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Sludge Dewatering Technology

Description

Premier Base has developed and patented an innovative approach to dewatering wastewater sludge that involves no energy consumption and no added chemicals.

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Premier Base Product Description

The units, which have been trialled in a number of municipal wastewater treatment plants (WWTP) of 750PE approximately, receive influent, which is typically raw sludge from a WWTP secondary stage settlement tank with a concentration in the range of 0.8% to 1% dry solids. The units dewater to a concentration in the range of 7% to 10% dry solid.

Sludge Dewatering Units

Two units in parallel in a 650PE WWTP

Benefits:

- Reduces sludge volumes by up to 90%

- Non mechanical therefore minimal maintenance

- No noise

- No energy required

- Odour free

- No chemicals required

- Can be installed without interfering with the daily running for the plant

- Significantly reduces the operational costs of a treatment plant

- Exhibits significant environmental impact benefits in the reduction of carbon outputs

The Product

- A concrete tank: unit dimensions 1.0m in depth, 3m in width and 8m in length.
- A membrane roof of woven black geotextile material on a lightweight hinged aluminum frame
- An outlet in one wall, which is closed by 2 baffle plates and manually operated
- An open sump outside the outlet, to receive decanted water
- Sludge inlet pipework mounted on the wall opposite the outlet

The floor of each unit or bed is constructed in a shallow V-shape to the center and is sloped towards the outlet at one side of the tank.

The units can be installed singly or in multiple units, in parallel configuration, to cater from 500PE to 5,000PE.

Operational Process

- Fill units with raw sludge at less that 1.0% dry solids by gravity or pump
- Allow retention time usually not less than 48 hrs (it can be held longer)
- Decant by opening baffle plates
- Close baffle plates at the end of the decanting process
- The holding period varies by plant since the determining factor is the time taken by the WWTP to generate surplus sludge requiring removal from the aeration basin
- Repeat Steps 1 – 5 for as many cycles as the capacity of the bed and/or the density of the sludge will allow
- Remove dewatered sludge typically at 7 – 10% dry solids using standard suction tanker equipment
- Wash down the unit to remove old sludge remnants with wash water returned to the head of the works. This is generally completed by the sludge transport contractor
- Repeat from Step 1

Case Study

The project consisted of the construction of 3 installations of new units, with fitted louver plate doors, and breathable membrane roofs.

The Water Systems and Services Innovation Centre (based at the Nimbus Centre, Cork Institute of Technology) was commissioned by Premier Base to design and undertake the necessary testing programme.

The process-proving phase lasted for 5 weeks. Prior to the first fill, the tanks were desludged and thoroughly cleaned to ensure no old/septic sludge remained, which could inhibit the dewatering process.

During the 5-week testing period ten fill/decant cycles were carried out, following the steps listed above.

Various items of data were gathered during the test period to monitor the performance and operating conditions of both the WWTP and the sludge beds. These included:

- Inlet Flow to the Wastewater Treatment plant
- Sludge Height in Bed before Fill cycle
- Sludge Height in Bed after Decant cycle

Reported operational financial savings over a 12 month period amounted to €206,036.43

In overall terms, it could be expected that operational savings would arise under a number of headings, namely:

- Reduced charges from the sludge transportation contractor
- Reduced processing costs
- Reduced polymer dosing
- Reduced operator hours

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