



Low level earth bunds

Holding Water



Description

Rivers today can become incised and disconnected from their floodplains, bunds can replicate natural processes encouraging water to be held on the flood plain. This will reduce the flood peak and encourage infiltration and ground water recharge. The engineered earth bank with a detention basin behind can vary in scale depending on site and size of area draining into it. The water is then slowly released via evaporation, infiltration and by an outflow pipe controlling the flow.

Design

The design should be tailored to each specific location, and incorporate 3 bunds in a sequence to allow for over topping of the first. Ideally local materials should be used to construct the bunds. The bund should have a flow control mechanism, such as a small pipe, orifice plate or filter material to allow the detained water levels to be controlled and drained after the flood peak. The top of the bund could be covered with a protective material to prevent scouring.

There are a few key suggestions when Earth Bunds

- Earth bunds should not be used on areas of archaeological importance.
- The detention basin could remain productive
- Construction of the bund should be done in dry weather to avoid compaction when using machinery.
- Modification of the banks to encourage water to spill out of the channel may further increase floodplain storage (in-channel works may require consent)
- Bunds can be designed to incorporate a sediment trap to reduce soil loss and provide an opportunity for sediment and nutrient reclamation (with appropriate consent from the Environment Agency)
- Permanent standing water is classed as ineligible features for the Basic Payment Scheme.
- Bunds can help capture spillages of slurry or chemical spills, protecting the watercourse
- The bunds should not be used as a flood embankment or to intercept run-off from field drains.

Location

Bunds should be sited on the floodplain near to the watercourse. The location of earth bunds can be suggested to by where standing water is present in flood conditions, or by intercepting areas prone to run-off. When choosing a location for an earth bund the soil type, contours and natural depressions of the land should be taken into account to avoid unnecessary excavation. Modelling may also be used to find an appropriate location for a bund or assess its design.

Low Level Earth Bunds

Holding Water

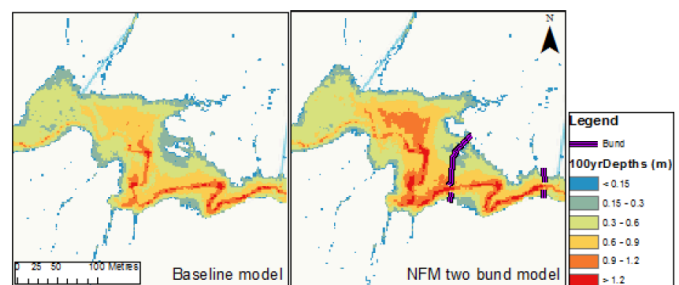
Case Study- Oughtershaw

Three low level earth bunds were installed at Oughtershaw in Yorkshire. Oughtershaw Beck is a feeder tributary of the River Wharfe. The beck is quite incised due to historic land management. Therefore, the floodplain was not being utilised effectively. The earth bunds were designed to temporarily hold water during high flows events and naturally drain back into the river.

The bunds were constructed from material on site. The bottom half of the bund was constructed out of clay, to create an impermeable layer. The top half was mainly composed of topsoil, which has encouraged vegetation growth. The angle of slope was 1:3, this was to ensure no land slippage. Some floodplain lowering was conducted to allow natural drainage. JBA Consulting provided advice on concept design. An experienced local contractor was used, cutting down overall costs.



One of the Low Level Earth Bunds from the sky installed at Swarthghyll Farm on Oughtershaw Beck.



Modelling scenarios from Oughtershaw low level earth Bunds, with and without bunds. Dark red illustrates additional storage.



Maintenance (High)

- The structural integrity of the bunds will need to be checked and inspected on a regular basis.
- Timelapse cameras can be used to ensure that the bunds are working effectively; both holding water and draining away after a flood event.
- A medium term maintenance agreement will most likely be required to ensure the long term viability of the bunds

Links and resources

River Restoration Centre- Managing Overland Floodwaters: http://www.therrc.co.uk/MOT/Final_Versions_%28Secure%29/6.3_Long_Eau.pdf

River Restoration Centre- Creating Floodplain Wetland Features: http://www.therrc.co.uk/MOT/Final_Versions_%28Secure%29/7.2_Pinkhill_Meadows.pdf