THE UPONOR INFRA CUSTOMER MAGAZINE » ISSUE 1/2017

pipe world

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Enghave Station builds on Uponor

Replacement of potable water pipeline guarantees reliable water supply for residents

- Replacement of 100m potable water pipeline in the Resistance's underground tunnels in Copenhagen
- OD500 mm PE100, SDR11 pipes ensure a flexible water supply with a long lifetime
- Full project service solution including pipe deliveries, on-site welding service and overall project management

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Dear reader,

Even if the world is moving in the right direction in general (lower childbirth mortality rates, higher school attendance and improved living standards, for example) we are experiencing turbulence in Europe and North America. The obvious sources of such turbulence are Brexit, the US Presidential election, huge migration pressures, the European Union and the Euro. In turn, these drivers are more or less powered by globalisation and the internet, the latter of which has democratised the business sector. Such developments are good for the world as a whole, but are having major impacts on developed countries, companies and institutions. We seem to be undergoing a major upheaval which will continue to redistribute global decision-making power and transform democratic systems. We are living in a VUCA (Volatile, Uncertain, Complex and Ambiguous) world, whatever the outcomes of these transformative processes will be.

For Uponor, this means being agile and bearing the customer's needs in mind (focus). That is precisely what we are doing in the reference projects explored in this volume of Pipe World. The current megatrends – globalisation, digitalisation, sustainability, growing water shortages and urbanisation – will continue and we must all find our place in this new reality. For Uponor, this means investing in digitalisation and the development of our product portfolio and service range. This issue of Pipe World provides good examples of Uponor projects that achieve these aims. We support a big city in Sweden in its work to become independent of fossil fuel, while a cabin village in Southern Norway gets a modular wastewater treatment plant that can be expanded according to needs. We will say more about our digitalisation and service efforts in the next issue.

I am delighted that this issue of Pipe World tells the world about some fantastic Uponor projects. I wish you all good reading!

Best regards,

Sebastian Bondestam
President
Uponor Infra

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Modular wastewater treatment plant can be expanded according to need

The biochemically operating WehoPuts 800–1600 wastewater treatment plant guarantees that the wastewater treatment of a cabin village in Southern Norway is handled without hitches, even as the village expands. Because the infrastructure of the cabin village is being developed and built in stages, it was important that the wastewater treatment system can be expanded according to need.

HUNNEDALEN is located in a beautiful, mountainous landscape in Southern Norway, about 40 kilometres from Stavanger, known as the oil capital of Norway. The first cabins were built in the valley, located at an elevation of almost one kilometre above sea level, in the 1940s; today, the area around boasts three hundred cabins, or hytts, as the Norwegians call them.

"Many of the cabins do not yet have running water. However, the infrastructure of the cabin village is now being developed and built in stages. Because the number of cabins is continuing to grow, new solutions were needed for wastewater treatment in the area, in addition to the old and small wastewater treatment plant there," says Application Manager **Ari Sillanpää** of Uponor.

Since the area is being constructed in stages, it was also very important to select a wastewater treatment plant that could be expanded according to growing needs.

"A modular wastewater treatment plant is easy to expand later, by adding more processing tank units."

"When the system can be expanded as needed, the initial investment costs can be lowered and the total costs spread over several years as the plant grows," Sillanpää says.

Around 200 cabins have already been connected to the WehoPuts 800-1600 wastewater treatment plant delivered to Hunnedalen.

"The wastewater treatment plant is currently dimensioned to handle the wastewater of 800 users. When a second, two-tank process unit is added to the system, the overall system will be dimensioned for 1,600 users."

It is estimated that around 50 new cabins will be connected to the plant annually during the next four years.

Customisation according to site and need

Sillanpää points out that WehoPuts wastewater treatment plants can be customised according to the site and the needs and wishes of the customer.

"In Hunnedalen, for example, the customer required that the pumps of the wastewater treatment plant should be dry-mounted, instead of the more commonly used submerged pumps. Process control of the wastewater treatment plant was also tailored to fulfil the wishes of the customer. A local automation company handled the electrification of the plant and the necessary connections."

The plant and its anchoring equipment were delivered from Uponor's Vaasa factory and installed in Hunnedalen in late November 2016.

The pipelines had been pre-constructed before the wastewater treatment plant was installed. There are both pressure and gravity sewers in the area.

"Treated water is pumped through a sampling well into a nearby brook."

Flow meters have also been installed at the treatment plant, in accordance with the customer's specifications. This allows the accurate monitoring of the amount of treated wastewater.

Because there is a lot of snow in the area in winter, a service building was constructed on top of the wastewater treatment plant to house both the equipment required to control the plant and service manholes.

"The building too will be expanded later, and this was taken into account in the designs. The plant will be built in the vicinity of a public car park, and public toilets and other social facilities will be situated in the building."

Manufactured from lightweight Weholite pipes, the WehoPuts is delivered ready for installation, to make its handling on site easy and quick. Installation is also facilitated by the pre-dimensioned anchoring equipment.

"Installing the tank on site is fast thanks to a high degree of prefabrication. The wastewater treatment plant can be started up as soon as the connections and electrification are ready," Sillanpää says. ■

New Uponor Infra office in Warsaw

THE WARSAW OFFICE moved to new premises on the 10th of February 2017. Located in the city centre and close to a railway station, the new office has more than 800m² of floor space and is divided between Uponor Infra and BLD Product Data Service. Two more units are to be located here in due course. The colleagues from Uponor BLD will join in April and the Finance Shared Service Center a little later. ■

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Project services news

Uponor Infra, Project Services team became a contractor for several projects in Sweden at the beginning of the year. The Project Services team is based in Vaasa, Finland, and is part of the Uponor Infra Europe Sales and Marketing organisation.

Öland desalination plant

Swedish Sjöentreprenad AB appointed project services to design, construct and produce a 750m long PE intake pipe with a diameter of DN450mm and a 200m long PE outfall pipe with a diameter of DN355mm, including an intake structure, diffuser and fittings for polypigging. The project began in February.

Boliden Minerals, Gällivare

Project Services has signed an agreement with Boliden Mineral AB for the design and delivery of a 6km PE pressure pipeline, DN800mm PN8-12.5, with fittings. The project includes welding and concrete work, as well as the pressure testing and commissioning of the line. The project will start in May 2017.

SCA Sundsvall

In the summer of 2016, Project Services performed the design and installation of process water pipelines with dimensions of 900mm and 1,200mm. The satisfied customer has also asked them to plan and install process water pipelines with dimensions of 800–1,200mm during the spring and summer of 2017.

Wastewater flow equalization tanks and pipelines for Upplands Väsby, Stockholm

NCC chose Project Services to design, deliver, weld and weight a Weholite DN/ID1,200mm flow equalization tank and 600m pipe. The project will also include further deliveries and installations of Weholite pipes and chambers. ■

Appointments

POLAND

On the 5th of December, **Andrzej Trybus** joined Uponor Infra Poland as its Commercial Director. Andrzej's main focus will be leading the sales function and organisation in Poland. He will also lead the local business team, ensuring cooperation and alignment between functions.

Andrzej has wide experience of working for international companies and leading local operations with full P/L responsibility, most recently in Consolis Group and Metsä Group.

DENMARK

On the 6th of February, **Jens Pedersen** joined Uponor Infra Denmark as its Director, Sales and Marketing. Jens will assume responsibility for leading the sales function and organisation, including Customer Service and Project Management, in Denmark.

In addition, he will lead the local business team, ensuring cooperation and alignment between functions.

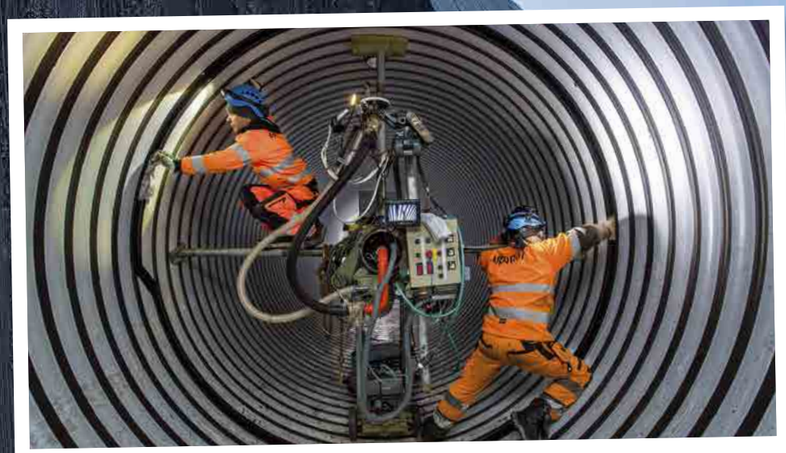
Jens has extensive experience of working in Sales and Sales Management in Denmark and other Nordic countries, having spent over 20 years in various sales leadership positions in Air Liquide Welding Scandinavia.

TEXT Outi Järvelä » PHOTOS Arto Leipälä, Olli Häkämies, Pekka Mäkynen, Uponor »

Installation-ready

Weholite tanks will save time and costs on site

The lightweight and durable Weholite is selected increasingly often for tank solutions demanding high capacity such as waterworks, stormwater, fire water and chemical tanks, alkalisation plants and attenuation basins. If the transport dimensions allow, Weholite tanks are transported ready for installation, which saves a significant amount of time and effort on site. The inner diameter of the largest Weholite tanks manufactured in Finland at the Vaasa factory already reaches 3.4 metres.



The use of the installation-ready, lightweight and easy to handle Weholite tanks is increasing steadily in construction projects.

Weholite tanks are delivered with all fittings completely individually designed and installed at the factory, so their installation and commissioning is fast.

"The tank is ready for use immediately after the connections have been made. Construction schedules are often tight, so saving work stages and time on-site is a significant benefit. The shorter installation time is also clearly reflected in the cost," says Application Manager **Ari Sillanpää** from Uponor Infra.

"Thanks to the light weight of the material and the structure of the pipe, transporting even a large tank is quite simple," Sillanpää notes.

Weholite can be used for the manufacturing of complete pipe and tank systems as well as a wide variety of customised solutions.

"Customised according to the site and the customer's needs, Weholite tanks are suitable for many different applications. The tanks are delivered, among other things, for use as potable water-, firewater-, septic- and chemical tanks, alkalisation plants, attenuation basins and as separators."

"We are constantly finding new applications," Sillanpää notes.

No risk of corrosion

Weholite pipes are manufactured from polyethylene or polypropylene profile by spiral winding. The layered structure of the pipe guarantees durability, flexibility, tightness and a certain thermal insulation for the tanks.

The structure is very resistant to, for example, the movement or depression of soil. When installed into the ground, the predicted service life of a Weholite tank is more than one hundred years.

"The tanks are completely sealed. We also always verify this by performing a tightness test to the tanks before delivery."

Manufactured from PE or PP, the tanks have no risk of corrosion and are resistant to most chemicals. The tanks are suitable for foodstuff and potable water use, and are also very resistant to acids, alkalis and solvents.

"Indeed, an increasing number of the tanks are delivered for industrial use," Sillanpää says.

Nothing from the tanks themselves dissolves into the environment or the contents of the tank.

Layered structure allows large container sizes

The layered structure of the Weholite tank allows the manufacturing of tanks with an inner diameter exceeding 3.5 metres.

"A Weholite tank with an inner diameter of 3.4 metres and a length of slightly under 20 metres is thus far the largest factory-manufactured tank we have delivered in Finland. Weholite tanks with an equal inner diameter were also delivered to a work site of Suomen Maastorakentajat Oy in Northern Finland."

The 12 Weholite 3,400 tanks manufactured at Uponor Infra's Vaasa factory are used to secure the water supply during the construction phase of industrial projects. The tanks used as potable, industrial, fire and reserve water systems have a volume of 135 m^3 and a length of 15.5 metres each. ▶

There is no room for compromise in the safety of a fire extinguishing system

The largest factory-manufactured tank delivered by Uponor in Finland thus far, a Weholite sprinkler tank with an inner diameter of 3.4 metres and a length of around 20 metres, will soon guarantee the fire safety of the small-dimensioned wood line at the Haapajärven Ha-Sa Oy sawmill in Haapajärvi, Central Finland.

Located in Northern Ostrobothnia, Ha-Sa delivers wood raw materials from its Haapavesi and Haapajärvi sawmills to, for example, the furniture and carpentry industries, building industry, and infrastructure construction.

The small-dimensioned wood line, Haapajärven veistämö, concentrates on delivering sawn timber intended for earthmoving and bridge construction as well as the packaging industry.

"From the start, an independently functioning sprinkler system has been a requirement at our other sawmills. The insurance company recently estimated that the system at the woodworking shop must be modified to trigger automatically as soon as a fire is detected. The current system in the woodworking shop is a dry pipe sprinkler system, that is, the fire department will supply the extinguishing water into the pipes once they arrive," describes Production Manager **Riikka Myllylä** from Ha-Sa.

More volume through increased pipe diameter

Once the sprinkler design was finished, Ha-Sa began to compare the different options.

"The benefits of the Weholite tank were clear: long service life, easy maintenance and the ability to make changes to the tank system even at a later date."

"Of course, the competitive price is also an important factor. Installing Weholite is quick and easy, which means cost savings on the construction site, too. Weholite tanks not needing separate thermal insulation is also evident in the costs. The layered structure of the tank, particularly when it is covered underground, is enough to ensure that the water in the tank will not freeze even in the winter."

The volume of the large tank is 175 m^3, with 140 m^3 of net capacity.

"The requirement was that the water volume in the tank is sufficient for supplying water to the sprinklers for one hour. The size of the tank is also dimensioned to allow other nearby businesses to connect to it in the future. The City of Haapajärvi, for example, has already joined the project, and water can be directed to the nearby industrial hall owned by the city in case of fire. The tank has also been equipped with extra connections enabling the future connectivity to other companies systems."

Regional Sales Manager **Jyrki Nikkinen** from Uponor notes that the Weholite tanks can be flexibly customised according to need.

"In this case, for example, we were able to increase the volume of the tank by changing the pipe dimension from the original 3 metres to 3.4 metres. This allowed us to keep the length of the tank reasonable, and the tank could be transported to the work site ready for installation."

The tank, to be installed a few tens of metres from the woodworking shop will be commissioned by summer.

"Once the ground thaws, we will be able to finish the excavation of the necessary connections."

Stormwater runoff causes no worries at the new Children's Hospital

The custom-made Weholite stormwater attenuation tank donated by Uponor will manage the stormwater runoff at the new Children's Hospital to be built in Helsinki, Finland, before it is discharged into the municipal network. The tank was delivered to the site ready for installation and was installed in just a couple of hours.

Uponor participated in the construction project of the new hospital, which will concentrate on specialised care for children, by donating municipal engineering and building technology solutions. One of the donated solutions is a Weholite stormwater tank with a capacity of a hundred cubic metres, which will be used to attenuate stormwater runoffs from the grounds of the new hospital, before the water is discharged into the municipal stormwater network.

"The current capacity of the city's stormwater network is no longer sufficient to handle stormwater formed in the area, so it needs to be held back on the lots," says **Teemu Salminen**, Project Development Manager at Uponor.

The Weholite tank was fully custom-built at Uponor's Vaasa factory, having been tailored to meet the needs of the Children's Hospital.

"Among other things, the length of the tank, its inlet and outlet connections with their elevations, and the service hatches were designed according to the wishes and needs of the hospital. Several inlet connections and inspection manholes were built on the tank, because stormwater enters the tank from several directions."

"Another, less common feature of the tank is its anchoring method; it is anchored directly into the bedrock in order to overcome the boyency effect of groundwater, without the more commonly used anchoring slabs. This was the obvious solution in this case as the installation place was small and a solid bedrock was available for anchoring the straos."

Best results through cooperation

Uponor Infra's project sales team was involved in the project from the planning phase.

"Together with the designer, we were able to position installations such as connections, inspection manholes and accessories in the manner that will best serve the needs of the property. The solution drawings we delivered were made available to the designer at the beginning of the project. We were also able to give advice on the anchoring of the tank after it became clear that it would not be possible to use anchoring slabs in the manner envisaged by the original plan."

Indeed, Teemu Salminen considers it highly important to be able to participate in projects in their early stages.

"If cooperation between the designer, client and contractor begins during the design stage, this ensures that projects remain on schedule and budget, and no unexpected, additional work is required on the work site, even for the most demanding deliveries. On this occasion, we were able to match the design and manufacture of the tank with the other design and construction work on the site."

"The earlier we can do things together, the easier it is to make changes as the project progresses," Salminen says.

He points out that Uponor offers dimensioning and design for all of its stormwater solutions, as well as installation and welding services for its customised Weholite solutions.

"Together with the customer, we can find a high-quality solution that is the best fit for each site."

Installation was quick

Because the large tank has an inner diameter of 2.4 metres and a length of 25 metres, special arrangements had to be made for its transportation.

Uponor's project sales team also handled the transport arrangements and provided the contractor with precise instructions on lifting and installation of the tank.

"The excavation and the mooring anchors were ready and waiting, and the tank could be installed quickly. The connections were made and the tank covered with soil on the same day. Weholite tanks are delivered ready for installation, which saves considerable time and work at the work site."

The tank was installed in mid-October 2016, so that it could be taken into use before the completion of the building's roof.

"After all, stormwater accumulates on the grounds during the construction period as well," Teemu Salminen says.

In addition to the stormwater tank, Uponor delivered wastewater, rainwater and stormwater pipes, drainage pipes, pressure pipes and various chambers for the municipal engineering of the work site.

"The compatibility of the products ensures a safe and tight system that works as planned, and in which no additional work is required on the connections, as an example."

Finished during next year

The new Children's Hospital will replace the obsolete facilities of two hospitals specialising in the treatment of paediatric patients. The hospital will treat paediatric patients from the entire country and perform paediatric heart surgery and organ transplants. The construction of the hospital is being funded by private donations in addition to public funding.

A durable and reliable solution for wastewater

The Weholite tanks, with an inner diameter of three metres, delivered to the Riihimäki wastewater treatment in Southern Finland will ensure that the plant keeps running, even during emergencies.

The tanks installed in late 2016 are used as emergency tanks at the wastewater treatment plant of a factory. The tanks can be brought online quickly, for example during disruptions or emergencies," says **Veli-Matti Hakala**, a Work Supervisor at Uponor.

Uponor delivered two Weholite tanks, each with an inner diameter of three metres and a volume of over 200 cubic metres.

"The tanks are 30 metres long, so they are quite large. It was very important to the client that the tanks could be delivered to the site in two 15-metre parts and welded together there. The roads leading to the plant would have had to be rebuilt to enable the tanks to be delivered at their full size. There would also have been additional transport requirements."

Uponor's field welders took care of the welding of the tank and installed a DN/ID 2,400mm Weholite pumping station, a DN/ID1,200mm Weholite valve chamber and connecting pipings.

"The work proceeded on the agreed schedule, although changes had to be made to the solutions on site due to old structures uncovered during the excavation. The reserve tanks were installed inside decommissioned concrete reservoirs. In order to place the tanks in precisely the desired place, one of the tanks had to be slightly shortened. The height and connection points of the pumping station also had to be modified on-site."

"The customer was highly satisfied with the outcome and the ability of the skilled installers to react quickly to the required alterations," says Veli-Matti Hakala.

Installation was completed in just over two weeks.

"The tanks have been tested and have worked just as intended."

Excellent for wastewater use

Veli-Matti Hakala says that Weholite is highly suitable for wastewater use.

"We deliver a high number of wastewater pumping stations, for example. Weholite has no risk of corrosion and is highly resistant to acids, alkalis and other chemicals. All solutions can also be customised according to the customer's needs."

Hakala mentions a Weholite wastewater application currently being built in a groundwater area. The Centre for Economic Development, Transport and the Environment approved Weholite as the material used on the site.

"Thanks to Weholite's layered structure, no protective piping is required around the actual pipe, although the regulations would require one from a conventional, heavy-duty pipe in a groundwater area." ■

TEXT Uponor PHOTO Uponor

Record-breaking intake cooling system in the Philippines

New challenges are where the Project Services Department at Uponor Infra feels most comfortable and can demonstrate its continuously developing expertise. The aim on this occasion was to provide a seawater intake cooling system – a pipeline, intake structure and chlorination line – for the 420MW extension of the Pagbilao Coal Fired Power Plant on Luzon Island in the Philippines.

CCT Constructors Corporation is a customer of Uponor Infra, a subcontractor of Daelim, the main contractor for the end client and owner of the plant, Team Energy.

The 146m pipeline will provide the 19m^3/s seawater flow with a service life of 30 years. An DN/ID3,000mm Weholite pipe and a record-breaking intake structure made of Wehopanels – the largest PE intake head in the world – were used to build the pipeline.

The pipes came from Thailand and all of the prefabricated parts for the intake head were delivered in containers from Uponor Infra's Vaasa factory in Finland.

The huge dimensions of the tower – the screen part had a 13.5m diameter – and local restrictions on lifting equipment inspired the Project Services design engineers to do their utmost to find the best solution for the tower's fabrication and installation.

The welding of the panels, manoeuvers to flip the huge covers, the ballasting of the internal walls, the lifting operations, the connection stages between the top and bottom part – all of these were designed and planned meticulously in the Vaasa Project Services offices, to ensure yet another successful installation by the Uponor Infra team.

Less than 24 hours were needed to launch, transport, sink and connect the pipe to the onshore chamber, saving a great deal of time and money for the customer by minimising the auxiliary equipment and diving hours.

Extremely demanding dimensions

The welding works began at the end of July 2016, the pipe was ready for launching on 23 August and the intake head was finished on 1 October, on the same day that the pipe was launched. After this, due to a delay in the dredging works, Uponor's crew returned to Finland, resuming their tasks at the end of November when they rounded off the works with the submersion of the intake head.

The extremely demanding dimensions of the intake head challenged the Project Services welding team or "Weholite Samurai" (they only enter the battlefield when groomed to perfection…). Their skills, professionalism and hard work were once again evident in the successful delivery of this project, a new milestone in the Weholite World. ■

TEXT Uponor » PHOTOS Sören Håkanlind »

Uponor Infra offered project management, technical support, customised products and field service with on-site installation. Adam Ciesz (left) and Petri Tähtinen from Uponor Project Sales visited on-site at Sobacken at least once a week.

Focus on sustainability

The town of Borås in Sweden is striving to become independent of fossil fuel. The Sobacken project, involving a combined heat and power plant, sewage treatment plant and a production plant for biogas, is an important part of the town's commitment to this goal. The aim is to secure the town's infrastructure and energy system for the future.

The building of Sobacken, with its new combined heat and power plant, sewage treatment plant and additional facility for biogas production, began in the spring of 2015 and is due for completion in 2018. The project's budget is SEK 3.4 billion and it has attracted both national and international attention due to its focus on future sustainability. For example, Sobacken will guarantee the supply of district heating to the people of Borås, will have the capacity to achieve statutory environmental limits for wastewater, handle all household sewage, and fulfil the town of Borås' ambitious environmental goals related to renewable electricity.

Responsibility from drawing to installation

Because the sewage treatment plant needs safe and reliable pipes and couplings between its wastewater treatment basins, the contractor chose Weholite as its system solution. However, Uponor's contribution to this complex and prestigious project is not just about supplying Weholite. It also includes project management and technical support such as design and calculations, customised products and field service with on-site installation – all coherently coordinated by Uponor Infra Project Services.

Prefabrication and customisation

The primary reason for preferring Weholite to traditional solutions using stainless steel or concrete pipes was the fact that Weholite is extremely flexible and easy to work with. For example, most components can be prefabricated and customised at Uponor Infra. This implies the minimum number of complex operations on site, where poor weather and difficult environmental and ground conditions can make work more difficult. When the prefabricated components are delivered to Sobacken, Uponor Infra's field service is called in to perform the welding and installation. With prefabricated components, the installation can be completed safely and quickly, saving both time and money.

From the very first drawing to the completed installation, the process was controlled by a project manager from Uponor Infra. He was also on-site at Sobacken at least once a week, to check that Uponor Infra was fulfilling its commitments and to ensure that safety margins and quality requirements met. ■

PROJECT FACTS

Contractor	Veolia Water Technologies AB
Sub-contractor	Tage & Söner
Installer	Uponor Infra Project Services
Country	Sweden
Town	Borås
Type of building	Combined heat and power plant, sewage treatment plant and biogas production
Start of operation	Period of construction 2015–2018
System	Weholite 1,400–2,200mm
Product group	Sewer

TEXT Uponor » PHOTOS Uponor »

A sewage solution for future demands

A new Weholite pump station – one of the largest high-density polyethylene pump stations in North America – meets the existing increase and future sanitary sewer demands in the Montgomery Borough of Pennsylvania, United States.

Montgomery Borough of Pennsylvania has experienced a substantial rise in population within the last few years. In the mid-2000s, the Montgomery region was facing difficulty dealing with an aged and failing sanitary sewer infrastructure. The West Branch Regional Authority (WBRA) in Montgomery is responsible since its creation in 2010 for finding ways to improve the efficiency and sustainability of the sanitary sewer and drinking water systems. Recently, WBRA required a new pump station to meet the existing increase and future sanitary sewer demands in Montgomery.

One of the most robust materials

Uponor supported the WBRA's project team by providing an 11' diameter x 30' deep Weholite RSC250 structural polyethylene quad submersible pump station wet well, one of the largest PE-HD pump stations in North America.

The Weholite pump station wet well was selected due to its high-density structural polyethylene construction meeting the ASTM F894 standard, making it one of the most robust and chemically inert materials available in the market today.

Material of the system is extremely important while dealing with sewage applications as it is highly corrosive. Sewage contaminants can easily dissolve and corrode materials such as concrete and steel, whereas PE-HD remains inert. The completely prefabricated polyethylene wet well offers a 100-year design life and is immune to H_2S, pH, corrosion, and abrasion. Selecting a material which is 100% chemically inert and not corrosive signifies that over the 100-year design life of the material, operations and maintenance costs would remain low as there would be no requirement for protective linings, as is the case with other materials.

WEHOLITE OFFERS A 100-YEAR DESIGN LIFE AND IS IMMUNE TO H_2S, PH, CORROSION AND ABRASION.

A custom designed solution

The Weholite wet well is extremely versatile and this system was custom designed to meet WBRA's requirements. Uponor worked with the Excel Fluid Group to custom design and prefabricate the Weholite wet well to support a total of four submersible pumps, surface-mounted valve assembly and subsurface, low-pressure discharge. The Weholite system's discharge piping, inlets, outlets, break-away fittings, guiderails and buoyancy counter-measure base were completely prefabricated under strict ISO 9001 quality control standards. All fabricated welds were pressure-tested to ensure they were free of leaks prior to shipment.

The Weholite wet well was delivered to the project requiring no internal plumbing or cast-in-place base work. Uponor's Weholite wet well vessel was ready to be set, connected, and backfilled immediately upon delivery.

Due to the high strength-to-weight ratio of Weholite, it is easy to load, transport, handle and install.

Easy to transport, handle and install

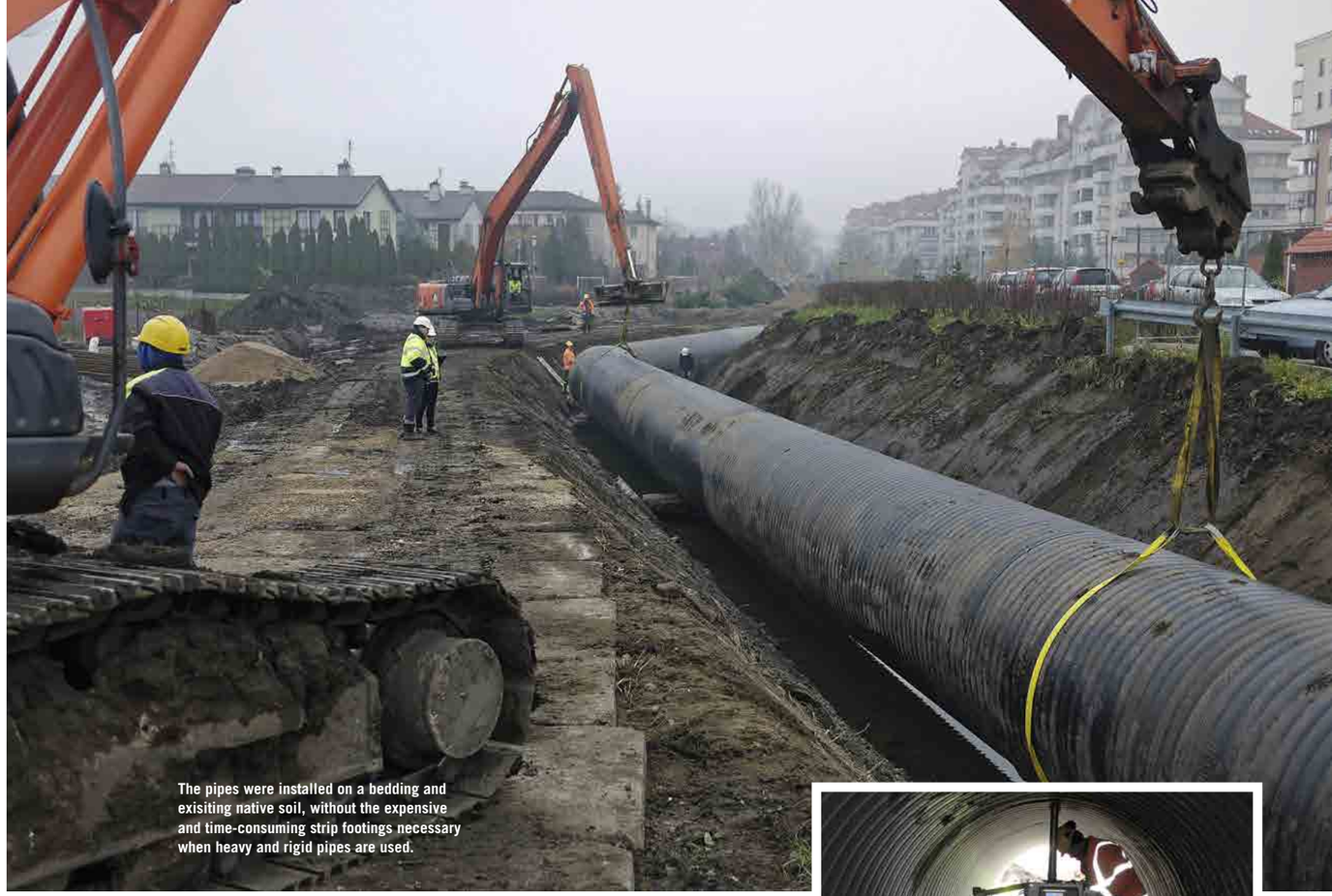
Due to the high strength-to-weight ratio of Weholite, the submersible pump station was easier to load, transport, handle and install by comparison to concrete, which is extremely heavy and cumbersome to handle. For example, a 25-foot (7,62m) length of Weholite weighs 4,750 lbs (2154kg). An 8ft. (2,44m) length of concrete pipe weighs 20,000 lbs (9071kg). The light weight of Weholite resulted in an increase in installation efficiency and a decrease in machinery and labour costs. This rapid installation of the Weholite system decreased the overall project cost and improved project safety.

In summary, Uponor successfully provided wet well design, fabrication and on-site support during installation for this project. ■

TEXT Monika Tarnawska » PHOTOS Uponor

Weholite guaranteed **a simple and quick installation in the Konotopa channel**

The renovation of the Konotopa channel is one of the most interesting hydro projects recently completed in Warsaw, Poland. Local authorities in the Ursus district faced the problem of a polluted waterway with a collapsing embankment. The piping of the channel with Weholite technology prevented further devastation, restored damaged sections of the waterway, and helped to improve local sanitary conditions.



The pipes were installed on a bedding and exisiting native soil, without the expensive and time-consuming strip footings necessary when heavy and rigid pipes are used.

The Konotopa channel (Żbikówka watercourse) is an open discharge channel which receives storm- and meltwater from the Ursus area. Once a small river, the watercourse begins west of the Ursus district and ends in Pruszków, where it flows into the Utrata river. For years, the channel had been polluted by industrial wastewater from local factories and workshops. While the authorities were successful in stemming the pollution, local residents were still bothered by odours from the channel. In the meantime, the area became increasingly urbanised with a new housing development and swaths of parking space being built in the vicinity of the channel. This posed an entirely new problem and, in 2013, stormwater from heavy rainfall caused parts of the channel's embankment to collapse.

An inspection of the site carried out by Geoteko Sp. z o.o. revealed that the damage was due to the faulty geometry of the embankment (the slope was too steep), lack of proper reinforcement and the adverse effect on the channel of a new parking lot built on the left bank. The investor considered several options for restoring the embankment, such as the use of gabion mattresses placed on an anchored sheet pile wall fitted with a drainage system, but this solution proved too costly. Finally, a decision was made to use PE-HD technology to close the section of the channel between the city limits and Magnacka street. Uponor Infra's structured-wall PE-HD Weholite was the pipe of choice for this project.

THANKS TO WEHOLITE, THE INSTALLATION COULD BE PERFORMED ON A FUNCTIONING CHANNEL, WITH NO NEED FOR A BY-PASS OR SHUTDOWN.

The benefits of Weholite pipes include their low weight in comparison to traditional steel, concrete and clay technologies, their overall resistance to corrosion, and their durability, joint tightness and simple and quick installation.

Thanks to Weholite, the installation could be performed on a functioning channel, with no need for a by-pass or shutdown. The pipes were installed on a bedding and exisiting native soil, without the expensive and time-consuming strip footings necessary when heavy and rigid pipes are used.

The ideal solution – piping with Weholite

Following a tender, in September 2016 Drainage Construction Company Tolos was appointed as the general contractor for the project. Uponor Infra delivered a total of 165 metres of structured-wall PE-HD Weholite, DN/ID2,000mm SN4 pipes to the installation site. Prep work included clearing the channel of concrete slab lining, dredging the ditch to make room for the new pipeline and laying the bedding. Uponor Infra pipe service staff then joined up the Weholite pipes to form two sections. The work was carried out on dry land on the right bank of the channel, by means of automatic extrusion welding using a WLI-3000 machine. This guaranteed the 100% tightness and homogeneity of the pipeline. A 100-metre section of pipeline was then lowered into the ditch, followed by the remaining 50-metre section with a fitted bend two days later. Since the channel was operational during installation, the two connecting sections of the pipeline were raised above the water level, where they were welded together. The pipeline was then connected to a reinforced concrete inlet of the underground section of the channel. A socket-and-spigot DN/ID200mm joint was fitted onto the pipeline, connecting it to an existing stormwater channel. Finally, the ditch was backfilled. At the spot where the new pipeline meets the open section of the channel, an outlet was secured with a steel grate to prevent unauthorised entry. The installation was completed in December 2016.

The investor was impressed with PE-HD Weholite pipes and the technology involved in the automatic extrusion welding, which enabled quick installation despite the difficult hydrogeological conditions and changing weather. The contractor, Tolos, also commended Uponor Infra's technical support for its flexibility and help in tackling the occassional problems that occurred during construction.

The curious case of Weholite technology

The renovation of the Konotopa channel was the first project in Warsaw to involve large diameter piping from Uponor Infra, but surely not the last. The installation was closely monitored by the district authorities in Ursus and drew the attention of both the municipal services and the private sector, which were keen to see Weholite technology in action. Visitors to the site, including representatives of Water Utility of Warsaw and the city's Infrastructure Department, as well as civil engineering companies and contractors, had the opportunity to witness first-hand just how simple and quick PE-HD installation is. Durable, leak-proof, totally resistant to corrosion and highly resistant to chemicals and damage from environmental factors, as well as being easy to install in even the most demanding conditions, Weholite proved once again to be the ultimate piping solution. It is no surprise that it wins over even the strongest sceptics time and time again. ■

TEXT Pablo Ramon » PHOTOS Uponor »

Success through

CHALLENGES

Many different factors like the weather conditions, the seabed properties and the variety of nationalities working on the project made the installation of an outfall for the cooling system in Tanh Hoa Province, Vietnam quite challenging.

When Weholite was born back in the '80s, it was fated to become a world-wide star in the big diameter marine pipe universe even if no crystal balls were available to foresee the future.

The Nghi Son Refinery Petrochemical project (NSRP), located 200 kilometres south of Hanoi in the Tanh Hoa Province in northern Vietnam, has ratified this again after the installation of the DN/ID2,700mm 2,025m out-fall for the cooling system of the plant.

The pipe supply consisted of 1,845 metres of Weholite DN/ID2,700 (11 strings of 180m each and an onshore section) and 60 metres of DN/ID2,400mm, DN/ID2,100mm and DN/ID1,700mm each (three strings) for the diffuser section, delivered from the former Wiik & Hoeglund factory in Thailand.

The pipe engineering and supervision of the welding works and submersion of the outfall has been provided by Project Services from Uponor Infra in Vaasa, Finland.

The methodology that followed for the installation of the 180m strings was the 'S' curve for the sinking of the water-filled pipes that had previously been welded and ballasted onshore with the Weholite hollow wall filled with limestone mix.

Toyo Construction Co. Ltd., the Japanese marine contractor, was already familiar with Uponor Infra´s technology. They are a repeat client after an earlier project in the Philippines in the Bataan, Petron Refinery.

The best result after hard work

Many different factors made this project peculiar if not singular: the weather conditions, the seabed properties, and the variety of nationalities working in a waking-to-development area. Almost every day, every aspect of the project was a test of the capabilities and the wit necessary to solve the difficulties involved in the fabrication and installation of this system. However, the expertise of the two welding crews from Vaasa and Thailand, and the cooperation between Uponor Infra Project Services and Toyo Construction Co. Ltd. led to the best result that can be expected from a project: another happy client.

The full completion of Uponor Infra activities took place in June 2016, after three working seasons in 2014, 2015 and 2016 since the sea conditions determined the available working windows for the marine equipment – typhoons and big storms aren´t uncommon from September to March.

By this spring, the mechanical completion of the NSRP complex will in fact be only a few months from the start of the commercial operations in July 2017. Different kinds of diesel, RON 92 and 95 gasoline, LPG, jet fuel and many other fractions and petrochemical derivatives, such as polypropylene coming from the 200,000 daily barrels of crude oil, will make this nearly $9 billion investment start to produce the benefits that the owner, Joint Venture (PetroVietnam, Idemitsu Kosan Co., Kuwait Petroleum Europe B.V., and Mitsui Chemical Inc.) originally set out to gain. ■

TEXT Birgitte Schnidt » PHOTO Uponor »

A precise and punctual delivery for the Copenhagen metro

In the South Harbour district of Copenhagen, Denmark, a major project is underway involving the construction of a metro station on Copenhagen's new Sydhavns Line. To make room for the metro, water pipes supplying Sydhavnen's residents with drinking water had to be moved on some parts of the line.

The new metro station will be built on Mozart Square in a formerly working-class, proud neighbourhood with a strong community spirit. The construction of the metro station will support an overall plan to modernise this urban area in southern Copenhagen.

HOFOR, Denmark´s largest utility company, invited tenders for the work as a construction delivery. After winning this and the welding assignment, Uponor contributed to the design and calculations of the pipe solutions, as well as project management of the pipe contract throughout the process.

The municipally-owned HOFOR has more than a million customers in Greater Copenhagen and the company invests more than 250 million euros each year in pipelines, cables and wind turbines.

Uponor's task involved replacing 200m of OD800mm concrete lines with PE pressure pipes OD900mm, PE100 SDR11. To make room for the metro, it was necessary to reorganise some sections of the pipeline, which supplies Sydhavnen's residents with clean drinking water.

The assignment included establishing OD1,100mm bends, OD1,100mm flanged fittings and DN300mm valves on OD900mm PE100 SDR11 branches. The branches were produced as OD315mm PE100 tees, which matched the DN300mm flanged multi joints used.

Prefabricated fittings

All of the fittings were delivered prefabricated by Uponor. Prefabrication was performed at Uponor's own factory in Svinninge, while other weldings were primarily conducted onsite just before the pipes were pulled into the trench.

When completing the final welding work in November 2016, Uponor was highly commended by builder HOFOR for its precise and punctual execution of the task.

Actual construction of the metro station will begin by the end of 2017. ■

PROJECT FACTS

Builder	HOFOR
Consulting engineers	Sweco Danmark A/S
Main contractor	NCC
Contractor	Kamco
Pipe supplier	Uponor Infra A/S

Before the construction of a metro station, 200m of concrete lines were replaced with PE pressure pipes.

TEXT Uponor » PHOTOS Uponor »

Weholite eliminates CSO events

A new Weholite detention facility is helping to protect a town's pristine streams and rivers and fulfil the CSO regulations adopted by the Canadian Council of Ministers of the Environment in Ville de Sainte-Agathe-des-Monts, a popular tourist destination in Quebec, the largest province in Canada.

Ville de Sainte-Agathe-des-Monts (Sainte Agathe) is a popular, four-season tourist destination in the Laurentian Mountains in the province of Quebec. Sainte Agathe was first settled in 1849 and saw rapid development in the early 1900s. This historic city's sewer system is a combined system that conveys both sanitary sewer and stormwater discharge into the local municipal wastewater treatment facility.

Combined sewers were a common approach to municipal sewer design in the first half of the twentieth century, when there was little focus on their environmental impact. In the case of such a system, the prime challenge lies in the fact that municipal wastewater treatment facilities are not typically designed for the treatment of the higher discharge rates and volumes associated with most rainfall events. Their discharge into streams and rivers is known as a combined sewer overflow (CSO) event and has been subject to tightening environmental regulation over the last 20 years.

Protecting pristine streams and rivers

On February 17, 2009, the Canadian Council of Ministers of the Environment (CCME) adopted the Canada-wide strategy for the management of municipal wastewater effluent. Although Quebec has not yet formally signed up to the strategy, it has declared its support for the strategy's technical content and aims to ensure that its criteria for land development or redevelopment projects include at least the Canada-wide overflow standards established by the strategy.

To protect the town's environment and fulfil the aims of the CSO regulations adopted by the CCME, Sainte Agathe commissioned a large-scale combined sewer detention facility adjacent to its municipal plant, along the Rivière du Nord. The detention facility is designed to store 260,000 gallons (984 m^3) of stormwater discharge during peak flow events. This additional storage capacity effectively eliminates CSO events during all but the largest storms and serves to protect the town's pristine streams and rivers.

Completely leak free system

A variable rock table and existing infrastructure constraints required that the system be based on multiple diameter barrels in a three-field approach. Uponor worked with the engineer of record at SMi Consultants, to develop a system that would provide the required storage volume while minimising rock excavation and the impacts on the plant's existing infrastructure.

The detention system was fabricated from a Weholite RSC 250 profile wall polyethylene pipe manufactured in accordance with ASTM F894. Its barrel geometry included 5', 6', and 7' diameter barrels connected by a continuous 36" header system with 36" manhole access risers. Bulkheads were manufactured from a Wehopanel P120H profile wall panel and reinforced with PE-HD encapsulated steel beams.

Large-scale underground detention systems require a comprehensive, engineered-systems approach to design. Uponor evaluated the Sainte Agathe system using a 2-dimensional (CANDE) finite element analysis routine, which accounts for soil-structure interaction under the applied loads. Uponor also performed a 3-dimensional finite element analysis of the system in order to analyse the bulkhead deflection and reinforcement requirements.

Uponor worked with the general contractor, Inter Chantiers, to coordinate the detention system's fabrication schedule, installation and field welding details.

All joints, fittings and fabricated elements were extrusion welded to ensure a leak free system. The fully assembled system was tested under a 24-hour exfiltration protocol and certified as leak free. Upon the successful completion of the project, **Alexander Foisy**, the President of Inter Chantiers commented:

"Inter Chantiers is proud to have successfully achieved this project on schedule and on budget. Our team truly believes that we not only "built another infrastructure project" but that we did so in a sustainable manner. I am proud to have contributed to my community by participating in this project. My two sons may come back to live here in Sainte-Agathe when they grow up and, if they do, I am sure they won't have to pay for the replacement of our project out of their taxes!"

PROJECT DETAILS

- **Owner:** Sainte-Agathe-des-Monts
- **Engineer:** Group SMi
- **Contractor:** Excavation Inter-Chantiers
- **Sub-contractor:** ProFusion, Inc.

SYSTEM DETAILS

- 260,000 gallon detention system
- CSO wet weather facility
- 17 prefabricated barrel sections
  - 480 LF of 5' diameter
  - 433 LF 6' diameter
  - 360 LF 7' diameter
- 3 prefabricated manifolds with access risers

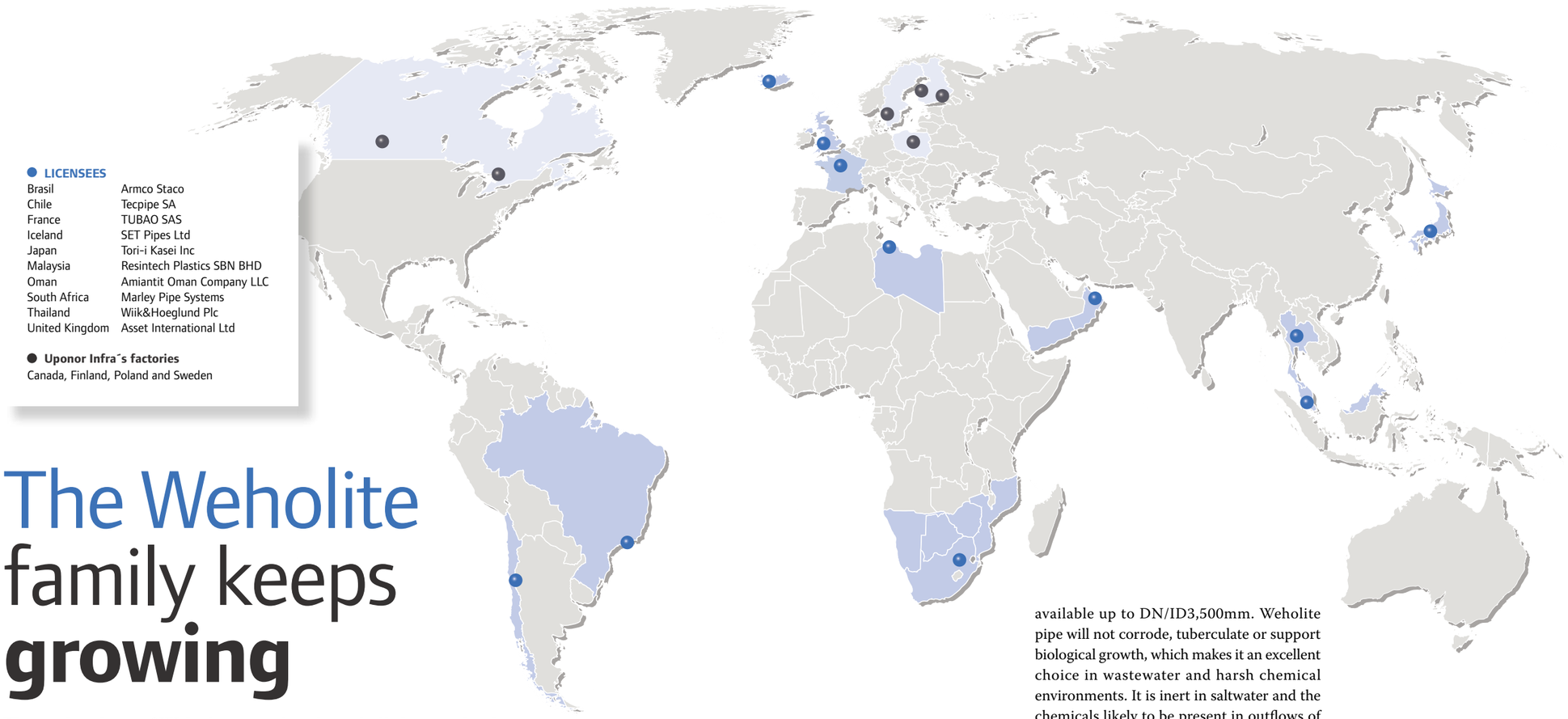
100-year design life without corrosion

Uponor's Weholite ASTM F894 profile wall polyethylene system provides a 100-year design life and is resistant to H_2S, pH, corrosion, and abrasion. Weholite has been used throughout the world and North America since 1981.

Uponor's systems are manufactured according to strict polyethylene welding standards and can be custom fabricated to meet the needs of any application. All fabricated structures are pressure tested prior to shipment. In-field extrusion welding is performed by Uponor's certified technicians to ensure that a leak free system is achieved.

Uponor is able to provide a high quality system with a longer design life and at a reduced total cost of ownership. ■

TEXT Outi Järvelä » PHOTOS Uponor »



The Weholite family keeps **growing**

The technology of Weholite was developed all the way back in 1983 and since then it has provided great value to the global pipe market. Today Uponor Infra manufactures Weholite pipes in six factories in Finland, Sweden, Poland and Canada, and Weholite licensees have manufacturing operations in nine countries in Europe, Asia, Africa and Latin America.

The development of the large-diameter Weholite pipe began in the early 1980s at Uponor Infra's Vaasa factory in Finland. In 1983, the first prototype was developed leading to the first pipe installation.

Weholite was initially manufactured in the Vaasa factory and in 1989, production began at the Uponor Infra´s factory in Thailand as well. Today, Uponor Infra manufactures Weholite pipes in six factories in Finland, Sweden, Poland and Canada.

The first Weholite license was granted in 1993 in South Africa. The Weholite family has been growing steadily ever since and Weholite licensees can now be found in the UK, Iceland, South Africa, Oman, Chile, Japan, Malaysia, Brazil and France, the latest member of Weholite family.

"Over a period of 30 years, Uponor Infra Technology has delivered a total of 37 production lines to customers worldwide," comments Sales and Marketing Manager of Uponor Infra Technology **Tapio Alanen**.

Unlimited possibilities

Weholite is a well proven durable system that is built to last for more than 100 years. It provides many benefits for the designer and contractor as well as the end-user, and has been successfully used in many thousands of projects in different parts of the world.

The Weholite polyethylene (PE) or polypropylene (PP) pipe is a spirally wound structured-wall pipe, which makes it very lightweight. The product is designed for non- or low-pressure applications such as sewage, drainage, stormwater, road culverts and retention tank systems in diameters currently available up to DN/ID3,500mm. Weholite pipe will not corrode, tuberculate or support biological growth, which makes it an excellent choice in wastewater and harsh chemical environments. It is inert in saltwater and the chemicals likely to be present in outflows of sanitary sewage.

"All Weholite solutions are 100% customisable. A great combination of pipes and panels enables the building of different prefabricated tailor-made products. Tanks, chambers and complete pumping stations are some examples."

"The structure of the Weholite pipe provides a favourable weight-to-ring stiffness ratio compared to other lightweight pipe concepts. Thanks to the smooth surface of the Weholite pipe, the flow rate is higher than that of steel, cast iron or concrete pipe," states Tapio Alanen.

"Lightweight Weholite pipes are easy to handle even at long lengths, which quarantees a quick and efficient installation. Weholite is continuously extruded and can therefore be supplied in any shippable length."

A global network of companies

The Weholite family is a global network of companies running their own independent business with some of the companies having Weholite as the main concept and some as a compliment to other activities. Many Weholite licensees have a background as plastic pipe manufacturers who have sought to differentiate themselves by offering a unique product such as Weholite.

"The new licensee gains a globally well-known product family and a brand which provides market credibility. Uponor Infra Technology offers a Weholite Licensing Agreement including production lines and equipment as well as the full range of production and product know-how."

"The machinery to be delivered can consist of three different Weholite production lines covering a pipe-size range of DN/ID400-2,200 mm, 800-3,000mm and 1,200-3,500mm, as well as various equipment for production of Wehopanels, fittings, joints, field jointing and quality control. The range of equipment can be tailor-made to suit the licensee´s needs."

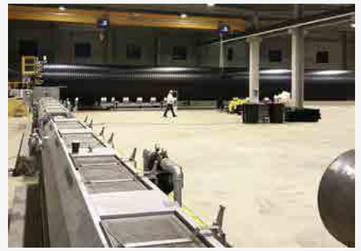
Knowledge, ideas and resources

The foundation of the Weholite family is sharing knowledge, ideas and resources. Production support by Uponor or other licensees will always be available.

"As a member of the Uponor Infra Family, a licensee gains a network of contacts and information sharing."

"The licensees have access to R&D, training and support services such as technical, product, laboratory and project services. Of course, trademarks, references, patents, manuals, calculation software, product development, quality control, marketing material, product standards and product- or application-related know-how are also at their disposal."

"Most of the licensees have developed niche products based on Weholite, which enable them to find new market segments and grow their business," shares Tapio Alanen. ■



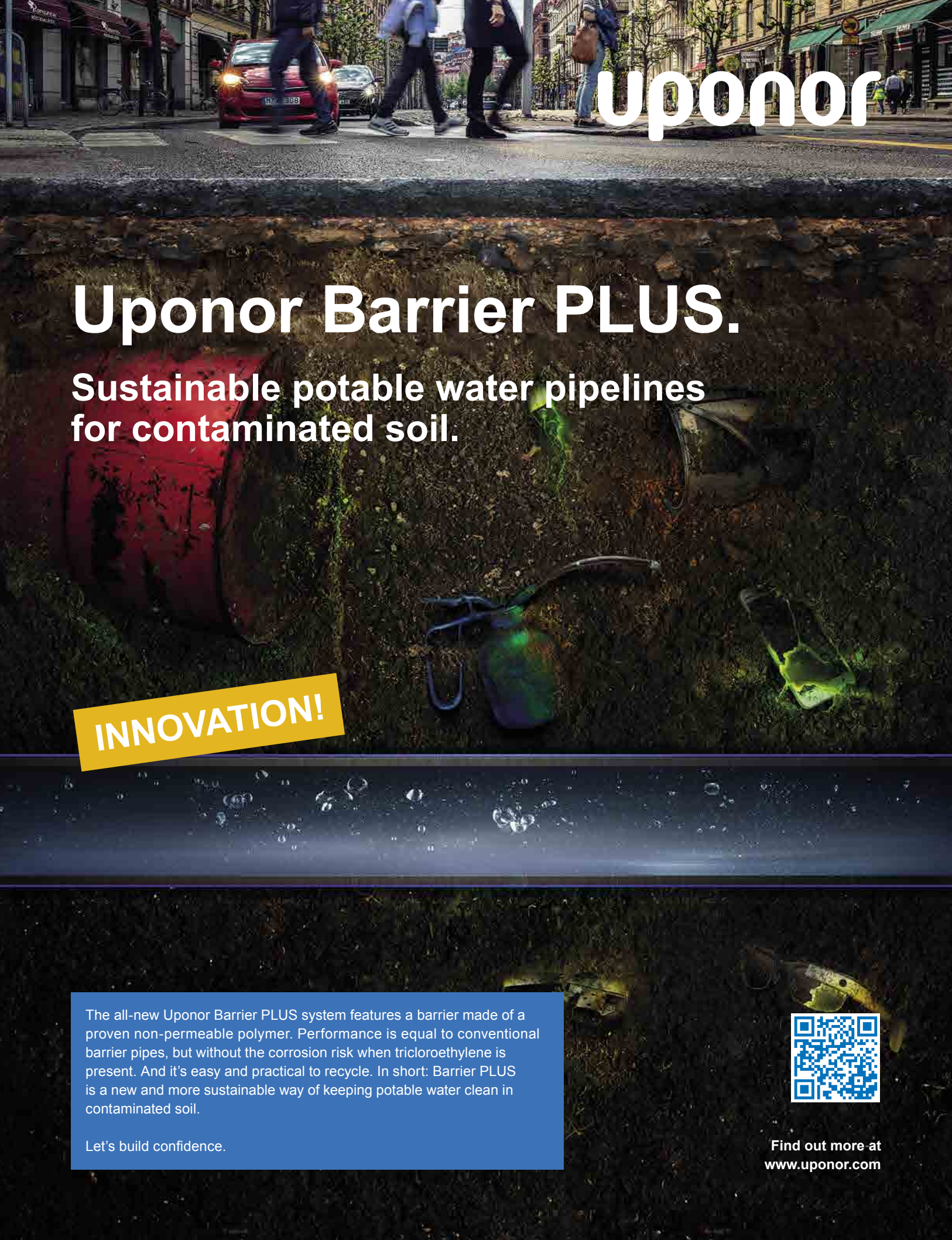
THE LATEST LICENCE FOR WEHOLITE AWARDED IN FRANCE

» Uponor Infra Oy and TUBAO S.A.S., Saint Saens, France have recently announced a licensee agreement, whereby Uponor Infra will grant TUBAO an exclusive licence for the manufacture and marketing of the Weholite pipe in France.

» TUBAO S.A.S. is a 60-year-old French company that specialises in the storage of rainwater based on a range of solutions, such as corrugated steel pipes and renovated tanks. TUBAO is one of the sector's major players in France and its neighbouring countries. TUBAO will produce Weholite in its new factory in Normandy in northwestern France.

» The structured-wall PE-HD Weholite pipe is available in various sizes, with interior diameters ranging up to 3,500mm. Initially, TUBAO plans to offer pipes up to ID3,000mm.

To learn more about Weholite, please visit **www.weholite.com**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The all-new Uponor Barrier PLUS system features a barrier made of a proven non-permeable polymer. Performance is equal to conventional barrier pipes, but without the corrosion risk when tricloroethylene is present. And it's easy and practical to recycle. In short: Barrier PLUS is a new and more sustainable way of keeping potable water clean in contaminated soil.
Let's build confidence.
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