



# DESSIN

Lunsjpresentasjon for KLIMA 2050, 2016-05-30

Herman Helness  
SINTEF

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## 6 universities / research centres



## 4 Site owners (one as 3<sup>rd</sup> party)



Oslo kommune



## 11 SMEs (47% of EC contribution)



adelphi



# TWOFOLD OBJECTIVE

- Demonstrate and promote innovative solutions to water-related challenges with a focus on water quality and water scarcity
- Demonstrate a methodology for the valuation of ecosystem services (ESS) as catalyser for innovation in the water sector.







**2. HOFFSELVA**  
Local Treatment of  
Combined Sewer  
Overflows

**3. WESTLAND**  
Freshkeeper and  
smart desalination



- ESS Mature site
- DEMO Scarcity
- DEMO WFD (quality)



**1. EMSCHER**  
Local Treatment of CSOs  
and Real-Time Control of  
Sewer Network

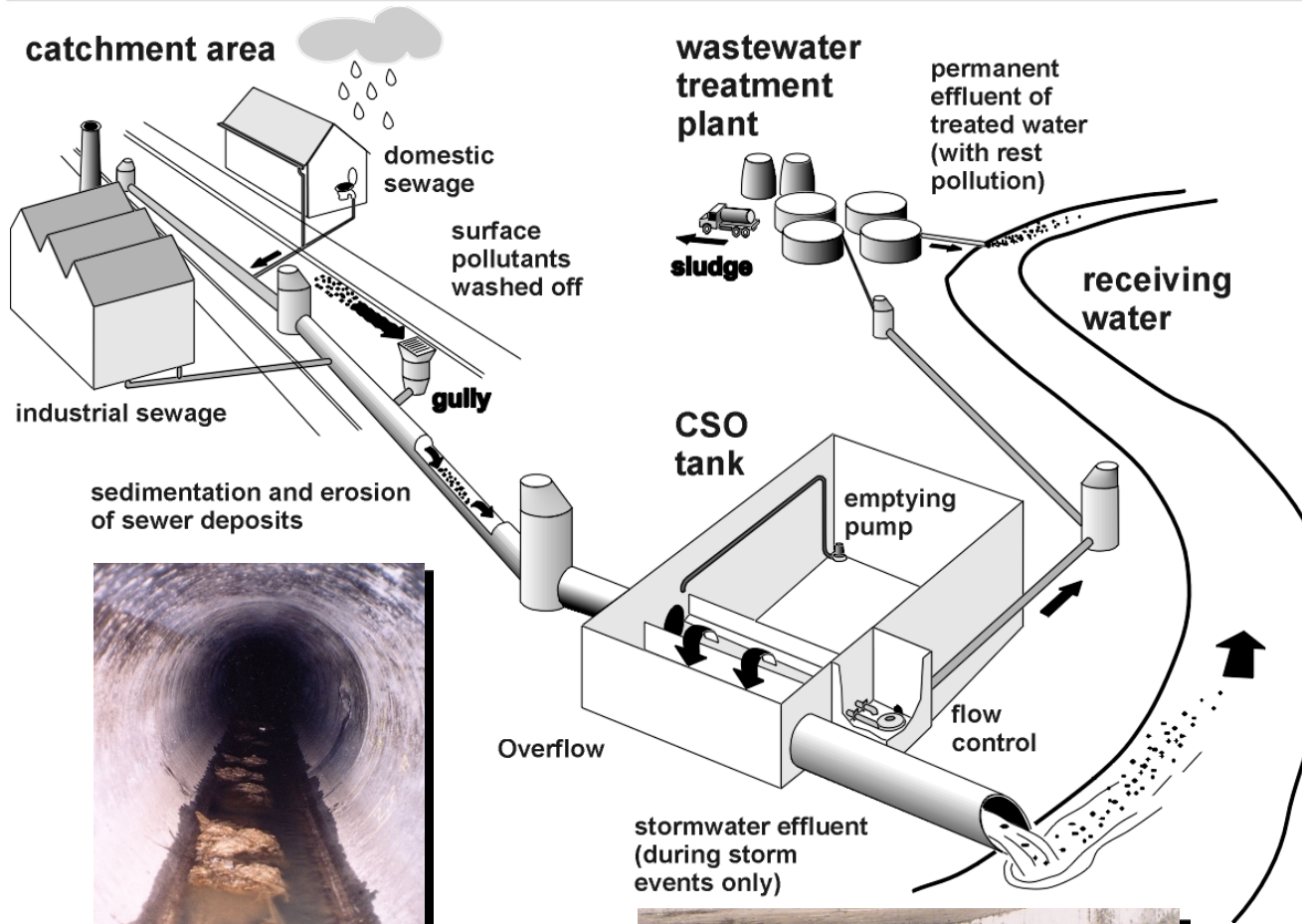


**4. ATHENS**  
AMI-Enabled Sewer  
Mining for water reuse



**5. LLOBREGAT**  
Flexible ASR to improve  
groundwater resources





# TYPICAL COMBINED SEWER SYSTEM (G. Weiss 2014)










# Team Hoffselva

Research



Peggy Zinke Herman Helness Stig Petersen



Bård Myhre Gema Raspati Edvard Sivertsen Rita Ugarelli Sigrid Damman

SME's



Per Kølner Cheng Sun



Site owner



Oslo kommune

Arnhild Krogh  
until Sept. 2015

Frode Hult



# Task 32 Hoffselva demo site (Oslo, Norway)

- Catchment area: 1 427 ha
- Number of people connected to the sewer system: 25 500
- There are 22 CSO's discharging into the river
- Aprox. 14 km sewer system





# Monitoring water quality in Hoffselva and evaluation of solutions





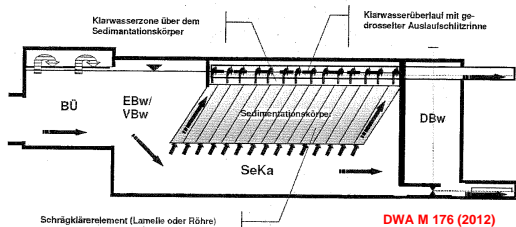
# Task 32 Hoffselva demo site (Oslo, Norway)

## OBJECTIVES

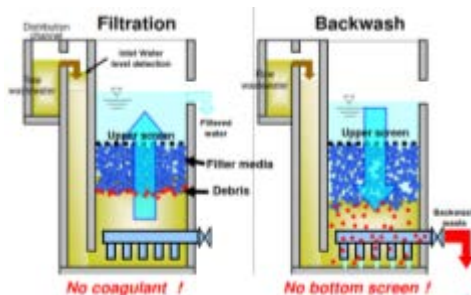
Demonstrate the feasibility and effect on ESS of different innovative local solutions for CSOs developed to improve water quality in Hoffselva.

## SPECIFIC TASKS

- T32.1 Enable enhanced particle removal in CSO tanks with innovative cross-flow lamella settlers (2016)
- T32.2 Enable local treatment of CSO overflow with an innovative high rate filter
- T32.3 Enable integration of local CSO treatment by innovative monitoring and data communication
- T32.4 Monitoring water quality in Hoffselva and evaluation of solutions



*Local CSO overflow treatment with cross-flow lamella settler*



*Local CSO overflow treatment with high rate filter*



*Integration of local treatment by monitoring and communication*

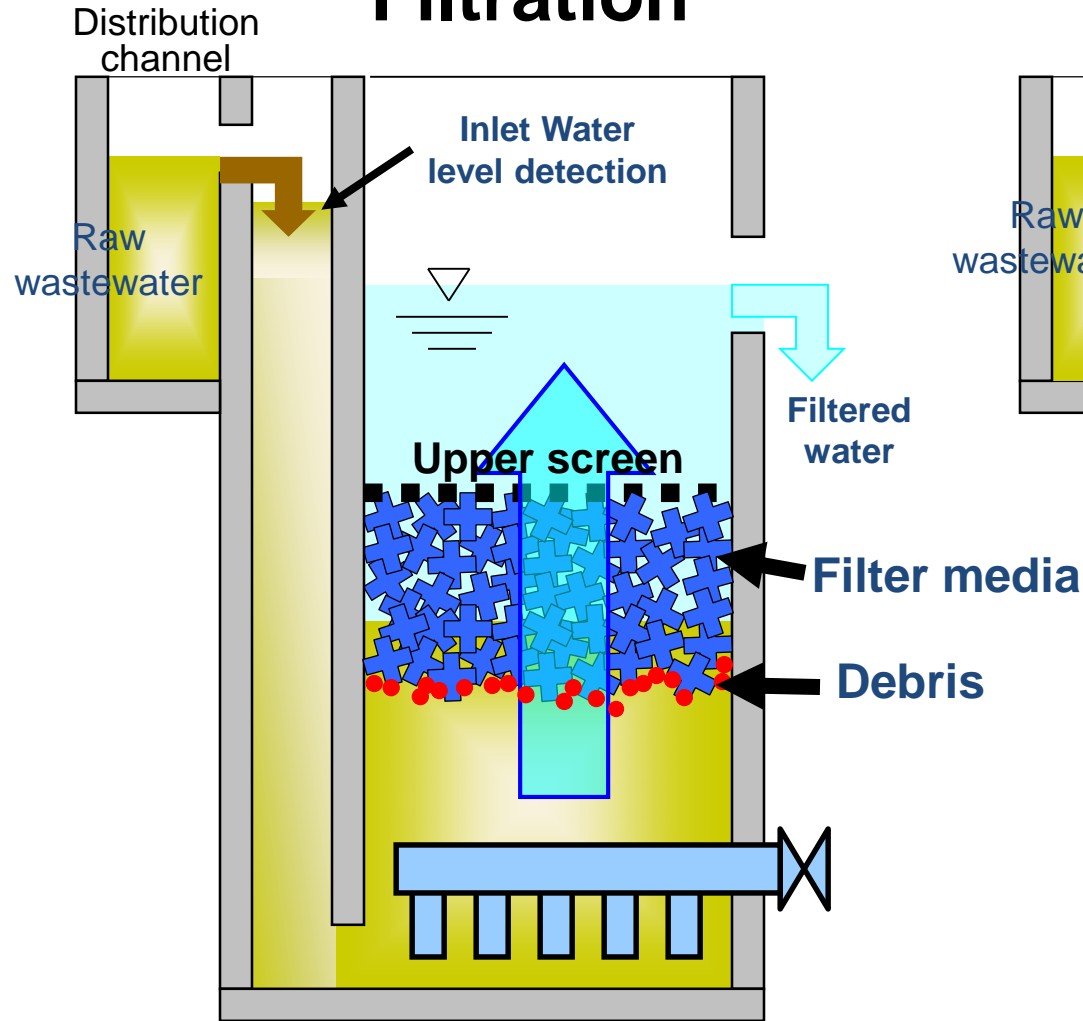
# T32.2 HRF demonstration plant in Hoffselva





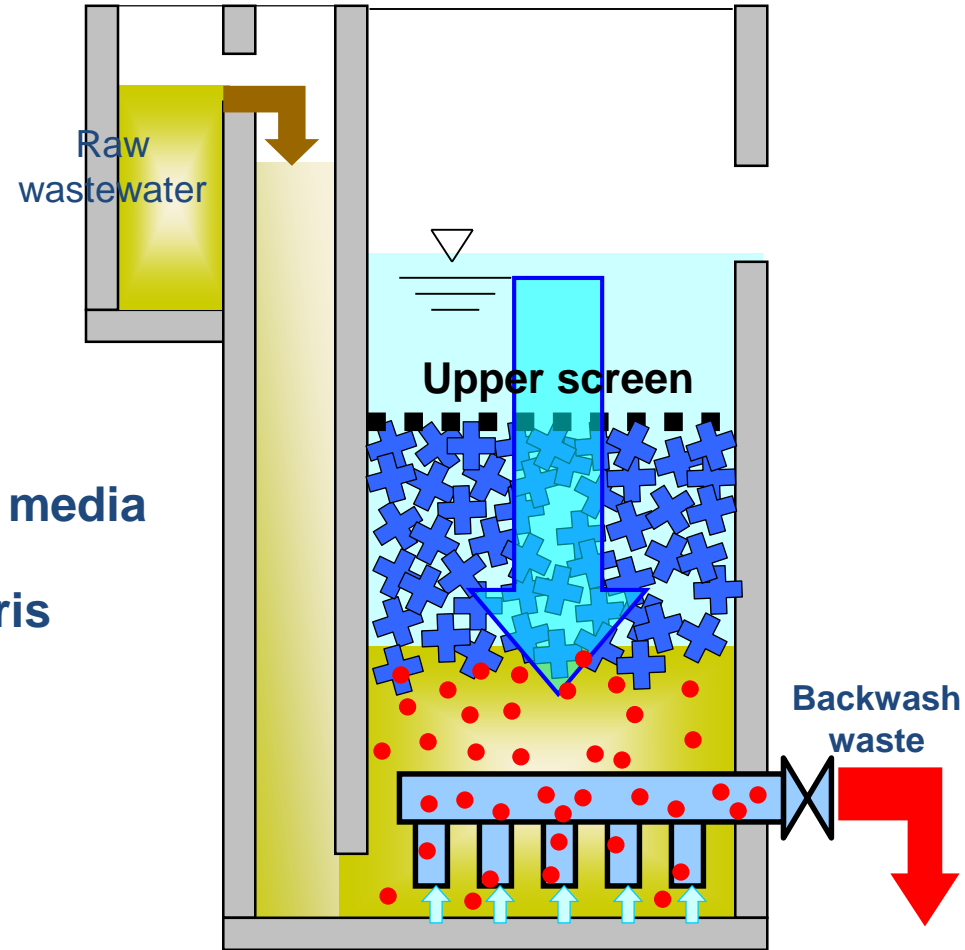
# Mechanism of High Rate Filtration

## Filtration

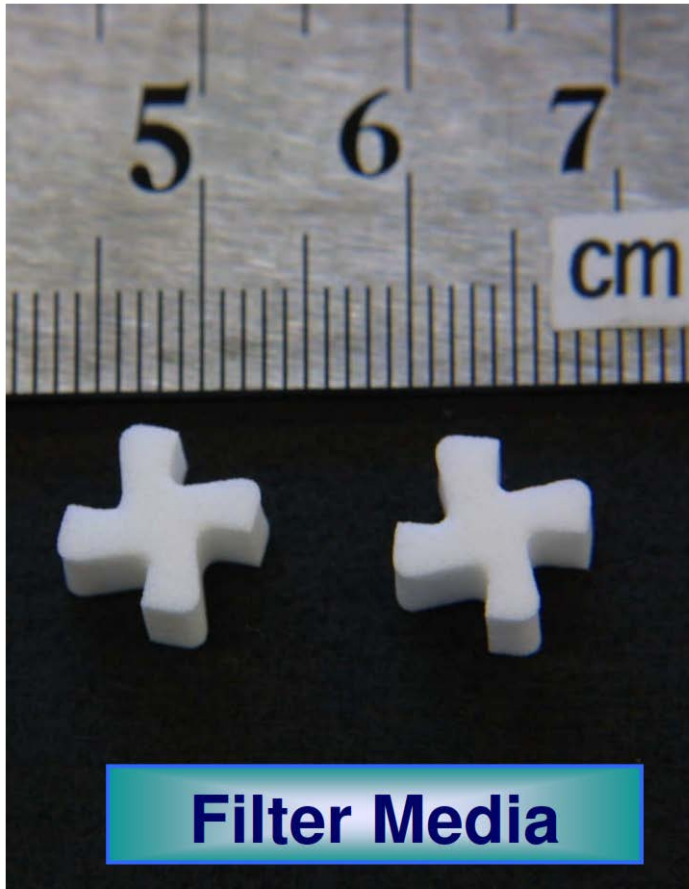


**No coagulant !**

## Backwash



**No bottom screen !**



- Floating filter media
- Optimal shape to capture debris, BOD & SS (high void ratio)
- Acid – proof, Alkali - proof

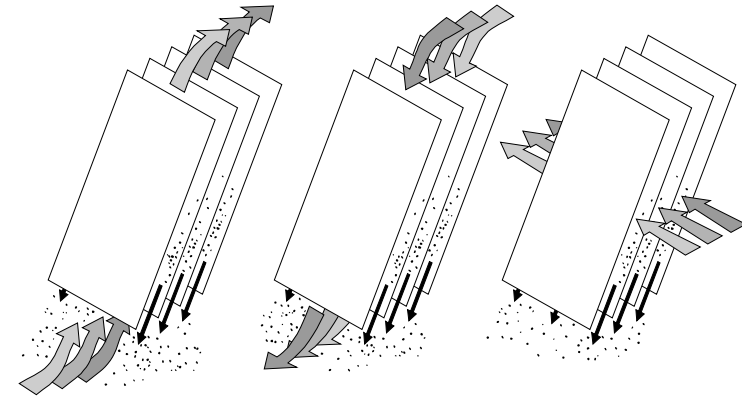


- **UFT demonstration plant for lamella sedimentation at Emscher in Germany**

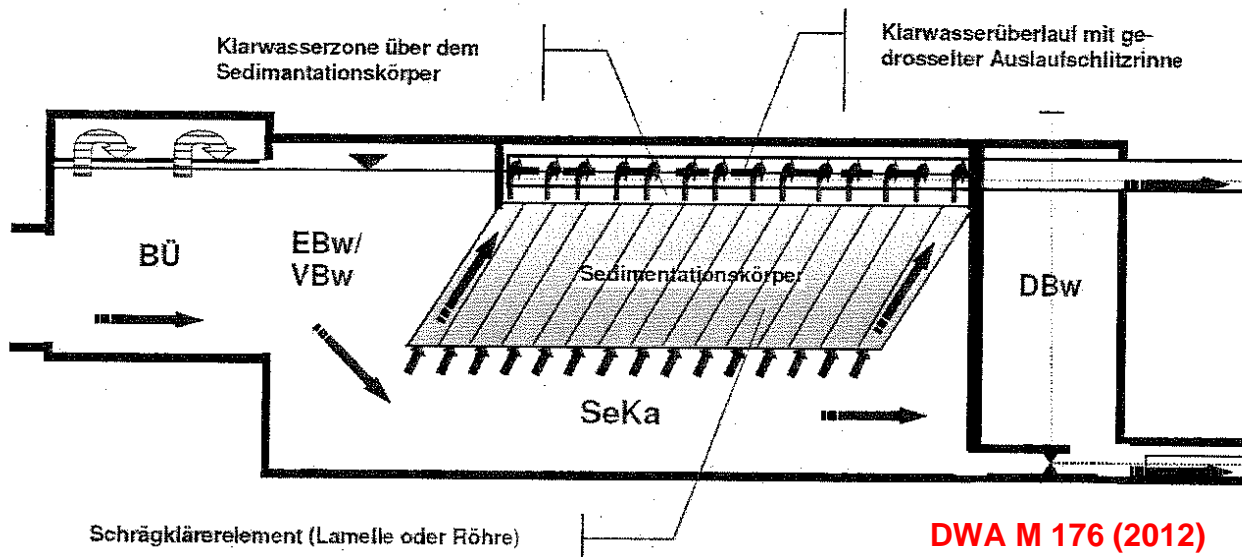


- Well known e.g. from mineral industries
- **New application: Stormwater treatment in combined or separate sewer systems**
- Some pilot plants → positive results

## Types of lamella separators



Upflow Downflow Cross-current





- On-line sensors
  - Flow rate x 2
  - Pressure x 2
  - Turbidity x 2
  - Level x 4
- Data acquisition manager (DAQ Manager)
- PC with wireless internet
- Remote access to desktop



DAQ Manager 1.7.5

Device: 3727A1448

Last Update: 2015-05-29 10:29:16

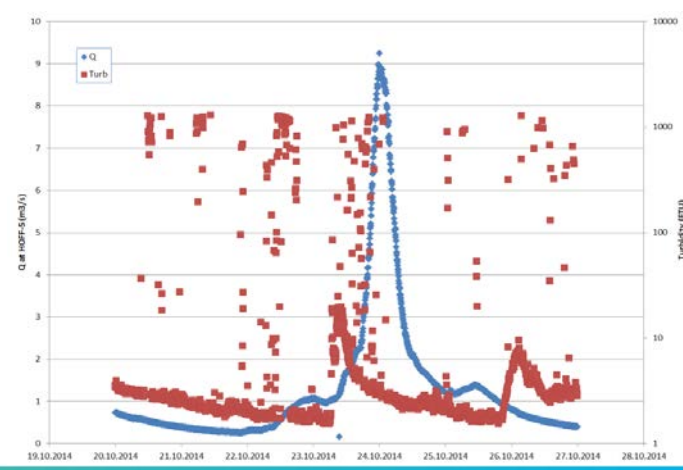
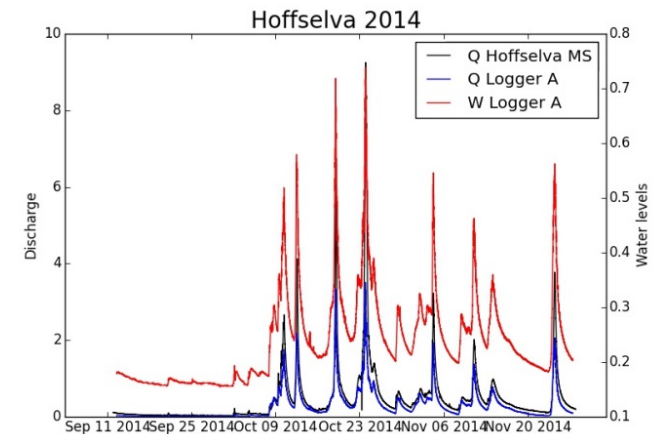
No.	Channel name	Channel type	Unit	Value	Average	Min	Max
1	Inlet Turbidity	Hardware input	—	299,94	299,98	299,89	300,00
2	Outlet Turbidity	Hardware input	—	299,83	299,85	299,77	299,87
3	FT-01 0-50m3/h Raw water	Hardware input	—	0,00	0,00	0,00	0,00
4	LT-01 0-100% Raw water	Hardware input	—	32,91	29,39	14,40	41,37
5	LT-02 0-100% Backwashed water	Hardware input	—	14,24	14,24	14,16	26,64
6	LT-03 0-100% Filtrate water	Hardware input	—	14,50	21,37	10,86	30,98
7	LT-04 0-100% Filtrate water	Hardware input	—	52,28	52,27	50,87	53,38
8	FT-01 0-100kPa Filtrate water	Hardware input	—	9,94	9,85	1,94	10,06
9	FT-02 0-100kPa Raw water	Hardware input	—	20,52	20,48	9,94	21,07
17	Inp. B17	Hardware input	—	0	0	0	0
18	Inp. B18	Hardware input	—	0	0	0	0
19	Inp. B19	Hardware input	—	0	0	0	0
20	Inp. B20	Hardware input	—	0	0	0	0
21	Inp. B21	Hardware input	—	0	0	0	0
22	Inp. B22	Hardware input	—	0	0	0	0
23	Inp. B23	Hardware input	—	0	0	0	0
24	Inp. B24	Hardware input	—	0	0	0	0
25	Inp. C1	Hardware input	mA	20,00	20,00	19,99	20,00
26	Inp. C2	Hardware input	mA	19,99	19,99	19,99	19,99
27	Inp. C3	Hardware input	mA	0,00	0,00	0,00	0,00
28	Inp. C4	Hardware input	mA	9,27	8,70	6,30	10,62
29	Inp. C5	Hardware input	mA	6,28	6,28	6,27	6,28
30	Inp. C6	Hardware input	°C	27	36	35	42
31	Channel 31	Hardware input	—	0	0	0	0

Event Log

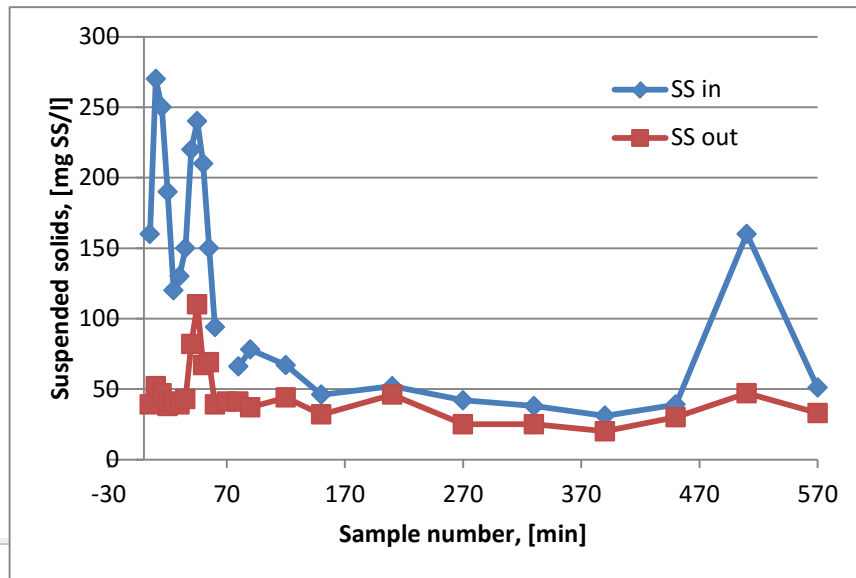
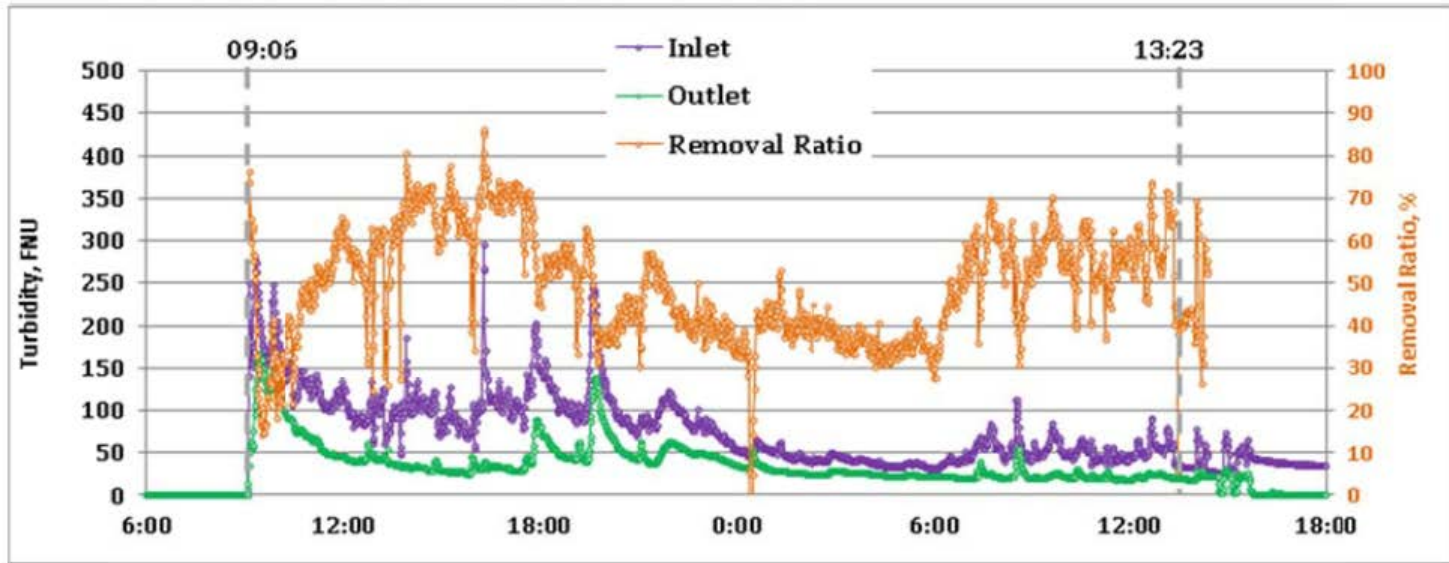
Time	Category	Description
2015-05-29 08:00:00	Operation	[3727A1448] Data downloading has been started.
2015-05-29 07:14:06	Operation	[3727A1448] Data downloading has been completed.

# T32.4 Monitoring water quality in Hoffselva and evaluation of solutions

- Three temporary water level loggers operated Autumn 2014 and 2015 (LogA, LogB, LogC)
- One turbidity logger + discharge logger operated Autumn 2014 and 2015, and water sampling and analysis in collaboration with NIVA (HOF5)



# Example of results from HRF (17<sup>th</sup> Sept. 2015)



Comparison of on-line turbidity and SS from water samples, CSO event 17th Nov. 2015



# Observasjonsstudie med Hoffselvens Venner

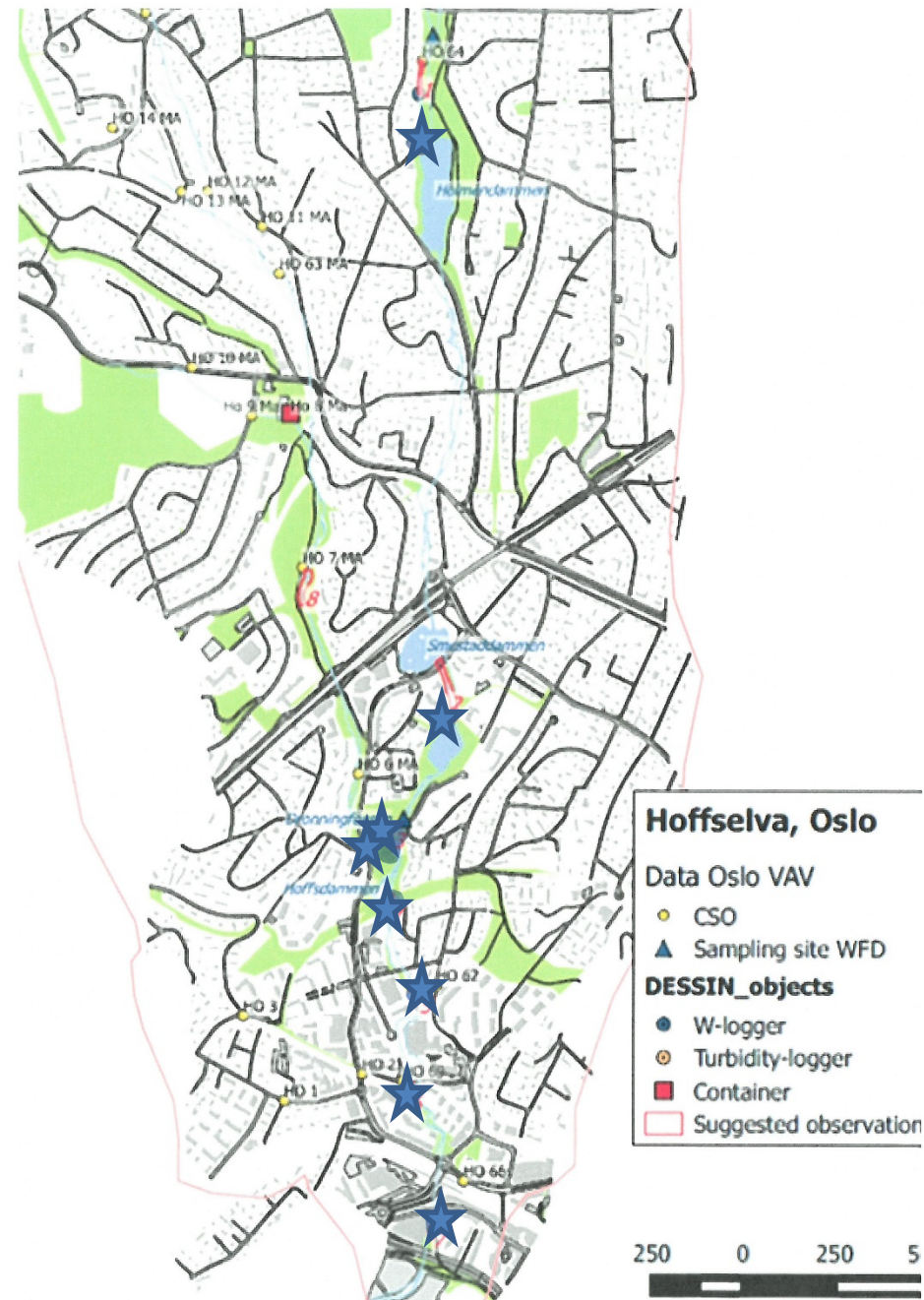
- 01.03-01.12 2016
- Hvordan opplever beboere/brukere av området vannkvaliteten i elva i dag?
- Hvordan påvirker dette opplevelsen og bruken av ulike områder langs elva?
- Hva vil forbedringene av vannkvalitet som DESSIN-teknologiene gir faktisk bety for brukerne?
- Hvilken verdi vil forbedringene kunne tilføre samfunnet – miljømessig, økonomisk og sosialt?



Noen av de mest engasjerte observatørene ifm oppstarten i mars.

# Hva observeres?

- 7 observasjonssteder
- 'Normale' forhold og etter overløp
- Mål, skjema og bilder
  - Tidspunkt, værforhold
  - Vannføring
  - Vannets utseende (farge, sikt/klarhet, naturlig og menneskeskapt materiale)
  - Lukt
  - Forhold langs breddene
  - Mennesker i nærheten
  - Egen aktivitet
  - Totalopplevelse (positiv-negativ)





# Type bildmateriale

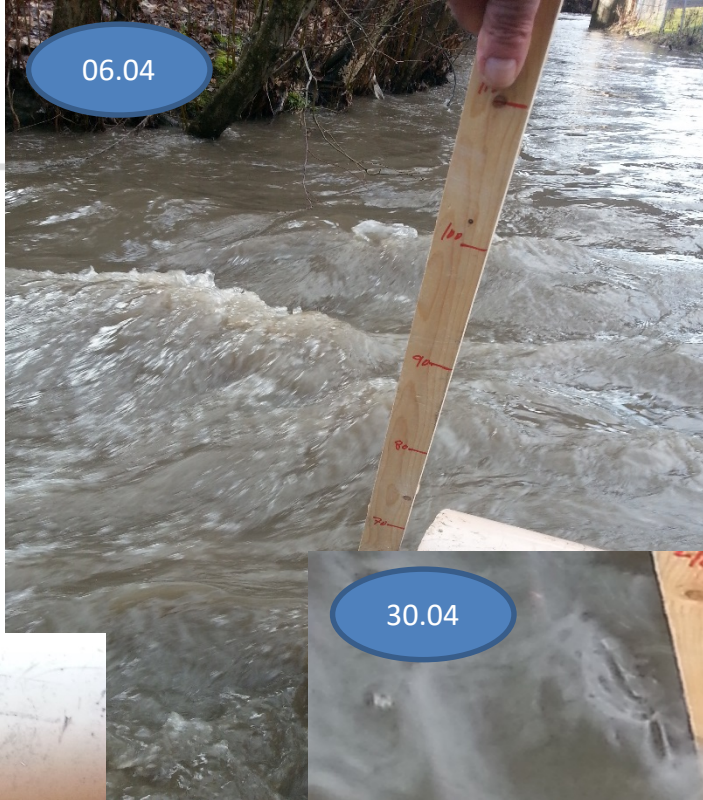




05.04



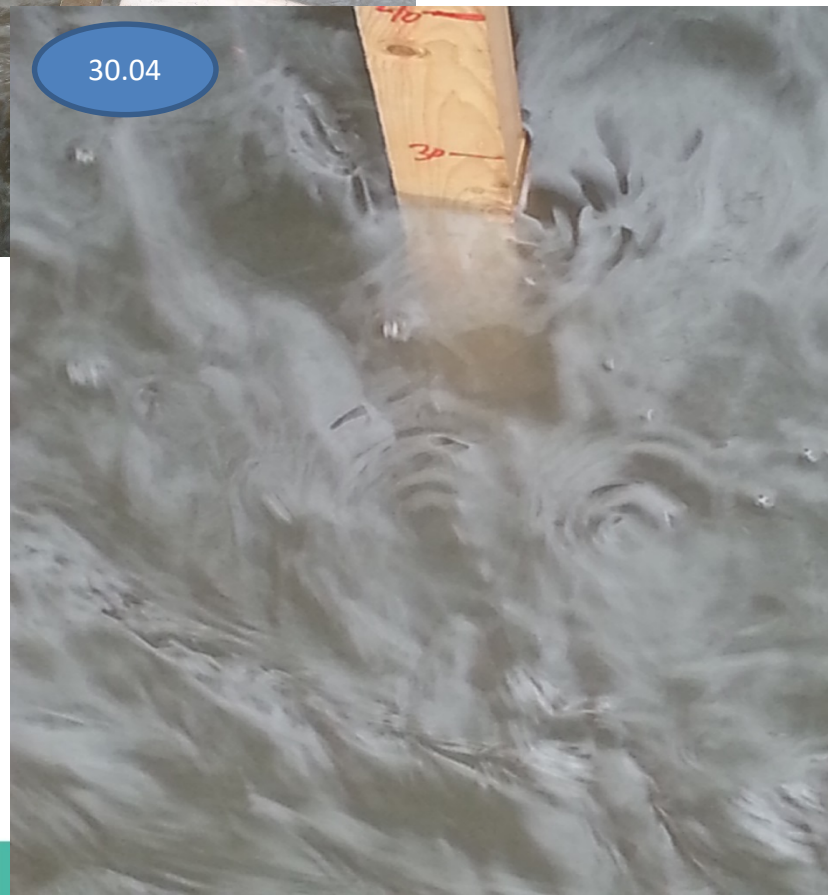
06.04



22.04



30.04



# Status og foreløpige inntrykk

- 5 runder med bruker-observasjoner til nå
  - (01.03, 05.04, 06.04, 22.04, 30.04)
  - 2 etter reelle overløpshendelser
- Klare forskjeller mellom observasjoner etter overløpsvarsel og uten overløpshendelser
  - Siktbarhet (turbiditet)
  - Misfarging
  - Noe lukt på de nederste observasjonsstedene
- Foreløpig for lite data til å trekke konklusjoner
- Ikke 'fanget' de verste forholdene (observert av forskerteamet i fjor)
- Egne observasjoner 12.05
- Flere varsler, og sannsynligvis overløpshendelser, men ustabil varslingsystem?
  
- Stabil, men rel. liten kjerne av observatører – hver er viktig, trenger gjerne flere!

# Veien videre

- Klargjøring av UFT-anlegg før sommer 2016
- Fra august 2016:
  - Sammenlignede forsøk med sedimentering og filter
  - Observasjonsstudie videreføres høsten 2016
- ESS evaluering
  - Datainnsamling
  - Implementering av metodikken for case Hoffselva
- Avslutning i desember 2017
  - Rapportering og seminar