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Use of salty groundwater for toilet flushing to substitute drinking water – water and microbial quality

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Background

A substantial part of the water used in householdings is used for toilet flushing, and this may not require drinking water quality. In this project, we have in full scale investigated abstraction of groundwater on the premises for this purpose. Since the groundwater at the specific location is not suited for use and distribution, it was treated and distributed in a separate distribution system to the toilets. The investigation was carried out in a newly (2017) built block of apartments with 95 apartments, at Nordhavn in Copenhagen, Denmark.

Application of any other water source than drinking water is raising a number of questions, and the aim of this investigation was to investigate which quality the water treatment has to reach? Is the wanted quality achieved and sufficient? Which microbial water quality is needed? – and is the toilet flushing with the applied water quality safe?

Water quality

The investigated block of apartments is located next to a harbour. The groundwater was selected as source since it was expected to be a mix of fresh groundwater and intruding salt water from the harbour. However, the abstracted groundwater was very salty and hard, besides it was anaerobic and contained dissolved iron. Subsequently, the water was treated by aeration and sandfiltration, and the water quality was monitored in the effluent from the treatment system during the first year of production.

Microbial quality

The microbial water quality was investigated in the effluent from the treatment system, in samples collected from toilet bowls and in samples collected from the toilet