

# Implementation and findings from stormwater treatment field pilots

- 1) Paskurinoja, Lahti (Finland)
- 2) Tähnase tee T5, Rae Municipality (Estonia)
- 3) Vecais parks, Smiltene (Latvia)

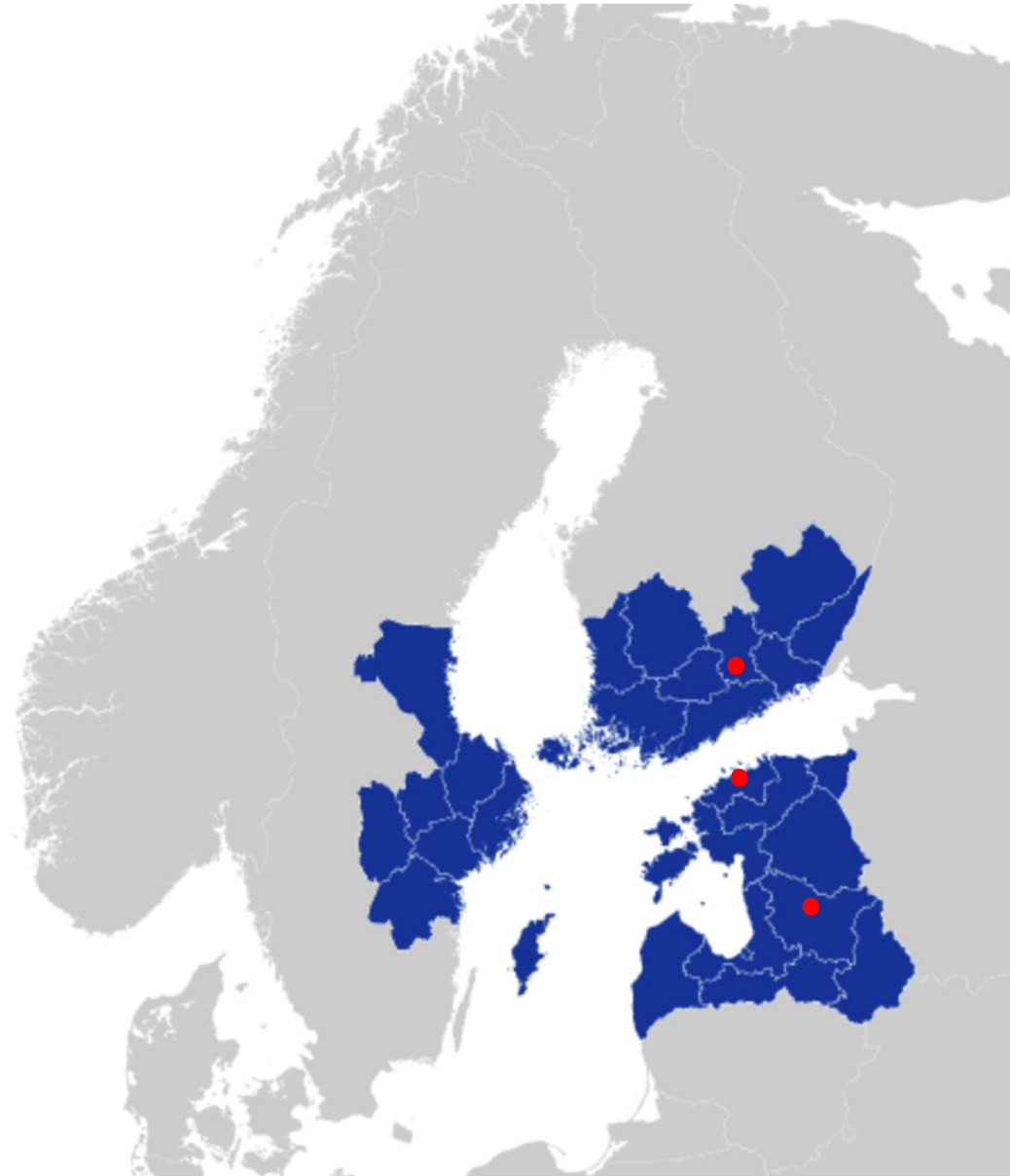
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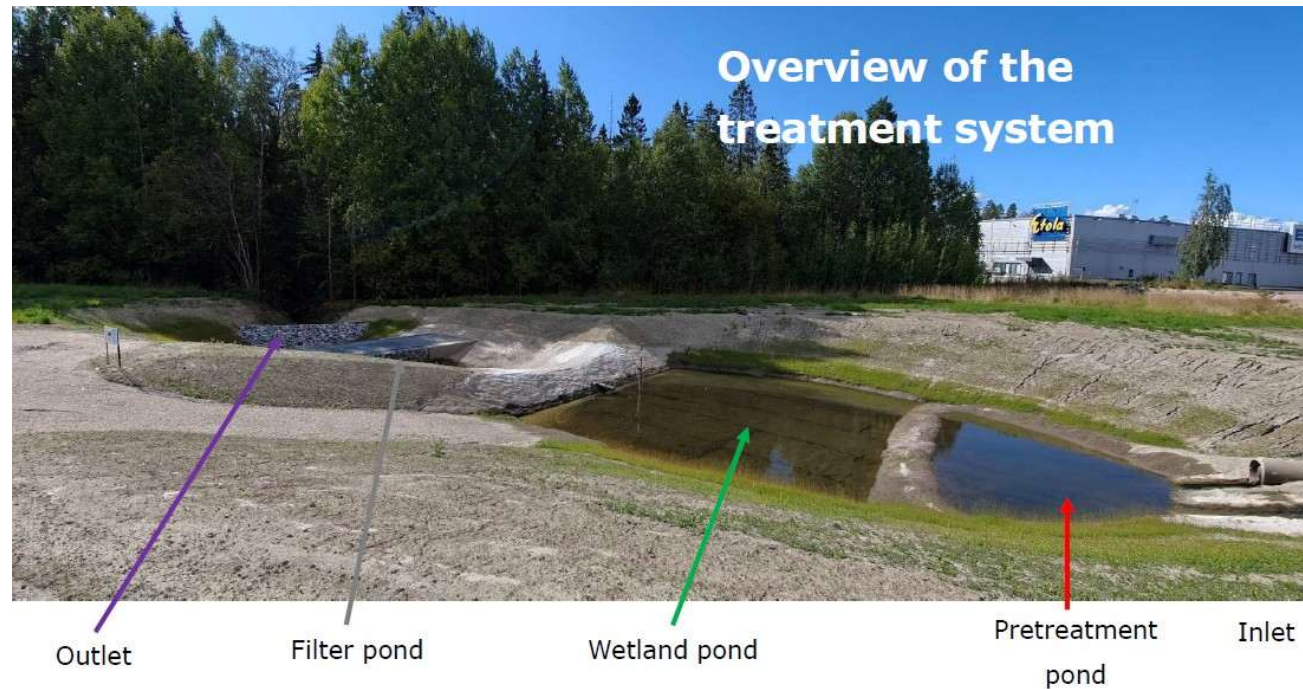
# Lahti stormwater field site

- **Main discharge channel:** Paskurinoja stream (connects to Porvoonjoki)
- **Catchment area:** 25 ha, imperviousness ~50%
- **Land use:** commercial, industrial and car traffic
- **Key challenges:** water quality and stream erosion
- Estimated **stormwater volume** ~50 000 m<sup>3</sup>/year
- Design and planning in 2024-2025, construction completed in summer 2025



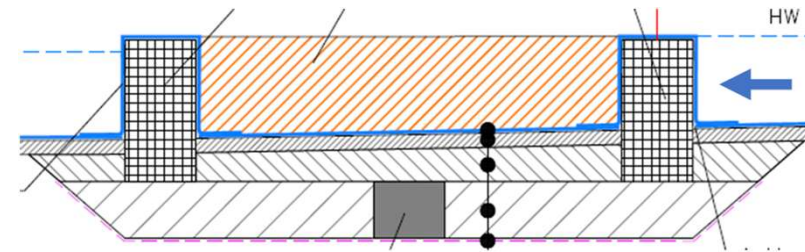
# Lahti stormwater field site

- Design preconditions:
  - Treatment volume capacity 360 m<sup>3</sup>, flooding reserve 800 m<sup>3</sup>
  - Nominal max flow 450 L/s
  - Accessible filter unit enabling different filter medias
  - Replaceable filter material
- Design made by Sitowise Oy
- Site consists of pretreatment pond, wetland pond and filter pond

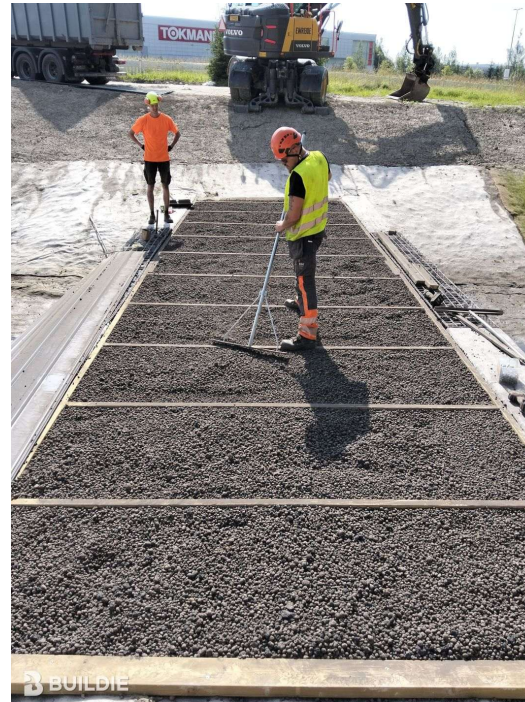


# Lahti site / filter unit

- Filter volume: 24 m<sup>3</sup> (3 x 8 x 1 m)
- Original aim was to use agglomerated CDW filter material
- First leaching tests were unfavourable
- Large-scale manufacture of agglomerates was not successful in due time
- Current filter material: Filtralite® (clay aggregates, 10-20 mm)
- Stormwater sampling (influent+effluent) carried out in March-May 2026



Cross-section of the filter dam



# Preliminary sampling results

		Lahti		Rae		Smiltene	
Filter material		Filtralite		Concrete		Concrete	
Number of samples		6		5			
		IN	OUT	IN	OUT	IN	OUT
pH		7,5	7,7	7,5	7,7		
Total Suspended solids (TSS)	mg/L	101	20	8,8	5,7		
Dissolved Organic Carbon (DOC)	mg/L	8,5	6,4	37	33		
Total Nitrogen	mg/L	1,9	1,2	3,7	3,0		
Total Phosphorus	mg/L	0,14	0,06	0,16	0,13		
Cu	ug/L	10,5	8,6	3,1	3,9		
Ni	ug/L	3,3	2,9	1,4	2,7		
Pb	ug/L	0,3	0,2	0,1	0,3		
Zn	ug/L	210	58	16	27		

## Preliminary sampling results – Mean reduction (%) in the levels of key indicators

	<b>Lahti</b>	<b>Rae</b>	<b>Smiltene</b>
Total Suspended solids (TSS)	80 %	35 %	
Dissolved Organic Carbon (DOC)	26 %	11 %	
Nutrients (N, P)	47 %	18 %	
Heavy metals	34 %	(neg.)	

# Design, construction and sampling for the stormwater filtration system at Tähnase Road T5, Peetri, Rae Municipality

Union of Harju County Municipalities  
16.06.2026

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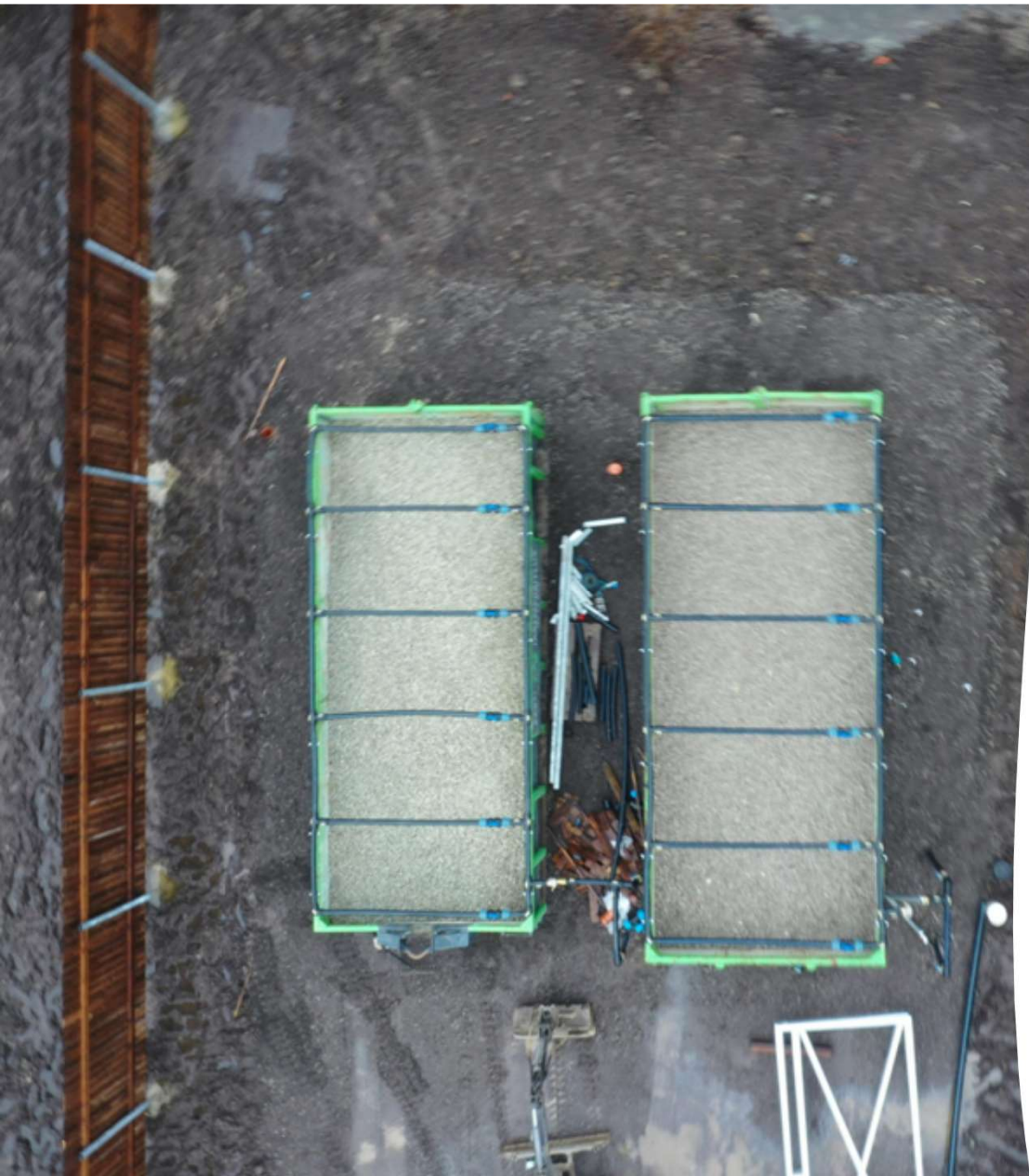
# Estonian pilot case

- Partner universities **analysed CDW**.
- Contracted a consultant for **preparing technical solution** (Infragate Eesti AS).
- Chose the **filtering agent**.
- **Procurement** for building project and construction - Feb 2025-June 2025, contract signed in July 2025 with **Schöttli Keskkonnatehnika**.
- Procured and contracted **owner supervision** and construction project management service (Infragate Eesti AS).
- **Design and construction** July 2025-December 2025.

Construction: October–  
December 2025

Equipment operation training:  
17.12.2025

Stormwater filter restart/training  
– **March 31, 2026**



## Ownership and maintenance

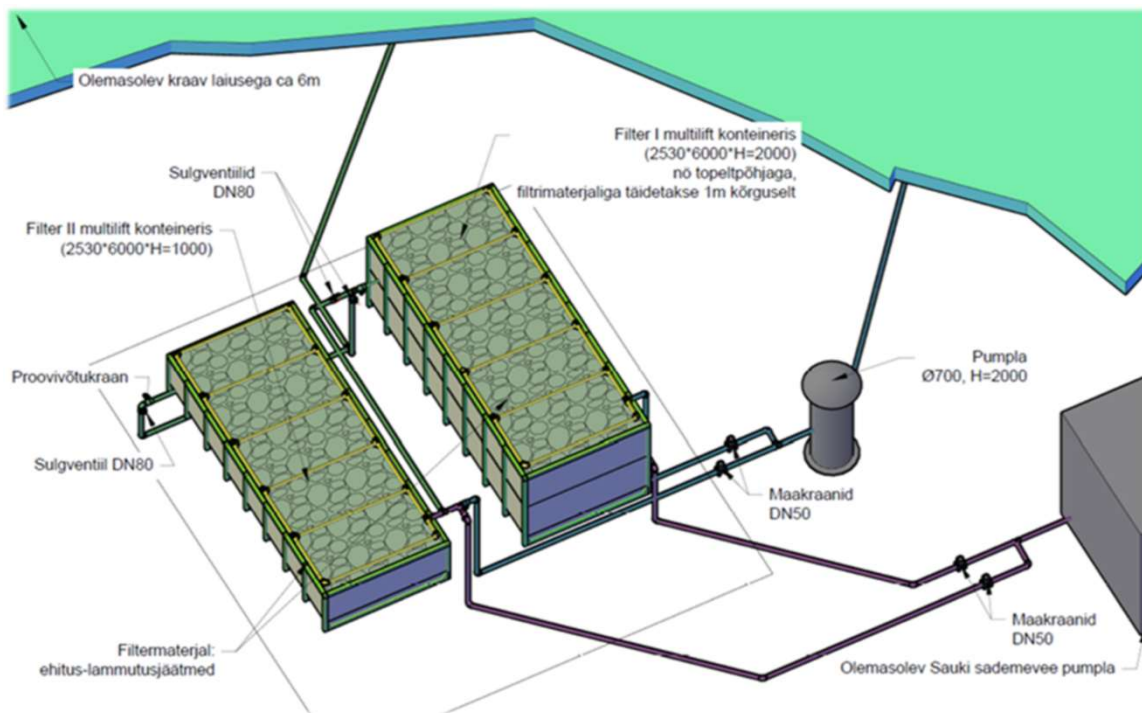
- The pilot system will remain **the property of Union of Harju County Municipalities (HOL)** at least for five years after the final project payment (appr. first half of 2032).
- The landowner, Rae Municipality, has granted HOL a **personal right of use** for the land on which the pilot system is located.
- **A trilateral agreement** has been signed between Rae Municipality, utility company Elveso, and HOL and specifies the parties responsible for the costs (e.g. electricity), maintenance responsibilities (e.g. mowing), and the evaluation of the filter system's effectiveness.



## Pilot System design

- The filter system consists of two reused multi-lift containers of different heights (1 m and 2 m).
- As the system will be above the ground, there is a danger of freezing and there will be a built-in system for emptying the pipes if needed.
- Water sampling will be possible either via taps or wells and samples can be taken from both filters' inflow and outflow.

# Operating pilot system



- **Filter I** is filled with CDW (crushed and sieved concrete) in fraction 16–32
- **Filter II** is filled with limestone gravel, fraction 16–32

## Two pumps – two possibilities:

1. pump – stormwater is taken to pilot system from the upstream ditch;
2. pump in existing pumping station – stormwater from wider area is directed to pilot system from Sauki pumping station.

The filters can be operated individually or in series.

## Results of Rae water analyses



- Stormwater quality in the site has been monitored by TalTech scientists.
- Testing the pilot system started on 31 March 2026 and samples have been taken seven times.
- Samples are taken from three locations: input from Sauki pumping station, after the first filter, and after the second filter.

### Results:

- Within the specified parameters, the output water complied with the requirements set by Estonian law.
- Heavy metal and petroleum products concentration complied with the requirements prior to the filtering process, therefore, not possible to assess the filters' ability to remove higher concentrations of heavy metals or oil products.
- The most evident treatment effect has been observed in the reduction of total nitrogen, total phosphorus, biochemical oxygen demand (BOD<sub>7</sub>), and suspended solids.





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# Implementation and findings from stormwater field pilot in Smiltene

**16.06.2026.**

Vita Grigule

Project manager, Smiltene municipality

**Lahti**

 **LUT**  
University

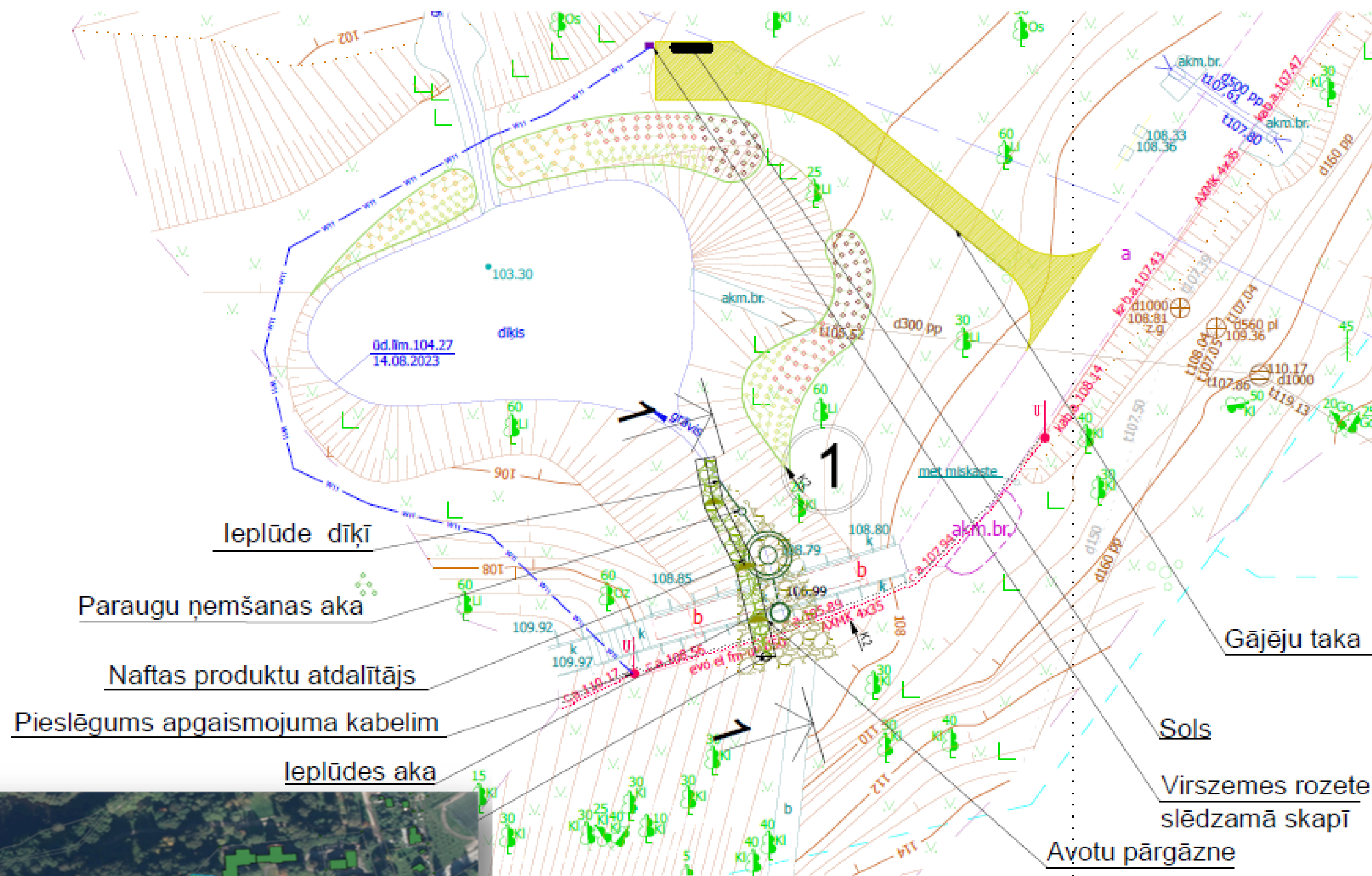
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**TAL  
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 **HOL**  
HARJUMAA OMAVALITSUSTE LIIT

 **Smiltenes novads  
sanāki!**

# Stormwater pilot site – Old Park



**3.4 ha**  
catchment area

**Q=5l/s**  
treatment flow

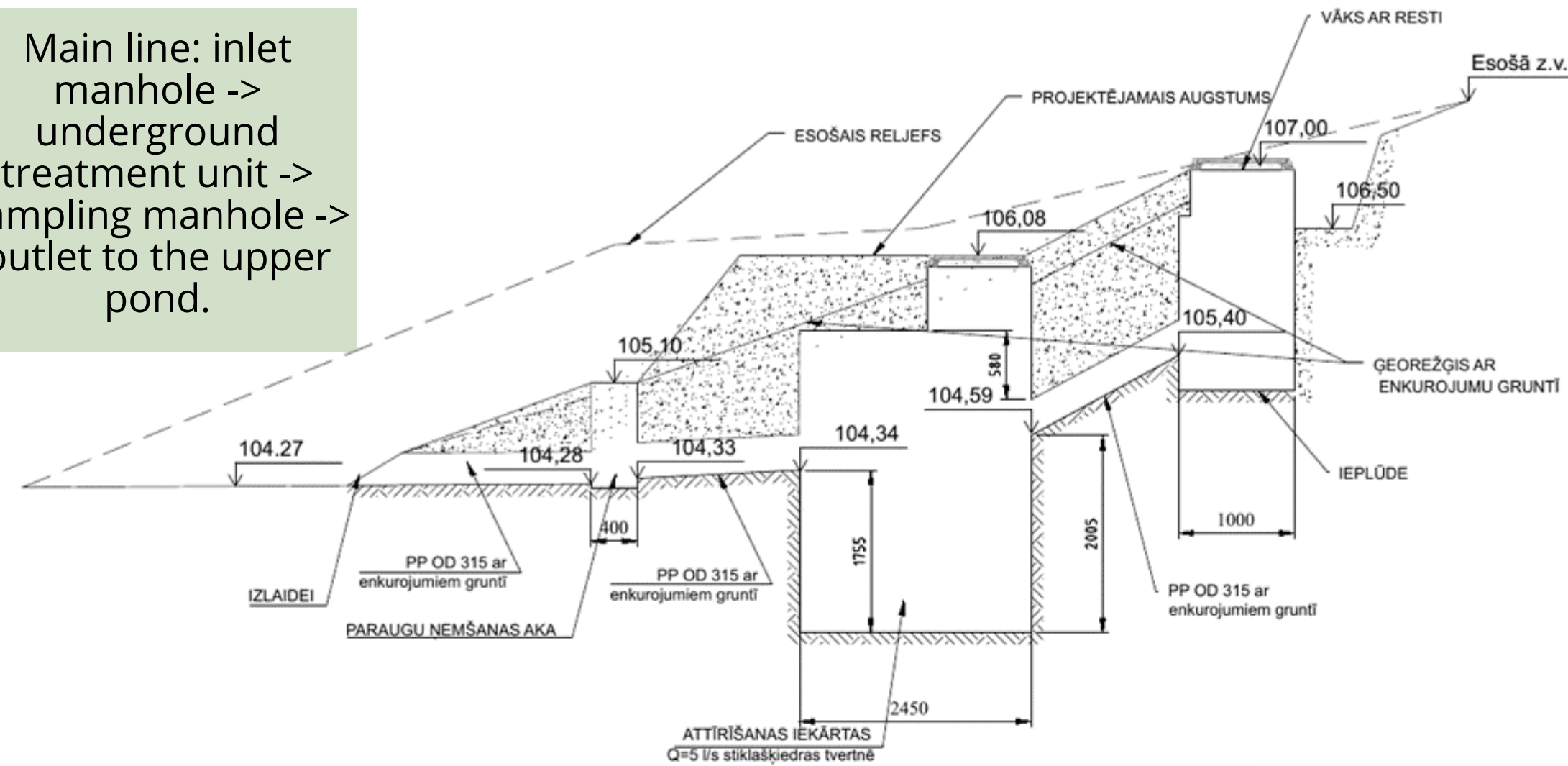
**15.0 m**  
pipe length



# Stormwater pilot site – Old Park



Main line: inlet manhole -> underground treatment unit -> sampling manhole -> outlet to the upper pond.



## Main technical data

### Treatment unit

ACO StormClean/ COCE Surface Water Treatment tank

### Flow capacity

Q=5 l/s; maximum overflow 24 l/s

### Tank and filter

Filter area 0.77 m<sup>2</sup>; filter volume 0.23 m<sup>3</sup>; total tank volume 966 l

### Connecting pipe

PP multilayer stormwater pipe, L = 15.0 m, anchored in soil

### Filter material

Mixed CDW, 16-70 mm, replaceable filter elements

# Implementation and findings

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## Key findings on project implementation

Positive experience in implementing innovations

## Challenges

- Limited time for research
- Turning result into practice

## Key Benefits

- Education and capacity building
- Innovative technical solution for resource and waste use
- Filter testing in several pilots



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sanāk!

# Thank you!

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