

THE UPONOR INFRA CUSTOMER MAGAZINE » ISSUE 2/2015

# pipe world



**WEHOCOAT  
REVOLUTIONISES  
FIELD JOINTING OF OIL  
AND GAS PIPELINES**

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**A DESIGNED SOLUTION  
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QUICK INSTALLATION  
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## Project Services – worldwide

Uponor Infra *Project Services* executes customized projects all around the world. Our long experience within demanding pipeline projects has resulted in a unique service concept, with the ability to deliver turnkey solutions. With Uponor as your partner, you will get high quality expertise throughout the entire project, with the aim of being established as a leading contributor to a sustainably built environment.

### We offer

- Calculations and simulations
- Design and drawings
- Method statements
- Manufacturing standard systems
- Manufacturing prefabricated systems
- Site installation and supervision
- Project management
- Turnkey solutions

### Solutions

- Marine pipelines
- Mining projects
- Municipal projects
- Special installations
- PE chambers, process pipelines for industrial applications
- Weholite low pressure applications, e.g. hydro power plants
- Infrastructure culverts
- On-site welding services

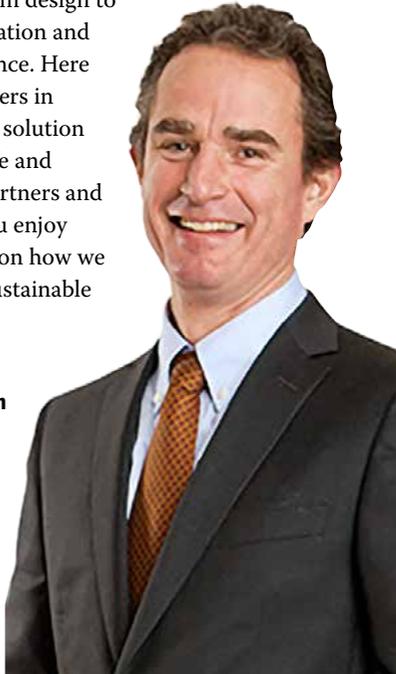


## Every detail matters

**W**hen visiting one of our customers last week, I asked why they chose products from Uponor. I was delighted with the answer; they do it because they trust in the quality and support provided by our solutions. This is what we dedicate ourselves to delivering; customer confidence in everything we do. But this takes a lot of work. Over the last couple of years we have focused on World Class Operations in our factories. Every employee is involved and every detail matters. It is when you delve into the details that you really begin to see the opportunity to improve and solve problems at their root causes. I'm proud of what we have achieved in continuously improving product quality and deliveries. This is a never ending story and we will continue to improve our performance.

During this year, we have been involved in a range of interesting Designed Solutions projects around the world. Sometimes we are hired to take full responsibility, from design to the completed installation and continuing maintenance. Here too, every detail matters in ensuring a long-term solution with a long service life and good value for our partners and customers. I hope you enjoy reading these stories on how we can contribute to a sustainable future.

**Sebastian Bondestam**  
President  
Uponor Infra Ltd



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# Uponor Infra offers **tailor-made systems** for customer needs

Uponor Infra is an expert and developer of customised solutions and comprehensive services. The Designed Solutions Sales concept offers services and product solutions that allow us to build precisely what the customer needs.

“In the future, we aim to offer solutions and services even more extensively customised according to the customer’s needs. Uponor’s Infra’s expertise and extensive experience are at the customer’s service, for everything ranging from single products to demanding turnkey deliveries for specialty applications. The components of the Designed Solutions Sales concept can be used to build precisely what the customer needs,” says **Juha Kainulainen**, Executive Vice President of Sales and Marketing at Uponor Infra.

“In addition to specified products, we are able to offer design and calculation, technical support, project management, detailed method statements and a variety of field services for the customer’s projects. Our most extensive service involves demanding specialty applications, such as marine installations, under the turnkey principle. In this way, a single party clearly has overall responsibility for the project.”

## Solutions for even the most demanding applications

“Innovative, highly customised solutions are among Uponor Infra’s strongest core competencies and allow us to clearly differentiate ourselves from our competitors,” says Kainulainen.

Kainulainen brings up, in particular, the product manufacturing possibilities based on the Weholite technology. The structured-wall, spirally wound Weholite pipe, manufactured from a PE or PP profile can be used to build entire systems and very different solutions. Kainulainen mentions, for example, special chambers and various tank solutions such as alkalisation plants, and stormwater and chemical tanks.

“The solutions are delivered ready for installation, saving a significant amount of time and effort at the work site. This is clearly evident in the installation costs.”

When it comes to the design and calculation services, Kainulainen brings up 3D design, and flow capacity, lifetime and hydraulic calculations as examples. Field services that Uponor Infra can offer include, for example, welding services and supervision of installation work.

“Uponor Infra’s extensive expertise also guarantees strong technical support for all projects.”



## Already involved at the design stage

Uponor Infra’s goal is to be involved in projects by their design stage.

“The earlier we are able to join forces with the customer and start designing together, the better the end result will be,” Kainulainen emphasises.

Kainulainen states that Uponor Infra is an expert in the plastics industry but also has strong experience in construction.

“The excellent properties of plastic allow new kinds of solutions for traditional construction, and things can be done more cost-efficiently and quickly and with higher quality. Our customers are often surprised by the versatility plastic offers in construction. Our objective is to make our customers see plastic as an important alternative to the traditional concrete and steel.” ■



# A designed solution saved time and money

The Elsinore Utility Company needed a new stormwater retention tank, but the challenge was that the area where it was to be placed was very narrow and small compared to the volume capacity that the tank was to hold. Uponor Infra suggested making the tank by using a designed Weholite solution instead of concrete, which was the original plan.

COWI, one of the leading consulting engineering companies in Denmark was working on a project for the Elsinore Utility Company located about 40km north of Copenhagen. The Elsinore Utility Company needed a new stormwater retention tank with a volume of about 500m<sup>3</sup> with a maximum 3l/s discharge to a nearby stream. The solution, as planned, was to use concrete, but this created challenges as this solution took up too much space. Therefore, COWI contacted Uponor to explore the possibility of using a design solution that constructed the tank out of plastic instead of concrete.

“The new stormwater retention tank was a challenge since the area where it was to be placed was very narrow and small compared to the volume capacity that the tank was to hold,” says **Jan Lunding**, Project Technical Manager at Uponor Infra.

“The tank was to be placed right next to a road and next to the recycling station in Elsinore.”

## A broad range of services

“Our Design Solutions department made an interim solution proposal and presented it to COWI and the Elsinore Utility Company. The proposal included a number of different calculations, drawings and a cost estimate, which were major factors for the success of the proposal,” says Jan Lunding.

The final offer and complete proposal consisted of a solution made in Weholite SN2 together with a number of added services. The solution was delivered directly to the customer.

## Weholite saves construction time

“At first glance, concrete was the traditional and cheapest solution. However, if the solution was to use concrete, we would need to add two chambers, so we started investigating the possibility of a designed solution in Weholite,” says **Martin Christensen**, Consulting Engineer at COWI.

He continues: “The Weholite solution had several advantages. As the solution was made of plastic it was very flexible and, therefore, we were able to have a one piece solution instead of having two separate pipes in concrete with connecting chambers.”

“In the end, the cost of the two different solutions was almost the same, but the solution made with Weholite would save us a lot of construction time, as it was much faster to install than the concrete solution. It only took four months from the time the project was started until the final result was a reality.”

“Before the final order was made, Uponor participated in defining the tender description for the contractor. After the order was placed and the solution successfully installed, we met at the site, together with Uponor and the contractor, to inspect, test and approve the solution for deformation, tightness and system control, etc. Working with Uponor has been a good experience – I will definitely use Uponor as a partner on other projects in the future,” says Martin Christensen. ■



The narrow space was a challenge for the solution.

## UPONOR BROUGHT TO THE PROJECT

- » Solution proposal
- » Prefabrication
- » Pipe delivery
- » Method and installation guidance
- » Onsite welding service
- » Participation in site meetings
- » Project management
- » Follow-up on final delivery

## THE SOLUTION PROPOSAL INCLUDED

- » Static calculation
- » Volume calculation
- » Buoyancy calculation
- » Welding calculation
- » Drawings
- » Cost estimate/budget price

# Weholite yields savings and smoother implementation

The Åland Islands-based company Fifax Ab is currently building one of the largest fish farms in the Nordic countries. The aboveground facility is located in Eckerö, Åland, about 1.8 kilometres from the sea. Operating at full capacity, it will produce more than 3,200 tonnes of rainbow trout for the Finnish and Scandinavian markets annually. The facility piping contract was simplified and implemented at a lower cost by replacing the pressure pipes specified in the original plan with 1,800mm Weholite pipes.

**T**he dry land facility under construction in the Åland Islands – an archipelago in the Baltic Sea and Finland's only autonomous region – will be one of the most advanced fish farms in the Nordic countries from an environmental perspective. It will be the first such facility in the Baltic region to recycle its utility water: it will not discharge water and fish nutrients into the sea.

This ecologically designed facility employs a closed recirculating aquaculture system and provides fish with ideal growth conditions. Unlike when raising fish in natural waters, the fish do not need to be fed antibiotics. It is also easier to monitor the feeding of the fish, thereby preventing overfeeding. This saves both the environment and costs. The plant is priced at about EUR 18 million and will be one of the largest

dry land fish farms in the Nordic countries. The facility takes care of the process from beginning to end, from fish egg production to fish processing.

The building will measure about 15,000m<sup>2</sup> with three basin areas. A total of 36 five metre-deep basins with a diameter of 12 metres will be built. The water used by the facility will be pumped from the Sea of Åland, located 1.8km away, to three water treatment plants.

In addition to its own water treatment plants, a biogas plant will be built in the area. It will utilise organic waste from fish processing to produce gas for use in the operations of the facility.

## Revised design yields savings

Uponor Infra has been involved in the project since the design phase and will carry out the piping works required



by the 36 basins. The contract includes design assistance and the delivery and installation of pipes.

Following the recommendation of Uponor Infra's experts, the original plans for the piping contract were revised to achieve a solution that yields greater cost-efficiency. **Dan Engblom**, a consultant at Deab Konsult who is responsible for the foundation and piping works in the project, says that the changes reduced the costs by about a third, compared to the original plans.

It was originally intended for the facility pipe system to be built with 630–800mm pressure pipes.

"Uponor Infra recommended that the pipes be changed to 1,800mm diameter low-pressure pipes, which stand up well to the 0.5 bar pressure in the system."

Thanks to Weholite, the crisscrossing pipes specified in the original plans could also be simplified. In the solution now being constructed, the recirculating aquaculture system in each of the three basin areas is being implemented with two Weholite pipes connected to the fish tanks.

"This solution is simpler, more rational and substantially cheaper," says Dan Engblom.

"Weholite pipes with a diameter of as much as 3.5 metres can be used to produce end-to-end pipe and tank systems as well as a variety of customised solutions," says **Tom Karnela**, Sales Manager at Uponor Infra.

With their layered construction, Weholite pipes are durable, flexible and light. They are manufactured from polyethylene (PE) or polypropylene (PP) profile using spiral seams.

## Harnessing experience yields benefits

The three-stage pipe installation work began at the turn of March and April. First-stage testing was carried out at the end of July, after which fish farming has been gradually started up. The whole pipe installation contract is expected to be completed at the turn of the year.

Engblom, who is responsible for overseeing the piping works, is satisfied with the progress of the work. "Pipe installation has progressed extremely well. Furthermore, Uponor's pipe deliveries are flexible, which has facilitated the organisation of work at the installation site."

According to Tom Karnela, this project is a good example of why one should turn to Uponor's experts in the early stage of projects. "When we come on board early, we can ensure that the customer reaps the best benefits from our expertise and is satisfied with the completed project."

Uponor Infra is delivering more than 10 kilometres of different kinds of pipes and other materials for the Fifax facility. The production facility is being delivered by the Norwegian company AKVA Group, the world's leading producer of aquaculture technology. ■

## FISH FARMING FACILITY IN ECKERÖ

- » Will produce 3,200 tonnes of rainbow trout annually when operating at full capacity
- » The first industrial-scale facility to be implemented using a recirculating aquaculture system
- » Recirculating aquaculture is the most advanced, environmentally friendly and efficient fish farming method
- » The size of the facility is about 15,000m<sup>2</sup>
- » 36 fish farming basins
- » Uponor Infra has provided design assistance and delivers the pipes and is responsible for their installation and welding

### Uponor Infra's delivery includes, for instance:

- » Approx. 600m Weholite ID/OD 1,800/1,950 low-pressure pipes, bends, tees, wall passings
- » Approx. 500m PE 630mm SDR 33 pipes, bends and other fittings
- » Approx. 7,500m PE 160mm SDR 17 PN 10 pressure pipes leading to the seaside pumping station
- » PE 110mm – 315mm SDR 17 PN 10 pipes and fittings
- » Weholite ID/OD 800/900 SN 4 pipes
- » Special fittings

# Flowing forward

The construction of an innovative retention sewage canal in Rzeszów in southern Poland was recently completed using Weholite piping and manholes. The award-winning sewer design is the brainchild of **Daniel Słyś**, PhD Eng., and Professor **Józef Dziopak** from the Department of Infrastructure and Sustainable Development at the Rzeszów University of Technology.

**R**esearchers from the Department of Infrastructure and Sustainable Development at the Rzeszów University of Technology (RUT) work on numerous engineering projects on a daily basis. Over the years, their work has won them many awards and citations at international fairs and invention exhibitions. Last year alone, they won five medals at the International Warsaw Invention Show 2014, where over 100 exhibitors from around the world showcased their ideas. One of these awards was a gold medal (the show's top honour) for the design of an innovative retention sewer. Now the project has been successfully implemented, for the very first time, in the city of Rzeszów using Uponsor Infra piping.

## A brilliant idea

The detention sewer devised by RUT researchers is a simple yet breakthrough



Awarded designers Daniel Słyś and Józef Dziopak.

solution for stormwater disposal. What's unique about it, is that the inside of the sewer is divided into chambers using baffles, which allows for maximum use of the sewer's internal capacity. Professor Dziopak explains: "Inside, the sewer is divided by baffles, which translates into a linear series of hydraulically interconnected chambers. The sewer serves

two functions in the general sewer network: the basic function of transporting sewage and that of temporarily retaining excess stormwater."

Observations of stormwater flows reveal that even during heavy precipitation, which in itself varies in intensity and duration, sewers never fully fill up, resulting in a surplus hydraulic flow capacity. "Our idea was to use the surplus volume by installing a series of baffles characterised by specific hydraulic parameters. In this way, we got a sewer that fulfils its traditional function of transporting wastewater, but when needed also serves as a retention channel that can be filled up practically to the maximum capacity of the pipeline," says Professor Dziopak.

When analysing the design for the retention sewage canal against an extreme rainfall scenario, the researchers decided that the sewer needed extra protection against water pressure. "We provided for overflow space

at the top of each baffle, which allows the discharge of excess water into the subsequent chamber during heavy rainfall. This protects the pipeline against additional water pressure created by elevated inflows of stormwater."

The retention sewage canal solves a number of problems with wastewater disposal in an urban setting, especially in areas where there is no possibility of utilising stormwater. According to Daniel Słyś: "The retention sewage canal definitely makes sense, especially when we're talking about including new drainage areas in the existing wastewater networks, which results in elevated wastewater volumes. It's also beneficial as a countermeasure to hydraulic overloads exerted on existing networks and facilities as well as for managing the discharge of rainwater into surface water."

#### A successful debut

Even the most brilliant, beneficial and cost-effective engineering solutions sometimes

**THE DETENTION SEWER  
DEvised BY RUT  
RESEARCHERS IS A SIMPLE YET  
BREAKTHROUGH SOLUTION  
FOR STORMWATER DISPOSAL.**

remain forever confined to drawing boards. Fortunately, this was not the case with the retention sewage canal designed at RUT. Work on the first such sewer began in 2014 in Krakowska-Południe, a fast-developing housing district in Rzeszów. Daniel Słyś, who acted as consultant for the installation says, "The new sewer in Rzeszów was designed to regulate the volume of stormwater transported from the new housing developments into the existing municipal wastewater network. Due to the required retention capacity of the sewer and limited installation space, the diameter of the pipe was set at 2.4m."

The construction was carried out in two stages. The first stage included the construction of a 140m section of the sewer with collectors for draining side roads and footpaths. The second stage provided for the installation of a 160m section of the wastewater channel along with auxiliary systems. The combined total length of the whole drainage system for the area is 1.5km. The pipes used had a nominal diameter of DN 200 to DN 2,400mm and ring stiffness of SN 4÷12 kN/m<sup>2</sup> with stormwater pre-treatment installations. The retention sewage canal was built using structural double-walled Weholite pipes by Uponor Infra made of high-density polyethylene (PE-HD) with a diameter of DN 2,400mm and ring stiffness of SN 8 kN/m<sup>2</sup>. The outer wall of the sewer is black, ensuring resistance to UV radiation. The channel frame features eight inspection manholes with a diameter of DN 1,200mm. To improve flow control the sewer was fitted with a series of baffles. The installation was carried out in difficult geotechnical conditions with



The retention sewage canal was built using Weholite pipes with a diameter DN 2,400mm and ring stiffness of SN 8 kN/m<sup>2</sup>.

high ground water levels presenting additional challenges. Obstacles, however, were tackled as the work progressed and the installation was successfully completed.

When asked about the reasons for choosing polyethylene piping for this project, Daniel Słyś mentions several factors: the tightness and homogeneity of joints, the possibility of installing the baffles, excellent static-strength parameters, resistance to abrasiveness, longevity of the pipeline as well as cost-effectiveness. "The application of PE piping guaranteed that all of the above criteria would be met. As designers of the system, my colleagues and I can attest that the piping provided for this project is of the highest quality."

### Successful cooperation

The Rzeszów retention sewage canal project is a great example of scientific minds and industry professionals coming together to create ingenious solutions for convenient and trouble-free living. Engineers at RUT confirmed they are very happy with the project. Daniel Słyś elaborates: "In order to successfully go from an idea that exists on paper to an operating network one needs goodwill, expertise and commitment from all parties involved. The inventors have to be realistic about what is workable and what actually can be implemented, the designers should be eager and determined to apply innovative solutions and learn as much as possible about them, the piping suppliers must guarantee the best-quality materials, and the contractors must have know-how and experience in these types

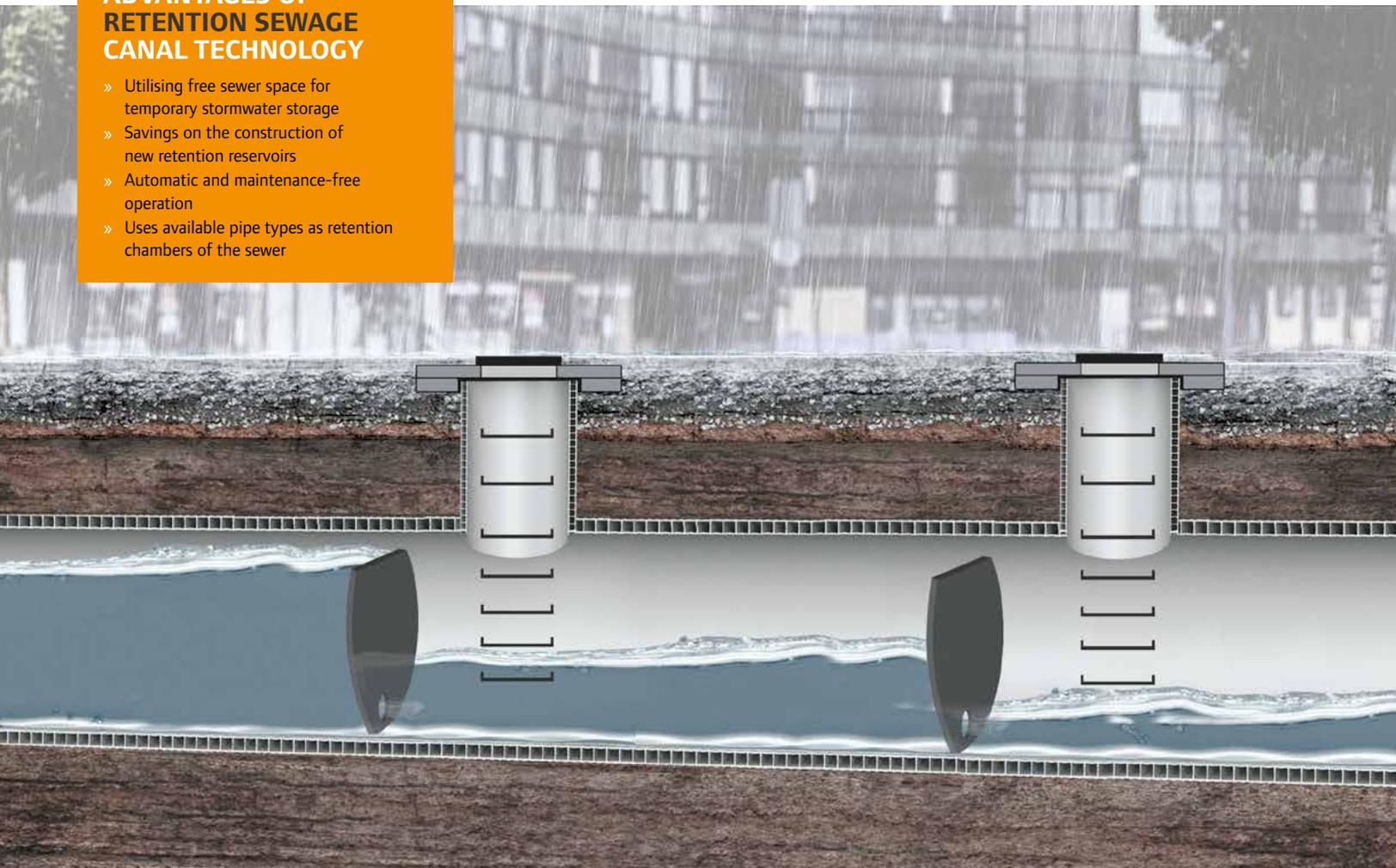
of projects. I believe that we were successful in bringing together a group of people who guaranteed the highest standards of service and expertise. It comprised engineers from the Bureau of Municipal Engineering in Rzeszów, Uponor Infra, which supplied piping for the project, Skanska – the general contractor – and the researchers and designers at the Rzeszów University of Technology."

**Joanna Szafron**, Manager of Uponor Infra's Silesian Sales Office says, "Clients often come to us with unique and demanding projects, which require top-notch expertise and products. We see such investments as interesting challenges and gladly take them on." ■

The retention sewage canal utilises free sewer space for temporary stormwater storage.

### ADVANTAGES OF RETENTION SEWAGE CANAL TECHNOLOGY

- » Utilising free sewer space for temporary stormwater storage
- » Savings on the construction of new retention reservoirs
- » Automatic and maintenance-free operation
- » Uses available pipe types as retention chambers of the sewer



# Wastewater treatment plant

## improving functionality for the future

The Annacis Island Wastewater Treatment Plant treats about 175 billion litres of wastewater every year.

Located in Delta, British Columbia, Canada, this plant provides secondary treatment to wastewater for over one million residents residing in 14 local municipalities. The treated wastewater is then discharged into the Fraser river.

The plant uses anaerobic digestion to break down organic materials from wastewater to produce biosolids and methane gas. The methane from this process is then used to generate heat and electricity, which is used to run the plant operations. Additionally, the plant produces enough energy to meet 100% of its own heat requirements and approximately 50% of its own electricity requirements, thus reducing its greenhouse gas emissions by 660 tonnes every year. Due to the rapid growth of Metro Vancouver, the Annacis Island WWTP is undergoing an expansion to increase treatment capacity. The project will include the addition of a foul air system that will improve the air quality for the community living and working in proximity of the facility.



welded joining system easily satisfied this important system design condition.

### On time delivery prerequisite

Onsite construction of the system presented an additional challenge. The existing plant facility could only be shut down for a very limited time period to accommodate this portion of the plant expansion. The contractor and Uponor field technicians accepted the challenge and worked for 21 hours straight to complete the installation. In spite of paucity of time, a leak free system was successfully installed and tested.

### Straight from the customer

**Robbie Plavcic**, the site superintendent of JJM Construction commented as follows:

“Tie-ins to the existing pipe is always difficult and the Uponor technicians did an outstanding job on making these connections which had to be done within a 24 hour window. The lightness of the Weholite pipe and the strength of

the welded joints enabled most of the pipe to be connected outside the trench and then lowered into place as one large spool piece.”

### Delivery of company's commitment

Uponor satisfied each of the demands presented by Metro Vancouver's Annacis Island Waste Water Treatment Plant project.

Uponor's success with this WWTP project was attributed to many factors, one of them being the involvement of our distributor – ISCO Industries – who worked closely with

Uponor from co-ordinating the approvals for the drawings to the delivery and installation of the pipe. 'The Annacis Island project stands as a shining example of Uponor's dedication to partnering with professionals in order to provide the most efficient, reliable and high-performing designed solutions that enrich people's way of life. This success will open doors for future large piping opportunities with Metro Vancouver, which are planned for 2016. ■

### Optimal product requirement

In a foul air system, air is drawn from trickling filters through a piping network into a filtration facility in order to remove the odours. The material of choice for this highly corrosive application was Weholite.

Produced from corrosion-resistant, high-density polyethylene resin Weholite is impervious to exposure from hydrogen sulfide gas and sulphuric acid condensate. Available in large diameters Weholite is easily fabricated into a wide array of standard and custom fittings. Combining that with the product's light weight and ease of handling, Weholite stood out as an ideal cost-effective choice.

Brown and Caldwell, the project's civil design consultants, specified leak-free joints as a system requirement. Weholite's field extrusion

### PROJECT INFORMATION

<b>Country</b>	Canada
<b>Sales</b>	Darrell Sallenbach
<b>Completion</b>	2015
<b>Project type</b>	WWTP Upgrade
<b>Building type</b>	Municipal
<b>Applications</b>	Foul Air Piping
<b>Products</b>	48"RSC160, 54"RSC160, 72"RSC160. Total Length 200 metres plus various elbows, reducers and laterals



## Wehocoat ensures durability on land and at sea

Welded joints coated by the Wehocoat robot, which was developed by Uponor Infra, meet the oil and gas industry's extremely high quality requirements, regardless of whether the pipes are laid at the bottom of the North Sea, or under the scorching sun of the Middle East. This innovative joint coating technology brings the performance of field joint coatings to a level comparable to mill applied coating, and has raised huge interest in Wehocoat.

A major loading operation is under way on the North Sea, in Orkanger, off the west coast of Norway, where an almost 10-kilometre long pipe string is being loaded onto a reel, mounted on a ship's deck.

The steel flexes on the reel when subjected to force, but the welded joints also need to withstand rough handling.

"All joints and seams on submarine oil and gas pipes must meet stringent quality standards. Wehocoat is by far the best field joint coating system on the market.

The key benefit is the consistent quality of the field joint coatings, since this does not depend on an individual technician," says **Patrick Jansson**, Project Manager at Uponor Infra Technology.

"The Wehocoat method involves using induction to heat pipes. This method is highly appreciated in the oil and gas industry, as it is much safer than using open fire from gas torches as used for other field-joint coatings," Jansson notes.

The extremely high quality of the oil and gas pipes, including welded joints, is a key requirement, not least for environmental

reasons. Besides, production interruptions or underwater repair work are very expensive.

"In this business, contracts typically include an extensive and detailed qualification process before work can begin."

### Each work phase can be traced

Uponor Infra Technology's Project Engineer **Christian Glasberg** points out that the oil and gas industry also demands exceptionally extensive documentation.

"The Wehocoat robot automatically documents each work phase. Each joint

and phase can be traced, and the robot saves information on temperature and pressure.”

One of the key benefits, according to Glasberg, is that the joints made by the Wehocoat robot are only around 3–6 millimetres thick compared to the 10–20 millimetres achieved using conventional injection moulding.

“The thinner the joints, the more steel pipe you can fit onto the reel.”

### On both sides of the North Sea

Five Wehocoat robots have been delivered to locations by the North Sea: three to Bredero Shaw, a major subcontractor for the oil and gas industry, and two to another big subcontractor, RAE Energy.

May–June more than 5,000 joints on ten-inch pipes.”

### User training provided

The Wehocoat robot performs all of its work phases automatically.

Once the welded joint has been sand-blasted, the robot applies powder epoxy and a plastic top coat. The reactive plastic developed by Borealis, a leading provider of innovative solutions in the fields of polyolefins, base chemicals and fertilisers, acts both as the adhesive and the top coat.

Depending on the certification of each element of the project, a large number of polyethylene and polypropylene products can be used as raw materials for the surface.

“The robot is relatively simple to operate, and Uponor provides the required user training,” Patrick Jansson explains.

“The robot is able to coat more than ten joints per hour. In addition, as we said, the quality of the joints is superior to any other coating methods,” Glasberg adds.

### Freezing cold and smouldering heat

In locations on the North Sea coast in Norway and Scotland, the Wehocoat robots were operated inside industrial halls because this was easy to arrange.

However, when performing onshore installation work, the Wehocoat robots have operated in extreme and highly varying conditions.

“Working conditions have varied from -30°C in Finland to +40°C in Abu Dhabi. People are uncomfortable at those temperatures, but a machine couldn’t care less,” says a delighted Glasberg.

He mentions the Gasum project of 2011 as a case in point: the Wehocoat robot coated 1,500 joints in Finnish winter conditions, at temperatures as low as -30°C.

This spring, during a live demonstration for customers in Abu Dhabi, the Wehocoat coated a 20-inch plastic-coated steel pipe. After the coating, additional tests were performed to ensure the proper adhesion of the coating.

“Around thirty customers from the Middle East attended the demo in Abu Dhabi. They were very excited and we received a large number of project queries afterwards,” Glasberg recounts. A Wehocoat demonstration was also arranged in Kuwait in 2013.



The third machine to RAE Energy will be delivered in September 2015.

The Wehocoat robots ordered by Bredero Shaw are used in Orkanger.

“Nine steel pipe segments, each measuring 900–1,000 metres, were welded together for reeling. The pipes were later laid on the Snøhvit offshore gas field in the Barents Sea, off the coast of Norway.”

Meanwhile, RAE’s Wehocoat robots have been working in Edinburgh, Scotland, catering to the needs of local oil and gas fields.

“In February 2015, the robots coated 500 joints on eight-inch pipes, and in

## WEHOCOAT FIELD JOINT COATING TECHNOLOGY

- » Wehocoat is an innovative technology that brings the performance of field joint coatings to a level comparable to mill applied coating.
- » The Wehocoat field joint coating system consists of two product families: onshore and offshore.
- » The basic idea is that the welded joint area is blasted clean, induction heated and then powder epoxy is applied followed by a layer of molten plastic using the specially designed robot. The Wehocoat robot carries out all stages of the work completely automatically.
- » The coatings made by the Wehocoat robot are extremely hard wearing and as durable as the pipe coating applied in the factory. The quality of the surface of the joint is better than any other joint coating.

### Responding to customer needs

Uponor Infra is currently developing an onshore robot able to coat steel pipes with a diameter of up to 1,420 millimetres. The smaller onshore robot is able to coat pipes with a diameter of 450–800 millimetres.

According to Christian Glasberg, development work will also continue on the offshore robot.

“Our customers participate actively in development work. We are currently working on improving the automatic documentation feature of the robots,” he explains. ■

# A designed solution with **added value**

In autumn 2014, Uponor Infra in Denmark was contacted by the utility company Sønderborg Forsyning in the southern part of Jutland. They were originally looking for a solution to replace an existing 1,000mm concrete pipeline, but ended up with a designed solution with added value.



## THE SOLUTION PROPOSAL INCLUDED

- » Static calculation
- » Volume calculation
- » Buoyancy calculation
- » Welding calculation
- » Drawings
- » Cost estimate/budget price

## UPONOR'S PART OF THE PROJECT

- » Solution proposal
- » Prefabrication
- » Delivering of the pipes
- » Method statement for installation guidance
- » Welding service on-site
- » Participating in site meetings
- » Project management
- » Follow-up on final delivery



**T**he existing concrete pipeline was problematic for a number of reasons. One of the major issues was that the pipeline was under great pressure due to a huge height difference of more than 17 metres. As a result, there was extensive sanitary sewer overflow from the chambers,” says **Finn Christensen**, Project Manager at Sønderborg Forsyning.

“The pipeline went through a privately owned field and of course the owner was not too happy with the overflow. In addition, the field owner did not wish to have a pipeline going through his field. The pipe would thus have to be installed along the field boundary. Therefore, we turned to Uponor for a designed solution.”

### A welded designed solution

“In the solution proposal, we concentrated on the customer’s need for a designed and welded solution in order to tackle the challenges posed by the height differences along the field. The height differences and the terrain meant that we had to take a lot of bends into account. Our original solution was based only on SN8 Weholite pipes, but we revised it later on during the project, as we could offer the customer a far better solution yielding greater value,” says **Jan Lunding**, Project Technical Manager at Uponor Infra.

During the proposal process, Uponor worked together with Grontmij, one of the leading consulting and engineering companies in Europe, in delivering, for instance, the method statement for installation guidance.

### Added value, easy and fast installation

During the evaluation of the proposed solution, which took place at the construction site, Jan Lunding discovered that the Weholite pipeline would be connected to a concrete chamber at one end. The chamber had to be replaced. Uponor suggested that the chamber should be made of plastic instead of concrete. Calculations were made and sent to Sønderborg Forsyning. Within a week, the order was placed!

“The chamber was made of Weholite panels. It gave us added value by saving us a lot of time. Since the chamber could be prefabricated and delivered in one piece, it was easy and fast for the constructor to install. Time was an important



Uponor Infra provided a customised solution and offered a range of services and technical support.

issue for us, especially as the pipeline and chamber are intended to transport stormwater away from the area,” says Finn Christensen.

### A professional and active partner

“Uponor not only provided us with a customised solution, but also offered a range of services and technical support,” says Finn Christensen.

“With Uponor we had a professional and active partner throughout the entire project. Therefore we ended up with a unique solution that matched our specific needs for a welded designed solution. Furthermore, we saved time on the project, because Uponor could provide us with a chamber that was ready to be installed right away. I’m really looking forward to working with Uponor’s designed solutions department on future projects,” says Finn Christensen. ■



# Quick installation without traffic jams

This summer for the first time in Latvia, renovation using Udonor's Omega-Liner non-entrenchment technology was carried out in two local municipalities, Madona and Ventspils, which was highly appreciated by its customers. During the 2.5km pipeline renovation the road surface was not damaged and routine traffic was affected. Renovation work was carried out quickly, avoiding the necessity to suspend service provision to clients.

**O**mega-Liner is a product conforming to a sustainability concept. It is environmentally friendly, because its assembly requires steam and pressure only. The pipelines ensure a long service life (approximately 50 years), and they are made up of recyclable materials.

The only non-entrenchment pipeline renovation equipment in the Baltic States is used by the Latvian company SIA "Ostas celtnieks", which acquired it in the spring of 2015. The decision to acquire Udonor equipment was made by company experts after careful market research, acquainting themselves with offers from various producers

and by visiting international fairs/exhibitions. Omega-Liner technology offered by Udonor was considered to be the best. Furthermore, the technical support team at the Udonor representative office in Latvia has taken care of the requirements and provided all the necessary pre- and post sales services at an adequate level.

**Konstantins Bursakovskis**, Chairperson of the Board at SIA "Ostas celtnieks" says, "Our company is one of the leading water supply and sewerage network construction and reconstruction companies in Latvia. To improve the quality of services provided and to enhance our operational capacity, we constantly improve our material and technological basis

as well as implement the latest, state-of-the-art water supply and sewerage network construction technologies."

"We have established a successful long-term cooperation with Udonor as a material supplier, thus, we have eagerly acquainted ourselves with the new Omega-Liner pipeline renovation technology. After becoming familiar with the Omega-Liner in Finland, we decided that this product is suitable for renovation of pipelines in the Baltic States as well as in other European member states. The technology and the product itself were sufficiently tested, of high quality and profitable. Thus, after assessing the economic justification, we decided to invest in Omega-Liner technical equipment.



## Over 900 metres renovated within 12 days

**Guntars Dambeniaks**, Chairperson of the Board at the Joint Stock Company Madonas Ūdens, says, “Use of non-entrenchment technology for pipeline reconstruction in Madona was the only possible solution, as sewerage pipelines to be reconstructed were located beneath main streets of the city with intensive traffic, on which asphalt surfacing was recently renovated using EU co-funding. Though, even if the streets would not have been renovated, it shall be considered that application of the open entrenchment method for pipeline reconstruction would require closing of traffic that would affect the economic life of the city.”

Beneath one of main streets of the city, pipelines are located at a considerable depth – 5m; the site has sandy ground that makes excavation work more complicated. This would require using shields or creating a very broad entrenchment.

“It would be a time-consuming and expensive process. For an optimum and most suitable technological solution, I visited several Latvian companies offering non-entrenchment pipeline renovation services, I became acquainted with various technologies, as well visited an existing site in Finland to learn more about the practical use of Omega-Liner technology. This technology, which provided for a well-to-well installation of a modified PVC-U pipeline into the existing pipeline, offered quick installation and positive references from the Finnish construction company.”

“The technology seems completely safe. After warming up and “blowing”, the PVC pipeline flattens closely to the pipeline to be reconstructed, flexibly responding to the terrain – both to narrowing and caving. Omega-Liner completely “copies” the shape of the pipe, in which it is installed. Furthermore, the internal diameter of the pipeline is insignificantly

### RENOVATION OF PIPELINES IN MADONA, LATVIA

- » Customer: JSC “Madonas ūdens”
- » Work carried out by “Ostas celtnieks” LLC
- » Type of renovation: renovation of household sewerage pipelines
- » Pipelines to be renovated: D 200–426m; D 250–483m.

### RENOVATION OF PIPELINES IN VENTSPILS, LATVIA

- » Customer: local government LLC “Udeka”
- » Work carried out by “Ostas celtnieks” LLC
- » Type of renovation: renovation of household sewerage pipelines
- » Renovation of pipelines with D 400–1,600m

reduced, and thanks to the excellent flow properties it does not affect the flow.”

“The winner of our tender for renovation of pipelines was the company “Ostas celtnieks”, offering the use of Omega-Liner technology. Renovation work was carried out smoothly without any traffic jams and inconveniences to the public, as the streets were not closed and the provision of water supply and sewerage services to public were not suspended. Over 900 metres of sewerage pipelines were renovated within 12 business days, which is at least seven times quicker than it would have been done using the open entrenchment method. For example, the renovation of 86m section, crossing several wells, was completed in only two hours! Even not counting the potential inconveniences caused to the city, renovation of pipelines using Omega-Liner technology method turned out to be less expensive than replacement of pipelines by digging an open entrenchment.”

### No inconveniences for everyday life

Upon surveying the sewage networks in Ventspils, a high level of infiltration in the old concrete manifolds was established, thus, reconstruction or renovation of networks was required. Considering that renovation of sewerage pipelines had to be carried out beneath the well-organised streets of Ventspils with heavy traffic, a decision was made to carry

out this work using non-entrenchment pipeline renovation technology. The depth of the old ID 400mm concrete pipelines varied from 2.5 to 5m depending on the site.

“In fact, the internal diameter of the concrete manifold in some places differed, thus, not all renovation solutions would be adequately effective. Upon execution of the construction plan, we announced an open tender on renovation of pipelines, where the winner was SIA “Ostas celtnieks” offering Omega-Liner non-entrenchment pipeline renovation technology. It was very important for us, as a customer, that manifold renovation work would cause no inconveniences for everyday life in the city, no traffic in the city would have to be shut down, reconstruction work would be carried out quickly, without polluting the environment, and all work would be carried out via the existing wells to avoid damage to road surfacing. I think that neither passers-by nor our clients realised how significant the work was that was carried out underground, as provision of services to them was not suspended at all,” says Technical Director **Guntis Grūbe** from the local government company “ŪDEKA”.

“When acquainting us with the Omega-Liner technology, experts at Uponor carefully explained to us the essence of the technology. Omega-Liner pipeline, which has a smaller diameter than the pipeline to be renovated, prior to installation, is folded to facilitate its insertion into the existing pipeline. Then, it is warmed up and blown as a balloon until it closely fits the existing pipeline, imitating the shape thereof. Thanks to its flexibility, the modified PVC-U pipe causes less narrowing of the existing pipeline without affecting the final quality – the main idea is that it must be fully open. Compared to the surface of concrete pipelines, the surface of Omega-Liner is perfectly smooth, which increases the flow rate, thus, recompensing narrowing of the internal diameter.”

“Another benefit is that Omega-Liner pipe has no connections from well to well, which allows the potential penetration of roots, infiltration and pollution risks to be avoided. We were sure that this was the most adequate solution for our needs.” ■



# Piping for mining in Lapland

LKAB – one of Sweden’s oldest industrial companies – mines magnetite ore in some of the world’s richest iron ore deposits, located in the Arctic Circle in Swedish Lapland. Uponor Infra has been working in the Svappavaara mine area for five seasons and is now building the external water system pipelines for the world’s first pelletising plant NOx scrubber in Kiruna as part of an installation contract for LKAB.

**A**s we see it, a happy customer is a good customer, and this is true for the LKAB Kiruna projects at Svappavaara Mine in Swedish Lapland, where Uponor Infra Project Services is now working on its third consecutive project,” says Project Manager **Adrian Bonden** at Uponor Infra Project Services.

LKAB is one of Sweden’s oldest industrial companies. LKAB mines mostly magnetite ore in some of the world’s richest iron ore deposits, located in the Arctic Circle in Swedish Lapland.

The company was founded in 1890 and has been an important cog in the Swedish export industry and industrial development

for more than a century. Throughout this period the company has played the role of reliable supplier and partner to the European steel industry.

Today LKAB is a high-tech mineral group with large-scale operations in a competitive global market. Although LKAB is a small producer in terms of tonnes of iron ore delivered, it is one of the world’s leading process exponents and the world’s second-largest producer of iron ore pellets. Other industrial minerals have been added to its product portfolio alongside the rich, high-grade iron ore from the north. This makes LKAB a reliable supplier that is constantly being developed with an eye on the future.



### Mining in northern Sweden for more than 120 years

LKAB's mines are located in Kiruna, Malmberget and Svappavaara in northern Sweden. LKAB has been mining iron ore here for more than 120 years. In the early days, mining was done in open pits. Today, LKAB has the world's largest and most modern underground iron ore mines. LKAB has achieved this by engaging in many years of constant development and extensive research and development to maintain a competitive cost level in ore production.

The ore body in Kiruna is about four kilometres long and has a depth of two kilometres. To date, more than one billion tonnes have been mined. A new main haulage level at 1,365 metres went into operation in 2013 and will secure mining operations for another 20–30 years.

**ONLY ONE RESPONSIBILITY OWNER FOR ALL ASPECTS OF THE PROJECT IS EASY FOR THE CUSTOMER.**

The Malmberget mine consists of about 20 ore bodies. The deposits consist of pure magnetite ore. In the Malmberget mine, a new main haulage level at 1,250 metres was inaugurated in 2012, considerably extending the lifetime of the mine.

The newly opened Gruvberget mine in the Svappavaara ore field is operated as an open pit mine. This mine, together with the planned Leväniemi and Mertainen mines close to Svappavaara, will produce about 25% of the company's total output of iron and ore in 2015.

### Fifth season in Svappavaara

"This is the fifth consecutive season of work in Svappavaara," says Adrian Bonden.

"We started with a special pumping line project for emptying the open pit mine in 2011. The contract included the detailed design, material deliveries, welding and installation works, marine works and pressure tests and commissioning of the pipes. Uponor Infra supplied 1.2 kilometres of floating pipes in the open pit mine and seven kilometres of transport/pumping pipes to the discharge point. In total almost 30 million m<sup>3</sup> of water was pumped over a period of 17 months to successfully empty the mine."

"When the open pit mine was emptied in autumn 2014, we had to be ready to deploy a continuous level control pumping line in order to keep it dry. The pipeline was successfully taken into use in autumn 2014. The pipeline length was 3.5 kilometres, with dimensions of 280mm–630mm. When the line was taken in use we started to dismantle the large pumping lines from the emptying project," says Adrian Bonden.

LKAB wanted Uponor Infra to reuse these old pipes in a new project in which LKAB will install the world's first pelletising plant NOx scrubber.

"For this 4.2 km-long project, Uponor Infra Project Services was selected to build the external water system pipelines in dimensions of 500mm–900mm, again with full service in mind, and to design, deliver, build and start up the concept," says Vice President, Project

Services **Christian Vestman** at Uponor Infra.

This concept makes it very attractive and easy for the customer, because LKAB did not need to work with many different companies and had only one contact and responsibility owner for all aspects of the project.

"The dismantled pipes were cut in lengths of 33m, 44m or 66 m and transported with our special wheel systems to the new installation route in the Svappavaara mine area. The project is expected to be ready in autumn 2015," says Christian Vestman. ■

# Heavy-duty pipe for Tallinn's district heating network

Large-scale construction has been the norm in Lasnamäe, the largest district of Estonia's capital city Tallinn. Now that they are renovating the district heating network, the pipes are also amply sized. A total of 1.1 kilometres of pre-insulated pipes with a diameter of DN 1,000 will be installed in the area.

**L**asnamäe is the largest of the eight districts of Tallinn. The residential area located in the eastern part of the city has over 118,000 residents, and it is known, among other things, for its large prefabricated buildings that date back to the Soviet Era, in the 1980s.

Lasnamäe has become accustomed to thinking big. Now that they are renovating the district heating network, the pipes are also amply sized.

Uponor Infra will supply Lasnamäe with a total of 1.1 kilometres of district heating pipes with a diameter DN 1,000. The steel pipes are insulated with polyurethane, and they have a 1,200mm plastic protective covering.

The customer is Küte ja Ehitus AS, while the end customer is the owner of the district heating network, AS Tallinna Küte.

**Vjatseslav Kovaltšuk**, Director of the development department of Küte ja Ehitus AS, says that this will not quite be the Estonian record for pipe size, but it comes pretty close.

“The largest pipes installed in Tallinn are in the size category DN 1,200. They were needed in the early 1970s when the Iru power plant was built near the city. At that time, the plant had to supply heating power for the entire city.”

"Today, systems are more modern and the city does not need as much energy. With the district heating network now being renovated, pre-insulated DN 1,000 pipes are sufficient," Kovaltšuk states.

### Two sites at the same time

Küte ja Ehitus AS is renovating the district heating pipes for Lasnamäe at two different locations.

"In the Smuuli area, we are renovating the pipes because a new intersection is being built there. It makes sense to renovate the main pipeline at the same time. Later, if we ran into problems with the old pipes, repairing them would be much more laborious and expensive."

"Near the Peterburi tee, the pipes are already in such bad condition that they need to be replaced. Lately, there have been several pipe breaks and leaks in the area."

Founded in 1993, Küte ja Ehitus AS is Estonia's largest engineering company specialising in the design, construction and renovation of heating energy infrastructures and fire safety systems. Its customers mainly comprise energy conglomerates, industrial facilities and main contractors of large buildings.

Moreover, the company is expanding outside the Estonian borders. From the beginning of next year, the company's name will change to KE Infra.

### Long history of cooperation

Küte ja Ehitus selected pipes from Uponor Infra for the contract based on its previous good experiences.

"We have worked in cooperation with Uponor for a long time, now. This year alone, Uponor has supplied us with pipes and components for twelve different projects in Tallinn," mentions Vjatšeslav Kovaltšuk.

"We have been very satisfied with the quality of the pipes, and the price level is competitive as well."

Kovaltšuk notes that the schedule has been extremely tight in the Lasnamäe contract.

"The manufacturing and transport of large pipes and installation components has been challenging. The experienced project team and Uponor professionals have; however, managed to meet the stringent requirements without having to compromise on quality or scheduling."

"The contracts must be completed during the summer season. Work began in July, and it is scheduled to be finished by the end of September at the latest, when the heating season begins."

### A lot of logistics to consider

According to Project Manager Jan-Erik Svarvén from Uponor Infra's Industry and Energy Plant Sales, the steel company SSAB delivers 16-metre steel pipes to Uponor Infra's Vaasa plant, where they are insulated.

"The manufacturing of large pipes requires significant lifting capacity as well as foam machines that are capable of spraying the required, larger than usual, amount of urethane in one go. Not all manufacturers have the means for this," Svarvén points out.

Uponor also delivered 44 elbows to Tallinn, the largest of which are up to 4x2 metres in size. Also crossing the Bay of Finland are, for instance,

Largest of elbows  
are up to 4x2  
metres in size.



**"THIS WILL NOT  
QUITE BE THE  
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two pre-insulated 3.6x2 metre T-branches with a wall thickness of 20 millimetres. The T-branches will connect the two main lines in Lasnamäe.

"The transportation has required a lot of arrangements, as only three pipes or four elbows fit into one vehicle. We had to build a special bed for the T-branches, wider than a regular lorry bed," Svarvén describes.

Pre-insulated valves, for example, are also used in Lasnamäe.

"We have designed the valves in cooperation with the customer and the valve supplier. We want to ensure that the customers get exactly what they want," Jan-Erik Svarvén emphasises.

In the Smuuli area, a nonconventional solution will be used on the line: The DN 1,000 pipe will be installed in a concrete channel in the location of the bridge, as there was no room to excavate at the location.

"We also had German engineers involved in the planning of this solution with us," Kovaltšuk says.

### Installation requires a lot of space

The excavation and installation work of large pipes naturally requires a lot of space.

"At times, it is difficult to get permission from the local traffic department for closing off roads that are heavily trafficked. The planning and preparation phase of this kind of work takes a significant amount of time."

Kovaltšuk says that in Lasnamäe, they do not usually run into the same problems as in the Medieval Old Town; there, the museum authorities interrupt work immediately, if excavations reveal something with historical significance. This naturally causes project delays.

"And as we are operating in a city, we also receive complaints from the residents every now and then. It is understandable, as the installation work always causes a certain amount of noise."

"However, we attempt to find compromises that ensure that the work causes as little disturbance to the environment as possible." ■

The treatment plant was manufactured at Uponor Infra's factory in Vaasa, Finland and delivered to Gotland at the end of February.

# WehoPuts treats the wastewater of holidaymakers

A WehoPuts 550-960 wastewater treatment plant was installed this spring in Åminne, a region on the east coast of Gotland, Sweden's largest island. The plant now handles the wastewater of more than a hundred summer cottages and 25 single-family houses. A few years from now, the system will be expanded to full-size, covering about one hundred more cottages.

**T**he scenic east coast of Gotland is called the sunniest place in Sweden. It is famous for its sandy beaches and spectacular sunsets. Åminne is located on the delta of the Gothem River, about 40 kilometres from Visby, the only town on the island. "Åminne" in fact means "river delta" in the Gotlandish dialect. The region is a popular holiday destination, with many summer residences as well as holiday centres and camping areas. During the summer, the population of Åminne – and Gotland as a whole – increases many times over.

## A single easy solution for wastewater treatment

The small community of Gothem in Åminne is also largely a summer cottage area. Several dozen people live there all-year round.

The community modernised the wastewater treatment of 140 properties by replacing the residents' old sedimentation basins and infiltration trenches, which were in poor condition, with





Only the service hatches and ventilation pipes of the plant remain visible.



a WehoPuts 550 plant. The bedrock of Gotland mainly consists of limestone, which makes it difficult to build infiltration trenches. The municipality of Gotland does not grant individual properties the right to build wastewater treatment plants, at least four to six properties must be linked to the same plant.

“A shared WehoPuts plant is an excellent solution for local conditions – and it’s easy for the residents,” says Product Manager **Jean Saarinen** from Uponor Infra.

Uponor Infra has already supplied several WehoPuts plants to Gotland.

“A few years ago, for instance, we delivered a WehoPuts 300 plant to the island of Furillen in northeast Gotland. In the future, we will pair it with another WehoPuts 300,” says Saarinen.

### More properties to be connected a few years from now

Saarinen says that 25 single-family houses with year-round residents and 115 summer cottages are now connected to the wastewater treatment plant in Gothem.

“A few years down the line, the system will be expanded with the addition of a second process tank unit. About a hundred more cottages can then be connected to it.”

The WehoPuts 550-960 plant, true to its name, is dimensioned to treat the wastewater of 550 users and expandable up to 960 users.

“With two process tank units, the system will be able to handle a total of 960 users. One of the reasons why Gothem chose WehoPuts is that its modular system can be easily expanded in accordance with the customer’s needs,” says Saarinen.

WehoPuts is made of lightweight structural Weholite pipe and is delivered fully ready-to-install. Handling and installation is very easy and fast. Installation is also facilitated by a predimensioned and designed anchoring package to secure a good installation.



### Installation takes only a few hours

The construction of the wastewater treatment plant was handled by the Gotland-based construction and industrial company OSAB Östra Gotlands Schakt AB, which also owns the plant. The company charges a connection fee and monthly usage fees from the properties based on their load.

“The pipelines were excavated last autumn and 135 pump wells were installed in the area. The treated water is pumped through a directionally drilled pipe that runs through the bedrock and into the sea,” says Jean Saarinen.

The WehoPuts plant was delivered from Uponor Infra’s factory in Vaasa, Finland at the end of February 2015 and installed at the turn of February and March.

“On-site installation of the treatment plant takes only a few hours. Once the connections and electricity are good to go, all you have to do to start up the plant is push a button. The WehoPuts was up and running in Gothem by the end of April, in good time before summer.”

### Stricter legislation

Swedish legislation does not lay down provisions on wastewater treatment in sparsely populated areas, although the country applies the EU Urban Waste Water Treatment Directive. The Swedish Environmental Protection Agency (Naturvårdsverket) issued recom-

mendations in 2006 on the basis of which each municipality can independently decide on its wastewater treatment. For this reason, practices differ around the country.

“However, stricter legislation is now being introduced.”

About 16–17,000 wastewater modernisation projects are carried out in sparsely populated areas of Sweden every year.

“The wastewater systems of about 700,000 properties need to be modernised – thanks to which there is good demand for high-quality wastewater treatment plants like WehoPuts,” says Saarinen. ■

### WEHOPUTS WASTEWATER TREATMENT PLANTS FOR VILLAGES

- » WehoPuts 200–1200 biochemical wastewater treatment plants are intended for treating the wastewater of several properties or an entire village.
- » The plants consist of one or more horizontal tanks that are installed in the ground as well as the required process equipment.
- » The modular system is easy to expand in accordance with the customer’s requirements.
- » The treatment plant is robust and compact. It is assembled at the factory and is fully ready-to-install upon delivery. On-site installation only takes a few hours.

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