Tallinna Vesi
Loome puhta veega parema elu!

AS Tallinna Vesi

Environmental Report 2017

CONTENTS

Chairman's Statement

As a water utility, we have a significant interface with the surrounding environment and local communities, and we continue to work hard to ensure that the needs and expectations of our various stakeholders are constantly being met. The same as before, we will concentrate on keeping our employees, customers, investors and a wider community satisfied with Tallinna Vesi's activities.

The Company's continued priority, is to provide a reliable and high-quality drinking water service to our customers, and to ensure that all our activities, from initial water catchment to wastewater treatment, are enacted in compliance with strict environmental legislation. As in previous years, 2017 was another year of exceptional performance for AS Tallinna Vesi.

We are very pleased with our performance regarding drinking water quality, which is further reinforced by the results of the water samples taken from various points in the Network and at the customers' tap. Water losses in the distribution network have reached an all-time lowest level. We also managed to reduce the average water interruption time, which is testament to the reliability of the network, and the effectiveness of our operational teams, who work on a continuous 24/7 basis.

AS Tallinna Vesi does not compromise on safety or protecting the environment. Our final effluent was again 100% compliant with the applicable requirements. Maintaining the quality of final effluent is essential to the continued security of the Baltic Sea.

Tallinna Vesi is committed to providing the best quality drinking water to our customers. However, we believe this should be reinforced by an equally outstanding service and effective communications. Each year, an extensive customer satisfaction survey is carried out by an independent research company Kantar Emor. The results of this survey map the current satisfaction level for both our contractual clients, and our consumers who pay indirectly via housing associations and landlords. Once again, we are pleased to see very high levels of customer satisfaction.

We have to keep in mind, that professional and dedicated employees is the key to our success and their continued occupational safety, remains our priority. It is equally important for us to make systematic efforts in succession planning and training, to enhance and develop skills and combat the general shortage of labour, especially in the water sector.

Finally, I would like to thank my colleagues in AS Tallinna Vesi, Watercom OÜ and United Utilities, and all our suppliers and business partners for their continued support in helping the company to deliver such exceptional performance during 2017. Building on the achievements of 2017, we will continue to work with all our stakeholders, including investors, and act as a good corporate citizen by continuing to support the wider communities and environment.

Sincerely,

Karl Heino Brookes

AS TALLINNA VESI IN BRIEF

AS Tallinna Vesi is the largest water utility company providing water and sewerage services to almost a third of the Estonian population. We serve more than 23 600 home and business customers and we have got 460 000 final consumers in Tallinn and its surrounding municipalities: in Maardu, Saue, Harku (Tiskre, Harkujärv villages and Harku countryside. As at 31 December 2017, the company emplyed 312 employees.

The company has two treatment plants: Ülemiste Water Treatment Plant and Paljassaare Wastewater Treatment Plant. Also included in the composition of Tallinna Vesi are accredited water and wastewater laboratories.

AS Tallinna Vesi was privatized in 2001. Following privatization with the Service Agreement concluded with the city of Tallinn, the company is committed to ensuring the quality of service at 97 service levels. The current Service Agreement is valid until 2020, but in the Tallinn area of service, the company has the exclusive right to proovide water and sewerage services until 2025.

The public water supply system comprises about 1 150 km of water pipelines, 18 water pumps and 64 underground water wells with a total of 93 wells. The surface water body in Harju and Järva county is about 1 800 km^2. The common sewerage system includes 1 126 km of sewerage network, 483 km of offshore water supply Network and 174 km sewage and sewage pumping stations throughout the service area.

MAIN PRODUCTS AND SERVICES

Collection, treatment and supply of water

Collection, treatment and disposal of sewage and storm water

Design works

Owner supervision and project management

Water and wastewater services

Laboratory services

Pipe construction works

Transportation services and road construction

OPERATIONAL SITES

- Head Office, customer service and support sevices are located in Ädala 10, Tallinn.
- Ülemiste water treatment plant, water and microbiological laboratory are located in Järvevana road 3, Tallinn.
- Paljassaare wastewater treatment plant, composting fields and wastewater laboratory are located in Paljassaare cross 14, Tallinn.
- The catchment area of ca 1,800 square kilometres is located in Harju and Järva counties.

OUR MISSION

We create a better life with pure water.

OUR VISION

Everyone wants to be our customer, employee and partner, because we are the leading water services company in the Baltics.

OUR VALUES

Commitment

We work with passion, doing the maximum to achieve the objectives.

Teamwork

We all form one team, whose success depends on my and my colleagues' contribution.

Customer focus

Our actions help our customers and colleagues to find solutions.

Proactivity

Working today for a better tomorrow.

Creativity

We have the courage and the energy to seek for new opportunities and achieve better solutions.

Environmental guiding principles

We are the largest water company in Estonia and our activity influences nearly one third of Estonia's population. We acknowledge that by providing service compliant with all requirements. We influence the quality of life of the citizens of Tallinn, neighbouring municipalities, as well as the Baltic Sea natural habitat and its surrounding areas. Therefore we take into account the impact we have on surrounding living environment, and association with the different stakeholder interests.

- We act responsibly – we take into account our impact on the surrounding natural habitat and on the community..
- We follow and fulfil all legal requirements, but we are constantly dedicated to do more than we are expected.
- We protect and value the natural environment we operate in. For cleaner natural environment we continuously try to reduce and avoid pollution.
- We use natural resources, including energy and water, sparingly. We continuously seek for new ways to make the processes more environmentally friendly and efficient.
- We act environmentally conscious, Tegutseme keskkonnateadlikult, taking our knowledge and mindset to the community and partners.
- We continuously improve our environmntal management system.

Environmental Management System

We have implemented an integrated management system that meets the relevant quality, environment and safety standards. Our Company`s environmental activity is in compliance with the requirements of the international environmental management standard ISO 14001 and EU Eco Management and Audit Scheme (EMAS) Regulation.

The environmental management system covers all the activities of AS Tallinna Vesi: the extraction and treatment ground water and surface water, drinking water supply to the service areas in Tallinn and surrounding municipalities, collection and treatment of wastewater and storm water, and customer service to provide the relevant services.

The environmental management system forms a part of the Company`s management system, as we strive to make the links between the Company and the environment part of our strategy and to take them into account in our everyday operation.

The basis for the environmental management system is the identification of environmental risks, significant environmental aspects and potential environmental impacts, which form the basis for determining the Company`s environmental objectives and tasks for improving the performance. Significant environmental aspects are such activities which, directly or indirectly, influence the nature, quality of services, co-operation between stakeholders, health and quality of life of the residents, and our business performance.

Management of the environmental system has been established in accordance with the Company´s structure. The main responsibility for ensuring and improving the functioning of the environmental management system lies with the senior management and the heads of structural units. Unit managers involve their employees in setting and fulfilling environmental objectives and tasks. We measure, monitor and assess the indicators of our environmental activities at least once a quarter, on the basis of which we annually compile an environmental report available for the public.

Environmental Aspects and Objects

Table 1: SIGNIFICANT ENVIRONMENTAL ASPECTS 2017

Environmental aspect	Environmental impact from the aspect	Direction of the impact*	Further actions
Use of heat energy	Heat energy is generated from natural gas, which is non-renewable resource and a fossil fuel. Causes air emissions, CO2	-	Insulation of buildings, energy savings, use of residual heat
Use of biogas to produce heat	Heat energy is produced on site from biogas, which is a residue of the sludge digestion process. Reduces ecological footprint and dependence on non-renewable sources of energy	+	Maximise the use of produced biogas
Construction waste	Construction waste has low potential of being reused, large quantities of waste damage the soil etc.	-	Wider use of no-dig methods in pipeline reconstruction
Use of electricity	CO2 emissions, air pollution, environmental damage, exhaustion of fossil fuels	-	Analysis of electricity consumption, introduction of more energy efficient equipment and energy saving modes.
Water extraction	Has an impact on energy and chemical consumption and the resulting environment impacts	-	Reducing the water leakages and process water consumption, applying of new technologies.
Compliant drinking water supply to consumers	Consumer can prefer tap water instead of bottled water, thus reducing the impact from the use of disposable plastic bottles. Impact on population's health.	+	Constant work in all the stages of water treatment, publishing the information about water quality, maintaining of sanitary protection areas.
Availability of environmental information	Easy access to information increases environmental awareness of our customers, employees, community and children. When people are better informed, less waste ends up in the sewage, reducing the negative impact on the environment. Sustainable consumption of clean water reduces the water quantities necessary to be extracted from natural sources; also, the demand for energy and chemicals decreases	+	Informing the public, campaigns, improving the availability and presentation of information, Use of various sources to expose information. Preparation of materials.
Handling of sludge	If the sludge remains unused and is not recycled back to the environment, the amount of waste that needs to be handled increases. Large quantities make the handling of sludge complicated	-	Further actions waiting for the court decision
Discharge of partially treated wastewater into the sea	Partially treated wastewater has a negative impact on marine life and environment and the quality of living environment. Negative impact on fish and therefore also on our food quality.	-	Continuous analysis, monitoring and managing of the treatment processes
Use of land	Very scattered locations of activity spread over large territory is an ineffective use of space and has a negative impact on biological diversity	-	Continue optimizing the use of land

Discharge of untreated sewerage into the environment	Causes pollution, negative impact on marine life and -environment. Impairment of living environment and smell problem.	-	Reconstruction of the treatment process, The construction of separate sewerage system in cooperation with Tallinn City Engineering Department, monitoring of systems.

*Positive or negative environmental impact of the aspect

Table 2: ENVIRONMENTAL OBJECTIVES AND RESULTS IN 2017

Objective	Indicator	Result by the end of 2017
Comply with all legal standards, environmental permits and requirements of the Services Agreement.	0 non-compliances	0 non-compliances
Reduced percentage of clean water leakages.	≤ 15.0 %	13.82%
Compliance of pollution parameters is achieved at the Wastewater Treatment Plant outlet. (averaged quarterly result)	0 non-compliances	0 non-compliances
Reduce the risk of environmental pollution in the Wastewater Treatment Plant	Works with the WWTP's domestic wastewater pumping station completed and equipment ready for work.	Works with the WWTP's pumping station completed and equipment ready for work.
Minimize the evitable sudden discharge of untreated wastewater to the sea.	Amount of untreated wastewater discharged to the sea in 2018 (th m3/y) <125 th m3/y	Adjustments made to the project desing, designing phase is being finalised, extension of the project deadline
Re-organising the waste management system	Volume of mixed municipal waste in 2018 < 2015-2016 average. More correct waste collecting and sorting.	Situation has been mapped, improvement activities on the sites continue
Improve the stakeholders' environmental awareness and knowledge of the Company's activity (employees, succession, consumers and community), in order to increase and maintain Company's good reputation (image).	≥ 1000 children have participated in water classes ≥ 60 guided tours /yr ≥ 2 open doors day ≥ 1 water- and environment related campaign or participation in an outdoor event	1371 last children participated 71 guided tours held 2 held Campaign focusing on avoiding blockages was carried out

Table 3: ENVIRONMENTAL OBJECTIVES IN 2018

Objective	Indicator	Due Date
Compliance with all legal standards, environmental permits and requirements of the Services Agreement	0 non-compliances	2018
Reduced number of clean water leakages	≤ 14.5 %	2018

Compliance of pollution parameters is achieved at the Wastewater Treatment Plant outlet (averaged quarterly results)	0 non-compliances	2018
Minimize the evitable sudden discharge of untreated wastewater to the sea.	Reconstruction works completed, amount of untreated wastewater discharged to the sea without dilution (at least 1:4) = 0 m^3	2020
Improve the effluent quality to reduce the pollution load to the Baltic Sea	P_{tot} annual average ≤0.45 mg P/l	2018
Reduce the use of natural gas bought externally at the Wastewater Treatment Plant	Biogas production >7000 m3/d	2018
Reduce energy use at pumping stations	Air-source heat pumps installed and in operation.	2018
Prepare sustainable solution for handling the sludge	Studies completed, solution for the reuse of sludge identified and implemented, in accordance with current legislation.	2025
Re-organising the waste management system	Volume of mixed municipal waste in 2018 is <2015-2016 average. More correct waste collecting and sorting	2018
Improve the stakeholders' environmental awareness and knowledge of the Company's activity (employees, succession, consumers and community), in order to increase and maintain Company's good reputation (image).	≥ 1100 children have participated in kindergarten visits ≥ 65 guided tours/yr ≥ 2 open doors day in a treatment plant ≥ 1 water- and environment related campaign or participation in an outdoor event	2018

Complicance of the Activities with Environmental Requirements

To a large extent the Company's environmental activities are regulated by requirements arising from the European Union (EU) as well as national legislation and the legal acts issued by local governments.

At the EU level, this means compliance with the EU Water Framework Directive (2000/60/EC). At the national level, compliance with the Water Act, Public Water Supply and Sewerage Act, Waste Act, Chemicals Act, Ambient Air Protection Act, and subordinate acts based on these acts must be ensured. At the local level, we are obliged to comply with different rules and requirements applicable in Tallinn and its surrounding municipalities.

Amendments to the requirements and legislation are being constantly monitored. In case changes are made to the legislation that concerns the Company, those are communicated to the managers and specialists responsible for the relevant matters, allowing them to assess the impact of the amendments on the Company and amend our processes accordingly if necessary.

In cooperation with the Estonian Waterworks Association we participate in the rounds of approvals of legal acts pertaining to the water sector and environmental matters by presenting our opinions and making amendment proposals to the draft legal acts under discussion. Our participation, via the Estonian Waterworks Association, in the work groups, which draft water and environmental legislation, has provided us with the opportunity to communicate our positions directly to the relevant ministries.

Our involvement in the drafting of the new Public Water Supply and Sewerage Act was of primary importance for us in 2017 and will actively continue in 2018. Work with the drafts of the Water Act and Waste Act will continue. In addition, together with the Estonian Waterworks Association we will participate in drafting the new drinking water directive in 2018.

The key draft laws, in the development and amendment of which AS Tallinna Vesi's specialists actively participated during 2017, were the amendments to the Regulation No. 24 (*quality and control requirements for drinking water and methods of analysis*), amendments to the Regulation No. 82 (*regulation on measuring instruments*) and already mentioned the Public Water Supply and Sewerage Act. Also, we worked with many others drafts that are important for us.

Environmental permits

We act in accordance with the terms and conditions set out in the environmental permits issued to the Company. Environmental Board's department has issued the following environmental permits to us:

- 4 permits for a special use of water (details on page 15);
- 2 waste permits (details on page 31);
- 2 ambient air pollution permits (details on page 35).

Requirements of the Services Agreement

On 12 January 2001 we concluded a tripartite Services Agreement with the City of Tallinn and investors, which, among other things, obliges us to comply with 97 Levels of Service. This makes us the most regulated water undertaking in Estonia. Our activities and levels of services are assessed once a year by an impartial inspection body – Supervisory Foundation for the Water Companies in Tallinn – to whom the Company annually, i.e. by the end of the first quarter, submits a report on compliance with the levels of service.

In 2017, we were in compliance with and in many cases outperformed all of the contractual levels of service. For example, in 2017 water quality at the customers' taps was 99.93% compliant with the standards, which is the best ever result outperforming the quality level specified in the Services Agreement by 4.93%. Also, the level of leakage continues to be belowe the target of 26%. In 2017 the leakage rate was 13,82%. This is the best result in

the history of the Company and has been achieved through forward-looking efforts and consistent work. The best result in years was also achieved in reducing drainage discharges. Thanks to the preventive maintenance and upgrading the sewerage network, we managed to reduce the number of blockages to 654 in 2017.

Requirements to contractual partners

As strict requirements apply to our activities, we consider it to be very important that our suppliers and contractors meet the environmental and occupational safety requirements, too. Among other things, the providers of construction works must confirm that they comply with occupational safety and environmental protection requirements at our repair and construction sites. In 2016, we organised an information day for subcontractors and cooperation partners, including a training on envronmental and occupational safety requirements. We plan to continue carrying out such events regularly also in the coming years.

We have established several criteria in our procedures which enable us to make sure that our partners meet our expectations. Our specialists monitor the activity of suppliers/contractors with regard to the safety and environment at sites on a daily basis.

Management system control and audit

In spring 2017, an external audit was carried out in the Company by an accredited certifier AS Metrosert in order to evaluate the compliance of the management system with the requirements of ISO 9001:2015, ISO 14001:2015, OHSAS 18001:2017 standards and with the Regulation (EC) No 1221/2009 (EMAS). As a result of the external audit, certifier confirmed the continuous compliance of the Company's integrated management system with the aforementioned standards and EMAS regulation. The auditors also verified that the 2016 environmental report complied with the requirements of EMAS. In their report, the auditors highlighted many positive observations about company's services. Among other things, the audit stated that the applied management system complies with the requirements set by the standard and is effective and contributes to the company's policy and objectives.

In addition to external audits, internal audits were carried out to assess the perfomance of the management system, in accordance with the inetrnal audit plan. As a result of internal audits carried out in 2017, our internal auditors put forward a total of 4 non-conformities and 32 improvement proposals. The non-conformities were analysed by the responsible managers and the corrective actions were performed.

The compliance of the activity and management system of Company's laboratories against the requirements of ISO 17025 standard were audited by the Estonian Accreditation Centre in 2017. The auditor did not find any non-conformities.

Environmental Education and Consumer Awareness

We keep on working hard to promote the environmental thinking amongst our population. We encourage people to drink tap water and make explanations on the prevention of sewage discharges. With our message "Tap water is drinking water" we draw people's attention to the very good quality of tap water. We also continued our co-operation with restaurants so that the customers would have the courage and awareness to ask for tap water when they dine out in restaurants. In addition, we participated in several public events and set up new public water taps to increase the availability of tap water. While only few years ago, in 2011, 48% of people trusted to drink tap water, the number of people trusting tap water quality had grown to 73% by the end of 2017.

- We continue contributing to environmental awareness of young people who would value the nature and environment. Each year, our employees organize water lessons in kindergartens and schools discussing water circulation, how to save water and avoid blockages. 1,371 children participated in these lessons in 2017.
- Over the years, we have prepared many educational study materials related to water and environment issues for children and teachers. These include, for example, a study material series "Blue Classroom" for the teachers in nature studies supporting the national study program in water-related classes. The games and puzzle book for kindergartens and primary schools got new great sequels in the form of Tilgu's playing cards and a puzzle book „Puzzle with Tilgu".

- AS Tallinna Vesi organized children's activities in „You Can Do It" Orienteering Day. The wwnt was organized by district goverments and attracted approximately 550 children who aquired new knowledge about tap water and environmental connections.
- At the end of 2017, we held a TV and social media campaign „ Do not let the blockages ruin your holiday", reminding people that food waste, paper towels and toiletries do not go to a toilet. Thanks to the influence of the population's consumption habits, we try to reduce the risk of blockage and environmental pollution, and to collect waste through the wastewater treatment plant pipelines.
- In addition to our core tasks – driking water and wastewater treatment – our treatment plants also play an important role in raising awareness among the general public. Every year we introduce the work of the stations toa n increasing number on interested people During the year we conducted over 70 excursions in the stations. In addition, in the spring of 2017, we organized an open day for residents of the city at a wastewater treatment plant and in the autumn we opened the doors for everyone interested in the Ülemiste water treatment plant.

Ecological Footprint

Ecological footprint method enables to evaluate the environmental impact of our activities in a complex manner. Ecological footprint assesses the use of space accompanying the lifecycle of a product or service and can be measured in hectares per year (hereinafter ha/y).

Our ecological footprint is calculated based on the methodology developed by the Estonian Fund for Nature. The calculation takes into consideration 11 different components and corresponding factors[1]. The components have been divided into five fields (water, waste, electricity, heating, transport). In order to get a better comparison, the ecological footprint per one employee has been pointed out separately.

Table 4: GROUP'S ECOLOGICAL FOOTPRINT IN 2016-2017

Aspects that serve as the basis for calculating the ecological footprint	Year	Consumption/ production	Ecological footprint per employee, ha/y per employee	Ecological footprint, ha/y	Direction of change
WATER					
1. Water consumed, m³	2017	1 858 413	0,5	148,7	↓
	2016	1 878 410	0,5	150,3	
WASTE					
2. Recycled paper, t	2017	3	0,03	8,1	↓
	2016	5	0,04	12,2	
3. Recycled metal, t	2017	49	0,2	54,0	↑
	2016	34	0,1	37,5	
4. Concrete (to a landfill), t	2017	35	0,0	3,5	↓
	2016	77	0,0	7,7	
5. Mixed municipal waste (to a landfill), t	2017	110	1,5	445,1	↑
	2016	90	1,2	362,3	
ELECTRICITY					
6. Electricity, MWh	2017	41 543	21,9	6 688,4	↑
	2016	40 787	21,3	6 566,7	
HEAT ENERGY					
7. Heat energy produced from natural gas*, MWh	2017	3 989	1,2	375,0	↓
	2016	4 150	1,3	390,1	
TRANSPORT FOR PEOPLE					
8. By car, km	2017	5 573 362	1,1	334,4	↓
	2016	5 670 165	1,1	340,2	
9. By plane, km	2017	92 000	0,03	8,3	↑
	2016	67 061	0,02	6,0	
10. By bus, km	2017	17 278	0,0017	0,5	↓
	2016	32 472	0,0032	1,0	
11. By ship, km	2017	2 952	0,0001	0,0	↓
	2016	2 068	0,0001	0,0	
TOTAL:	**2017**		**26,4**	**8 066**	↑
	2016		**25,6**	**7 874**	

*In addition to the heat energy produced from natural gas we use the biogas, which is a by-product of the sludge treatment process, to produce the heat energy.

[1] Ecological footprint factor is a conversion unit which helps to equalize the measured source data so that the result would be easily understandable and comparable.

In relation to the many challenges we faced last year, our ecological footprint has slightly increased. The highest impact on the environment comes from the use of electricity, followed by the use of heat energy, mixed municipal waste and motor transport. The use of electricity and heat energy and motor transport are in a close and inevitable connection with our core activity and the factors that impact this. We will continue to work to reduce mixed waste and it has been set as one of the Company's environmental objectives.

The consumption of all the resources is analysed in the next chapters of this report.

Quality and Use of Water Resources

Permits for special use of water

Our activities in using water resources are regulated by the Water Act and its implementing provisions. As a water company we must hold a valid permit for a special use of water and pay a fee for the water resource we have used. The permit for a special use of water sets us certain obligations and restrictions. For instance, the permit determines the allowed water extraction volume (m^3), obligation for keeping account over the used water quantities, requirements for sampling, monitoring and analyse standards, as well as the allowed limit values for pollutants in effluent, requirements for monitoring the pollutants and the measures to reduce the impacts deriving from the use of water.

All requirements established in the permits for a special use of water were met in 2017. Fee for a special use of water is paid for the amount of water taken from Ülemiste lake into the water treatment plant and for the ground water pumped from the aquifers. In 2017, the fee for a special use of water amounted to 4.5% of the costs of the sold products/services (2016: 4,6%).

Table 5: VALID PERMITS FOR SPECIAL USE OF WATER OF AS TALLINNA VESI

Permit for special use of water no.	Valid until	Description of special use of water
L.VV/323855	31.10.2018	**Saue City public water and sewerage service area.** Extraction of ground water from boreholes, over 5 m^3/day. Collection of wastewater and directing wastewater to Paljassaare Wastewater Treatment Plant owned by AS Tallinna Vesi.
L.VV/322982	31.03.2018	**Tallinn public water suply and sewerage system main operating area, Tallinn surface water catchment system facilities area in Harju and Järva Counties.** Regulating surface water resources in water bodies of Ülemiste-Pirita-Jägala surface water system, water extraction from Lake Ülemiste, extracting ground water from Ordivician-Cambrian and Cambrian-Vendi aquifers through Tallinn public water supply and sewerage system boreholes, for discharging biologically treated effluent through a deep-sea outlet pipe into Tallinn Bay and for discharging mechanically treated storm water into the sea, Mustjõe Stream and Pääsküla Wetland.
L.VV/328381	31.12.2042	**Harku Municipality.** Extraction of ground water from boreholes, over 5 m^3/day.
L.VV/328349	01.07.2039	**Maardu City public water supply and sewerage system operating area.** Extracion of industrial and drinking water from Cambrian-Vendi aquifers in order to supply water to Maardu City, Kallasvere and Muuga area. From november 2012 all Kallasvere and Maardu public sewerage system is discharged to Tallinna public sewerage system..

Water catchment

Nearly 90% of our consumers in Tallinn and Maardu get their drinking water from the surface water resources. Even though Lake Ülemiste is the main drinking water source for the people of Tallinn, the natural catchment of the lake itself is small. To increase the water volume and ensure that the needs of the City of Tallinn are met, we have established a water catchment system, which consists of hydropoints constructed on rivers, as well as water reservoirs and channels connecting those. Our water catchment system mainly comprises Harju sub-basin and the river basins of Soodla, Jägala and Pirita rivers with the total area of ca 1,800 km^2. The most important water reservoir is Lake Ülemiste with a net volume of 15.8 million m^3. Additional water reserves, can also be to improve Ülemiste lake's poor water quality, have been accumulated to Paunküla water reservoir on the headwaters of the Pirita River (9.9 million m^3) and to Soodla water reservoir on the Soodla River (7.4 million m^3).

The volume of water resources in Tallinn surface water catchment system primarily depends on the annual amount of precipitation. Constant information on the flows enables us to use the water resource in the most efficient manner. To regulate the water resources in an optimum and accurate manner we have established water metering points at all hydropoints, which enable us to meter the flows conducted to the channels and the sanitary flows in the rivers. We perform metering regularly, as per the requirements of the permit for a special use of water.

The year 2017 is characterized by high water levels and modest ice conditions. For the fourth year in a row, the water regime of the first quater of the year can be described in quite similat terms: the winter was warm and unstable temperature, snowless, ice short-termed, unstable or not at all, fluctuating conditions with winter flood and waterless high water periood. By the beginning of the secon quarter, all the ice remains had melted in all the water bodies, although snow and ice continued until May. For the fourht spirng in a row, high water started in the first quarter and the water level in the second quarter was rather affected by rains rather than snow. The summer periood is described by colder temperatuures from the lõng-term average and higher raifall, which affected the drainage of rivers in the Intake system and the water levels of the reservoirs. The heavy rain remained until the end of 2017 and there were no expected cold temperatuures. In the autumn, warmer and rainy periods, drainage of streams and the water levels of reservoirs were high.

In order to protect the water resources and the water body used for the drinking water extraction, a sanitary protection zone around Lake Ülemiste has been formed. The sanitary protection zone, which comprises Lake Ülemiste, water catchment facilities, bank reinforcements and the land in the immediate vicinity of the lake, needs to be kept in its natural condition. In addition, sanitary protection zones have been formed in the catchment area to protect the facilities of Soodla, Kaunissaare, Paunküla and Aavoja water reservoirs.

Use and quality of surface water

According to the permit for a special use of water no L.VV/322982, the Company is allowed to extract 47.60 million m^3 of surface water per year from Lake Ülemiste. The actual surface water extraction in 2017 was 23.72 million m^3.

Table 6: USE OF SURFACE WATER FROM LAKE ÜLEMISTE AND COMPLIANCE WITH THE PERMIT FOR A SPECIAL USE OF WATER No. L.VV/322982, million m3

	2013	2014	2015	2016	2017
Use of surface water from lake Ülemiste	22,20	22,61	22,76	23,73	23,72

Maximum amount allowed 47,6 million m^3/y

The water quality in surface water sources is monitored in line with the program determined by the permit for a special use of water. In 2017, the quality of raw water extracted from the water catchment system was compliant with the Decree No 1 issued by the Minister of Social Affairs. We have been taking raw water samples from the intake of our water treatment plant on a daily basis to ensure the compliance. Nitrogen and phosphorus compounds and total organic carbon are determined in raw water once a week. Furthermore, an in-depth analysis of raw water is carried out once a month in line with the quality monitoring programme established for

a drinking water source. We study the results of the analyses to understand the changes and processes in the catchment area and decide upon the necessity to replenish the water stock in the lake.

Table 7: ÜLEMISTE LAKE'S WATER QUALITY IN 2013-2017

Parameter	Unit	Average results				
		2013	2014	2015	2016	2017
Colour	mg/L Pt	44	33	36	34	38
Turbidity	NTU	6,6	8,2	12,0	10,5	11
pH		8,09	8,30	8,90	8,32	8,27
Permanganate index (COD_{Mn})	mg O_2/l	10,2	8,9	11,2	9,9	11,1
Total organic carbon (TOC)	mg C/l	10,5	9,5	11,0	10,0	10,7
Total phosphorus	mg/l	0,035	0,036	0,030	0,028	0,038
Total nitrogen	mg/l	1,42	1,17	1,45	1,58	1,60
Ammonium, NH_4^+	mg/l	0,081	0,019	0,038	0,085	0,112
Phytoplankton abundance	objects/ml	15	17298	100004	5771	7168

In 2017 the water quality of lake Ülemiste stayed similary weak like in 2016. The permanganate oxygen demand was above the average and plankton remained high for a longer period of time compared to the previous years.

Use and quality of ground water

Approximately 10% of consumers in Tallinn are supplied with water extracted from the Cambrian-Vendian and Cambrian-Ordovician aquifers. Ground water is supplied in the districts of Nõmme, Laagri, Merivälja, Pirita and Tiskre in Tallinn, Tiskre village in Harku Rural Municipality and City of Saue. Total of 2,710,410 m^3 of ground water was extracted in 2017.

Table 8: USE OF GROUND WATER AND COMPARISON WITH THE MAXIMUM VOLUMES SET BY PERMITS FOR A SPECIAL USE OF WATER, th m^3

Parameter	Maximum volume permitted	Average results				
		2013	2014	2015	2016	2017
Tallinn (Permit no. L.VV/322982)	7150,7	2152	2076,3	2 146,1	2437,4	2384,2
Saue (Permit no. L.VV/323855)	511	205,2	230,7	265,5	278,7	283,9
Harku (Permit no. L.VV/328381)	110	58,3	57,9	58,6	46,7	42,3
Maardu (Permit no. L.VV/328349)	720	1,5	0	0,1	0,3	0,48

According to the EU Water Framework Directive (2000/60/EC), the qualitative or chemical condition of ground water is regarded to be good if the concentration of pollutants does not indicate an inflow of salty water or other water, nor does it exceed the respective quality standards. In 2017, the quality of drinking water at the borehole pumping stations complied with the requirements of the Regulation No 82, issued by the Minister of Social Affairs. There were no ground water pollution incidents or potential pollution incidents demanding the notification of the City of Tallinn and the Health Board.

We monitor the ground water quality parameters in accordance with the permits for a special use of water and the drinking water source quality monitoring programme, and if necessary, the ground water will undergo a

treatment process. On a monthly basis we monitor the treated ground water quality (content of iron, manganese, and ammonia) in 20 ground water pumping stations, which constantly provide water to the public network. All the bore-wells that are currently in use are equipped with automatic hydrostatic pressure sensors, which enable to measure the static and dynamic level of ground water. The results of this measuring enables us to assess the recovery of ground water resources.

Ground water in Northern Estonia (Cambrian-Vendian aquifer) contains natural radionuclides. The natural radioactivity of Estonian ground water has been thoroughly studied by the Geological Survey of Estonia, as well as the Estonian Radiation Centre. To assess the health impacts of radioactivity, the Radiation Centre together with the Health Board carried out a health risk assessment in Tallinn ground water areas in 2010. Based on the results of this risk assessment, any random health damage resulting from the content of radionuclides in the water of Cambrian-Vendian bore-wells is unlikely. Repeated radiological analyses in all the bore-wells are carried out in every ten years, in accordance with the requirements.

Drinking Water Production and Quality

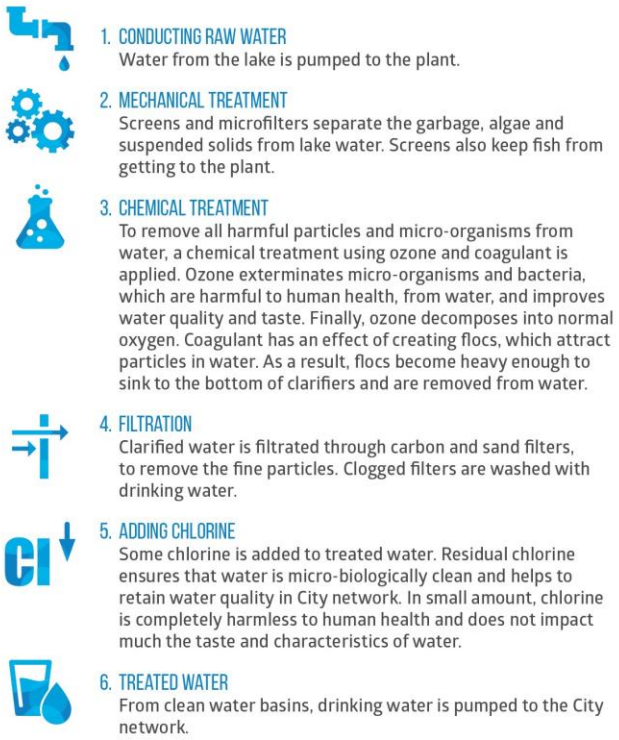
Last year we supplied 25 million m^3 of pure drinking water to our consumers. Drinking water quality is required to comply with the Regulation No 82 "Quality and Control Requirements and Analysis Methods for Drinking Water", issued by the Minister of Social Affairs on 31 July 2001 (hereinafter referred to as the Regulation No 82), originating from the Estonian Water Act and the European Union Drinking Water Directive 98/83/EC. The water quality is monitored following the monitoring programmes approved by the Health Board. Samples are taken from the raw water (Lake Ülemiste, its catchment area, and ground water), treatment process, water tanks at the groundwater pumping stations, as well as the customer taps.The quality indicators for drinking and groundwater in Ülemiste Water Treatment Plant in 2017 are added at the end of the report.

Water analyses are carried out by the Company's water and microbiology laboratory, which is one of the largest water laboratories in Estonia. The quality of the analyses is guaranteed by the certified samplers and laboratories accredited by the quality management system (EVS-EN ISO/EC 17025 standard), using modern equipment and professional staff. In 2017, our water and microbiology laboratory performed a total of 100 000 analyses.

Thanks to the high quality of water and improved awarenesss of consumers, the number of people drinking tap water in our service area has shown a steady increasing trend over the last years.

Surface water treatment process

Figure 1: Water treatment process at Ülemiste water treatment plant



Ülemiste Water Treatment Plant treats water extracted from the lake applying a treatment scheme which is used world-wide. Due to the quality of surface water in Lake Ülemiste, the law stipulates that in order to ensure the drinking water quality, the surface water must undergo mechanical and chemical treatment – preliminary ozonation, coagulation, clarification, filtration, and disinfection.

In 2017 the Water Treatment Plant was invested in several major projects. Four filters were regenerated last year to improve the water treatment process. In addition, one additional reconstruction of clarifier was commissioned in 2017, so that in the future it would be possible to disperse the load while reduced quality of raw water and increase the water retention time in a clarifier.

From an environmental point of view, one of the most important porjects was in ozone station. The ozone air preparation lines replaced depreciated coolant dryers, that used environemntally hazardous chemicals, with much more up-to-date and environmentally friendly ones. Consequently, AS Tallinna Vesi will not use environmentally hazardous refrigerants. In the old water treatment plant, reconstruction of one of the largest clarifier was completed, as a result of which we can reduce the speed of ohter clarifiers and produce more compliant drinking water.

Ground water treatment

Ground water used for producing drinking water usually falls under the quality class I-III. Ground water from Ordovician-Cambrian aquifer usually falls under the quality class I and does not need any treatment. However, ground water from Cambrian-Vendian aquifer, which is the main drinking water source, qualifies as class II or III and requires treatment. The main reason is mostly a natural excess content of iron, manganese, or ammonium, resulting in higher turbidity of water than usual.

The Water Act implies the preservation of ground water as similar to its natural conditions as possible, therefore, no chemicals are used. In order to supply compliant drinking water, we treat ground water by using filtration and aeration to remove excess iron, manganese and ammonium from the water. The samples taken after the ground water treatment process indicate a significant decrease in turbidity as well as in the content of iron, manganese and ammonium, an improvement of colour and stability index and an increase in oxygen content.

Drinking water quality in the network and at customer premises

Tap water in Tallinn and Maardu is of a very good quality and safe to drink. In terms of quality, the year 2017 did not differ from the previous periods. During the year, we took samples twice a month at the sampling points (at customer premises) agreed with the Health Board.

99.93% of all water samples complied with the standards, which means that in 2017 we detected non-compliances only in 2 samples of the total of 2,973 samples taken from the customer taps. Non-compliances are mainly related to higher iron and turbidity parameters caused by the conditions of the water network. We always react immediately to a non-compliance.

100% of the 144 water samples taken in Maardu in 2017 complied with the requirements. Before connecting with Tallinn water network, the quality compliance of drinking water in Maardu was only 33%..

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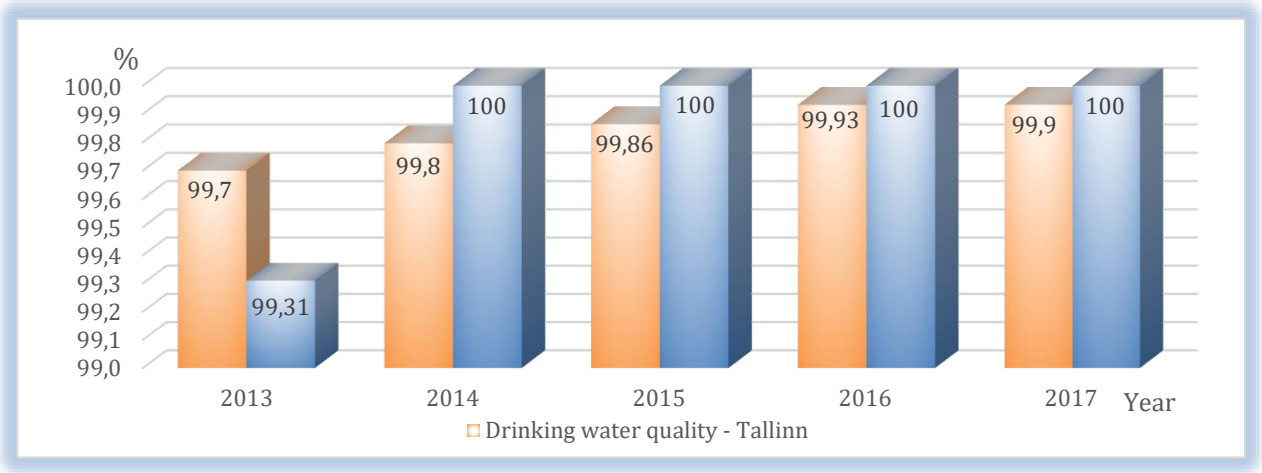


Ghart 1: Compliace of the quality of drinking water with the requirements set out by the Minister of Social Affairs decree no. 82 in 2013-2017, %

Water Network maintenance and related investments

We are constantly performing maintenance and rehabilitation works on the network to retain and improve the drinking water quality. To guarantee high drinking water quality for our consumers we regularly clean and flush the water network. During the cleaning process the sediment build-up is removed from the network, serving as one of the important methods for improving water quality in distribution networks. In 2016, air-scouring pipe cleaning method was carried out on 137 km of water network.

Table 9: CLEANED WATER NETWORK 2013-2017, km

	2013	2014	2015	2016	2017
Cleaned water network	140	146	140	137	137

Investments in replacing old water pipes have facilitated an improvement in water quality at customer premises and a more efficient use of water resources. Each year, we renovate at least 5 km of sewerage network and 5 km of water network, pursuant to the Services Agreement signed with the City of Tallinn.

Leakages and interruptions to water supply

One of our key objectives is to keep the losses of water in the water network at a minimum level. The Services Agreement covering the service area in Tallinn sets the obligation to the Company to reduce the level of leakages to 26%. We have managed to keep the leakage at a considerably lower level than that for several consequtive years already, achieving 13.82% in 2017. About ten years ago the level of leakages exceeded 32%, which means that we are currently saving over 27,000 m^3 of treated water a day compared to ten years ago. The reduction in the level of leakages has been facilitated by our consistent efforts to use the water resource sustainably and with lower losses.

Table 10: LEAKAGE LEVEL IN 2013-2017, %

	2013	2014	2015	2016	2017
Leakage level	16,97	16,14	14,68	15,07	13,82

Daily water loss monitoring helps to find as fast as possible and to reduce the level of leakages. Our specialists have special equipment for finding leakages and, along with zoning the network and remote reading devices, it allows us to detect the leakages faster.

In order to mitigate the inconveniences resulting from an interruption to the service, we notified the customers in advance of unplanned interruptions nearly 99% of the events. In case of interruptions to water supply we provide customers with a temporary water supply with the water tanks.

Water metering

The water meters we use are of high quality. All new water meters comply with the currently applicable European standards and European Measuring Instruments Directive along with the relevant accuracy requirements established therein. The expert studies and calibration of water meters is performed by the national Central Office of Metrology, AS Metrosert.

24 060 water meters in total have been installed to customers' connection points. Water meters enable a more accurate accounting for the usage of water resources.Vastavalt kehtivale mõõteseadusele on meil kohustus taadelda veearvestid, mille näitude alusel toimub vee-ettevõtja ja tema kliendi vaheline tehing, iga viie aasta tagant.

In 2017, we replaced the total of 6,202 water meters based on a programme developed for that purpose. In 2018, we shall continue our work to make sure that all our customers have duly verified water meters.

Wastewater Collection

Wastewater Network and collection of wastewater

Wastewater is directed to the wastewater treatment plant by using the combined sewer system, which collects both sewerage and storm water. Some parts of our service area are also covered with a separate storm water system with storm water outlets. However, most of the storm water is collected with a combined sewer system and ends up at the wastewater treatment plant in Paljassaare.

The number of blockages is a good indicator for reflecting the condition of the wastewater network. Blockages are mainly caused by the sediments build-up in the wastewater network or the misuse of the wastewater network by consumers. Initially, the pipelines were dimensioned for larger flow volumes, so today's smaller water consumption results in the reduction of flow volumes and flow speeds, which in turn increases the risk of blockages. Additionally, continuous extension of sewerage network is affecting the total number of blockages.

Table 11: NUMBER OF BLOKAGES IN 2013-2017, pcs

	2013	2014	2015	2016	2017
Number of blockages	789	771	759	708	699

We have been able to achieve steadily good level of blockages in the recent years due to many preventive actions, such as arranging preventive flushing on the pipelines. For flushing a pipe, first, a flow speed is generated with high pressure carrying sediment into the nearest cesspool. Sediment is then collected with pressure washing trucks and transported to Paljassaare Wastewater Treatment Plant.

In addition, each year the Company rehabilitates at least 5 km of problematic wastewater pipelines, which also contributes to the effective wastewater collection.

Discharging

To serve the inhabitants whose properties have not been connected to the sewerage system, the Company has provided two dicharge places in Tallinn, where sewage suction trucks bring sewage from septic tanks. The availability of discharge places contributes to ensuring that the sewage from septic tanks finally ends up in the wastewater treatment plant and gets treated to a required degree. Consequently, it diminishes the risk of environmental pollution caused by discharging sewage in a manner and place not intended for the specific purpose.

The discharge services that help to make sure that sewage from septic tanks is delivered to Paljassaare Wastewater Treatment Plant through the discharge places are provided by our partners in Tallinn. Although the number of inhabitants, who are not connected to the sewerage system, is below 1%, the volume of sewage transported from the septic tanks in Tallinn and neighbouring municipalities to our discharge places last year amounted to approximately 82,000 m^3. Therefore, we continue to cooperate with various local governments in Harju County to find the best solutions for discharge services outside Tallinn as well.

Pollution load in wastewater and storm water

In order to ensure acceptable pollution load in wastewater reaching the Paljassaare wastewater treatment plant we regularly monitor the wastewater discharged in Tallinn and Maardu and in the surrounding areas and check the compliance of pollution parameters with legal requirements.

In 2017, our Wastewater Inspectorate performed 659 inspections to identify inspection wells, to check local treatment facilities and boundary drawings. 1,413 wastewater samples, incl. 439 monitoring samples were taken for determining the wastewater pollution load at sites. Over-pollution instances were identified and over-pollution fees were applied on 404 occasions.

In 2017 the level of precipitation in Tallinn was 865 mm per area unit, which is again more than in 2016. Consequently, the amount of storm water discharged to the environment through storm water outlets also increased in 2017.

Table 12: STORM WATER VOLUME 2013-2017, miljlion m3

	2013	2014	2015	2016	2017
Storm water volume	4,17	4,08	4,2	5,8	6,6

According to the requirements set by the permits for a special use of water we monitor 24 storm water outlets, the largest among them being the Lasnamäe, Harku and Mustoja outlets. In orde to prevent any potential pollution, some of our storm water outlets (in Olevi, Kaare, Raba and Vabaduse Streets) have been equipped with sand and oil traps, which are regularly maintained.

Table 13: POLLUTANTS FROM THE MAIN OUTLETS IN 2013-2017, t

	2013	2014	2015	2016	2017
Suspended solids	69,8	109,4	84	87	130
Oil products	0,5	0,8	0,2	0,4	0,6

Wastewater Treatment

We treat the wastewater collected in Tallinn and nearest surrounding areas at Paljassaare Wastewater Treatment Plant. We are committed to maintaining the high standards and achieving the results that would outperform the standards that have been set for the treated effluent discharged into the Baltic Sea. Almost 51,5 million m^3 of wastewater was treated at Paljassaare wastewater treatment plant in 2017.

Figure 2: Description of the wastewater treatment process at Paljassaare Treatment Plant

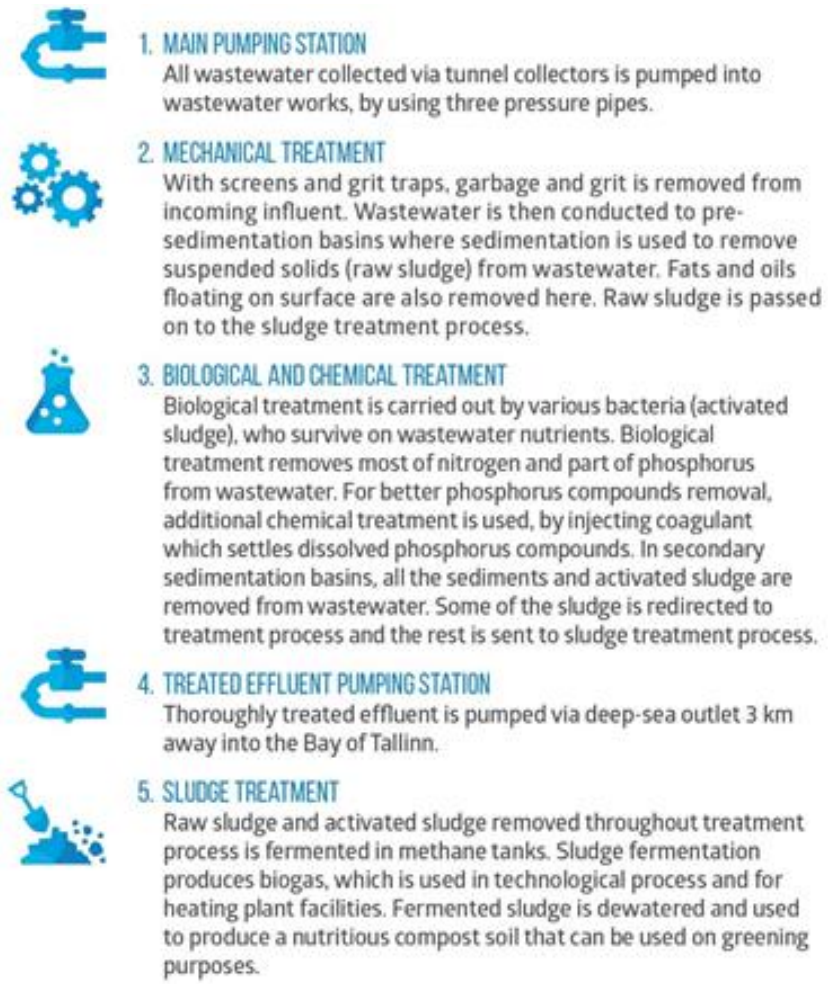


Table 14: TREATED WASTEWATER VOLUME IN 2013-2017, milj m3

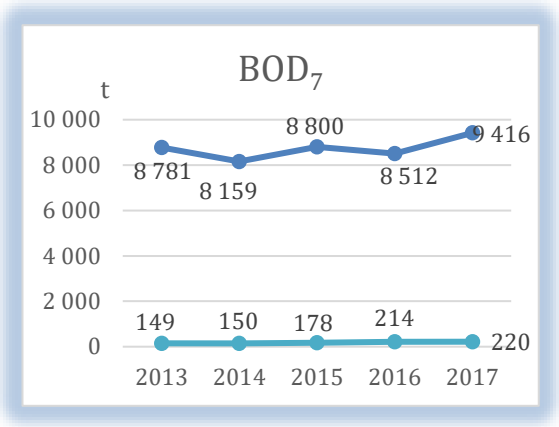
	2013	2014	2015	2016	2017
Treated wastewater volume	45,02	42,99	45,07	50,22	51,49

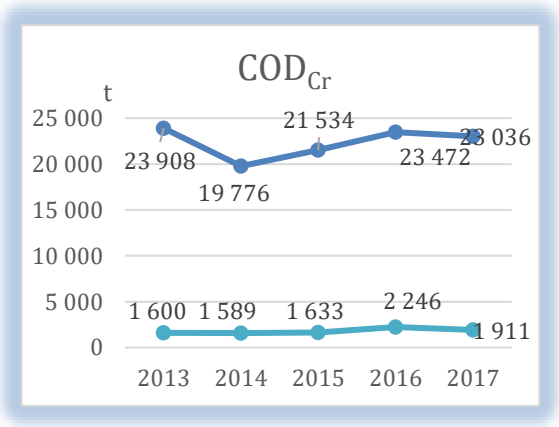
The requirements for the quality of effluent discharged into the sea are determined by the legal acts and the water extraction permit no L.VV/322982. The concentration of pollutants in inlet and in the outlet are monitored in order to assess the efficiency of the treatment process and the quality of effluent. In 2017, the wastewater laboratory carried out about 49,000 analyses at different wastewater treatment stages, storm water discharged and wastewater collected.

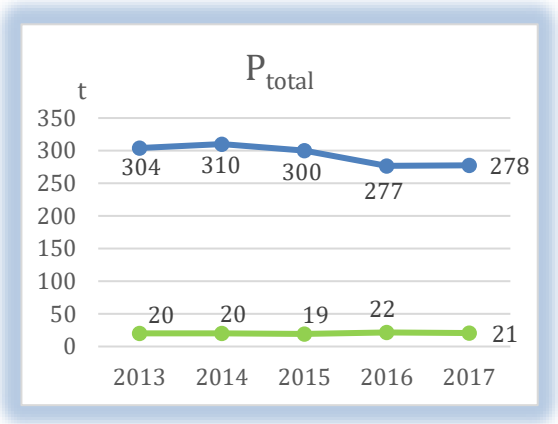
The important pollution parameters for us are the following:

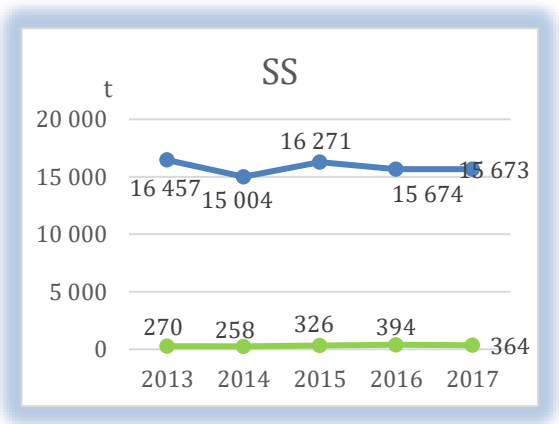
- BOD_7 - biological oxygen demand shows the amount of oxygen, it takes to decompose the organic matter in the course of 7 days;
- COD_{Cr} - chemical oxygen demand is an indicator for the decomposition of organic matter, measured as the consumption of oxygen in chemical oxidation of the organic matter in water;
- SS - suspended solids shows the volume of solid matter in water which is caught in a filter with a defined mesh size;
- N_{total} and P_{total} - total phosphorus and total nitrogen are nutrient salts, which foster the growth of plankton in water. Nitrogen- and phosphorus compounds serve as nutrients, which in high quantities lead to the eutrophication of water bodies.
- Oil products - shows the amount of non-volatile oil products in water.

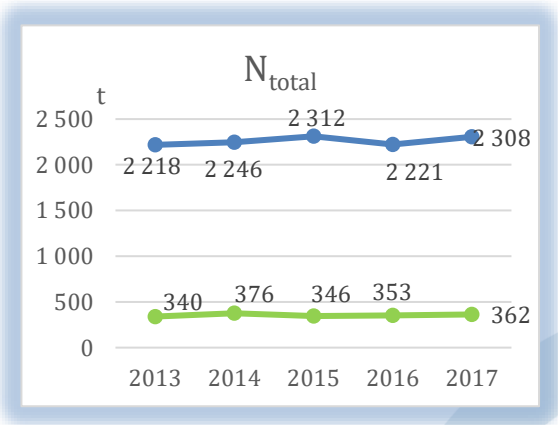
Ghart 2: Amount of pollutants coming to the wastewater treatment plant and discharged into the sea in 2013-2017, t/y

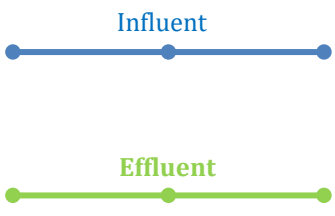




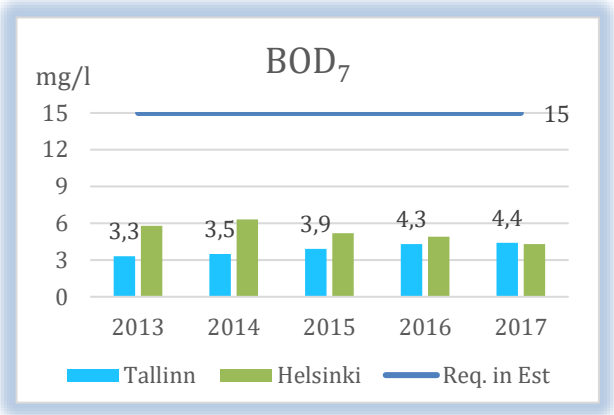


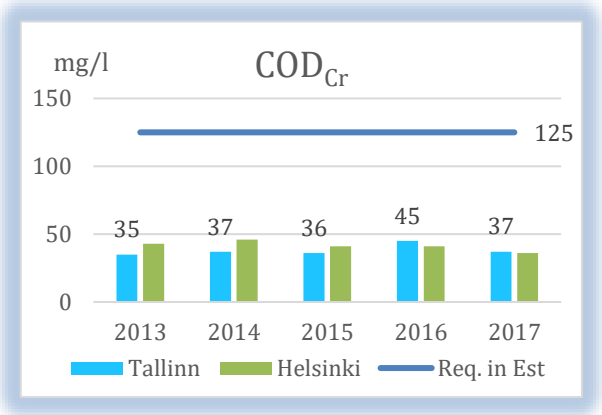


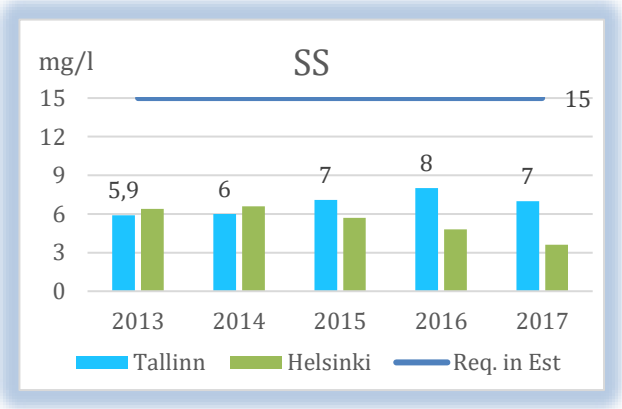


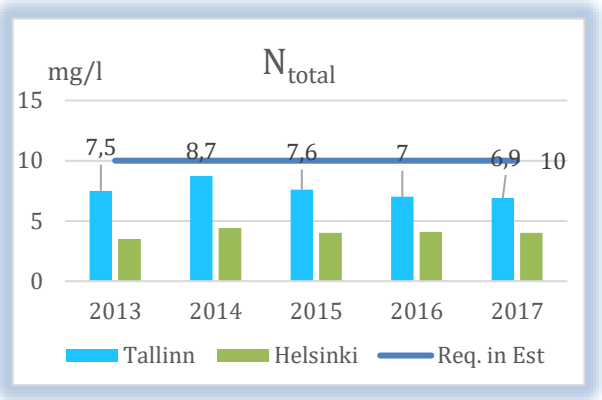


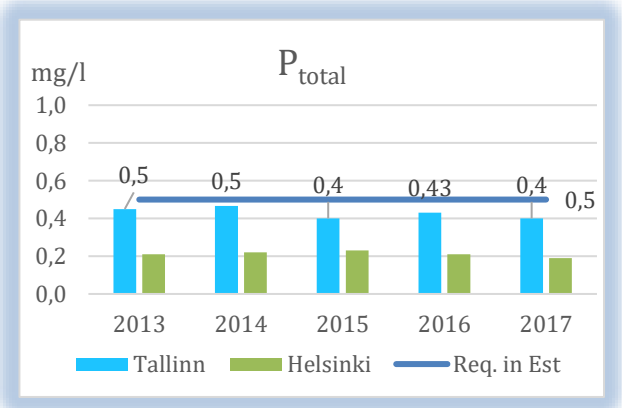
Ghart 3: Average pollution concentration in treated effluent in 2013-2017, compared to regulatory maximum allowable limit and results of Helsinki HSY, mg/l

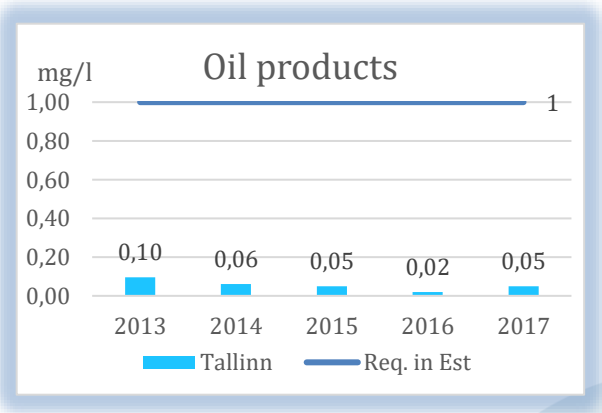






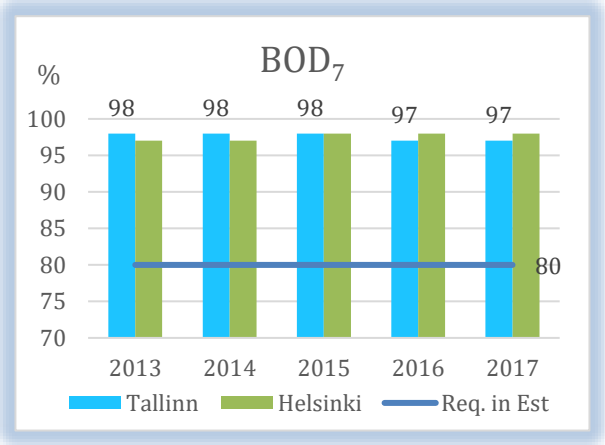


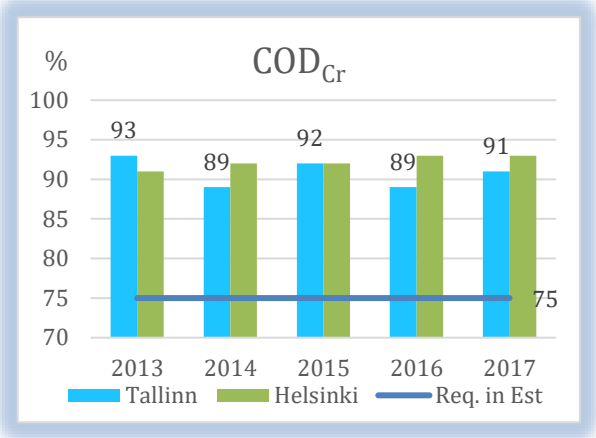


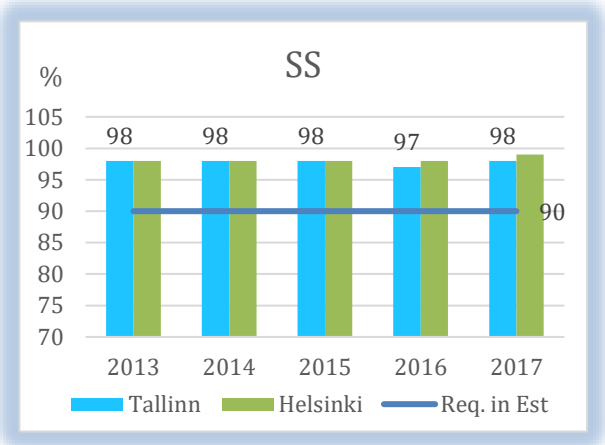


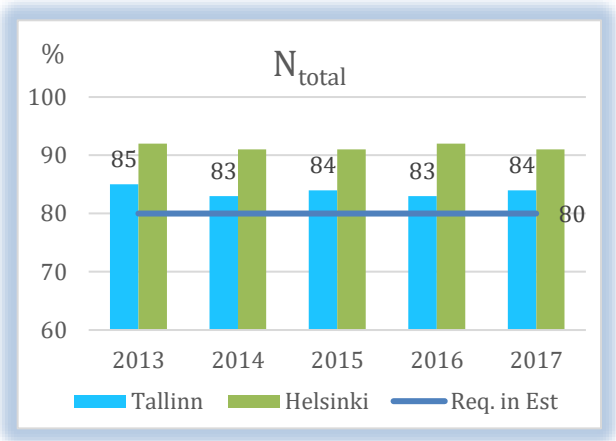
In 2017, the outgoing sewage water from wastewater treatment plant parameters for all wastewater treatment plants were met, as well as purification efficiency and, in summary, the wastewater treatment results were largely in the same magnitude compared to the previous year.

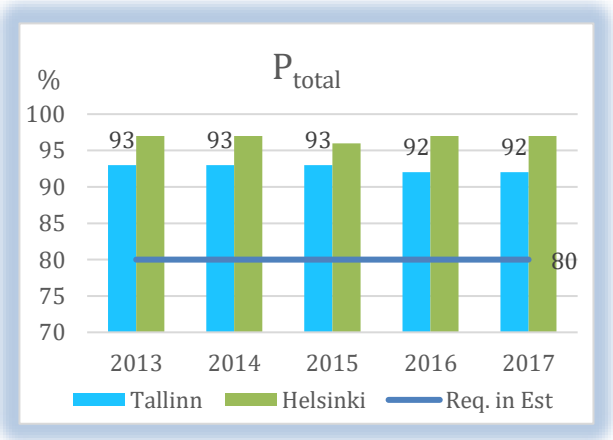
Ghart 4: Wastewater treatment plant's treatment efficiency in 2013-2017, compared to regulatory minimum requirements and results of Helsinki HSY, %

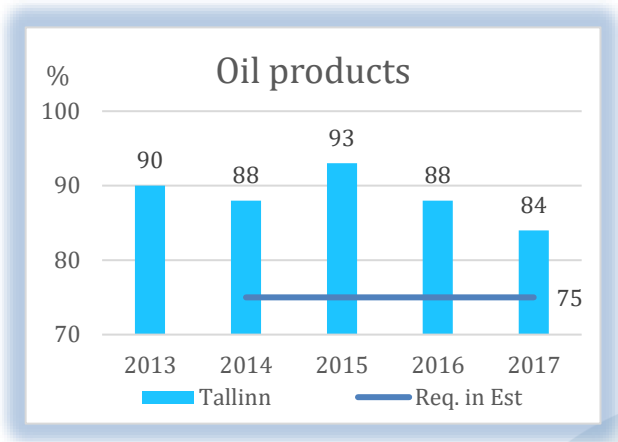












Wastewater outlets to the sea

During 2017, we were bound to open the emergency outlets in the wastewater treatment plant four times for a short period of time during heavy showers, in order to avoid any major damages. Total of 111,309 m^3 of wastewater diluted by storm water (dilution ¼) was conducted to the sea.

Due to the shock loads which exceeded the biological treatment capacity, 897,108 m^3 of highly diluted wastewater that had undergone mechanical treatment was discharged into the sea through the deep-sea outlet in 2017.

Table 15: WASTEWATER TREATMENT PLANT OVERFLOWS IN 2013-2017, th. m3/year

	2013	2014	2015	2016	2017
Untreated wastewater discharged to the sea	380	1,3	45,0	122,7	111,3
Partly ytrated wastewater discharged to the sea	200	225	317	584	897

Pollution charges

As a water company we are required to act in line with the environmental permits and pay pollution charge with the aim to prevent and reduce the potential damage caused by pollutants or waste discharged to the environment.

The calculation of pollution charge is established in the permit for a special use of water and the Environmental Charges Act, and is applied to the pollutants contained in the effluent and storm water at the particular outlets. Both the receiving water coefficient of the specific outlet, as well as compliance with the pollutant limit value in effluent are taken into account in pollution charge calculations. In 2017, the pollution charge paid for discharging pollutants into receiving waters formed 4.3% of the cost of services sold (2016: 4.2%).

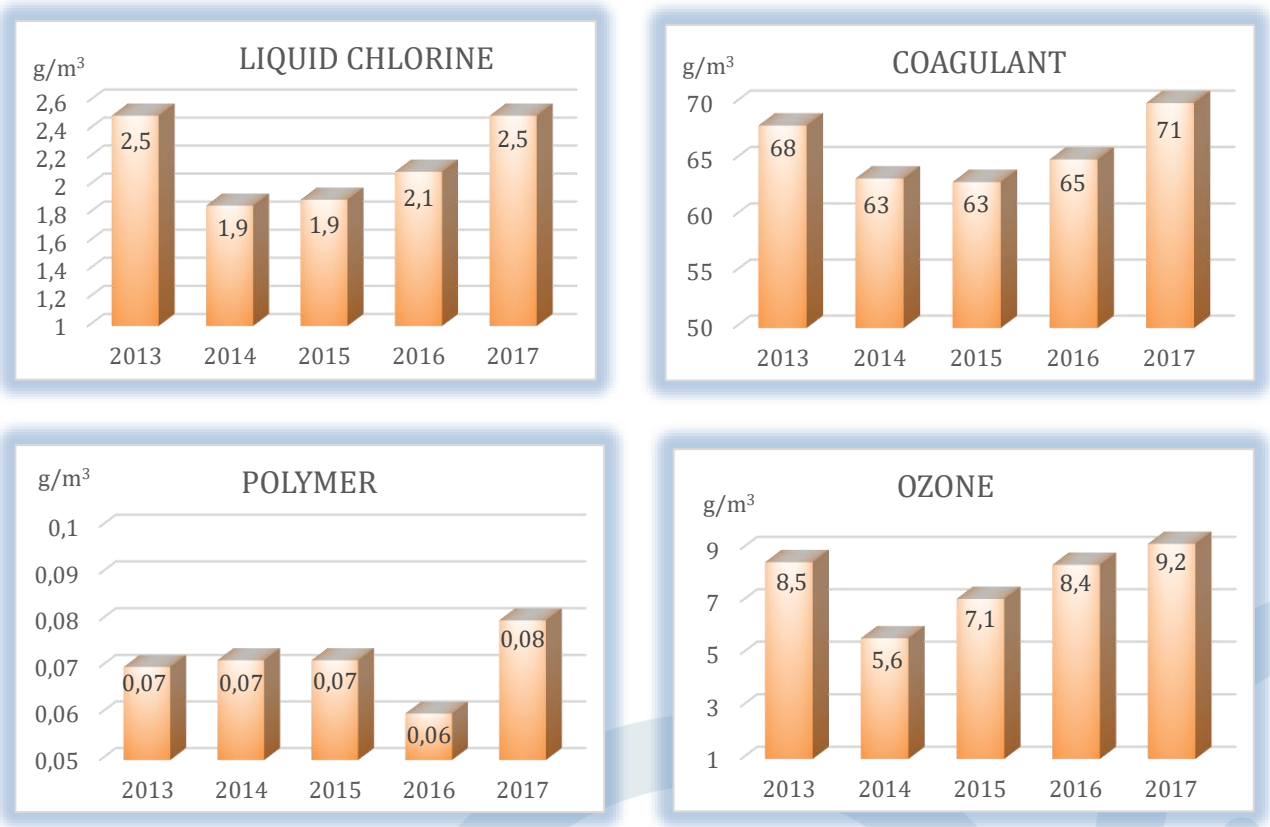
Use of Chemicals

With regard to the health and wellbeing of our employees we deem a safe handling of chemicals at the work site extremely important For this purpose, we have created necessary conditions for a safe storage and use of all chemicals. In 2017, we used about 5,620 tons of vairous chemicals (2016: about 5,540 tons), but no reported accidents with chemicals occurred, which could have caused damage to people or the environment.

Use of water treatment chemicals

- Chlorine is an effective disinfecting chemical with a long-term aftereffect. The Regulation No 82 issued by the Minister of Social Affairs "Drinking Water Quality and Testing Requirements, and Analysis Methods" (dated 31.07.2001) specifies the content of chlorine added to the drinking water produced out of surface water to be in the range 0.2 – 0.5 mg/l. We add chlorine in the final stage of the water treatment process to ensure the microbiological purity of water and to help to maintain the water quality in the city's water distribution network. Chlorine has a strong oxidising effect and is extremely poisonous for aquatic microorganisms. In Estonia, we have been classified as a category B company with risk of a major accident due to the chlorine stored at the plant and used in the water treatment process. By applying the necessary safety measures we have minimized the likelihood of chlorine accidents.
- Ozone is a good and quick oxidiser, which effectively breaks down organic matter and microorganisms in raw water and improves the coulour of the water. Ozone is produced locally in the plants from the ambient air and only in necessary quanities. Thanks to the closed process and the absence of stock reserve the environmental risk is taken to minimum.
- Coagulants and polymers are chemicals that are used in significant amounts in liquid form. These chemicals are added in the treatment to remove the particular matter (e.g. suspended solids and organic substance) from water.

Ghart 5: Average use of water treatment chemicals per unit of production in 2013-2017, g/m3



Water quality in Ülemiste Lake is strongly dependent on the weather. However, long-term observation patterns show periodic changes of water quality also over the years. In 2017 the raw water parameters were also poor compared to 2016, which also affected and increased the consumption of chemicals in the water treatment plant.

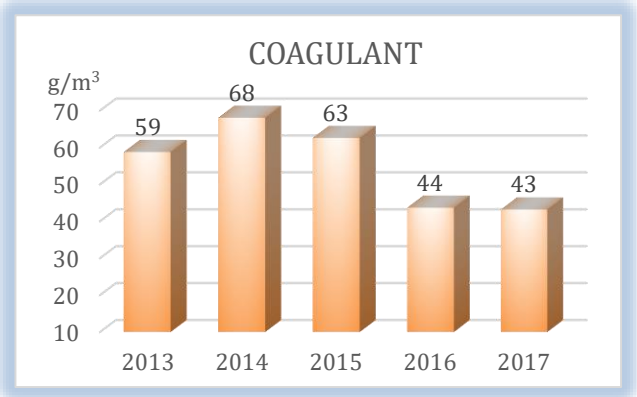
Use of wastewater treatment chemicals

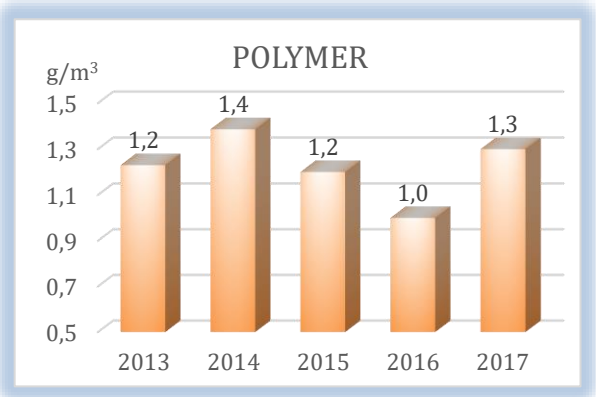
- Methanol - We use methanol at the wastewater treatment plant to increase the nitrogen removal efficiency of the bacteria participating in the biological treatment process. Due to the extremely explosive methanol used in the wastewater treatment, we have been classified as one of the most hazardous companies in Estonia.
- Coagulants and polymers are used in large amounts in the wastewater treatment process. Coagulants are used for the chemical processing of wastewater to remove phosphorus. Polymers are used to change the qualities of sludge by accelerating the dewatering process.

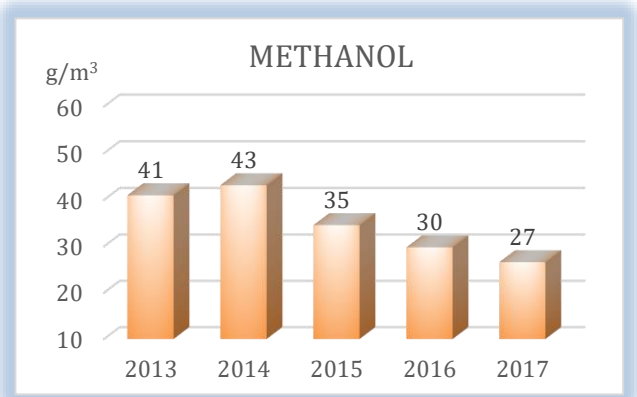
The amount of chemicals used in the wastewater treatment process is dependent on the pollution levels of incoming wastewater, which in turn is affected by the weather. The higher the concentration of pollutants in incoming wastewater and the lower the regulatory limits for pollutants in the treated effluent, the higher is the volume of chemicals used in the wastewater treatment process.

In 2017 the use of chemicals for wastewater treatment (methanol and coagulants) was slightly smaller than in 2016.

Ghart 6: Average use of wastewater treatment chemicals per unit of production in 2013-2017, g/m3







The use of polymer depends on the quantities of dry solids and sludge to be treated. In 2017 slightly more polymer was used compared to 2016. More polymer was needed because in 2017 wastewater amounts were bigger and thus the amount of sludge was bigger.

Waste Management

Waste generation

A total of 48,248 tons of waste was generated in the Company in 2017. The majority of waste is made up by the sludge, which is a by-product of the wastewater treatment process.

Table 16: TYPES AND AMOUNTS OF MAIN WASTE IN 2013-2017, t

Type of waste	2013	2014	2015	2016	2017
Mixed municipal waste	97	93	67	90	110,0
Paper and cardboard *	4	6	5	5	3,3
Packages paper and cardboard *	0,7	0,5	0,6	0,7	0,9
Biodegradable waste *	5	7	7	7	6,5
Waste from screens	984	1085	615	651	961
Wastewater sludge *	27 220	32 109	31 974	31 741	35481
Sandtraps grid	422	142	0	161	141
Excavated stones and soil *	13 341	10 882	11 235	11 354	10630
Asphalt waste	869	1 190	1 548	1 181	812
Mixed building waste	47	84	40	81	0
Concrete and bricks	53	62	274	77	35
Metal scrap *	14,0	44,8	68	34	61
Hazardous waste	0,0	3	2,4	3,6	4,5
Other waste	79	2	9	15	2,2
Total	***43 135***	***45 711***	***45 844***	***45 401***	***48 248***

* - possible to reuse

Although the sludge generated in the wastewater treatment process forms large part of our waste, in 2017 we recycle all the sludge through our sludge treatment process. Sludge stabilization process (anaerobic fermentation of sludge in methane tanks) produces biogas used for heat generation both for heating and for technological process. We analyse planting soil from raw sludge at least four times a year according to the requirements set in the Decree No 78, issued by the Minister of Environment on 30.12.2002. All the results of the sludge analyses were public and displayed on the Company's webpage during the period of issuing landscaping soil.

In addition to sludge, the wastewater treatment process produces significant amount of other types of waste, such as waste from screens, which is disposed to our waste handling partner. The volume of waste generated within the wastewater treatment process is directly affected by the volume of incoming wastewater, the weather and the efficiency of the City cleaning services. However, people also have an important role to play here as they can avoid throwing waste and hazardous substances into the wastewater system.

Excavated soil, stones and asphalt waste account for the majority of waste resulting from the networks maintenance and repair works. The volume of waste from construction and excavation works is again dependent on the volume of works. However, since 2013, we have been performing most of the network reconstruction works using the so-called no-dig closed method, which allows carrying the works out faster and reduces the inconveniences caused by traffic jams during the road works.

We collect and sort the other types of waste, which have a smaller share in the total waste volume, and hand them over to the waste handling company. We separate paper and cardboard, biodegradable waste, hazardous waste, metal and mixed municipal waste.

Waste permits and sludge

The Company has two waste permits, issued to manage the sludge produced in the wastewater treatment process. The permits establish technical and environmental requirements for the waste handling process.

Table 17: VALID WASTE PERMITS ISSUED TO AS TALLINNA VESI 31.12.2017

Permits	Valid until	Description of waste permit
Waste permit No. L.JÄ/325362	*	Issued for recycling waste at Paljassaare, procedure code R3o - recycling
Waste permit No. L.JÄ/325737	Kuni: 18.06.2020	Issued for recycling waste in Liikva, procedure code R12o – biological treatment preceding the recycling of waste

* Valid until a court decision to be made in the administrative case no 3-14-52374 takes effect or the currently applied interim injunction is amended or terminated.

In 2017, 35,481 tons of stabilized sewage sludge was removed from the wastewater technological treatment process, which was transferred to the composting field fo the purpose of producing so-called landscaping soil (mixing with milling peat and aerobic fermentation). In 2017, 32,645 tons of soil for greenery was given to people for free.

Although a waste permit was issued also for Liikva composting field, since 2014, no sludge has been recycled in Liikva because the new permit does not allow recycling.

Table 18: AMOUNTS OF SEWAGE SLUDGE AND LANDSCAPING SOIL IN 2015-2017, t/y

Type of waste	Quantities		
	2015	2016	2017
Waste permit L.JÄ/325362 (Paljassaare)			
Stabilised sewage sludge separated from the wastewater treatment process	31 974	31 741	35 481
Issued landscaping soil (reuse of sewage sludge)	38 285	39 073	32 645

Energy Consumption

Electricity consumpiton

The majority of electricity is used to run the Company's core processes – to operate the water treatment plant, wastewater treatment plant and pumping stations on the network.

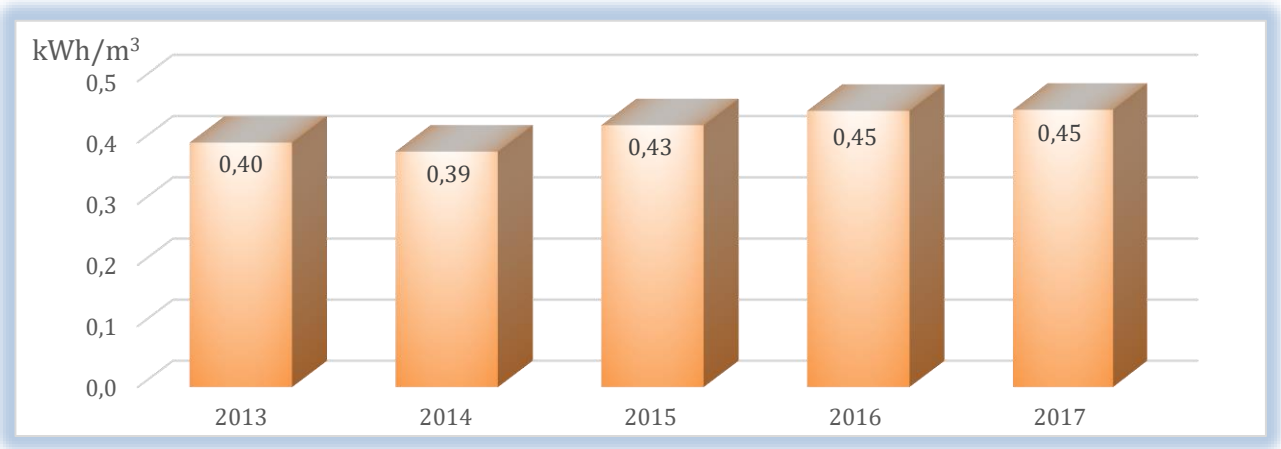
Although we have been making significant investments aimed at decreasing electricity consumption, the energy consumption is still inevitably and closely connected to the operation of our core processes. Those are in turn affected by changes in consumption and in service areas, also by the weather conditions.

Table 19: ELECTRICITY CONSUMPTION IN 2013-2017, MWh

Unit	2013	2014	2015	2016	2017
Water Treatment	9 705	8 709	9 746	10 721	10 755
Wastewater Treatment	22 336	21 295	21 617	22 516	23 000
Networks pumping stations, incl. Maardu	6 838	6 409	6 346	6 841	7 094
Other	830	776	757	710	693
Total	***39 709***	***37 188***	***38 465***	***40 787***	***41 543***

Although the total consumption of electricity in 2016 was slightly higher than in 2015, it has been quite stable over the few last years. Increase in the use of electricity last year was mainly induced by higher wastewater volumes and lower raw water quality in Lake Ülemiste.

Ghart 7: Electricity consumption per unit producted at the water treatment plant in 2012-2016, kWh/m³



Electricity consumption in the water treatment plant has been increasing year-on-year along with the growing use of surface water. A significant proportion of the electricity consumption in the water treatment plant is used to produce ozone. Both the higher doses of ozone and increased electricity consumption in 2017 were brought along by lower quality of raw water in Lake Ülemiste.

Ghart 8: Electricity consumption per unit producted at wastewater treatment plant in 2013-2017, kWh/m³

Consumption of electricity in the wastewater treatment process depends largely on the weather, as it is mainly used to pump wastewater and to produce air i.e. to aerate the activated sludge in the biological treatment stage. During the years 2012-2015 the aeration tanks were reconstructed in stages, which resulted in the replacement of the membranes of aerators in all aeration tanks and installation of new dissolved oxygen sensors in the aeration tanks. This allows saving electricity in producing the air.

Consumption of heat energy

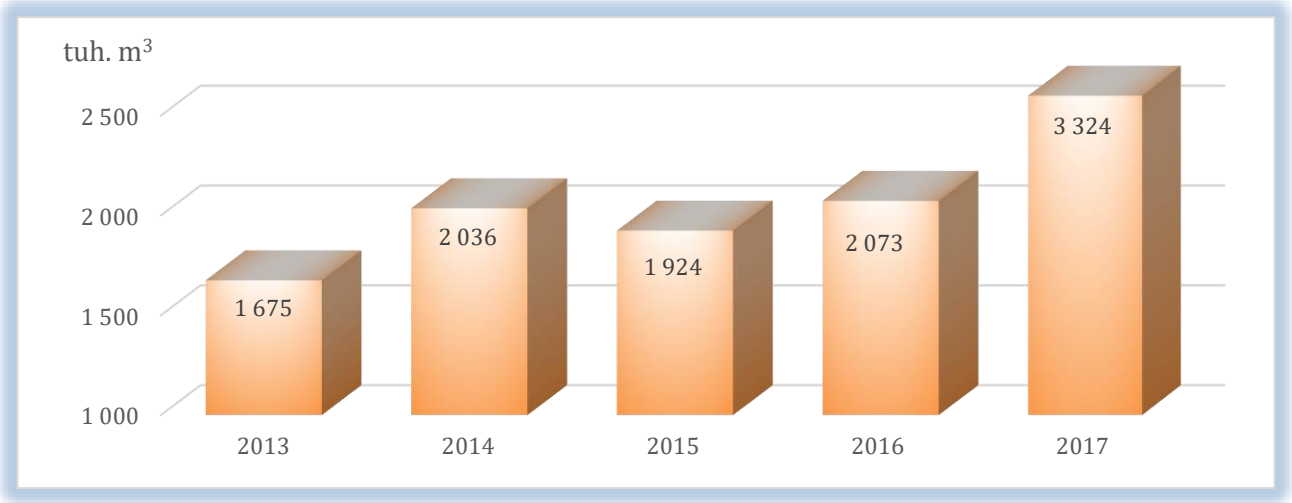
In addition to heating the premises we need heat energy to run the core processes. The water treatment plant produces heat out of outsourced natural gas in its boiler house. Ädala site uses central heating also produced out of natural gas in our area. The majority of the wastewater treatment plant's needs for heat energy is covered by biogas.

Table 20: CONSUMPTION OF HEAT ENERGY 2013-2017, MWh

Unit	2013	2014	2015	2016	2017
Water Treatment	4 111	3 978	3 540	3 224	3 022
Wastewater Treatment	7 310	8 989	9 446	9 281	7 298
Incl. Heat energy from biogas	7 310	8 977	9 446	9 272	7 223
Ädala office	1 049	1 164	920	1 100	1 044
TOTAL	***12 470***	***14 131***	***13 906***	***13 605***	***11 364***

We produce biogas at the wastewater treatment plant within the process of digesting sludge in the digesters. Biogas is used to produce heat energy on site, which is then used for heating the premises at the wastewater treatment plant and for operating the core processes. Due to the nature of biogas production from time to time we are bound to burn some of the biogas and to use some natural gas as well. In 2017, we used 48% of the total volume of biogas to produce heat energy (71% in 2015) and it accounts for 63% of the total heat energy consumed in 2017 (2016: 63%).

Ghart 9: Biogas production in 2013-2017, tuh m3



Measured biogas volumes have increased significantly since in 2017 a new biogas flow meter was installed at the waste water treatment plant.

Transportation and fuel consumption

Road transport accounts for the biggest part of our need for transportation. The Company has 88 vehicles for carrying out different operating tasks and for driving between the company locations and numerous service sites. The biggest group of vehicles is cars and operating vehicles, including minivans and team vans. We have a total of 75 cars and operating vehicles and a total of 14 special purpose vehicles (such as tractors, loaders, excavators, jet washing trucks etc.).

Table 21: NUMBER OF VEHICLES AND FUEL CONSUMPTION IN 2013-2017

	2013	2014	2015	2016	2017
Total number of vehicles, pcs.	95	93	94	95	88
Petrol, l	71 095	70 075	65 962	63 289	56 759
Diesel, l	135 738	122 456	115 485	113 622	104 719
Total fuel, l	**206 833**	**192 531**	**181 447**	**176 911**	**161 478**

Due to the decrease in the number of vehicles in 2017, the cost of the whole fuel has also decreased. We continuously try to keep the fuel consumption under control through the fuel limits set on the car users and through GPS-tracking devices. Some of the cars are being shared between employees, which means that all authorised employees are able to use the cars to deliver their work duties. This enables the Company to cut down the costs and save natural resources.

The number of business trips made by our staff in and outside Estonia is relatively low. In planning the travel routes we follow the principle of always choosing the most advantageous option. The most frequent destinations of business trips outside Estonia are the United Kingdom and Finland, to where our staff usually travels by plane and by boat respectively. Other means of transport (e.g. bus and train) are used very little.

Air Emission

AS Tallinna Vesi has been issued two ambient air pollution permist. In order to reduce any potential air pollution, the Company focuses on limiting the amount of pollutants emitted from Ülemiste and Paljassaare boiler houses, particularly the pollutants of primary importance, such as nitrogen dioxide, carbon monoxide and volatile organic compounds, as well as CO_2 greenhouse gas emissions. Also the emissions of ozone produced for drinking water treatment are regulated. The Company pays a pollution charge for pollutants emitted into ambient air.

Table 22: VALID AIR POLLUTION PERMITS OF AS TALLINNA VESI

Permit	Valid until	Description of ambient air pollution permit
Pollution permit NO. L.ÕV.HA 48701	termless	Valid for Paljassaare wastewater treatment plant pollution sources - the chimney of the boiler house, exhaust pipes, the chimney of the combined heat plant. Establishes the list of pollutants emitted into ambient air and the annual permitted emission amounts thereof.
Pollution permit NO. L.ÕV/319438	termless	Valid for Ülemiste water treatment plant pollution sources - the chimney of the boiler house, ozonisation, diesel generator. Establishes the list of pollutants emitted into ambient air and the annual permitted emission amounts therof.

Table 23: AMBIENT AIR POLLUTION FROM WATER TREATMENT PLANT POLLUTION SOURCES IN 2013-2017, t

Pollutant	Limit	2013	2014	2015	2016	2017
Nitrogen dioxide	1,954	1,11	1,1	1,01	0,829	0,78
Carbon monoxide	1,846	0,98	0,97	0,88	0,761	0,712
Volatile organic compounds	0,125	0,07	0,07	0,06	0,052	0,049
Carbon dioxide	1688	880	868	787	692	647
Sulphur dioxide	0	0,001*	0,001*	0,001*	0,001*	0,001
Total solid particles	0,004	0,004	0,004	0,004	0,003	0,003

* Sulphur dioxide pollution below the limit

Table 24: AMBIENT AIR POLLUTION FROM WASTEWATER TREATMENT PLANT POLLUTIO SOURCES IN 2013-2017, t

Pollutant	Limit	2013	2014	2015	2016	2017
Nitrogen dioxide	29,8	2,3	2,7	2,6	2,8	4,7
Carbon monoxide	210	2,3	2,7	2,6	2,8	4,7
Volatile organic compounds	14	0,2	0,2	0,2	0,2	0,3
Carbon dioxide	4440	2039	2477	2341	2523	4045
Sulphur dioxide	17,8	17	16,8	17,2	17,5	17,5

Emissions from both Ülemiste water treatment plant and Paljassaare wastewater treatment plant have been relatively low and remained stable throughout the years. The võlume of biogas has increased signifivantly in connection with the changeover of flow meter, as well as the amount of emissions in wastewater treamtent plants in 2017.

Environmental Performance

In addition to the data on ecological footprint and as set out by the requirements of EMAS, we outline below our main indicators of the environmental performance regarding energy efficiency, material efficiency, water, waste, biological diversity and emissions. Three elements have been presented for each main indicator:

• Figure A, which stands for the total annual input/impact in the respective area.

• Figure B, which stands for the total gross sale revenue of the organization in millions of euros.
In table 25 figure B shows the organization's and subsidiary Watercom OÜ consolitaed annual gross sales revenue. In 2017 the organization's annual consolidated gross sales revenue 55.4 million euros and the annual gross sales revenue of Watercom OÜ 4.4 million euros were taken separately. In 2016 the same data calculated separately was equivalent to 54.4 and 4.6 million euros.

• Figure R, which stands for the ratio A/B.

Table 25: ENVIRONMENTAL PERFORMANCE IN 2016-2017

Main indicators of environmental perfomance	Year	Consumption (rounded) i.e. annual input (figure A)	Annual output of the Company (figuure B)	Ratio R (A/B)
Electrycity				
Electric power produced from oil shale, MWh	2017	41 543	59,8	695
	2016	40 787	59,0	692
Heat				
Heat produced from natural gas, MWh	2017	3 989	59,8	67
	2016	4 150	59,0	70
Thermal energy produced from biogas, MWh	2017	7 223	59,8	121
	2016	9 272	59,0	157
Handling chemicals				
Liquid chlorine, t	2017	60	59,8	1,0
	2016	51	59,0	0,9
Coagulantt, t	2017	3 905	59,8	65,3
	2016	3 738	59,0	63
Polymer, t	2017	68	59,8	1,1
	2016	53	59,0	0,9
Ozone, t	2017	218	59,8	3,6
	2016	200	59,0	3,4
Methanol, t	2017	1 369	59,8	23
	2016	1 497	59,0	25
Water				
Water for own consumption, th. m^3	2017	1 858 413	59,8	31 069
	2016	1 878 410	59,0	31 847
Surface water, th. m^3	2017	23 716	59,8	396
	2016	23 734	59,0	402
Ground water, th. m^3	2017	2 711	59,8	45
	2016	2 763	59,0	47
Effluent, th. m^3	2017	51 487	59,8	861
	2016	50 216	59,0	851
Waste				
Mixed municipal waste, t	2017	110	59,8	1,8
	2016	90	59,0	1,5

Recycled paper and cardboard, t	2017	3	59,8	0,1
	2016	5	59,0	0,1
Recycled packages, t	2017	0,9	59,8	0,02
	2016	0,7	59,0	0,01
Recycled biodegradable waste, t	2017	6,5	59,8	0,1
	2016	7	59,0	0,1
Waste from screens, t	2017	961	59,8	16
	2016	651	59,0	11
Recycled sludge, t	2017	35 481	59,8	593
	2016	31 741	59,0	538
Sandtraps grid, t	2017	141	59,8	2,4
	2016	161	59,0	2,7
Recycled excavated stones and soil, t	2017	10 630	59,8	178
	2016	11 354	59,0	192
Asphalt waste, t	2017	812	59,8	14
	2016	1 181	59,0	20
Mixed building waste, t	2017	0	59,8	0,0
	2016	81	59,0	1,4
Concrete and bricks, t	2017	35	59,8	0,6
	2016	77	59,0	1,3
Recycled metal, t	2017	61	59,8	1,0
	2016	34	59,0	0,6
Hazardous waste, t	2017	5	59,8	0,1
	2016	4	59,0	0,1
Other, t	2017	2	59,8	0,0
	2016	15	59,0	0,3
Biological diversity				
Land use, land carrying buildings*, m^2	2017	679 090	59,8	11353
	2016	678 135	59,0	11497
Emissions				
Nitrogen dioxide, t	2017	5,5	59,8	0,1
	2016	3,6	59,0	0,1
Carbon monoxide, t	2017	5,4	59,8	0,1
	2016	3,6	59,0	0,1
Volatile organic compounds, t	2017	0,4	59,8	0,007
	2016	0,3	59,0	0,005
Carbon dioxide, t	2017	4 692	59,8	78
	2016	3 215	59,0	55
Sulphur dioxide, t	2017	0,001	59,8	0,00002
	2016	0,001	59,0	0,00002
Total solid particles, t	2017	0,003	59,8	0,0001
	2016	0,003	59,0	0,0001
Hydrpgen sulphide, t	2017	18	59,8	0,3
	2016	18	59,0	0,3
Environmental education				
Number of children participatind in the discussion circles, pc	2017	1371	59,8	23
	2016	1553	59,0	26

*From 2016 land use is described as the total area under the buildings on Company's properties (Estonian Land Board data)

EMAS Verification

Having examined the environmental management system and the information provided in the 2017 environmental report of AS Tallinna Vesi, AS Metrosert as an accredited verifier EE-V-0001 certified that the information and data presented in the organisation's environmental report was reliable and adequate and complied with the requirements of the Regulation No 1221/2009 (on the voluntary participation of organisations in a Community eco-management and audit scheme (EMAS)) of the European Parliament and of the Council dated 25th November 2009.

The environmental report was verified on 17th May 2018.

Andres Martma

EMAS verifier

Metrosert AS

www.metrosert.ee

Appendix 1: Drinking water quality in Ülemiste water treatment plant in 2017

Parameter		Min	Max	Average	Act nr 82, 31.07.2001	EU directive 98/83/EC
Temperature	°C	1,0	21,5	9,5		
Odour	points	1	1	1	Acceptable to consumer	Acceptable to consumer
Taste	points	1	1	1	Acceptable to consumer	Acceptable to consumer
Turbidity	NTU	<0,06	0,34	0,13	1	1
Color	mg/l Pt	<3	3	<3	Acceptable to consumer	Acceptable to consumer
Dry reisude	mg/l	238	281	260		
pH	pH unit	7,08	7,43	7,25	≥6,5 and ≤9,5	≥6,5 and ≤9,5
Conductivity, 20 °C	µS/cm	347	424	381	2500	2500
Alkalinity	mg-ekv/l	2,36	3,18	2,74		
Total hardness	mg-ekv/l	3,49	4,38	3,88		
Permanganate index (COD_{Mn})	mg O2/l	2,92	3,86	3,49	5	5
Total organic carbon	mg/l	5,6	6,5	6,1	Without unusual changes	Without unusual changes
Dissolved Oxygen	mg/l	5,8	15,4	10,6		
Dissolved Oxygen	saturation %	66	112	91		
Free CO2	mg/l	11	25	17		
Carbonates, CO32-	mg/l	0	0	0		
Bicarbonates, HCO3-	mg/l	149	191	169		
Chlorides, Cl-	mg/l	28	31	30	250	250
Sulphates, SO42-	mg/l	22	31	26	250	250
Orthophosphates, PO43-	mg/l	<0,02	<0,02	<0,02		
Fluoride, F-	mg/l	0,08	0,12	0,10	1,5	1,5
Nitrates, NO3-	mg/l	<1	5,7	3,4	50	50
Nitrites, NO2-	mg/l	<0,003	<0,003	<0,003	0,5	0,5
Ammonium, NH4+	mg/l	<0,006	0,010	<0,006	0,5	0,5
Sulphides, S2-	mg/l	<0,004	0,010	<0,004		
Cyanide, CN-	µg/l	<2	<2	<2	50	50
Calcium, Ca2+	mg/l	57	74	65		
Magnesium, Mg2+	mg/l	7	8	8		
Iron, Fe	µg/l	<20	<20	<20	200	200
Manganese, Mn	µg/l	1,3	17,8	4,9	50	50
Aluminium, Al	µg/l	60	244	125	200	200
Boron, B	µg/l	11,6	16,6	14,3	1000	1000
Sodium, Na	mg/l	6,79	8,12	7,50	200	200
Potassium, K	mg/l	2,55	3,02	2,72		
Barium, Ba	µg/l	34,0	43,1	39,1		
Strontium, Sr	µg/l	84,6	96,2	89,6		
Arsenic, As	µg/l	0,30	0,51	0,41	10	10
Beryllium, Be	µg/l	<0,02	<0,02	<0,02		
Cadmium, Cd	µg/l	<0,02	<0,02	<0,02	5	5
Cobalt, Co	µg/l	0,03	0,06	0,05		
Chromium, Cr	µg/l	0,46	0,82	0,58	50	50
Copper, Cu	µg/l	0,37	2,7	1,5	2000	2000

Parameter		Min	Max	Average	Act nr 82, 31.07.2001	EU directive 98/83/EC
Mercury, Hg	µg/l	<0,1	<0,1	<0,1	1	1
Molybdenum, Mo	µg/l	0,37	0,46	0,43		
Nickel, Ni	µg/l	0,23	0,40	0,32	20	20
Lead, Pb	µg/l	<0,02	0,13	0,06	10	10
Antimon, Sb	µg/l	0,07	0,11	0,09	5	5
Selenium, Se	µg/l	<0,7	<0,7	<0,7	10	10
Zinc, Zn	µg/l	0,33	2,2	1,1		
Vanadium, V	µg/l	0,17	0,30	0,23		
Thallium, Tl	µg/l	<0,01	<0,01	<0,01		
Uranium, U	µg/l	0,47	0,75	0,61		
Acrylamide	µg/l	0,012	0,019	0,015	0,1	0,1
Chloroform	µg/l	10	30	18		
Bromodichloromethane	µg/l	2,4	8,2	4,5		
Dibromocloromethane	µg/l	0,50	3,30	1,35		
Bromoform	µg/l	<0,2	0,2	<0,2		
THM	µg/l	15	34	23	100	100
1,2-dichloroethane	µg/l	<0,2	<0,2	<0,2	3	3
Trichloroethene	µg/l	<0,3	<0,3	<0,3		
Tetrachloroethene	µg/l	<0,2	<0,2	<0,2		
Tetrachloroethene and trichloroethene (sum)	µg/l	0	0	0	10	10
Benzene	µg/l	<0,2	<0,2	<0,2	1	1
Benzo(a)pyrene	µg/l	<0,00017	0,0010	<0,00017	0,01	0,01
PAHs(polycyclic aromatic hydrocarbons) sum	µg/l	0	0	0	0,1	0,1
Pesticides (sum)	µg/l	0	0	0	0,5	0,5
Enterococci	CFU/100 ml	0	0	0	0	0
No of colony forming units at 22^{0}C	CFU/ml	0	2	0	Without unusual changes	Without unusual changes
Coliform bacteria	CFU/100 ml	0	0	0	0	0
Escherichia coli	CFU/100 ml	0	0	0	0	0
Clostridium perfringens	CFU/100 ml	0	0	0	0	0
Residual Chlorine (free chlorine)	mg/l	0,21	0,50	0,35	≥0,2 ja ≤0,5	
Bromate	µg/l	<5	<10	<10	10	10
UV-abs	AU/cm	0,048	0,082	0,062		

Appendix 2: Ground water quality in 2017

Parameter	Unit	Average results					Decree no 82, EU directive 98/83/EC
		Nõmme	Merivälja	Tiskre	Saue	Pillado	
Odour	points	1	1	1	1	1	Acceptable to consumer
Taste	points	1	1	1	1	1	Acceptable to consumer
Colour	mg Pt/l	<3	8	<3	<3	<3	Acceptable to consumer
Turbidity	NTU	0,29	0,40	0,74	0,37	1,45	Acceptable to consumer
Lahustunud O_2	mg/l	5,4	7,0	5,8	6,8	3,85	
pH	pH unit	7,96	7,88	7,88	7,93	8,15	>6,5 and <9,5
Conductivity	µS/cm	524	598	837	560	406	2500
Alkanity	mg-ekv/l	2,44	3,55	2,03	2,34	1,97	
Total hardness	mg-ekv/l	3,00	4,43	4,50	2,81	2,40	
Transient hardness	mg-ekv/l	2,43	3,50	2,03	2,27	1,97	
Overall hardness	mg-ekv/l	0,57	0,93	2,48	0,54	0,44	
Permanganate index (COD_{Mn})	mgO_2/l	<0,5	1,2	0,54	<0,5*	0,71	5
Free Carbon dioxide	mg/l	3	6	4	4	2	
Total iron, Fe	µg/l	<20	63	45	42	147	200
Fluoride, F^-	mg/l	0,61	0,45	0,77	0,67*	0,71	1,5
Chloride, Cl^-	mg/l	76	76	170	85*	45	250
Manganese, Mn	µg/l	<8	20	14	10	40	50
Ammonium, $NH4^+$	mg/l	0,088	0,270	0,038	0,088	0,177	0,5
Nitrite, NO_2	mg/l	0,005	0,014	0,009	0,011	<0,003	0,5
Nitrate, NO_3	mg/l	<1	1,3	<1	<1	<1	50
Stability index		0,05	0,31	0,07	-0,018	0,05	
Total organic carbon, TOC	mg/l	0,60	2,80	0,40	0,29*	0,23	Without unusual changes
Sulfide, S^{2-}	mg/l	<0,004	0,008	<0,004	<0,004	<0,004	
Sulfate, SO_4^{2-}	mg/l	24	4,5	27	16*	31	250
Hydrocarbonate, HCO_3^-	mg/l	149	217	124	142	120	
Calcium, Ca^{2+}	mg/l	41	65	68	39	31	
Magnesium, Mg^{2+}	mg/l	12,6	13,4	15,4	10,5*	11,0	
Dry residue	mg/l	297	346	482	282*	218	
Sodium, Na^+	mg/l	39,7	30,8	68,8	52,5*	29,8	200
Potassium, K^+	mg/l	6,76	6,3	9,27	7,33*	7,68	
Boron	µg/l	184	77,4	116	263*	215	1000
Aluminium	µg/l	2,05	2,52	1,20	2*	<0,5	200
Arsenis	µg/l	<0,1	<0,1	<0,1	<0,1*	<0,1	10
Cadmium	µg/l	<0,02	<0,02	<0,02	<0,02*	<0,02	5

Chromium	µg/l	0,49	0,84	0,61	0,65*	0,44	50
Copper	µg/l	1,27	7,46	3,0	<0,2*	0,80	2000
Mercury	µg/l	<0,1	<0,1	<0,1	<0,1*	<0,1	1
Nickel	µg/l	0,41	0,52	0,22	<0,2*	0,31	20
Lead	µg/l	0,071	0,077	0,82	0,12*	0,16	10
Antimony	µg/l	<0,02	<0,02	<0,02	<0,02*	<0,02	5
Selenium	µg/l	<0,7	<0,7	<0,7	<0,7*	<0,7	10
Beryllium	µg/l	<0,02	<0,02	<0,02	<0,02*	<0,02	
Barium	µg/l	182	83,0	44	219*	44	
Coliform bacteria	CFU/100ml	0	0	0	0	0	0
Escherichia_coli	CFU/100ml	0	0	0	0	0	0
Enterococci	CFU/100ml	0	0	0	0	0	0
No of colony forming units at 22^0C	CFU/ml	5	4	3	14	7	Without unusual changes
Effective dose	mSv per year	0,23	0,27	0,026	0,21	0,07	0,1

* The parameter was analyzed in 2015