

Bransholme Lagoon: Problems in design and implementation of a sheet pile solution to remedial works

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SYNOPSIS Bransholme Lagoon is located adjacent to the River Hull and is operated by Yorkshire Water Services Ltd. The lagoon had a pre-raised volume of 74,000m³ and is a Category A reservoir. The lagoon is kept at a low level, operating as emergency storage for the adjacent pumping station, providing flood storage for the surrounding area should there be a major storm event. Following an inspection under Section 10 of the Reservoirs Act, 1975 a recommendation was made to reconstruct the spillway. Additionally, to provide the increased capacity for the design event, the reservoir embankments needed raising.

Installing sheet piles through the existing embankments using a silent press technique enabled the operating water level to be raised by 2m. Following installation of the sheet piles, a water test of the reservoir noted seepage from the toe of the embankment. Investigation of the seepage through observations and monitoring with additional instrumentation produced an unexpected result from the changes in reservoir level.

This paper describes the original design solution, the issues encountered during testing, and the subsequent monitoring and remedial works. The paper summarises the lessons learnt in the application of sheet pile solutions to clay embankments for water retention and in understanding the behaviour of a composite solution.