

Agenda Item

DATE: August 12, 2021

TO: Facilities Committee Members

FROM: Bettina Mayer, PE, District Engineer

SUBJECT: Provide and Update on the Wastewater Treatment Plant Filtration Alternatives Analysis and provided recommendations for ne next steps. (DISCUSSION)

RECOMMENDED ACTION:

That the Committee receive an update and recommendations on the Wastewater Treatment Plant Filtration Alternatives Analysis. (DISCUSSION)

FISCAL IMPACT:

No Immediate Fiscal Impact. Recommend installation of Filtration Technology be considered early next year. Future Installed Capital Costs estimated to range from \$950K to \$1.7M.

DISCUSSION:

The East Side Force Main and Lift Stations Project has been fully operational now for two years, since the end of June 2019. The increased flow impacts the operations of both the treatment pond system and the land disposal/percolation system.

Though the Upper Salinas Conjunctive Use Project grant request initially included a tertiary treatment filtration system, this component was cut from the project when the grant was reduced by one million dollars. Filtration of the treated wastewater prior to discharge to the Selby ponds will be necessary in the near future in order to improve the water quality of the effluent and maximize the volume of treated wastewater capable of being discharged to the percolation ponds. In order to make the best informed decision about filtration system is best for our system, Wallace Group has prepared a targeted alternatives analysis of various systems available and in use, with a focus on technologies that are effective for the removal of algae from the effluent. The attached analysis includes preliminary cost estimates including capital cost and annual operations and maintenance for the 3 technologies that appear to be the most suitable.

As stated in the Memorandum, during the late spring and early summer, the WWTP typically experiences increased algae growth in the pond system, which in turn impacts the infiltration capability of the effluent into the Selby percolation ponds. The Technology Screening analysis began with a rough screening of approximately 6 technologies and reduced to three treatment options. Table 7. Technology Summary is reproduced here for discussion purposes:

Table 7. Technology Summary

Criteria	Suspended Air Flotation (SAF) System	Continuous Backwash Sand Filter	Membrane Microfiltration
Capital Equipment Cost¹	\$379,000	\$484,000	\$665,000
Estimated Installed Cost	\$950,000	\$1,240,000*	\$1,665,000
Treatment Costs	\$137/MG	\$104/MG	\$135/MG
Footprint	12.6' x 8.5' x 9.4' tall	11.3' diameter x 25.8' high (per unit, 2 units proposed)	47.5' x 35.5' x 12.75' high
Electrical Usage	153 kWh/MG	109 kWh/MG	592 kWh/MG
Relative Chemical Usage	Medium	Low to Medium	High
Labor Requirements	1.0 FTE assumed	0.5 FTE assumed	1.5 FTE assumed
Additional Comments	<p>Effluent quality at average BOD/TSS concentrations expected to consistently meet treatment objectives; no data were available to evaluate performance at higher peak concentrations.</p> <p>Use of coagulants may be required presenting risk of carryover into treated effluent. Polymer test kit recommended for periodic monitoring of effluent.</p> <p>Continuous potable requirement (6 gpm).</p> <p>Float sludge management required; a sludge drying bed is anticipated for sludge management and is included in the capital equipment cost.</p>	<p>May not consistently achieve required effluent limit.</p> <p>Use of coagulant may be required to promote treatment presenting risk of carryover into treated effluent.</p> <p>Would require approximate \$30,000 pilot study to confirm treatment objectives can be met.</p> <p>Continuous reject water management required.</p>	<p>Membrane filtration is the least likely to require coagulant pre-treatment.</p> <p>This system is the most operationally complex but produces highest quality effluent. CIP, waste neutralization system, and waste management system required.</p> <p>Pre-treatment screening is required; a Hellan strainer is assumed to be required ahead of the membrane filtration system and is included in the capital equipment cost.</p>

* Continuous backwash sand filter installed cost includes \$30,000 for pilot testing.

¹ Note that capital equipment cost proposals were obtained in April through June of 2020 and may not reflect the most current vendor pricing.

Each evaluated system has its own set of pros and cons. The Suspended Air Flotation (SAF) system has the lowest installed capital cost. However, this is a technology that is in use for wastewater and is expected to provide a consistent effluent quality suitable for discharge at the Selby ponds. The operation is relatively simple, however it does require the use of coagulants, which can be monitored, and a float sludge drying bed. The maintenance and operational costs are in the mid-

range, estimating the equivalent of 1.0 full time utility staff person, or one Full Time Equivalent (FTE) needed for operation, compared to the other technologies.

The Continuous Backwash Sand Filter System has the mid-range installed capital cost. This treatment system does not have a proven track record for treating wastewater and it may not consistently achieve the required treatment level. However, the manufacturer recommends that a pilot testing, using coagulant, be performed to further evaluate the appropriateness of this technology. The maintenance and operational costs are in the mid-range, estimating the equivalent of 0.5 FTE utility staff person.

The third technology evaluated is the Membrane Microfiltration System. This technology will consistently produce the highest quality effluent. A simple pre-screening strainer is recommended ahead of the filtration. The system requires the addition of chemicals for pretreatment and more additional chemicals are required for the membranes than the other systems. This system is the most complex and the maintenance and operational costs are in the high range, estimating the equivalent of 1.5 FTE utility staff person.

There are a number of factors that should be considered in the final selection of a filtration system and each system's pros and cons will be discussed further at the Facilities Committee Meeting. Rob Miller will also be in attendance and available for discussion and to answer questions.

Attachment:

Effluent Filtration Technology Screening Memo, dated 7/27/2021, prepared by Wallace Group.