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Efficient drinking water monitoring in the distribution network

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2M Sensors Limited, Netherlands

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outline

- SAWA
- Monitoring in the distribution net
- Fieldtest in drinking waternet in Assen
- First results from field test
- Summary and planning



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- Initiated by Sensor Universe, NOM and Waterlaboratorium Noord, de Waterleidingmaatschappij Drenthe, het Waterbedrijf Groningen.



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Goals

- Application of sensor technology in the drinking water sector.
- Further development of sensors to measure drinking water quality
- Further development and clustering of new knowledge in the field of sensortechnology for drinking water applications.
- Support with the commercialisation of knowledge of sensortechnology for water quality



3 sub projects in SAWA

- Continuously monitoring the quality of surface water for drinking water preparation
- Detection of bacterial regrowth in drinking water
- **Monitoring and dynamic modelling drinking water in distribution network**



Efficient and real time monitoring of water quality in the distribution net

- Goals
- Development of smart and low-cost sensors to control on-line and realtime the quality en quantity parameters.
- Determination of the required parameters for this sensor.
- Quality control is now covering 0.5% of water supplied to consumer via testing of collected samples.
 - Main interest is microbiological contamination



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Partners



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SENTEC - sensor test center

- 3 separate test areas, including a certified test area for Genetically Modified Organisms.
- Supply of 6 different water sources like: surface water, ground water, drinkingwater from several sources
- System for adding compounds to every water supply line
- Sensor systems can be tested and compared with traditional methods.



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SENTEC



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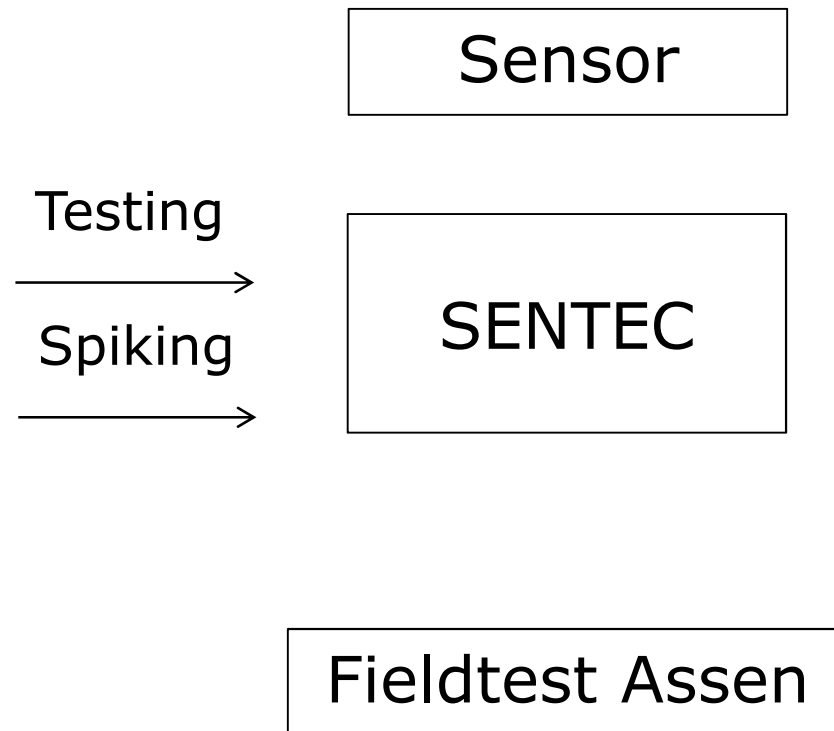


Sensors and data system

- Microbiology sensors – Aquaexplorer (Fish)
- Chemical sensors – Interline (UV-Visible, potential differences)
- Physical sensors – Brightspark(miniature Flow, Pressure, EGV, T)
- Data acquisition, communication and web-presentation – AVIC
- Data analysis and evaluation - Water companies, 2M Sensors, INCAS3,



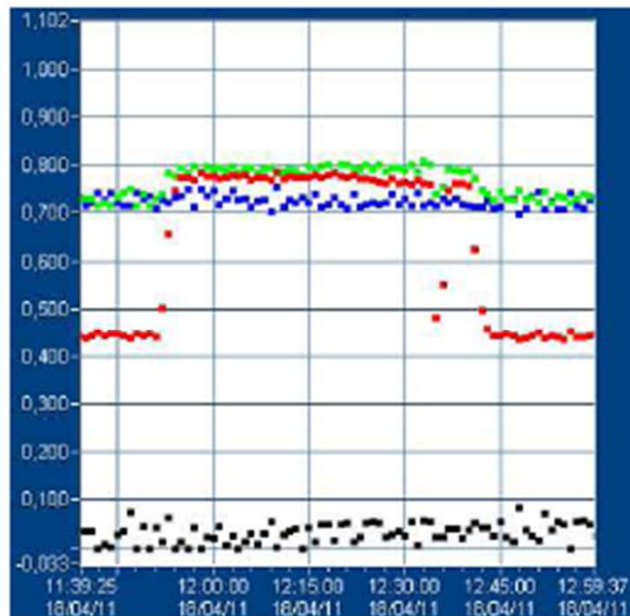
Sensor validation





Spiking experiments

Sensor: S::can supplied by Interline
Method: analysis of UV-VIS spectrum



Time series NO3 spike 11:40

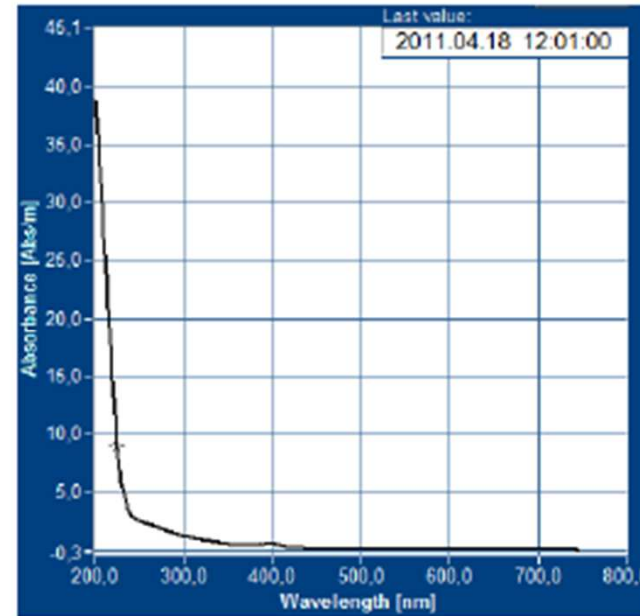


Fig. 19. Spectrum NO3 spike 11:40



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First fieldtest in Assen

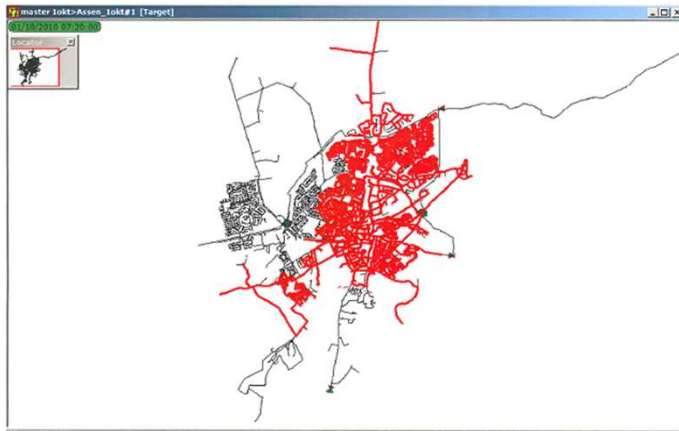


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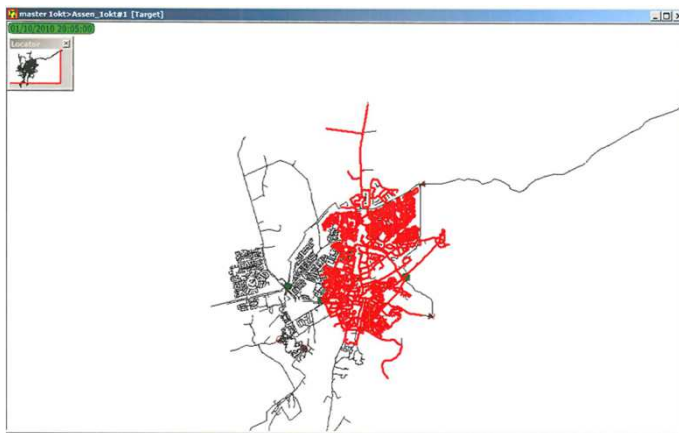
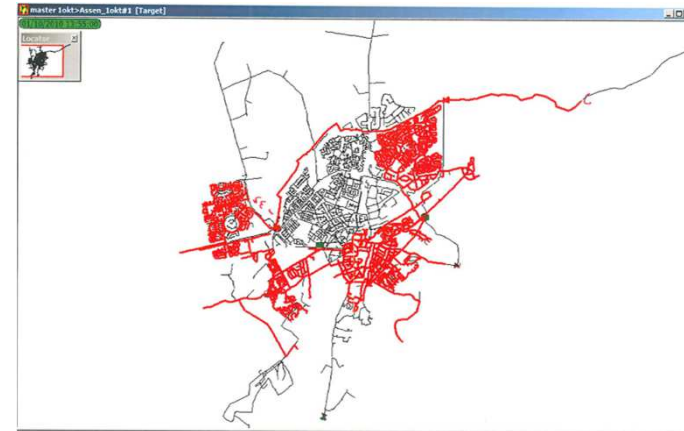


Assen - pumpstation

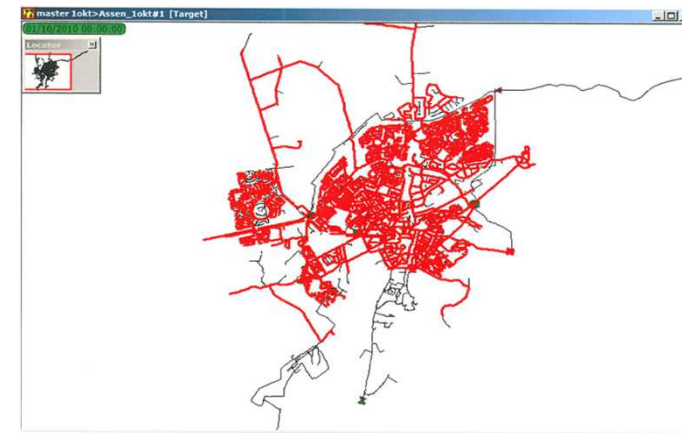
07.00 uur



14.00 uur



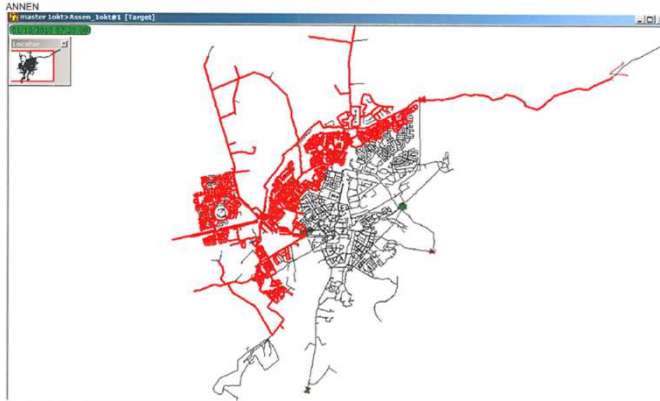
20.00 uur



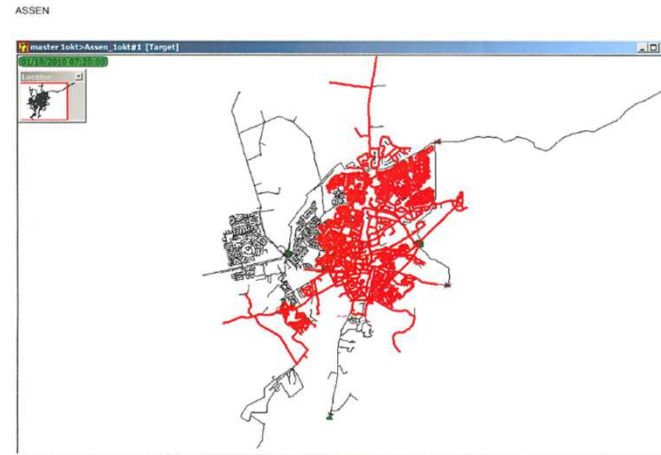
24.00 uur



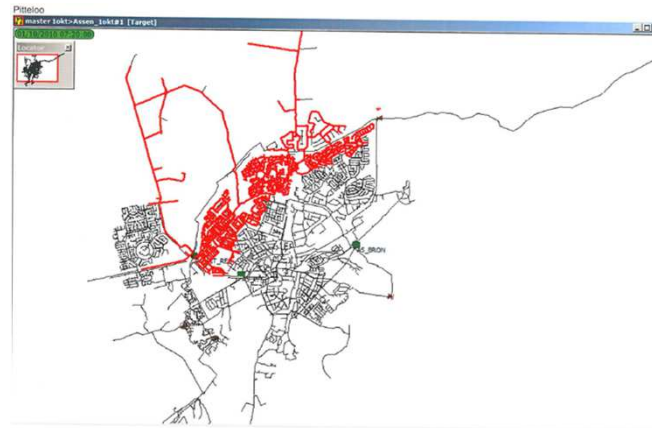
Water supply at 7.00 am in Assen



Annen



Assen



Pittelo



Research question for this fieldtest in Assen

- Can we detect with the sensors the change in fingerprint of the water?
- How does the prediction from Infoworks hydraulic model for the water distribution net match with the changes in fingerprint of the supplied water?



Locations in Assen

- Changing water supply during the day
 - Main office Watermaatschappij Drente
 - Pumpstation Pittelo
- Sensors now UV-Visible analyser
- More to come



Test location pittello





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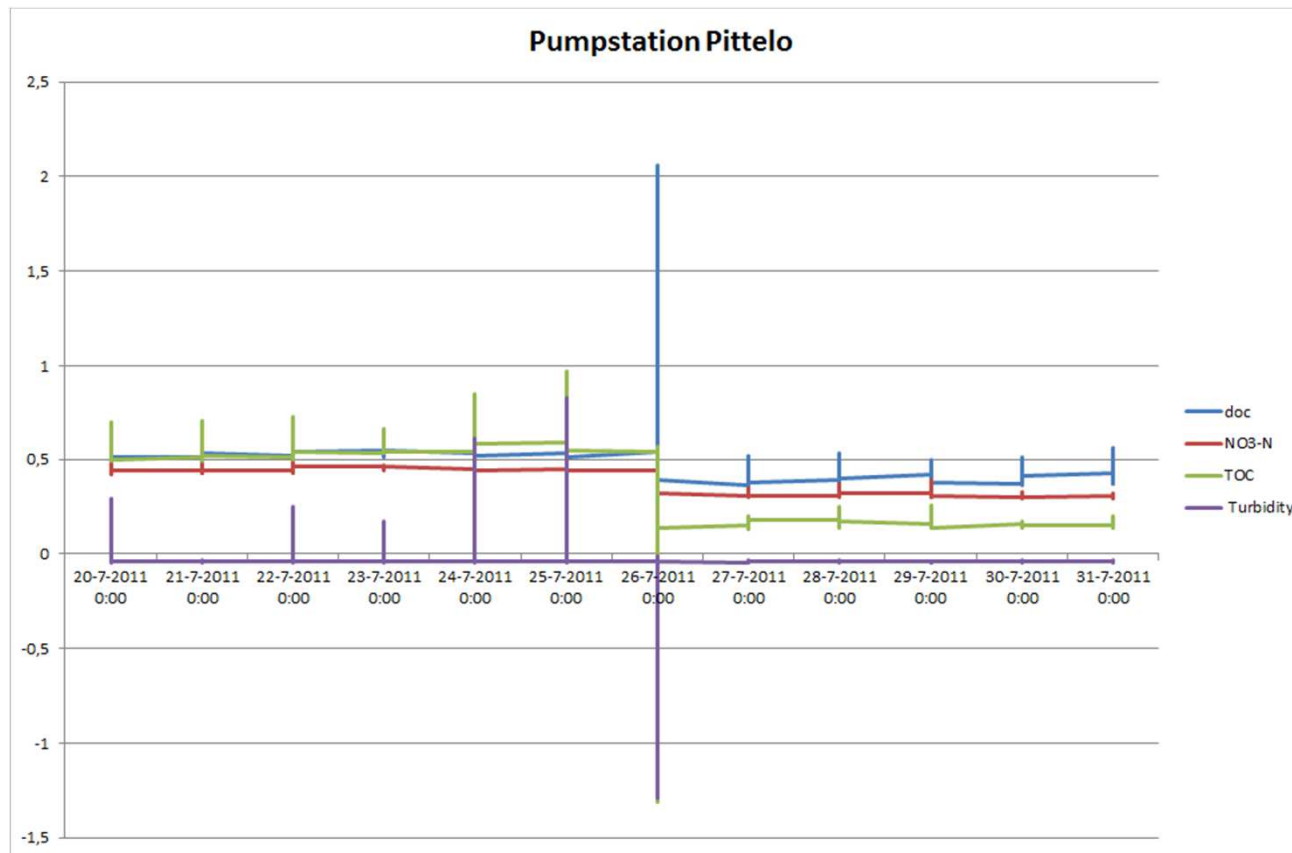
First results from fieldtest



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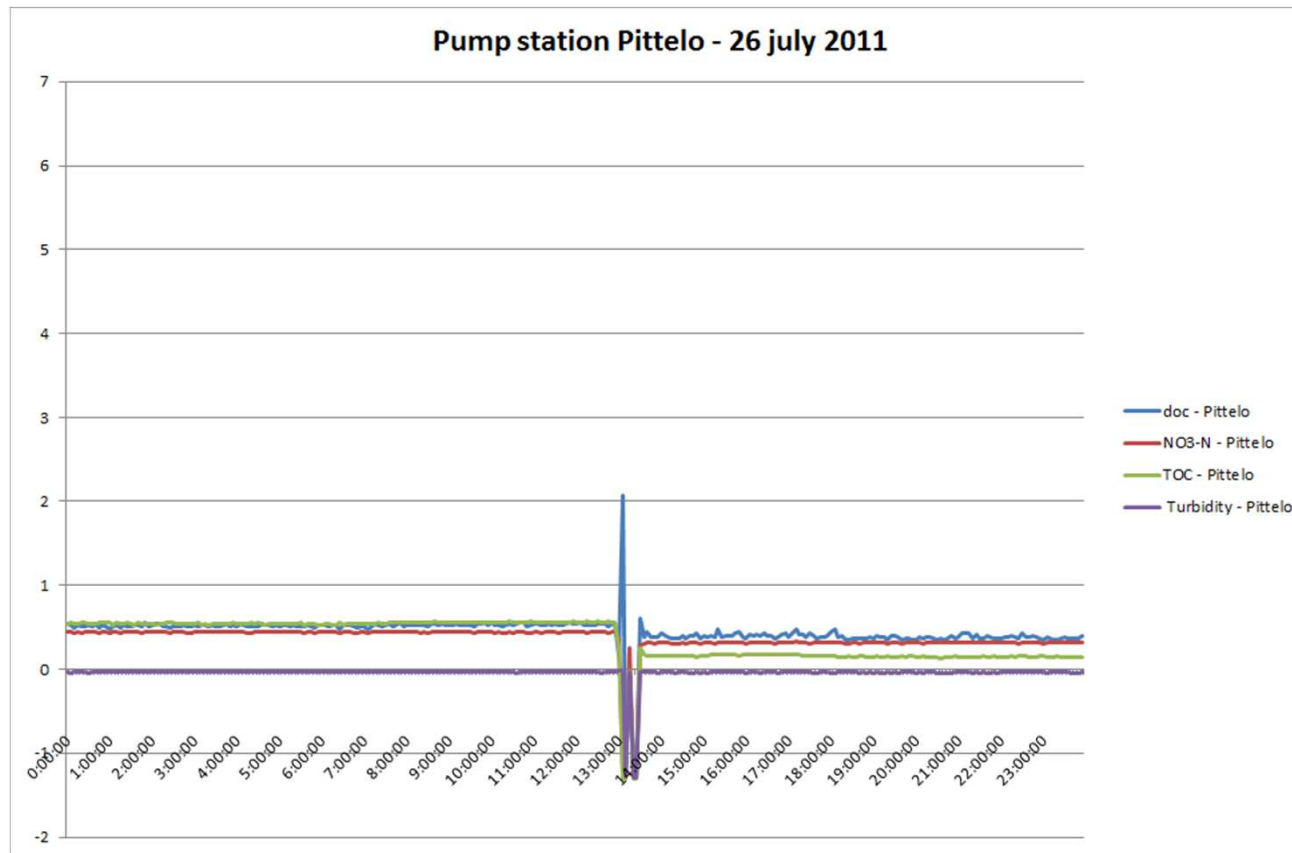


UV-Visible sensor Pittelo



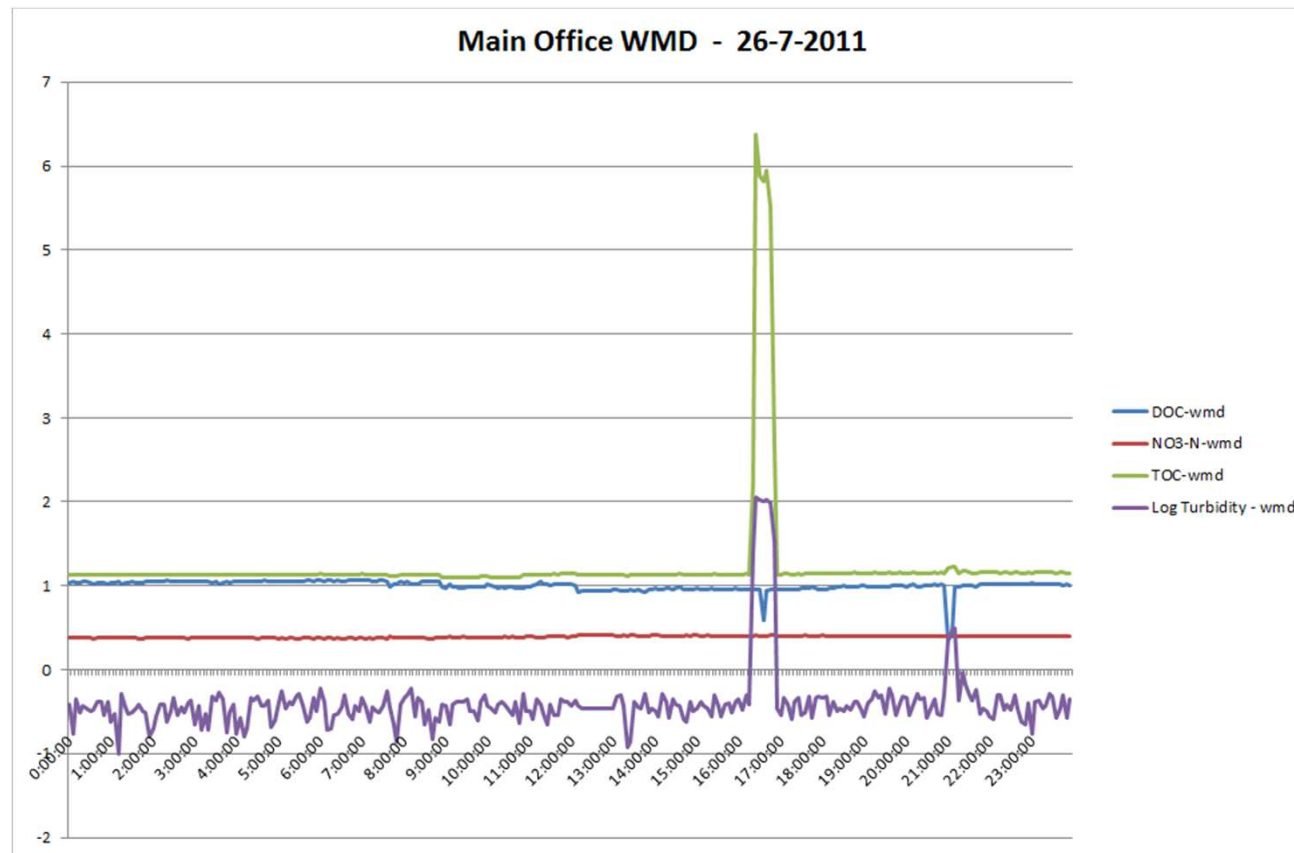


UV-visible sensor Pittelo





UV-Visible sensor WMD





Summary

- Waterquality is very good
- Periodic changes, possibly related to daily change in flow direction
- Further analysis to correlate with pump stations and Infoworks output.



Planning

- Fingerprint measurement of water supplies
- New fieldtest planned in Groningen in march 2012 to run during the summer period
- Locations that are more vulnerable to biological regrowth
- More sensors.



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The Northern Netherlands Provinces (SNN)

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www.projectsawa.nl

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Questions?