

Non-technical explanation of Bowston Weir design flood extents/ model results

Figure 1 shows a comparison of modelled 100 year plus 35 % uplift (to account for climate change predictions) flood water levels between design conditions and existing conditions for the Bowston Weir site.

For the purpose of this document, the term ‘design conditions’ represents the following:

- the removal of the existing weir structure and associated fish passes,
- the installation of a ‘nature-like’ rock ramp downstream of the weir location, with associated scour protection along the toe of the existing wall on the right bank of the river, and
- the excavation of a ‘proto-channel’ extending ~140 m upstream of the rock ramp, to allow the river to adjust to a more natural form over time.

The red line in the figure is the design wet/dry boundary or flood outline. The blue line is the existing wet/dry boundary or flood outline. The shaded contours show water level difference, with cold colours being where design levels are lower than existing conditions, and hot colours where design levels are higher than existing conditions.

The design rock ramp has a crest lower than the existing weir, and so the main difference in water levels is that the design water levels are significantly lower in the impounded region upstream of the original weir crest. This lowering of water levels upstream of the original weir has a large effect on flood risk to the house adjacent to the weir: for existing conditions flood water is able to flow past this property from the upstream impounded region, but is retained within bank for the design case.

Over the crest of the existing weir water levels drop vertically and a lot of flow energy is lost. For design conditions, water levels are higher over the sloping ramp (but remain in bank) before returning close to existing water levels at the downstream end of the ramp. There is less energy dissipation over the ramp than for the existing weir so water velocities in the channel are around 0.2 m/s higher for design conditions than existing conditions. This, combined with a slightly greater flood flow to the left floodplain, means that the design water levels are around 4 cm lower in the channel adjacent to Kent Close than for existing conditions. Because of the slightly increased channel velocity, water levels for design are slightly lower through the bridge also, returning to equal those of existing conditions downstream of the bridge.

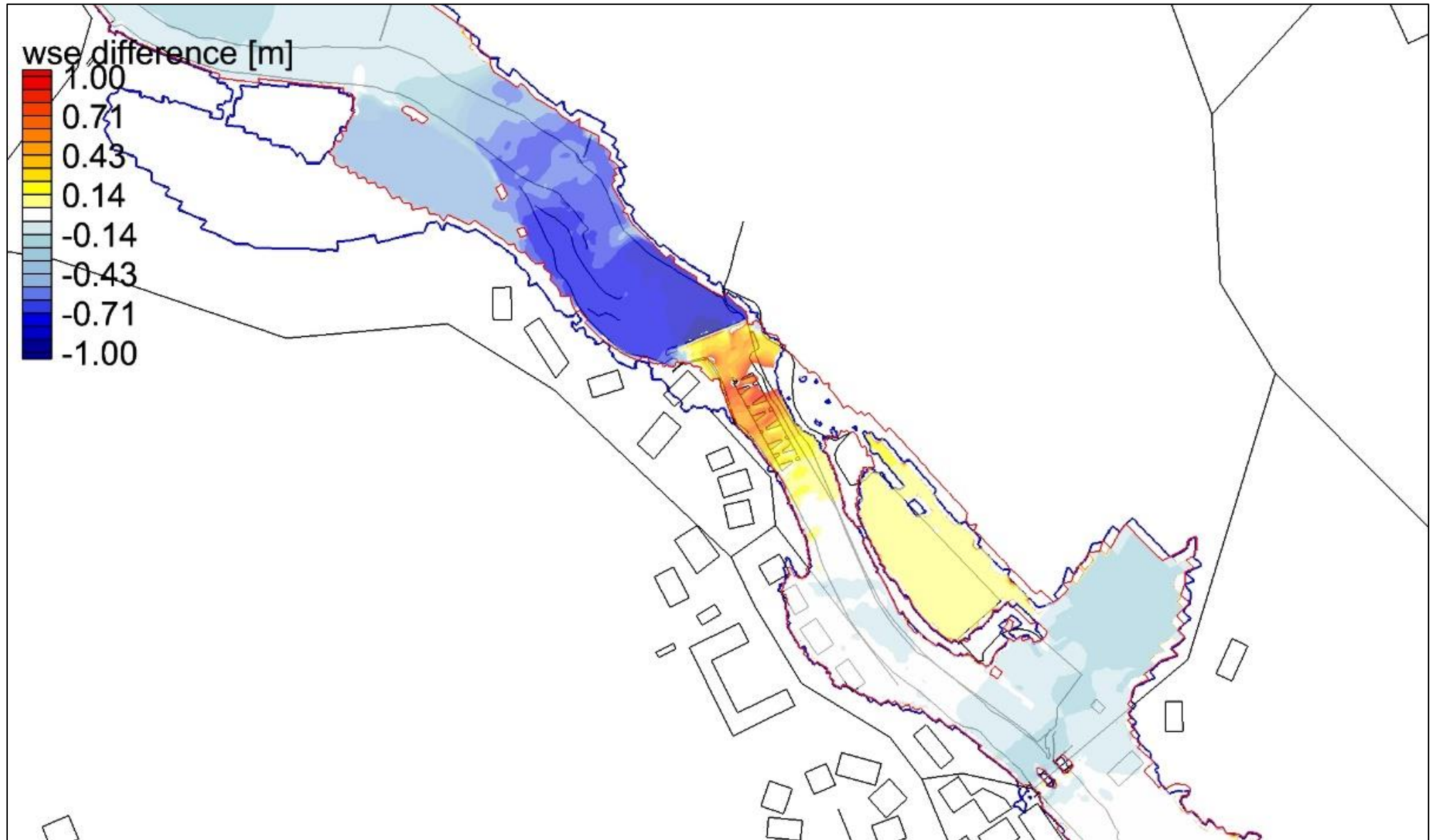


Figure 1 Water level difference 100y+35% flood, Bowston Weir. Red line: design flood outline; Blue line: existing flood outline. Contours: cold colours are where design water levels are lower than existing; hot colours are where design levels are greater than existing.