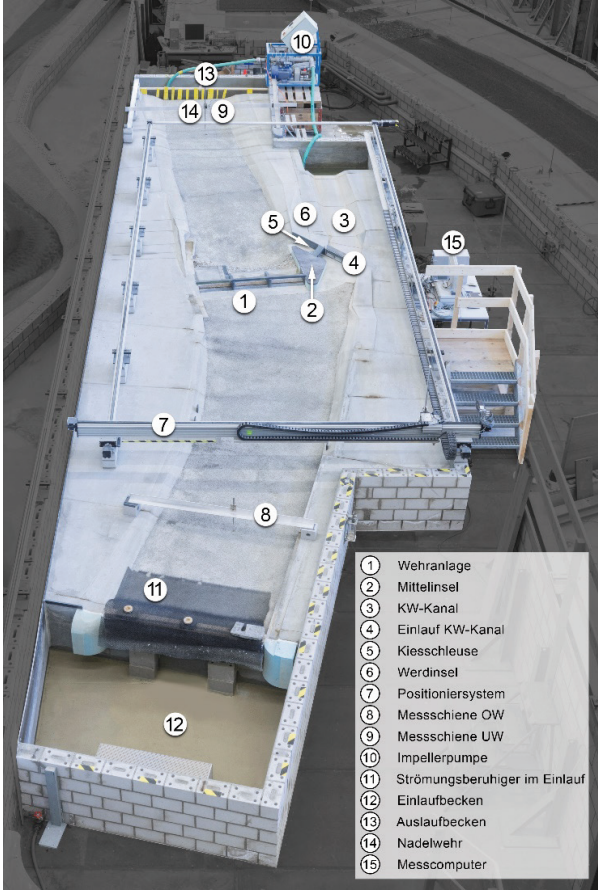


## Refurbishment of weir Höngg



Physical model at scale 1:40

After nearly 35 years of operation the weir Höngg is subject to refurbishment. The present weir is located at the river Limmat in Zurich and was built from 1978 to 1982 as a bear trap weir with three weir fields. The main purposes for the water regulation are the energy production as well as the replenishment of the groundwater aquifer upstream.

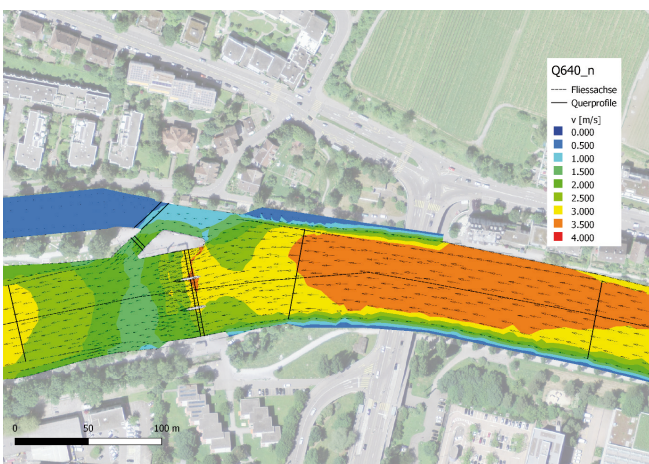
In the course of the weir refurbishment, the existing fish pass, which does not satisfy the requirements, has to be replaced by a new functioning system. Furthermore the construction of a residual water power station was under discussion to induce an attraction current for the fish and to generate energy from the residual water.

These constructional changes narrow the outlet cross-section of the weir. To evaluate the effect on the water levels and flood safety, VAW was commissioned by the Elektrizitätswerk of Zürich (ewz) to perform hybrid model tests.

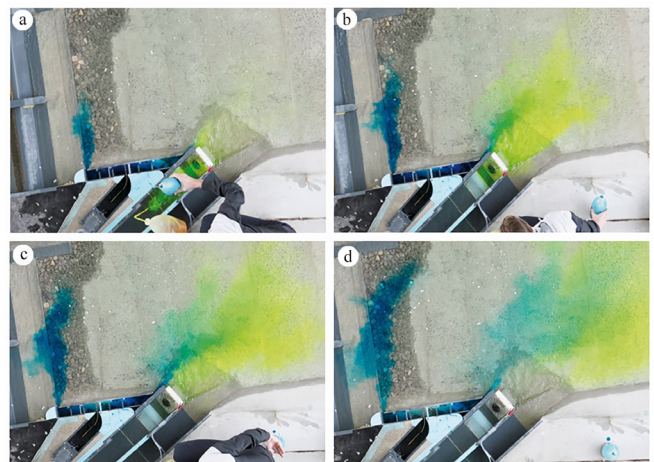
The physical model included the close range of the weir in a scale of 1:40. To learn the correct approach flow conditions to the hydraulic model as well as the influence on the flood safety in the whole concession area, the investigation was backed by numerical 2D simulation of a larger area.

In a second phase, a selected solution of fish pass was checked more detailed in regard to operational conditions. The inflow velocity field to the residual water power station (very-low-head turbine, VLH turbine) was optimized. The attraction current to the fish pass was analyzed and improved.

As the residual power plant will not be built currently out of financial reasons, a fish pass that works with or without the VLH turbine was developed. If ewz eventually decides to build the examined residual power plant, the fish pass could be slightly adjusted and the turbine flow works as an attraction current to the fish.



Resulting flow velocities from the 2D numerical simulation of the design flood. Flow from right to left.



Visualization of flow through the fish pass (blue) and the residual power plant (yellow).

Keywords: bear trap weir, flood safety, residual power plant, fish pass  
 Commissioned by: Elektrizitätswerk der Stadt Zürich (ewz)  
 Project status: Completed 2018

