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City of Oxnard

Public Works Integrated Master Plan

WASTEWATER

PROJECT MEMORANDUM 3.7.2 ALTERNATIVE OXNARD WASTEWATER TREATMENT PLANT ASSESSMENT - RELOCATE OXNARD WASTEWATER TREATMENT PLANT

FINAL DRAFT
December 2015

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City of Oxnard

Public Works Integrated Master Plan

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1.0 INTRODUCTION

The City of Oxnard (City) is considering purchasing the land to the North and East of the Advanced Water Purification Facility (AWPF) for a variety of uses. This land, located along Hueneme Road at Perkins Road, is currently owned by the Navy. The City is currently in discussions with them to purchase it. The City is considering using a portion of this land for a 'Gateway Park' and another portion of this land for AWPF finished water storage. However, there would still be space available for other City uses. One possible other use for this land is the relocation of the Oxnard Wastewater Treatment Plant (OWTP). While there is still considerable work that would be needed to assess the feasibility of moving the OWTP, at this time there are no fatal flaws to this option and thus it is considered in this PM, by request of the City.

There are a variety of considerations that make moving the OWTP a viable option. First, much of the existing infrastructure at the OWTP is nearing the end of its useful life and needs to be repaired or replaced within the next 15 years. Since a large portion of OWTP facilities are recommended for replacement in this Public Works Integrated Master Plan (PWIMP), it is worth considering the optimal location for these replacement facilities. Additionally, the OWTP is located very near the coast. FEMA predicts that in the future there is the possibility that portions of the OWTP will experience significant flooding within the next fifty years due to its low elevation. Thus precautions should be planned to prevent such flooding. One such option for flooding protection is the construction of a floodwall to protect the OWTP at its existing location. This option is currently planned for in Scenario 2, and outlined in Project Memorandum (PM) 3.7.1. Another option to consider, is to move most of the OWTP facilities to a location of higher elevation, while leaving some facilities in place. This preliminary option is discussed in the sections below.

1.1 PMs Used for Reference

The recommendations outlined in this PM include recommendations from the following other PMs:

- PM 3.2 - Wastewater System - Flow and Load Projections.
- PM 3.4 - Wastewater System - Treatment Plant Performance and Capacity.
- PM 3.5 - Wastewater System - Condition Assessment.
- PM 3.6 - Wastewater System - Seismic Assessment.

- PM 3.8 - Wastewater System - Arc Flash Assessment.
- PM 3.9 - Wastewater System - Cathodic Protection Assessment.
- PM 3.10 - Wastewater System - SCADA Assessment.
- PM 3.11 - Wastewater System - Flow Monitoring.

1.2 Other Reports Used for Reference

In addition to the information referenced in PM 3.7.1, this PM also draws on information from the following reports:

- *Gateway Park / Ormond Beach Opportunities Analysis*, August 2011, (Kestrel Consulting, 2011).
- *DRAFT Direct Potable Reuse Case Study for WRRRF,* May 2013, (Carollo, 2013).

2.0 IMMEDIATE NEEDS

In order to move the OWTP to a new location, the City would need to consider the regulatory, timing, and financial feasibility of the move. A detailed facilities feasibility study (including location/sizing of facilities and costs) and environmental assessment would need to be conducted. The City would also need to obtain the proper permits for converting the land to its intended uses. It is estimated that this upfront work could take approximately five to ten years to complete. Given this timeframe and the existing condition of many of the OWTP facilities, there are a number of critical improvement projects at the OWTP that will need to move forward regardless of whether the OWTP will be relocated in the future.

Table 1 outlines the projects critical to keeping the plant safe and operational for the next five to ten years. During this time, the City can study and determine whether the preference is to keep the OWTP at its existing location or better define moving some of or all of the wastewater facilities. The projects identified as critical are based on those identified in PM 3.7.1 and also several small group workshops held with City management and staff and other consultants currently working directly with the wastewater plant. Table 1 lists the critically needed projects, a brief description, project timing, and a planning level cost estimate for each project. Two estimates are given. The higher estimate would provide more complete repairs and be more likely to sustain the plant for ten years. It also includes a 10 percent contingency for emergency needs that might arise. The lower estimate would likely cover the bare-bone essential repairs needed to keep the plant operational for five to six years. The total estimated cost of these immediate needs ranges from $21 to $39 Million (M). Moving forward, an average repair cost of $30 M was used.

Table 1 Immediate CIP Project Needs at the OWTP to Keep the Plant Operational
Public Works Integrated Master Plan
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		Low-End Estimate		High-End Estimate	
Start Year	**Years to Implement**	**Project Name**	**Un-escalated Project Cost Estimate**	**Project Name**	**Un-escalated Project Cost Estimate**
2016	3	Headworks Odor Control with Screen Walls, Concrete Repair, and RPF Cover Replacement	$3,000,000	Headworks Odor Control with Screen Walls, Concrete Repair, and RPF Cover Replacement	$4,640,000
2016	4	Headworks Below Cover Coating Repairs	$500,000	Headworks Below Cover Coating Repairs	$1,310,000
2016	2	Replace Primary Clarifier Equipment and secure launders	$3,000,000	Replace Primary Clarifier Equipment	$5,000,000
2016	1	Demolish Biotowers	$800,000	Demolish Biotowers	$800,000
2016	1	Add Baffle Walls in ASTs	$380,000	Add Baffle Walls in ASTs	$380,000
2016	2	Replace/Refurbish Interstage and Effluent Pump Station Pumps	$1,500,000	Replace Interstage and Effluent Pump Station Pumps	$4,000,000
2016	2	Clean Digesters #1 and #3, add Dystor Cover to #2	$3,000,000	Clean Digesters #1 and #3, add Dystor Cover to #2	$3,000,000
2016	1	Rebuild/Rehab the Gravity Thickeners	$750,000	Rebuild/Rehab the Gravity Thickeners	$1,000,000
2016	1	Refurbish the Belt Filter Presses	$2,000,000	Replace the Belt Filter Presses	$4,000,000
2016	2	Refurbish 2 of 3 Cogen Units	$800,000	Rebuild Cogen Units	$500,000
2016	3	Replace Standby Generators	$2,500,000	Replace Standby Generators	$2,500,000
2016	5	Replace Some Plant MCCs	$1,500,000	Replace Plant MCCs	$5,430,000
2016	2	Plant-Wide Utilities	$1,000,000	Plant-wide Cathodic Protection	$1,430,000
2016	1	SCADA System Upgrades	$500,000	SCADA System Replacement	$1,000,000
2016	4	Water Quality Early Warning System	$330,000	Water Quality Early Warning System	$330,000
	Subtotal		$21,230,000		$35,320,000
	Contingency				$3,680,000
	Total		**$21,560,000(1)**		**$39,000,000(1)**

Notes:
(1) $30,000,000 was chosen as a budgetary estimate of immediate CIP project needs.

3.0 PRELIMINARY SITE LAYOUT FOR MOVING THE OWTP

If the City moves forward with relocating the OWTP, a phased approach to relocation is suggested. If relocation is the preferred option, the City should consider moving all primary treatment, solids handling, and support facilities to the new site in the first phase of plant relocation. During Phase 2, secondary treatment, disinfection, and effluent pumping should be relocated. Phase 2 facilities were broken out because they are generally on higher ground than Phase 1 facilities and are not as impacted by potential flooding associated with sea level rise. Additionally these Phase 2 facilities are generally in better shape and have a longer remaining useful life. However, when these Phase 2 facilities reach the end of their remaining useful life they too should be relocated as see level rise will eventually impact them as well. Assuming permitting and the environmental process takes five to ten years, moving the Phase 1 facilities should start around 2023 and Phase 2 should start around 2035.

Phase 1 should not only include the relocation of primary treatment, solids handling, and support facilities, but it should also include rehabilitation of the facilities that will stay in their existing location until Phase 2, namely secondary treatment, disinfection, and effluent pumping facilities. Additionally, Phase 1 should include the demolition of the biotowers and gravity thickeners as well as headworks rehabilitation.

At this time it's assumed that the new plant location will not be as space limited, therefore conventional activated sludge treatment and chlorine disinfection could be installed for secondary treatment instead of MBR and UV facilities, to reduce costs. However, all other new facilities recommended in PM 3.7.1 - *Wastewater System - Traditional OWTP Assessment - Upgrade in Place,* like a FOG receiving station and Chemically Enhanced Primary Treatment (CEPT), are still recommended with this new plant option.

Given the OWTP's existing footprint, and the additional facilities needed through 2040, it is estimated that approximately 1,230,000 square feet (sqft) (around 28 acres) will be needed for this relocation. This footprint accounts for the additional DAFTs needed for co-thickening, larger digesters, a non-hazardous liquid receiving station, a FOG receiving station, sludge silos, and additional aeration basins if nitrification/denitrification is needed in secondary treatment. This footprint does not include a new headworks, as it is assumed that will remain in place and in operation and will not be relocated.

While more study is needed to determine the optimal site layout, it is recommended that all liquid treatment facilities be located together. It is also recommended that solids treatment facilities be located further from the roads to provide an added buffer from neighboring communities due to possible odors. Additionally, to provide a welcoming entrance and easy access, the administration and operations buildings should be located near the plant entrance. If located near the AWPF, these facilities could be similar in style to the AWPF for continuity and architectural interest. The equalization basins (approximately 90,000 square

feet) could either be re-built near their existing location, or moved to the new site as well. The phasing of facility transition should be explored further and will depend on the age and condition of existing facilities, the ability of the plant to operate during the transition, regulatory considerations, and constructability.

3.1 Other Site Considerations

The land east of the AWPF is not only being considered for OWTP relocation, but other facilities as well. The City is also considering using this land for a proposed 'Gateway Park', DPR and agricultural storage, parking, and a regional project to support groundwater basin management. Land requirements for these other projects are shown in Table 2. If the OWTP is relocated to the proposed site north and east of the AWPF, the remaining available land is expected to be around 397,000 sqft. This available land area is less than the minimum land needed for other uses. However, it is possible that the EQ basins could remain at their existing location freeing up an additional 90,000 sqft, and some of the existing OWTP facilities/buildings could be consolidated when they are relocated. Additionally, the City could look into purchasing additional land nearby or reducing the footprint of other proposed facilities.

Table 2 Other Possible Land Uses Considered for the Land Near the AWPF
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Purpose	Area Needed (sqft)
Gateway Park(1)	353,000 - 666,000
DPR Storage(2)	60,000
Agricultural Storage(3)	45,000
Parking(4)	76,000 - 120,000
Regional Project to Support Groundwater Basin Management(5)	100,000
Total	**634,000 - 991,000**

Notes:
(1) Based on the ranges given in *Gateway Park / Ormond Beach Opportunities Analysis*, Kestrel Consulting 2011. Includes a visitor center and adjacent amenities, community recreation area, trails and access, and general landscaping and signage.
(2) Assumes 3 tanks each with 3.125 MG storage capacity. This is based on the 2013 "Direct Potable Reuse Case Study for WRRRF."
(3) Assumes peak irrigation flow of 7 mgd for 8 hours would need to be stored in an 8 ft deep basin. This is based on the 2013 *Direct Potable Reuse Case Study for WRRRF*.
(4) Based on the ranges given in *Gateway Park / Ormond Beach Opportunities Analysis,* Kestrel Consulting 2011.
(5) Based on the land used for the existing Port Hueneme Water Agency Desalter.

4.0 PRELIMINARY COST FOR RELOCATING THE OWTP

A preliminary master-planning-level cost estimate was developed for relocating the OWTP to a new location; however, this estimate should be refined as the project develops further. Table 3 shows the projects involved in this option and their associated costs. In addition to these projects, funds should also be reserved for land acquisition, permitting, demolition and reclamation of the existing OWTP site, and additional civil/site work/inter-process piping needed with a new plant. For example, the site may need to be raised to a higher elevation and consider future sea-level rise. Table 4 adds these costs to the new plant option and compares the total cost of a new plant to the cost of rehabilitating the existing plant. This table also incorporates the additional operations and maintenance costs likely to be realized with an aging plant if the existing plant is kept in operation. As this table shows, based on class five cost estimates, there is not a significant difference between these two options.

The costs and timing presented in this PM represent Carollo's best professional judgment of the capital expenditure needs of the City and of the timing needed to maintain a reliable and compliant system that can meet current and future wastewater generation needs. Timing was set to align with the seven master plan drivers, namely: R&R, regulatory requirements, economic benefit, performance benefit, growth, resource sustainability, and policy decisions. Timing is also based on input from City staff and the condition assessments performed.

While the costs developed in this PM match the costs analyzed as part of the Cost of Service Study, the timing presented may differ. The Cost of Service Study will balance not only the CIP projects identified but also the rates and rate payer affordability based on a yearly balance and also the integrated costs for the different City funds and enterprises.

Table 3 List of Projects Needed with New Site Option
Public Works Integrated Master Plan
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Project	Driver	Start Year	Years to Implement	Un-escalated Project Cost ($)
Phase 1 Projects				
New Primary Clarifiers	R&R	2023	5	$24,500,000(1)
CEPT	Performance	2023	2	$1,500,000(2)
New Digesters	R&R	2023	5	$78,800,000(1)
New DAFTs	Performance	2023	3	$15,800,000(1)
New Chemical Handling Facilities	R&R	2023	2	$19,300,000(1)
New Primary Sedimentation Building	R&R	2023	5	$3,100,000(2)
New Chemical Handling Building	R&R	2023	3	$3,400,000(2)
New Non Hazardous Liquid Receiving Station	Performance	2023	2	$2,800,000(2)
New FOG Receiving Station	Resource Sustainability	2023	2	$3,700,000(2)
New Digester Control Building	R&R	2023	5	$1,700,000(2)
New Polymer Building	R&R	2023	3	$800,000(2)
New Solids Processing Facility	Performance	2023	3	$27,800,000(2)
New Sludge Silos	Performance	2023	3	$6,900,000(2)
New Cogeneration Facility	R&R	2023	A	$16,100,000(2)
New Operations Center and Lab Building	R&R	2023	4	$18,500,000(2)
New Collection System Maintenance Building	R&R	2023	2	$7,100,000(2)
New Storage/Warehouse	R&R	2023	2	$7,100,000(2)
New Effluent Electrical Building	R&R	2023	3	$1,300,000(2)
New North Area Electrical Building	R&R	2023	3	$2,000,000(2)
New Main Electrical Building	R&R	2023	3	$1,000,000(2)
Solar Facilities	Resource Sustainability	2023	10	$1,700,000(2)
SCADA System Upgrade	R&R	2023	5	$11,800,000(2)
AST Blower and Diffuser Replacement	R&R	2016	3	$6,200,000(2)

Table 3 List of Projects Needed with New Site Option
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Project	Driver	Start Year	Years to Implement	Un-escalated Project Cost ($)
Secondary Small Equipment Replacement	Small Equipment Replacement	2016	3	$700,000(2)
Secondary Sedimentation Tanks Replace Skimmers, Collectors, Drives and RAS Pumps	R&R	2016	3	$12,000,000(2)
EQ Basin Small Equipment Replacement	Small Equipment Replacement	2019	3	$ 600,000(2)
AST Concrete Rehabilitation	R&R	2016	11	$8,800,000(2)
SST Concrete Rehabilitation	R&R	2016	11	$6,200,000(2)
EQ Concrete Rehabilitation	R&R	2016	3	$2,800,000(2)
Chlorine Contact Tanks Rehabilitation	Small Equipment Replacement	2023	3	$400,000(2)
Chlorine Contact Tanks Coating	R&R	2025	2	$1,500,000(2)
Effluent Pump Station Rehabilitation	R&R	2016	3	$16,800,000(2)
CMMS	R&R	2016	3	$300,000(2)
Phase 2 Projects				
New Activated Sludge Tanks	R&R	2035	5	$33,300,000(1)
New Secondary Sedimentation Tanks	R&R	2035	5	$31,500,000(1)
New EQ Basin	R&R	2035	5	$8,800,000(1)
New Chlorine Contact Tanks	R&R	2035	5	$3,500,000(1)
New Effluent Pump Station	R&R	2035	5	$8,800,000(1)
Headworks Rehabilitation	R&R	2035	5	$11,600,000(2)
			Total:	**$410,500,000**

Notes:
(1) EALC is 75% of construction cost for those projects based on cost curves.
(2) EALC is 35% of construction cost for those projects originally estimated for the existing site, but now moved to new site with this scenario, due to new site uncertainties.

Table 4 Cost Comparison Between Keeping the Existing Plant and Constructing a New Plant
Public Works Integrated Master Plan
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Components	Existing Plant ($ M)[1]	New Plant ($ M)[2][3]
Total Construction Cost	$331	$258
Total Project Cost	**$410**	**$411**
Constructability and Protection of electrical and major equipment from SLR	$50	--
Additional O&M for Old Plant (15% of Construction Cost)	$77	--
Immediate Needs	--	$30
Additional civil/site work/inter-process piping needed with new plant (15% of Construction Cost)	--	$39[4]
Demolish and Reclaim old site	--	$10
Land Acquisition	--	$22
CEQA/Permitting (2% of Construction Cost)	--	$5
Total[5]	**$540**	**$520**

Notes:
(1) EALC is 24% of construction cost, consistent with other recommended projects in this PWIMP.
(2) EALC is 35% of construction cost for those projects originally estimated for the existing site, but now moved to new site with this scenario, due to new site uncertainties.
(3) EALC is 75% of construction cost for those projects based on cost curves.
(4) Spread over all the projects implemented at the new site.
(5) Totals are rounded up to the nearest 5 Million.