nordic water ZICKERT

Thanks to our Z 2000s our sludge now has high total solids content

The Lovö water purification plant on the outskirts of Stockholm supplies some 400 000 of the city's inhabitants with their drinking water. The plant takes its raw water from Lake Mälaren, and has a production capacity of 275 000 m³ a day. Production is currently running at around 130 000 m³ to 140 000 m³ a day. Originally the plant had four sedimentation basins with a capacity of 2 000 m³ each, but these were supplemented in the 1960s by another two basins, each with a capacity of 2 500 m³.

"The raw water is first screened through two intakes that make it possible to accept it at a number of different depths," explains Olle Svedberg, the plant's process engineer. "That means we can select the temperature and quality of water that best suits a particular situation. Then a reagent is added, to produce a sludge that precipitates in the sedimentation basins and can be removed by Z 2000 scrapers on the basin bottoms. The sludge is drained off automatically via valves.

As a result of the trials carried out at Lovö, all the plant's sedimentation basins now have Z 2000 sludge scrapers

Olle Svedberg, process engineer at Lovö water purification plant. The plant supplies a large part of the Stockholm area with its supplies of drinking water

"After chemical precipitation, the next stage in the process is mechanical filtration via two fast filters, enabling us to remove the sludge that did not precipitate. That's followed by biological purification over slow filters, to remove any substances that might affect the taste or smell of the water.

"Finally, before the water leaves the plant, we add alkali to bring its pH value up to 8,5 and sodium hypochlorite for disinfection purposes. The water's then ready for distribution to consumers."

Basins on two levels

The type of basins used at the plant have come to be known as Lovö basins, and are on two levels, with the bottoms sloping towards the ends at which the sludge is removed. The water enters at the lower level, and the direction of flow is reversed at the upper level. Most of the sludge precipitates at the lower level.

Successful trials

"When it came to choosing the scrapers to be installed, we were by no means certain how everything would work out, and at Zickert they were equally unsure. But the company put me in touch with Klaus Zickert, the man who actually designed the Z 2000's scraper. The two of us carried out a series of laboratory tests, and came to the conclusion that the Z 2000 could do the job. We then installed a Z 2000 for a year on a trial basis, and it proved to be a success. It was a question of adjusting the scraper's function and working mode to meet our particular requirements. Based on those trials, we went ahead and installed scrapers in the other basins too.

"The work was carried out on a step-by-step basis. We installed a Z 2000 with two scrapers as far back as 1993, and tested it for a year to see how things worked out. Then, in 1997, we installed Z 2000s in the other three original basins. Now in 1998 we've got them installed in all six basins.

"The reason for installing the Z 2000s is to give us the capacity to deal with all sludge formed at the plant, before the end of the year 2000. We used to dump it back in the lake, and to a limited extent we still do so. But the Z 2000s have reduced the volume of sludge and made it easier to deal with. We used to have to empty all the basins and sluice them out every 14–20 days, depending on the time of year. Today we can go on operating the plant for three or four

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months at a time, and sometimes for as long as six months, before we have to empty the basins. In the final analysis it's a matter of hygiene as to how long one can go on operating with sludge in the basins."

High total solids

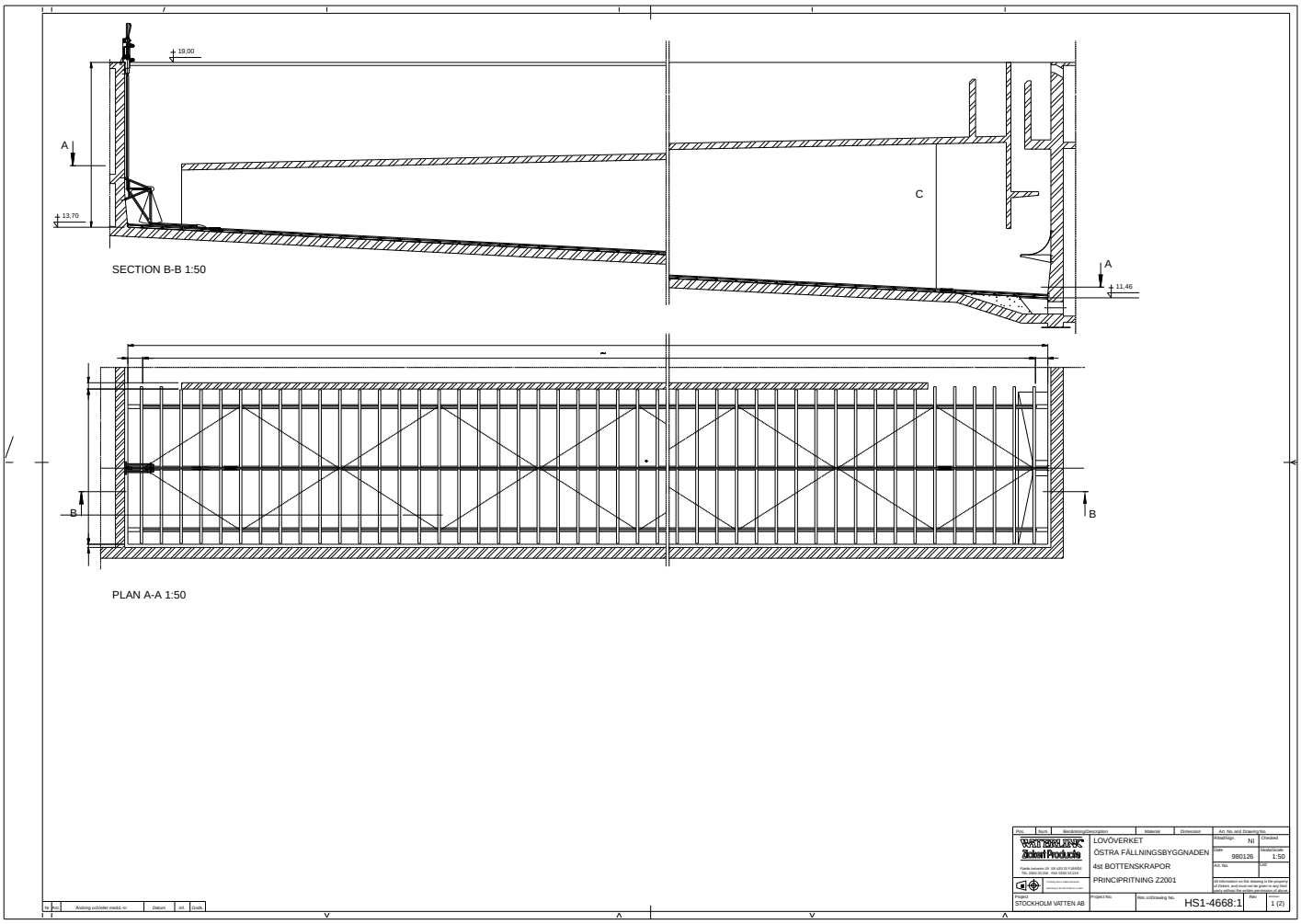
"Installing the Z 2000s has reduced our energy consumption, and it's also reduced our workload. Pumping 2 000 m³ of water out of a sedimentation basin and then filling it again uses a good deal of energy.

"But perhaps the biggest advantage of all is that we can now thicken the sludge here at the plant so that, when it's removed, it has a high total solids content. Today our sludge has a total solids content of 3% to 4% , as against 0,5% to 0,7% before we installed the Z 2000s and when volumes were much higher. That's something that's unique to the Z 2000, as I see it.

"Reduced volume is an important consideration when it comes to pumping the sludge to a sewage works or to thickeners, as the amount of energy consumed is in direct relation to the volume of sludge. But the Z 2000 is more than just an efficient thickener. It's also an efficient bottom scraper."

Improved hygiene

"I feel that these results should be seen in broader terms than those of sludge management," says Olle Svedberg. "By constantly maintaining the sludge content in our sedimentation basins at low levels, we also achieve higher standards of hygiene. Even during the first year the quality of the water was very much better than before in terms of turbidity and smell. When you get down to it, it stands to reason that, if you can keep the dirt down, you'll enjoy better standards of hygiene. Our Z 2000s make it easier for us to maintain very high standards of hygiene in what is, in fact, a foodstuffs factory."



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