Water and Environmental

ADVANCED MODELLING & SIMULATION – AMS –

WWW.AFRY.COM/AMS; WWW.TRANSAT-CFD.COM; AMS@AFRY.COM

JANUARY 2020

AFRY

Flooding & Landsliding

AFRY

Tailings Dam Overtoping and Erosion
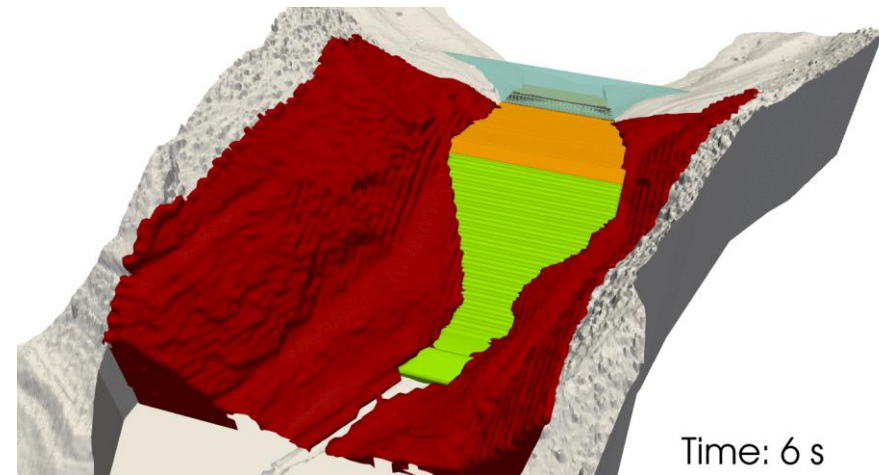
Time: 6 s

AFRY

Dam Break

Snow Avalanche in Dams

AFRY
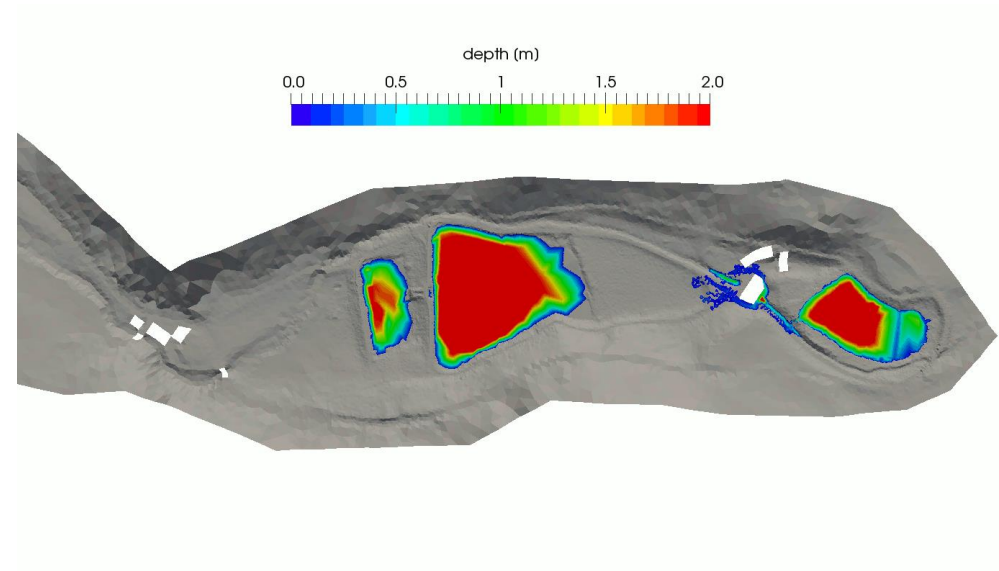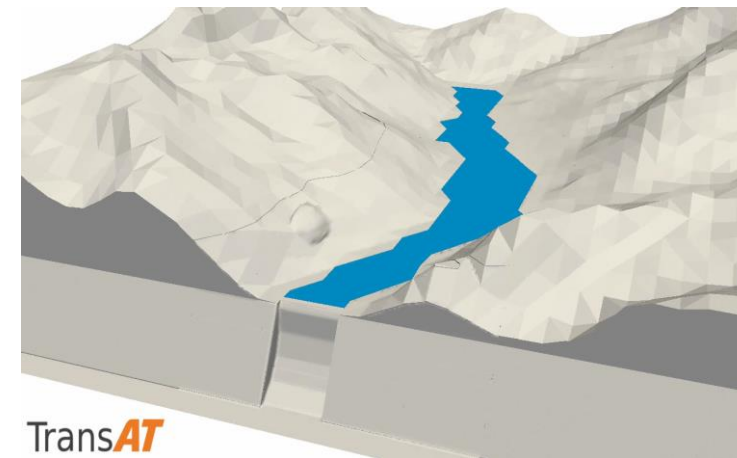
Debris Flows
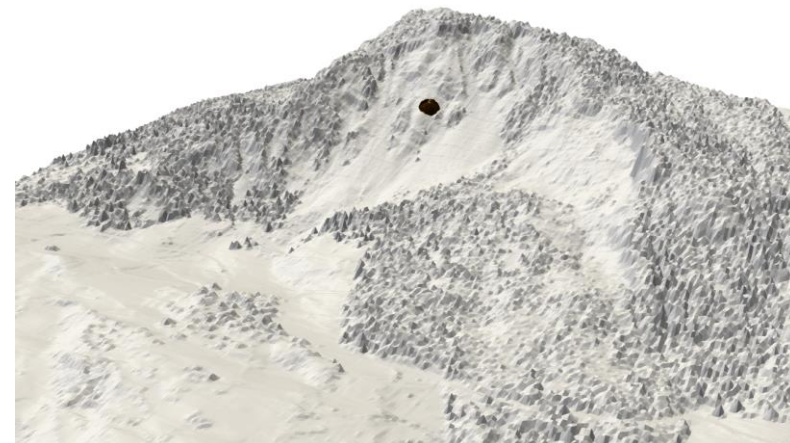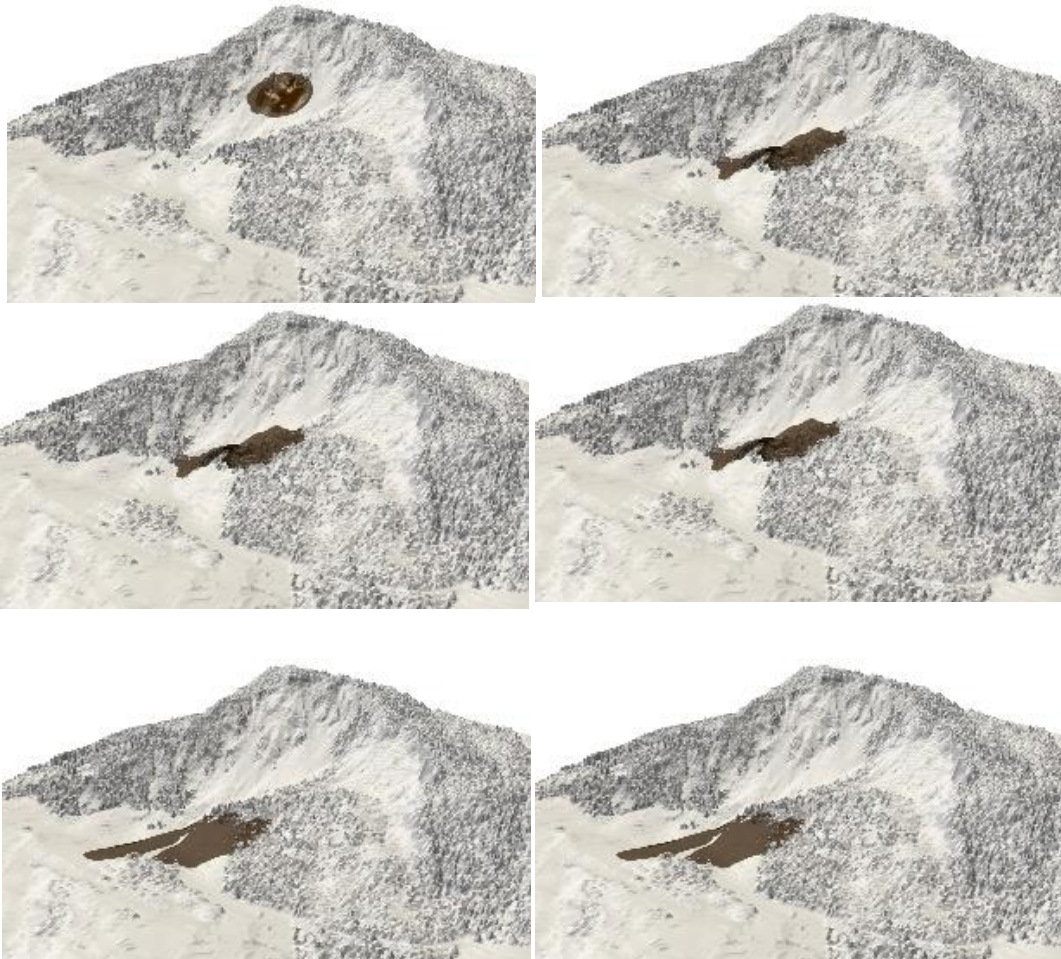
Snow Avalanches in Ski Resorts
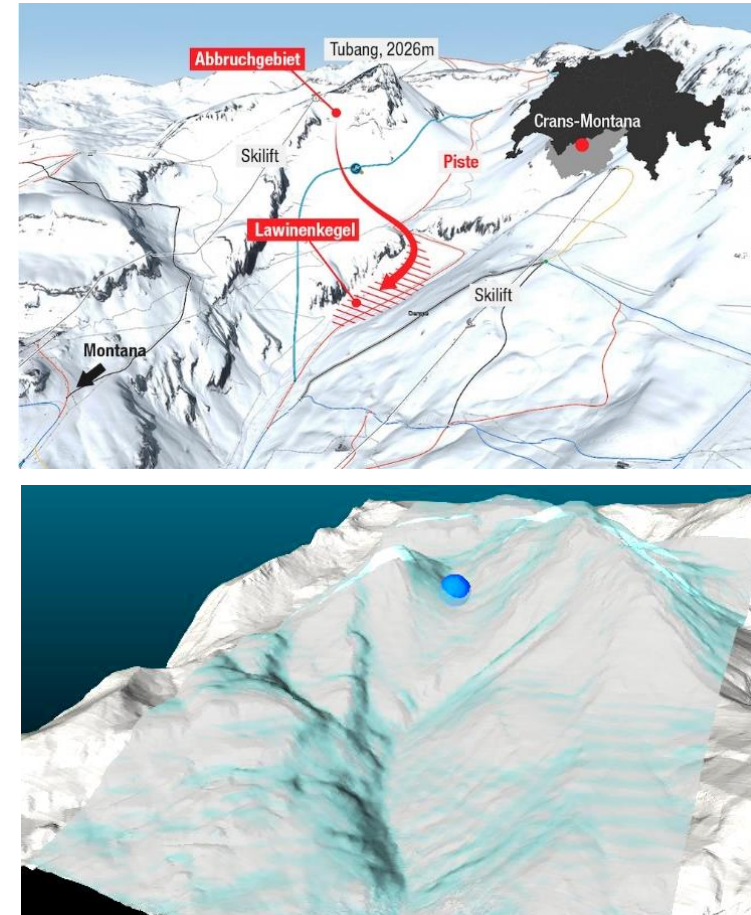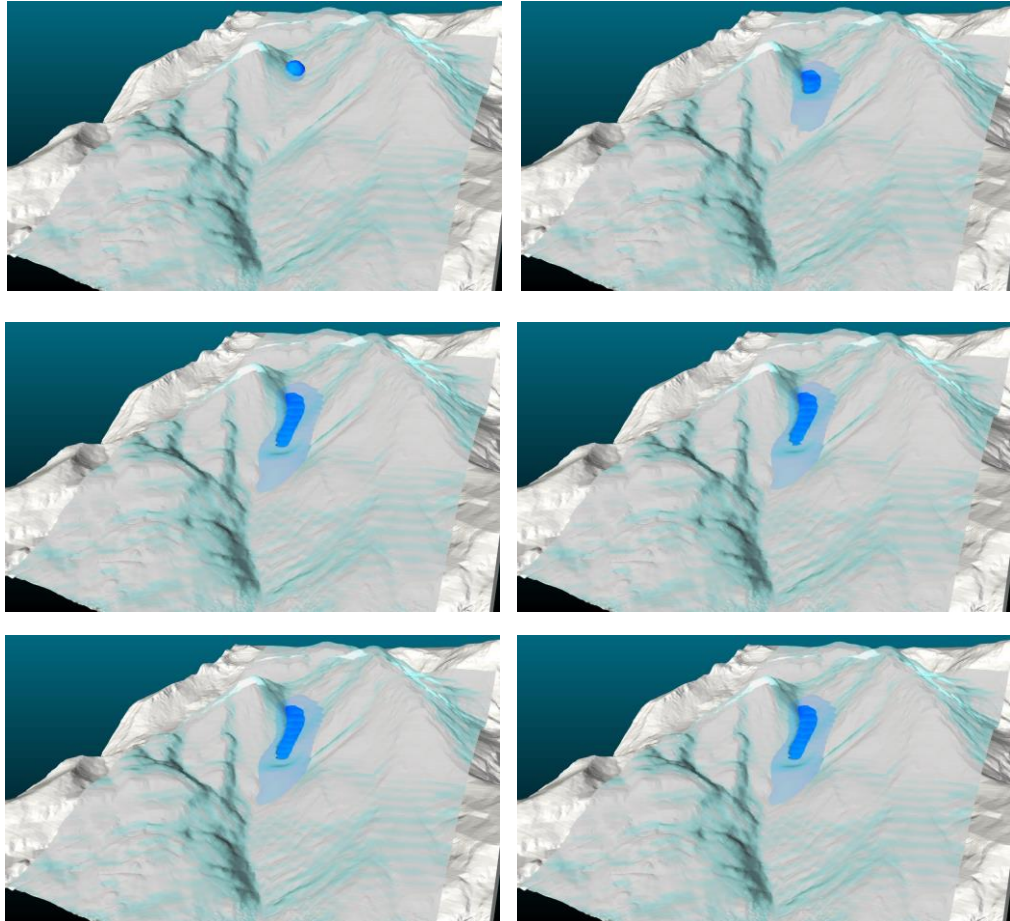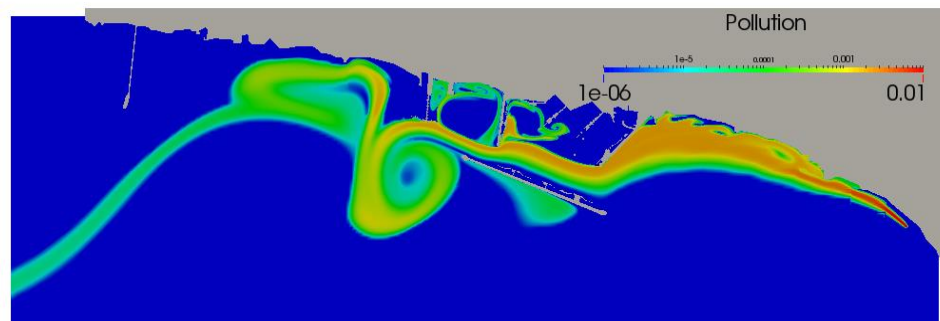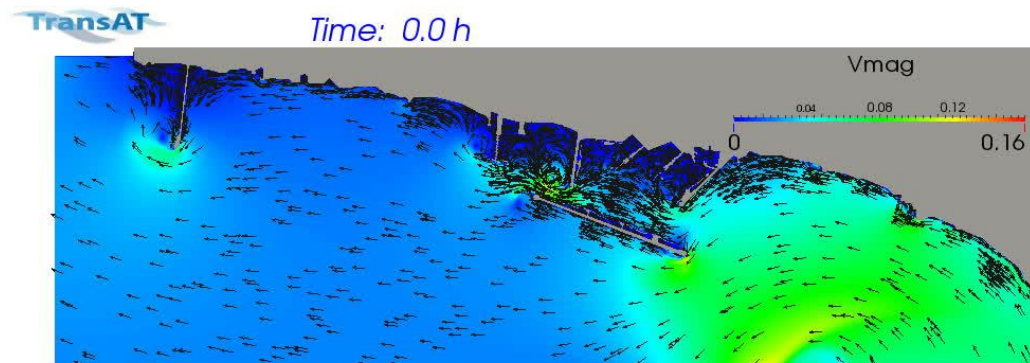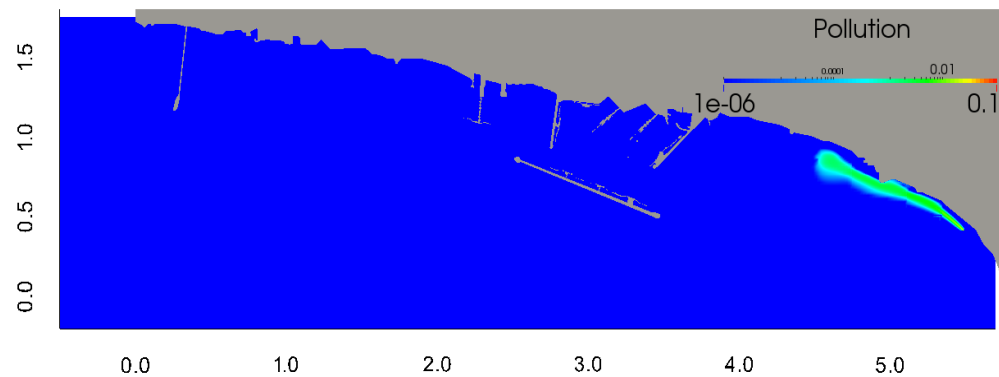
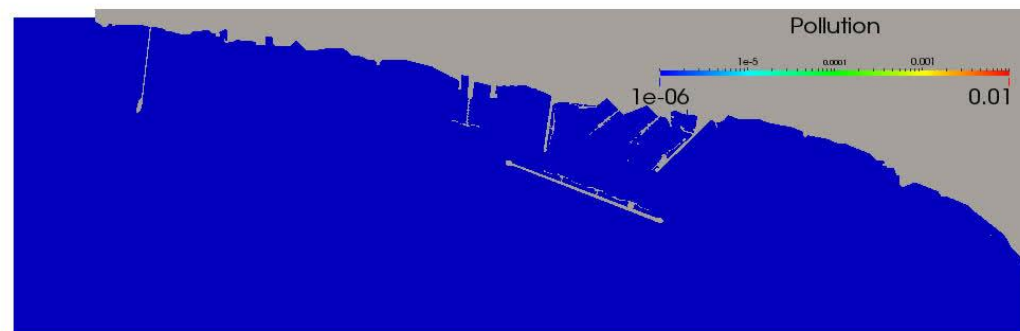# Coastal Engineering

Port Pollution

Suspected origin of pollution

Releases from the oil refinery is suspected. The density of this pollution suggests that these are heavy chemical constituents that evolve slightly below the water surface, the density of which is close to that of water ~0.9 kg/m3.

Port Pollution

ASCOMP Switzerland

ASCOMP Switzerland

AFRY

Channel Intake Design

The Problem

The water desalination plant is located in an industrial LNG harbour, and as such the water intake channel can be invaded by pollution-induced oil droplets, which causes the plant to stop water desalination.

Our Solution(s)

we have designed and tested various collector systems preventing such pollution intake, which is found to heavily depend on weather conditions.
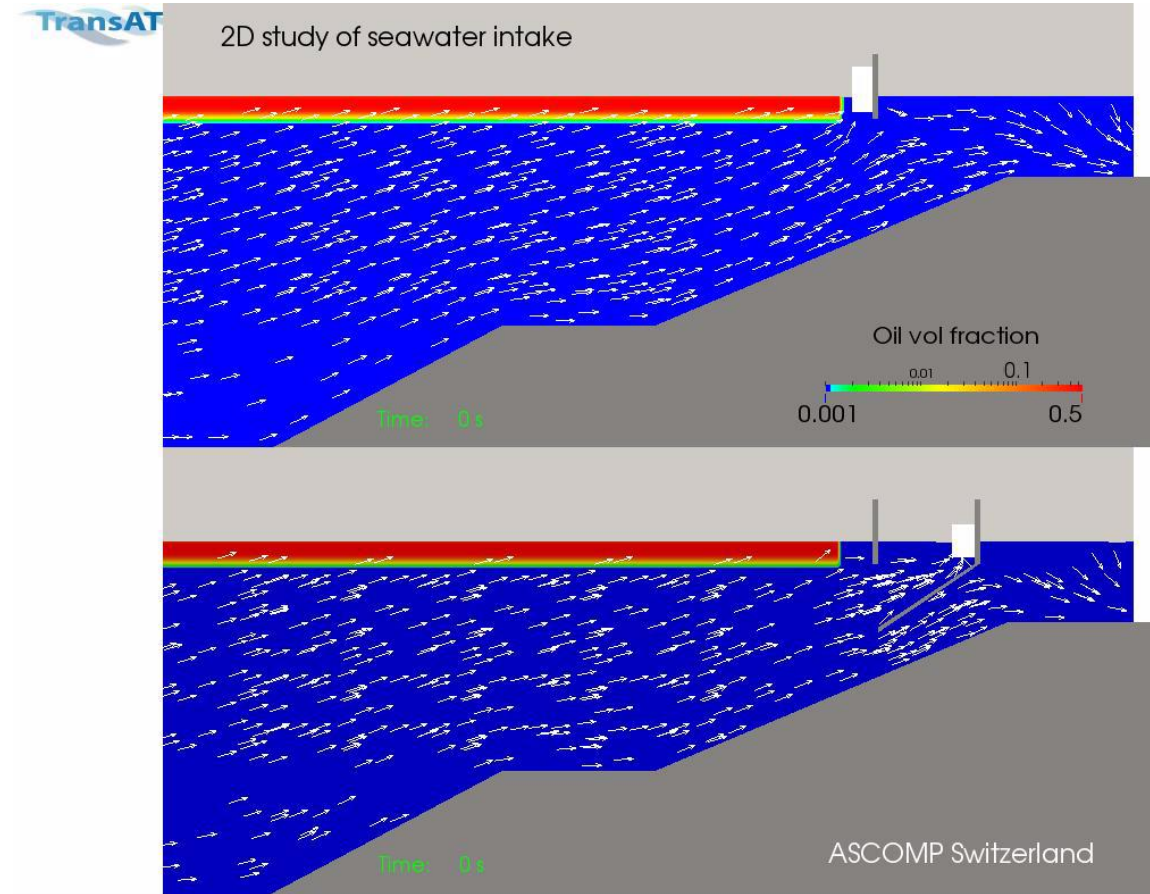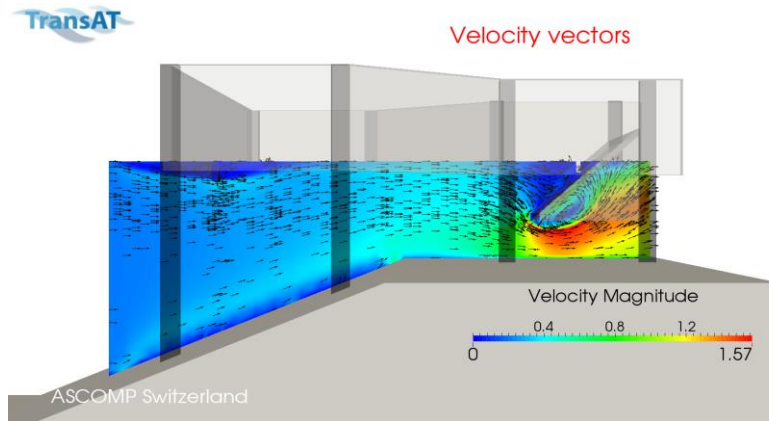
Simulations were performed for various designs, using TransAT, and the best one was selected by the end user and put in place.

Pompe Ecraimeuse
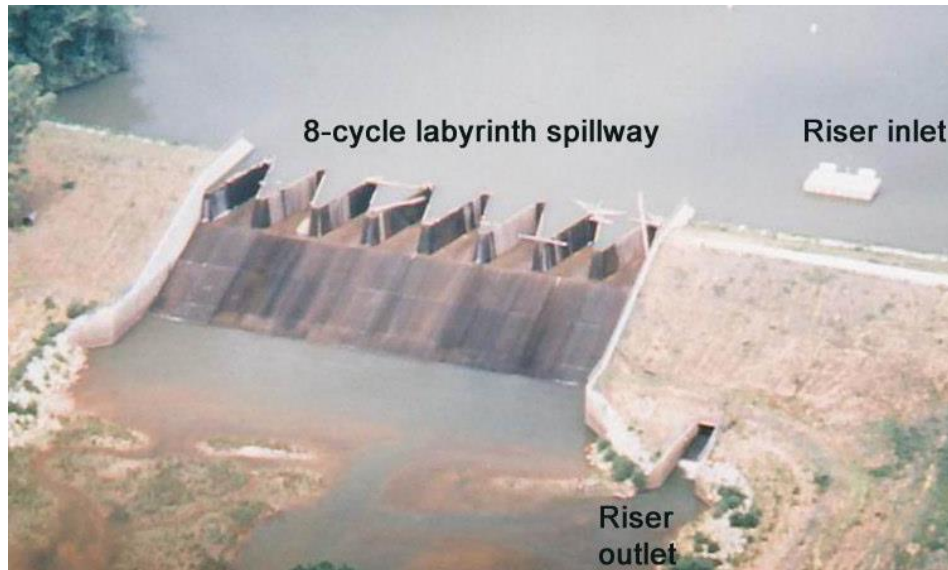

TransAT

AFRY
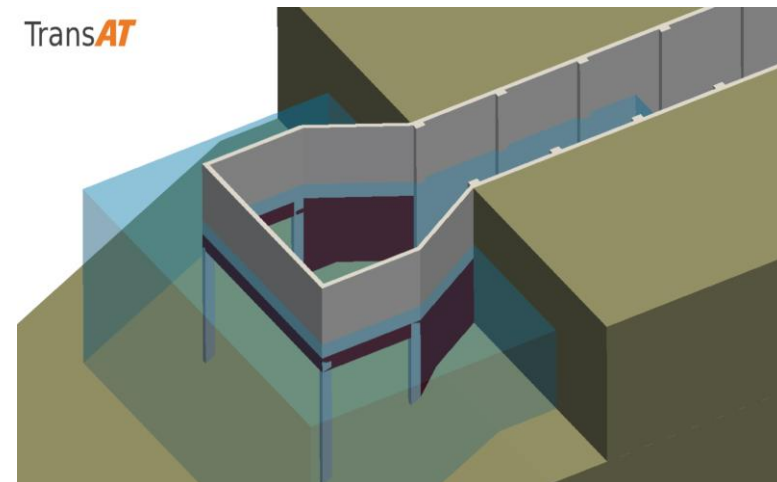
Channel Intake Design

Our Solution(s)

The intrusive solution shown below was found to work well, but other non-intrusive solutions were also proposed for the same purpose.
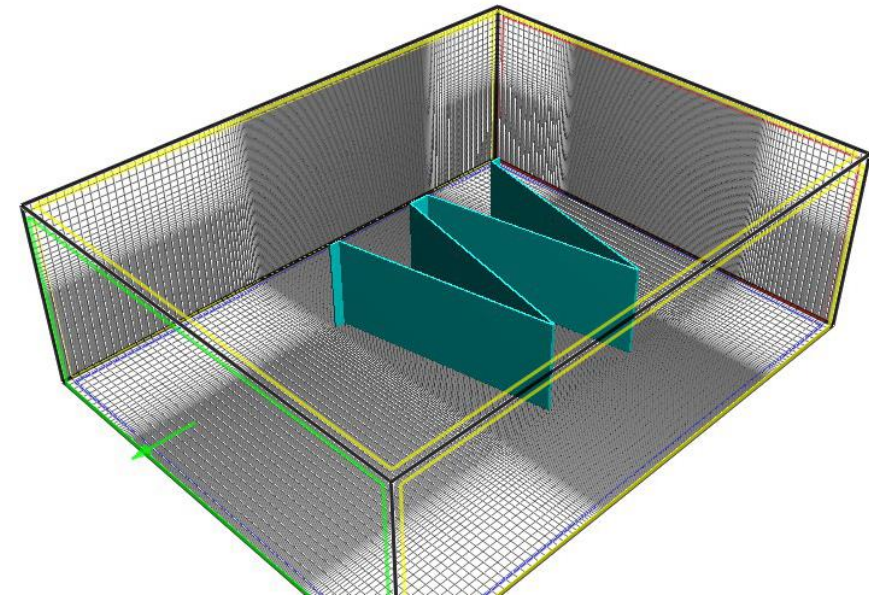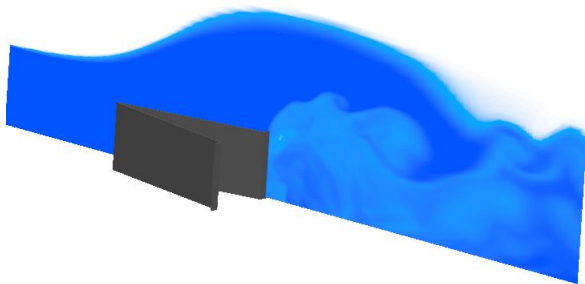
AFRY

Hydraulics Systems

Design of Spillways
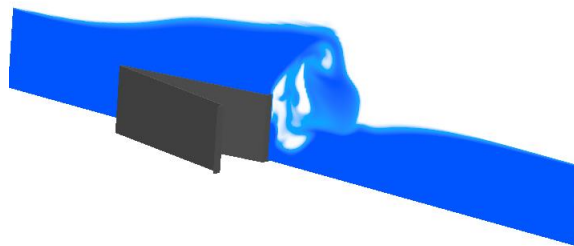

Dog River Dam labyrinth spillway, Douglas County, Georgia.

AFRY

Design of Spillways (ALDEN, USA)
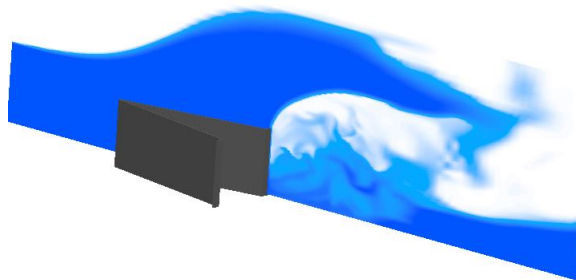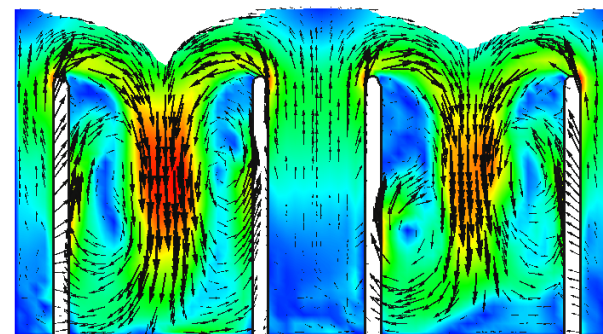
Design of Spillways
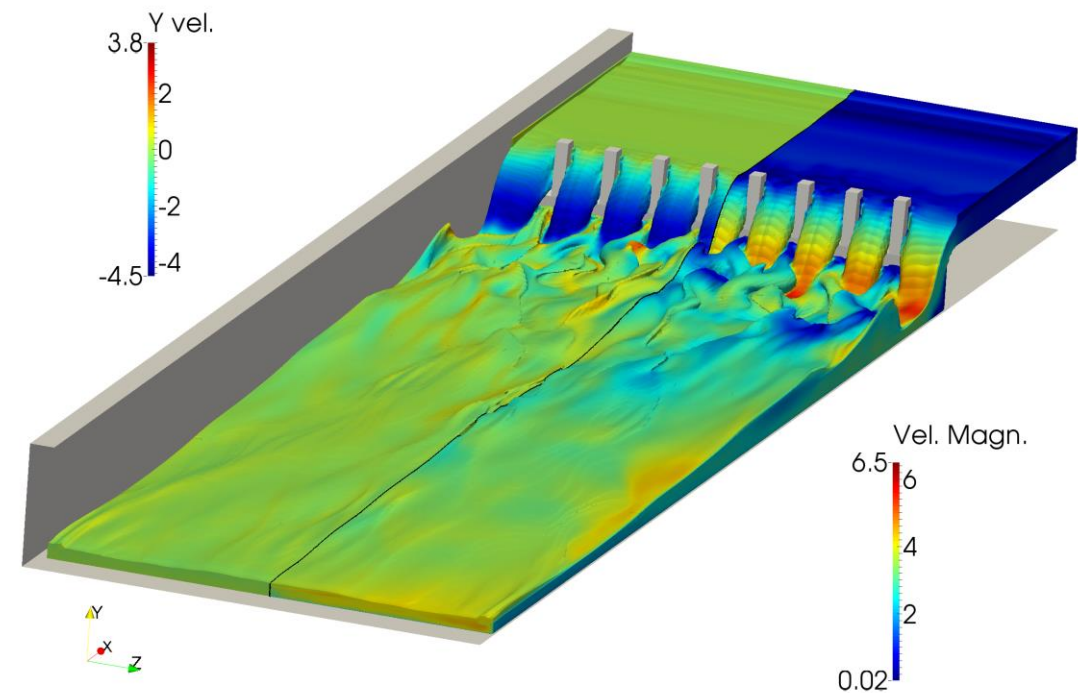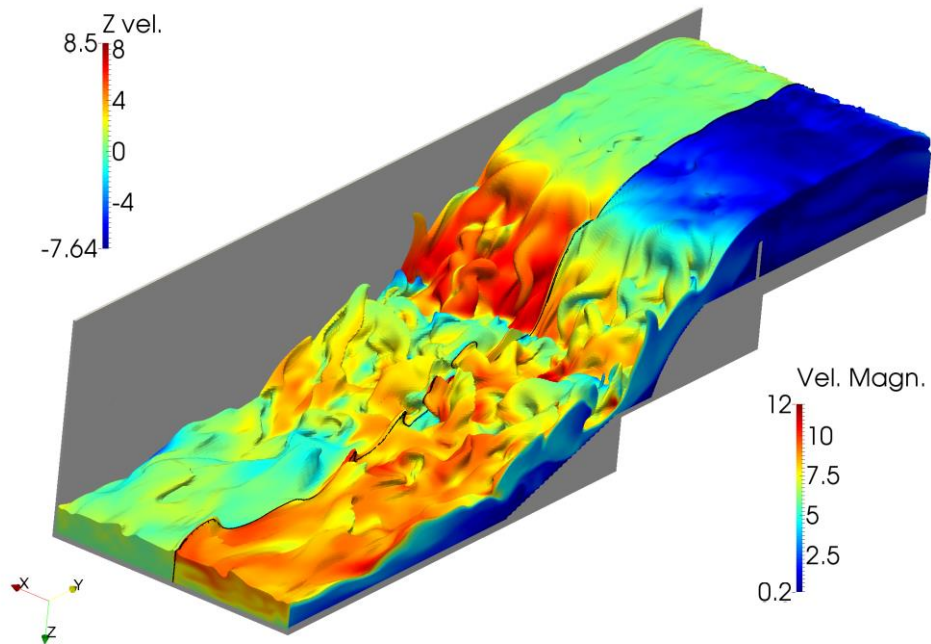
AFRY

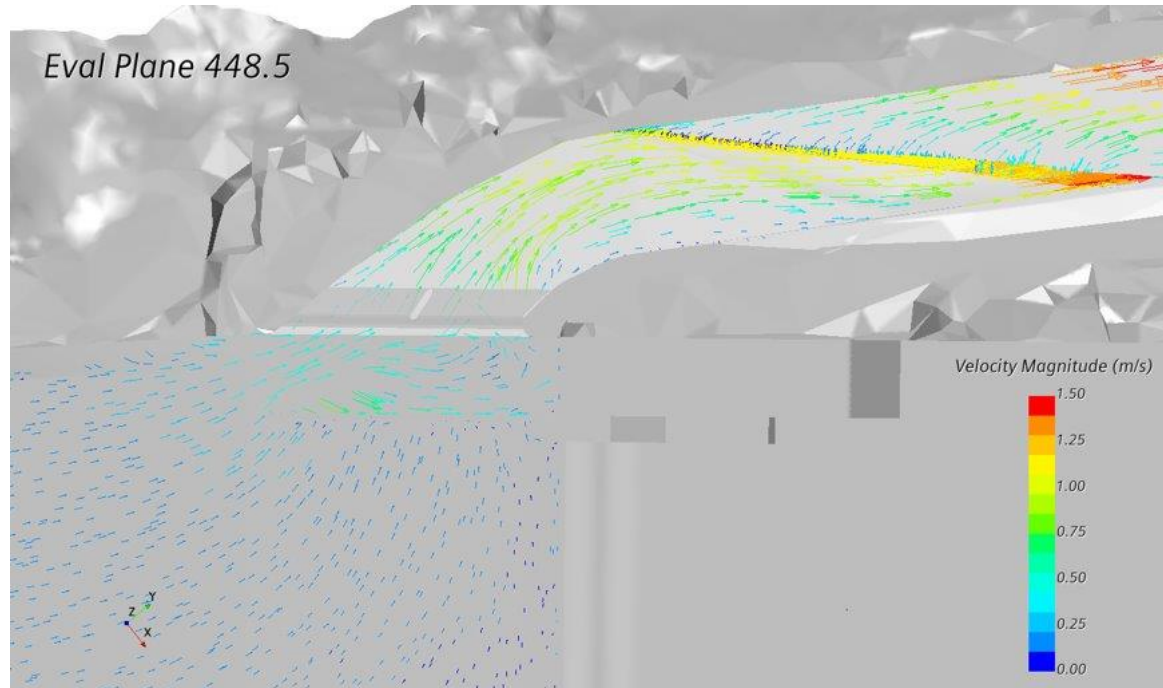# Rain-water Retention Systems

AFRY
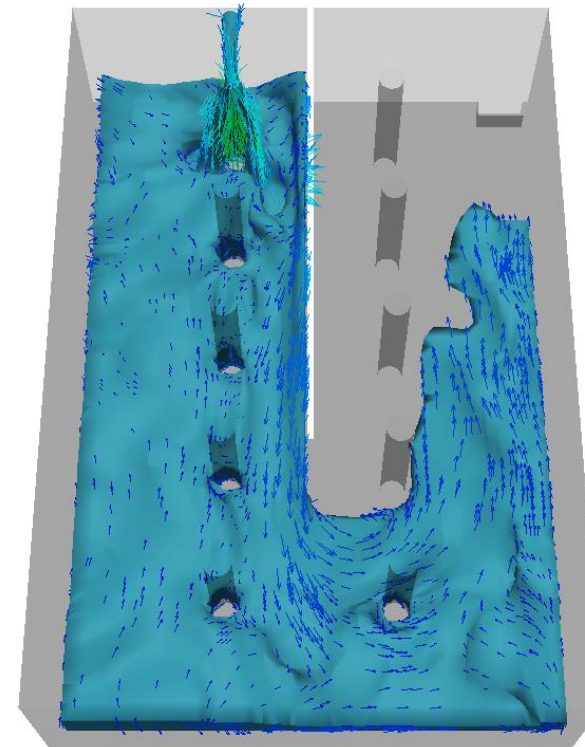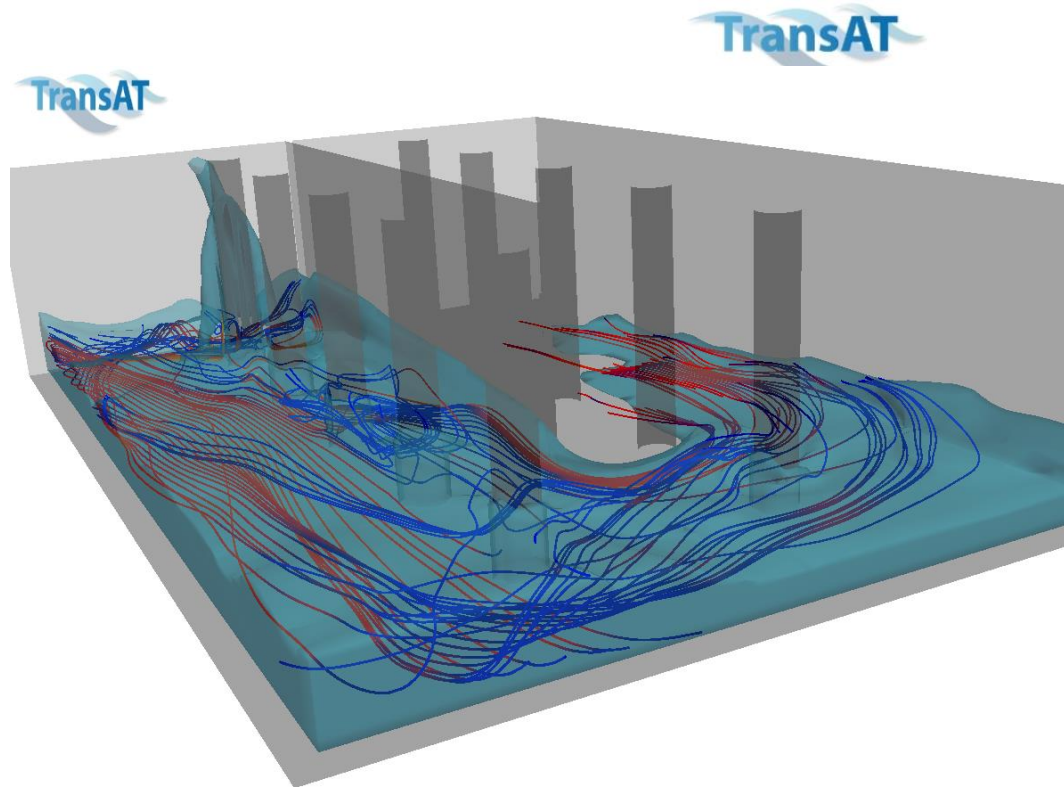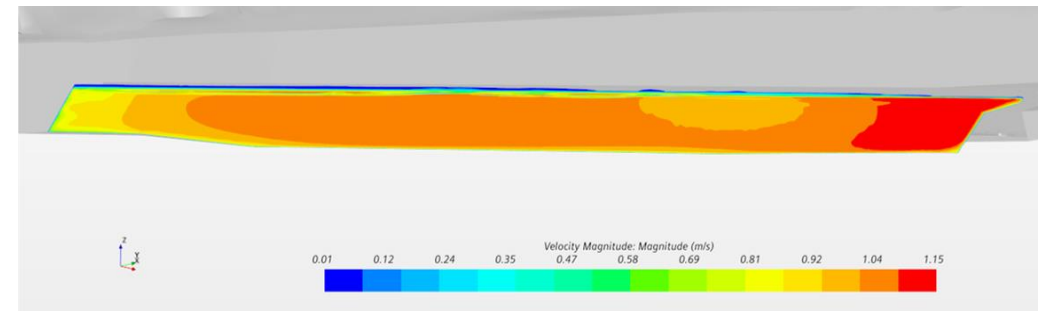
Emmenweid Wier Renovation
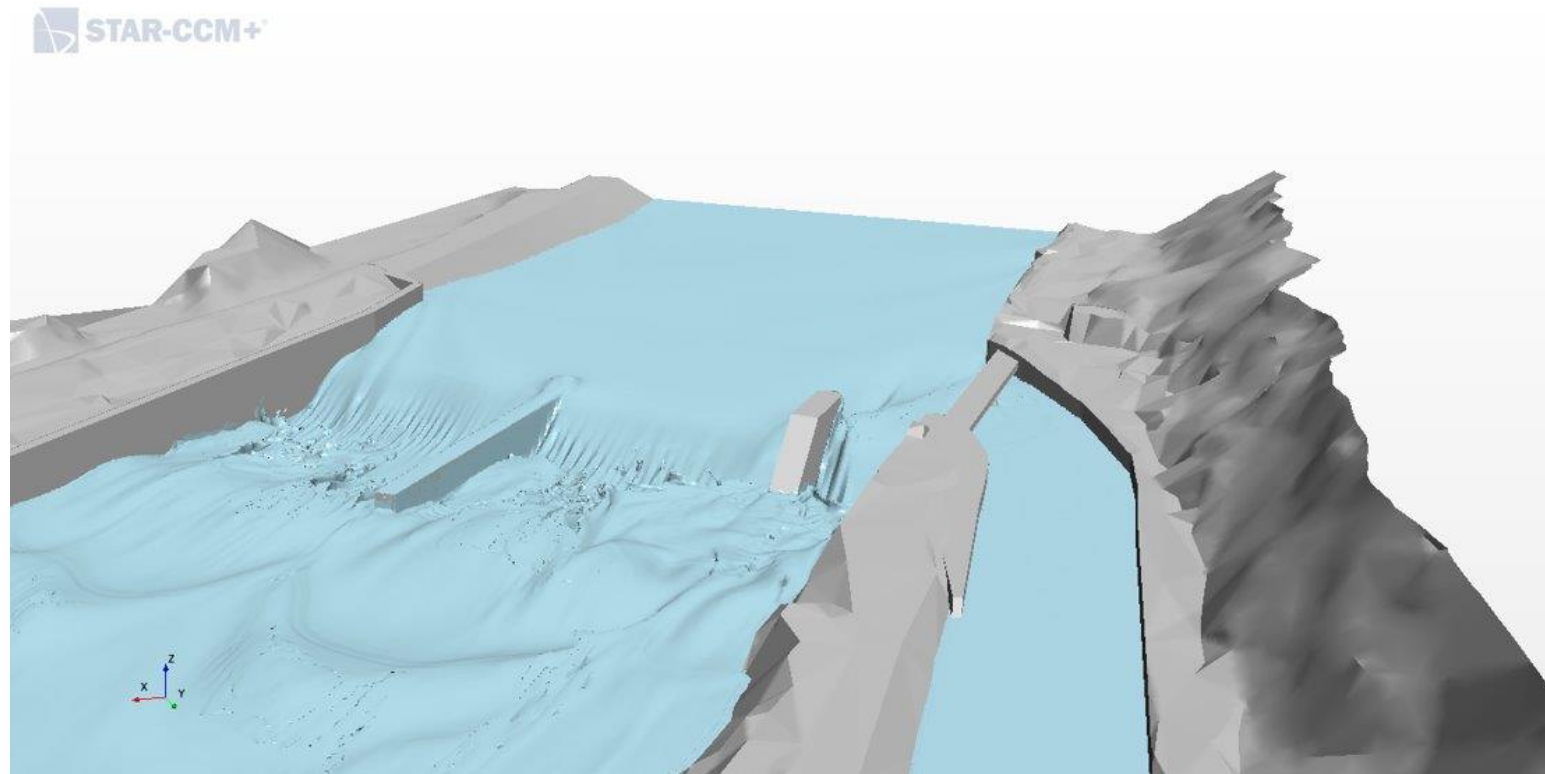
Water velocities into divergence channel for fish migration
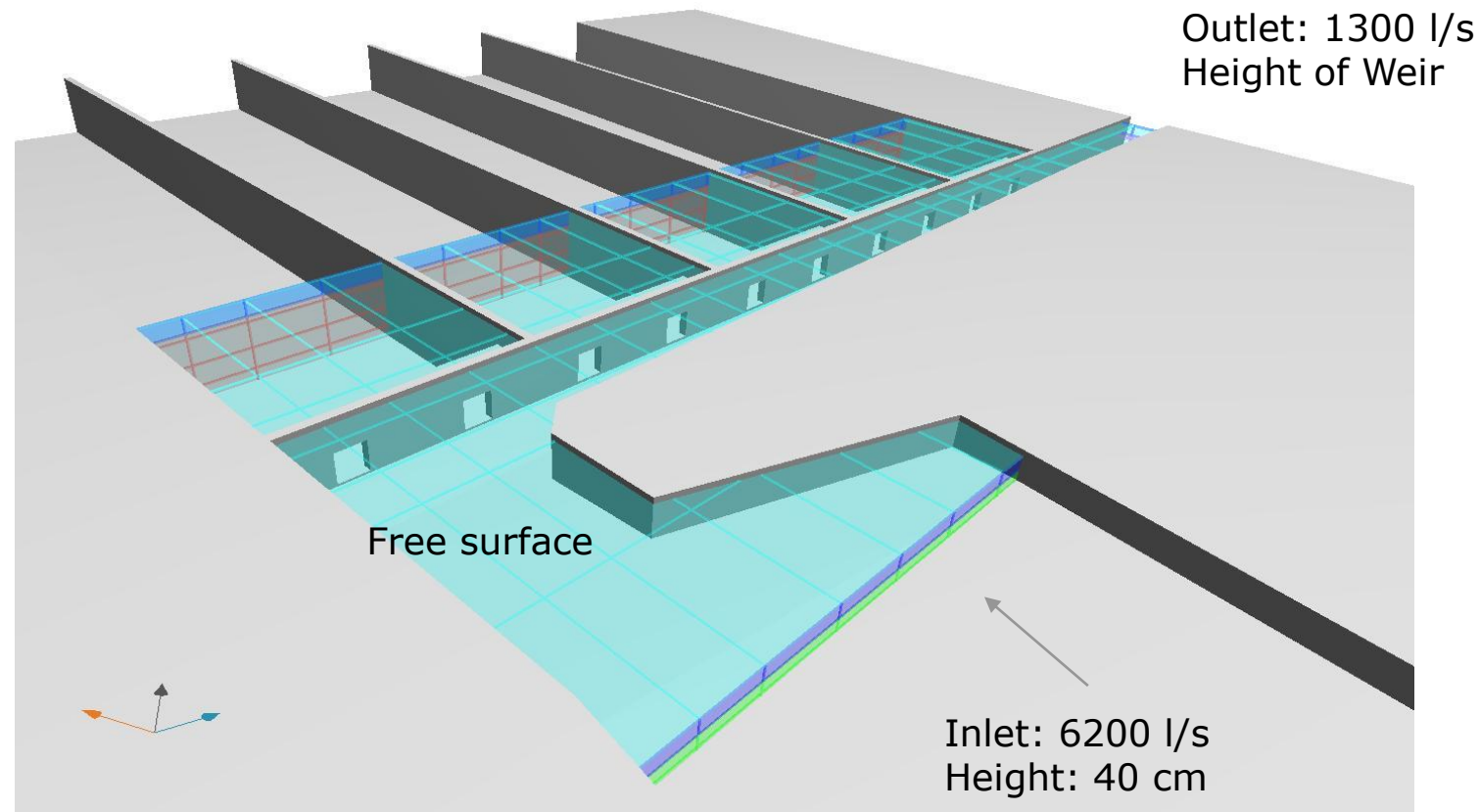

Fish Rack across channel

Emmenweid Wier Renovation

Flooding Scenario – Embankment design to prevent spill over

AFRY

Rain-water bassins retroffiting

CFD SIMULATION CAMPAIGN FOR REAL ENTSORGUNGS UND RECYCLING
LUZERN CH

Outlet: 1300 l/s
Height of Weir

Free surface

Inlet: 6200 l/s
Height: 40 cm

AFRY
ÅF PÖYRY

Simulation Results - 1

MASS BALANCE

— Global balance in water mass flow rates is observed after 100-150 seconds.

— Flow into Becken 1 is two times the flow into Becken 2-5

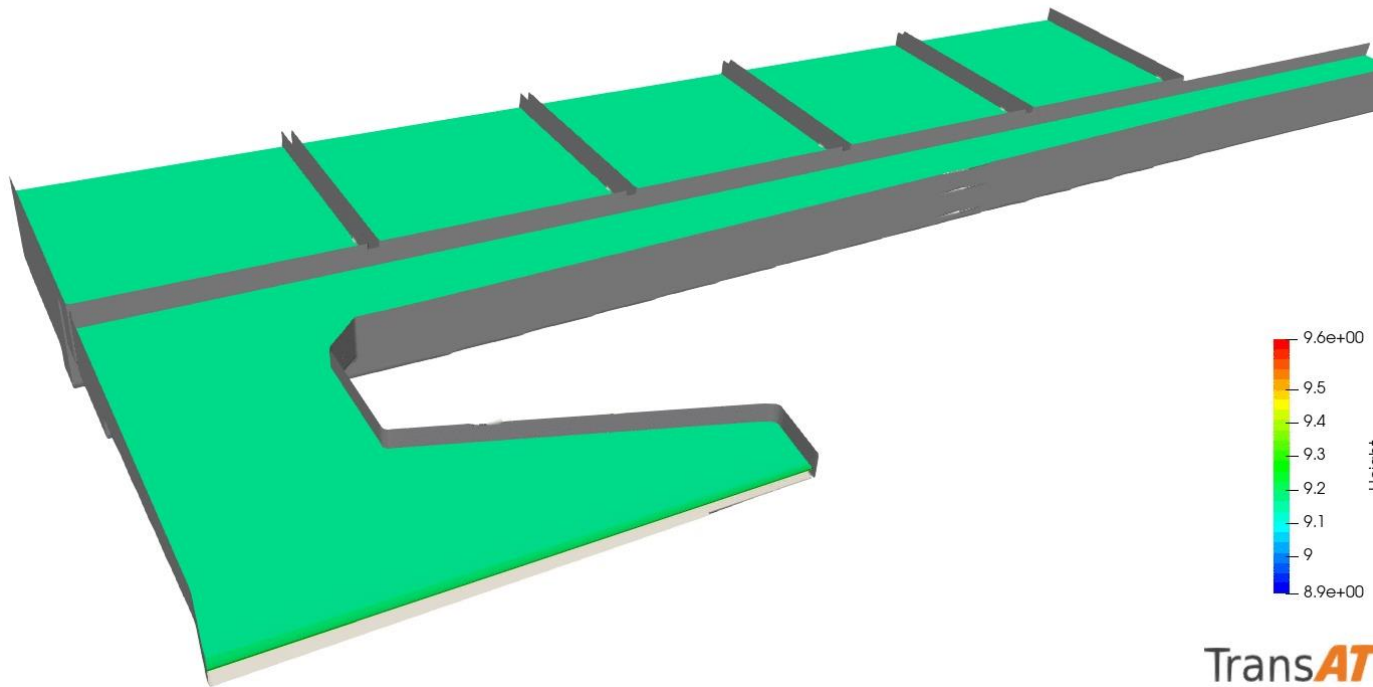— 32% goes to Becken 1 and around 17% goes into Becken 2-5
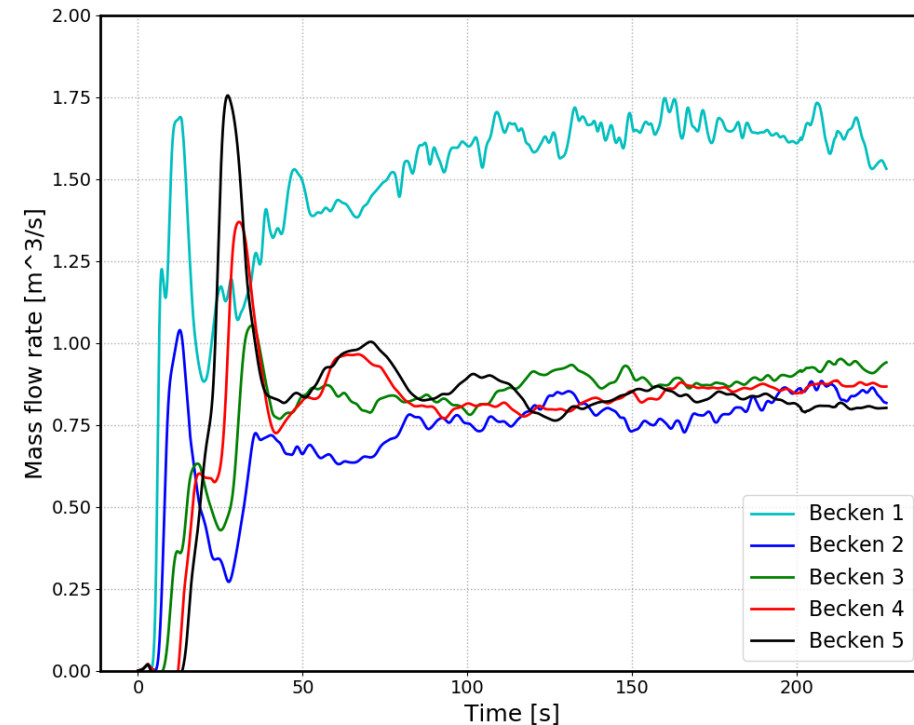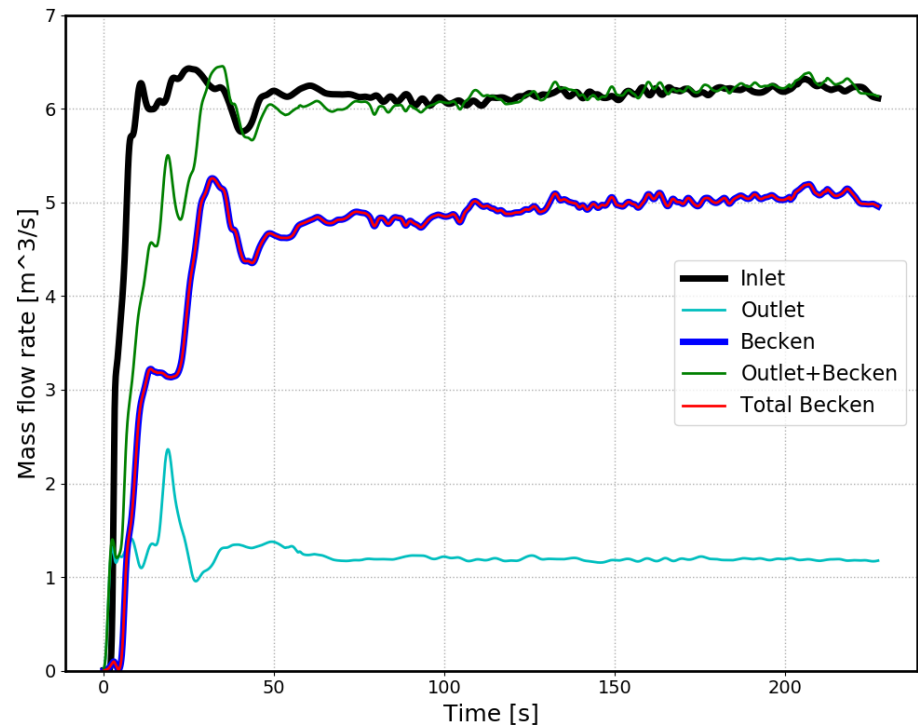
Simulation Results - 2

WATER LEVEL

— Water level is high at the left edge near Becken 1.

Time: 0.05 s

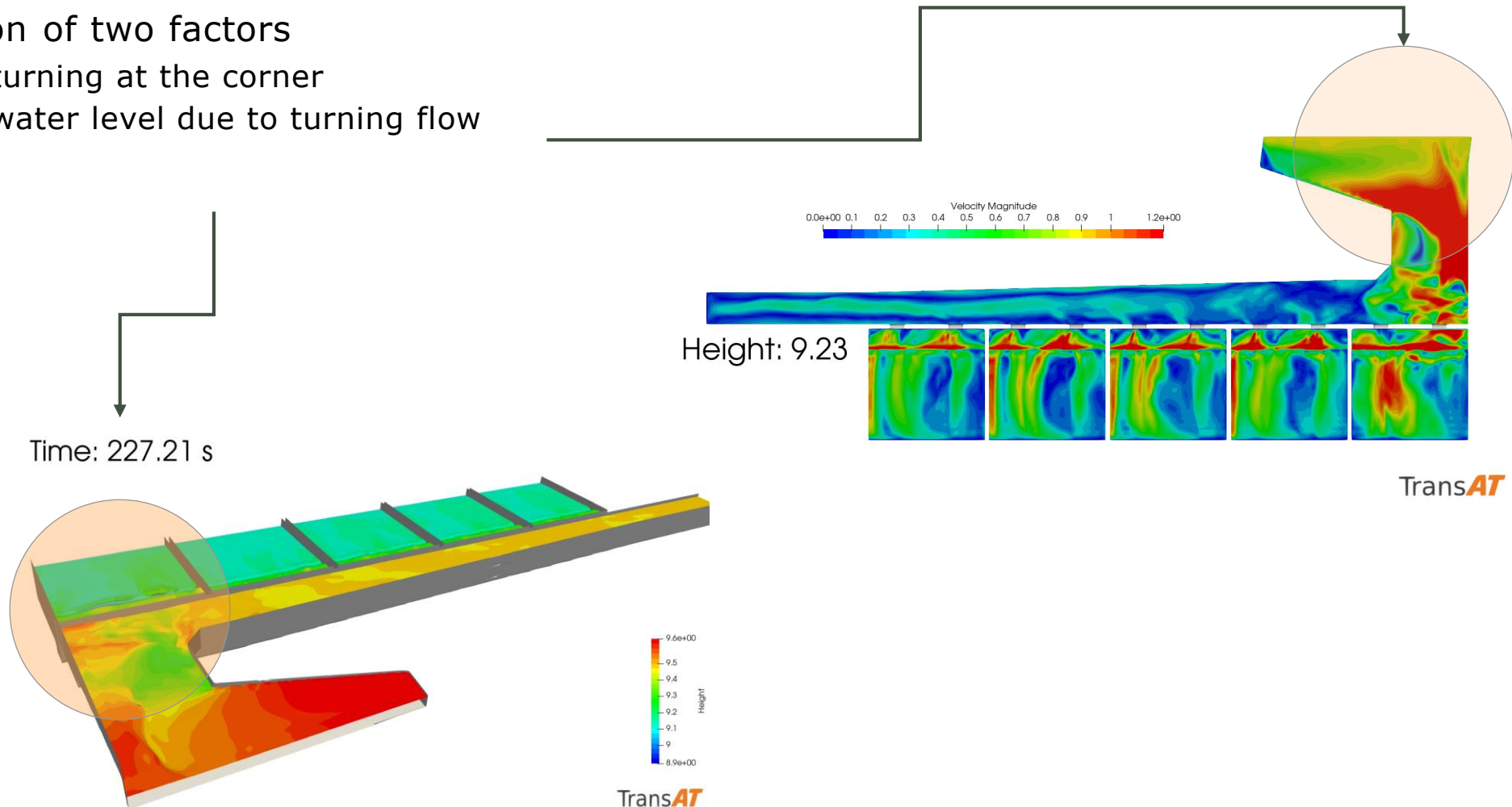Slideshow for Animation

TransAT

AFRY
ÅF PÖYRY

Simulation Results - 2

HIGH FLOW RATE INTO BECKEN 1

Combination of two factors

1. Flow turning at the corner
2. High water level due to turning flow

Velocity Magnitude

Height: 9.23

TransAT

Time: 227.21 s

TransAT

AFRY
ÅF PÖYRY

Making Future

— Advanced Modelling & Simulation

— www.poyry.com/ams; ams@poyry.com

AFRY