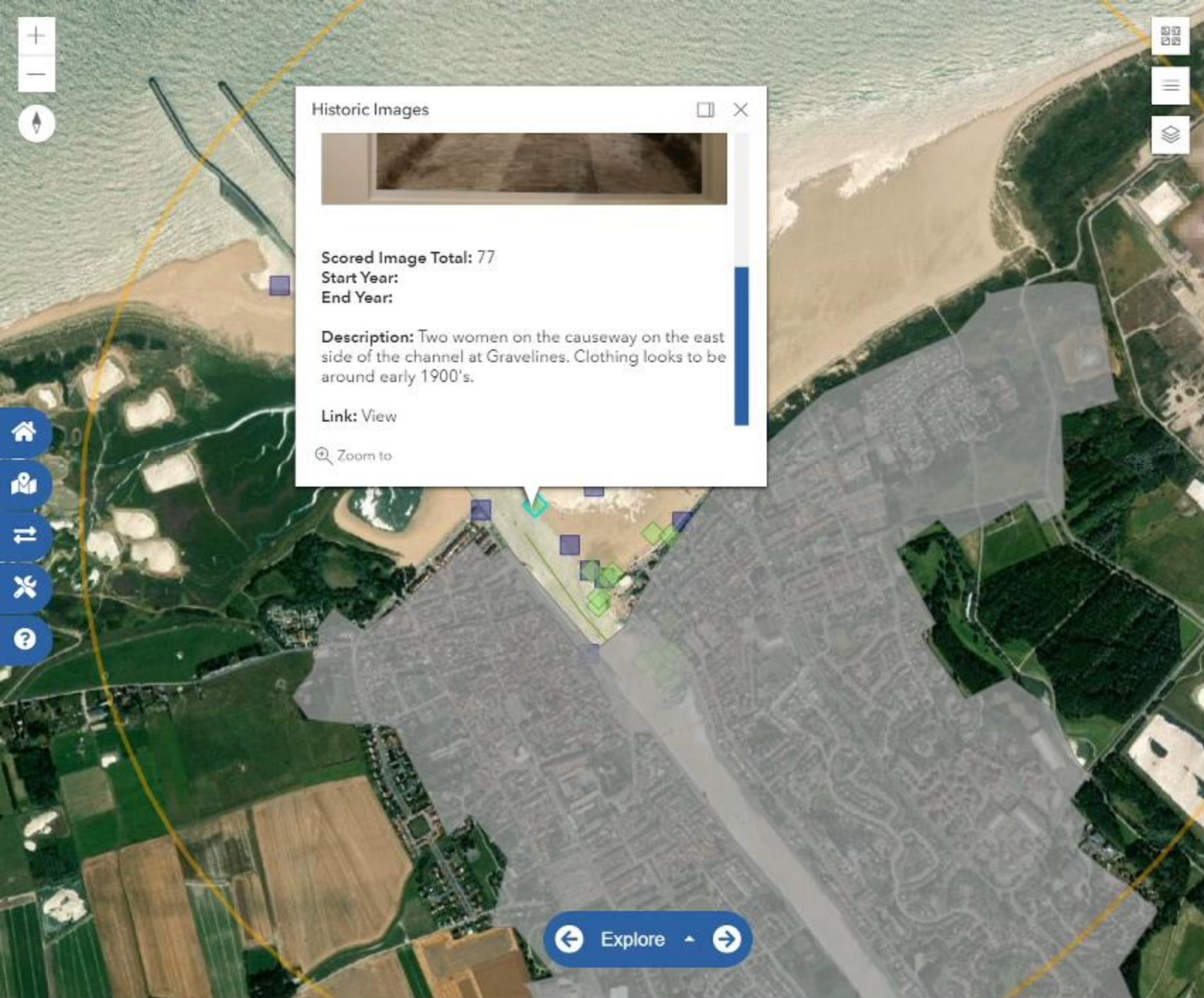
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Historic Images



Scored Image Total: 77
Start Year:
End Year:

Description: Two women on the causeway on the east side of the channel at Gravelines. Clothing looks to be around early 1900's.

Link: [View](#)

Zoom to

Then and Now

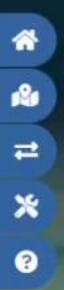




Gravelines

Then and Now





← Explore →

Gravelines

What/where is the pilot?

Gravelines, a beautiful coastal city located between Dunkirk and Calais, has a rich history, not only in terms of architecture, but also in management of marine submersion and floodings thanks to the "wateringues" system consisting of hundreds of kilometres of canals.

The functioning of our pilot is simple : strengthening the existing dune. In order to create a high enough natural wall against the dangerous combination of waves and high tide, we developed a simple system that literally traps the sand, thanks to wooden fences. While sand accumulates around these fences, small vegetation tends to grow in the sand and in turn reinforces the thickness and stability of the dune.

Why is the pilot needed and what are the benefits?

Gravelines is situated under sea level, just like large parts of Belgium and the Netherlands. Therefore, we are highly vulnerable to maritime submersion.

Luckily, and unlike many cities on the Cote d'Opale region that suffer from constant loss of sand on their beach, sand tends to accumulate on our coastline, a phenomenon called accretion.

We also dug elevated pathways to allow small bats and people to go through the sand dune while protecting lands and people from water flooding : once again we take advantage from the wind and the sand and trap it thanks to wooden fences and wooden flooring to stabilise the pathway. The pathway faces eastward as you can see to take into the equation sand flows through wind . We had to strike a balance between the different uses of the beach. There are many benefits to the pilot, beyond a better protection against maritime submersion: a higher sand dune definitely looks better and it is beneficial to biodiversity: plants more easily grow in thicker dune and animals are coming back to the beach, roaming around the pilot site.

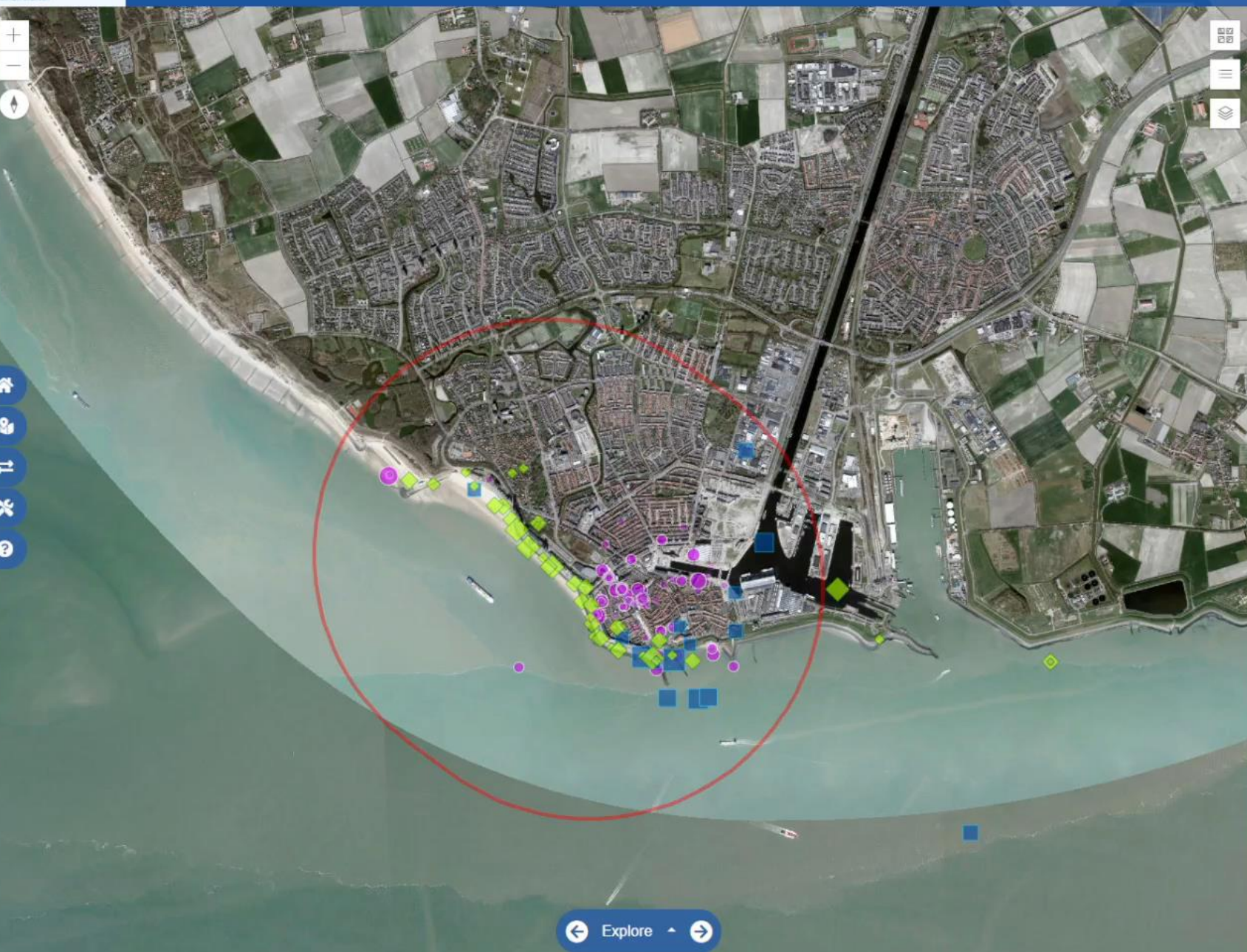
How is the pilot using Nature-Based Solutions?

Then and Now

Click the thumbnails below to compare historical images with modern photographs.







Theme 3: Infrastructure Planning



Many coastal management strategies focus on hard engineering, with little consideration for natural processes that have developed over thousands of years. This is not always the most effective way to protect the coast in the long term and coastal urban planning is shifting towards NBS and using nature as a resource to benefit society. This is becoming more pertinent as the climate is now changing rapidly.

A major concern is coastal squeeze where mudflats and salt marsh are being lost. This can be made worse by grey infrastructure. Once the natural defences are lost, the wave energy reaching the shoreline will increase.

To combat the issue of coastal squeeze in cities we can use innovative urban planning designs. Examples include the creation of new intertidal zones, between the sea and land, where the sea is allowed to flood. Developments are engineered to work with natural processes not to disrupt them.



Grey Infrastructure 1: Hard engineering



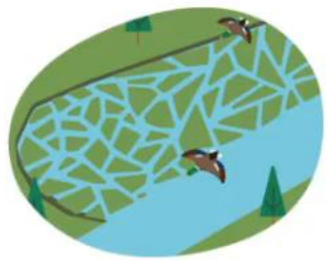
Grey Infrastructure 2: Coastal squeeze



Grey Infrastructure 3: Natural sea defences



Theme 2: Biological Processes



The formation of biomass can help to achieve a balance in physical cycles. This in turn protects the coastline. For example, sea grass forests or Oyster reefs that absorb and slow the flow of erosive wave energy, trap sediment and build-up of natural obstacles to absorb wave energy.

This results in a flexible defence against sea level rise and climate change by ensuring the system is in equilibrium, making it possible to re-establish the NBS that have been compromised by grey infrastructure.

Natural sea defences require a specific set of conditions to form. In cities, homogenous 'grey infrastructure' or inert rock armour can negatively affect the development of 'green' defences.

To tackle the issue of grey infrastructure an approach known as 'greening the grey' can be pursued. This might involve using 'hybrid nature-based solutions' to increase textural heterogeneity and biocolonisation potential. The green surfaces absorb wave energy, adding another layer of protection, known as bio armouring.



Biological Processes 1: Biomass formation



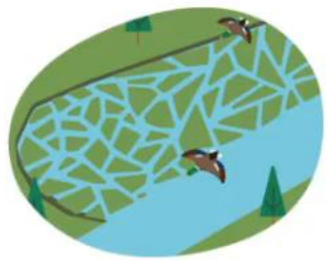
Biological Processes 2: Greening the grey



Biological Processes 3: Natural sea defences



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Biological Processes 1: Biomass formation



Biological Processes 2: Greening the grey



Biological Processes 3: Natural sea defences

Expanding the visualisation toolkit

Summary of VT objectives

- Its purpose is to demonstrate why NBS should be chosen and deployed
- Draws together all of the highly engaging SARCC media content and research themes into a single platform, presented in context and towards a focused narrative
- Provides various methods of exploration (linear by case study; by theme; free exploration)
- Benefit of the *Longue durée* with archaeological and historical context



Expanding the visualisation toolkit

Final VT Initiatives

- Final update of case study partner content
 - Map views of installations and areas
 - Images / videos of final partner projects
 - Engagement with all partners to source final material
- Interactive Coastal Planning NBS selection tool
 - Integrated within the VT, introduced on the landing page
 - Two-way links between the case studies and the NBS tool
 - Closing the circle on the VT – primary method of illustrating various NBS options as valuable coastal planning resource



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Visualisation Toolkit

