Stormwater Intrusion in the Corvallis Sewer System

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Methods

Basin Selection Criteria:
Concrete piping, installed in the 1970's, is susceptible to cracking and joint failure due to aging.

Basins 2, 3, and 17 were chosen because they have substantial concentrations of concrete (see Figure 3) and are served by both a flowmeter and two lift stations (Brooklane and Fairway View).

Basin Analysis:
Dry average: Average daily flowrate without rainfall. Pump cycle: Total hours of continuous pumping of each pump in a lift station. Brooklane had four pumps, enabling a max pump cycle of 96 hours.

Analysis of Basins 2, 3, and 17

Brooklane pumped for 5,240 hours and Fairway View pumped for 575 hours in 2015. This resulted in an extra $3,200 per year in pumping costs.

Flow Analysis

If the lift station capacity is reached during the wet season, the waste would be directly discharged into nearby rivers. Treatment plant additions and modifications would be needed to handle the nondischarged waste. Intrusion reduction would minimize this future capital expenditure.

Additionally, all wastewater that enters the treatment plant incurs a processing cost. Wastewater flow must therefore be monitored, and an associated cost must be determined to relate pumping and operation costs.

Results

Brooklane and Fairway View have considerable intrusion, but the pumping cost is not excessively high due to the low cost of electricity.

Conclusions

• Annual costs associated with excess pumping in analyzed basins averaged $7,200 per year, which is negligible.
• Assuming processing costs are 0.1 cents per gallon of wastewater, the excess flows over three years amounted to $1.2 million, which suggest future analysis should be process oriented.

Recommendations

• Future wastewater flows need to be estimated for the entire city to determine the likelihood of exceeding capacity.
• Flow monitors should be used to determine which basins contribute greatest intrusion.

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References