# Don’t count on luck to protect you from flooding

**With a bit of good luck, a property can overcome rains without flooding, but fewer and fewer count on such luck. As its stormwater solution, a waste power plant to be built in southern Finland chose one-hundred-metre long Weholite tanks.**

If the hardest rains in 50 years and a fire occurred at the same time, where would the rainwater and fire water end up? These kinds of questions were considered by the planners of the energy company Vantaa Energy and the consulting and engineering company Pöyry, as the drawings for the future waste power plant of Vantaa, one of the largest cities in Finland, were on the table.

The goal was to prevent flooding, even in the worst case scenario. An extra challenge had to do with the fact that it had been decided that the waste power plant of Vantaa was going to be constructed in a rockbound hollow.

“It is like a tub surrounded by 10 metres of rock-face. Water is absorbed into the ground so slowly that it is better to collect it all and dispose of it,” says Project Manager **Markku Vuorimaa** from Vantaa Energy.

The waste power plant was built on the eastern side of Vantaa, where the distance to the river Krapuoja is quite short, but this good salmon river should not be subjected to extra water.

It was decided that the stormwater drainage pipeline would be drilled through rock, built over the motorway and into an open ditch where the plant is allowed to discharge one hundred litres of water per second. So floods must be prevented at both ends of the pipeline.

“We decided to use a stormwater detention tank,” says Project Manager **Jarmo Salo**, responsible for regional piping planning of Pöyry. Pöyry will

planned and built the power plant and supervised the whole project from the purchases through its commissioning.

**From concrete to plastics**
The material for the stormwater retention tank had to be selected first. Salo thought that old habits would have directed the planners to choose concrete, if the rocky hollow had not defined its own criteria. That is, as the excavation proceeded, it was discovered that the tank had to be dug deep below the groundwater level in order to get a sufficient slope for the stormwater drainage system. Building with concrete was no longer a viable option.

He stated that it would be substantially easier and faster to install a polyethylene tank structure. Two 700-cubic-metre tanks from Uponor Infra were chosen as the stormwater retention tanks.

**Strict schedule**
The tanks were made of Weholite pipes with internal diameters of three metres and they were one hundred metres long. Their ten-metre ends were assembled at Uponor Infra´s factory and were brought to Vantaa together with the 20-metre pipes.

The pipes were welded together on-site and the tanks were pressure tested, after which builders from the contractors Destia anchored them into the excavated pit.

The installation was completed in December 2011, and in January 2012 the tanks and the yard were already covered with portable buildings.

In principle, the tanks could have been used right away, but the excavation work was still going on. The entire storm water system was put into operation in March.

**Absolutely tight**
In addition to the quick installation work, Jarmo Salo required that the tanks be absolutely tight. No groundwater should seep into the tank. Salo also wanted to pay attention to the scenario of dirtier substances getting into the clean rain water, for example along with fire waters.

“Then the pump is stopped and the water in the tank is examined. We can decide if thewater is passed to a reservoir for contaminated water or discharged to the open ditch. It is also important that the solids that have managed to pass through the stormwater chambers settle down onto the bottom of the tank.”

“A maintenance man can climb down into the tank and also wash it when needed.” In a normal state, the pumping station always pumps water when the water level exceeds a certain level, and the water will continue via the discharge chamber along the gravity discharge pipe to the open ditch.

**The start of a giant project**

Markku Vuorimaa regards the completion of the stormwater retention system as a good intermediate point in the huge construction project.

“The system would have been needed already the year before when a pit for the waste bunker was being excavated, 18 metres downwards from the upper rock surface level,” laughs Vuorimaa.

He was in charge of mechanical installations for the power plant, the biggest of which are still to come. The main installations – two waste boilers, the associated flue gas cleaning equipment, a steam turbine, a gas turbine and a heat recovery boiler – were already ordered earlier waiting to be installed. According to the plans, the basic work of the boiler hall began the following year.
The first loads of waste arrived at the yard in the summer of 2014.

In Finland, there were already two similar waste power plants in use and another one is being built, where the steam is passed from the waste boiler to a turbine and the turbine uses it to generate electricity or district heating. Additionally, a gas turbine was also utilized
in the Vantaa plant, to increase the plant’s energy efficiency.

“There are not very many solutions of this kind in the world, in which the plant has both a gas turbine and also a heat recovery boiler,” states Vuorimaa.

**A stormwater retention tank made of Weholite pipe**

Weholite tanks are made of a corrosion resistant PE or PP profile by spiral welding. Both the outer and the inner surfaces are smooth. The largest possible inner diameter is 3,500mm (varies from country to country) and the transportable length is 30 metres.
The retention tanks are equipped individually. Thermal welding of joints makes the tank completely watertight. Anchoring packages that are suitable for the site are planned for each tank. The anchored tank will be ready to use as soon as the feed and discharge pipes have been connected.

For further information about this project please contact: infofi@uponor.com