Brandenburgische Technische Universität Cottbus - Senftenberg

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TELEMAC 2D

Case Study 2: Rhein River Polder

EUROAQUAE+

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Cottbus, 26.11.2020

Overview

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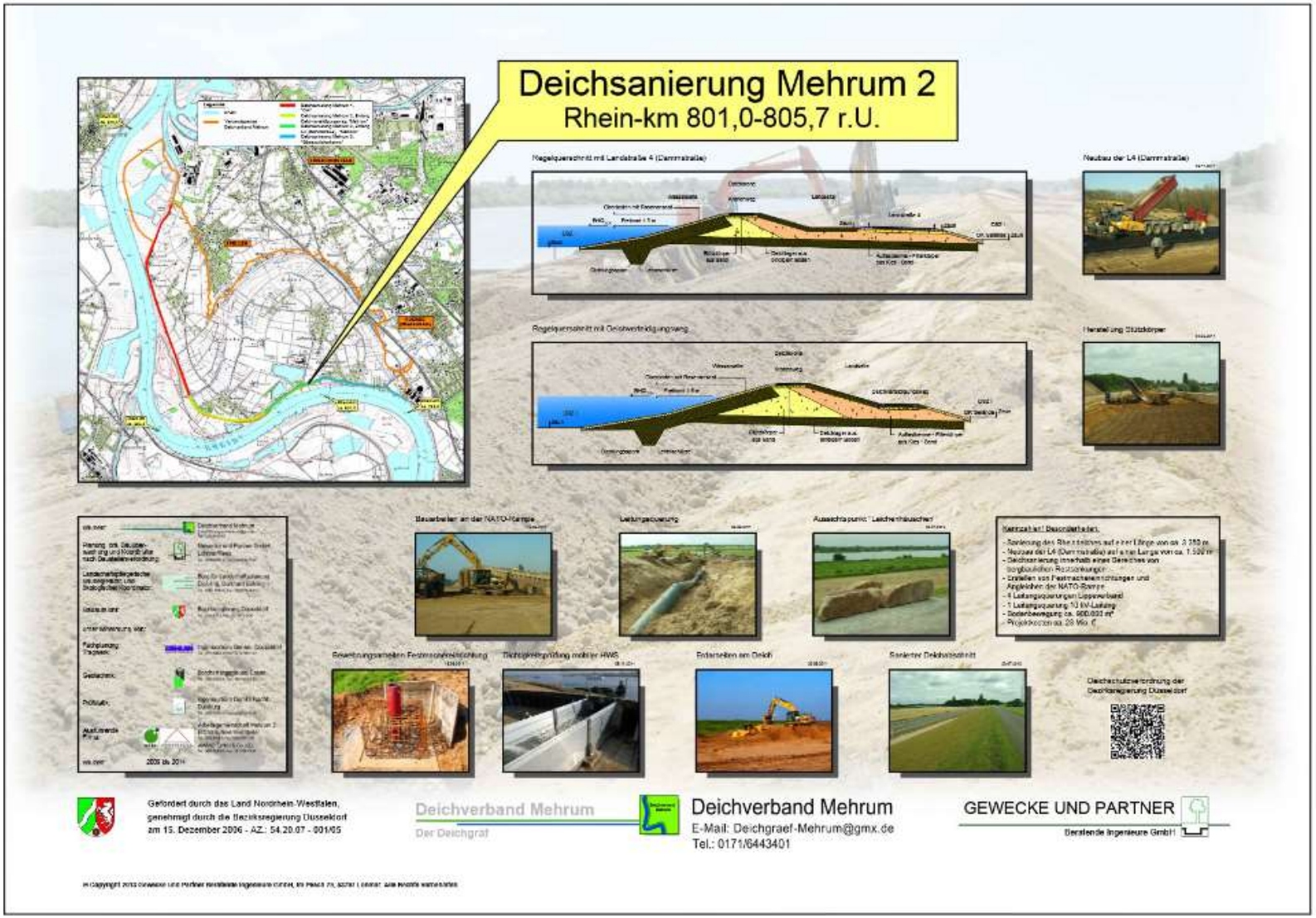
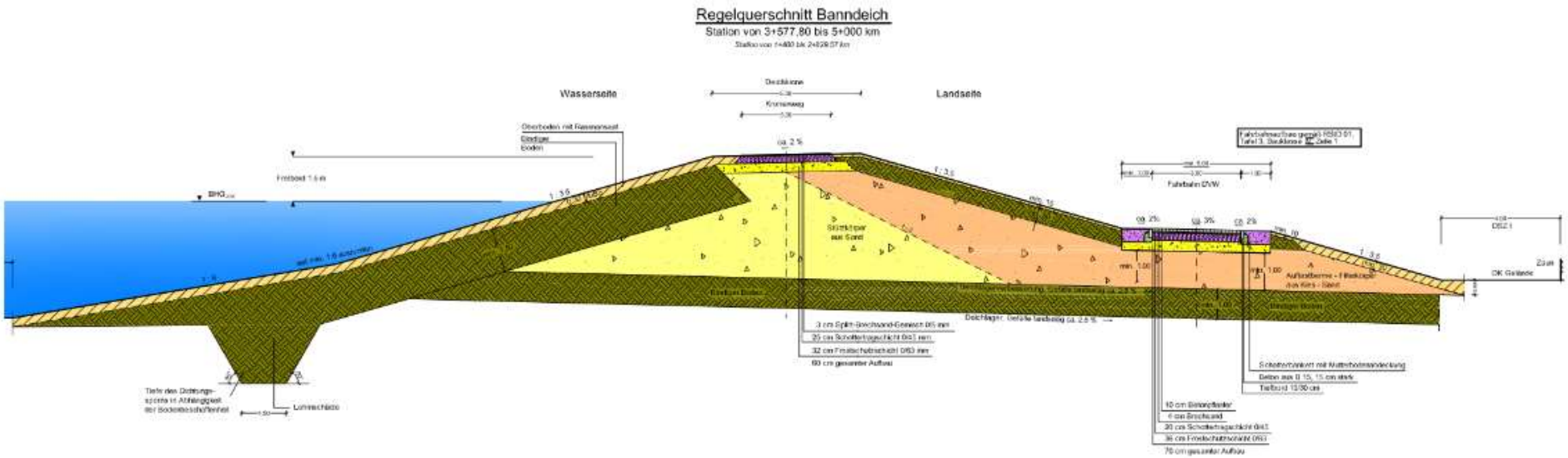
Introduction



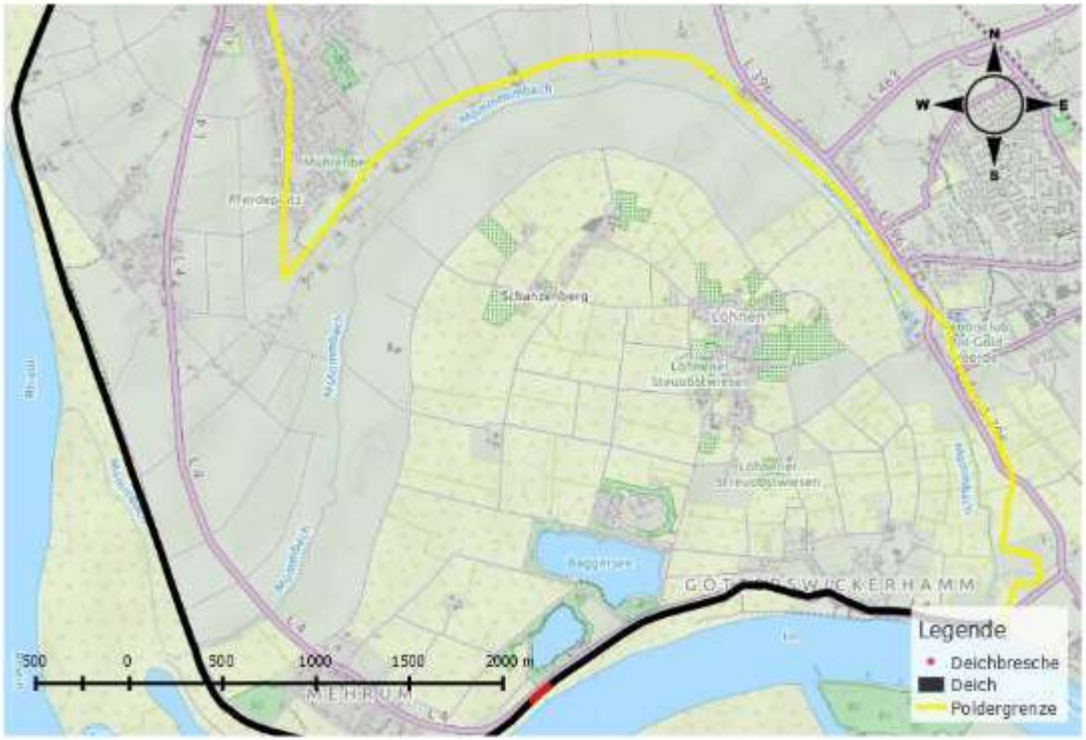
Introduction

- The area has been used in several ways throughout the years, with percentages of a land allocated for urban development and agricultural purposes.
- There is a dyke protecting the area, with an elevation of 22 meters.



Problematic

Given that there is a dyke currently existing and protecting the area of the polder, how much flooding would arise given within this region considering there would be an overflow (dam/dyke break)?



Strategy

- Run a steady state simulation that relates first with constant water depth until there is convergence within the domain of the simulation
- From the steady state, create a hot start file that can be used afterwards when running the dike break scenario, including as variables the velocities in x and y (u and v).
- Run a transient (unsteady) simulation using the information obtained from the hot start file and the discharge observations from before.
- Identify water depth and velocities throughout the domain of the simulation.
- Identify the dam break and set up the model so that we are able to see when it is happening.

Existing conditions

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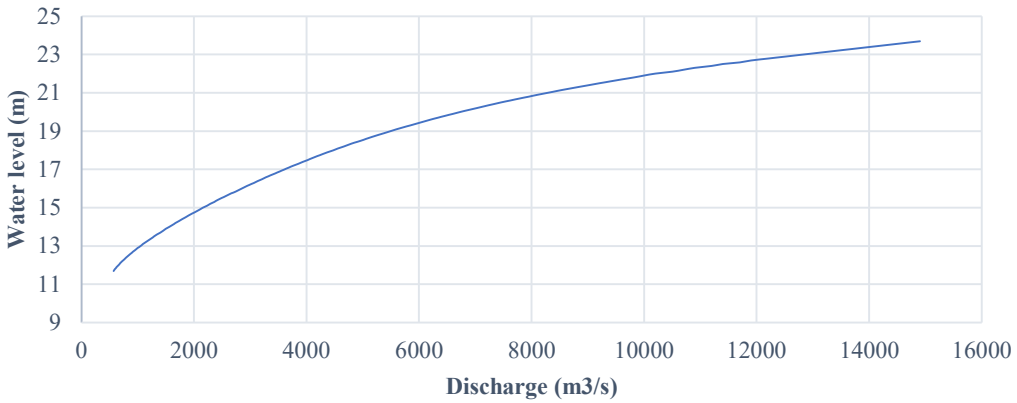
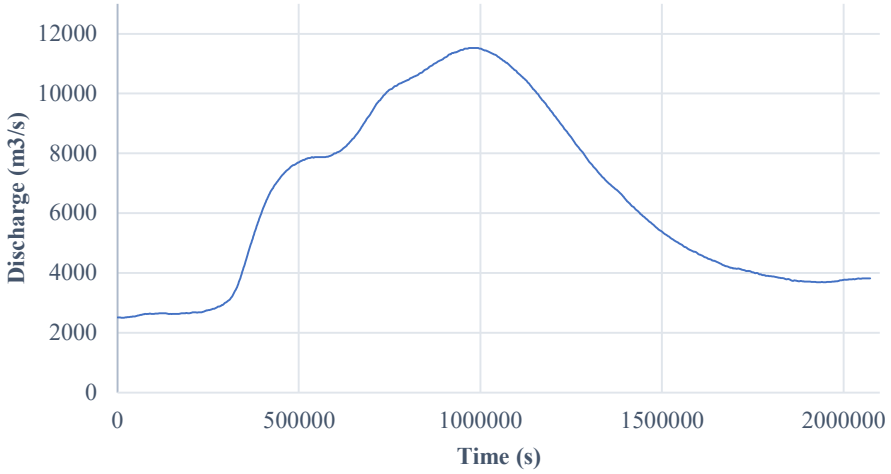
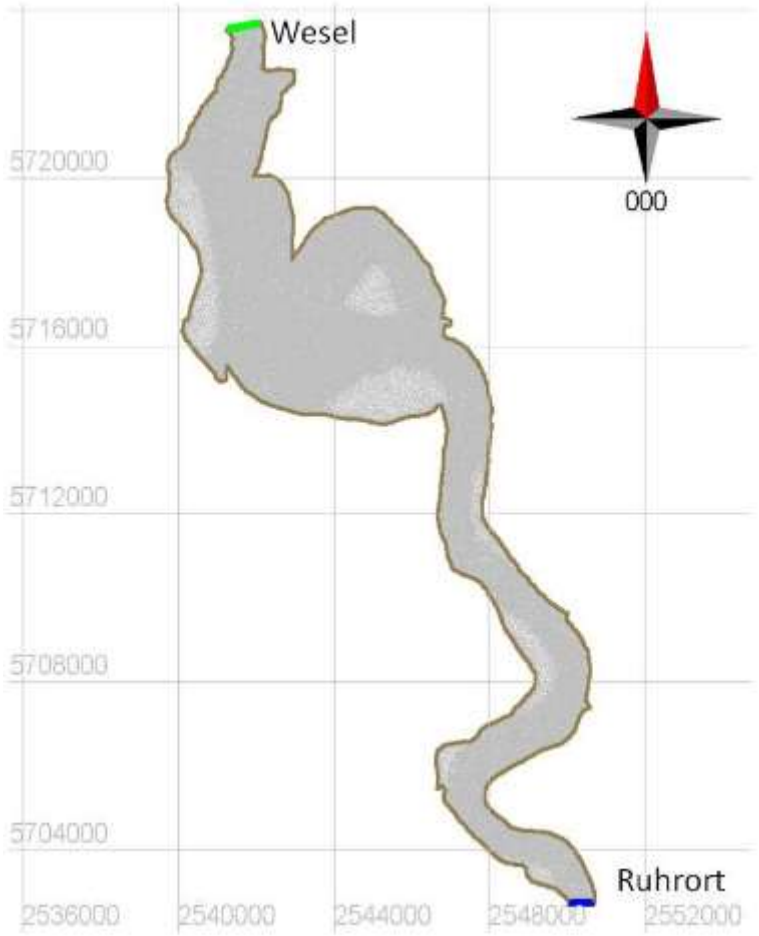
Rating curve at Wesel (based on 1996 readings)



Discharge in Ruhrort for 24 days





Existing conditions

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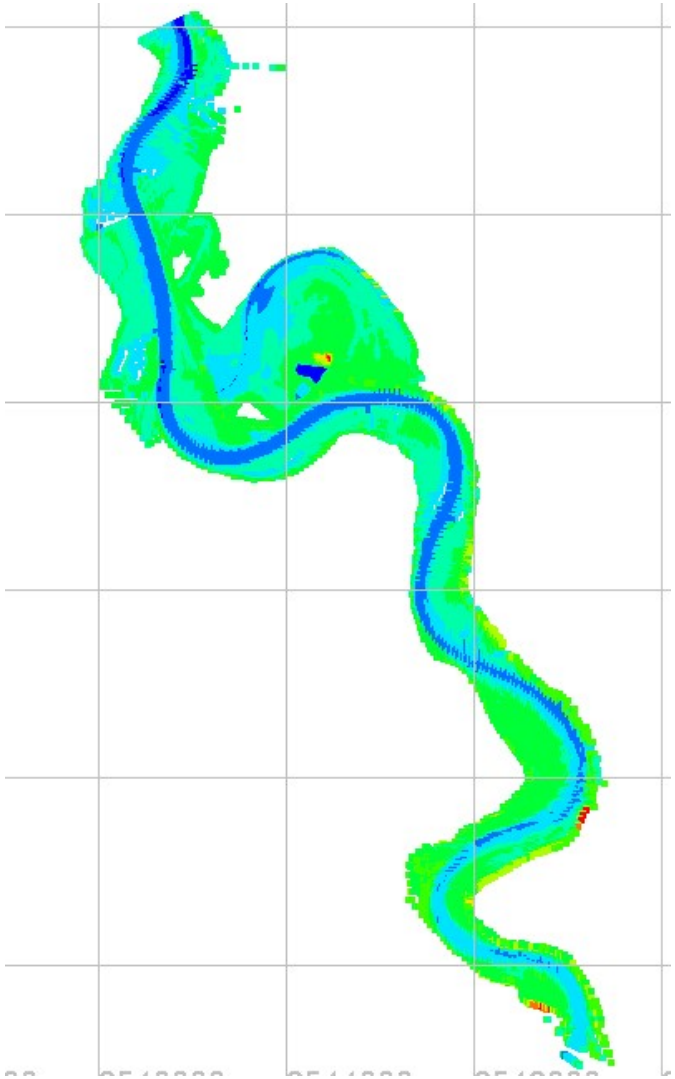
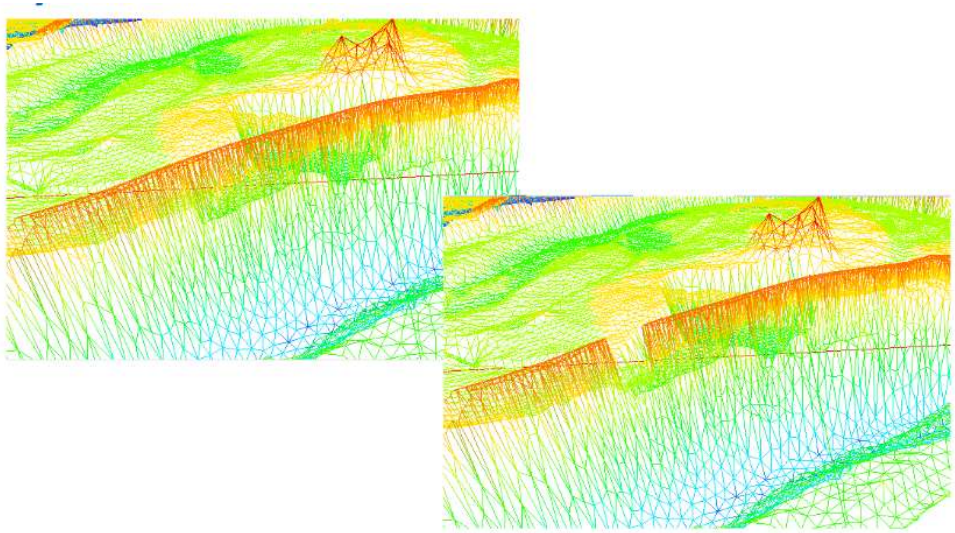
#Number of breaches
1
Bandwidth of the polyline defining the breach
80
Breach definition:
Option for the breaching process
3
Duration of the breaching process (0.0 = instant opening)
0.0
Final bottom altitude of the breach (appr. Height of the land behind the dike at this location)
22.0
Number (global mesh) of the point controlling the breaching
25145
Water level initiating the breaching process
22.6
Number of points of the polyline
5
Description of the polyline
2544280.750 5715852.500
2544300.500 5715871.500
2544320.000 5715890.500
2544341.000 5715908.000
2544362.000 5715925.500

#coordinates - control section file
6 0
Rhein_upstream_(Fm780900)
2549987.276 5702840.683 2550723.057 5702876.656
Rhein_mid0_(Fm789600)
2549145.204 5708199.191 2550661.331 5708039.751
Rhein_mid_(Fm798300)
2546752.413 5714824.14 2547889.285 5715186.877
Rhein_mid2_(Fm807600)
2540553.64 5717736.904 2541843.789 5717896.636
Rhein_wesel_(Fm813800)
2541283.281 5723463.551 2542641.211 5723637.594
DYKE_BREACH802000
2544280.750 5715852.500 2544362.000 5715925.500

TELEMAC Simulation