KÖTIVIZIG
KÖZÉP-TISZA-VIDÉKI VÍZÜGYI IGAZGATÓSÁG SZOLNOK

Interreg CENTRAL EUROPE
European Union
European Regional Development Fund

RAINMAN

Interreg CE Project RAINMAN

EUSDR Water Climate Conference
Budapest, 28 November 2023

Gábor Harsányi, Deputy Director, Chief Engineer – Middle Tisza District Water Directorate

THE AIM

GOAL reduce the losses in the natural and built environment caused by heavy rain

RAINMAN developed innovative management tools and methods for municipalties and other regional and local stakeholders

5 Tools developed until 2020

11 Outputs planned until June 2020

26 trainings offered to local, regional and international level

6 Countries

10 Project Partner

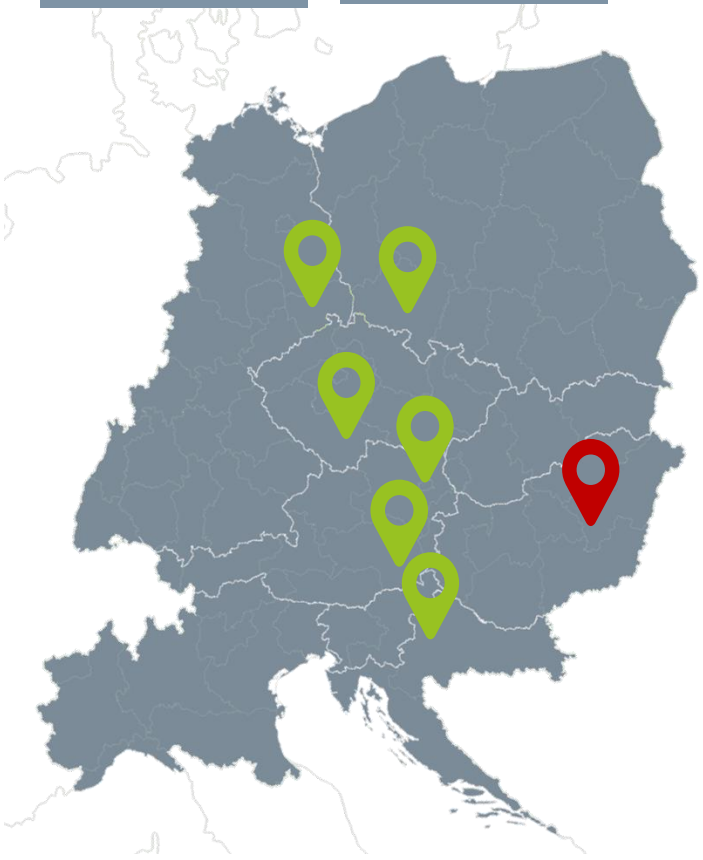
3 Mio. EUR Budget (ca.)

2,5 Mio. EUR ERDF (ca.)

PARTNERSHIP

6 Countries

10 Project Partner



Germany

- **Saxon State Office for Environment, Agriculture**
- **and Geology – Lead Partner**
- Saxon State Ministry of the Interior
- Leibniz Institute of Ecological Urban and Regional Development

Austria

- Environment Agency Austria
- Office of the Styrian Government

Croatia

- Croatian Waters

Czech Republic

- T. G. Masaryk Water Research Institute, p.r.i.,
- Region of South Bohemia

Hungary

- **Middle Tisza District Water Directorate**

Poland

- Institute of Meteorology and Water Management
- National Research Institute

FUNDING

The Project is funded by the Interreg CENTRAL EUROPE Programme.

The program was funded by the European Regional Development Fund and supports institutions to work together beyond borders to improve cities and regions.

3
Mio. EUR
Budget (ca.)

2,5
Mio. EUR
ERDF (ca.)

PROBLEM

Risks of heavy rain events are increasing all over Europe

- Floods
- Only very short warning time
- Environmental damages
- Destruction

TOOLBOX

- RAINMAN toolbox was the central output of the project
- The toolbox contains 5 transferable tools:
  - Assessment and mapping tool for heavy rain risks
  - Implementation guide for risk reduction measures, warning and emergency response
  - Recommendations for flood risk management plans
  - Awareness raising and stakeholder involvement tools
  - Catalogue of good-practice examples for the integrated reduction of heavy rain risks

TOOL 1: Method for identification and mapping of high risk areas

- Development of methods to assess heavy rain risks under different categorized physical conditions and land uses
- Specification according land uses and setting
  - E.g. urban / rural land uses, mountainous and low land
- The outputs are the fundament for adaptation to the risks

TOOL 2: Tool for reduction of heavy rain risks

- The partners created one tool and one strategy to reduce the heavy rain risk
- Catalouge of risk reduction measures and guidance for selection and implementation of suitable measures

PILOT ACTIONS

- 7 pilot activities in 6 countries
- implemented to test the developed joint methods and tools and to prove their feasibility and applicability
- different characteristics to cover a wide range of application conditions
- pilot actions improve the developed measures with experiences and make them transferable

PILOT ACTION- MIDDLE TISZA DISTRICT

- Project actions of MTDWD:
  - Development of assessment methodology for excess water risk. (Previouly and partly done in FRMP)
  - Assesement of the risk on two pilot areas:
    - 10.07 Excess water defence secion
    - Territory of Tiszakécske municipality
  - Preparation of the Water Damage Prevention plan of Tiszakécske.
  - Development of the Application VÍZ24 to help municiplaities in case of emergency.
  - Preparation of the Retention Concepts Document
  - Pilot Investment: A Storage development on the Kakat channel by 12.000 m^3.

Excess water damages – Escess water control

Pluvial flood

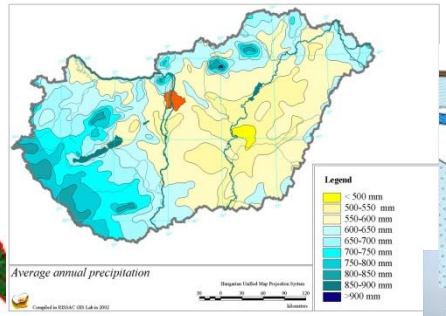
Formation of excess water inundations

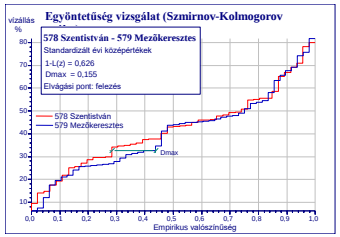
Constant factors

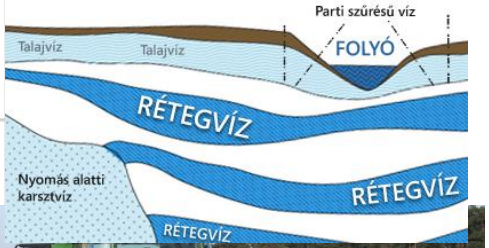
- geological structure;
- soil conditions;
- relief;
- dead river beds, etc.

Variable and human factors

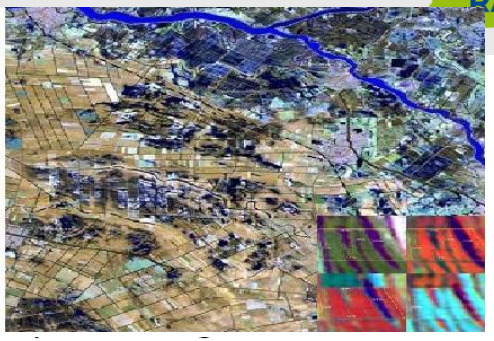
- weather, heavy rain events and groundwater conditions;
- land use;
- water management;
- agricultural techniques;
- land degradation;

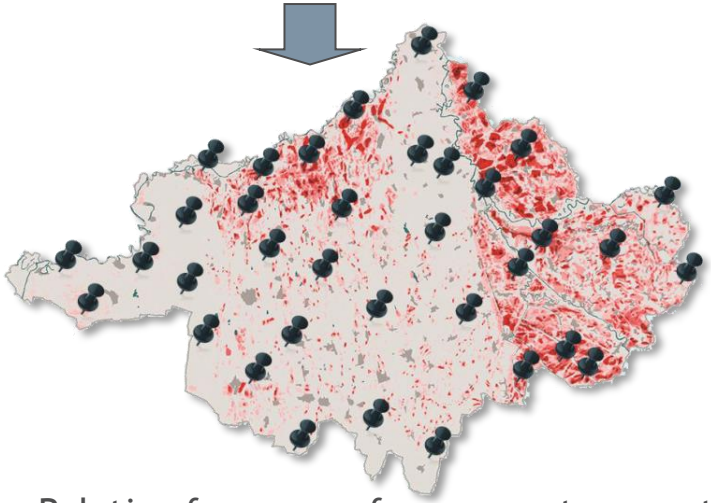






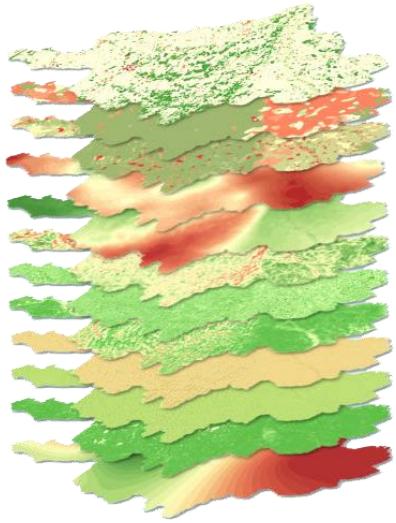
Complex Excess Water Hazard mapping process





Relative fequency of excess water events

Correlation



Each influential factor was typified by only one value in a grid.

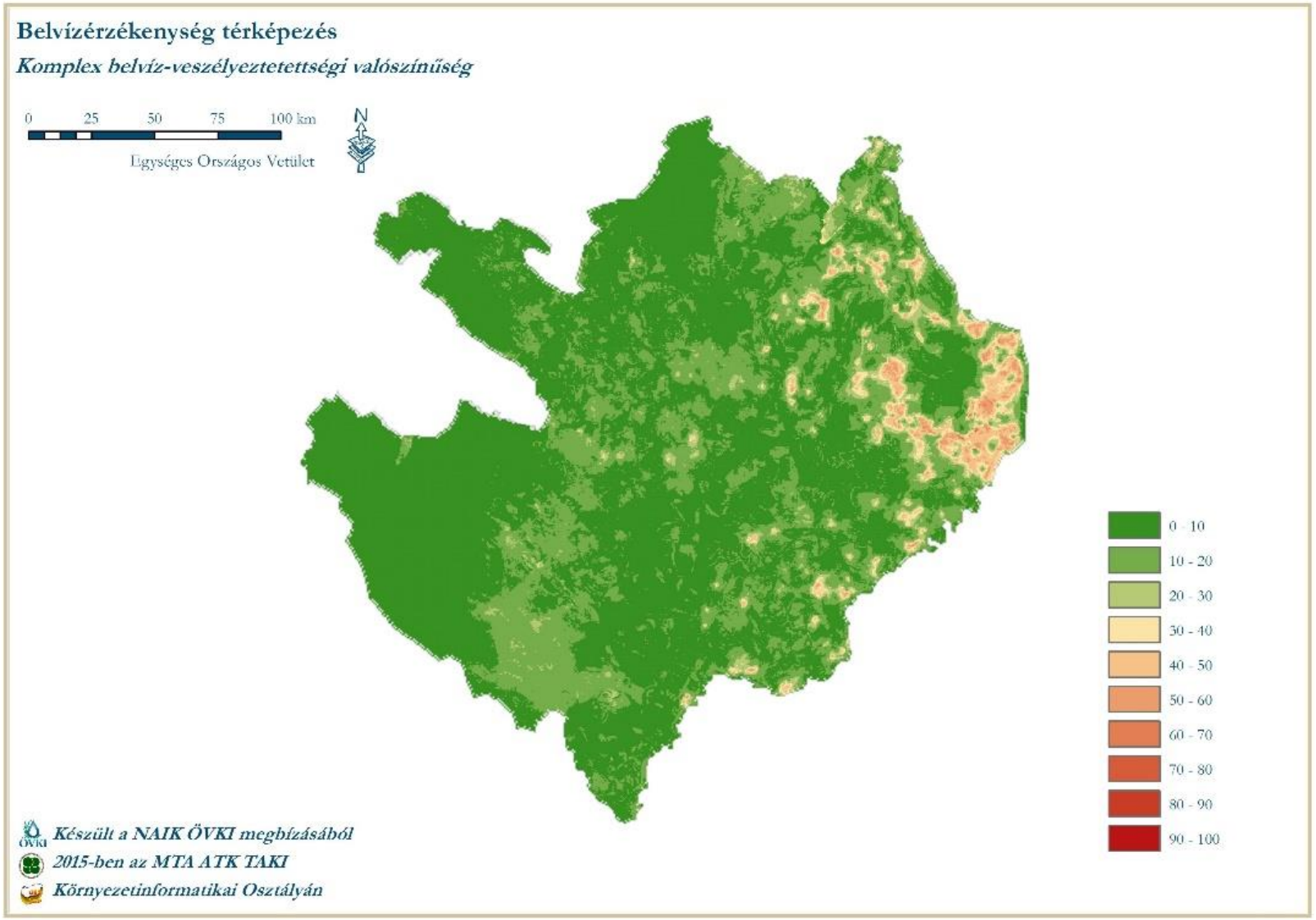
Hydrometeorology
Relief
Soil
Geology
Groudwater
Land use

MULTIPLE LINEAR REGRESSION ANALYSIS → TREND + RESUDIALS → ORDINARY KRIGING

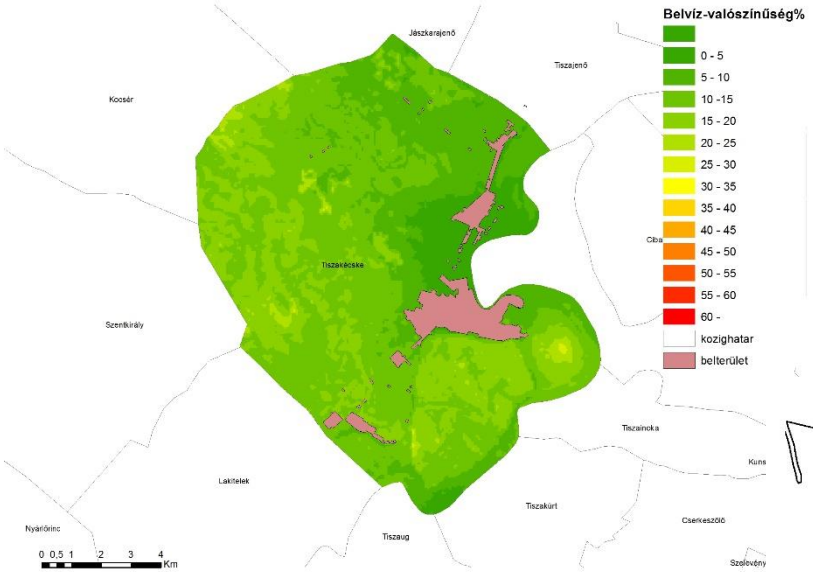
RK is a spatial prediction technikque which combines the regression of the dependent variable on influential factors with krigging of regression resudials.

RESULTS, HAZARD MAP/RISK MAP

END RESULT

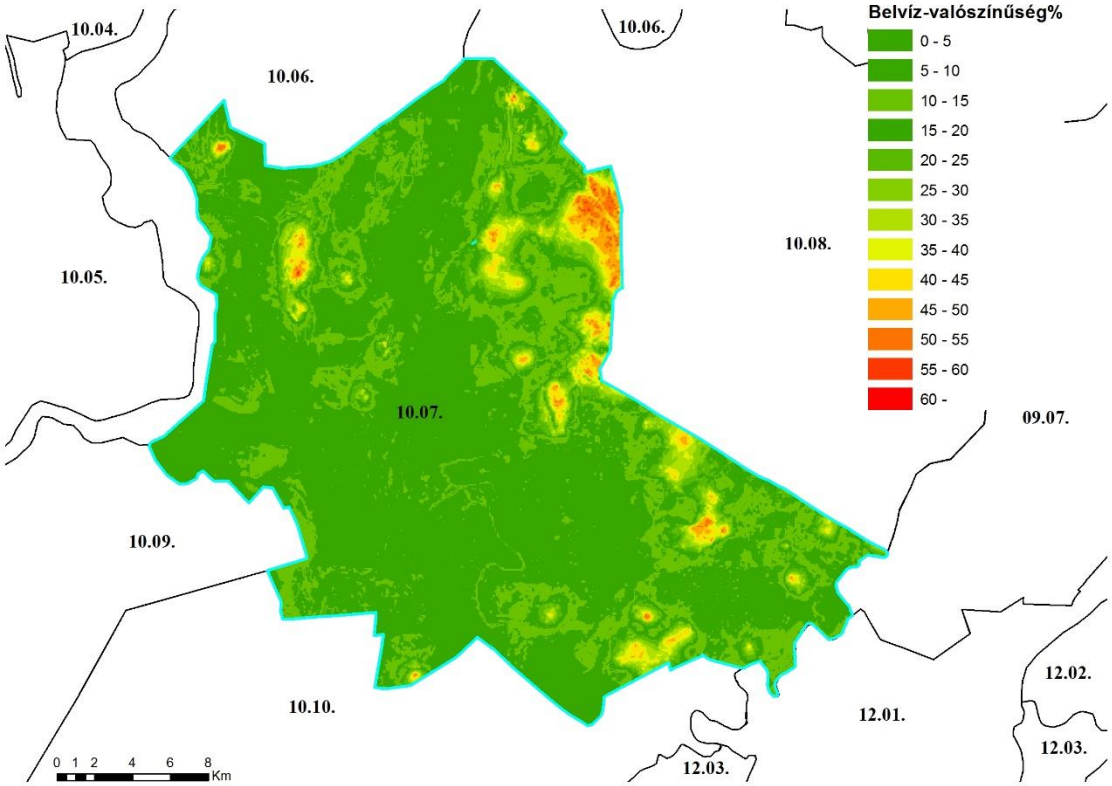

Belvízérzékenység térképezés
Komplex belvíz-veszélyeztetettségi valószínűség
0 25 50 75 100 km
Egységes Országos Vetület
N
0 - 10
10 - 20
20 - 30
30 - 40
40 - 50
50 - 60
60 - 70
70 - 80
80 - 90
90 - 100
Készült a NAIK ÖVKI megbízásából
2015-ben az MTA ATK TAKI
Környezetinformatikai Osztályán

DETAILED RESULT OF MAPPING



Tiszakécske municipality

10.07 excess water section



VÍZ24 APP

- IDEA:
  - To give 21th century useful tool for muncipalities to organize the defense works
  - To display a GIS based channel system, reservoirs, etc
  - Include weater forecast and warning (push message)
  - To integrate the documents of defence
  - Phonebook, contact data
  - Etc.

VÍZ24 APP

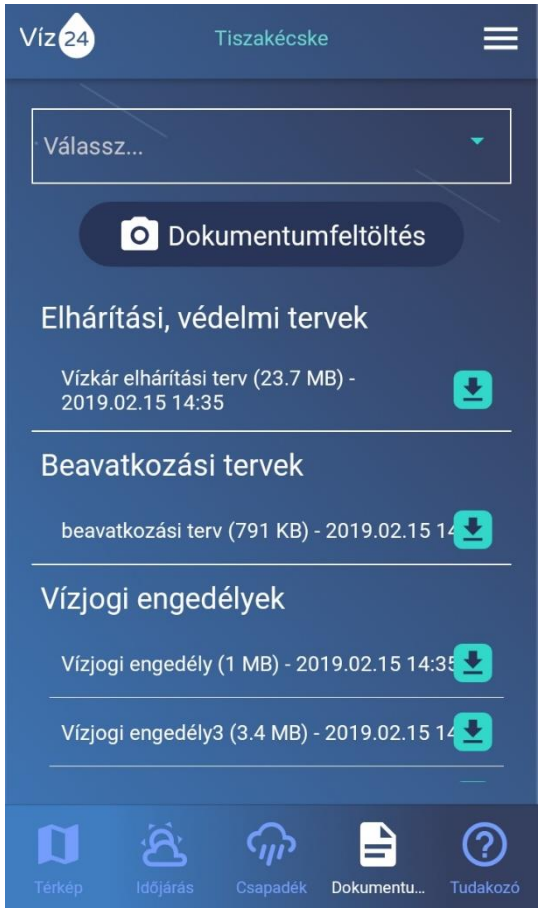
Enter page

Territory chosing page

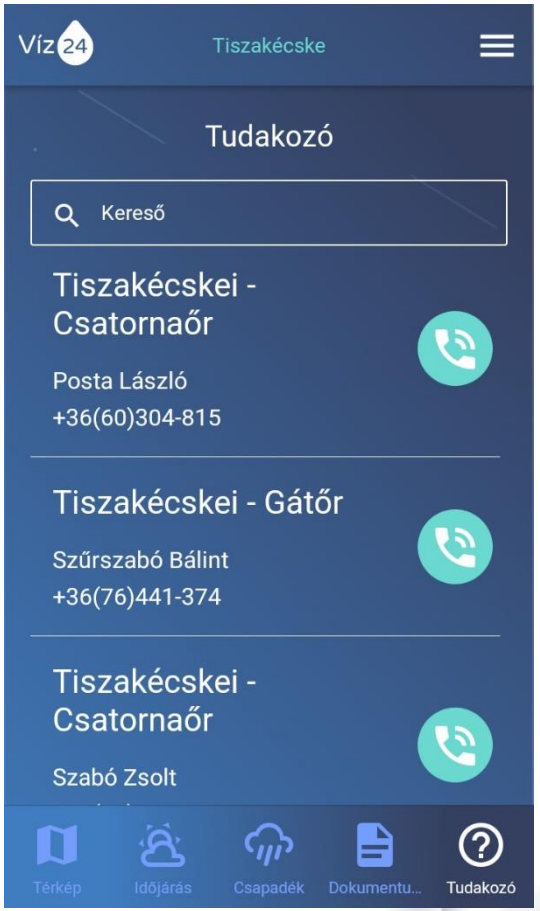
Municipality page

VÍZ24 APP

Rainfall forecasting page



Documents page



Contact data page

- Problems:
  - Most of the settlements tackle with rainwater problems
  - Municipalities have poor information about storage possibilities and solutions
  - Spatial planners barely consider storage opportunities

- Aims:
- To give useful guidance to municipalities for storage management
- To give recommendations based on best practices
- To give a tool to have rough estimation on storage sizes
- To show solutions for the harmonization of urban and rural retentions
- Focus on urban/semi urban areas but also have proposals for rural areas (arable areas, farmers, etc)

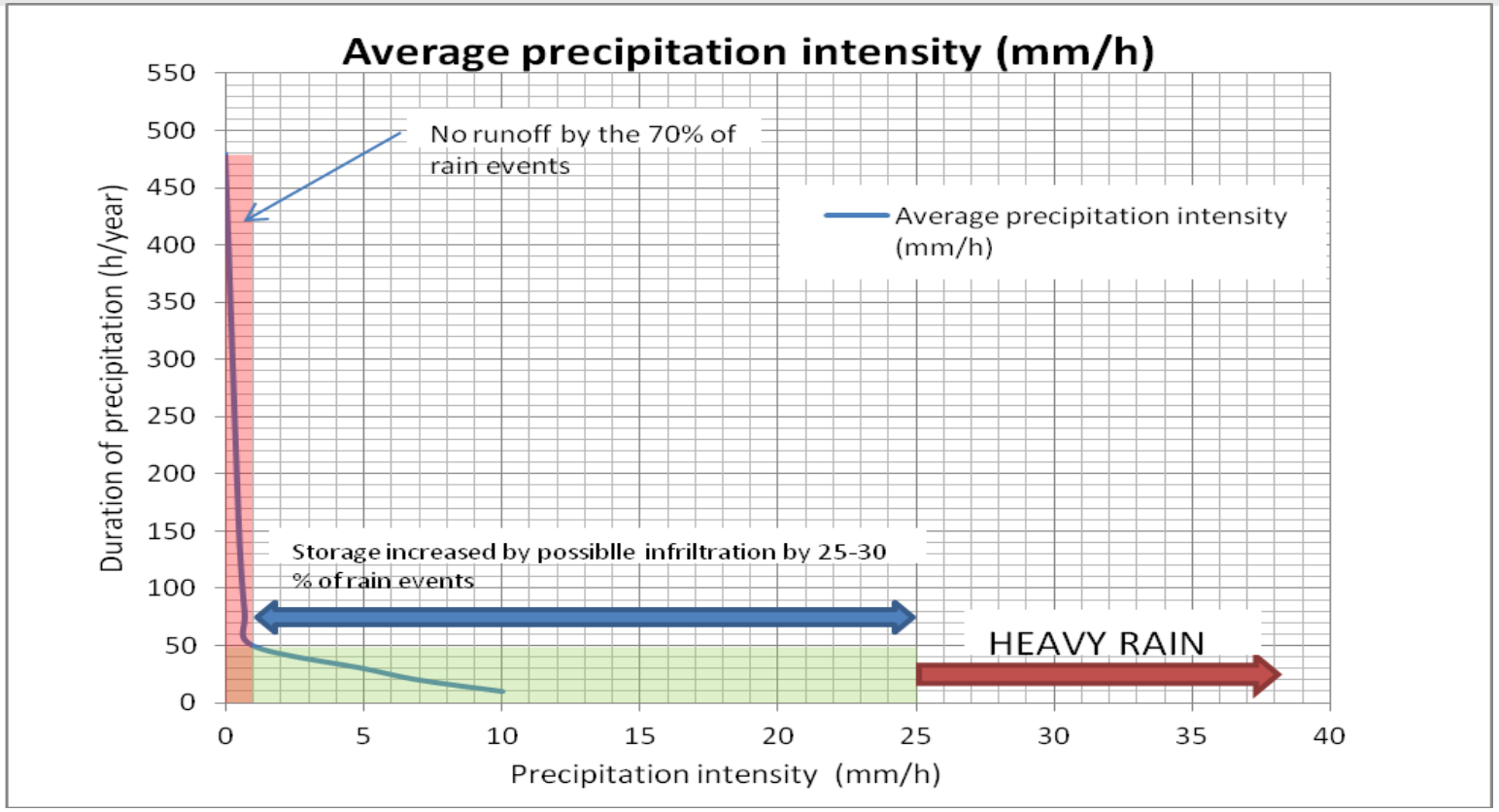
RCD-STRUCTURE

- General introduction
  - Project context, setting the goals, approach and structure
- Runoff regulation and retention issues related to heavy rainfall
- Technical practice guide
  - Sample calculation
- Best practice examples (factsheets)
- Summary, conclusions

GENERAL INTRODUCTION

- This document contains basic level scientific and technical background
- The goal of the document is to:
  - give hints to municipalities for proper storage designing and management
  - show best practices from Hungary and Participating countries
  - show solutions for harmonization of urban and rural retentions
- The study mainly focuses on best practices in the topic of rain water retention. These examples were provided by the partner countries of the RAINMAN project

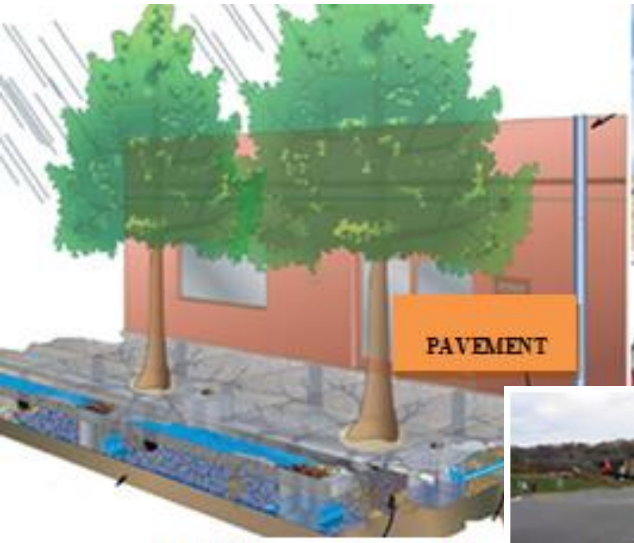
RCD-MAIN FINDING



- Almost 70% of the rain events, there is no or not accountable runoff from the surface.
- At 25-30% of the cases the local storage can be increased by extension of the infiltration capacity of the surface.
- And the rest part is heavy rain from 25 mm/h intensity, that needs drainage/storage.

BEST PRACTICE EXAMPLES

- Gathered altogether 17 types of retentions
- Prepared factsheets based on the types

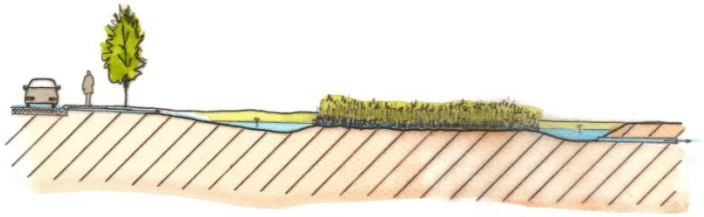


Infiltrating cells

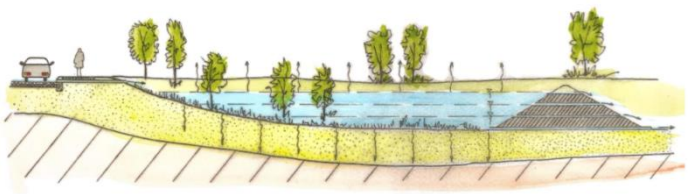
Temporary inundated areas

BEST PRACTICE EXAMPLES-POLAND

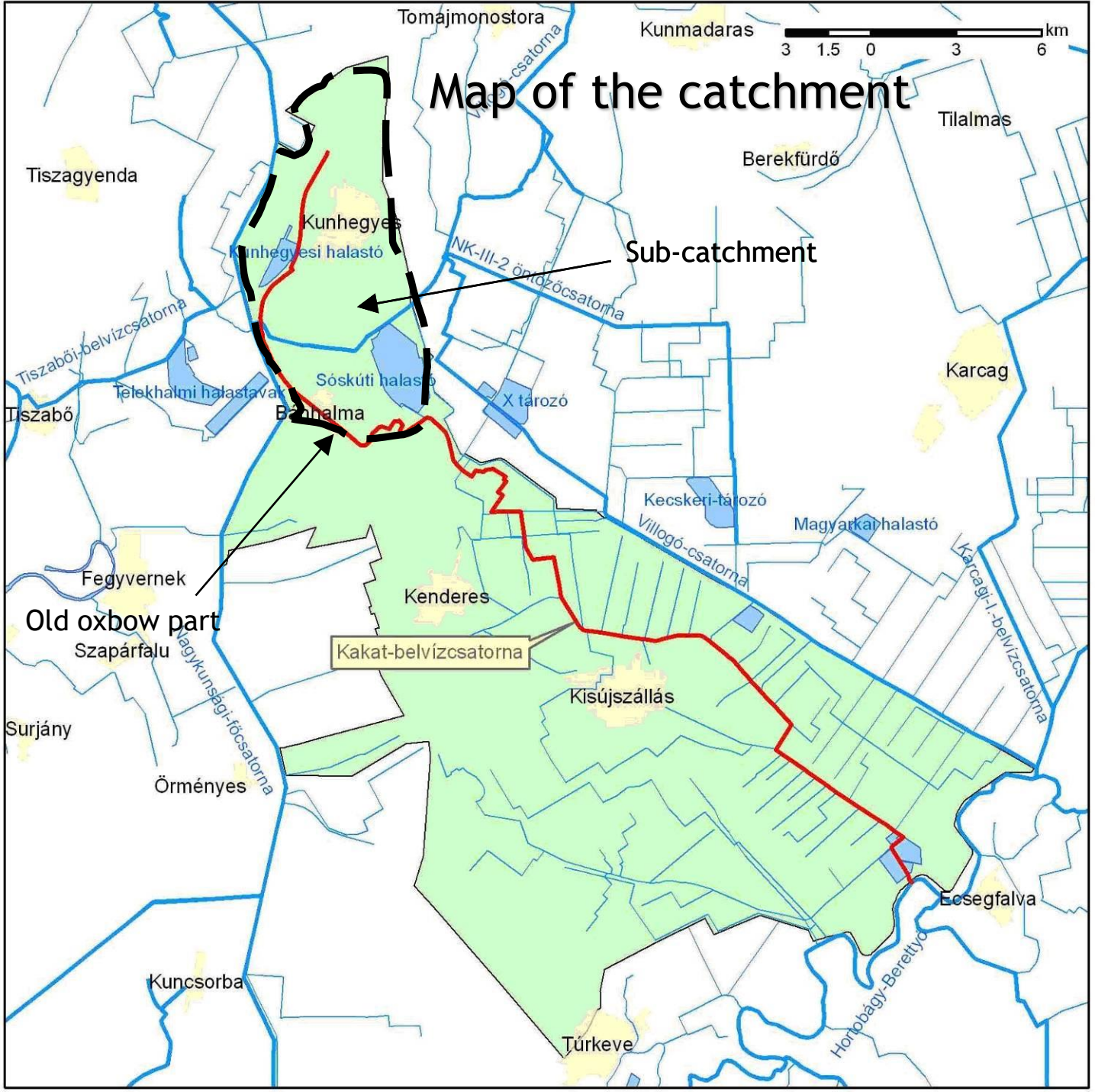
R/08 – OBIEKT HYDROFITOWY



R/11 – SUCHY ZBIORNIK RETENCYJNY



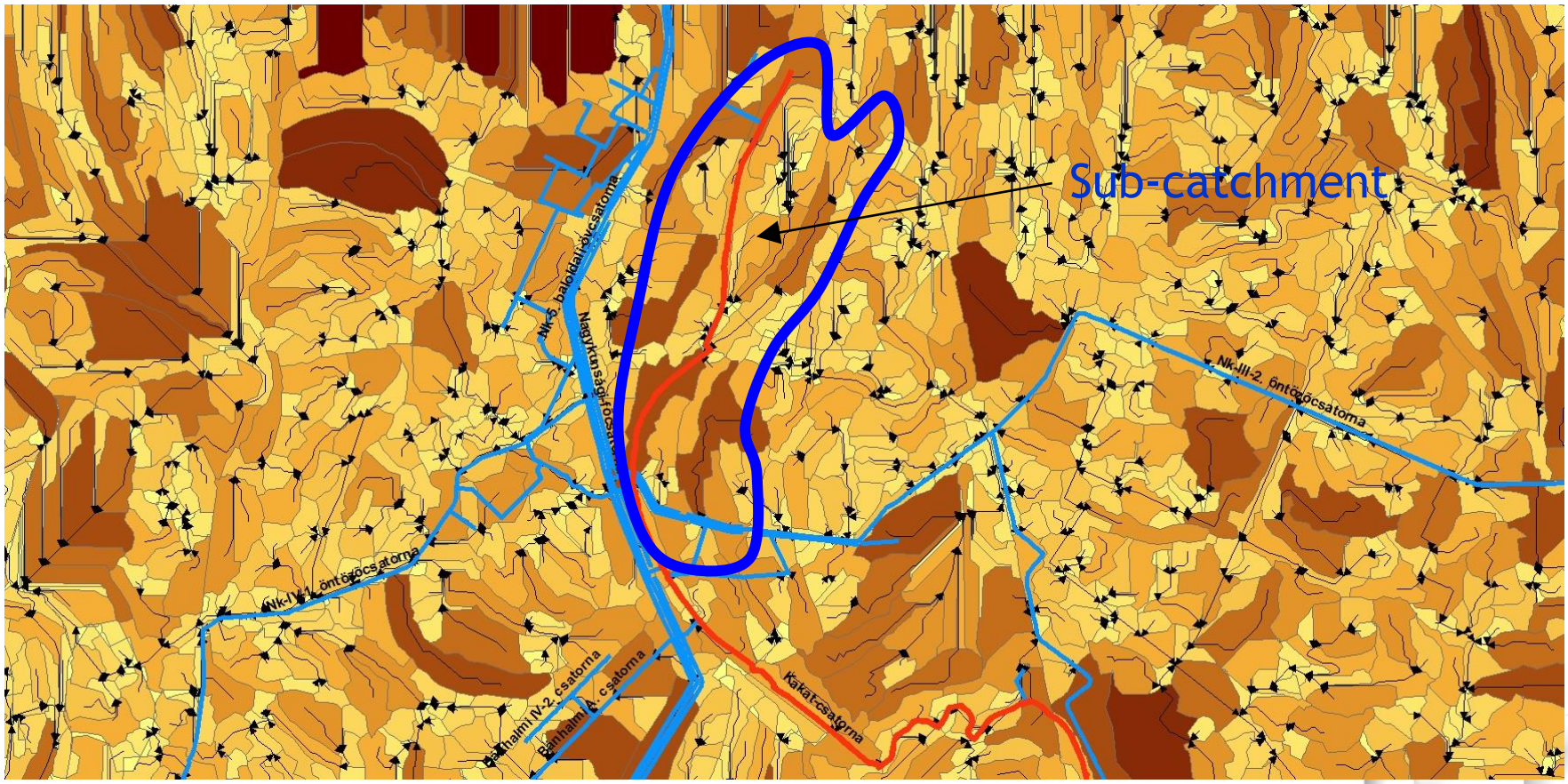
PILOT INVESTMENT



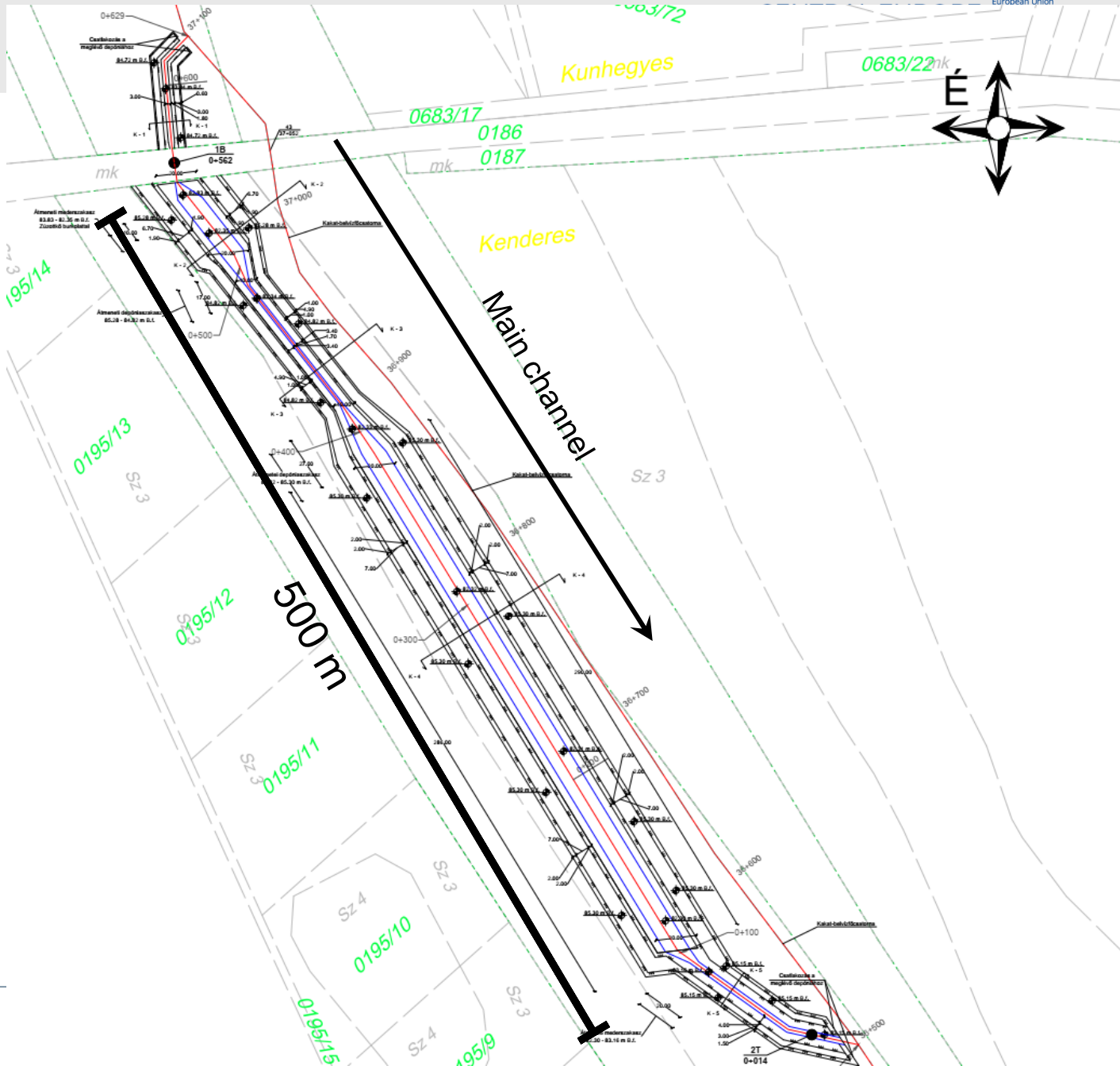
WORKING STEPS

- Enumerated the data needs (GIS, hydrological, land use, etc)
- Analysed the discharges (urban and rural discharges)
- Preparation of permission plans, get permission
- Execution of the works

GIS ANALYSIS



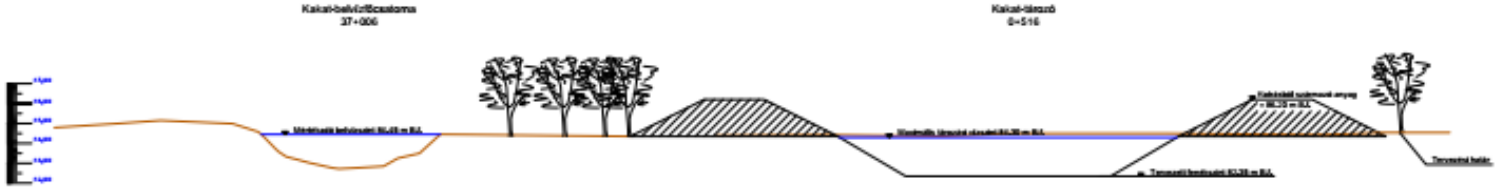
Site Plan


Main channel
500 m
Kunhegyes
Kenderes
0683/17
0683/22
0186
0187
0195/13
0195/12
0195/11
0195/10
0195/9
mk
Sz 3
Sz 4
É

Cross-sections

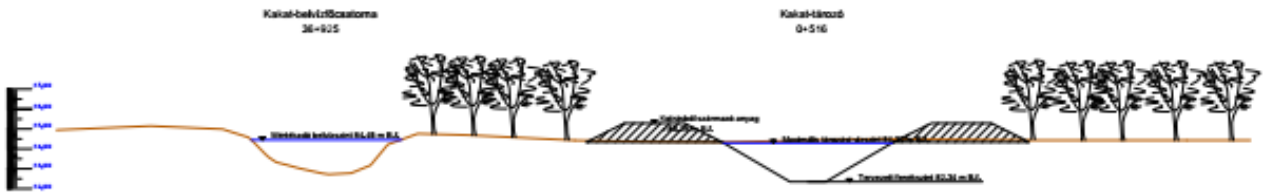
K2 - K2

Depónia	Kakat-belvízfőcsatorna	Depónia	Tározó								Üzemtervezett erdő	
10.40	8.90	9.60	3.70	3.00	3.70	3.40	10.30	3.40	3.70	3.00	3.70	.70	2.50



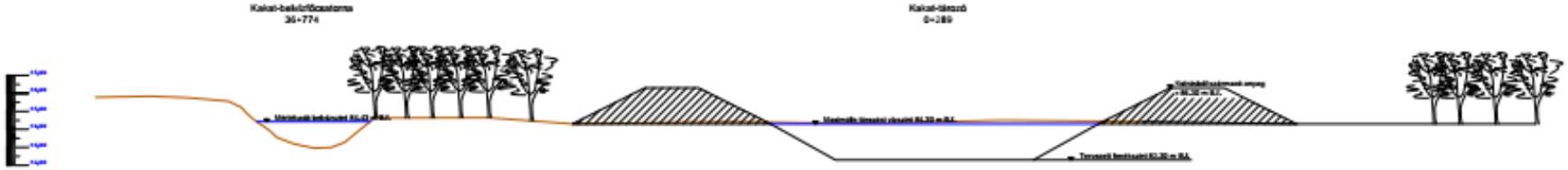
K3 - K3

Depónia	Kakat-belvízfőcsatorna	Depónia	Tározó									Üzemtervezett erdő
8.30	9.80	8.50	1.90	3.00	1.90	3.40	1.70	3.40	1.90	3.00	1.90	7.90	3.20



K4 - K4

Depónia	Kakat-belvízfőcsatorna	Depónia	Tározó								7.60	Üzemtervezett erdő
7.40	8.10	11.00	4.00	3.00	4.00	3.60	11.00	3.60	4.00	3.00	4.00	7.60	5.70



BEFORE

AFTER

CONTACT DETAILS

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