

Excessive levels of sediment in the Eems Dollard estuary are having a negative impact on water quality and biodiversity. On the other hand, clay is needed to strengthen the dikes surrounding the estuary and to raise farmland, in response to climate adaptation and subsidence. Turning the sediment of the estuary into clay for dikes provides a win-win situation: the water quality improves and the clay can be beneficially used to strengthen dikes and to raise farmland. If the pilot is successful, this technology can be scaled-up for upgrading various kilometers of dikes along the Eems-Dollards, and possibly beyond.

In the Clay Ripener, we are testing a range of ripening strategies to see which is the most feasible strategy to produce dike clay, both technically and cost-effective. The pilot project is expected to deliver usable clay soil for the construction of a one-kilometre section of Wide Green Dike.

## Clay Ripening Pilot Project

### Sediment ripens into clay

The sediment is transformed into clay soil through processes such as dewatering, desalination and oxidation. The pilot location includes several sections that allow us to test different ripening approaches. The pilot location in Delfzijl (Oterdum) was filled with dredged material from the Port Canal near Delfzijl in 2018. The second pilot location was filled in 2020 with material from the Breebaart polder near Termunten.

### Research questions

Researchers are monitoring the ripening process closely. At the end of the pilot project, they hope to have answers to the following research questions:

- Is clay production on land a cost-effective solution for the sediment problem?
- What are the best ways of extracting sediment from the Eems Dollard area and ripening it efficiently?
- What quality of clay can clay ripening deliver?
- Which ecosystem services can clay ripening deliver?
- What is the business case for clay ripening?

### Application

The Hunze and Aa's water authority will be using 70,000 m<sup>3</sup> of ripened clay to strengthen a one-kilometre section of sea dike in the 'Broad Green Dike' pilot project. This is a dike with a shallower slope than the current dike, covered by a relatively thick layer of clay and grass.

### Upscaling

If the Clay Ripening pilot project is successful, the remaining 11,5 km of dike may be strengthened with Eems-Dollard ripened clay. Scaling up could significantly reduce the amount of sediment in the Eems Dollard. The aim is to extract 1 million tonnes of sediment from the Eems Dollard annually by 2022. This will have a positive effect on the unique ecological value of the estuary.

### Exporting knowledge

The pilot project will generate a lot of knowledge about ripening dredged material into clay, with the business case for clay ripening at a large scale being one of the most important issues. The knowledge is also very valuable elsewhere in the Netherlands, for example in the Western Scheldt. The knowledge can also be used outside the Netherlands: estuaries elsewhere in the world have problems with sediment, too.

### Living Lab for Mud

The Clay Ripening Pilot Project is part of the Living Lab for MUD (Multifunctional Use of Dredged sediment). EcoShape and its partners are conducting five pilot projects to develop knowledge about the sustainable use of sediment. Sediment is an essential material for global sustainable development. Unused sediment dredged from lakes, coasts and rivers can be used to strengthen dikes, reclaim land or create natural islands. This generates social benefits in terms of flood risk management, navigability, nature development, water quality and the local economy, and in the form of building material for land reclamation and dike construction. Combining the use of sediment with natural processes like currents and vegetation allows us to build with nature.

### For more information, visit

[www.ecoshape.org](http://www.ecoshape.org) and [www.livinglabformud.org](http://www.livinglabformud.org)

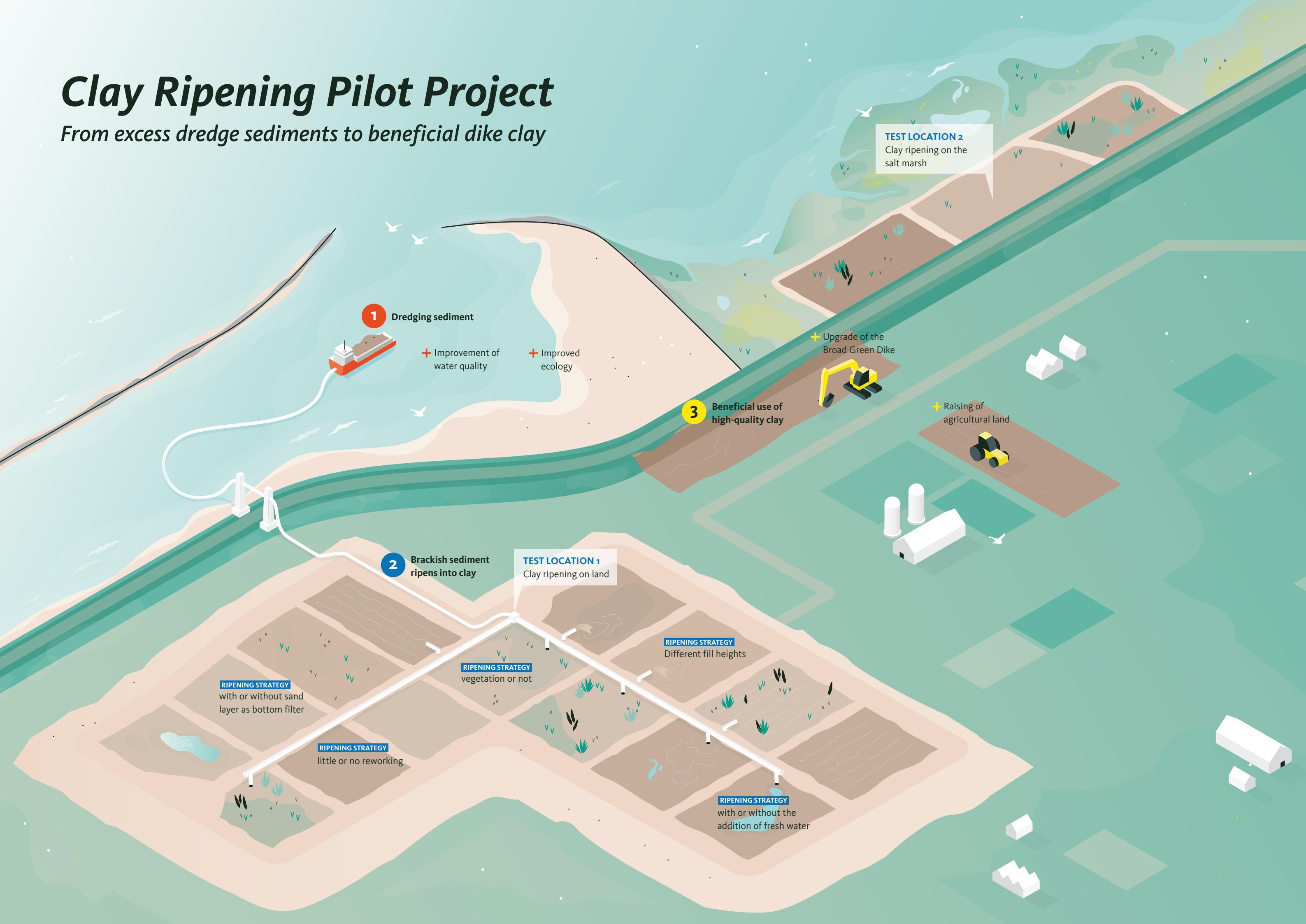


# Clay Ripening Pilot Project



# Clay Ripening Pilot Project

From excess dredge sediments to beneficial dike clay



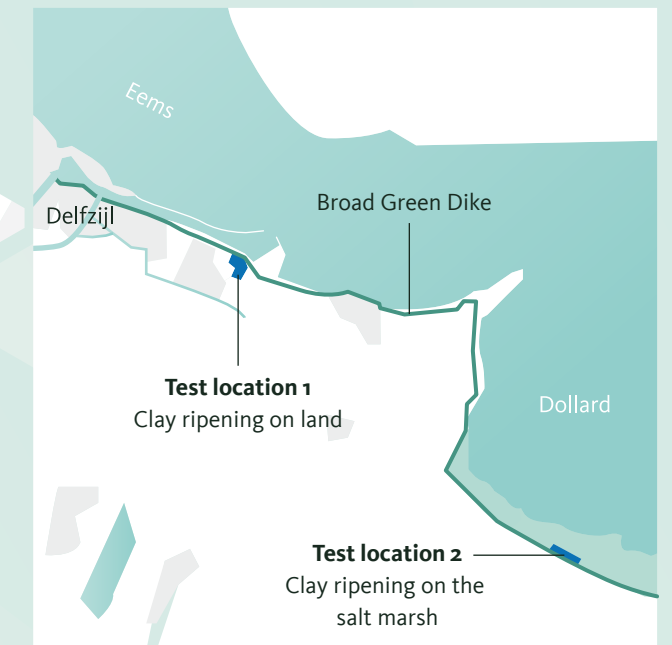
The provincial authority of Groningen, Rijkswaterstaat, Groningen Seaports, Hunze en Aa's water authority, Groninger Landschap and EcoShape are looking at ways of transforming sediment into clay soil in the Clay Ripening pilot project. EcoShape researchers are engaged in field and laboratory experiments to study which ripening strategy works best, technically as well as cost-effective.

The project is part of the Eems Dollard 2050 programme and the Dutch Flood Risk Management programme. Co-financing has been received from the Wadden Fund.

This project will have a positive impact on:

- Water quality
- Building material
- Flood risk management
- Navigability

## TEST LOCATIONS



## IF THE PILOT PROJECT IS SUCCESSFUL:

- 1 million cubic tons of sediments will be extracted
- The clay will be used to strengthen dikes and raise agricultural land
- Knowledge will be exported outside The Netherlands