



“The work carried out by Royal HaskoningDHV is key to our expansion plans. Its multidisciplinary team provided all the experience we needed to assess the initial damage, consult with the statutory bodies, and design the repair works. Their good communication and negotiation skills helped us find the best solution and made a significant contribution to the success of this project.”

Jeremy Lihou, Port Manager

## Flood repairs are key to Workington Port's future

Severe flooding of the River Derwent in November 2009 caused significant damage to the Port of Workington. Now, following repairs to the port and harbour to protect it from future flooding, the port has secured over £5.7 million pounds of investment through the Britain's Energy Coast initiative to help it achieve its aim to become one of Europe's major freight hubs.

Workington is an ancient market and industrial town on the mouth of the River Derwent where it joins the Irish Sea. The town's port is one of the largest in Cumbria, and a vital gateway for industry, agriculture, manufacturing and processing businesses in the North West of England. The first shipments of coal from Workington to Ireland took place in 1604. Today it handles 300,000 tonnes of cargo and around 300 ship movements annually.

The north west of England has the highest levels of rainfall in the UK and has always been prone to flooding, but the 300mm of rain that fell in twenty-four hours before Friday 20 November 2009, was unprecedented. Flood water from the River Derwent caused considerable damage to many communities including Cockermouth and Keswick, before reaching the Port of Workington, washing away parts of bridges, quay walls and the riverbank. Over 120,000 tonnes

of debris, including boulders, rocks, trees and silt, were deposited in the river basin – enough to fill 24 Olympic-sized swimming pools.

Engineering and Environmental Consultancy, Royal HaskoningDHV, has a long relationship with the Port of Workington, and was commissioned at short notice to assess the flood damage and give expert advice on remedial actions. Howard Rushton, project manager for Royal HaskoningDHV, explains the impact the flood had on the harbour: “There was significant flood damage in the harbour, especially around Merchants Quay, where parts of various retaining walls and riverbanks had been completely washed away. Sections of the bridge crossing the harbour were also damaged, making them unsafe to use.”

Royal HaskoningDHV recommended Merchant's Quay should be repaired and strengthened to protect the harbour against future erosion and flooding. A new 130m long rock revetment would be constructed at Merchants Quay, additional rock armour placed at Riverside Revetment and scour protection provided to the South Harbour Arm. The bridges were considered to be so unstable that it was recommended they should be demolished and rebuilt at a later date, if required.



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“Having completed the initial assessment, we were commissioned at the end of 2009 to prepare designs and gain consents for the repair work. We mobilised a multidisciplinary team of coastal and rivers experts, bridge engineers, environmental scientists, geotechnical engineers, numerical modellers, and contaminated land experts, to deliver all the necessary consultancy services.”

One of the main challenges was to establish the best way to transport all the large rock and material needed. The repair work involved 26,000 tonnes of rock – the largest armour rock would be three to six tonnes. Various options were considered, including using an existing Network Rail level crossing, constructing a temporary causeway across a section of the harbour and transporting the material by sea, directly to the quay. Network Rail agreed that their rail crossing could be used for access, which was the most cost effective solution.

“We worked closely with the Environment Agency, Marine Management Organisation, and Natural England to obtain the relevant consents as quickly and efficiently as possible.”

Royal HaskoningDHV commissioned a Phase 1 habitats and protected species survey, to include recommendations on otters, bats and reptiles, and record the location of Japanese knotweed. Natural England was also concerned that the works could affect sea and river Lamprey as well as Atlantic Salmon. It was recommended that the rock should be tipped gradually and a channel left for the fish to swim through the repair works. Additionally, all work should be carried out during daylight hours as Salmon and Lamprey migrate mainly at night.

The repair work began on 4 April 2011 with demolition of the bridges. A temporary ramp and causeway was built on the river bed, enabling demolition plant to get access close to the bridges.

The repair work was completed in October 2011, and is key to the port's plans for expansion.

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