Interreg
Baltic Sea Region

EUROPEAN UNION
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VillageWaters

LEITGIRIAI VILLAGE PILOT (LITHUANIA)

MIDONA DAPKIENĖ

04 10 2017, Warsaw

LEITGIRIAI VILLAGE

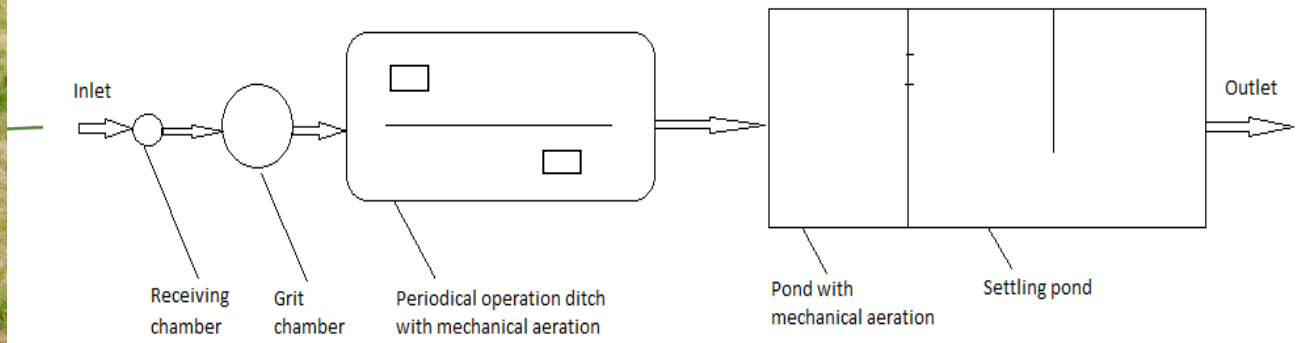
Leitgiriai is a village with 104 inhabitants (40 households) in the district of Šilutė, near Leitė River (right tributary of Rusnė - branche of the Nemunas River).

Leitgiriai WWTP

- Leitgiriai WWTP was built in 1991.
- The periodical exceedance of pollutant concentrations in treated wastewater was established in 2012 – 2015 (*State control was carried out 2 times a year, local - 1 time per quarter*).

Problem: Insufficient removal of biogenic matters

Indicator	Treatment efficiency %
TN mg/l	36
TP mg/l	38



PROBLEMS

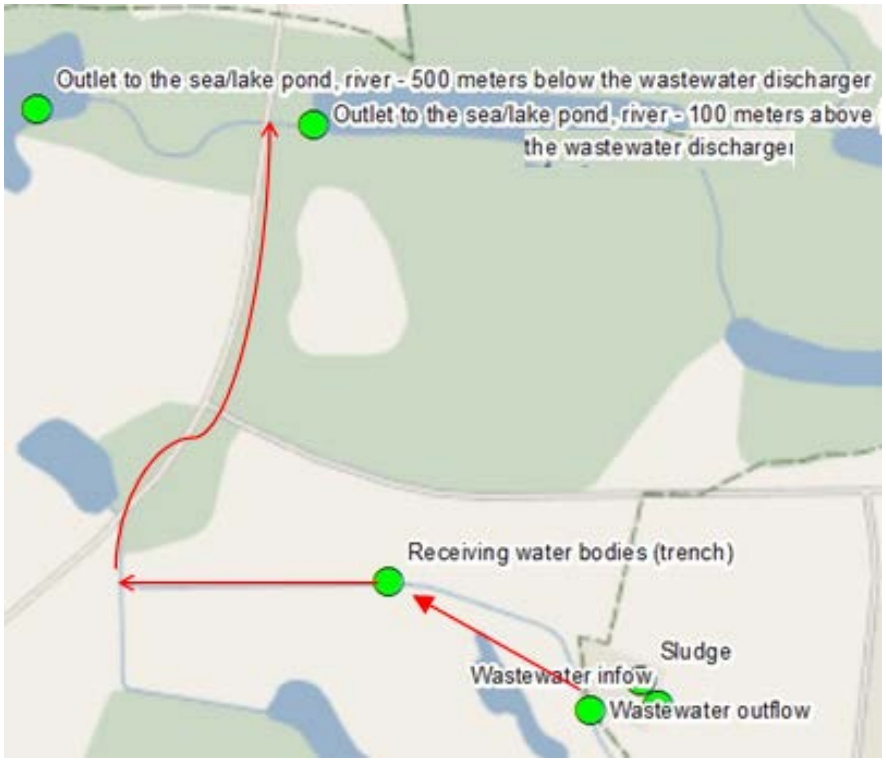
- Leitgiriai WWTP seasonal used only periodical operation ditch with mechanical aeration, it did not provide adequate wastewater treatment. **During the cold season (October-April) WWTP stopped working because of inability of mechanical aerators to use in freezing temperature.**

- Wastewater treatment plant was **too large**, because the actual discharge of wastewater was less than the projected one, wastewater stagnated for too long, so a **secondary pollution occured in WWTP**.

Assessment of wastewater pollution and Leite River water quality before the reconstruction of the Leitgiriai WWTP

- The identified indicator values were compared with the limit values regulated by the Wastewater Treatment Regulation (2008) according to the pollution norms for the wastewater released to the natural environment.

- Indicator values were compared with the limit values regulated by the Procedure for determining of the status of surface water quality (2010).



Scheme of wastewater inflow into the Leitė River

RESULTS OF POLLUTION OF WASTEWATER IN LEITGIRIAI WWTP 2016-2017

Results of untreated wastewater flowing into the Leitgiriai WWTP

Data	07 2016	10 2016	12 2016	03 2017	06 2017
Suspended solids, mg/l	129	131	133	138	119
BOD_7 mg/l O_2	290	330	450	410	135
Total phosphorus mg/l	3,25	2,14	4,25	3,91	1,11
Total nitrogen mg/l	19,8	17,2	26,1	24,3	13,9

Results of treated wastewater flowing out of the Leitgiriai WWTP

Data	The limit value	07 2016	10 2016	12 2016	03 2017	06 2017
Suspended solids mg/l	Not regulated	19	22	22	20	60
BOD_7 mg/l O_2	<2000 p.e., **29 mg/l O_2**	31	62	69	31	22
Total phosphorus mg/l	< 1 0000 p.e., **2 mgP/l**	3,19	2,02	3,27	2,18	1,55
Total nitrogen mg/l	< 1 0000 p.e., **20 mg/l**	19,01	17,9	25,8	23,8	14,5

Evaluation according to the limit values regulated by the Procedure for determining of the status of surface water quality

The status of the Leite River was bad according to the total nitrogen concentration, nitrate nitrogen concentration, BOD_7 values in all assessment cases, according to ammonium nitrogen and total phosphorus – in December 2016.

MEETING WITH LEITGIRIAI VILLAGE COMMUNITY

Seminar "Reconstruction of Leitgiriai Wastewater Treatment Plant: Technological, Social and Environmental Aspects"

Meeting of project „VillageWaters” Lithuanian partners in the office of the Director of Šilutė District Municipality Administration

TECHNOLOGY FOR RECONSTRUCTION OF LEITGIRIAI WWTP

Method: biological wastewater treatment with biological nitrogen and phosphorus removal.

Suggested technology: sludge layer filtration (vertical flow labyrinth VFL).

***Benefits*:**

- **high treatment efficiency** with biological nitrogen and phosphorus removal;
- biological treatment **without the use of chemicals**;
- l**ow operation costs** (low electric consumption) and low excess of sludge production;
- compactness, stability;
- **easy maintenance**.

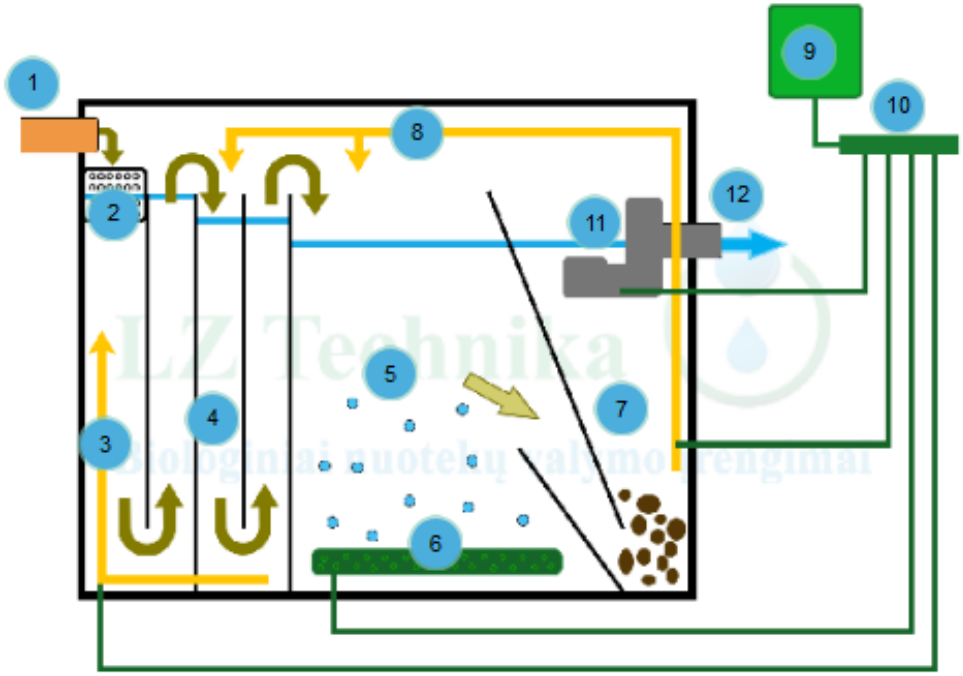
RECONSTRUCTION OF LEITGIRIAI WWTP

- Device was made by "August ir Ko“ UAB.
- All wastewater treatment process is performed in one single radial polypropylene content.
- Wastewater treatment process is completely automatic, so the plant automatically reacts to the total daily flow and content changes.

- Device is made from the hightest quality polypropylene.
- Because of its durability it is the most widely used type of plastic.
- Polypropylene is resistant to cororosion, acids and differences in temperatures.
- It is known for its logevity, strenght, flexibility and lightweight qualities.

TECHNOLOGICAL SCHEME OF BIOLOGICAL WWTP

- At first, wastewater flows into non-aerated zone, where mechanical pretreatment takes place (2). The non-aerated zone is divided by several internal dividing walls, where internal circulation is established.
- Further, the wastewater flows into anaerobic fermentation zone (3), mixes with activated sludge and flows into denitrification zone (4), where proceeds denitrification processes.
- From the denitrification zone wastewater overflows into aeration zone (5) . The compressed air through single-bubble aeration elements – diffusers (6) - is incorporated into aeration zone and into airlifts for circulation and re-circulation of the activation mixture.
- The air supply is from the only mechanism in the system – air blower (9). In the aeration zone wastewater oxidation and nitrification processes take place.
- Further, the mixture of activated sludge flows into bottom of sedimentation section (7), where activated sludge by airlift is recycled into denitrification (non-aeration) or nitrification (aeration) zone of plant.



1 - Inflow 2 - Mechanical treatment

3 - Anaerobic fermentation zone

4 - Denitrification zone

5 - Aeration zone 6 - Diffuser

7 - Final clarification zone

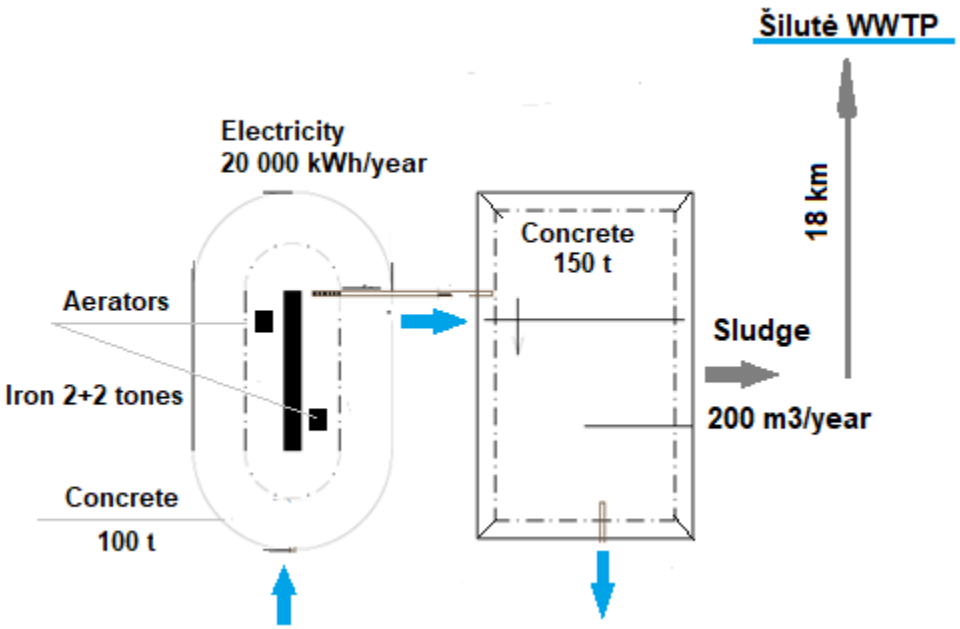
8 - Air distribution panel

9 - Air blower 10 - Air distribution panel

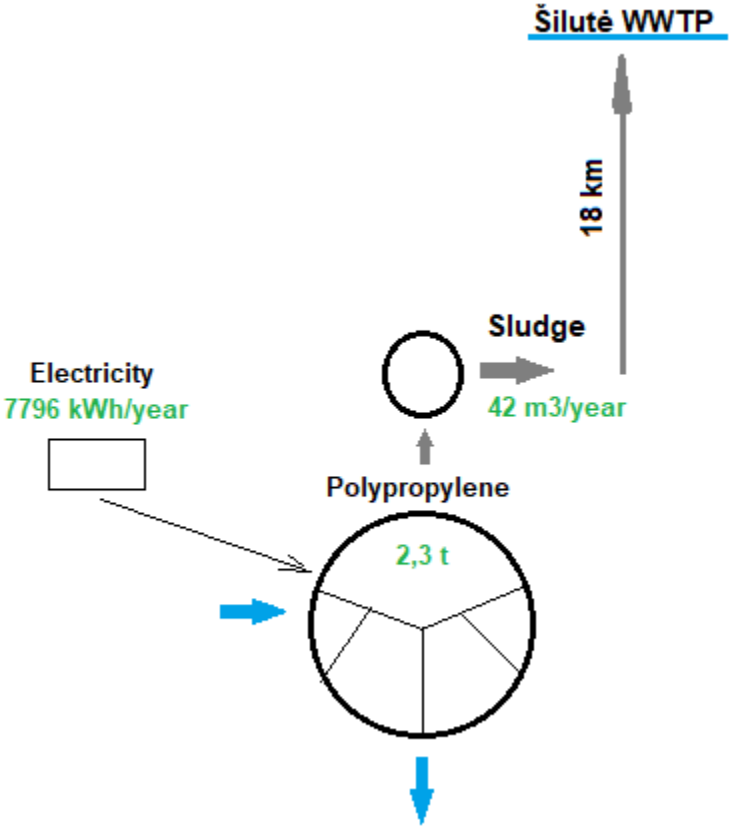
11 - Flow regulator 12 - Outflow

RECONSTRUCTION OF LEITGIRIAI WWTP

BEFORE RECONSTRUCTION



AFTER RECONSTRUCTION

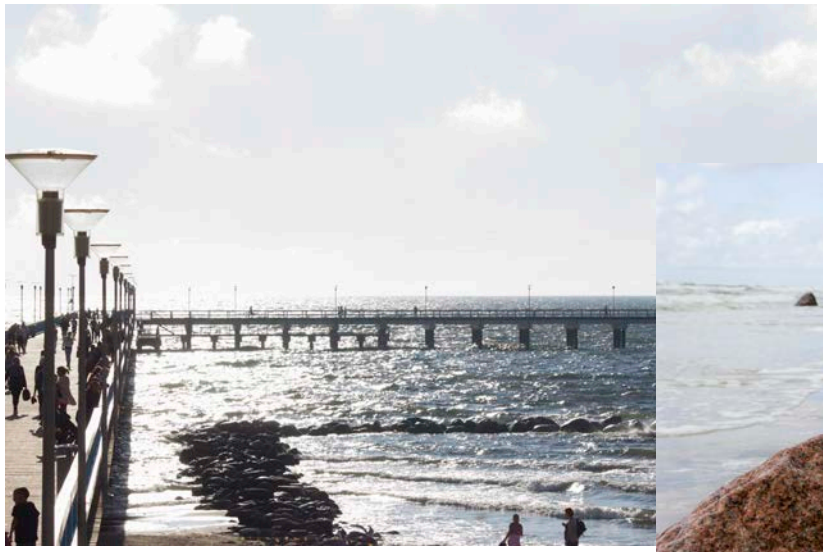


7 times less territory

No chemicals

RECONSTRUCTION OF LEITGIRIAI WWTP

VISITING OF RECONSTRUCTED LEITGIRIAI WWTP



Thank You!

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