

## Network monitoring 4.0

- Network survey and leak zone detection
  - Reducing water loss sustainable
    - Detecting leaks immediately



# MARTINEK GMBH - Who we are?

## Competences and services

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- More than 30 years of experience in leakdetection and surveying of pipe networks
- We are specialist for hydraulic networks survey and pre-detection of leaks.
- Martinek developed and produce the WLM-SYSTEM (WaterLossManagement-SYSTEM) – network monitoring system
- Our scope: – Sensoric – Datalogger – transmission of data – datamanagement – Visualisation and analysis of data **AQUALYS**
- We consult utilities in terms of network monitoring and strategic water loss management.
- Our solutions are highly cost effective and easy applicable
- **Our goal:** Producing and implementing a tool that empower utilities and water suppliers to save and secure the most important goods, *costly produced clean potable water.*

# WHY NETWORK MONITORING

- **Understand „black box“ waternet**
  - Network calculation
  - Recognition of closes valves, open hydrants, flushing actions,...
  - Customer behaviour
- **Strategic Waterloss Management**
  - Immediate Information about network condition
  - Information about waterloss volume
  - Survey of Repairs



# WHY NETWORK MONITORING INFLUENCES ON WATER PIPES

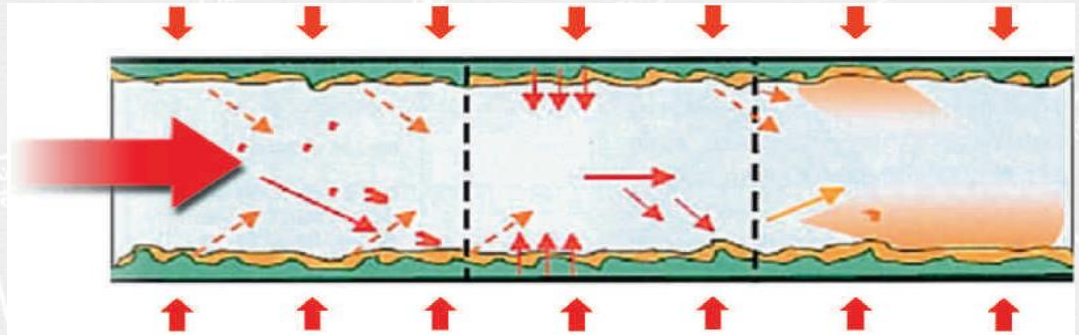
## influences from inside

flow velocity, pressure,  
surges (hammers),  
temperature,  
water quality,  
chem. parameters,  
disinfection



## *Consequences:*

- **hygien & microbiological water problems**
- **Inside corrosion**
- **sediments**
- **Claudiness of water**



## influences outside

underground structure,  
soil class, stray currents, ground water,  
underground works, quality of pipe laying,  
traffic, subsidences

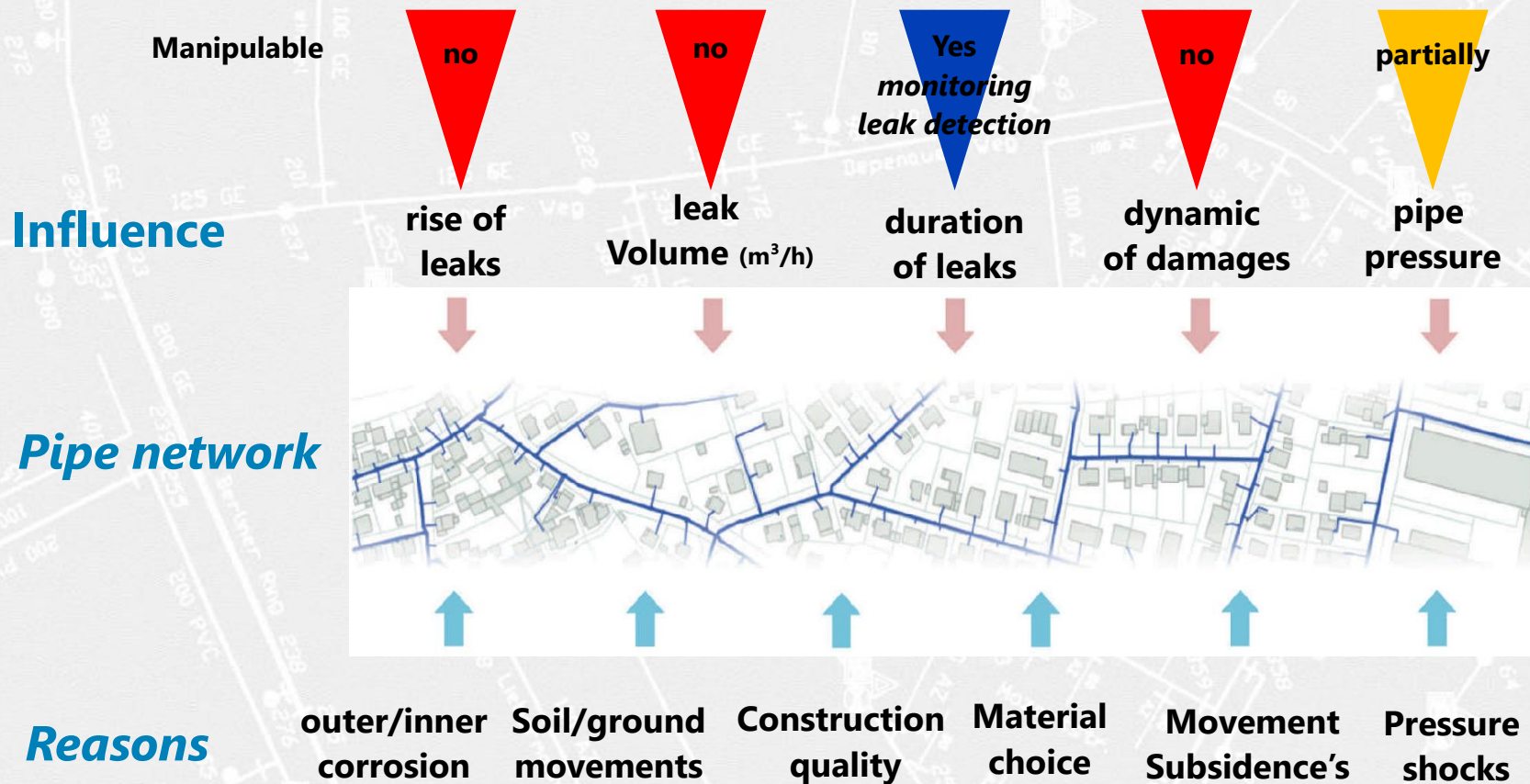


## *Consequences:*

- **leaks & waterloss**
- **cut of supply**
- **subsequent damages**
- **loss of value**

# WHY NETWORK MONITORING

## Reasons for losses and possibilities of loss influences





# Demands for a integral network survey system

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- » **'Real' information** live from operating water pipe network
- » **Even smallest deviations** in the network must be recognized
- » Recognition of huge leakages – water in water (**no leak noise!**)
- » **Automatic alerts** – no time consuming analysis required
- » **Early notice** about **upcoming leak**
- » Shorten the duration of leaks
- » Enable monitoring of open and closed networks zones  
→ no sectionizing necessary due to creation of **virtual zones**
- » Control of **all leakage parameters** → flow pressure and noise
- » **Easy applicable - very simple installation** into all networks **under pressure**  
**(pipe diameter & material-independent!)**
- » **High sensitive** measurement technology – long term stability
- » **Flow measurement up from basically zero** (1cm/sec resolution 1mm/sec)
- » Monitor entire pressure range (0,00 to 20,00bar)
- » **Detection of very low leak noises** (hydrophone in sensor included)

# WLM-Sensor: 3 PARAMETERS AT ONCE



**Flow (bi-directional)**



**Noise**



**Pressure**



**Temperature (optional)**

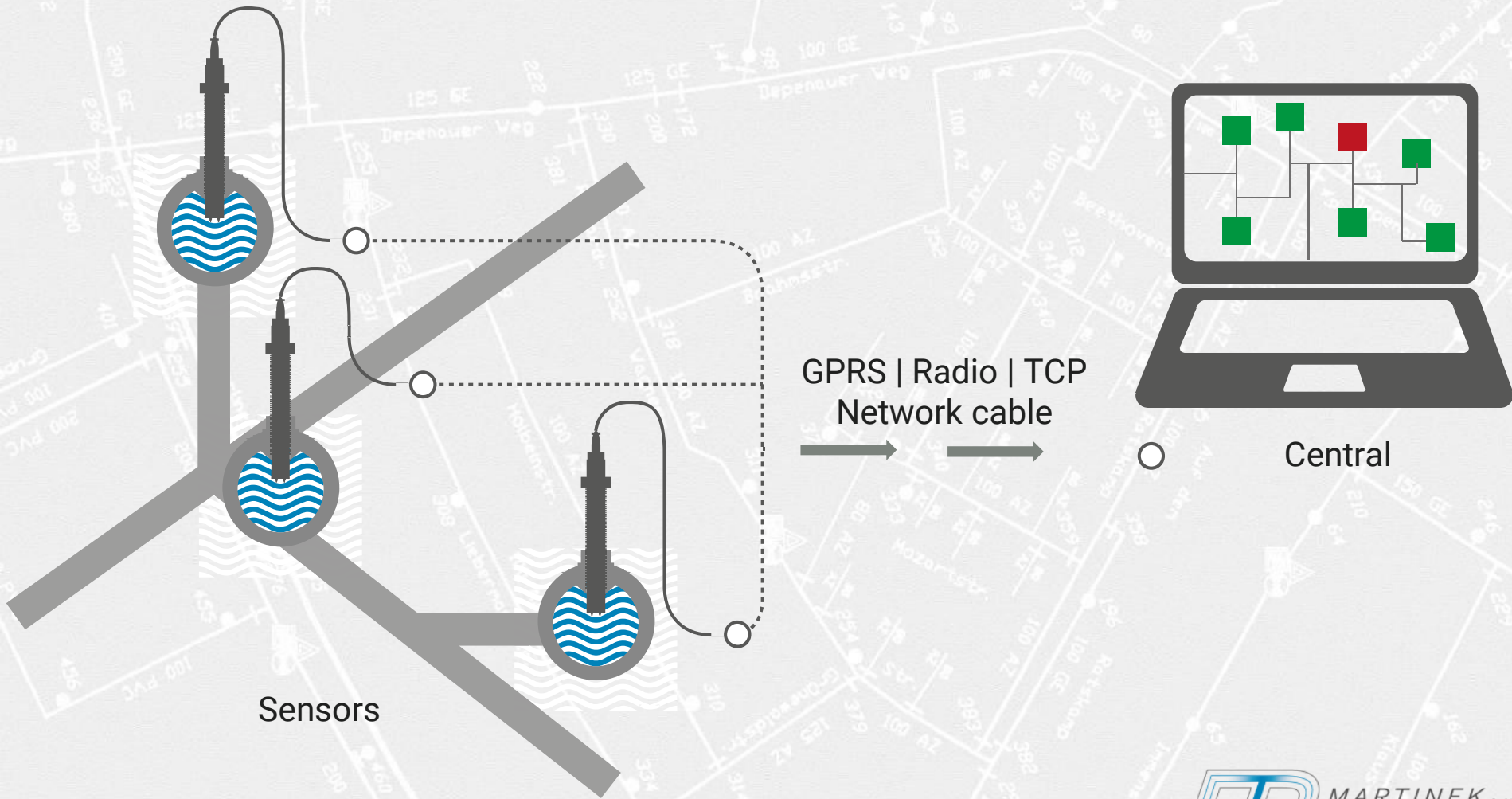
# FEATURES OF THE WLM-SYSTEM

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- » With compact, solid shape, suitable for bad environment conditions
- » No moving parts, no pressure loss or abrasion
- » Low start-up flow rate. Minimum measurable flow velocity 0.01m/s with long-term stability
- » Very fast response to flow changes
- » Remote reading functions
- » Installable on every pipe diameter and all materials
- » Unique housing design, continuously underwater (IP68)
- » Measuring of all parameters simultaneously (min, max, avg,..)
- » Various interfaces to connect to SCADA system
- » Hot taping – Installable under full pressure



# PRINCIPLE OF THE MONITORING

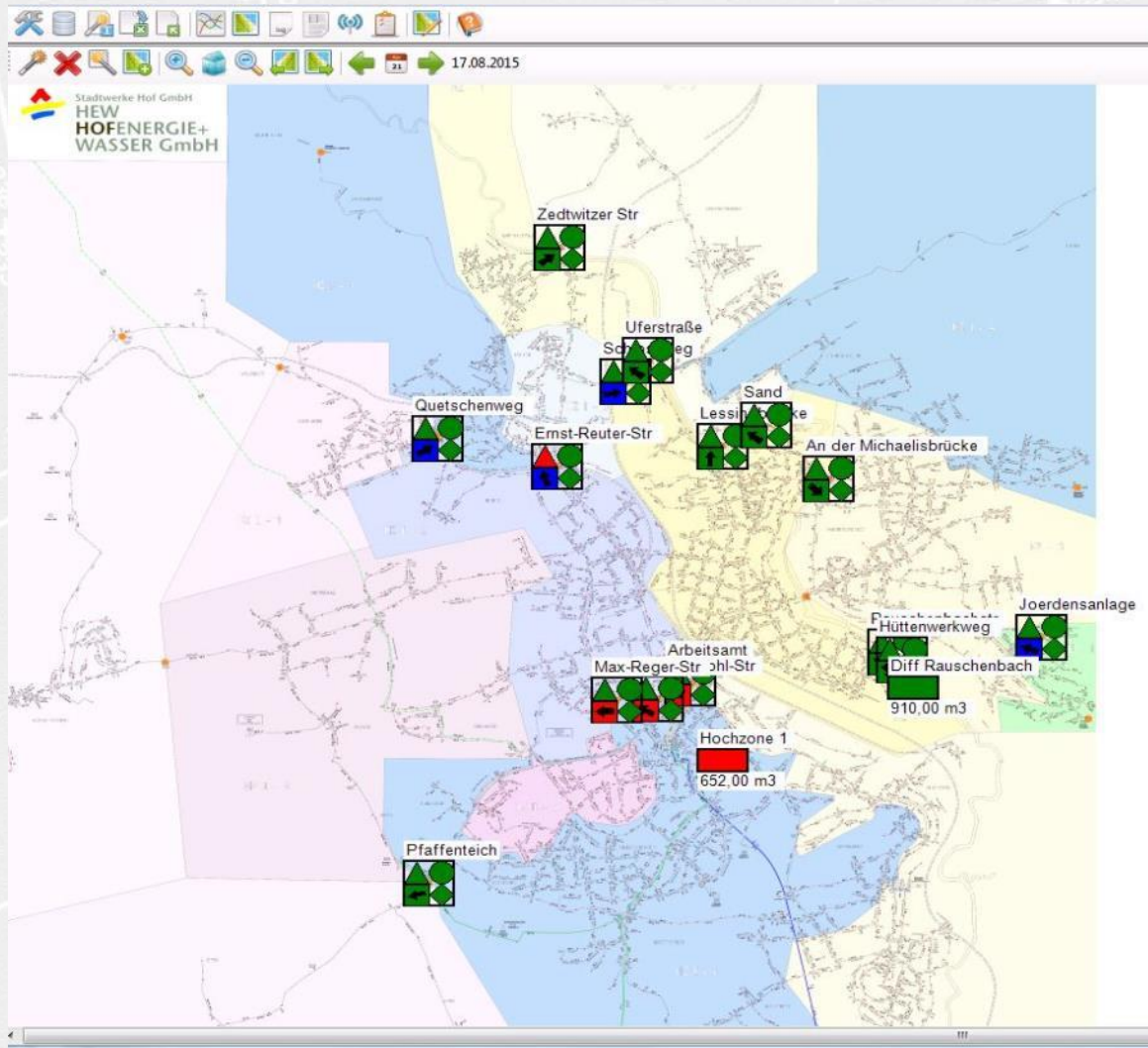


# WLM-SYSTEM AND AQUALYS

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- » Automatic and manually organized data transmission  
Bi-directional (TCP / GPRS / Glass fibre / GSM)
- » Automatic calculation of daily and boundary values
- » Remote setting of WLM-Sensors
- » Integration of existing GIS map
- » Connection to any SCADA system (bi directional)  
- export and import data (from “foreign” flow or pressure meters)
- » Server – Client architecture
- » SMS alert in case of crossing boundaries
- » Flooding or theft alarm
- » Totalizer – Quantifies balance of individual DMA's – physically or virtually
- » Implementation of all kind of flow and pressure data
- » Clear and easy presentation of displayed data

# GRAPHICAL REPRESENTATION AND CALCULATION OF MEASURED VALUES



**HOF / Germany**

**GIS-MAP with WLM-Sensors allocation**

● All values in range

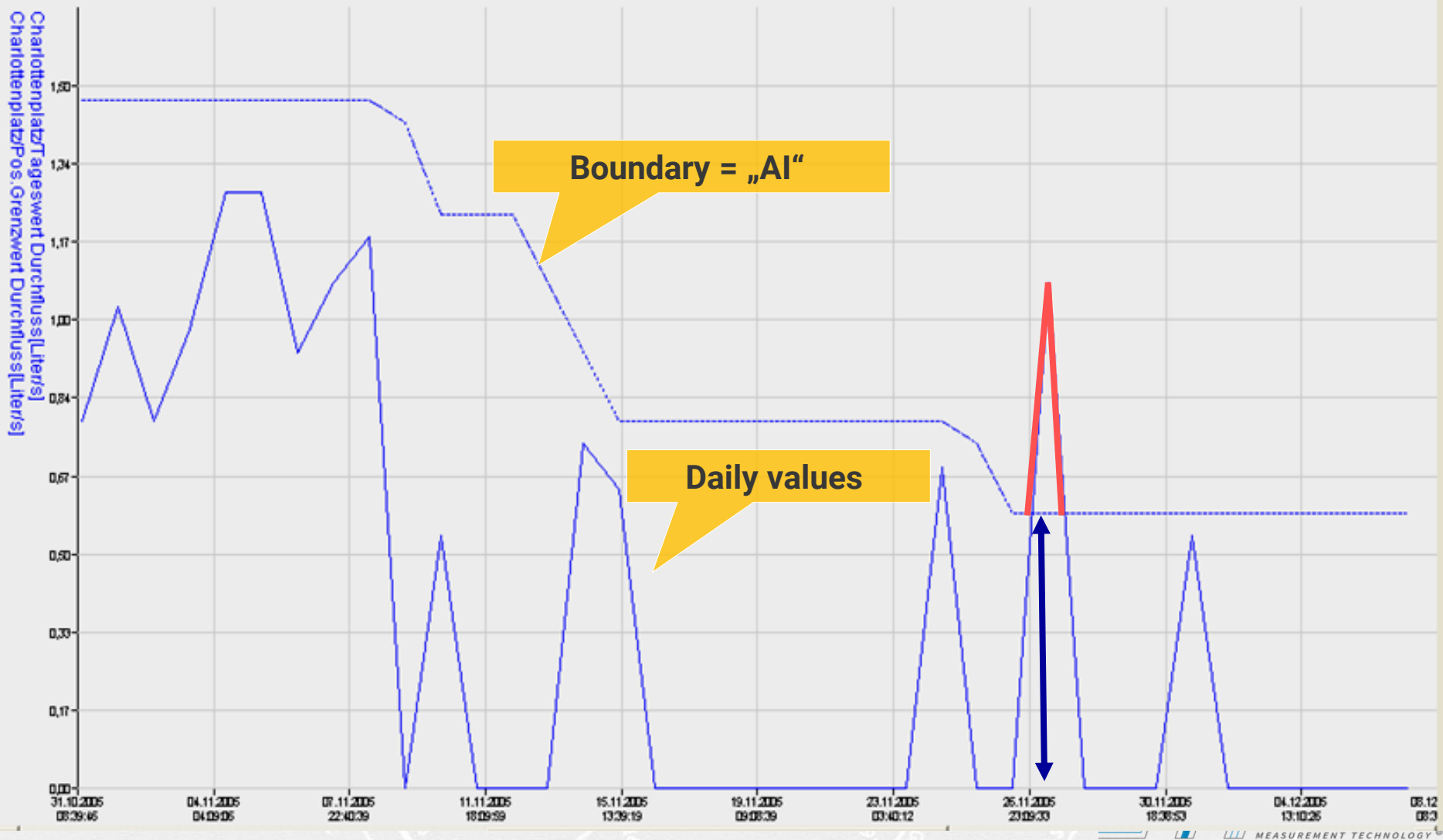
● Flow reverse

● **ALARM!**



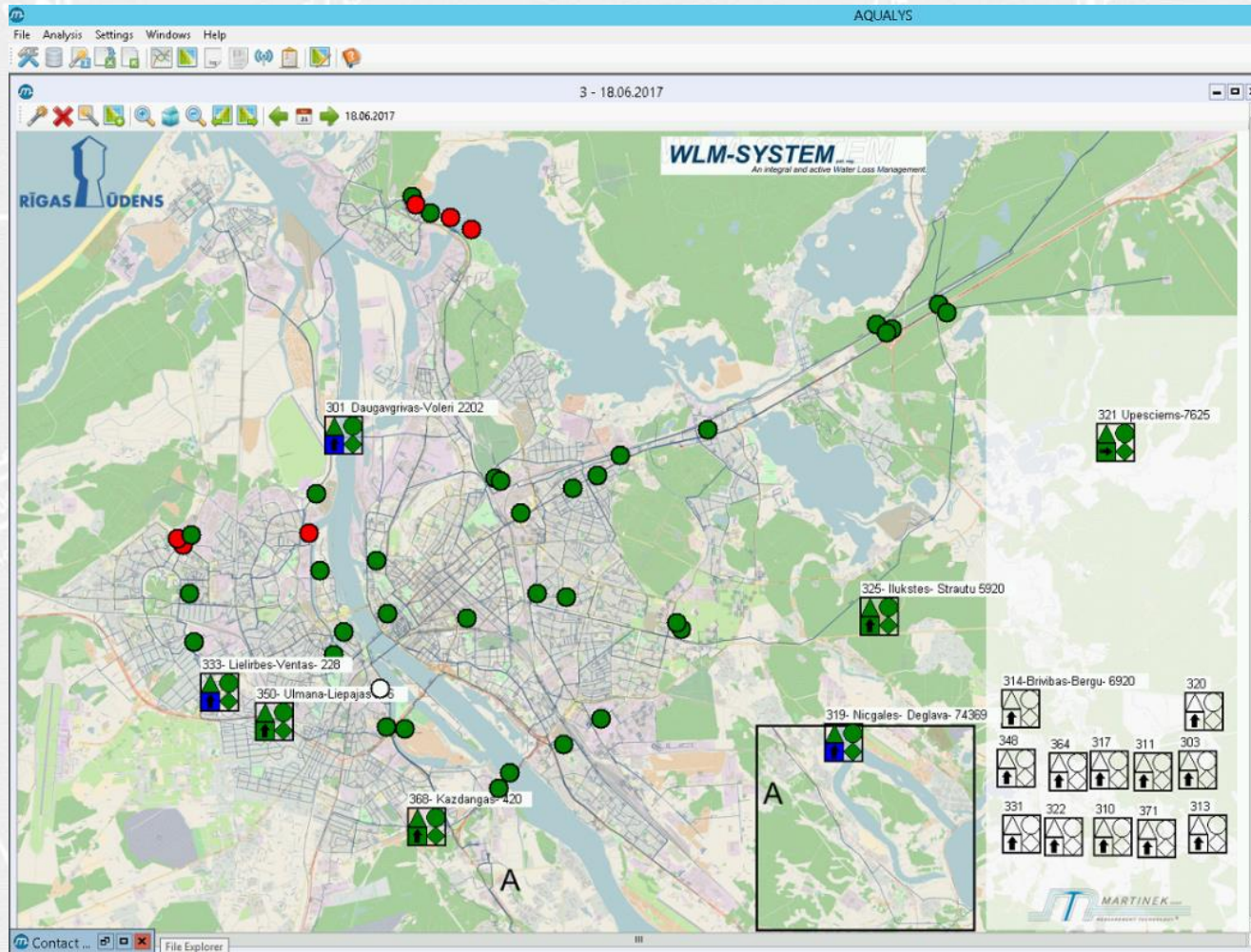


# AUTOMATIC CALCULATION OF BOUNDARY VALUES IN RELATION TO DAILY VALUES VIA **AQUALYS** SOFTWARE



# SURVEY MAP **AQUALYS**

## DISPLAY OF AUTOMATIC SURVEY



**RIGA / Lettland**

**GIS-MAP with WLM-Sensors allocation**

- Green circle: No error messages - All clear!
- Blue circle: Flow reverse
- Red circle: **ALARM!**



# 48 BOUNDARIES /PARAMAMETERS /DAY

## Warning limits

☒ Activate flow [m3/h]

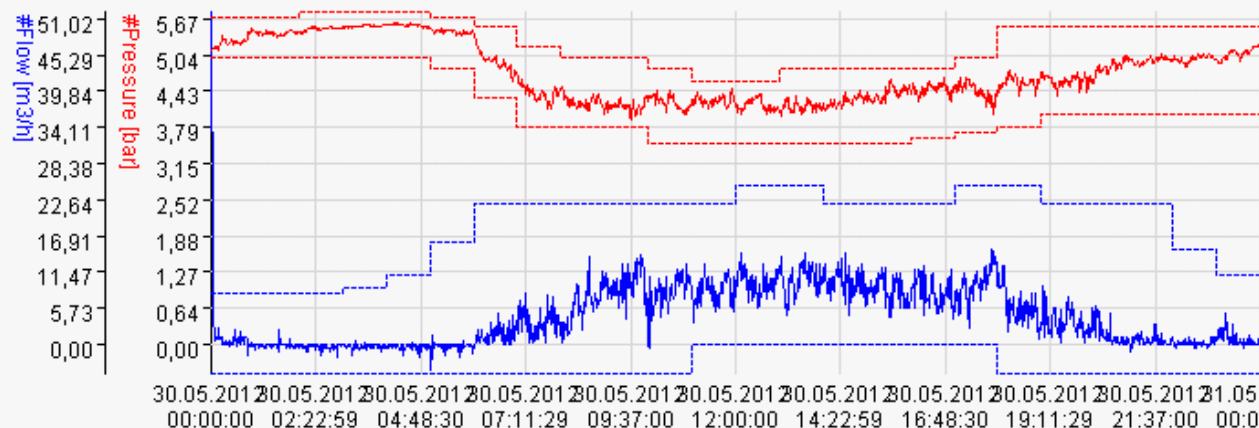
☒ Activate pressure [bar]

From day: 30.05.2012

☐ Activate noise [-]

☐ Activate battery [V]

Time [hh:mm]	Flow min	Flow max	Noise min	Noise max	Pressure min	Pressure max	Battery min	Battery max
19:00	-5,00	22,00	0	500	4,00	5,56	11,00	15,00
20:00	-5,00	22,00	0	500	4,00	5,56	11,00	15,00
21:00	-5,00	22,00	0	500	4,00	5,56	11,00	15,00
22:00	-5,00	15,00	0	500	4,00	5,56	11,00	15,00

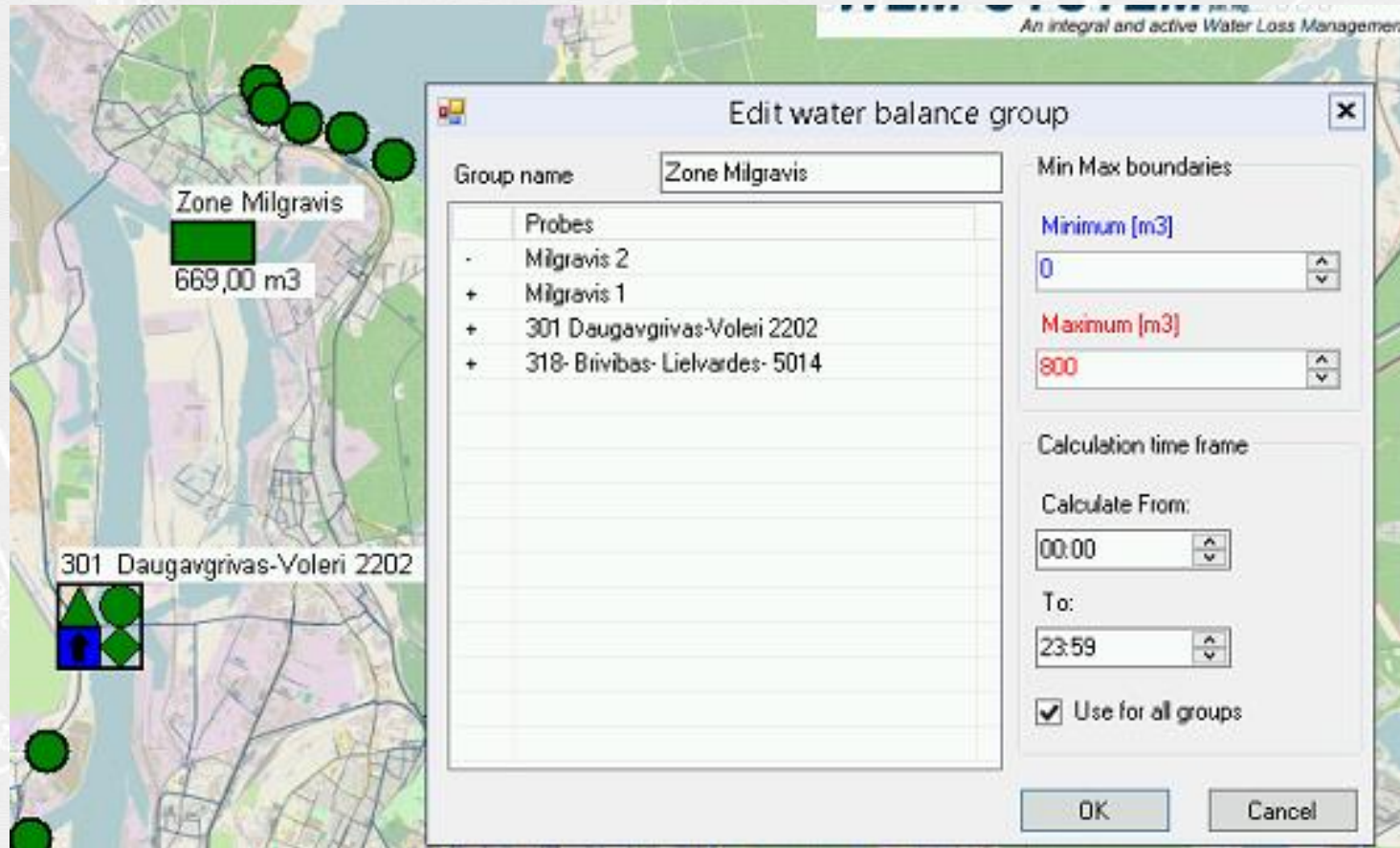


OK

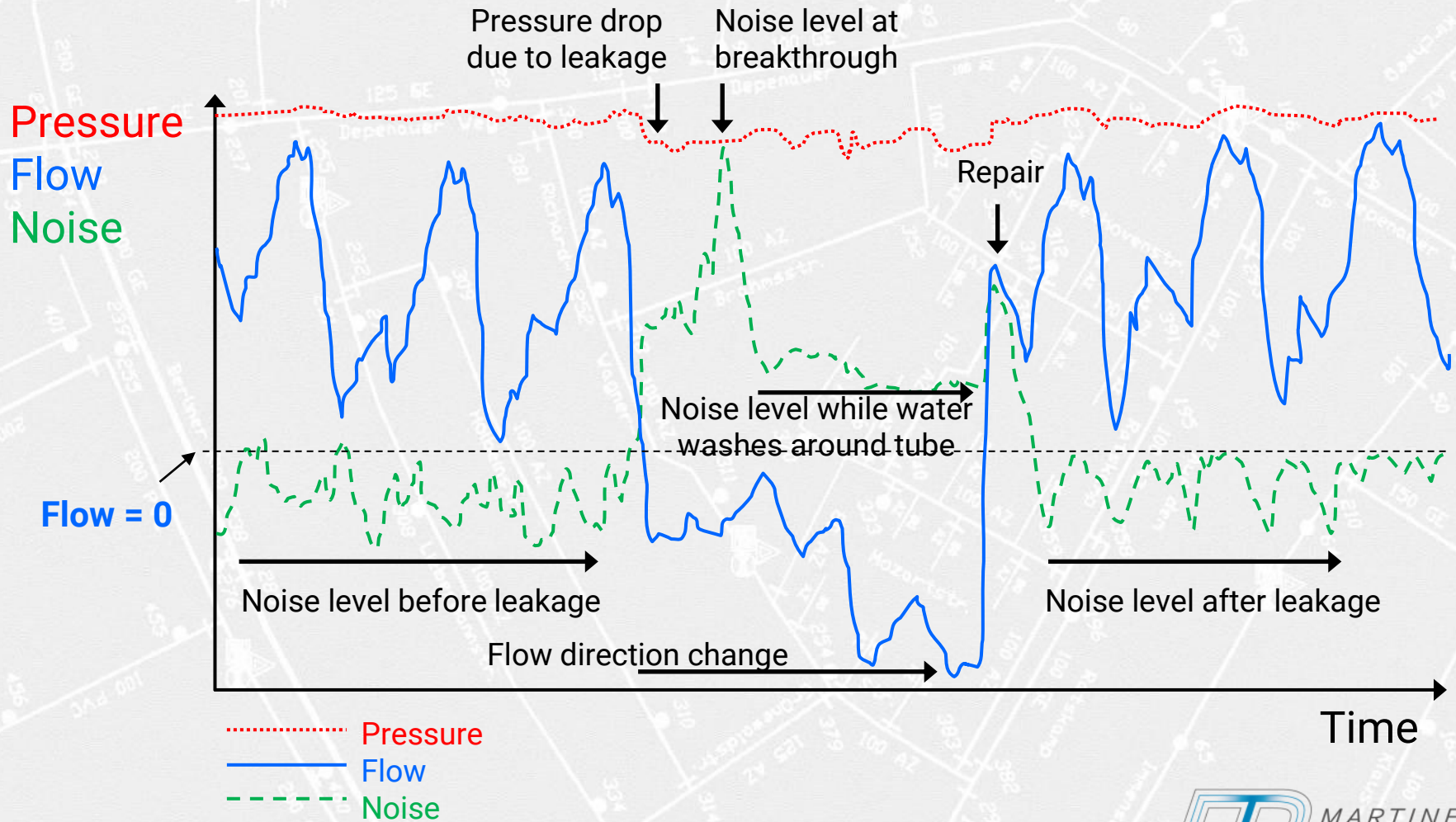
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# TIME BASED WATER BALANCE

i.e. 0-24H OR 3-4am...

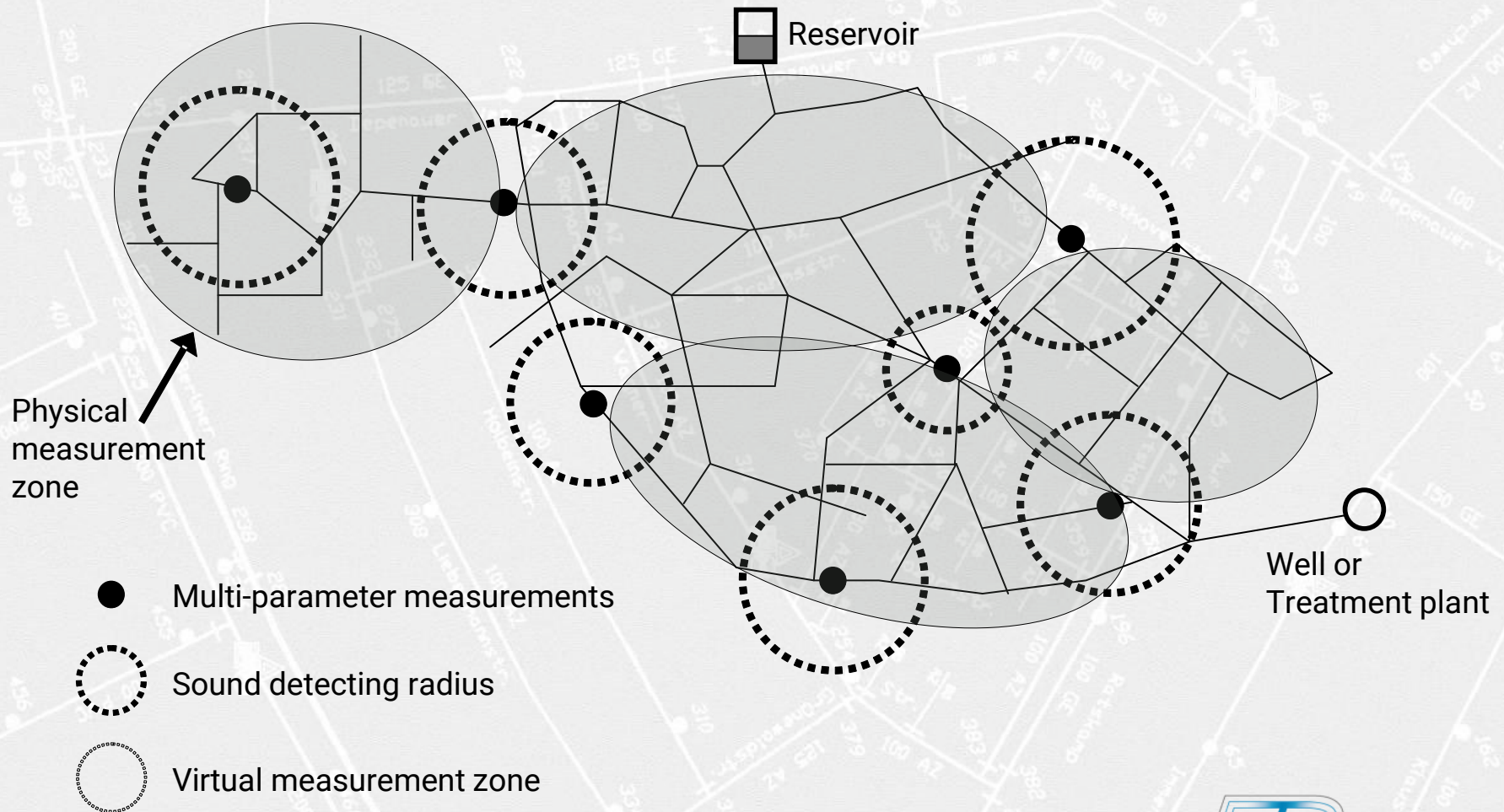


# MULTI-PARAMETER MEASUREMENT MEASURING PRINCIPLE





# PHYSICAL AND VIRTUAL ZONES



# ADVANTAGES AND DISADVANTAGES VIRTUAL-DMA TO 'REAL'-DMA

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## Advantages

- » No separation of network
  - › All advantages of 'open' networks
  - › Maximum of hydraulic capacity
  - › Higher safety of supply in case of fire fighting
- » No stagnation in displaced strings
  - › No flushing effort
- » No need to control tightness of zone borders
- » Cost effective!
  - › No new valves, chamber, ...

## Disadvantages

- » No pressure management for small sections possible
- » No direct water balance for virtual zones possible

# INSTALLATION PROCEDURE WLM-SYSTEM

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- » Determine key positions in water pipe network
- » Installing WLM sensor under full pressure (hot-tapping, pipe saddle)
- » Choose transmission tool (GSM / GPRS / Network cable / Fibre glass / etc.)
- » Choose a power supply (Battery / Solar panel / Mains supply)
- » Installation of software on the central PC
- » Configure each WLM sensor according to network structure

**Monitoring of entire pipe network  
(Flow / Pressure / Noise)  
directly from your Desk / PC central**



# WLM-SYSTEM - INSTALLATION

Gate valve



Pipe saddle



Transport mains installation

# COST EFFECTIVE INSTALLATION CHAMBER



- » Installation without any interruption
- » Manufactured by HAWLE GmbH
- » Easy installation and dismantling
- » No concrete chamber construction – just small street cap
- » Length adjustable on site





# WLM-SYSTEM

## SOLAR PANEL / BATTERYPACK / MAINS

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- » Mains supply; street light
- » With solar panel online data 24 hours / every minute
- » Accumulator powered up to 12 months
- » Battery powered operation for "profiling" up to 3 years

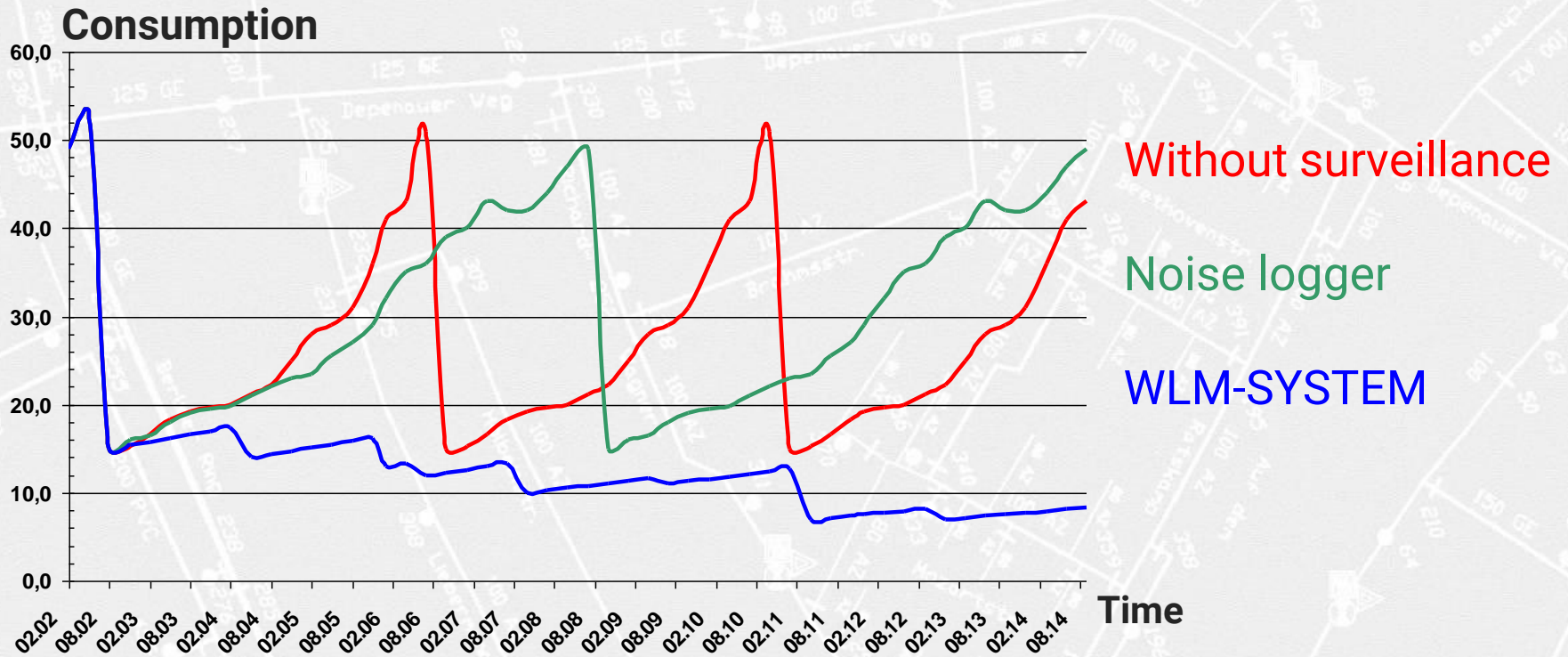


# m-log DATA LOGGER



- » Registration of pressure, flow, temperature, 4-20mA...
- » Input for Impulse Pos., Neg., and status (MID, Bulk meters, etc.)
- » Measurement of fluid level (reservoir, deep wells etc.)
- » Battery mode up to 10 years (GPRS) ; mains supply 220AC
- » GPRS or Cable communication (bi directional)
- » Full Integration into **AQUALYS**
- » Data storage up to 500000 values
- » Remote parameterizing
- » IP 68 – 24h/365 days submersible
- » Internal or external antenna
- » 24 boundary values/channel/day
- » SMS warning

# Network monitoring with WLM-SYSTEM →→SUSTAINABILITY



# WLM-SYSTEM

**Thank you for your attention!**  
**Talk to us!**

## **MARTINEK GMBH Measurement Technology**

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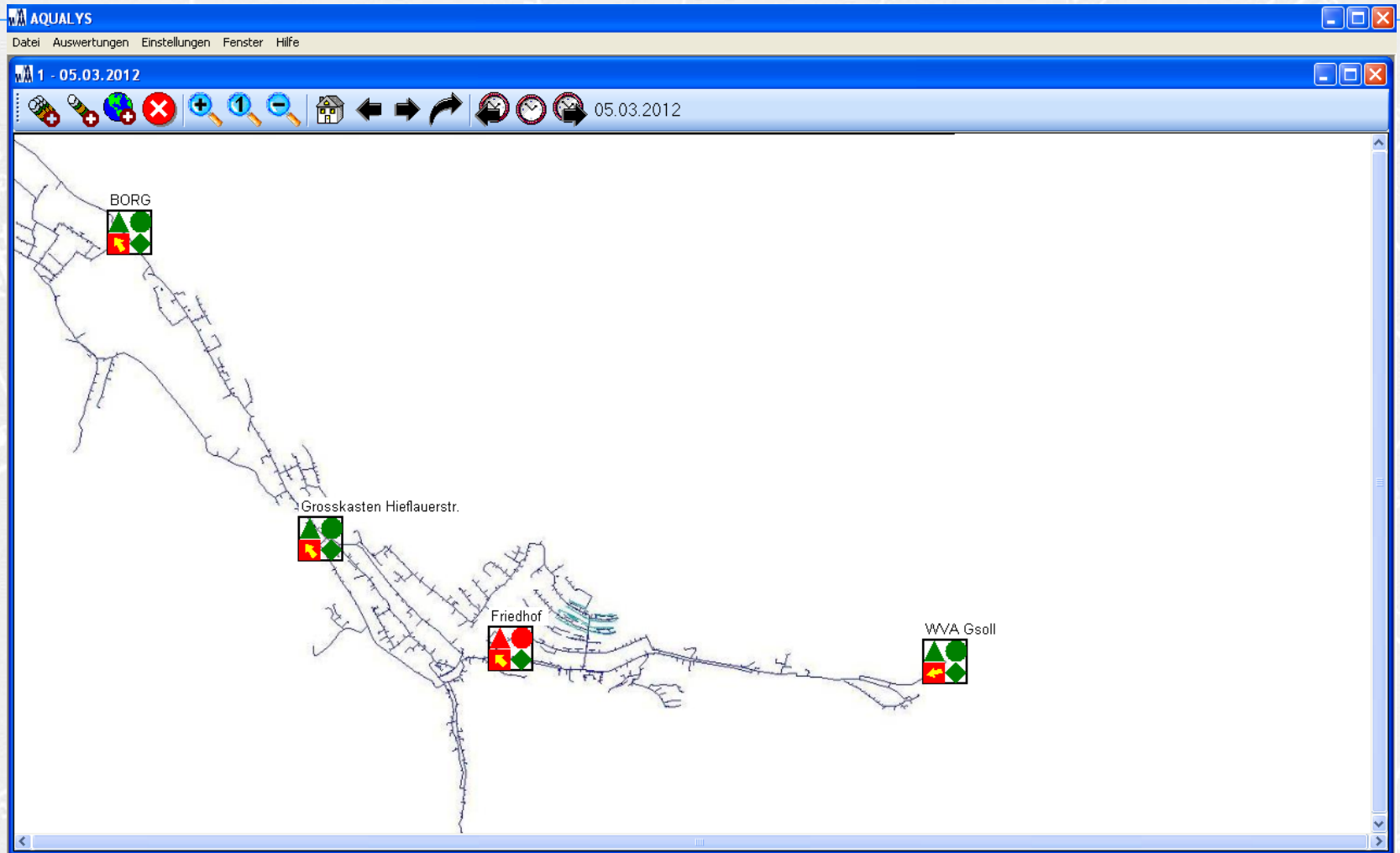
[office@martinek.org](mailto:office@martinek.org) | [www.martinek.org](http://www.martinek.org)

### **Our references:**

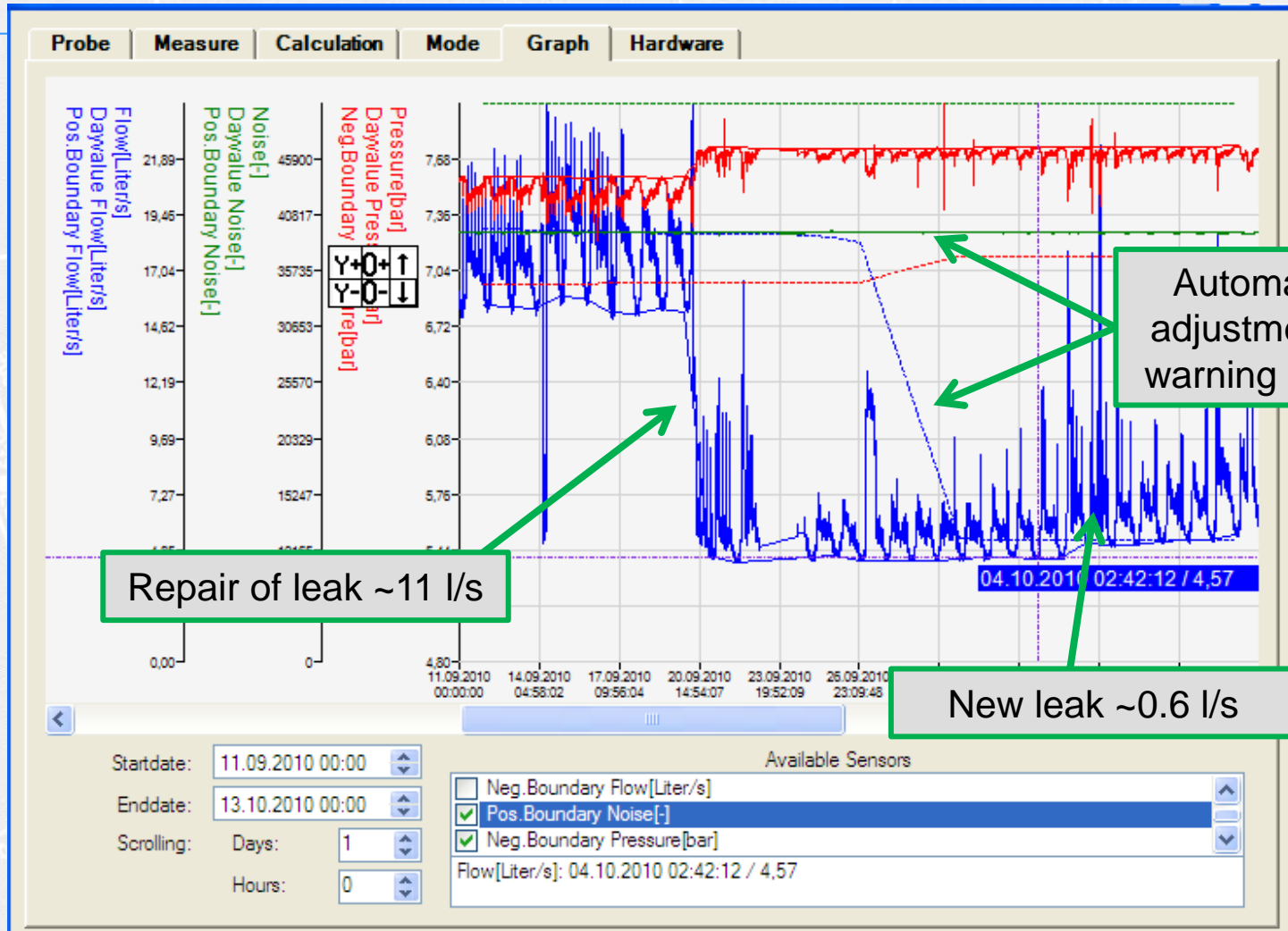
- » DE Hof
- » DE OOWV
- » DE Brühl
- » EE Tallinn
- » LV Riga
- » PR San Juan
- » and many more



# Example – Eisenerz (Austria)



# Example – Eisenerz, Austria



## Example 2 – Eisenerz (Austria)

