References

A smart retention system for an anti-flooding solution



Uponor involvement

- Weholite pipes PE SN8 DN500÷DN2400 - approx. 18 km, WehoTripla PP SN8 pipes DN200÷DN400 - approx. 7 km, about 300 units of base and eccentric manholes with baffles, diameters DN1000-DN2200, approx. 400 sand trap manholes, 3 pcs. of flow distribution chambers DN3000, 4 batteries of 3, 4 and 6 tanks

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September 2018 saw the launch of the project for a stormwater drainage system in Rzeszów, almost 26 kilometres long, in the residential District of Budziwój, which partially coincides with the floodplain of the River Wisłok. One of the elements of this system is the retention canal. The project, scheduled for delivery by May 2020, will help to finally solve flooding problems which have been plaguing the residents of this region of Poland.

In 2005, Rzeszów covered a surface area of 54 km2, and had a population of around 154,000. At that time, this capital of the Podkarpacie Province was the smallest among the regional centres of administration in Poland, and had the highest population density per square km. Shortage of space, even for housing development, was a serious problem at that time. Hence, it was decided to incorporate several nearby villages into Rzeszów, and one of these was Budziwój, integrated into Rzeszów on 1 January 2010. In September 2017 Stage I construction works were initiated in Budziwój for the nearly 26-km-long stormwater drainage system, which will install pipes with diameters of DN200–DN2,400. The investment value of the works in this stage is PLN 69 million, with the total project cost being estimated at PLN 96 million.

Project Facts:

Location	Completion
Rzeszów Budziwój, Poland	2020
Building Type	Product systems
Municipal	Storm water, Tailor made constructions
Project Type	
New building	

Partners

Designer:
Biuro Projektów Budownictwa Komunalnego z Rzeszowa (The Bureau of Municipal Engineering in Rzeszów)

Investor:
The Rzeszów Municipality – Rzeszów City Hall

Contractor:
PRID Krosno – Contractor for Stages 1–3
Bogdan Duplaga Instalatorstwo – Contractor for Stages 4–5

Land development and impermeable surfaces

The Budziwój District partially coincides with the floodplain of the River Wisłok. Before it was integrated into Rzeszów, most of the local landscape was dominated by a mosaic of meadows, pastures and woods, so rainwater quickly soaked into the ground. The problems began when residential buildings expanded into this terrain and the subsequent progressive development created impermeable surfaces which critically limited or reduced to zero the natural water retention capacity. This, in turn, led to flooding or water stagnation. The smart system which is now under construction will facilitate the drainage and management of any storm or melt waters running through the residential estates. This complete stormwater drainage system is planned to be constructed over an area of 632ha. Pipelines will be laid along fifteen streets. The system will also accommodate the needs of privately owned lands, making it possible both to dewater the roads and to remove excess water from the river catchment area.

A total of 24 retention tanks will be built, including eight channel tanks with a total capacity of 7,500 m3, and six lateral tanks with a total capacity of 1,700 m3. Water will be drained via these tanks into the Rivers Wisłok and Strug. The tanks will be provided with a smart retention management system to allow the ongoing monitoring of water levels, and there will be storm

and melt water treatment installations upstream from the pipes' outlets. Additionally, the drainage ditches will be extended, provided with partial covering, and regulated, as part of the project, including the reinforcement of their slopes and bottoms.

High-speed work and extensive deliveries

To ensure that this large-scale project is successfully implemented, Uponor Infra will deliver to Rzeszów about 26km of pipe, including around 18km of Weholite PE SN8 pipe with diameters in the range DN500–DN2,400, and more than 7km of WehoTripla PP SN8 pipes with diameters DN200–DN400. The company will also supply, among other things, nearly 300 manholes, including those with base units, and eccentric manholes with damping baffles with diameters DN1,000–DN2,200, and sand trap manholes. Additionally, it will also be necessary to install large-volume sand trap manholes and flow distribution chambers with diameters in the range DN2,200 – DN3,000, and special fittings, tees, bends or flanges, and other components which are vital for such an extensive stormwater drainage system.

The Weholite polyethylene pipes which were selected for the system in Rzeszów are designed for use in complete external water drainage systems with diameters DN300 –DN3000, and supplied in ring stiffness classes ranging from SN2 to SN16 (SN8 pipes will be used in Rzeszów). The Weholite system will also be provided with the WehoTripla polypropylene system, available in diameters from DN110 to DN400.

With projects of this scale, the focus should be on coordinating the production and deliveries to support the high speed of the projects.
Supplies are delivered on as needed basis, says Piotr Dańczuk from Uponor Infra. How does this work in practice? Whatever the general schedule of project, Uponor is in constant contact with the contractors, and we try to confirm what mix of products will be needed ahead of time. As soon as this is confirmed, we start the production and preparation of new deliveries right away. On average, there are two to three full-load deliveries every week. Different procedures are used for large-sized elements. Their delivery must be agreed with the transport service provider at least seven days in advance, so that any necessary permits can be obtained. Such deliveries are made at night, when there is less road traffic. The construction site, however, must be prepared for unloading large-sized components, which requires the use of heavy machinery mostly cranes.

Reliability and long service life

The products supplied to Rzeszów for use in the stormwater drainage system are made of polyethylene, which means they have a long service life, are resistant to corrosion, overgrowing, and abrasion. Most important from the contractors' point of view, they are easy and quick to install, even in winter conditions.

These are reliable and long-life products. They can be safely used for up to 100 years, affirms Piotr Dańczuk. What is also highly important is that the system can be customised to individual structures, providing complex and compatible solutions. The system is also characterised by high static strength, which makes it possible to use these components where water and soil conditions are difficult – as is the case with the floodplain of the River Wisłok. Moreover, as a result of the extrusion welding used, the joints are highly uniform and capable of transferring any loads imposed on the pipeline, including axial loads, he adds. This is of particular importance, because the system is guaranteed to remain watertight throughout its whole service life, and as such requires no maintenance or additional sealing of joints.

The project in the Budziwój District will continue until May 2020. This highly effective anti-flooding solution will allow making use of new sites for housing and business services. Besides Budziwój, nine other villages have also been incorporated into Rzeszów in recent years. Currently, Rzeszów has an area of 126 km2 with a population of nearly 194,000 inhabitants.

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