

What's With All the Water?

By

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In a word, **re-circulation**. The water for drilling the main holes for the new waste water treatment plant was simply kept in a closed loop.

On the south side of the Screening Plant, a pond 2 metres (6.5 feet) deep was excavated in August and lined with a 30 mil (0.8 mm) thick engineered plastic sheet. The sole purpose of the pond was to hold water used for drilling the 2 main shafts in which will sit the influent pipes and air lines that form part of the new sewage treatment system. The 2 shafts are some 96 metres (315 feet) in depth from the surface of the ground.

But where did the water come from? To begin with, the pond was filled with potable water from the fire hydrant on the other side of Fifth Avenue by the Locomotive Museum. A suction line was placed at the southeast corner of the pond and a pump running continuously, drew water from the pond and dropped it into the large round casing that the drill machine sat on. The pipe from the casing back to the pond was used as an overflow. That maintained a proper level of water over the drill bit and helped to stabilize the shafts. As the bit progressed into the rock, the air supplied to the bit caused a Venturi (suction) effect and started the cuttings up the air lift. The air then forced cuttings and water up the drill pipe and through the blue rotary head at the top of the drill, through a large diameter rubber hose and pipe into the black tank located on the west side of the pond. The cuttings were deposited into the black tank and the water then overflowed a baffle and back into pond over the 3 spillways.

Why is all the water so dirty? The dirty water is because of the clay materials in the rock as well as the grinding of the rock as the drill bit progressed through the rock.

Doesn't this dirty water harm the environment? The answer to that is no. The reasons for that are that all of the water is re-circulated, the rock is very tight and has clay seams in it. Also, water samples were taken from the pond and results indicated that the water can be emptied from the pond directly into the Screening Plant. As part of the Environmental Protection Plan, a weekly inspection by an independent third party is carried out on site and the town's well water is sampled to ensure that the drilling is not affecting our groundwater that supplies the wells.

Why has it taken so long to drill these holes? The drilling started in June didn't it?

Well, apart from a problem with the 50" diameter drill bit while drilling the West Shaft, the main part of the drilling was actually small diameter holes (5-1/2") that were used to cement the rock.

At this point we should step back and explain a bit about the rock.

Last year we drilled a diamond drill hole to learn about the nature of the rock. Bedrock was found at approximately 10 meters (33 feet) which was a bit of a surprise as we thought that bedrock was much deeper. The hole was drilled some 100 metres (328 feet) deep, however between 30 and 70 metres a bad section of rock was encountered which led to the small diameter drilling we started with in June. The 2 – 50" diameter shafts are **the most important and riskiest part** of the entire project and without them, there would be no project. Therefore we had to stabilize the rock and that was done by injecting cement into the rock in a curtain around the 2 shafts. That is what took the bulk of the time.

What happens next? Once the drilling of each shaft was completed, the next tricky thing was to lower the 38" diameter Aeration Vessel into the ground. This was done with the use of a crane and welding 80' sections together. Since the bottom of each Aeration Vessel is closed (dome shaped bottom), water was added to sink it. Once each Aeration Vessel was properly situated, a pressure test was completed to ensure that they do not leak. After that, each Aeration Vessel was cemented in place with grout delivered in 4 separate lifts. Following that, the internal piping was welded together and lowered into each Vessel.

Will these shafts leak sewage into the environment? For the shafts to leak, the influent (sewage) would have to penetrate the 1/2" thick steel Aeration Vessel, then penetrate the 6" thick cement grout around the steel vessel, then get through the cement grout curtain around the 2 shafts. Following that the influent would have to get through very tight bedrock as well as clay seams. At the top of each shaft is a 1" thick casing that was drilled through the overburden gravels and is seated approximately 2.5 metres (8 feet) into bedrock. There is grout between the 38" steel vessel and the 1" thick steel casing. Therefore, the answer is no, the shafts will not leak into the environment and, most important, the aquifer that supplies our drinking water.

Think about this though. What happens if a sewage pipe located in the aquifer in the south end of town breaks? That would be a far bigger problem.



East Shaft (50" diameter)

West Shaft (50" diameter)

Pump intake

Overflow Pipe

Black Tank Spillway

Re-circulation Pond