

DISTRIBUTION NETWORK ANALYSIS

SELECTING PRESSURE ZONES FOR SAMPLING



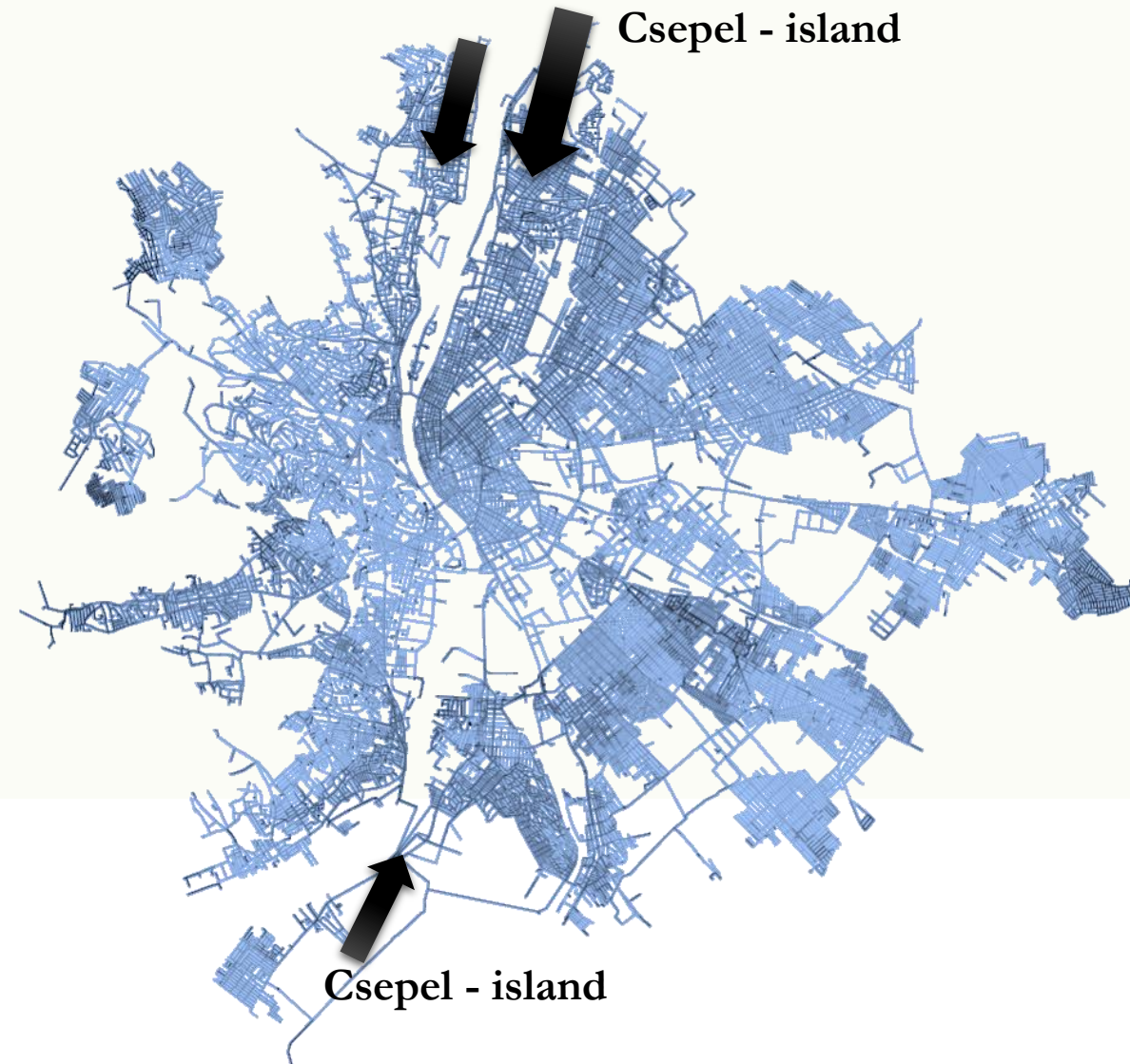
NATIONAL RESEARCH, DEVELOPMENT
AND INNOVATION OFFICE
HUNGARY

PROJECT
FINANCED FROM
THE NRDI FUND
MOMENTUM OF INNOVATION

Table of contents

- I. Network overview
- II. Criterias
- III. Residence time analysis
- IV. Selected zones
 - I. Pesthidegkut – Mikes
 - II. Janoshegy
 - III. Szigetszentmiklos
 - IV. Budafok
 - V. Kelet-Pesti – Pressure reduced zone Nr.1
 - VI. Rakoshegy

I. Network overview

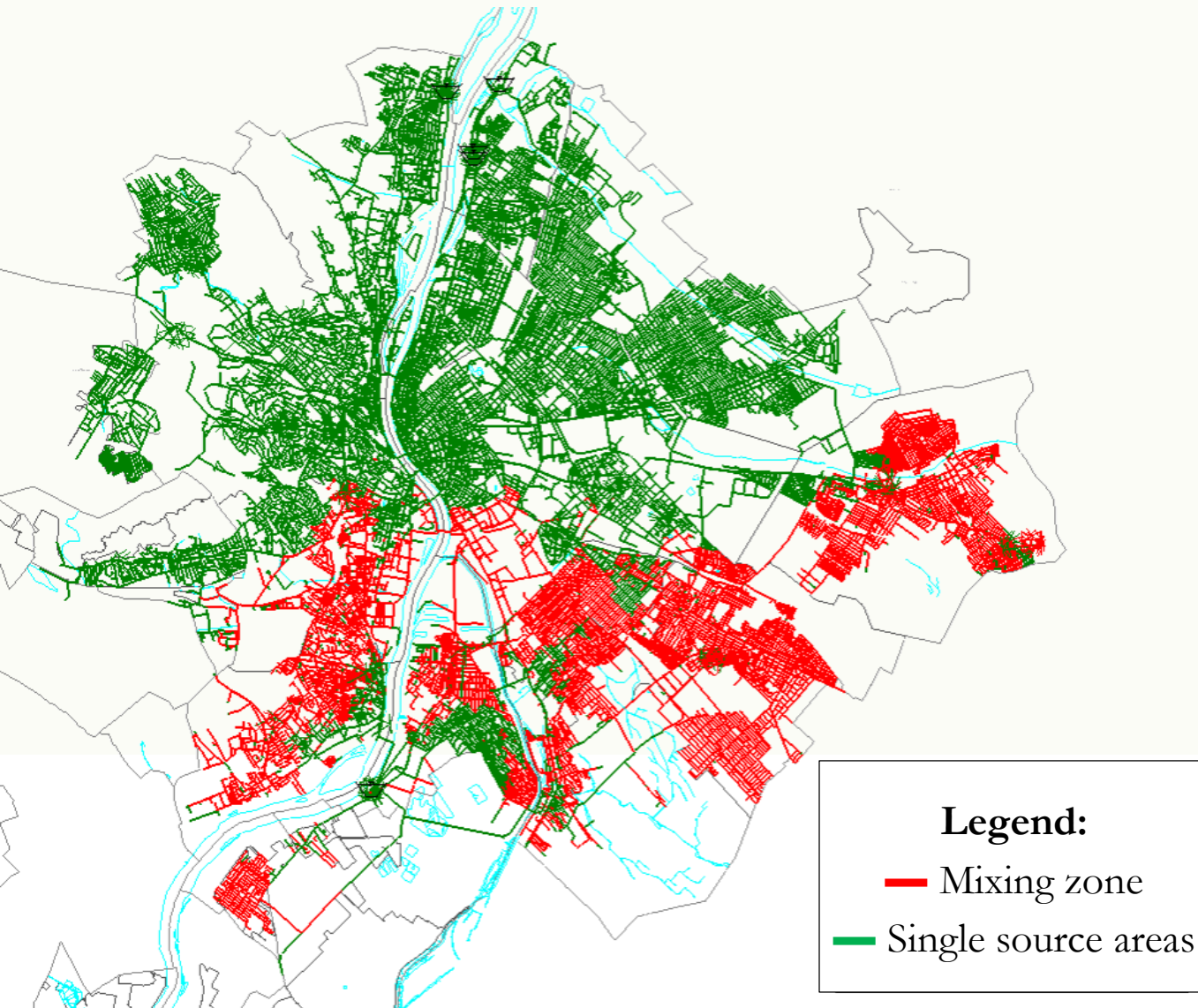


- Two main sources of water supply:
 - Northern pumping stations
 - Csepel-island pumping stations
- Main zone along danube:
 - Hydraulic grade: 145 m
- Elevation rises at East and West
- ~280 000 m³ tank volume

I. Criterias of selection

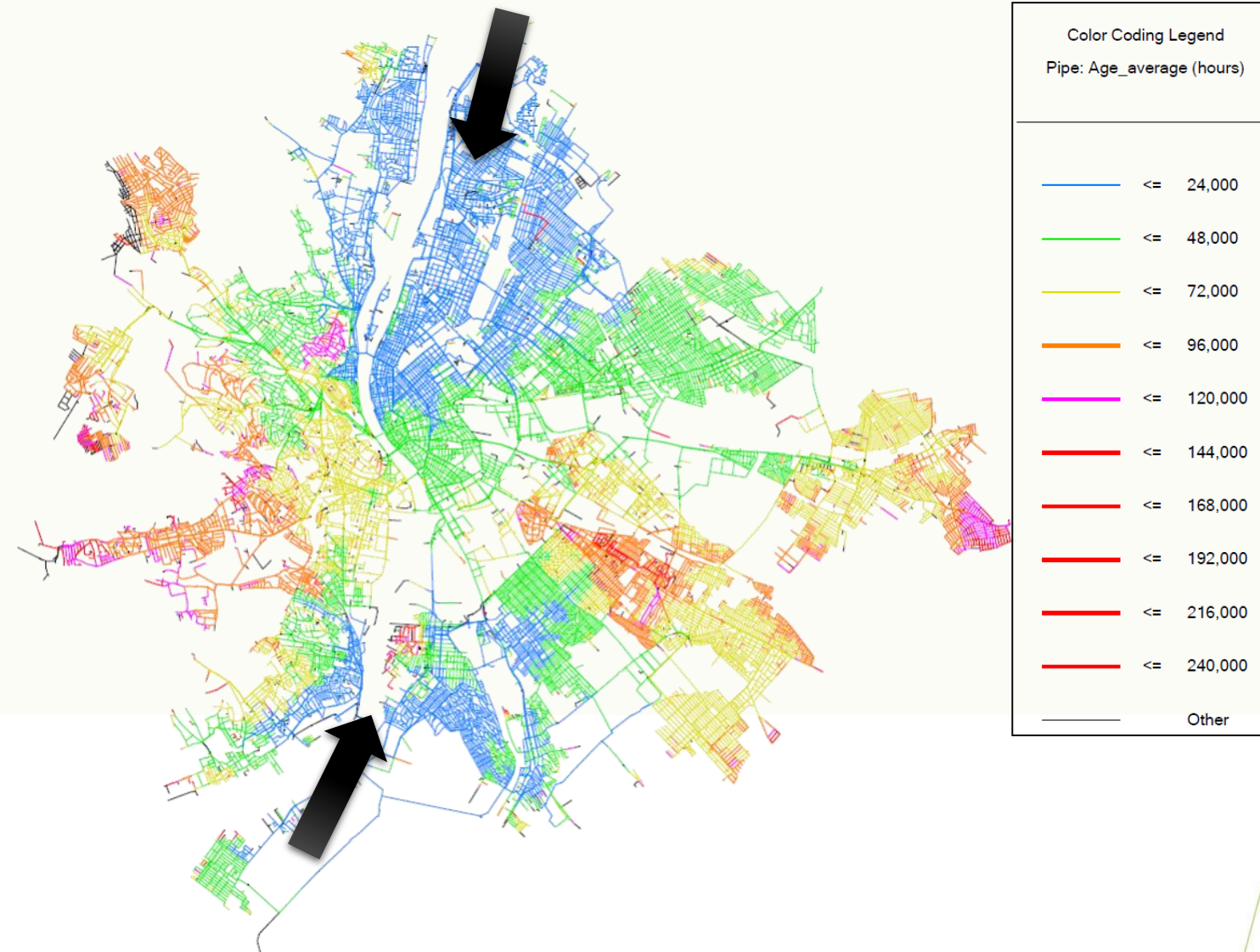
- Available hydrants for sampling
- Residence time: 48-96 hours
- Pressure zone supplied from:
 - Northern aquifers
 - Southern aquifers
 - Both sources – mixing zone

I. Different sources and the mixing zone



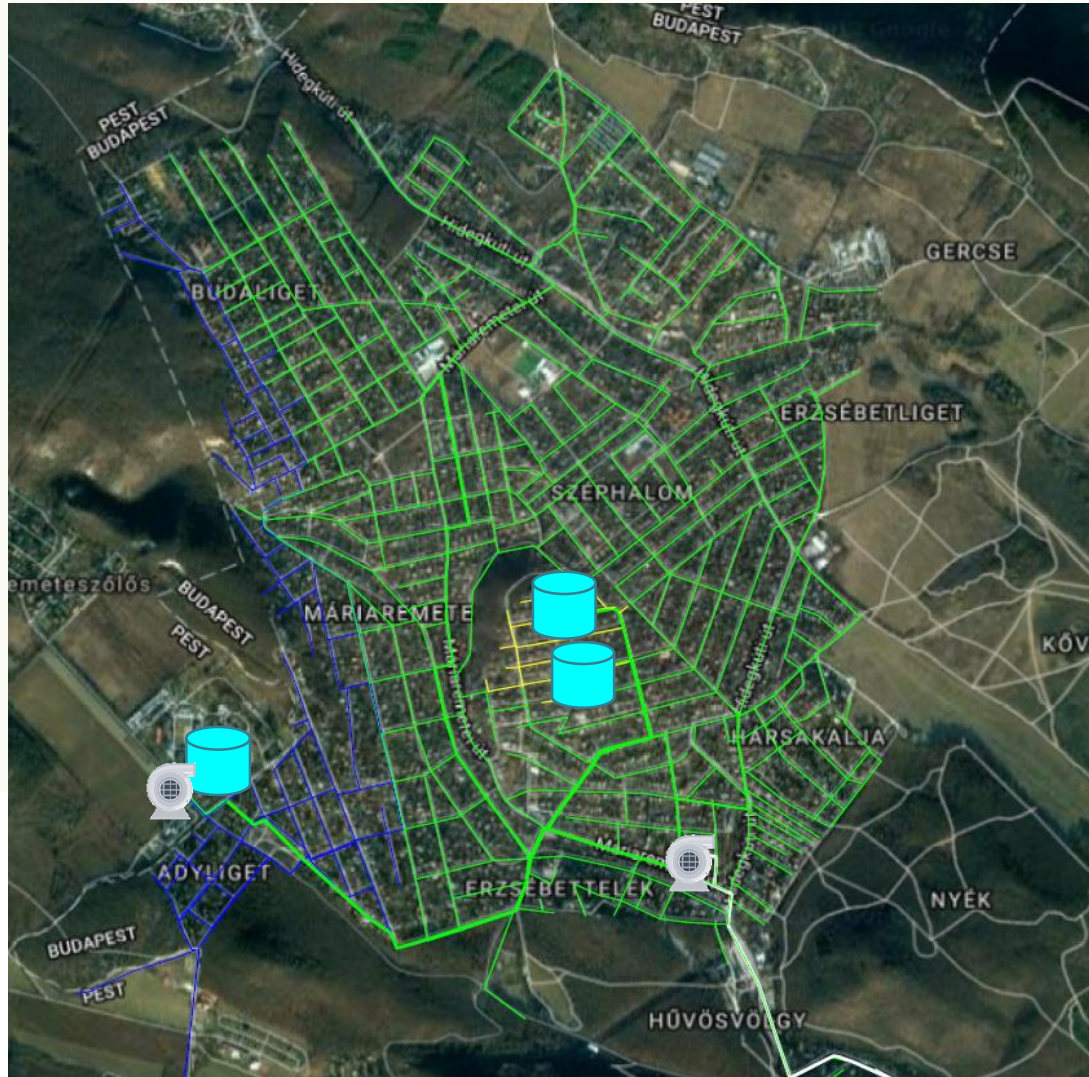
- Water demand: average
- Simulation Duration: 10 days
- Control based simulation
- Ratio of supply N:S=9:1

I. Residence time analysis



- Water demand: Average
- Simulation Duration: 10 days
- Control based simulation
- Software: WaterGEMS
 - Export to INP

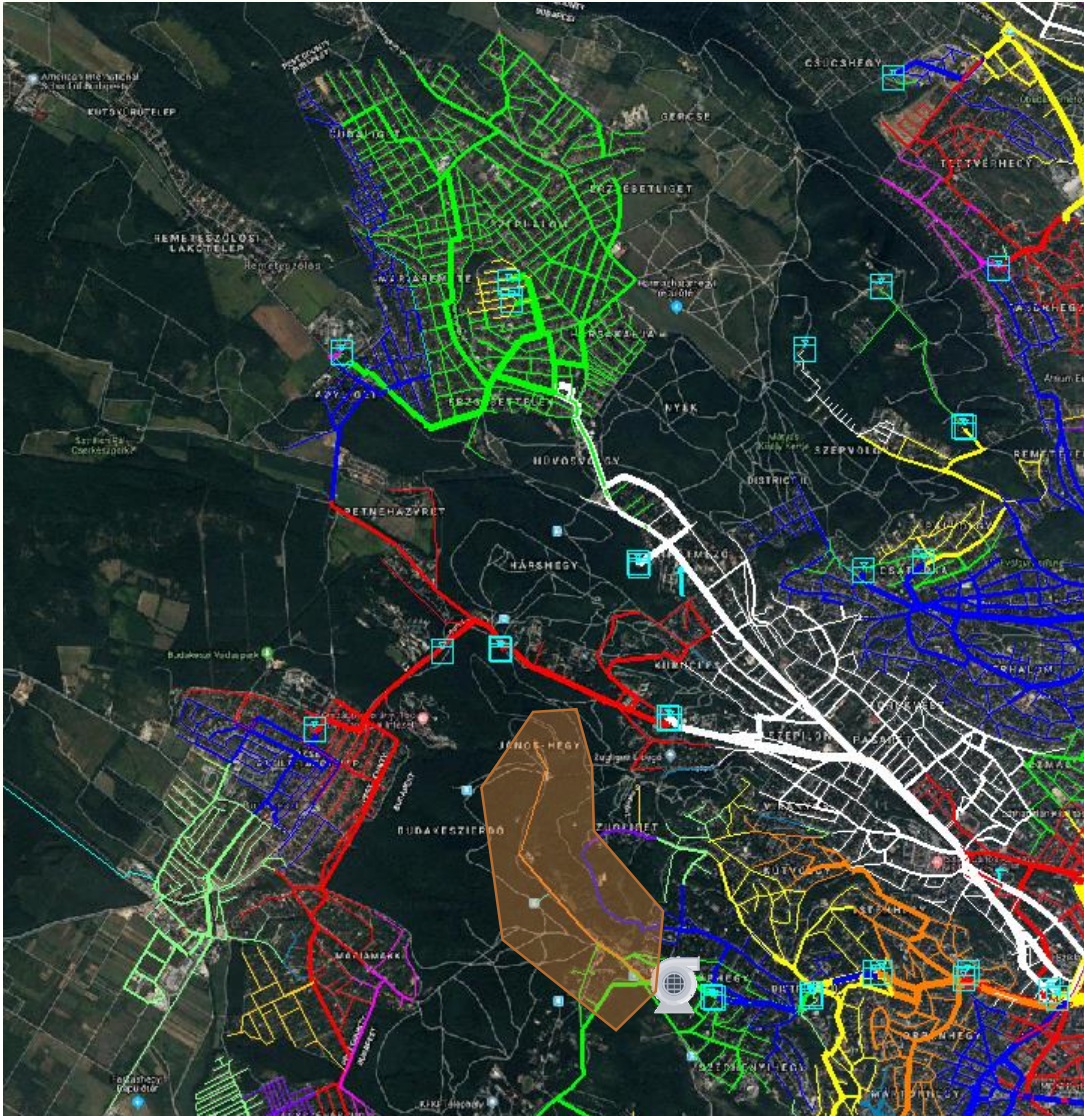
IV. Selected zones



• Pesthidegkut – Mikes

- Only northern water at average demand
- Water age: 48-96 hours
- Multiple tanks connected to the zone
- Suburban area
- Seasonal changes in demand

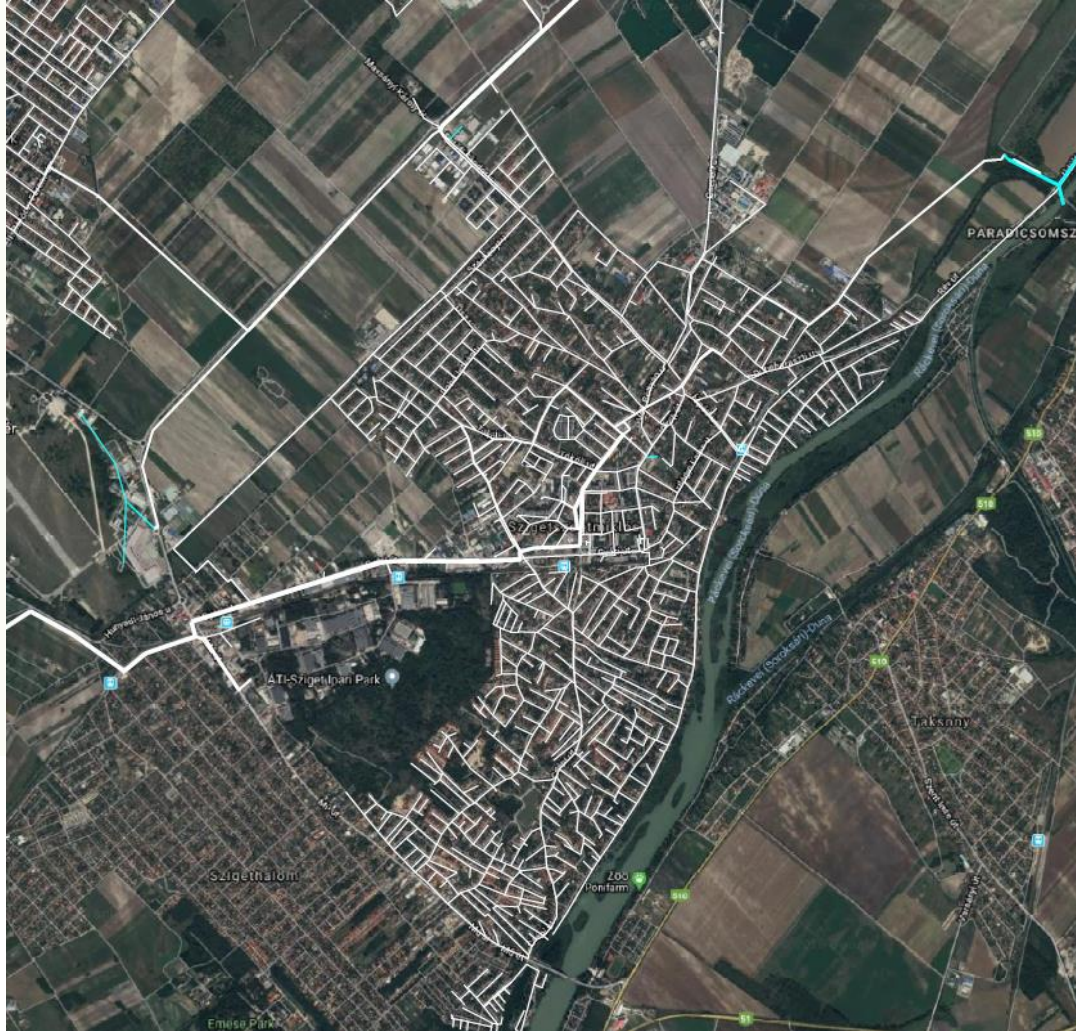
IV. Selected zones



- **Janoshegyi**

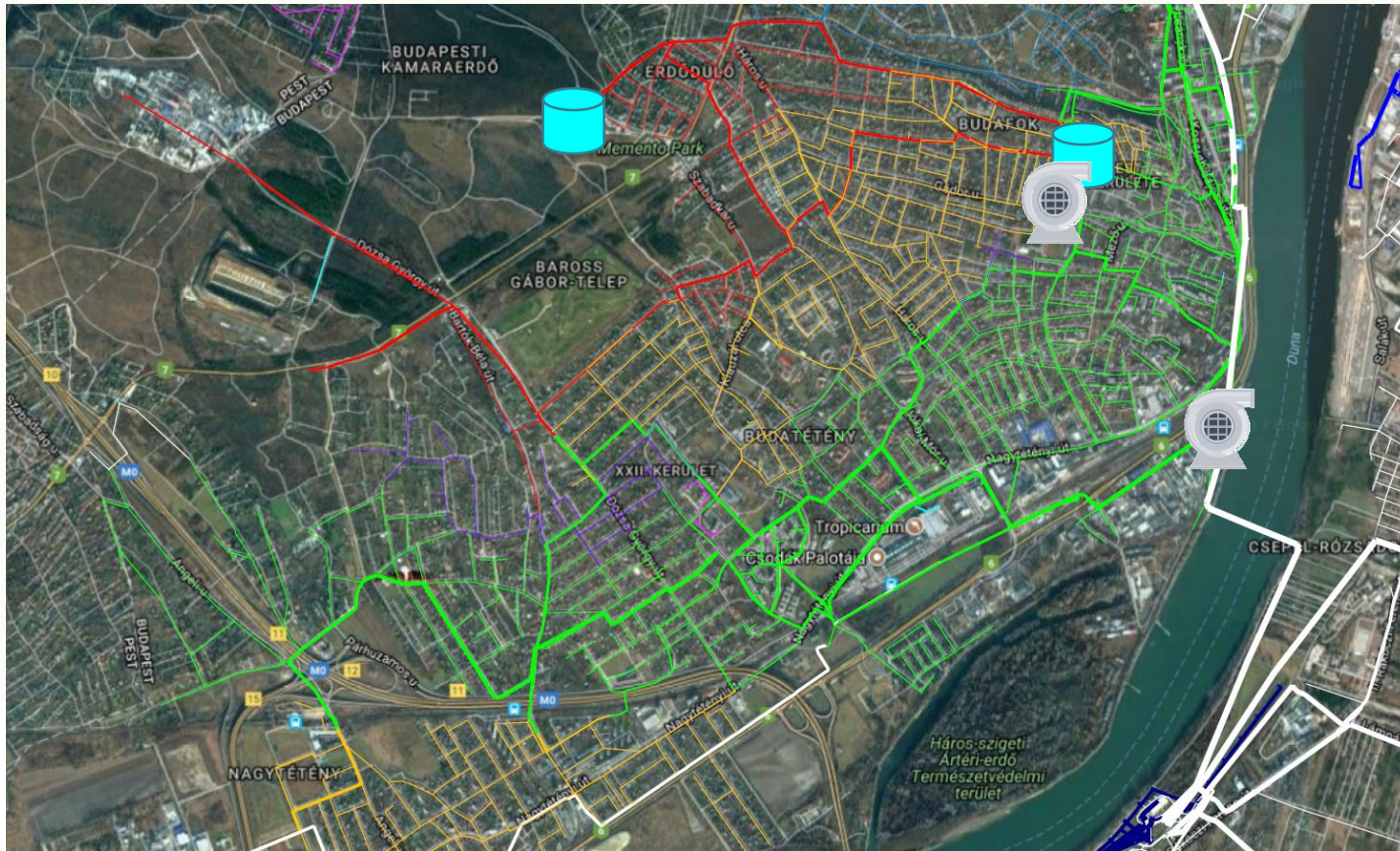
- Alternative of Pesthidegkut-Mikes zone
- Single pipe (3km)
- Straightforward hydraulics
- High water age (72-120+ hours)
- Possibility to alter hydraulics
- No tank connected to the zone

IV. Selected zones



- **Szigetszentmiklós**
 - Water from southern aquifers
 - Water age: 0-48 hours
 - Suburban area
 - Hydraulics are complex – multiple inputs

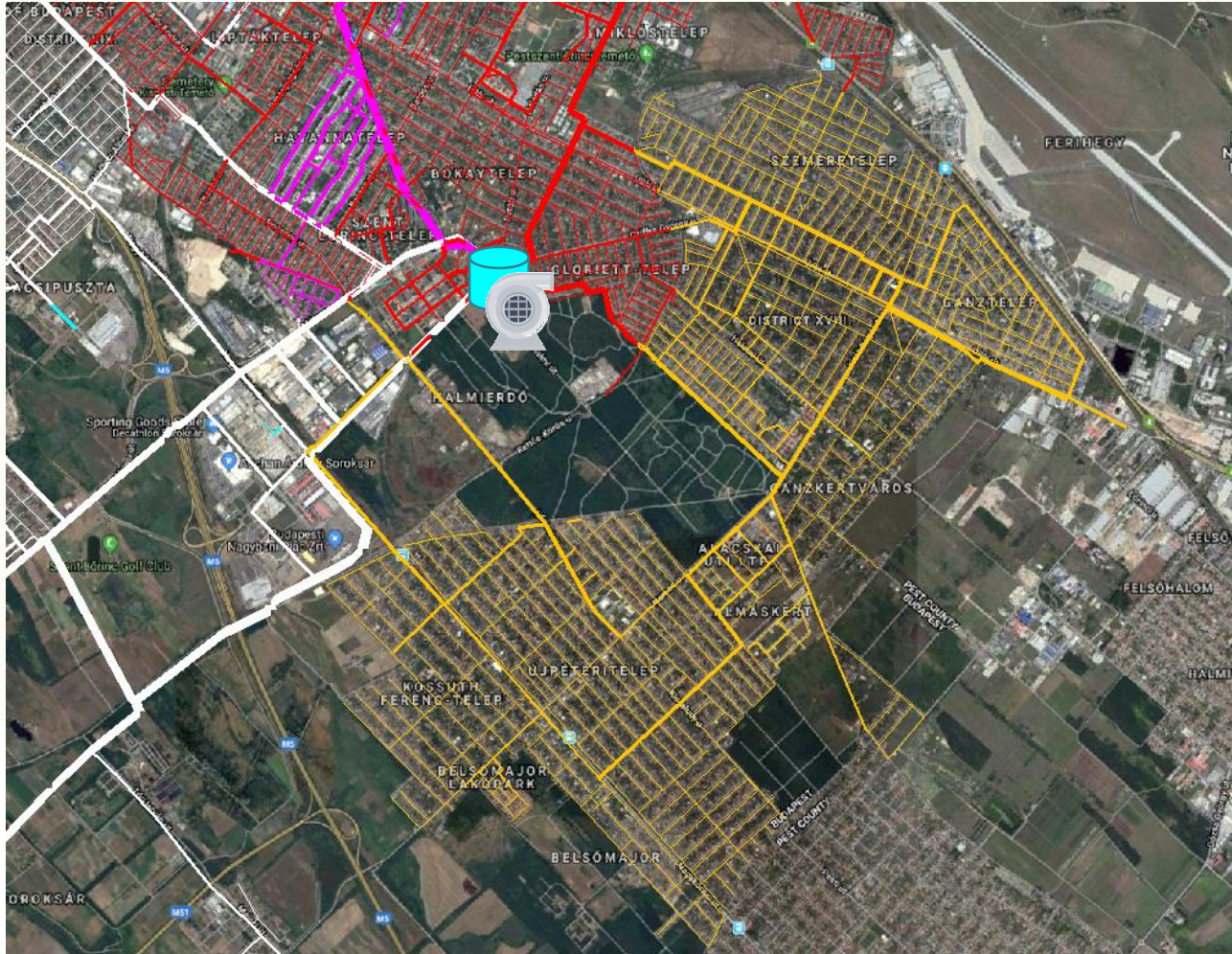
IV. Selected zones



• Budafok

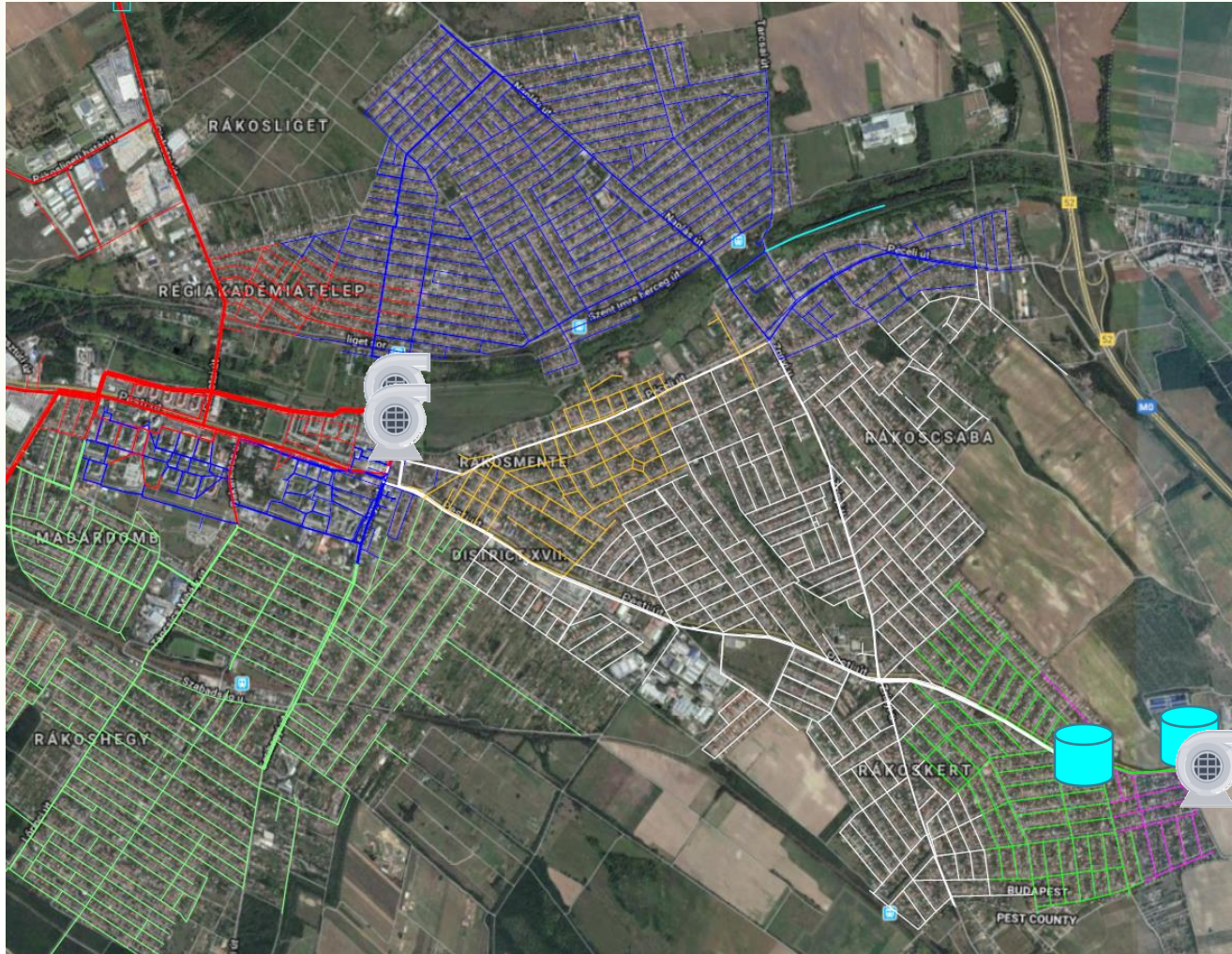
- Alternative of Szigetszentmiklós
- Only southern water in some areas
- Water age: 24-72 hours
- Numerous pressure reduced zones
- Some areas are hard to access by vehicle

IV. Selected zones



- **Kelet-Pest felso: Pressure reduced zone Nr.1**
 - Water age 48-96 hours
 - Mixing zone
 - No transit role → straightforward hydraulics
 - Suburban area

IV. Selected zones



- **Rakoshegy**

- Water age 48-96 hours
- Mixing zone
- No transit role → straightforward hydraulics
- Suburban area

V. Summary

- Selected Zones
 - Pesthidegkut – Mikes
 - Szigetszentmiklos
 - Kelet-Pest (Reduced zone Nr1)
- Each zone has it's own characteristics and properties
- The ratio of supplies in the mixing zone depends on the water demand

Budapest Waterworks



NATIONAL RESEARCH, DEVELOPMENT
AND INNOVATION OFFICE
HUNGARY

PROJECT
FINANCED FROM
THE NRDI FUND

MOMENTUM OF INNOVATION