Pipe World

The Uponor Infra customer magazine › issue 2/2021

Blue is the new green

uponor Ultra Rib 2 Blue

Having a ‘green’ product is not enough.

Ultra Rib 2 Blue is the first plastic gravity sewer pipe with up to 70% reduction in carbon footprint. Based on renewable raw material, and with the same quality and performance than the traditional Ultra Rib 2.

With Uponor Blue, you can be confident of acquiring a truly sustainable product that will help you reduce your environmental impact.

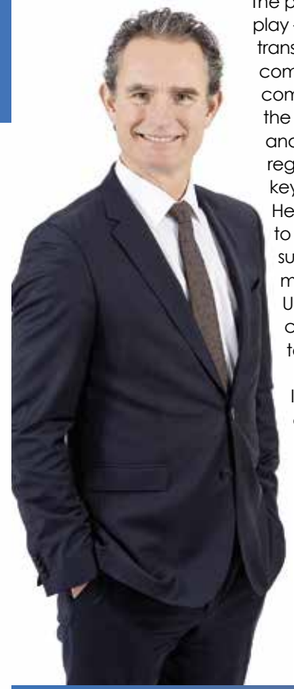
Blue is the new green with Ultra Rib 2 Blue.

uponor | Moving > Forward

Dear reader,

World leaders recently gathered in Glasgow, Scotland for the 2021 United Nations Climate Change Conference. The main topic of the conference was how to limit global warming to 1.5 °C. Achieving this requires decisive and urgent action at all levels of the private and public sectors.

As a frontrunner, Uponor has committed to the Science Based Target initiative to make its ambitious contribution to limiting the global temperature rise to 1.5 °C. In addition, we will continue to introduce more products and solutions that help our customers reduce their CO_2 emissions and ensure a more sustainable built environment and infrastructure. One example of this is the new innovative Ultra Rib 2 Blue sewer pipe, with an up to 70% smaller carbon footprint. You can read more about this sustainable product on page 6.



The private sector has a crucial role to play – every sector in every market must transform itself. However, the actions of companies alone will not be sufficient to combat climate change. In our industry, the purchasing criteria used by national and local governments and utilities regarding underground infrastructure are key to driving the sustainability agenda. Here in Northern Europe, we have yet to see broad-based implementation of sustainability as a significant decision-making criterion in public investments. Until this changes, public infrastructure construction will only take limited steps towards a more sustainable future.

I call upon all my industry colleagues as well as decision-makers at the national and local level to ensure that more sustainable solutions are made available to the market, and to implement sustainability-related criteria as key elements of future investments.

Sebastian Bondestam
President, Uponor Infra

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PROJECT FACTS

- **Project:** New culvert in the Fifalla River
- **Location:** Valdemarsvik in southern Sweden
- **Product:** Weholite (1,400mm diameter)
- **Customer:** Valdemarsvik Municipality
- **Contractor:** Svevia
- **Field service:** Uponor Infra 360° Project Services

A new culvert as a turnkey solution

THE FIFALLA RIVER, flowing through Valdemarsvik Municipality into the Valdemars Bay in southern Sweden, was culverted in 1960. At the end of the 19th century, a local leather factory had been built over the river at its outlet. When the factory was closed in 1960, the culvert was installed under the main street, all the way up to the factory building.

The culvert was made of galvanised sheet metal and had a life expectancy of 50 years. It had already exceeded its lifespan when a drainage hole appeared in the town hall's parking lot a couple of years ago.

Over the years, numerous wires and cables had been installed on top of the old culvert, so it was a matter of getting the new culvert under these. Also, the old culvert consisted of two halves joined together with bolts and nuts that all had to be unscrewed – over 4,000 bolts that had been underground for over 60 years!

Valdemarsvik Municipality decided that the best choice would be a turnkey solution from Uponor. The new culvert has a total length of 135 metres and was made of Weholite pipes with a diameter of 1,400mm. Uponor Infra 360° Project Services, in collaboration with the contractor Svevia, installed and welded the pipes on the site. The result is a safe and durable plastic pipe solution that will last for the next 100 years.

Uponor has a new President and CEO

MICHAEL RAUTERKUS has started as Uponor's President and CEO on 23rd August 2021.

"It feels great to be here and start my Uponor journey. Uponor is a leading company with great people and a global presence, as well as innovative technologies in highly attractive markets. I am excited to meet my fellow Uponorians, our customers and shareholders, and lead the company to its next development phase," Rauterkus says.

Michael Rauterkus has long experience, wide knowledge and good networks in the industry. His most recent operative role was as the CEO of Grohe AG, a German sanitary technology manufacturer. During his tenure as CEO in 2015–2019, he developed Grohe into a global leader of bathroom and kitchen solutions. Prior to this, he worked in various roles at Grohe since 2006. Earlier in his career, he worked for companies such as Hasbro Inc., Levi Strauss & Co., and Kraft Jacobs Suchard, known today as Mondelez.

A new Weholite production line to France

UPONOR INFRA OY and the Weholite licensee Tubao S.A.S. have agreed on the delivery of a new Weholite production line to France.

The delivery consists of a complete Weholite production line of 2,200mm, a ring stiffness tester including colour flanges for coating of profiles and different seam colours as an option.

The equipment will be delivered to the TUBAO factory in Saint Saens, northwestern France, during the second quarter of 2022.

The original Weholite licence agreement was signed with Tubao in 2015. The delivery included a Weholite and Wehopanel line of 3,500mm. This new investment will double Tubao's production capacity.

TUBAO S.A.S. is a French company that specialises in solutions for purification, drinking water, industry and agriculture, gravity-driven sewers, and flat panels.

TEXT Outi Järveläinen › PHOTOS Matti Viljanen ›

A new step towards more sustainable construction

Uponor Ultra Rib 2 Blue is an innovative new step towards more sustainable construction. Over half of the raw materials of the Ultra Rib 2 Blue pipe are from renewable, certified sources – ensuring that its carbon footprint is up to 70 per cent smaller. This next-generation sewer pipe has already been installed at several sites in Sweden. In Finland, a pilot installation were carried out in Lahti, the European Green Capital 2021.

The Uponor Ultra Rib 2 gravity sewer system was developed back in 1999. It was designed to meet the toughest requirements: a sewer system that stands up to extreme conditions and is 100% tight, reliable and long-lasting. The system has been constantly enhanced with new features, such as the renewal of the socket structure introduced last year.

The Ultra Rib 2 Blue, with up to 70% CO_2 reduction, does not compromise on any of these features. Like the traditional Ultra Rib 2 pipe, it meets double the requirements of Nordic Polymark quality certification. This durable pipe has an expected lifespan of more than 100 years.

The carbon dioxide emissions of Ultra Rib 2 Blue have been reduced substantially, as more than half of its raw materials are from renewable, certified sources. This solution developed in cooperation with Borealis is an excellent example of utilising the circular economy. The renewable raw materials used for the pipes come from sources such as waste and residual streams from the food industry, including cooking oil.

Borealis is one of the world's leading suppliers of circular economy-based polyolefin solutions. The renewable polypropylene included in the Ultra Rib 2 Blue pipes is produced at the company's plant in Porvoo, Southern Finland.

Entire production chain is traceable

Replacing traditional 315mm Ultra Rib 2 pipes with Blue can achieve emission reductions of about 1,000kg per 100 metres.

The manufacturing of the Ultra Rib 2 Blue is based on a certified mass balance approach, which is a reliable, transparent means of measuring and reporting on the quality and amount of recycled or bio-based raw materials used in production when combined with fossil-based raw materials. The entire supply chain of the renewable raw material can be traced. This is verified using the prestigious ISCC certificate (International Sustainability & Carbon Certification).

The customer is always given a certificate of the amount of renewable raw material with the Ultra Rib 2 Blue.

Blue is the new green

Uponor has launched numerous systems and solutions that enable more sustainable construction, save energy and water, and help to reduce harmful emissions. The most sustainable products can now be recognised from the "Blue" mark. Uponor's familiar blue colour thereby also emphasises the company's commitment to sustainability: "Blue is the new green."

Going forward, it will be easy to check the environmental footprint of other products, too – the first Environmental Product Declarations (EPDs) have already been published. EPDs are currently available for traditional Ultra Rib 2 sewer pipes and IQ stormwater pipes.

Uponor will continue to publish more EPD's on regular basis with several large product groups being covered by the end of 2022. The company is committed to covering 40% of its product sales with manufacturer specific EPDs by 2025 and 100% by 2030.

Lahti collects user experiences from a pilot

The Ultra Rib 2 Blue pipes were first launched in Sweden – this year, the pipes have already been installed at several locations. In Finland, a pilot installation was carried out in early autumn in the Jalkaranta district of Lahti, a few kilometres from the city centre.

Lahti Aqua, which is responsible for water supply for the approximately 145,000 residents of the Lahti, Hollola and Nastola area in Southern Finland, installed Ultra Rib 2 Blue pipes in dimension 200mm at a complementary construction site where water supply services were built for new detached houses.

"The size of this project made it suitable for pilot installation. We will gain good user experiences of this new product," says **Pekka Kaikkonen**, Constructor Engineer at Lahti Aqua.

Uponor has been a familiar partner to Lahti Aqua for decades. Kaikkonen says that it's easy and safe to try out new innovations with a reliable partner. Earlier, Lahti has used pilot projects to test out products such as stormwater filters developed by Uponor.

Quality and durability are key

Lahti has set ambitious climate targets. It intends to be the first large Finnish city that is carbon neutral by 2025.

"Sustainable construction in water supply hinges especially on lifecycle thinking and the durability and reliability of the solutions," says Kaikkonen.

He points out that the safety and quality of water supply are particularly important in Lahti, as the city is mainly in a groundwater area.

"This means that we must be extremely careful in choosing materials. It's absolutely vital for us to be certain of the quality and durability of products when we're seeking to lower carbon dioxide emissions. The Ultra Rib 2 Blue pipe provides another means of reducing the environmental load – it's definitely a welcome innovation in the industry," says Kaikkonen. ■

UPONOR ULTRA RIB 2 BLUE GRAVITY SEWER PIPE

- up to 70% lower carbon dioxide emissions
- containing over 50% of renewable raw material
- production is based on a mass balance approach
- same quality and usage characteristics as traditional Ultra Rib 2 pipes
- meets double the requirements of Nordic Polymark quality certification
- service life expectancy of over 100 years
- made at Uponor's ISCC Plus-certified plant in Fristad, Sweden
- a certificate of the amount of renewable raw materials in the product is provided with the delivery

TEXT Outi Järvelä › PHOTOS Uponor ›

The aim in designing the globe was to help the industry to handle some of its big challenges: achieving better fish welfare, eliminating lice and thus the need for lice treatment, and preventing escapes.

A game changer for fish farming

The first commercial version of a ground breaking fish farming facility was launched in 2019: FishGlobe 3.5K. With 3,500m³ of space for fish, a height of 18 metres and a diameter of 22 metres, it also was – and still is – the world's largest PE plastic structure designed for marine conditions. Now, after two years in operation, it has demonstrated excellent results in fish welfare and growth. But the development of FishGlobe has not ended here. The second FishGlobe 3.5K, incorporating numerous improvements, was lifted into the sea in October 2021. The next steps, FishGlobe 10K and FishGlobe 30K, will soon get under way.

The Norwegian company FishGLOBE AS has spent several years on the development of its floating fish farming facility with an enclosed structure. After the first demo versions and prototypes measuring 10m³ and 70m³ respectively, the FishGlobe 3.5K with a capacity of 3,500m³ was launched two years ago in collaboration with Uponor Infra.

The first fish, 250,000 smolts, were introduced into the facility in November 2020. Now, after two years in operation and four generations of fish, the results have proved to be excellent. Compared to traditional fish farming facilities, all the generations have grown faster and been healthier with lower mortality and with no need for lice treatments or antibiotics. Naturally, the fully enclosed structure also prevents the fish from escaping.

An innovative structure

The FishGlobe 3.5K (FG 3.5K) is a fully automated fish farming facility in which the young salmon – smolts – are grown from a size of 100 grams to a kilo. In the globe, the fish live their first six months in safe conditions before they are moved to open pens in the sea.

The innovative system provides numerous benefits – one of the most significant is efficient water flow and circulation. The water is in constant circulation, changing three times per hour. The high circulation ensures that the oxygen content of the water is over 90%, enhancing fish welfare and growth. Thanks to rapid growth, farmers are able to harvest fish twice in two years, compared with the current rate of once per two years.

The water is taken through six intake pipes from a deep level, that is, from below the sea lice belt. As the upper section of the facility is also enclosed, the waves cannot introduce salmon lice and other parasites into the habitat, either. This is a huge advantage, as one of the biggest challenges in the fish farming industry is the treatment of sea lice.

Also, minimising the environmental impact on the fjords is essential. The water is treated before it is discharged back into the sea and, in addition to this, all of the sediments and sludge are collected and reused in biogas production.

As a floating system, the facility is easy to move to another site or for maintenance.

The development continues

Since the first commercial FG 3.5K was launched, FishGlobe and Uponor have been continuing the development work of the facility. The second FG 3.5K was lifted into the sea in October 2021, and the next steps, FG 10K and FG 30K, are in the pipeline. In terms of size, they will be great leaps forward. The K10 will have almost three times and the K30 as much as ten times more fish capacity. With a diameter of 32m and 44m and a height of 24m and 30m respectively, they will be quite impressive when completed.

"The facility we've now completed is the same size as the first, but we've made numerous significant improvements that have impacted on the manufacturing and construction processes as well as the performance of the facility. The development and design work with the customer took almost a year," says **Kari Karjalainen**, Export Manager at Uponor Infra. "The design process has been demanding – there are dozens of subsystems in the facility, and even the slightest detail change affects a number of other things."

Karjalainen is satisfied with the results of the development work.

"Now, the construction requires, for example, fewer elements and less welding and sawing, and the assembly time has been reduced from 7.5 months to 5 months. The amount of scrap generated during manufacturing and construction has decreased by 80%. This all ensures a more effective and sustainable way to build."

Karjalainen points out that plastic has undeniable advantages, also from an environmental point of view.

"It's a durable material with a lifespan of over a hundred years and the products can be recycled or reused at the end of their life. Thanks to its flexibility, plastic doesn't develop cracks that lead to breakage – and it's not at risk of corrosion, either."

Highly durable PE profiles

The facility is built using large Wehopanels and Weholite pipes made from layered PE100 profile.

The highly durable panels and pipes developed by Uponor Infra can be dimensioned and equipped individually for countless applications, such as tanks, foundation slabs, support structures, underground pumping station chambers, and floating or submerged marine structures.

"They are strong enough to withstand the harsh conditions of the Norwegian Sea and support the massive size of the structure, which weighs 200,000 kilos."

Wehopanels measuring as much as 3 x 10 metres from 250 x 200 x 20mm profiles are used as the functional shell and internal structures of the globe. A Weholite pipe with an internal diameter of 3.4 metres serves as its central pipe. The six water feed pipes, which also serve as the support structures of the facility, are 1,100mm pressure pipes.

Facilities of the future

FG 3.5K is now entering the commercial phase in fish farming markets in Norway, as well as in the UK, Canada, and Chile.

The developer is confident about the future of the facility. The results from the first generations show that FishGlobe delivers on its promises in fish welfare and meets the requirements of environmental considerations for the aquaculture industry. For example, the Government of Norway is planning a new aquaculture strategy. Here, sustainable growth will be a key goal, and there must be solutions to the challenges posed by lice, escapes, and high mortality.

"Enclosed facilities are the fish farming method of the future, ensuring high-quality fish in an environmentally friendly way." ■

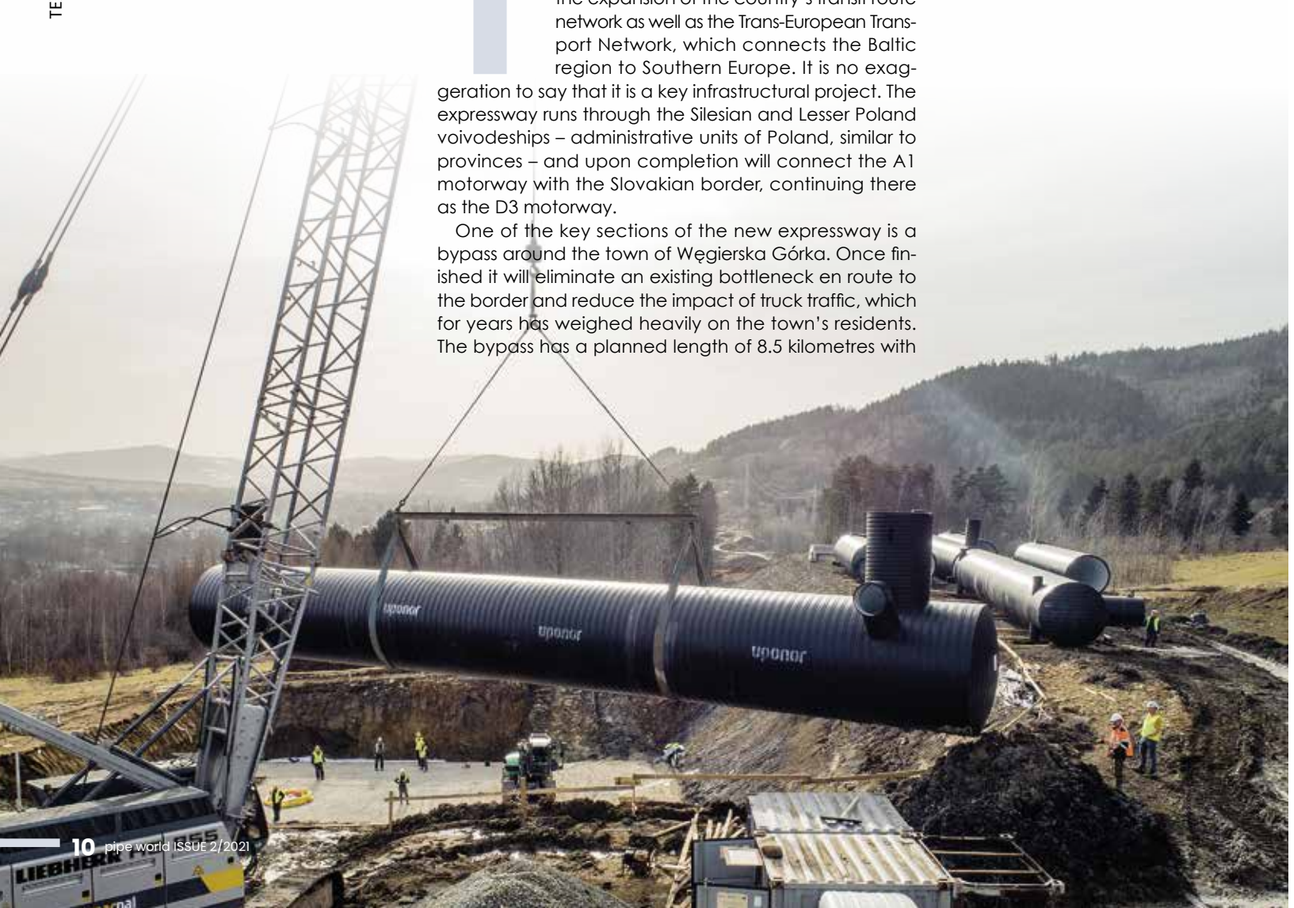
TEXT Ewa Krasuska › PHOTOS Uponor ›

In the heart of the mountains, easy installation is key

In the picturesque Beskid Śląski Mountains in Southern Poland, a construction project is under way on a key section of the S1 expressway. The beauty of the local landscape and the sheer scale of the EUR 300 million investment are certainly impressive – yet the difficult mountain terrain poses a challenge to both man and technology. Thanks to Weholite retention tanks, the task just became a bit easier.

The S1 expressway, currently under construction in Poland, is an important next step in the expansion of the country's transit route network as well as the Trans-European Transport Network, which connects the Baltic region to Southern Europe. It is no exaggeration to say that it is a key infrastructural project. The expressway runs through the Silesian and Lesser Poland voivodeships – administrative units of Poland, similar to provinces – and upon completion will connect the A1 motorway with the Slovakian border, continuing there as the D3 motorway.

One of the key sections of the new expressway is a bypass around the town of Węgierska Górka. Once finished it will eliminate an existing bottleneck en route to the border and reduce the impact of truck traffic, which for years has weighed heavily on the town's residents. The bypass has a planned length of 8.5 kilometres with two tunnels, a series of flyovers and bridges. Along a length of 3.7 kilometres – leading up to the tunnel entry and continuing past the exit – the road will be a single carriageway with two lanes, one in each direction. The 4.8-kilometre section – inside the tunnels and between them – will be a dual carriageway, each consisting of two lanes. The tunnels, measuring 830 metres and 1,100 metres, will be excavated under the Barania massif and Białożyński Groń massif, respectively. Junctions at both ends of the bypass, partially completed during work on neighbouring routes, will be finished to connect the new expressway to the local road network. The estimated cost of this multi-stage and technically complex project, carried out in the "design and build" system – meaning that the contactor is responsible for design, calculations and for building – is approx. EUR 300 million.



A steep climb

Difficult mountain terrain poses the biggest challenge to the project due to a complex geological structure, soil makeup that includes lots of rocky soils, and high groundwater levels. Wet mountain terrain impedes construction, often halting it altogether. It can also adversely affect the newly completed road, damaging the surface and engineering structures along the route. That is why a cut-to-measure drainage system is absolutely crucial. It is certainly a timely issue. Due to climate change, Poland has been grappling with the recurring problem of torrential rains and flash floods. Just last summer, across many towns and cities downpours lasting hours brought more rain than is typically seen in an entire month. It seems the problem is here to stay – hence the need to look ahead and account for efficient and durable drainage and retention solutions in all future infrastructural projects.

Retention system to last a lifetime

At Wegierska Gorka rainwater will be collected and stored in PE-HD retention tanks provided by Uponor Infra. Originally, the technical specifications called for GRP tanks, but after consideration the contractor chose PE-HD technology as being better suited to the installation conditions, roadworks process and schedule. Thanks to their flexibility, PE-HD Weholite tanks are able to withstand dynamic ground movements. Their robust, homogeneous structure and resistance to both corrosion and adverse external factors guarantee fail-safe operation under varying hydrogeological conditions. They are lightweight, which makes them easier to handle and install. Large tanks are transported to the building site in segments and then connected by means of extrusion welding, which ensures monolithic structure, durability and longevity as well as 100% tightness of the tanks.

Uponor Infra Poland is under contract to deliver 19 tanks and tank batteries of DN/ID1,200mm to DN/ID2,400mm for the Wegierska Gorka bypass project by 2022. The total capacity of the tanks is 5,477.44m^3 with the longest one measuring 140 metres. The biggest battery will consist of six tanks DN/ID4,200, measuring 23 metres in length and having a total capacity of 604.80m^3. To save time on site Uponor will deliver tanks in segments of up to 17 metres. In addition to the tanks, Uponor is also responsible for delivering a PE-HD stormwater collector with an outfall to the Soła river. The collector is connected to a compatible system of eccentric manholes and a PE-HD end-of-line valve.

Faster and cheaper

Six tank batteries have been installed so far and work is under way on the seventh battery. If general construction on the project goes according to plan and conditions allow, an eighth battery will be installed before the end of the year. **Joanna Szafron**, the Manager of Uponor's Silesian Sales Office, points out that all and any work on the bypass is carried out to a complex and precise schedule, which includes tasks and operators from many different sectors.

"We must be flexible in terms of deliveries as well as managing the work of our service teams, who not only carry out the extrusion welding, but also conduct leak proof tests," Szafron says.

Once all the elements of the retention system are welded, each tank undergoes a separate leak proof test.

"Our testing method does not require filling the tanks with water, which significantly shortens commissioning time and eliminates the costs of pumping the water in and out of a high-capacity installation."

Both representatives of the contractor and investment supervisors are present for the tests. When the trials are successfully completed, the tanks are awarded tightness and leak proof certificates.

A reliable partner

Apart from work on the ground, delivering, welding and testing the tanks, Uponor Infra also provides technical support throughout the project. Thanks to extensive experience of working on big-scale infrastructural projects in many corners of the world, Uponor's experts are ready to consult and advise on technical issues arising from changes to the project's design or unforeseen developments on site. In the case of the Węgierska Górka bypass, Uponor's technical team worked quickly to conduct static and displacement calculations when the contractor was forced to change the location of some of the tanks. As many of Uponor's satisfied clients can attest, when it comes to any project, there's no better partner than a reliable one. ■

TEXT Uponor › PHOTOS Uponor ›

Sustainable solution for Denmark's largest infrastructure project

The Fehmarnbelt Tunnel linking the Danish island of Lolland with the German island of Fehmarn is Denmark's largest ongoing infrastructure project. But it's not just a construction site – it's also a residence for approximately 1,300 employees. Durable Weholite tanks with a lifespan of 100 years will ensure a sustainable and economical solution to provide employees with clean drinking water and good sanitary facilities 24/7.

Uponor delivered to the site a total of seven Weholite tanks with an inner diameter of 3,000mm.

The Fehmarnbelt Tunnel linking the Baltic Sea regions of Denmark and Germany is one of Europe's largest ongoing infrastructure projects. This combined road and rail tunnel will be 18 kilometres long, featuring a four-lane motorway and a double-track electrified rail line. Travel time across the Baltic Sea will be cut from 45 minutes by ferry to around 10 minutes by car and 7 minutes by train.

The immersed tunnel will consist of 89 individual elements. With a 17.6-kilometre submerged section, it will be by far the longest immersed tunnel in the world. Its foundations will reach more than 40 metres below sea level, making it one of the deepest tunnels of this type as well. The tunnel is expected to be opened in 2029.

Facilities for 1,300 employees

Now, accommodation facilities are being established for the employees, who are gradually making their way to Lolland and their jobs for the next many years.

Esbjerg Maritime Service (EMS Aps), with Uponor as its subcontractor, was awarded the contract by the consortium Femern Link Contractors (FLC) for ensuring clean drinking water and sanitary conditions for the working staff. FLC is in charge of the design and construction of the tunnel, the portals and the ramps.

"This isn't just a construction site. It's also the residence for approximately 1,300 employees moving their lives to Rødbyhavn to work on the largest construction project in Danish history. It's essential to ensure that there's clean drinking water and good sanitary facilities 24/7," says **Bent Rønfeldt**, Project Engineer at Uponor Infra.

Uponor is manufacturing, delivering, and installing the plastic tanks needed for drinking water and wastewater solutions for staff accommodation, as well as for the factory where the employees work.

The tunnel elements for the Fehmarnbelt link will be produced at a large purpose-built factory east of the coastal town of Rødbyhavn on Lolland Island. The factory will be equipped with a temporary new harbour where most of the raw material for element construction will be delivered by sea.

The port at Rødbyhavn will be the largest of its kind in Northern Europe. This also means that both drinking water and wastewater must be transported over long distances.

"This requires a lot of energy, especially when many smaller distribution points are used. Therefore, Uponor's task is to create a compact and optimised central solution that is more energy efficient," says Rønfeldt.

Prioritising the sustainable angle

EMS has prioritised the sustainable angle of the project infrastructure, an issue that's very important to Uponor, too.

"Uponor Infra Project Service has the expertise and know-how from numerous previous projects to manage the task. It's exciting to be part of such a comprehensive project," Bent Rønfeldt says.

The original plan was to use steel tanks for drinking water and wastewater solutions. However, it soon became clear that lightweight and easy-to-handle plastic tanks will shorten both delivery and installation time.

"As a maintenance-free solution with an estimated lifespan of 100 years, the tanks will ensure a long-term sustainable solution for not only the Fehmarn project, but also future projects. This was in every way the most economical choice in both the short and long run," says **Tom Sørensen**, Project Manager at EMS Aps.

Plastic has undeniable advantages: it's a durable and flexible material, and when made of polyethylene or polypropylene, the tanks have no risk of corrosion. In addition to this, Sørensen points out that one significant advantage is that the control system and all the fittings of the tanks can be connected before delivery to the construction site.

Uponor delivered to the site a total of seven Weholite tanks with an inner diameter of 3,000mm. Three of the tanks are for drinking water with capacity of 100m^3, the three tanks for sewage are of 100m^3 and 75m^3. In addition to this, Uponor supplied a 20m^3 tank for process water. All the tanks have already been installed.

Excellent for industrial solutions

Plastic, with its long lifespan, high chemical resistance, and minimal need for maintenance, is often a better choice than steel, even in industrial solutions.

"EMS Aps is a supplier to the oil and gas sector, energy sector and wind energy, as well as power-to-X process plants. The fact that they made the decision to use plastic solutions for the Fehmarnbelt project emphasises that various applications can be implemented with plastic in industrial sectors where steel has traditionally been the material of choice," says Bent Rønfeldt.

Once the workers' village in Rødbyhavn has been established, the new partners Uponor Infra and EMS Aps will move on to work on the factory where the tunnel elements will be produced. The collaboration between the two companies is the start of a forward-looking partnership that, in the long run, will serve many different industrial sectors. ■

TEXT Matti Välimäki › PHOTO Uponor ›

Smart cooling

The Smart Technology Hub will soon be completed in Vaasa on the west coast of Finland. A major investment by the technology company Wärtsilä, this research, development and production centre is unique in its field. The technology centre's large-scale cooling system – which will, for instance, be used to cool large engines during test runs – also required special solutions.

Wärtsilä, which supplies technology and end-to-end solutions to the shipping and energy markets, is currently developing the Smart Technology Hub – a unique research, development and production centre that is being built on Vaskiluoto island in Vaasa.

The centre is scheduled for completion this year and will enable more efficient R&D and testing for smart solutions in the maritime, oil and gas industries as well as new energy systems. A 15,000-square-metre office building will be built next to the technology centre, which will itself cover 55,000 square metres. All Wärtsilä employees and operations that are currently located in downtown Vaasa will transfer to the new technology centre, as will all logistics and maintenance operations in the Runsor district.

The total budget for this major project is about EUR 200 million, of which modern testing and production technology accounts for EUR 83 million.

Cooling to meet the whole building's needs

Uponor has been closely involved in the project, as it has supplied and installed the cooling line for the technology centre. The delivery included the underground intake and outfall pipes, and the pipelines for the pumping station and heat exchanger station.

"The heat exchanger station will cool the facility's internal IC water circuit, to which engine heat will be directed during test runs. The heat will primarily be reused in our own process, but some will be condensed into seawater. The condensing system will also be used to cool the facility's ventilation and other process and electrical equipment," says **Vesa Ihanamäk**i, Maintenance Manager at Wärtsilä.

Carefully considered details

The intake and outfall pipes used in the cooling line are PE pressure pipes of 1,200 millimetres in diameter. A total of 650 metres of these robust pipes were used to install the intake and outfall pipelines. Inside the heat exchanger station, the water is directed from the intake pipe to two 800-millimetre PE pipes that are connected to the heat exchangers.

Uponor Infra 360° Project Services have been involved from the outset.

"We've been working with Wärtsilä and Citec, the design agency, to decide which solutions will work best at the site and what kinds of pipes and connection methods ought to be used," says **Tom Karnela**, Sales Manager at Uponor Infra.

For example, a special solution developed by Uponor has been used for the intake pipe feedthrough to the heat exchanger station.

"A completely waterproof, sealed plastic structure has been placed inside the concrete cast," says Karnela.

Vesa Ihanamäki also mentions the solution used at the point where the outfall pipe discharges into the channel.

"The concrete slabs lining the channel were replaced with large Wehopanel structural panels, and the outfall pipe was fed through one of the Wehopanels. This was the smoothest solution in terms of installation, as the feedthrough could be prefabricated at the factory."

"Wehopanel structural panels are very well suited for this purpose, as they are lightweight yet sturdy, and hold their shape well. This point was also carefully sealed, as seawater rises and falls, and it's important to prevent water from eroding the ground along the landward edge of the channel," says **Veli-Matti Hakala**, a foreman at Uponor Infra.

Services nearby

Hakala says that the 1,200-millimetre PE pressure pipes have mainly been butt welded together. Electric welding has been used to connect pipes in confined spaces where it has been impossible to manoeuvre them in the manner required for butt welding.

"It's rare to use electric welding on pipes of this size. We had to procure special equipment for the construction site in order to do this job as well as possible," says technician **Petri Knuuttila** from Uponor Infra.

He says that the installations were made a lot faster by the fact that Uponor's designers and draughtsmen were involved from the outset.

"Some changes will always occur on a construction site as the contract progresses. However, these changes went very smoothly, as we were able to start designing the necessary additional components, such as bends, as soon as the measurements had been taken on site. The pipes and accessories also came from our nearby factory in Vaasa."

The installation of the system's large intake and outfall pipes was completed in 2020. The technical piping for the heat exchanger station was begun in summer 2020 and finished in spring 2021, when the intake pipe was also connected to the completed seawater pumping station.

Flexibility to meet changing situations

A lot has been happening throughout this large-scale construction project. There have been several contracts in progress on the site at the same time, and some work stages could only be started once the previous one had been completed.

Uponor's work in Vaskiluoto has also been split over a number of periods.

"For instance, it was only possible to carry out pipeline excavation work in the vicinity of the engine laboratory during the summer maintenance breaks. We also had to install the outfall pipe in the condensate discharge channel at this time, and as it was also being used by the power plant, we could only work when there was no strong flow to hinder the installation," says Ihanamäki.

He notes that Uponor has been able to operate flexibly and react quickly to new situations.

"It's been extremely important to ensure that schedules are kept, and work doesn't overlap with the following stages."

Ihanamäki has been satisfied with cooperation and says that he has been involved in joint projects with Uponor before.

"Uponor's design is professional, and things are done properly without the need for additional work," says Ihanamäki.

Uponor was able to hand over its contract in Vaskiluoto in August 2021 after the pressure tests had been successfully concluded. ■

TEXT Uponor › PHOTOS Uponor ›

Turning wastewater into green energy

A ground breaking liquid biogas plant turns process water into green energy at Stora Enso's Nymölla Mill in southern Sweden. It is a major milestone in the mill's long history of sustainable operations. Sustainable, safe and flexible piping systems will play a significant role in future fuel supply.

Stora Enso's Nymölla Mill in southern Sweden is the second largest fine paper producer in Europe, with an annual output of 340,000 tonnes of pulp and 485,000 tonnes of wood-free uncoated paper.

The mill started operations in 1962. Today, it's a part of the Stora Enso Paper division and has 540 employees.

The mill holds just about every esteemed environmental certificate and label. The paper manufactured at the Nymölla Mill is recyclable, renewable and biodegradable – approximately 90% of its paper brands have eco-label certifications.

Back to the Nymölla Mill

In 2018, Uponor Infra Project Services supplied Nymölla Mill with a new outfall pipe to replace its old wooden one. Nymölla chose Weholite for the new pipe due to its ability to withstand external wear such as friction against the seabed – in fact, due to this advantage, other alternatives were ruled out.

In total, 3,500 metres of Weholite dimension DN/ID 1,500mm were installed, and Uponor Infra Project Service's work also involved drawings, calculations of stability, corrosion and hydraulics, project management and job descriptions as well as the field service work, including welding, profile-filling, and the monitoring of sinkings.

Thanks to this successful project, Stora Enso asked Uponor Infra Project Services to design, supply and install the pipes for a new biogas plant as well as for the renovation of the mill area's infrastructure.

In total, Uponor Infra has provided the site with almost five kilometres of pipes, including PE100 pressure pipes in dimensions 280–630mm and Weholite pipes in dimension 1,200mm.

Uponor Infra is also responsible for drawings, dimensioning, field service and pressure testing of the pipelines.

In total, Uponor Infra delivered almost five kilometres of pipes to the site.

PROJECT FACTS

- **Customer:** Stora Enso Nymölla Mill
- **Country:** Sweden
- **City:** Nymölla
- **Project time:** 2019–2021
- **Products:** PE100 pressure pipes in dimensions 280–630mm and Weholite in dimension 1,200mm
- **Consultant:** Uponor Infra Project Services and Stora Enso Nymölla Mill
- **Contractor:** PEAB Anläggning and Uponor Infra Project Services

Fuel supply of the future

The infrastructure project in the mill area had been planned for several years. At the start of the project, plastic was chosen as the material for the new pipes. Plastic pipes are a durable and reliable solution with a lifespan of 100 years, and they can be recycled or reused at the end of their life.

"Stora Enso pays great attention to the sustainability of products and solutions. Sustainable operations and resource efficiency with renewable raw materials and recycling are key at the Nymölla Mill," says **Henric Höglind**, Head of Factory Development and Project Manager for the construction of the new biogas plant.

With its sustainable, safe and flexible piping systems, Uponor Infra also contributes to the fuel supply of the future.

Back in 2008, Stora Enso had the idea to found a biogas plant in the Nymölla Mill area.

Initially, the plan was that the plant would be operated by Stora Enso and the mill would be powered by biogas made from process water. As the idea evolved into selling biogas, Stora Enso contacted Gasum – the gas company was not only able to bring its technical know-how in producing biogas to the table, but also had a distribution network. This resulted in ground breaking circular economy cooperation, the first of its kind in Sweden.

A win–win solution

The Gasum biogas plant opened in April 2021. It is situated in the mill area and is connected to the mill's existing effluent system. Incoming process water is treated in an anaerobic high-rate reactor, where the organic content is transformed into biogas. The treated process water, which contains 50–60% organic compounds, is led back to the mill's existing aerobic wastewater treatment plant. The produced biogas is upgraded and liquefied. The liquefaction process cools the biogas to -162 °C, turning it into a liquid state. The liquified biogas is then stored in large holding tanks before being collected and transported to filling stations. The plant can produce 75–80 GWh of liquefied biogas on a yearly basis, enough to supply the annual fuel consumption of up to 200 trucks.

The win for Nymölla is to turn wastewater into a valuable renewable energy and, in addition to this, achieve energy savings, as the wastewater has already been partially treated at the biogas plant when it reaches the mill's own treatment basins.

"This is a smart and sustainable win-win solution, and the time is just right for it," says **Ingemar Persson**, Project Manager for new construction at Nymölla Mill.

He adds: "We are dependent on competent partners in projects like this. We are very pleased that the contractors – Uponor Infra Project Services and the construction company PEAB Anläggning – collaborated to find the best solutions for this project. We can rely on their experience and expertise of similar projects and be able to focus on our core business." ■

TEXT Outi Järvelä ▸ PHOTOS Trustmary Finland Oy ▸

Real-time certainty

Monitoring water quality in real time helps water utilities to detect and understand variations in it and identify deviations immediately. To this end, Äänekosken Energia, an energy and water utility company in Central Finland, installed the Uponor Qumo water monitoring system in two water tanks.

One of the most important tasks of a water utility is to ensure clean potable water. If potable water is contaminated, the consequences can soon become serious, difficult and expensive.

Finnish water utilities monitor the quality of the water they supply in accordance with the required control research programmes. Even though water quality is monitored regularly, laboratory samples analysed at intervals of a few weeks or months are not always enough to reveal deviations in water quality soon enough. In the Nordic countries, incidents due to poor water quality have almost always been caused by foreign substances that have entered the water supply network and contaminated potable water.

"When an incident occurs, it's important to identify the source of contamination without any delay so that immediate action can be taken. However, it can take days to get laboratory test results – and in that time, the situation can escalate. A lot of water flows in just one day," says **Jussi Niemelä**, Sales Manager at Uponor.

Up-to-date information on water quality is ever more important as pipelines age and the need for renovation increases.

It's important to ensure that aging water supply networks don't pose a risk to safe water supply. For instance, pipe breakage can result in loose sediment in the water – or, in the worst case, introduce microbes that are dangerous to health.

Finnish regulations require risk assessment and management for drinking water for the full chain from source to end user, amended about four years ago, which requires the assessment of the risks of the tap water production chain in the water supply areas.

Tackling the situation – without delay

Monitoring water quality in real time helps water utilities to detect and understand variations in it and identify deviations immediately.

To this end, Äänekosken Energia installed Uponor Qumo monitoring stations in two water tanks.

UPONOR QUMO FOR REAL-TIME MONITORING OF WATER QUALITY

- **the system analyses the size, shape and number of particles and microbes in the water**
- **a highly sensitive detection system utilising holographic microscopy notices even small changes rapidly – the network owner can immediately take the necessary measures**
- **real-time alerts for anomalies in water quality, differentiating between critical and non-critical events**
- **easy to install, scale and maintain**
- **a cost-effective means of maintaining the water supply network**

"Microbiological contamination of water is one of the greatest risks faced by water utilities. When harmful particles are detected in one-off samples under the control research programme, we're always already a little bit behind. With real-time monitoring, we can tackle the situation immediately," says **Atte Myllylä**, Production Engineer at Äänekosken Energia.

Äänekosken Energia Oy is an energy company owned by the City of Äänekoski in Central Finland. It is responsible for the energy and water supply of the city and its surrounding area.

The company supplies a total of about 3,000m^3 of water per day. It has slightly over 20,000 tap water users. The total length of its water supply network is around 400km.

Real-time information on deviations

The Uponor Qumo monitoring station operates continuously, utilising particle measurement based on holographic microscopy, which analyses the size, shape and number of particles and microbes in water. The analysed particles may be inorganic, organic or biological, such as clay particles, bacteria, algae or protozoa. The system also collects data on water turbidity, electrical conductivity and temperature.


Atte Myllylä at Äänekosken Energia appreciates the certainty provided by real-time monitoring.

Its highly sensitive detection system quickly notices changes in water quality and gives an alert about deviations.

"The system reacts sensitively to changes. For instance, iron sediment dislodged during a sprinkler test or other pressure impact has immediately triggered an alarm. These amounts have been so small that they're invisible to the eye," says Myllylä.

"We haven't had major pipe breaks or other incidents in recent years – and we hope that this will remain the case."

Safety for critical parts

The sensors of the Uponor Qumo system can be installed in the desired parts of the network, from water production all the way up to the end user. The system is easy to install and scale as required.

"We now wanted to focus our monitoring on the most critical part of water supply – the water tanks from which water flows to users," says Atte Myllylä.

In recent years, Äänekoski has made numerous large investments to improve the quality of potable water and ensure sufficient supply. The largest investment, amounting to about EUR 3 million, was the Syvälahti groundwater intake facility, which was inaugurated around five years ago. This year, Syvälahti has also started the production of artificial groundwater.

"Thanks to real-time monitoring, we can ensure that our customers get safe and high-quality potable water – and we can be more confident that the water quality is always as it should be," says Myllylä. ■

TEXT Ovidiu Avramr • PHOTOS GB Instaplan

Perfectly fitted and right in time

Lightweight and durable pipes are a huge advantage at a challenging site. This was proven once again in Târgu Mureş, central Romania, where two Weholite tanks and a pumping station will now assure a long-lasting solution for stormwater retention at the A3 motorway exit.

The battery of tanks was lifted at 7m from one side with the help of two cranes to remove the scaffolds placed underneath.

Founded in the 14th century, Târgu Mureş is located in the centre of Transylvania's historical region, 50 kilometres from Sighişoara City, the birthplace of Vlad Ţepeş, better known as Dracula. This unique city is located by the Mureş River, for years beeing the cultural, economic, industrial, and educational centre of the region.

Today, the city's largest employer is the chemical industry. Uponor had just completed a project for transporting process water at Azomureş plant, the biggest fertiliser producer in Romania, when the contractor STRABAG gave it a challenging new task in Târgu Mureş: to find a technical solution for a retention and road drainage system at the A3 motorway exit, in proximity to the plant.

The A3 motorway is under construction. When finished, it will run nearly 600km from the capital Bucharest to the Transylvania region and the northwest part of the country. At the border it will connect with Hungary's M4 motorway.

The region's main water and sewage operator, Aquaserv, had determined that the stormwater from the motorway should not be discharged into the public sewerage network. Considering this, the demanding execution criteria, and the tight execution terms, the general contractor for the highway, STRABAG, decided that all stormwater from the highway exit will be retained in a 600 m³ retention tank and then pumped into two collectors above ground. It is planned that the water will be discharged into Mires creek, which flows into the Mureş River.

A cut-to-measure solution

After analysing the project's design and the existing conditions on the site, a decision was made to install the retention tanks and the pumping station on a single expropriated plot of land at the site. Due to this, the solution had to consider that the installation would be done under high voltage lines with limited clearance.

Uponor embraced the challenge and together with GB Instaplan, a specialist in fluid pumping solutions, analysed the project's requirements and came up with a proposal that meets STRABAG's expectations. The solution was a cut-to-measure, lightweight PE-HD retention system that is easy to handle on site, flexible and long-lasting. Along with the technology, the partners provided static calculations, draft drawings of the entire system, and details of the assembly.

Battery of two tanks

The 600m³ Weholite tank battery comprises two 300m³ tanks with a pumping station also made from Weholite pipes.

The tanks were delivered to the installation site in 10 parts, and then welded by GB Instaplan's welding team, trained, and certified by Uponor. Each tank had a final length of 67.03 metres. The pumping station SN8 DN2,400mm produced by Uponor, was equipped and delivered to the site by GB Instaplan.

Complementing each other's know-how

The project itself involved several challenges. One of these was the fact that the tanks and the pumping station were placed under high voltage lines, which meant that the cranes had limited clearance. As the high groundwater level reaches six metres, technical pits could not be made. Thanks to the properties of Weholite, it was possible to weld the tank elements on supporting scaffolds from the lower level of the pit. This also allowed the installation team to stay on schedule.

After welding of the tanks on the scaffolding was completed, the battery of tanks was introduced into the open trench by gradually removing the scaffoldings with the help of two cranes. This operation was possible thanks to the light weight and durability of Weholite as well as the quality of the welds executed by GB Instaplan's welding team.

The other operations, which were welding of the joints, connecting the tanks to the pumping station and installation of the ladders, ventilation pipes, covers, and automation for the pumping station were carried out quickly and without problems.

PROJECT FACTS

- **600m³ Weholite tank battery comprising two 300m³ Weholite tanks and the pumping station:** Uponor Infra
- **Project management, welding, and installation on site of Weholite tanks and manhole, the equipping of the tanks, the pumping station and the automation system:** GB Instaplan
- **Handling of all equipment and earthworks:** STRABAG
- **Designer:** Search Corporation & Primacons Group
- **Investor:** CNAIR (National Company for Road Infrastructure Administration)

"Uponor and GB Instaplan complement each other's know-how. From our first meeting, we knew that their solution would be the perfect choice for this application. The unique advantages of the Weholite system mean we will definitely consider it for future projects and strongly recommend it to all investors, designers and contractors, too," says Technical Group Leader **Radu Cojocaru** from STRABAG. ■

TEXT Uponor › PHOTOS Uponor ›

Keeping the Baltic Sea clean

As an industrial city and a port on an inlet of the Baltic Sea, Norrköping in southeastern Sweden strives to prevent pollutants from ending up in waterways. In an ongoing pilot project, pollutants carried by stormwater run-offs will be captured in a massive, tailor-made Uponor Vault, a stormwater treatment chamber to ensure that the stormwater is purified before it reaches the Ljura Stream and finally the sea.

Even in this size, installation of light weight Weholite is easy and fast.

Uponor Vault is a part of a climate project ongoing in the Smedby area in Norrköping.

PROJECT FACTS

- **Product:** Uponor Vaults in dimensions of 3,500mm x 8,000mm and 3,000mm x 6,000mm
- **Solution:** Tailor-made Weholite stormwater treatment chamber
- **City:** Norrköping
- **Client:** Nodra AB
- **Contractor:** AMA AB
- **Project schedule:** 2021

Norrköping is located by the mouth of the Motala River in Bråviken Bay, an inlet of the Baltic Sea.

"As a municipality so close to the sea, we generally face higher demands to reduce the number of pollutants released into our waters. In this case, we're talking about the Baltic Sea, one of the most sensitive and polluted seas in the world, which is particularly affected by eutrophication. The requirements become stricter the closer to the coast you get. Further inland, the pollutants in streams and rivers have time to be naturally filtered through, for example, ditches, gravel and sand," says **Tommy Sandberg**, Maintenance Engineer at the local water utility company Nodra AB.

This is why Nodra has now installed a tailor-made Uponor Vault as a part of a climate project ongoing in the Smedby area in Norrköping. This project is called Smedby Klimatanpassning – Smedby Climate Adaptation. Among other things, it aims to take care of polluted stormwater before it reaches the Baltic Sea.

With dimensions of 3,500 x 8,000mm, a maximum flow of 1,600 l/s, and an optimised purification flow of 160 l/s, this is the largest Uponor Vault installed in Sweden to date. The vault's intake and outfall pipes measure 1,000mm.

In addition to this, Nodra has also installed three Uponor Vaults in dimensions of 3,000 x 6,000mm in a new residential area in Norrköping, the Inner Harbour, to purify stormwater before it flows into the Motala River.

A three-step process

The Uponor Vault effectively collects sediment and particle-bound contaminants carried by stormwater run-offs.

The first purification step consists of a coarse grid where coarser particles such as leaves and branches are captured. After the coarse grid, there is a sediment pocket that collects sediment from the stormwater. The final step consists of 12 tailor-made pipe filters – the number of filters is set based on the maximum flow the vault should have – with Filtrate P (Filtralite). The water is forced through the filters before it flows out of the vault and into the recipient. The goal is that before ending up in the Ljura Stream, the water is so clean that it does not exceed the EIA environmental quality standard.

"The most harmful kind of stormwater is the so-called 'first flush' from the top layer of the asphalt that comes with heavy rain. Among other things, it contains heavy metals and salts that flow directly into our stormwater chambers and then into rivers and streams. We want this first flush to get stuck in the filters," explains **Helena Aspdahl**, Project Manager at Nodra AB.

"This is a pilot project to investigate the purification effect of the vault by taking samples of stormwater before and after the treatment. When we know more, we can decide if maybe a different type of filter or an adjustment of some kind is needed. Also, we have to consider how to most effectively maintain the vault," says Helena Aspdahl. ■

Uponor Qumo
secures your water 24/7

- **Detects changes in water quality immediately**
- **Creates time to react on water quality incidents**
- **Artificial Intelligence (AI)-boosted analytics**
- **Continuous software and AI updates**
- **Easy to install, scale and maintain**

Continuous monitoring of drinking water

Sensors with artificial intelligence continuously monitor the water quality from the source to the end user. The particles in the water are analysed with AI in real time online. The system alerts when deviations from given limits are detected.

uponor | Moving › Forward