ADMINISTRATIVE REPORT

TO: Public Works Commission

FROM: Cathi Zammit, CWP Program Manager

PREPARED BY: Public Works Department

MEETING DATE: Wednesday, August 12, 2015 – Regular meeting starts at 7:30 p.m.

SUBJECT: Clean Water Program 2014 Draft Integrated Wastewater Master Plan Validation Study and Recommended Alternative Technology Approach

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RECOMMENDATION

That the Public Works Commission receive and provide comment on an update on the Clean Water Program validation study results and recommended alternative technology approach to the 2014 Draft Integrated Wastewater Master Plan.

BACKGROUND

In December 2014 the City submitted a draft 20-year Integrated Wastewater Master Plan to the Regional Water Quality Control Board as required by permit. The plan identifies capital improvements needed for the sanitary sewer collection system and wastewater treatment plant (WWTP) to meet regulatory requirements of the 2009 Cease and Desist Order and 2013 WWTP operation permit, address current plant reliability issues, provide capacity assurance for projected increases in wet weather flows reaching the plant, and plan for increasingly restrictive regulatory requirements over the next 20 years.

In October 2014, the Clean Water Program, Program Management Office (CWP PMO) was formed when the City entered into an agreement with CH2MHILL to provide professional program management services for this multi-million dollar program. The initial tasks of the PMO included conducting a chartering session to confirm the program mission, vision, and goals, and a validation study of the master plan to assess its alignment and ability to meet program goals and achieve desired outcomes. For purposes of the validation study, the original master plan is referred to as the baseline 2014 Draft Integrated Master Plan (2014 DIMP).

The PMO technology team validated the 2014 Baseline DIMP to reflect new regulatory guidance, City sustainability goals, and WWTP siting changes. These validation studies determined that the 2014 Baseline DIMP can meet current regulatory water quality needs, but restricts the WWTP's ability to meet future potential water quality requirements and City sustainability goals. The team then looked at technology alternatives to the 2014 DIMP to meet expanded CWP goals for future regulatory drivers and better water quality limits, and sustainability goals focused on reclaimed water, biosolids management, and energy generation and reuse.

Four Viable Alternatives to the 2014 DIMP

Validation studies narrowed down viable alternatives to four alternatives that could meet CWP and sustainability goals. These alternatives all provide reclaimed water, whereas the 2014 Baseline DIMP would require additional funding for treatment to achieve similar reclaimed water quality. All four alternatives were developed using site-specific WWTP process and technology models, site wastewater sampled data, detailed financial analysis including potential rate impacts, and site visits to other peer wastewater treatment facilities that are operating similar approaches.

The 2014 DIMP does not provide reclaimed water until year 2030 and cannot meet future water quality limits until 2035. To meet these potential future requirements, additional funding not included in the current Capital Improvement Projects list (CIP) will be required.

Two alternatives (Alternatives 1a and 1b described below) modify the 2014 Baseline DIMP to meet potential water quality discharge limits and sustainability goals over a 13 year period. These modified 2014 Baseline DIMP alternatives require construction phasing into the existing WWTP while it operates, which makes these two options much more complex to implement and to maintain NPDES discharge compliance.

Two additional, proven alternatives (Alternatives 2 and 3 described below) were selected that meet potential water quality discharge limits and sustainability goals. These alternatives are at lower costs than the 2014 Baseline DIMP and Alternatives 1a and 1b and both can be constructed to meet compliance and sustainability goals within 5 – 7 years. These additional alternatives can be constructed independently on the Detroit Drive site as a "standalone WWTP" while the existing WWTP remains in operation. This greatly reduces the risk of non-compliance with the WWTP's current NPDES wastewater effluent discharge requirements and the risk associated with construction phasing and logistics.

Four alternatives resulting from the validation studies are described below:

- Alternative 1a - Modified 2014 Baseline DIMP includes full wastewater conveyance to the WWTP (Full Conveyance Alternative) – The 2014 Baseline DIMP was modified to meet lower nitrogen (N), Total Nutrients (TN), and phosphorous (P) removals levels that are in alignment with projected potential regulatory requirements and allows full wastewater conveyance storage at the WWTP. This option allows space for a Fund 72 corporate yard, but has little to no available footprint for sustainability related facilities.
- Alternative 1b - Modified 2014 Baseline DIMP includes in-system wastewater storage and smaller WWTP equalization basin (In-System Alternative) – The 2014 Baseline DIMP was modified to meet lower N, TN and P removals that are in alignment with projected potential regulatory requirements. The only difference between Alterative 1a and 1b is that Alternative 1b has in-system wastewater storage upstream of the WWTP and a smaller WWTP flow equalization basin. This option also allows Fund 72 corporate yard, but has little to no available footprint for sustainability related facilities.
- Alternative 2 – Conventional Activated Sludge (CAS) for biological nutrient removal (BNR) – The CAS approach removes N, TN, and P to required potential regulatory levels, along with providing filtration for reclaimed water. This alternative uses a dual treatment train approach that provides year round wastewater treatment. Dual treatment train approach provides a combined treatment strategy for both dry and wet weather flows. This approach significantly reduces the required wastewater treatment processes and associated footprint needed to meet potential regulatory requirements. This approach will also convert the WWTP's activated sludge basin into an equalization basin for flow control during wet weather events. This option allows Fund 72 corporate yard, and has available footprint for sustainability related facilities.

- Alternative 3 (Recommended Alternative) – Membrane Bio-Reactor (MBR) – MBRs are combined with a CAS approach to reduce N, TN, and P and to produce higher quality reclaimed water. This alternative uses a dual treatment train approach similar to Alternative 2 that provides year round wastewater treatment. This approach has greater footprint reductions than Alternatives 1a, 1b, and 2 since no filtration and clarification basins are required to meet potential regulatory requirements. This approach will also convert the WWTP's activated sludge basin into an equalization basin for flow control during wet weather events. This alternative is the only one that provides higher quality final WWTP effluent. The other alternatives all require additional filtration and clarification to be at the same water clarity level. This higher quality effluent provides several additional water reuse treatment options and lower costs than the other alternatives. This option allows Fund 72 corporate yard, and has the most available footprint for sustainability related facilities. This alternative has low risk of impacting existing WWTP NPDES compliance since it can be completely constructed on Detroit Drive site and then tied into the existing WWTP.

Table 1 provides a comparison of each alterative. Table 1 includes alternatives' investment, projected rate increase & duration needed, and total rate impact for a 10 and 20 year Capital Improvement Program (CIP). Final rate impacts will be determined by the City's rate consultant. In all cases significant capital costs can be saved by going to a 10 year CIP implementation schedule. The 2014 Baseline DIMP was estimated at near $900 million over a 20 year CIP, but would require additional funding of approximately $200 million to meet potential future regulatory requirements and City's sustainability goals.

Table 1 – Alternatives Costs Comparisons for a 10 and 20 year CIP Program

Alternative:	Investment (million)	Avg. Projected Rate Increase	Duration of Rate Increase Period	Total Rate Impact
10 Year CIP				
Alternative 1a – Full Conveyance	$936	14%	8 years	108%
Alternative 1b – In System	$911	13%	8 years	105%
Alternative 2 – CAS	$805	13%	8 years	100%
Alternative 3 – BNR/MBR	$770	12%	8 Years	98%
20 Year CIP				
Alternative 1a – Full Conveyance	$1,100	8%	16 years	130%
Alternative 1b – In System	$1,000	7%	16 years	127%
Alternative 2 – CAS	$886	10%	16 years	131%
Alternative 3 – BNR/MBR	$862	10%	16 years	127%

The validation studies determined that the 2014 Baseline DIMP did not fully align with City's sustainability goals. Recycle water would not be available until 2030 and additional biosolids and biogas management including conversion to energy were not considered. Therefore, investments for all the alternatives do not include funding for biosolids management or energy recovery. Alternatives 2 and 3 provide significant WWTP site footprint for both biosolids management and advanced WWTP effluent treatment (direct potable reuse) facilities. Facilities for biosolids management and resource recovery will be addressed in a biosolids & resource recovery master plan being conducted by the CWP PMO. Direct potable reuse facilities will be explored by the CWP PMO with our water suppliers and distribution agencies and companies.

Alternative 3 is the least expensive for both a 10 and 20 year CIP, has the least total rate impact, allows space of Fund 72 corporate yard functions, and is in line with our City's sustainability goals. This alternative produces the highest quality final WWTP effluent which will allow many more

recycle/reuse options than the other alternatives and cost effectively future proofs the WWTP for potential regulatory compliance needs.

Recommended Alternative 3 - MBR
Alternative 3 – MBR is recommended because it has the least cost impacts, provides the highest quality reclaimed water, treats the full dry weather wastewater treatment plant influent flows to reclaimed water standards, and allows footprint for other facilities, including Fund 72 corporate yard, direct potable reuse facilities and biosolids management, resource recovery, and energy generation facilities. This alternative is endorsed by USEPA in other states and no concerns were provided by the RWQCB when staff presented this recommendation to them in June 2015.

Next Steps
Staff will be presenting this recommended Alternative 3 to the City Sustainability Commission on August 13th, 2015 and City Council on August 17th, 2015. Staff will consider and incorporate the Public Works Commission comments and concurrences into the presentation made to Council.

BUDGET IMPACT

None at this time. Potential costs savings of over $100M may be realized if Alternative 3 is selected as the preferred alternative following certification of the Programmatic Environmental Impact Report in June 2016.

ENVIRONMENTAL DETERMINATION

Preparation of a Programmatic Environmental Impact Report (PEIR) for the Clean Water Program was initiated in 2015. The PEIR will evaluate potential impacts of two programmatic wastewater flow management alternatives (In-System Storage and Full Conveyance). The PEIR will also evaluate potential impacts of the treatment alternatives included in the various technology strategies being considered from the 2014 Baseline DIMP and subsequent validation studies. Following certification of the PEIR in June 2016 and approval of the preferred Program alternative, final selection and approval of individual treatment project alternatives can proceed.

ATTACHMENTS
None

STAFF CONTACT

Brad Underwood, Director of Public Works
Bunderwood@cityofsanmateo.org
(650)522-7303

Cathi Zammit, Clean Water Program Manager
Czammit@cityofsanmateo.org
(650)522-7306