

WEST CUMBRIA RIVERS TRUST NATURAL FLOOD MANAGEMENT (NFM) CASE STUDY: CORNEY FELL BUNDS

ABOUT THE PROJECT

This project was led by West Cumbria Rivers Trust and involved constructing earth bunds across the downstream end of two natural depressions on Corney Fell to create temporary water storage areas, which have an estimated storage capacity of ~1200m³. The project cost £7,200 and funding was provided by the DEFRA NFM programme.

The bunds have small pipes at the base (150 mm and 100 mm) to allow the water storage areas to drain after rainfall. During heavy rainfall, water enters the depressions from surface runoff and from field drains, which have been blocked within the water storage areas. When the volume of water entering the depression exceeds the capacity of the drainage pipe through the bund, the water storage areas fill. A larger pipe (300 mm) near the top of the bund begins to flow when the feature is almost full and a lowered overspill channel has been constructed on the side of the bunds to direct overflow when the water storage area is full.



Images: West Cumbria Rivers Trust. Corney Fell bunds

Top left: Bund 1; Top right: Looking upstream from bund 1 across the water storage area; Bottom left: Downstream side of bund 2; Bottom right: Upstream side of bund 2.

DESIGN AND CONSTRUCTION METHODS

The following permissions were required for the project:

- Planning permission
- Ordinary watercourse flood defence consent.
- World Heritage Site heritage impact assessment.

A topographical survey was undertaken to determine the appropriate height of the bunds and ground investigations was undertaken with laboratory soil testing to ensure the soil had sufficient clay content to be stable in the bund.

The bunds were built from site-won clay soil with topsoil re-laid over the top. A plastic pipe was put through the base of the bund to allow the feature to drain with a 300 mm pipe above. Once on-site, field drains were identified underneath the site of the bund. The larger bund was filled and a 150 mm outlet pipe installed. On the smaller bund, the field drain was left and a 100 mm outlet pipe installed. The outflow and an overspill channel were protected against scour using stone from the site. The bunds were fenced to prevent trampling by livestock.

EFFECTIVENESS

Topographical surveys show that the bunds hold a maximum of 823m³ and 400m³.

A water level logger and time lapse camera are installed on each of the bunds and at a downstream reference point. The dams filled to the level of the top pipe but not up to the overspill in a 0.5 % AEP event (1 in 2-year). Dam 1 filled and drained rapidly, responding to rainfall intensity whereas dam 2 filled and drained much more slowly. The dams stored water at a maximum rate of 0.06 m³/sec.