

Water Recycling Toolbox

Stormwater recycling for fountain operation and greenery irrigation

Saldus Municipality

Real-world pilot replication blueprint



Introduction to the pilot measure **Stormwater recycling for fountain operation and greenery irrigation** Saldus Municipality

15 March 2023





Saldus Municipality

Kick – Off – Meeting
Kalmar & Västervik / SE

Saldus



Saldus is located in valley





Sometimes this happens...



Place of implementation of the pilot project – Oscar Kalpak Square



Construction of a fountain, which will use the accumulated rainwater in its operation

What are we planning to do this year?

Carry out the procurement procedure to attract experts for the development of technical documentation. Takes about 8-9 months total. Together with our specialists will develop the best solutions.

In year 2024

1. Prepare documents and make procurement for construction works and construction supervision. It will be 3-4 months.
2. Construction works start in the spring/aprill. It will be 6-7 months.
The fountain will not work in winter time.

A large yellow circle is positioned on the left side of the slide, partially cut off by the edge.

Saldus

In the last year of the project

Check..

Test..

Make a video....

Saldus

Thank you!

Eva Jekobsone

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1st Peer-review session

Stormwater recycling for fountain operation and greenery irrigation

Saldus Municipality

5 Sept 2023





WaterMan

Saldus Municipality

05.09.-06.09.2023.

Saldus

The problem to be solved in the project

- *The Ciecere river flows through the municipality and is its main drainage point.
- *Saldus is facing both periods of drought and regular floods, in particular in Saldus town centre that is located lower than the surrounding areas and lacks water reservoirs to absorb water from heavy rainfall or rapid snowmelt.



Saldus is arranged like a « bowl »





Sometimes this happens...



Place of implementation of the pilot project – Oscar Kalpak Squire

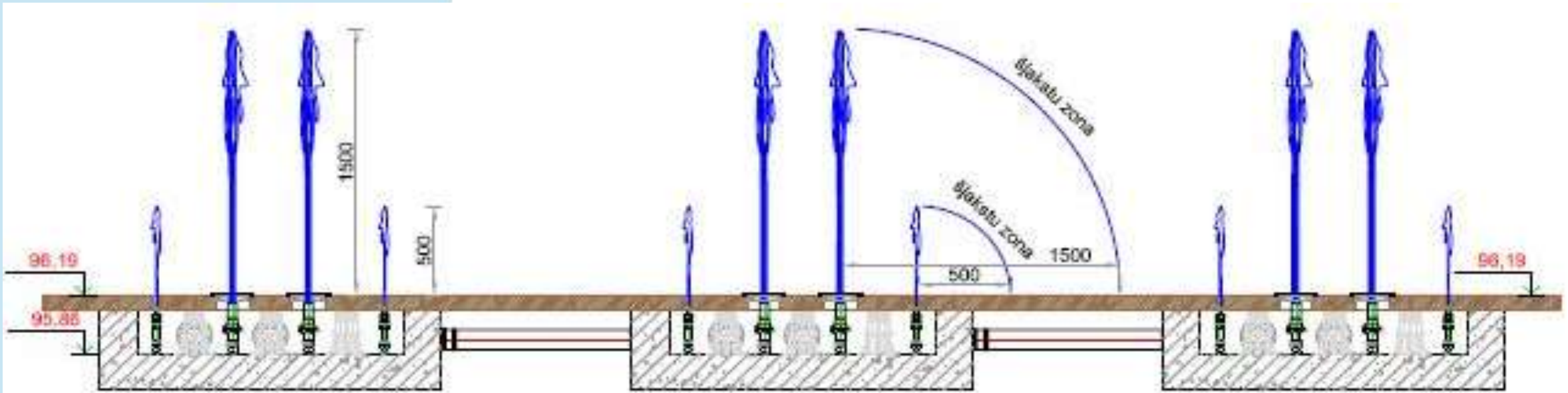
*Accumulation tank
(underground)*

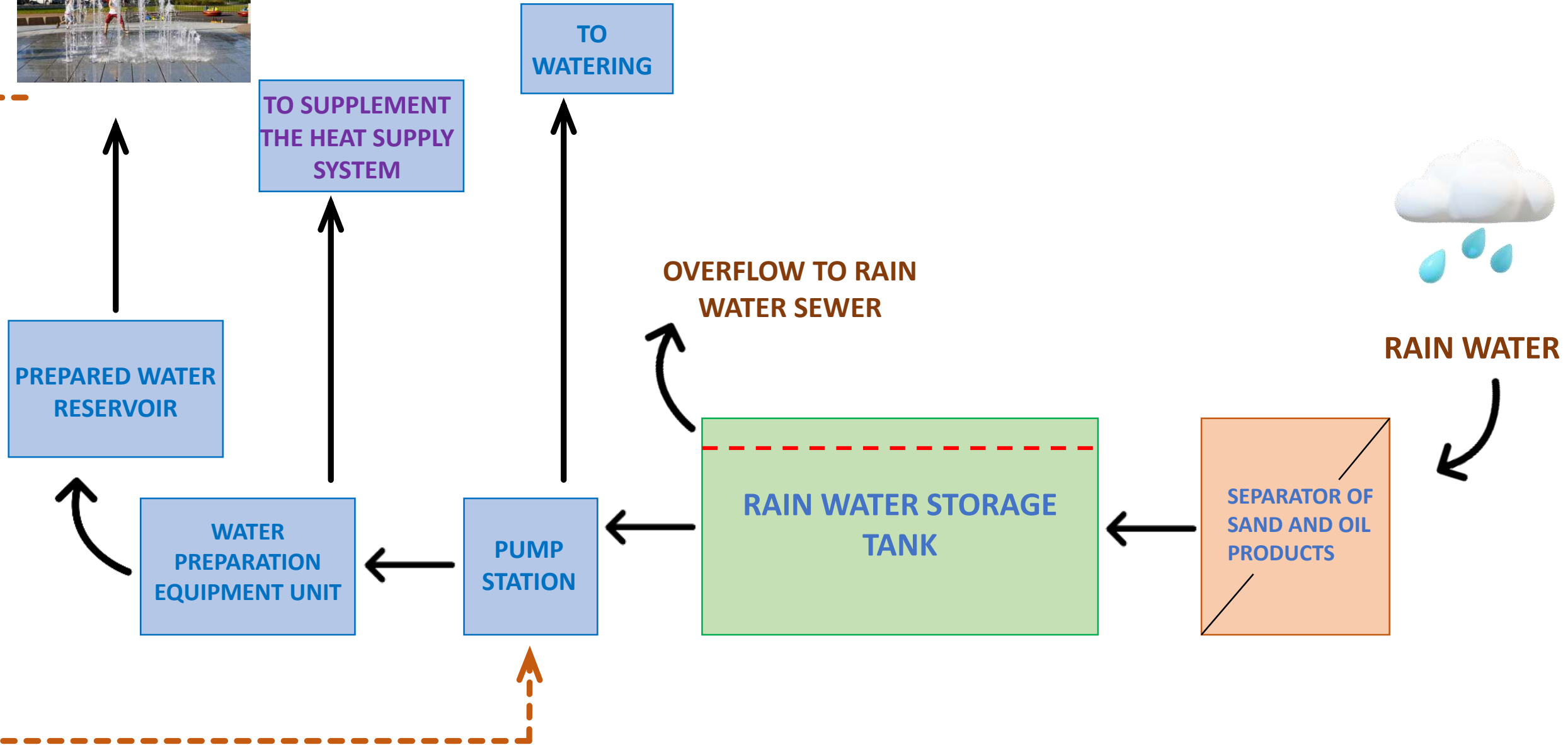


*Construction of a
fountain, which will
use the accumulated
rainwater*

✓ *To operate the fountain, use rainwater, which must be stored in the projected tank under the Kalpak Square. The volume of the tank must be calculated by the designer.*

Fountain operation from May to October





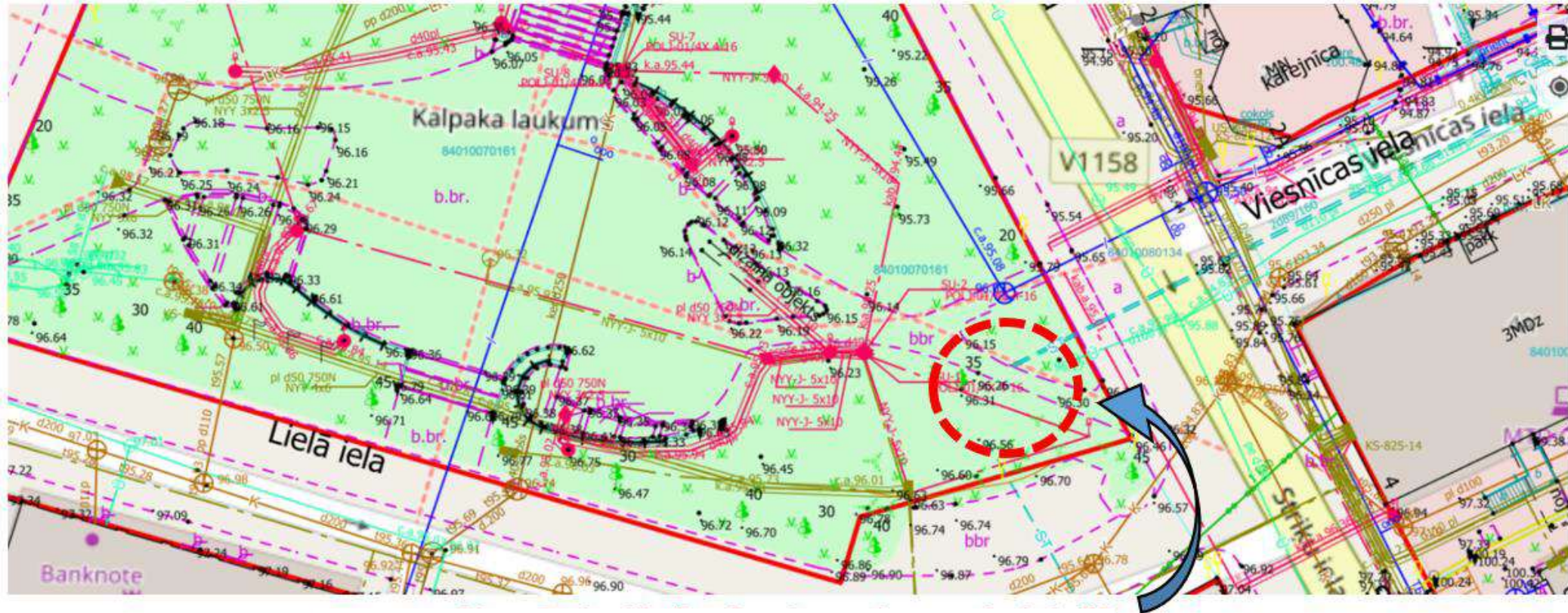
Our technical setup for designers....

- ✓ *Provide the fountain not only from the rainwater of the inner yard, but also from the rainwater that flows along Striķu Street (a Street adjacent to the territory). To install the bed and connect it to the already existing rainwater network in the area.*
- ✓ *Install a connection point for watering green plants in Kalpak Square which can be used there is a if there is a surplus of the volume of the fountain's supply tanks for operation in the summer season.*

✓ *Provide for the treatment of collected rainwater to drinking water quality, according to Latvian regulation enactments. Design treatment facilities. Purify the rainwater released into the thermal track to the level specified in Latvian regulations*

- ✓ *Provide access, crew hatches, etc. options for replacing filters, sieves, cleaning solid particles from the tank (for tanks, if several are needed)*
- ✓ *Provide for the recording of accumulated rainwater (counter) and the "monitoring system". Monitoring provides that the Municipality and to the server can control the amount of rainwater collected, the state of water in the tanks, the need for chemicals ... on his computer or mobile phone.*
- ✓ *Move the remaining water (would clean up) to the Ciecere River.*

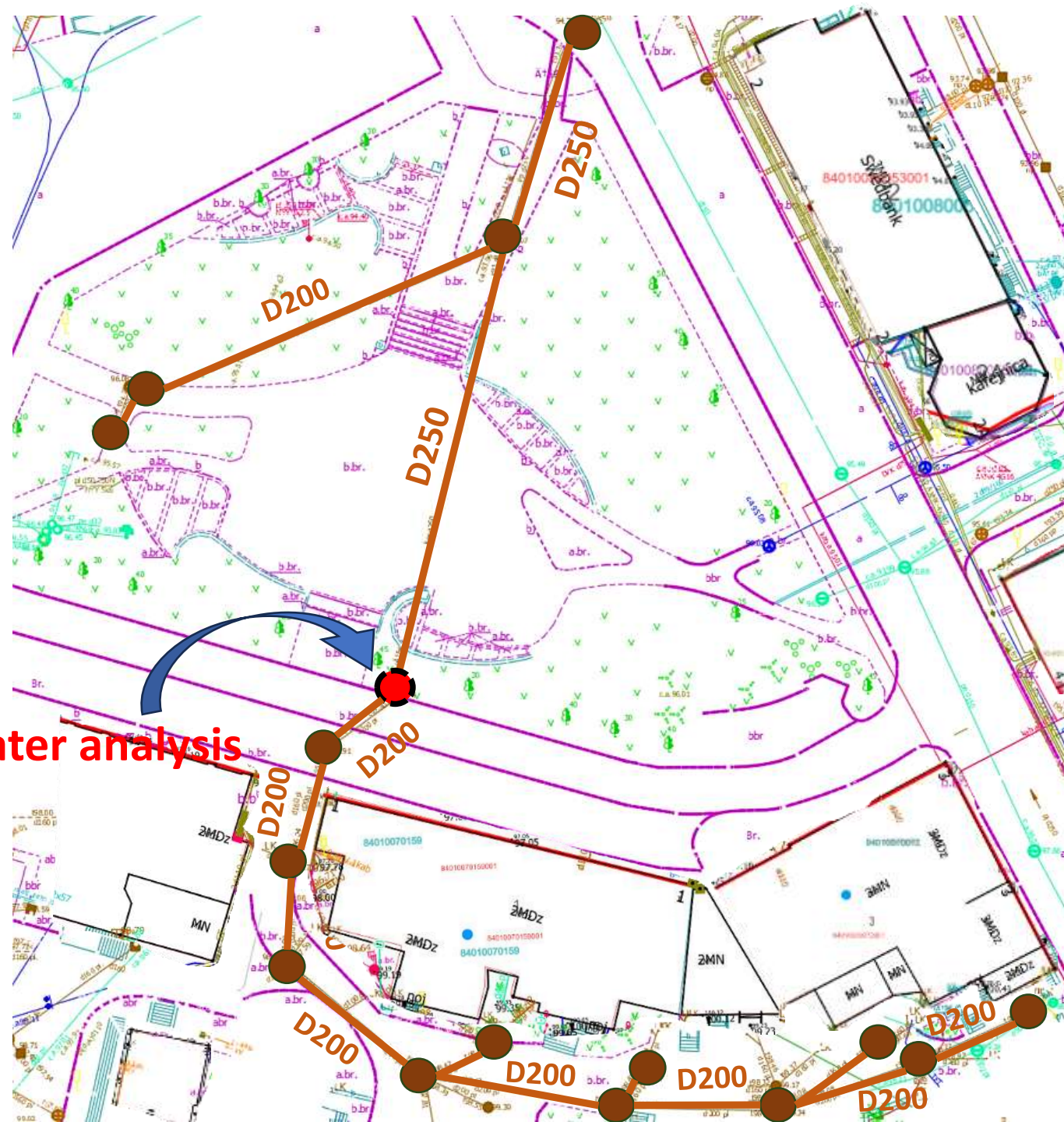
- ✓ *Use water from melting snow in winter to maintain the heating system, purify it to the appropriate quality.*



In the possible connection, a place at the return pipeline - for feeding the system

- ✓ *Coordinate and switch the designed material with the part of the fountain technology developed within the framework of the 2nd round.*
- ✓ *Coordinate the developed construction project with an external expert, receive a positive opinion/ by obtaining information about this from the customer. If necessary, make changes until final approval.*
- ✓ *In addition to the operation of the fountain, provide solutions that educate children / youth / residents, etc. about climate change in the world - lack of drinking water. Solve during design, in cooperation with the Customer. Include in the initial project concept and visual materials. Present the information in a modern, attractive form - as a visual, planar or spatial solution that is displayed on the screen or on the surface of the facade of the house. Add audio accompaniment to images or animation.*

Location of rainwater analysis



Rainwater analysis results 03.08.2023.

Place Nr.1

Indication	Method	The result
TSS	LVS EN 872:2007	20,0 ± 2,0 mg/L
P total	LVS EN ISO 6878:2005, 7.nod.	< 0,10 mg/L
N total	LVS EN 25663:2000	< 1,0 mg/L
COD	LVS ISO 6060:1989	< 30 mg of oxigen/L
Oil products	LVS EN ISO 9377-2:2001	<0,02 mg/L

Rainwater analysis results 03.08.2023.

Indicator	Method	The result
TSS	LVS EN 872:2007	14,3 ± 1,4 mg/L
P total	LVS EN ISO 6878:2005, 7.nod.	< 0,10 mg/L
N total	LVS EN 25663:2000	2,8 ± 0,3 mg/L
COD	LVS ISO 6060:1989	< 30 mg of oxygen/L
Oil products	LVS EN ISO 9377-2:2001	<0,02 mg/L

Time shedule (next step)

After receiving
expert opinion
Saldus Municipality

**Procurement/
contract-
2 months**

Saldus Municipality
Designers
Experts
Project team and partners

**Vision
development
and alignment-
3 months**

Saldus Municipality
Designers
Project team

**Development
of technical
documentation
– 5-6 months**

Project team
Construction
Board
Expert opinion

**Acceptance of
technical
documentation
- 1 months**

Saldus Municipality
Experts
Project team and partners
Procurement Comission

**Preparation of
documents for the
procurement
procedure of
construction works
and procurement
3 months**

Updating the construction project 9-10 months

2023

2023

2024

2024

Project implementation risks at the moment:

We have a team responsible for risk assessment & management. Risks are controlled, evaluated and eliminated.

Design risks- Chances are we won't be able to find a designer who can design these innovative things. So far, there is no fountain in Latvia that works on purified rainwater.

In order to avoid this, we have contacted several designers and informed them about the planned purchase

Risk of appreciation.

There is a high risk that the actual costs for construction (as a results of the procurement procedure) will exceed asian. Deputies must decide on the allocation of additional funding. The decision can also be negative..

In order to prevent this, we inform residents and decision-makers about the importance of implementing this type of project in Saldu

Other risks will be assessed during design..

Saldus

Thank you!

Eva Jēkobsone, eva.jekobsone@saldus.lv, +371 20267729

Jānis Blūms, 111water@inbox.lv, +371 29551442



1st Peer & expert review session: Recommendations & conclusions

- Quality of water vs. the design of fountain. The envisaged design is very much accessible to wildlife, dogs, people, etc. It could be reconsidered to make the design less accessible. In that case, it may not be necessary to operate it with drinking water quality according to Latvian requirements.
- The proposed multi-use (e.g. irrigation of public areas, reuse for heat system) is good for increasing the cost-benefit ratio. In general, therefore, multi-use is a very good direction. However, reconsider what the water may be used for beyond the fountain. The quality requirements to use it for supplementing the heat supply system may be very specific and difficult to meet (salinity → corrosion, etc.). It could be worth to consider also other, less complicated solutions: In the summer time e.g. cleaning streets, cleaning dust-bins, cooling streets, in winter time e.g. ice skating (on the square) could be an option.
- The planned use of multimedia information at the fountain to raise the awareness (e.g. closing the fountain in phases of drought, and presenting information on the reasons when there is no water in fountain) of the general public is nice and appealing. It is strongly encouraged to use the pilot, which has a very prominent and visible location, in such educational & pedagogical way – and to even further elaborate & strengthen these activities. For example, it could also be highlighted that the behaviour of the people in the vicinity of the fountain influences the quality of the retained water, and thus the treatment needs & costs of the water that is used in the fountain.
- Think again about the timing & approach to stakeholder involvement & awareness raising. The current plans appear promising, but there could also be alternatives:
 - Your current plan to go step-by-step: First, you will raise the awareness the stakeholders / political decision makers involved and acquire their support to construct the fountain, incl. the educational element. In the next step, you would then implement awareness raising measures towards the general public by using the educational elements of the fountain. This could indeed be a promising approach.
- But it could be done in other ways, too: You could, for example also involve the public already in the planning stage, and inform them why you create a fountain with the purpose of the use of alternative water sources / recirculation of retained & treated water. This could be done by simple measures, e.g. inviting school classes to show them what you are doing. This may create even more attention & support for the pilot measure – and awareness for the topic.
- Disinfection of the water:
 - As the site is open to the public, adding liquid chlorine appears as the easiest & best option. Advantage: The residual chlorine prevents regrowth of pathogens in the storage tank for the treated water. Disadvantage: The specific smell of the water that may be disturbing and the increase in salinity, which may counteract additional uses, e.g. in the heat system.
 - Ozone disinfection could be an alternative but requires safety measures due to the public location. In particular, it has to be ensured that the residual ozone is destroyed. It may be worth to investigate ozone-based solutions that are regarded as more safe – e.g. machines that take ozone from the air and concentrate it. Also underground installations could be considered – but those may be costly and not easy to maintain. Keep in mind also that ozonation – as UV disinfection - does not prevent regrowth of microorganisms in the storage tank after treatment to maintain the microbial water quality.

Absorption report **Stormwater recycling for fountain operation and greenery irrigation** Saldus Municipality

07 November 2023



**Saldus
Municipality**

WaterMan

Saldus piepilda



Place of
implementation the
pilot project – Oscar
Kalpak Squire





Expert advice and our solutions

Quality of water vs. the design of fountain. The envisaged design is very much accessible to wildlife, dogs, people, etc. It could be reconsidered to make the design less accessible. In that case, it may not be necessary to operate it with drinking water quality according to Latvian requirements.

It is impossible to create a fountain in the square that is not accessible to people and animals.

The fountain will be created to please the residents, to create a mood, refreshment in hot weather conditions.

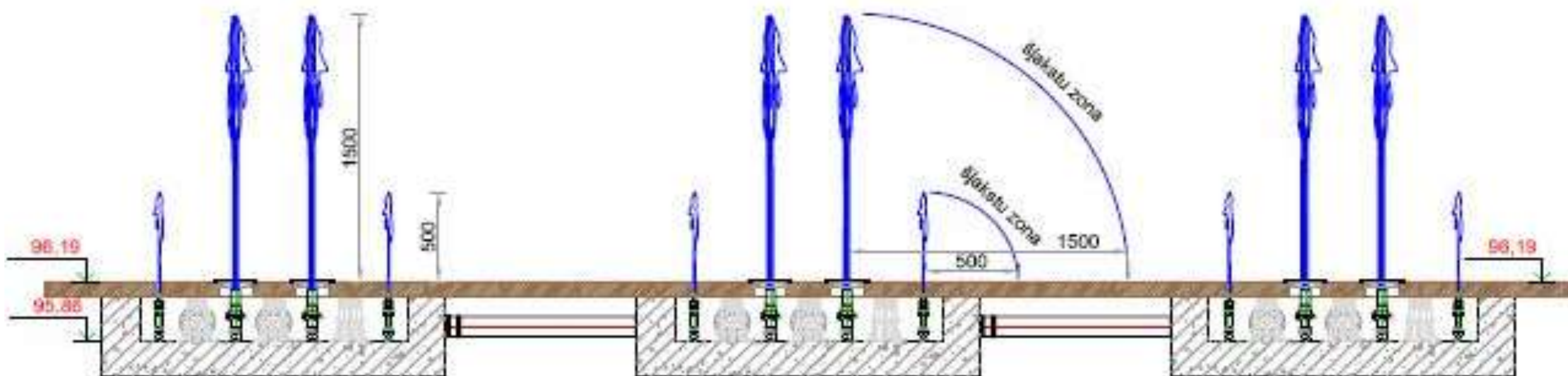
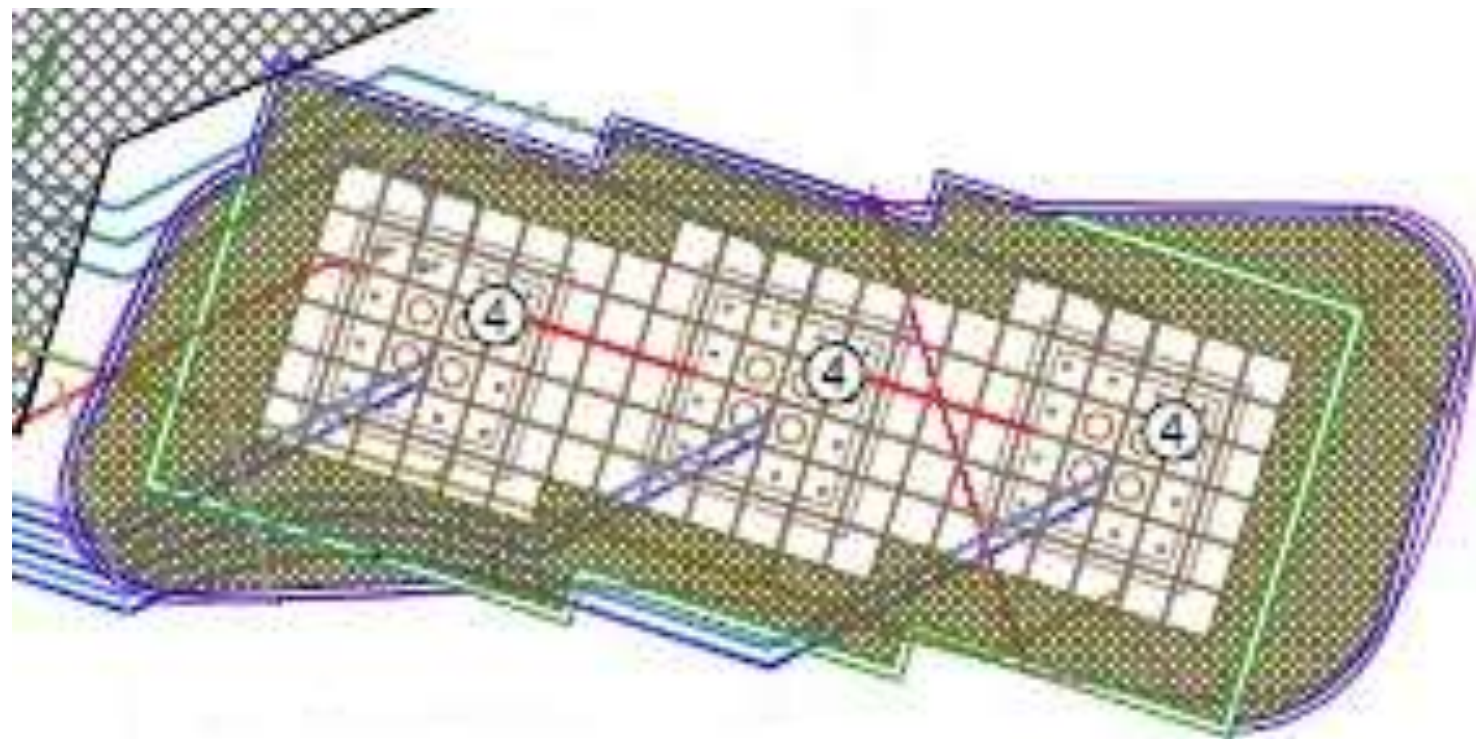
Conditions from the State Environmental Service

There are no requirements for water treatment up to drinking water quality.

Water quality must be such that neither the surrounding environment for animals and people are harmed.

PROVIDE FOR BACTERIOLOGICAL PURIFICATION, PREVENT THE REGENERATION MICROORGANISMS IN THE TANK AND MAINTAIN WATER QUALITY

Conditions from the State Health Service



Disinfection of the water:

As the site is open to the public, adding liquid chlorine appears as the easiest & best option.

Advantage: The residual chlorine prevents regrowth of pathogens in the storage tank for the treated water. Disadvantage: The specific smell of the water that may be disturbing and the increase in salinity, which may counteract additional uses, e.g. in the heat system.



Ozone disinfection will not be used for safety reasons.



Rainwater will not be used to supplement the heat supply system.



Planned water treatment:

Seperator of sand and oil products, sand filter.



In addition to safety, UV disinfection, NaOCl or hydrogen peroxide liquid dosing.

In the square post attractive warning signs that the water is not potable.



RAIN WATER



OVERFLOW TO
RAIN WATER
SEWER OR RIVER
CIECERE

**RAIN WATER
STORAGE TANK**

**PUMP
STATION**

**STREET
WASHING**

**TO
WATERING**

**WATER
PREPARATION
EQUIPMENT UNIT**
SAND FILTER
UV LAMP
 H_2O_2 or NaOCl

**PREPARED
WATER
RESERVOIR**

The proposed multi-use is good for increasing the cost-benefit ratio. In general, therefore, multi-use is a very good direction. However, reconsider what the water may be used for beyond the fountain. The quality requirements to use it for supplementing the heat supply system may be very specific and difficult to meet (salinity, corrosion, etc.). It could be worth to consider also other, less complicated solutions: In the summer time e.g. cleaning streets, cleaning dust-bins, cooling streets, in winter time e.g. ice skating (on the square) could be an option.



Fountain water will not use in the heating system, due to specific requirements.






Foresee the possibility of using rainwater for street watering/washing in dusty weather.



Install a connection point for watering green plants in Kalpak Square which can be used if there is a surplus of water.

The planned use of multimedia information at the fountain to raise the awareness of the general public is nice and appealing. It is strongly encouraged to use the pilot, which has a very prominent and visible location, in such educational & pedagogical way – and to even further elaborate & strengthen these activities.

For example, it could also be highlighted that the behaviour of the people in the vicinity of the fountain influences the quality of the retained water, and thus the treatment needs & costs of the water that is used in the fountain.

-  After developing the project vision, present the developed idea to residents and at least 2 schools.
-  During the implementation of the project, organize a competition in schools (including art school). For the development of a logo or some visual material that could be used for marketing activities.
-  An educational solution that informs visitors about climate change (such as the screen etc.)

Public involvement and information



Saldus Municipality facebook page



Saldus Municipality home page

Involvement of management, members and decision makers in the process

Thematic meeting with students, during design

Organization of a thematic competition in schools

Thematic meeting with residents of Saldus region, during design

Screen in Kalpak Square (educational)

Time shedule

After receiving
expert opinion
Saldus
Municipality

2

MONTHS

Procurement/
contract-

Saldus Municipality
Designers
Experts
Project team
and partners

3

MONTHS

Vision
development
and alignment

Saldus Municipality
Designers
Project team
*Local community,
schools*

5-6

MONTHS

Development of
technical
documentation
*/community
involvement*

Project team
Construction
Board
Expert opinion

1

MONTHS

Acceptance of
technical
documentation

Saldus Municipality
Experts
Project team and
partners
Procurement Comission

3

MONTHS

Procurement
procedure of
construction
works

Updating the construction project 9-10 months

2023

2023

2024

2024

Thank you!

Eva Jēkobsone



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2nd Peer-review session **Stormwater recycling for fountain operation and greenery irrigation** Saldus Municipality

7 November 2024



**Saldus
Municipality**

WaterMan

Saldus piepilda



Progress update

DEVELOPMENT OF TECHNICAL DOCUMENTATION

- The vision development has been completed.
- The development of the technical project has been COMPLETED (01.10.2024.).

Progress update

PROCUREMENT

- Documents for the construction procurement have been prepared.
- We have started the procurement procedure, which includes a survey lasting 10 days until November 6. Following this phase, an open competition will take place for the planned construction works and supervision - lasting one month.
- Documents for the construction supervision procurement are being prepared.



Progress update

PROCUREMENT

- Construction costs calculated by designers : **EUR 600 000 including VAT**
- Construction costs foreseen in the project : **EUR 180 000 including VAT**

Next Steps

- After the procurement process for construction is completed, we will request additional funding from the municipality, if necessary.
- By using alternative methods, costs can potentially be reduced to **EUR 50,000**, but this will not significantly impact the overall budget.



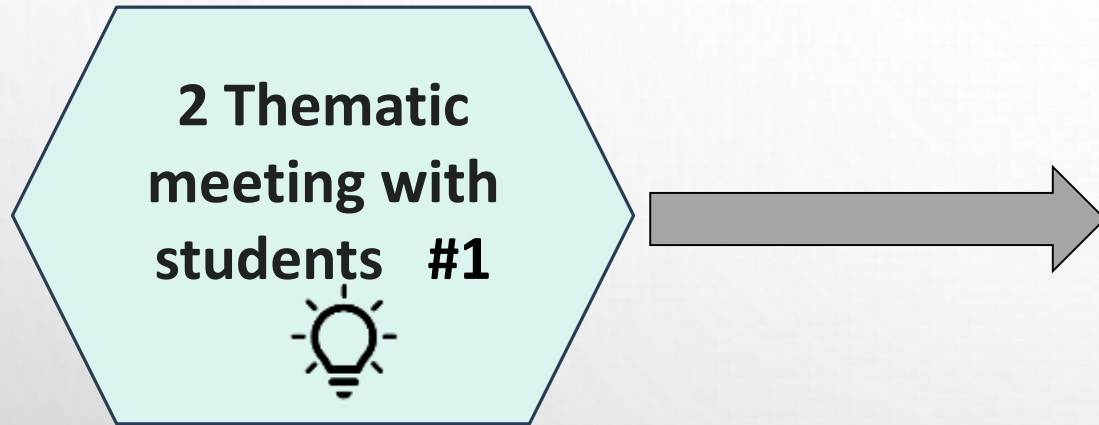
If the financing of construction works exceeds the planned and the municipality does not grant additional financing, we will propose changes to the project

Plan- Construction work is planned to start in spring and to be completed by August 1, 2025, at the latest

Progress update

May 14, 2024

EDUCATIONAL AND INFORMATIONAL ACTIVITIES IN SALDUS



Topics Covered: *Climate change, Water reuse practices, Planned activities within the project*

Saldus Elementary School participants: 93
Saldus Secondary School participants : 84

Two of the largest schools in Saldus:

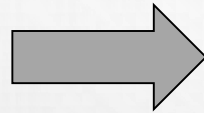


Progress update

September 27, 2024

EDUCATIONAL AND INFORMATIONAL ACTIVITIES IN SALDUS

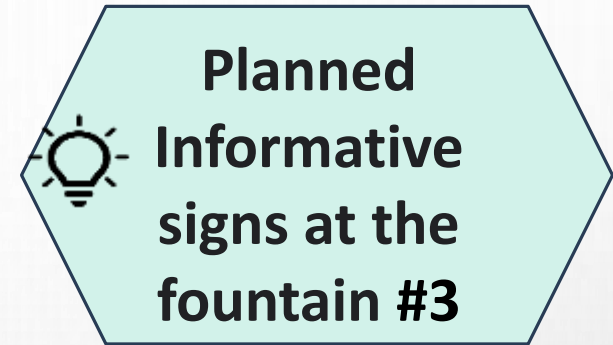
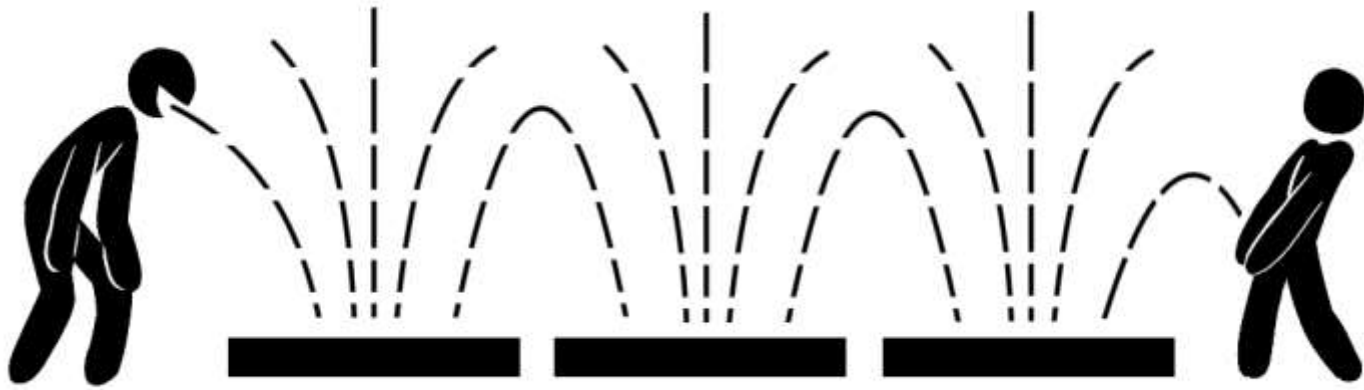
Thematic meeting
with Saldus
residents#2



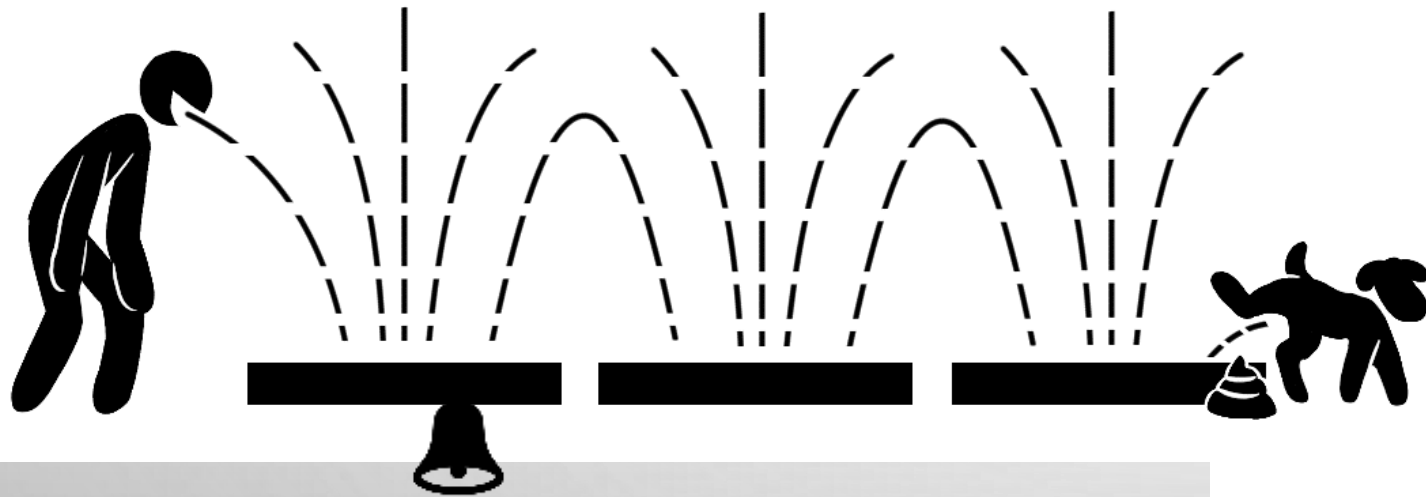
Informative event about
four projects implemented
in Saldus Municipality.
One of them is WaterMan.



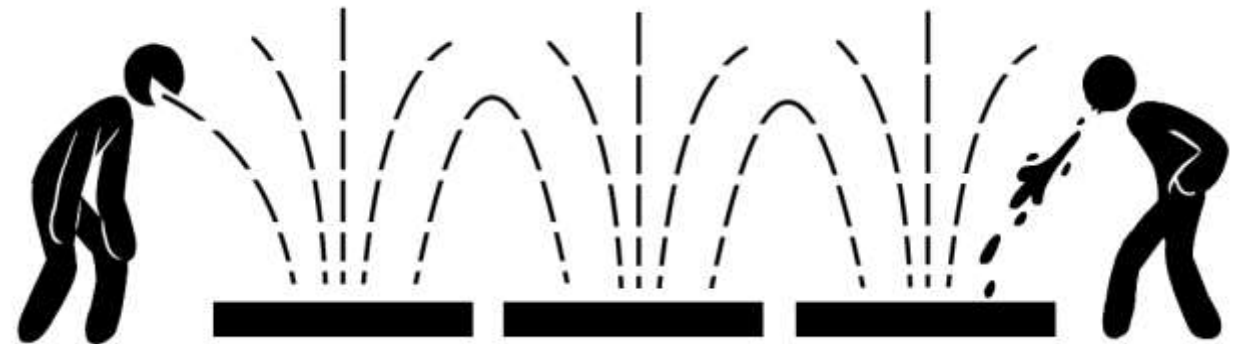
Local press representatives were invited



Will be installed after construction works are completed

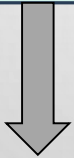


Attention! The water may be contaminated!
DO NOT DRINK!



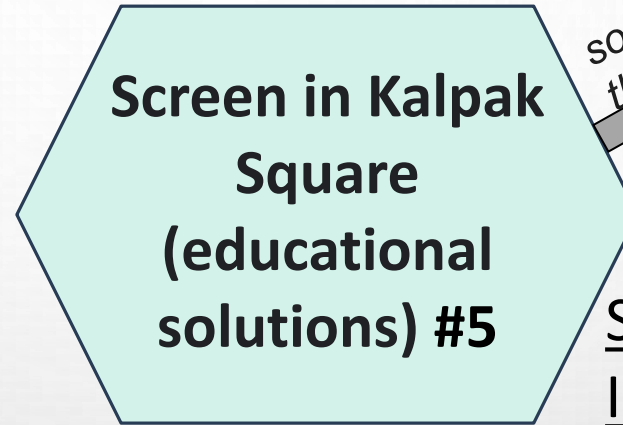
Progress update

EDUCATIONAL AND INFORMATIONAL ACTIVITIES IN SALDUS



It is planned to be organized during the construction process, in the spring of 2025.

It is planned to develop a specific logo with which the Saldus fountain will be associated.



something like
this



Screen Display general
Information:

- Current and forecasted weather;
- Educational information section (*fountain vision, demo movie...some educational game*);
- Graphical data on current reservoir water level and seasonal rainwater usage;
- Notifications on fountain status and reasons for any outages.

Multifunctional use of the fountain

The educational touch screen will be located here

The underground rainwater reservoir (90 m³) will be located here

90 m³ rainwater reservoir

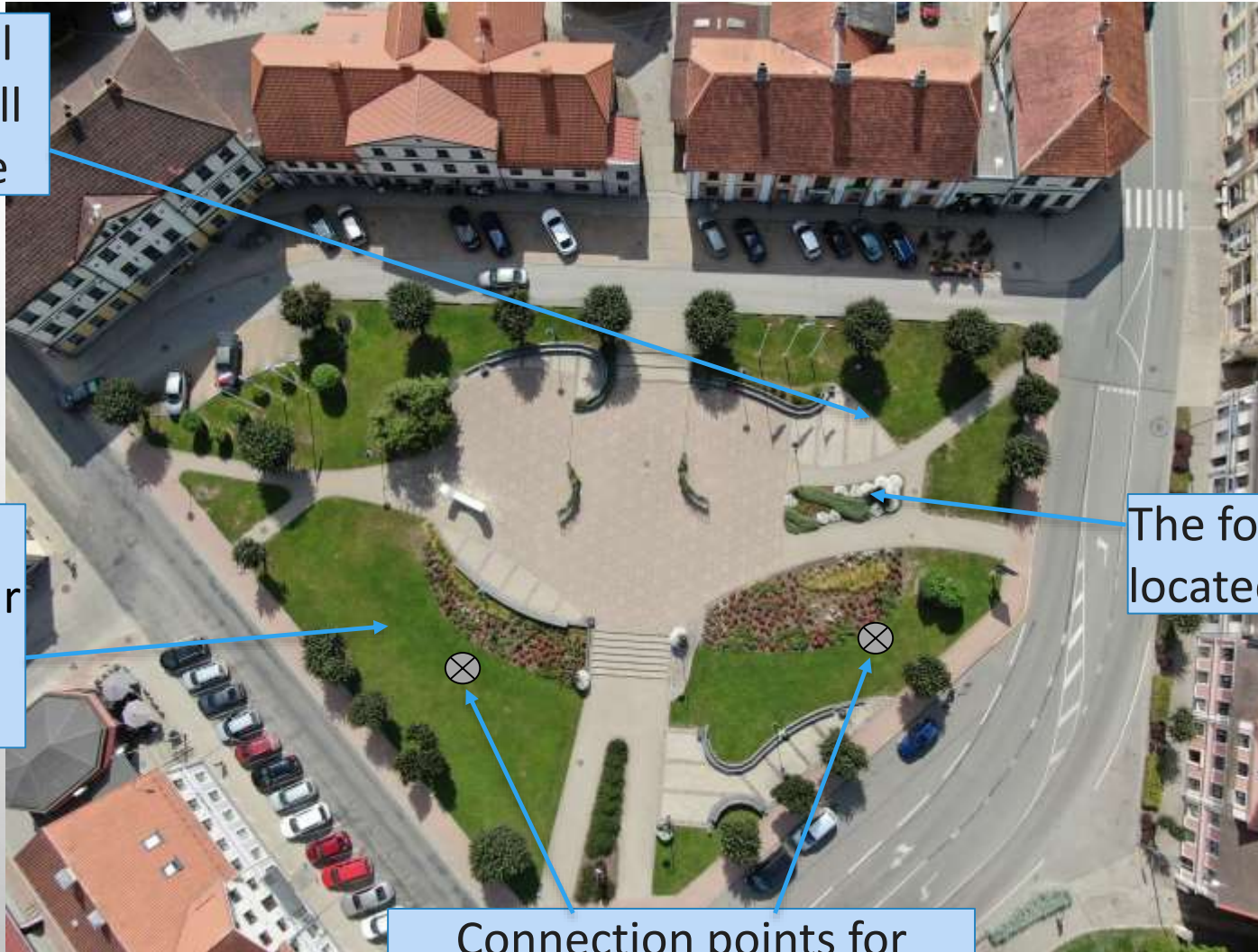
Fountain operation

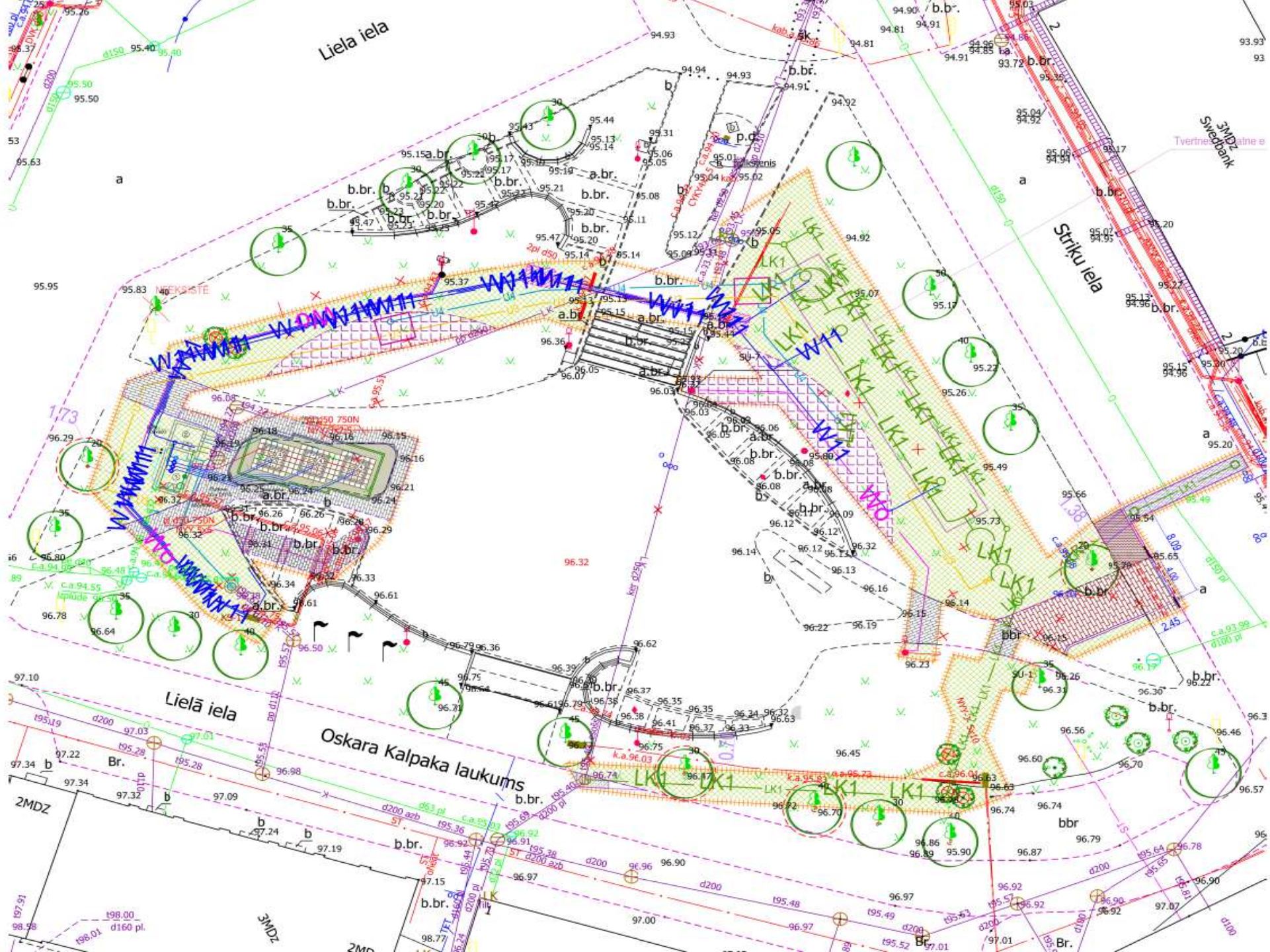
Watering of greenery

The fountain will be located here

Street watering (in spring)

Connection points for greenery watering (located in wells)





Collected rainwater treatment

Water Quality Requirements:

- pH level: 7.2 to 7.6
- Total water hardness: 8° to 15° dH (1.4 – 2.3 mmol/L)
- Chloride content: max 250 mg/L

➡ Cleaned from coarse impurities

➡ Separator for Sand and Oil Products

➡ Water Preparation Equipment Unit (NaOCl)

2 UV radiation lamps have been installed in the water treatment unit to prevent bacterial contamination



Results of the Analyses of Rainwater ^{2023/2024} in Kalpaka Square

- **Total suspended solids:** 16.2-182 mg/l
- **Conductivity:** 74.9- 130 $\mu\text{S}/\text{cm}$
- **Total Microorganism Count (MAFAM):**
 - Total Microorganism Count at 22°C: $2.2\text{-}3 \times 10^4$ CFU/1ml
 - Total Microorganism Count at 37°C: 4.2×10^2 CFU/1ml
- **Escherichia coli** (CFU/100 ml): 1.1×1000
- **Intestinal enterococci** (CFU/100 ml): 3.8×1000
- **Petroleum Products:** not detected
- **pH:** 6.6-8.1
- **P total:** < 0.10
- **N total:** 1-2.8
- **COD** (Chemical Oxygen Demand): < 30

Monitoring

Damage Signal: Alerts in case of damage or malfunction.

Water Metering Devices: Ultrasonic water meter with data transmission capability. Reflects seasonal water consumption (data updated daily and stored in the database). Water used for irrigation will be recorded separately.

Tank Level Sensors: Informative graphics display level changes over time. Level measurement device.

Data will be displayed on a unified platform with options for transmission to tablets and third-party systems.

Vision

<https://www.youtube.com/watch?v=4mU-bQoPCbA>





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2nd Peer & expert review session: Recommendations & conclusions

- Very good that you have an alarm system. The idea is that the alarm is sent to the servicing company responsible for the fountain.
- For the municipal users for irrigation: please involve them and train them, to gain their acceptance in the beginning. Like Klas did in Kalmar.

Status updates

Stormwater recycling for fountain operation and greenery irrigation

Saldus Municipality

30 April 2025



**Saldus
Municipality**

WaterMan

Saldus piepilda



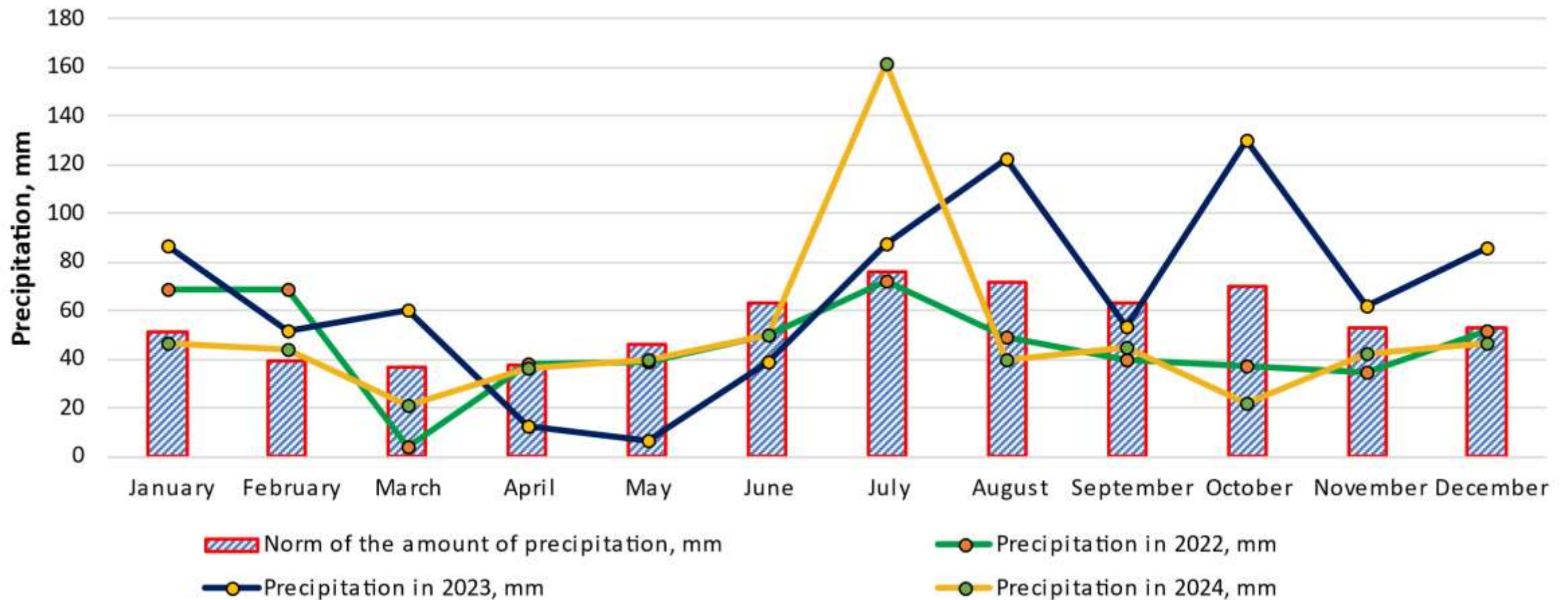
THE CIECERE RIVER FLOWS THROUGH THE SALDUS AND IS ITS MAIN DRAINAGE POINT. SALDUS IS FACING BOTH PERIODS OF DROUGHT AND REGULAR FLOODS, IN PARTICULAR IN SALDUS TOWN CENTER THAT IS LOCATED LOWER THAN THE SURROUNDING AREAS AND LACKS WATER RESERVOIRS TO ABSORB WATER FROM HEAVY RAINFALL OR RAPID SNOWMELT. SALDUS IS ARRANGED LIKE A « BOWL ».



To address this issue, the Saldus Municipality has joined the WaterMan project, which aims to provide a solution that combines both the sustainable development of the city and the desires of its residents. In the case of heavy rainfall, the situation in the city center can also be as follows:



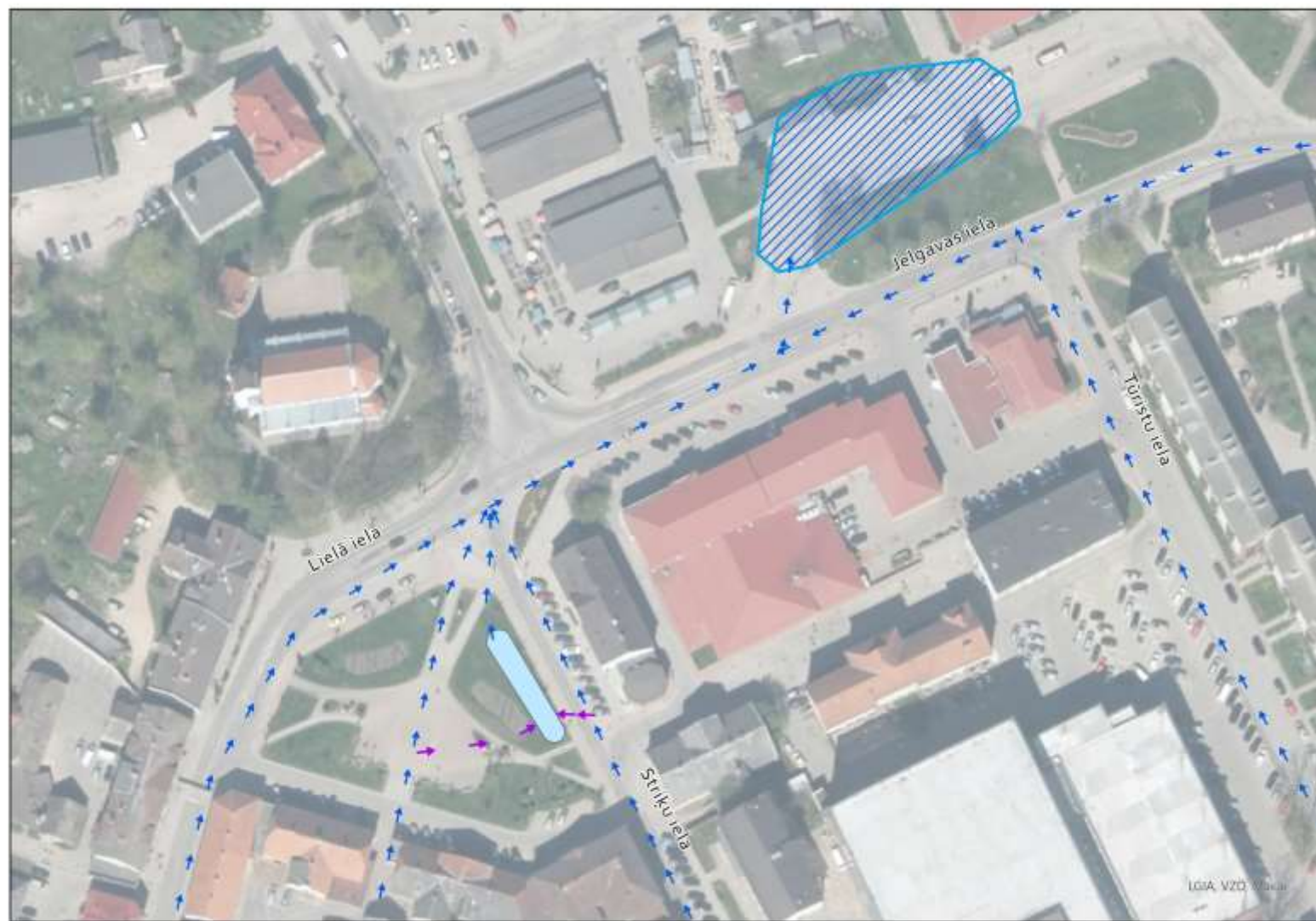
Precipitation in City of SALDUS from 2022 - 2024



Actions Implemented in the project: a Path to Sustainable Development

- Geological research
- Rainwater analysis
- Development of the project vision
- Preparation of technical documentation
- Communication and public education

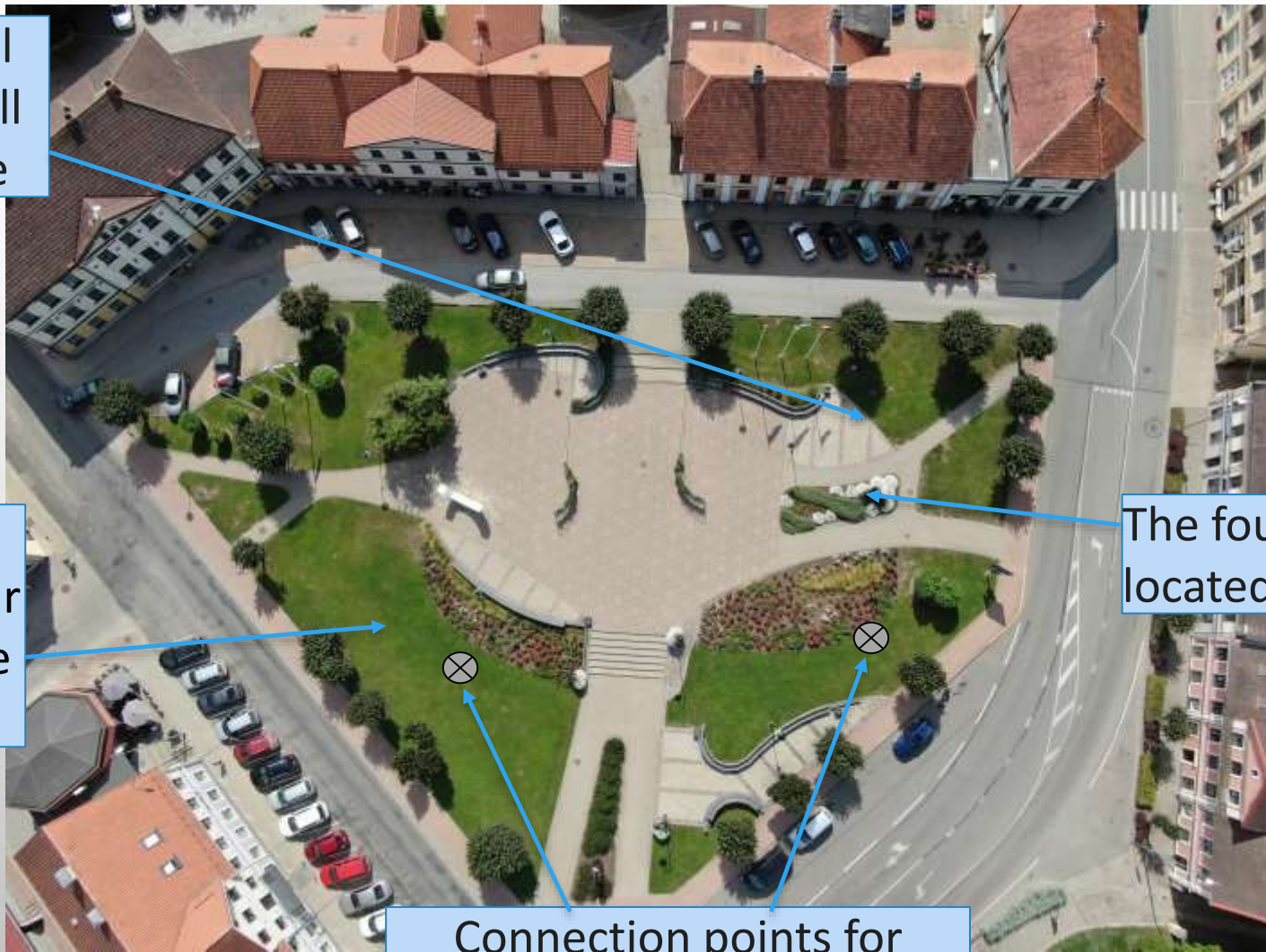




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Technical Documentation -Multifunktional Use of the Fountain



The educational touch screen will be located here

The underground rainwater reservoir (90+10 m³) will be located here

Connection points for greenery watering (located in wells)

The fountain will be located here

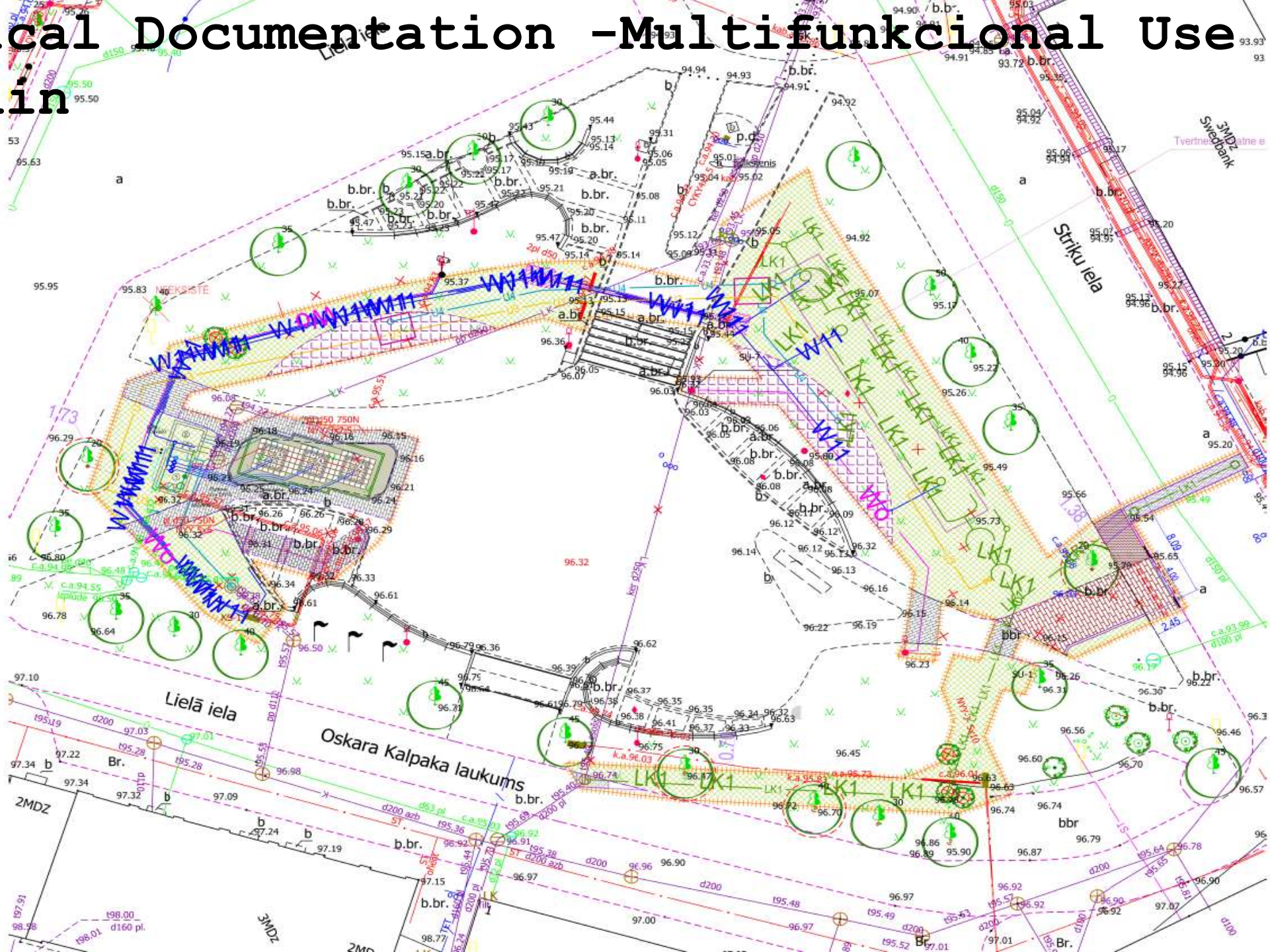
90 m³ rainwater reservoir

Fountain operation

Watering of greenery

Street watering (in spring)

Technical Documentation - Multifunctional Use of the Fountain



Collected rainwater treatment

Water Quality Requirements:

- pH level: 7.2 to 7.6
- Total water hardness: 8° to 15° dH (1.4 – 2.3 mmol/L)
- Chloride content: max 250 mg/L

→ Cleaned from coarse impurities

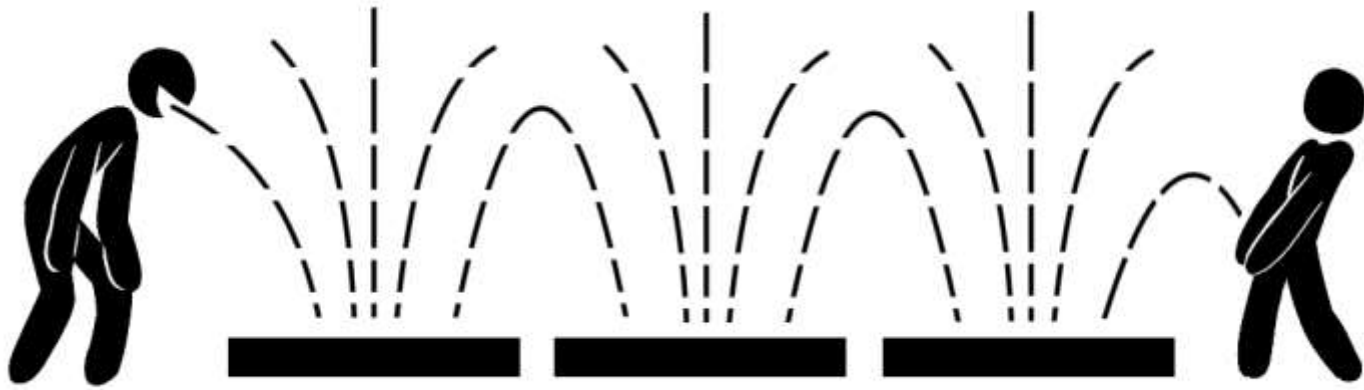
→ Separator for Sand and Oil Products

→ Water Preparation Equipment Unit

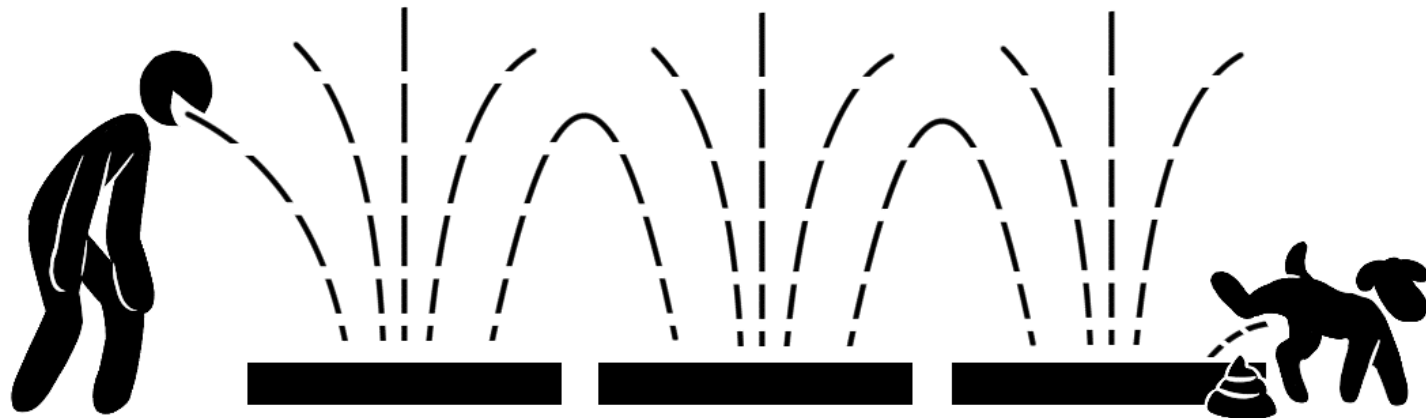
↓

2 UV radiation lamps have been installed in the water treatment unit to prevent bacterial contamination

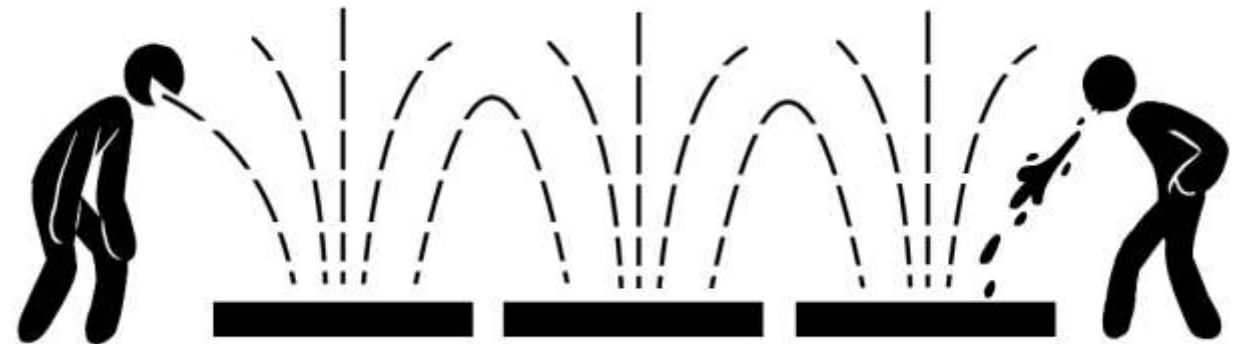
Done if construction works are carried out



*Installed if construction
works are carried out*



Attention! The water may be
contaminated!
DO NOT DRINK!



Planned Fountain Monitoring in the Technical Documentation

*Installed if construction
works are carried out*

Damage Signal: Alerts in case of damage or malfunction.

Water Metering Devices: Ultrasonic water meter with data transmission capability. Reflects seasonal water consumption (data updated daily and stored in the database). Water used for irrigation will be recorded separately.

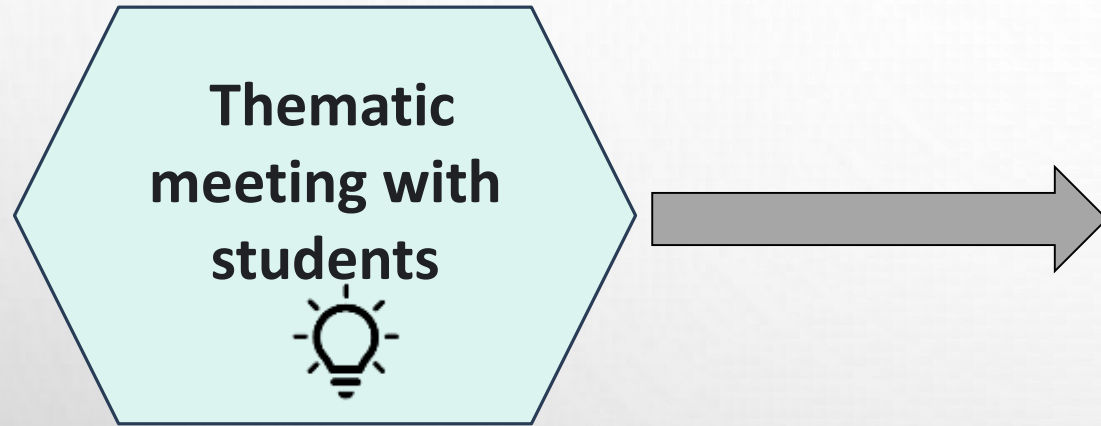
Tank Level Sensors: Informative graphics display level changes over time. Level measurement device.

Data will be displayed on a unified platform with options for transmission to tablets and third-party systems.



Educated and Informed Society May 14, 2024

EDUCATIONAL AND INFORMATIONAL ACTIVITIES IN SALDUS



Topics Covered: *Climate change, Water reuse practices, Planned activities within the project*

Saldus Elementary School participants: 93
Saldus Secondary School participants : 84

Two of the largest schools in Saldus:



Educated and Informed Society

September 27, 2024

EDUCATIONAL AND INFORMATIONAL ACTIVITIES IN SALDUS

Thematic meeting
with Saldus
residents



Informative event about
four projects implemented
in Saldus Municipality.
One of them is WaterMan.



Local press representatives were invited

Future Plans for Rainwater and Wastewater Management in Saldus Municipality



- Implement the developed innovative project idea, attracting investments.
- Collaboration with entrepreneurs in realizing new, innovative ideas in Saldus - reuse treated wastewater for business needs.



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The „BSR Water Recycling Toolbox” was elaborated as part of the project “WaterMan - Promoting water reuse in the Baltic Sea Region through capacity building at local level”, The project is co-financed by the European Union (European Regional Development Fund) and implemented within the Interreg Baltic Sea Region Programme. More information:

eurobalt.org/WaterRecyclingToolbox
interreg-baltic.eu/project/waterman

WaterMan promotes a region-specific approach to water recycling, which intends to use the alternation of too much and too little water that has become typical in the Baltic Sea Region to make the local water supply more resilient, and supports municipalities & water companies in adapting their strategies.

The contents of „BSR Water Recycling Toolbox” are the sole responsibility of the authors and can in no way be taken to reflect the views of the European Union, the Managing Authority or the Joint Secretariat of the Interreg Baltic Sea Region Programme.

