
CAPITAL INVESTMENT PLAN

TABLE OF CONTENTS

Summary	<u>199</u>
Capital Investment Plan Organization	<u>200</u>
Capital Investment Plan Development	<u>202</u>
Table 2 - Project Proposal Guidelines	<u>202</u>
Table 3 - Evaluation Criteria and Multiplier	<u>205</u>
Project Evaluation	<u>206</u>
Capital Investment Plan For Fiscal Years 2018/19 and 2019/20	<u>207</u>
Financial Projections	<u>209</u>
Figure 1 - Capital Investment Plan for FY 2018/19 and FY 2019/20 by Program	<u>210</u>
Figure 2 - CIP 10-year Window by Program FY 2013/14 through FY 2022/23	<u>211</u>
Table 4 - Three-year Outlook	<u>212</u>
Proposed Change this Budget Cycle	<u>216</u>
Capital Investment Plan Detail	<u>216</u>
Figure 3 - Appropriation Number Naming Convention	<u>217</u>
Table 5 - Key Appropriation Information	<u>218</u>
Narratives	<u>218</u>
Table 6 - Appropriation Title Index	<u>218</u>
Individual Appropriation Summaries	<u>222</u>

This page intentionally left blank.

CAPITAL INVESTMENT PLAN

Summary

The primary focus of the CIP Appendix is to provide information on all capital programs and projects that are scheduled to begin or will be underway during FY 2018/19 and FY 2019/20. Scope, accomplishments, objectives and financial projections are provided for each capital program and appropriation. Every project with work planned for the two budget years is listed under the Individual Appropriation Summaries.

Capital expenditures for FY 2018/19 and FY 2019/20 are estimated to be \$254.7 million and \$259.8 million, respectively, and are planned to be funded by a combination of current operating revenues (R&R and PAYGO) and debt.

The total FY 2018/19 and FY 2019/20 capital budget of \$514.5 million includes all anticipated costs for labor including administrative overhead, construction and professional services contract costs, right of way, materials, operating equipment, and incidental expenses.

Capital Program	FY 2018/19	FY 2019/20	Total
Cost Efficiency & Productivity	\$5,838,700	\$2,185,875	\$8,024,575
CRA Reliability	\$50,150,170	\$51,571,939	\$101,722,109
Distribution System Reliability	\$60,506,270	\$46,762,828	\$107,269,098
Minor Capital Projects	\$4,614,738	\$4,598,624	\$9,213,362
PCCP Reliability	\$39,519,326	\$52,832,893	\$92,352,219
Regional Recycled Water	\$4,192,261	—	\$4,192,261
Regulatory Compliance	\$1,680,035	\$6,573,370	\$8,253,405
ROW & Infrastructure Protection	\$5,831,896	\$6,554,364	\$12,386,260
System Flexibility/Supply Reliability	\$5,556,301	\$3,576,433	\$9,132,734
System Reliability	\$36,498,784	\$54,156,801	\$90,655,585
Treatment Plant Reliability	\$37,610,288	\$30,390,464	\$68,000,752
Water Quality/ORP	\$2,682,517	\$609,058	\$3,291,575
Total	\$254,681,286	\$259,812,649	\$514,493,935

Capital Investment Plan Organization

CIP Structure

The CIP is structured into three levels. In descending order, they are:

1. PROGRAM
2. APPROPRIATION
3. PROJECT

The highest level of the CIP structure is Program. Programs are comprised of one or more appropriations. There are 12 capital programs described in Table 1. Under each capital program, there is one to several appropriations, each with multiple projects.

Table 1 - Capital Programs

Program	Definition
Colorado River Aqueduct (CRA) Reliability	Projects under this program will replace or refurbish facilities and components on the CRA system in order to reliably convey water from the Colorado River to Southern California.
Cost Efficiency & Productivity	Projects under this program will upgrade, replace, or provide new facilities, software applications, or technology that will provide economic savings that outweigh project costs through enhanced business and operating processes.
Distribution System Reliability	Projects under this program will replace or refurbish existing facilities within Metropolitan’s distribution system including reservoirs, pressure control structures, hydroelectric power plants, and pipelines in order to reliably meet water demands.
Minor Capital Projects	Projects under this program will execute refurbishments, replacements, or upgrades at Metropolitan facilities that cost less than \$250,000.
Prestressed Concrete Cylinder Pipe (PCCP) Reliability	Projects under this program will refurbish or upgrade Metropolitan’s PCCP feeders to maintain reliable water deliveries without unplanned shutdowns.
Regional Recycled Water Supply Program	Projects under this program are planned to demonstrate the feasibility of recycling wastewater for recharge of groundwater basins within Southern California, for development of a potential regional recycled water supply system.
Regulatory Compliance	Projects under this program will provide for prudent use and management of Metropolitan’s assets in compliance with regulations and codes, other than water quality.
Right-of-Way and Infrastructure Protection	Projects under this program will refurbish or upgrade above-ground facilities and rights-of-way along Metropolitan’s pipelines in order to address access limitations, erosion related work, and security needs.
System Flexibility/Supply Reliability	Projects under this program will enhance the flexibility and/or increase the capacity of Metropolitan’s water supply and delivery infrastructure to meet current and projected service demands.

Program	Definition
System Reliability	Projects under this program will improve or modify facilities throughout Metropolitan’s service area in order to utilize new processes and/or technologies, and to improve facility safety and overall reliability. These include projects related to Metropolitan’s Supervisory Control and Data Acquisition (SCADA) system and other Information Technology projects.
Treatment Plant Reliability:	Projects under this program will replace or refurbish facilities and components at Metropolitan’s five water treatment plants in order to continue to reliably meet treated water demands.
<ul style="list-style-type: none"> • Diemer Plant • Jensen Plant • Mills Plant • Skinner Plant • Weymouth Plant 	
Water Quality/Oxidation Retrofit	Projects under this program will add or upgrade facilities to ensure compliance with water quality regulations for treated water at Metropolitan’s treatment plants and throughout the distribution system.

CAPITAL INVESTMENT PLAN DEVELOPMENT

Background

The projects that comprise the proposed CIP have been identified from many Metropolitan studies of projected water needs as well as ongoing monitoring and inspections, condition assessments, and focused vulnerability studies. Staff continues to study operational demands on aging facilities and has made recommendations for capital projects that will maintain infrastructure reliability and ensure compliance with all applicable water quality regulations, and building, fire, and safety codes. Staff has also studied business and operations processes and proposed projects that will improve efficiency and provide future cost savings. Additionally, several projects have been identified and prioritized to address uncertain or reduced allocations from the State Water Project.

CIP Development Process

The CIP is structured to reflect Metropolitan’s strategic goals of providing a reliable supply of high-quality water at the lowest cost possible. As part of the CIP development process, all new and existing projects are evaluated against an objective set of criteria to ensure existing and future capital investments are aligned with Metropolitan’s priorities for water supply reliability, water quality, and public safety.

This rigorous evaluation process has resulted in a thorough review and assessment of all proposed capital projects by staff and managers prior to inclusion in the CIP budget. Staff continues to conduct comprehensive field investigations that identify critical replacement and refurbishment projects and a variety of necessary facility upgrades related to infrastructure reliability as well as regulatory compliance. Project schedules are evaluated regularly in order to plan for necessary capital investments in infrastructure reliability and to accommodate the urgency of each project. Additionally, current demand projections that account for ongoing conservation, planned increased local supply production, and the economy, have been evaluated to ensure that demand and growth-related projects are appropriately scheduled.

Project Proposals

Sponsors are required to submit proposals for all projects to be considered for inclusion into the CIP. For newly proposed projects, proposals must include scope, justification, alternatives, impacts of re-scheduling work for a later time, impact on operations and maintenance costs, and an estimate of total project cost. For existing projects, staff must also provide justification for continuing the project, explain any changes since inception of the project, and describe critical phases for the upcoming years.

The projects are evaluated, rated, and prioritized based on the contents of the proposals. The guidelines provided to the project sponsors are summarized in Table 2.

Table 2 - Project Proposal Guidelines

Section	Guideline
Appropriation and Project No. (if existing) and Project Title	If a proposed project has been previously authorized by the Board, provide the Appropriation and Project numbers along with the Project Title. If not previously authorized, provide a project title.
Sponsoring Group	Indicate the Group sponsoring the project, as follows:

Section	Guideline
	1) Office of General Manager 2) Water System Operations 3) Water Resource Management 4) Engineering Services 5) Information Technology 6) Real Property 7) Office of Chief Financial Officer 8) External Affairs 9) General Counsel Department 10) General Auditor Department 11) Ethics Office
Total Project Estimate	Show the total estimate of cost from inception to completion of a project, including administrative overhead and contingency, as applicable.
Current Project Phase	Indicate the phase (Study, Preliminary Design, etc.) as of the date proposal submitted.
Current Phase % Complete	Current phase percent complete as of the date proposal submitted.
Project Description	Describe the project scope of work.
Changes to Existing Project	For an existing project, describe any changes to the project scope, budget, or schedule over the past two years.
Justification	<p>Describe the nature of the issue to be addressed by the project. What is the problem? Consider issues such as:</p> <ul style="list-style-type: none"> • Operational flexibility • Water supply/facility expansion • Aging/deteriorated infrastructure • Process failure/improvement • Maintenance capability • Seismic vulnerability • Obsolescence (vendor support, parts, technology, etc.,) • Security • Regulatory Compliance (water quality, environmental, health and safety, etc.) • Cost savings • Revenue generation • Environmental benefits • Energy savings • Health & Safety • What is the function of the facility/component being addressed by the proposed project? Why is it important? <p>Include an explanation of how the project addresses any of the above issues and provide documentation, when applicable, to substantiate the need for the project.</p>

Section	Guideline
Directive	<p>Regulatory/Legal Settlement: Indicate if this is related to a written citation or directive, verbal/written directive, or in-house identification (includes environmental mitigation mandated by a MND or EIR).</p> <p>Special Initiative/Directive: Indicate if the project is specifically identified in one of the core or strategic initiatives; identified via Area Study, System Overview Study, etc.; and/or what phase(s) of the project have been authorized by the Board such as study, preliminary design, final design, or construction by contract.</p>
Service Disruption	Describe how Metropolitan’s day-to-day operations could be impacted if the project is not approved. Consider business as well as water system operations, including maintenance activities.
Cost/Productivity/ Sustainability	Describe potential cost, water, and/or energy savings, revenue generation, productivity gains, environmental benefits, better customer service, etc., that justify the project. Include a pay-back period.
Alternatives	Provide a brief description of any potential project scope alternatives, including any opportunities to “stage” the work. Include if it is possible to only perform a portion of a project to meet foreseeable customer needs. Consider the possibility of new technology, changing demands, as well as environmental impacts and economies of scale. Describe any reasonable projects, processes, or other initiatives available as alternatives to the project. Discuss both positive and negative aspects of each alternative. If possible, explain what other similar companies are doing about this or similar issue.
Additional Background Information	Provide any other supplemental information (e.g. detailed history of a problem, supporting technical information, shutdown constraints, etc.) that will help in evaluating the project. This can also be attached to the proposal.
Schedule	Indicate the proposed beginning and end dates for all appropriate phases.
Detailed Project Estimate	<p>Include an itemized list of all costs for the project, as follows:</p> <ol style="list-style-type: none"> 1) Direct Labor with additives at the indicated rate 2) Equipment and Materials 3) Incidental Expenses 4) Professional/Technical Services (e.g., consultants) 5) Right-of-Way and Land Purchases (e.g., easements, fee title, escrow fees) 6) Operating Equipment Use and Rental 7) Contract Payments (e.g., construction contracts) 8) Administrative Overhead at the indicated rate 9) Contingency <p>All new project proposals and existing projects must include this estimate.</p>

Section	Guideline
Post-Implementation O&M Impacts	To the extent available/known, provide a description of the impacts, costs, and/or benefits this capital project is anticipated to have on Metropolitan’s current and future O&M expenses and services upon completion (e.g. labor, maintenance, and equipment costs; enhanced reliability; improved water quality, etc. For example, “Ozone generators will substantially increase electrical consumption by approximately \$1 million annually and the number of new pieces of equipment will require periodic maintenance per the manufacturer’s recommendations beginning in FY 2015/16. PDR and future studies will provide additional detail on the overall lifecycle costs”). This is required for projects greater than \$2 million and whose planned implementation date is within the next five fiscal years.
Approvals	<ol style="list-style-type: none"> 1) Person submitting and/or sponsoring the proposed project 2) Team manager of the person submitting and/or sponsoring the project 3) Unit manager of the person submitting and/or sponsoring the project 4) Section manager of the person sponsoring the project (e.g., all new and existing projects) 5) Group manager sponsoring the project (e.g., all new projects) 6) Project manager signs in concurrence. (e.g., Engineering and IT organizations)

Evaluation Criteria

The evaluation criteria cover four characteristics or objectives for capital projects: Project Justification, Directive, Service Disruption, and Cost/Productivity/Sustainability. In addition, a multiplier is applied to a project rating to factor in a risk assessment. Table 3 provides a description of the criteria and multiplier.

Table 3 - Evaluation Criteria and Multiplier

Criteria	Description
Justification	<p>Assessment of the overall importance of a project. Criterion looks at whether or not a project supports the following:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Supply reliability <input type="checkbox"/> Infrastructure reliability <input type="checkbox"/> Regulatory compliance <input type="checkbox"/> GM Business Plan <input type="checkbox"/> Other goals (e.g., cost savings, revenue generation, and energy savings)
Directive	<p>Assessment of whether or not a project is specifically identified in one of the core or strategic initiatives, if any permitting agency such as the California State Department of Safety of Dams has issued a directive or citation to take corrective actions, and/or the current Board authorized scope of work:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Regulatory/Legal Settlement <input type="checkbox"/> Special Initiative/Directive <input type="checkbox"/> Board authorization
Service Disruption	<p>Assessment of not doing a project. Criterion evaluates the following:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Impact to Metropolitan’s business operations <input type="checkbox"/> Impact to water system operations (e.g., system delivery and/or reliability, cascading impact on system due to failure, etc.)
Criteria	Description

Criteria	Description
Cost/Productivity/Sustainability	<p>Assessment of whether or not a project improves cost efficiency/productivity, specifically:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Cost/benefit analysis <input type="checkbox"/> Increased productivity <input type="checkbox"/> Sustainability <input type="checkbox"/> Customer service
Multiplier	Description
Risk Assessment	<p>Assessment of the probability of:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Facility/component/process failure <input type="checkbox"/> Workplace health and safety <input type="checkbox"/> Water quality or environmental impact <input type="checkbox"/> Missed opportunity (e.g., available resources, shutdown, revenue generation, cost savings, supply) <input type="checkbox"/> Not meeting service demands

Project Evaluation

A CIP Evaluation Team comprised of staff from Water System Operations, Water Resource Management, Real Property, Engineering Services, Finance, Information Technology, Environmental Planning, and External Affairs evaluate and rate all project proposals. The evaluation criterion is designed to prioritize projects that directly support reliability, quality, and safety for inclusion in Metropolitan’s proposed CIP.

An iterative process is employed to first score and rank every new and existing project, and then solicit feedback from project sponsors, customers, and resource providers in order to establish schedules and cash flow requirements. Those schedules, along with analyses of facility shutdown requirements, environmental permitting timeframes, and contracting process requirements, also enable resource managers to identify staffing needs. The final schedule and implementation plan for FY 2018/19 and FY 2019/20 are reflected in the budget and objectives summarized for each of the individual appropriation narratives that appear later in this document.

Capital Investment Plan for Fiscal Years 2018/19 and 2019/20

Additions

Eighteen projects totaling \$22.7 million were added to the FY 2016/17 and FY 2017/18 budget as authorized by the Board. These projects were identified after adoption of the budget and included projects such as Lake Perris Seepage Water Conveyance Pipeline, Second Lower Feeder Urgent PCCP Repairs, Casa Loma Siphon Repairs, CRA Housing Improvements, Valley View Hydroelectric Plant Refurbishment, and Headquarters Facility Security Upgrades.

New Projects

This year, a total of 83 new projects, excluding Minor Capital projects, have been recommended by the CIP Evaluation Team to either proceed as proposed, or be staged to perform only a portion of the work in the biennial budget period, and have been incorporated into the capital programs.

Overall, there are a total of 345 projects (excluding Minor Capital Projects) in 70 appropriations within the Capital Investment Plan for FY 2018/19 and FY 2019/20.

Major Objectives

Below, grouped by CIP Program, are descriptions of some of the capital project major activities anticipated to be underway or completed over the next two fiscal years.

Colorado River Aqueduct Reliability

Complete construction of the 6.9 kV Switch House seismic retrofit. Commence construction of the pumping plant overhead crane improvements and discharge line isolation couplings. Commence construction of the pumping plant sump system rehabilitation and main pump power cable replacement.

Cost Efficiency and Productivity

Complete installation and deployment of a new, enhanced corporate project controls and reporting system that will replace the outdated Project Management Information System.

Distribution System Reliability

Complete the replacement of the liner and floating cover and sodium hypochlorite feed system at the Palos Verdes Reservoir. Complete construction of the Orange County Region Operations and Maintenance Facility. Depending on the SWP allocation, commence construction of Stage 3 relining of the Etiwanda Pipeline, and the relining of 9 miles of the Orange County Feeder. Complete final design of the Sepulveda Canyon Control Facility improvements (Bypass Line). Begin design to refurbish pressure control structures and multiple underground valve structures.

Complete assessments and begin design of instrumentation upgrades for the dams at Lake Skinner and Lake Mathews.

Prestressed Concrete Cylinder Pipe Reliability

Continue pipe procurement, valve procurement, and construction to rehabilitate the remaining PCCP portions of the Second Lower Feeder. Continue preliminary design to rehabilitate the PCCP portions of the Allen-McColloch Pipeline, Calabasas Feeder, Rialto Pipeline, and Sepulveda Feeder. Continue annual electromagnetic inspections of all PCCP pipelines.

Regional Recycled Water Supply

Complete construction of a demonstration-scale recycled water treatment plant for a Regional Recycled Water Supply Program.

Right of Way and Infrastructure Protection

Commence construction of pipeline protection and access improvements in the Orange County Region. Certify the Programmatic EIR for the Western San Bernardino County Region. Complete preliminary design of pipeline protection and access improvements in the Los Angeles, Riverside and San Diego County Regions.

System Reliability

Operation Support

Continue design, construction, and renovation of District housing facilities.

LaVerne Shop Facilities

Complete construction of remaining utility extensions and final building improvements. Complete procurement of replacement fabrication and machine shop equipment.

Information Technology

Complete design and begin replacement of input/output components and operating systems for approximately 300 Remote Terminal Units that monitor and control Metropolitan's treatment plants and distribution system.

Headquarters Building

Complete final design of building improvements and commence construction of seismic upgrades to Metropolitan's Headquarters Building in Los Angeles.

Supply Reliability/System Flexibility

Start construction of upgrades to the Greg Avenue Pump Station depending on the SWP allocation.

Treatment Plant Reliability

Weymouth Plant

Complete construction to upgrade the west washwater tank. Complete construction of the domestic and fire water system improvements. Complete design of the seismic upgrades for the Administration Building. Complete construction of the chlorine system upgrades.

Diemer Plant

Complete construction of seismic upgrades and control room improvements at the Administration Building. Commence rehabilitation of the remaining four flocculation/sedimentation basins and upgrade of the plant's filter buildings, including valve replacement and seismic strengthening on the west side of the plant.

Jensen Plant

Complete the first phase upgrades to the plant's electrical systems. Complete construction of the inlet water quality instrumentation upgrades.

Mills Plant

Complete chemical tank replacement.

Water Quality/Oxidation Retrofit

Weymouth Plant Oxidation Retrofit

Complete all remaining construction to support ozone system operation.

Financial Projections

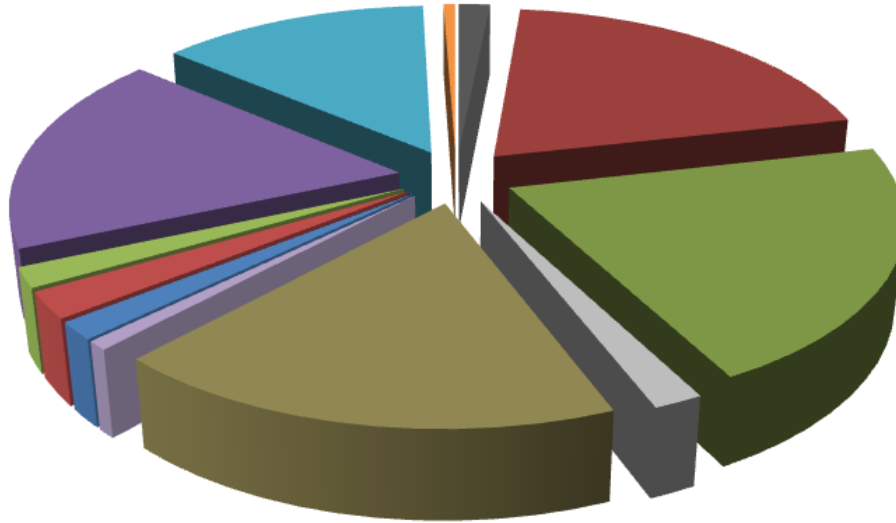
The CIP budget for FY 2018/19 and FY 2019/20 is estimated to be \$254.7 million and \$259.8 million, respectively, and is planned to be funded by a combination of current operating revenues (R&R and PAYGO) and debt. All of the projects in the CIP are reviewed as part of the biennial budgeting process. Considerations for timing of nearby projects and facility shutdowns, urgency, aging infrastructure, updated service demand projections, and regulatory requirements are taken into account. Estimated capital expenditures are updated on a regular basis as new projects are added, other projects are completed, construction cost estimates are refined or contracts awarded. From time to time, projects that have been undertaken are delayed, redesigned or deferred for various reasons and no assurance can be given that a project in the CIP will be completed in accordance with its original schedule.

The overall CIP budget for the FY 2018/19 and FY 2019/20 biennium totals \$514.5 million as shown in Figure 1 by Program. This CIP budget has been estimated based on anticipated project progress and estimated costs for the new biennium budget period. Planned capital expenditures for FY 2018/19 are approximately \$15 million more than what was budgeted for FY 2017/18. This increase in planned expenditures supports the long-standing core business objective to maintain infrastructure reliability and provides a new emphasis on enhanced infrastructure safety, security, and resiliency as reflected in the General Manager's Strategic Priorities. Actual expenditures in FY 2017/18 are projected to be about \$43 million less than budgeted. Therefore, planned expenditures in FY 2018/19 of \$255 million reflect a \$58 million increase from projected actual expenditures in FY 2017/18 of approximately \$197 million.

Figure 2 depicts the capital expenditure profile, including actual and projected cash flow, for the 10-year period from FY 2013/14 through FY 2022/23 and Table 4 provides a more detailed three-year outlook.

Figure 1 - Capital Investment Plan for FY 2018/19 and FY 2019/20 by Program

Capital Investment Plan for FY2018/19 and FY19/20 - \$515 M



- Cost Efficiency & Productivity \$8 M
- CRA Reliability \$102 M
- Distribution System Reliability \$107 M
- Minor Capital Projects \$9 M
- PCCP Reliability \$92 M
- Regional Recycled Water \$4 M
- Regulatory Compliance \$8 M
- ROW & Infrastructure Protection \$12 M
- System Flexibility/Supply Reliability \$9 M
- System Reliability \$91 M
- Treatment Plant Reliability \$68 M
- Water Quality/ORP \$3 M

Figure 2 -CIP 10-year Window by Program FY 2013/14 through FY 2022/23

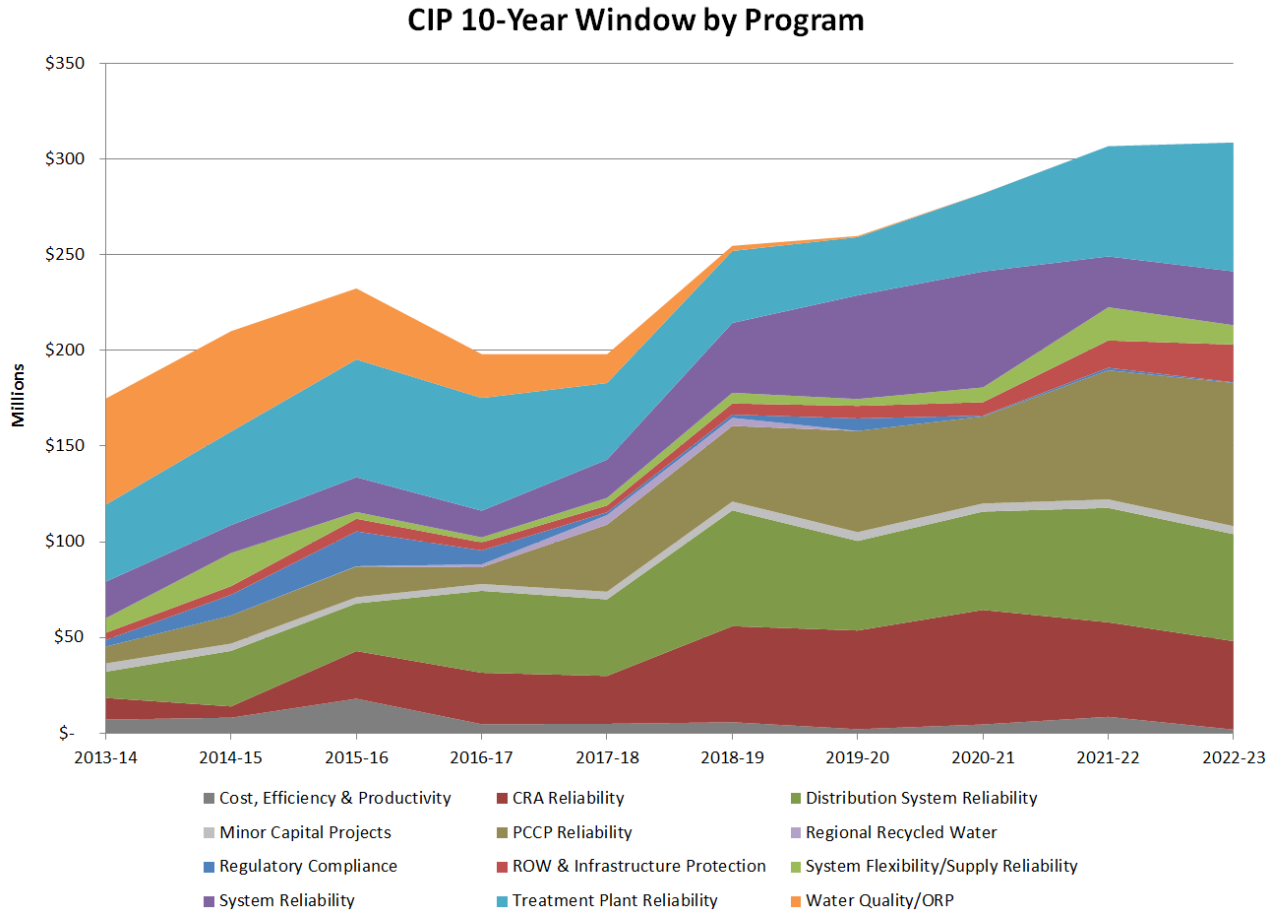


Table 4 - Three-Year Outlook

Capital Program and Appropriations	Appn. No.	FY 2018/19	FY 2019/20	FY 2020/21
Cost Efficiency & Productivity Program		\$5,838,700	\$2,185,875	\$4,658,636
DVL Recreation Facilities	15334	\$397,565	\$402,434	\$3,656,496
Power Reliability and Energy Conservation	15391	\$21,472	\$2,934	\$2,143
Information Technology System - Business, Finance, and HR	15411	\$757,626	\$135,510	—
Business Operations Improvement	15484	\$1,108,002	\$500,000	—
Project Controls and Reporting System	15490	\$2,319,035	—	—
Enterprise Content Management	15500	\$1,235,000	\$1,144,997	\$999,997
Colorado River Aqueduct Reliability Program		\$50,150,170	\$51,571,939	\$59,826,214
Cabazon Radial Gate Facility Improvements	15320	—	—	—
White Water Siphon Protection	15341	\$2,940,513	—	—
CRA - Conveyance Reliability	15373	\$9,391,601	\$1,673,986	—
CRA - Electrical/Power Systems Reliability	15384	\$7,653,620	\$12,556,202	\$12,068,498
CRA - Reliability for FY2006/07 through FY2011/12	15438	\$9,741,992	\$7,864,908	\$14,597,293
CRA Main Pump Reliability	15481	\$4,051,386	\$12,534,760	\$9,241,866
CRA - Reliability for FY2012/13 through FY2017/18	15483	\$15,115,391	\$14,240,575	\$19,394,760
CRA - Reliability for FY2018/19 through FY2023/24	18901	\$1,255,667	\$2,701,508	\$4,523,797
Distribution System Reliability Program		\$60,506,270	\$46,762,828	\$55,362,538
Conveyance and Distribution System - Rehabilitation	15377	\$10,174,007	\$14,281,382	\$1,698,451
Reservoir Cover Replacement	15417	\$16,485,432	\$3,718,547	\$6,484,709
Dam Rehabilitation & Safety Improvements	15419	\$6,233,677	\$4,841,995	\$4,729,001
Conveyance and Distribution System - Rehabilitation for FY2006/07 through FY2011/12	15441	\$2,549,373	\$1,274,191	\$9,293,434
Hydroelectric Power Plant Improvements	15458	\$3,469,641	\$250,000	\$421,374

Capital Program and Appropriations	Appn. No.	FY 2018/19	FY 2019/20	FY 2020/21
Conveyance and Distribution System - Rehabilitation for FY2012/13 through FY2017/18	15480	\$20,009,824	\$19,918,892	\$20,489,116
Pipeline Rehabilitation and Replacement	15482	—	—	—
Conveyance and Distribution System - Rehabilitation for FY2018/19 through FY2023/24	18902	\$1,584,316	\$2,477,821	\$12,246,453
Minor Capital Projects Program		\$4,614,738	\$4,598,624	\$4,265,945
Capital Program for Projects Costing Less Than \$250,000 for FY2014/15 through FY2015/16	15489	\$1,067,653	—	—
Capital Program for Projects Costing Less Than \$250,000 for FY2016/17 through FY2017/18	15498	\$2,374,956	\$2,366,656	\$912,001
Capital Program for Projects Costing Less Than \$250,000 for FY2018/19 through FY2019/20	18908	\$1,172,129	\$2,231,968	\$2,353,944
Capital Program for Projects Costing Less Than \$250,000 for FY2020/21 through FY2021/22	Future	—	—	\$1,000,000
Prestressed Concrete Cylinder Pipe Rehabilitation		\$39,519,326	\$52,832,893	\$45,440,250
PCCP Rehabilitation and Replacement	15471	\$1,940,449	\$1,956,224	\$1,948,334
Sepulveda Feeder PCCP Rehab	15496	\$1,500,000	\$996,240	\$7,984,647
Second Lower Feeder PCCP Rehab	15497	\$30,307,285	\$47,300,725	\$31,139,430
Allen-McColloch Pipeline, Calabasas Feeder, and Rialto Pipeline PCCP Rehabilitation	15502	\$5,771,592	\$2,579,704	\$4,367,839
Regional Recycled Water Supply Program		\$4,192,261	—	—
Demonstration-Scale Recycled Water Treatment Plant	15493	\$4,192,261	—	—
Regulatory Compliance Program		\$1,680,035	\$6,573,370	\$427,489
Chlorine Containment and Handling Facilities	15346	—	—	—
CRA - Discharge Containment	15385	\$1,680,035	\$6,573,370	\$427,489
Right of Way & Infrastructure Protection Program		\$5,831,896	\$6,554,364	\$6,998,356
Right of Way & Infrastructure Protection	15474	\$5,831,896	\$6,554,364	\$6,998,356
System Flexibility/Supply Reliability Program		\$5,556,301	\$3,576,433	\$7,714,204
Hayfield and Lake Perris Groundwater Recovery	15402	\$567,342	\$1,200,000	\$3,221,413
Perris Valley Pipeline	15425	\$318,998	—	\$586,400

Capital Program and Appropriations	Appn. No.	FY 2018/19	FY 2019/20	FY 2020/21
Water Delivery System Improvements	15488	\$1,587,963	—	\$2,345,329
Verbena Property Acquisition	15492	\$1,714,380	\$1,728,318	\$1,561,062
Delta Wetlands Properties (Delta Islands)	15494	\$1,367,618	\$648,115	—
System Reliability Program		\$36,498,784	\$54,156,801	\$70,551,092
Information Technology System - Infrastructure	15376	\$12,857	—	—
Information Technology System - Security	15378	\$700,594	\$2,287,879	\$1,507,205
LaVerne Shop Facilities Upgrade	15395	\$2,307,330	\$5,447,637	\$592,642
Water Operations Control	15467	\$12,978,126	\$6,438,335	\$23,638,330
Union Station Headquarters Improvements	15473	\$2,380,380	\$21,882,915	\$29,596,836
IT Infrastructure Reliability	15487	\$4,974,420	\$8,880,943	\$7,694,986
Operations Support Facilities Improvement	15495	\$7,714,235	\$1,219,122	\$282,117
Metropolitan Security System Enhancements	15499	\$1,080,428	\$5,349,395	\$862,994
Infrastructure Reliability Information System	15501	\$2,743,040	\$93,942	—
System-Wide Paving & Roof Replacements for FY 2018/19 through FY 2019/20	18909	\$183,096	\$1,214,120	\$5,948,621
System-Wide Paving & Roof Replacements for FY 2020/21 through FY 2021/22	Future	—	—	\$200,000
Enterprise Data Analytics	18910	\$1,424,278	\$1,342,513	\$227,361
Treatment Plant Reliability Program		\$37,610,288	\$30,390,464	\$50,746,146
Weymouth Water Treatment Plant Improvements	15369	\$7,446,272	\$5,563,862	\$11,308,098
Jensen Water Treatment Plant Improvements	15371	\$1,979,749	\$4,000,238	\$5,999,998
Diemer Water Treatment Plant Improvements	15380	\$5,221,124	\$1,770,186	\$8,337,199
Mills Water Treatment Plant Improvements	15381	—	—	—
Skinner Water Treatment Plant Improvements for FY2006/07 through FY2011/12	15435	\$177,444	\$178,888	\$45,000
Diemer Water Treatment Plant Improvements for FY2006/07 through FY2011/12	15436	\$7,417,346	\$1,426,231	\$4,744,592

Capital Program and Appropriations	Appn. No.	FY 2018/19	FY 2019/20	FY 2020/21
Weymouth Water Treatment Plant Improvements for FY2006/07 through FY2011/12	15440	\$250,000	\$1,414,479	\$6,327,514
Jensen Water Treatment Plant Improvements for FY2006/07 through FY2011/12	15442	\$2,003,971	—	\$5,836,278
Mills Water Treatment Plant Improvements for FY2006/07 through FY2011/12	15452	\$2,191,195	\$834,520	\$413,468
Weymouth Water Treatment Plant Improvements for FY2012/13 through FY2017/18	15477	\$5,545,488	\$6,081,917	\$1,801,952
Diemer Water Treatment Plant Improvements for FY2012/13 through FY2017/18	15478	\$159,877	\$250,000	\$3,270,002
Mills Water Treatment Plant Improvements for FY2012/13 through FY2017/18	15479	\$1,406,241	\$1,836,099	\$59,374
Jensen Water Treatment Plant Improvements for FY2012/13 through FY2017/18	15486	\$1,087,514	\$212,180	\$79,181
Diemer Water Treatment Plant Improvements for FY2018/19 through FY2023/24	18903	\$248,872	\$1,117,816	\$153,033
Jensen Water Treatment Plant Improvements for FY2018/19 through FY2023/24	18904	\$526,274	\$3,741,799	\$1,946,008
Mills Water Treatment Plant Improvements for FY2018/19 through FY2023/24	18905	\$1,387,000	\$30,000	—
Skinner Water Treatment Plant Improvements for FY2018/19 through FY2023/24	18906	\$448,157	\$1,722,842	—
Weymouth Water Treatment Plant Improvements for FY2018/19 through FY2023/24	18907	\$113,764	\$209,407	\$424,449
Water Quality/Oxidation Retrofit Program		\$2,682,517	\$609,058	\$36,662
Diemer Water Treatment Plant Oxidation Retrofit	15389	\$1,240,526	\$609,058	\$36,662
Weymouth Water Treatment Plant Oxidation Retrofit	15392	\$1,325,311	—	—
Enhanced Bromate Control	15472	\$116,680	—	—

Proposed Funds for Paving and Roof Replacements

The criteria used to evaluate, score, and rank CIP proposals is designed such that projects for critical infrastructure used directly for transmission, treatment, distribution, or storage of water receive the highest priority. Consequently, pavement or roof restoration projects normally are not prioritized over water system or infrastructure technology improvements. These projects are often deferred until it can be demonstrated that existing paving or roofing has deteriorated to the point that water system reliability may be impacted, and the need to replace them becomes urgent and sometimes more expensive.

Rather than wait until pavement or roof conditions threaten system reliability, staff will recommend establishing an appropriation similar to the Minor Capital Projects Program, where a limited amount of funds may be authorized by the General Manager to perform paving and roof replacement projects before they reach this point. The replacement projects would continue to be prioritized based on need, but would not compete directly with other infrastructure reliability projects. Establishing a limited replacement fund would allow these recurring projects to be performed quickly and efficiently.

Capital Investment Plan Detail

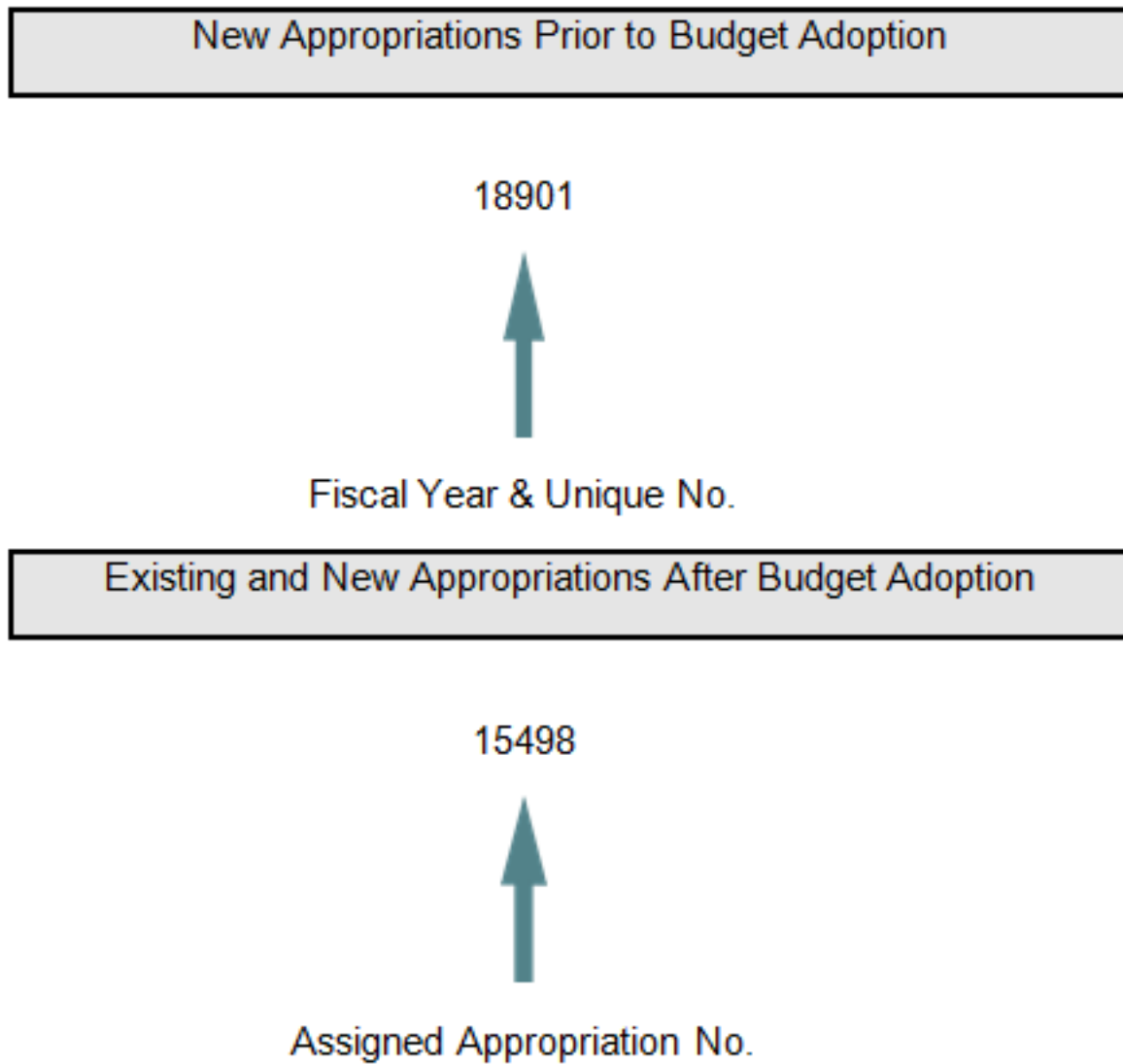
The core of this section is the Individual Appropriation Summaries, which provides information for each capital project that is scheduled to begin or will be underway during FY 2018/19. The information provided reflects appropriation and project details current as of the time of publication and is subject to change. The Individual Appropriation Summaries are ordered alphabetically by Appropriation title. For assistance in locating a specific appropriation, refer to Table 6. The information contained in the Individual Appropriation Summaries is described in further detail below.

Capital Appropriation Numbers

Appropriation numbers are comprised of a five-digit number. The five-digit number uniquely identifies an appropriation.

For new appropriations prior to budget adoption, the first three numeric digits represent the fiscal year the appropriation was identified (e.g., “189” is FY 2018/19), the last two numeric digits uniquely identify the new appropriation placeholder number. After Board adoption of the budget, the five-digit numbers in the placeholder number change to an assigned appropriation number. Figure 3 shows examples of the placeholder and appropriation numbers.

Figure 3 – Appropriation Number Naming Convention



Key Information

For each appropriation, key information is highlighted at the top of the Individual Appropriation Summary page and includes total appropriation estimate, appropriated amount, FY 2018/19 and FY 2019/20 biennial estimate, and total cost to date through September 30, 2017. Table 5 provides an explanation of each item.

Table 5 - Key Appropriation Information

Item	Description
Total Appropriation Estimate	The total estimate of cost from inception to completion of budgeted projects in an appropriation. It includes a contingency amount and actual expenditures if projects in the appropriation are complete or underway.
Appropriated Amount	The total appropriation estimate may have: (a) no funding authorization from the Board; (b) partial funding from the Board; or (c) complete funding from the Board. Amount of expenditures the General Manager is authorized by the Board to spend on projects in an appropriation. The amounts shown reflect actual appropriated amounts as of September 30, 2017.
Biennial Estimate	Estimate of expenditures from July 2018 through June 2020. It does not include a contingency amount.
Cost Through 9/30/2017	Actual expenditures to date through September 2017.

Narratives

Each Individual Appropriation Summary also contains a narrative portion that includes the purpose and scope of the appropriation, accomplishments through FY 2017/18, and objectives for FY 2018/19 and FY 2019/20. In these narratives, major activities, milestones, and actions are highlighted. The narratives conclude with a description of each project planned to be underway during the two-year budget period.

Table 6 - Appropriation Title Index

Appropriation Title	Appropriation No.	Page No.
Allen-McColloch Pipeline, Calabasas Feeder, and Rialto Pipeline PCCP Rehabilitation	15502	222
Business Operations Improvement	15484	224
Cabazon Radial Gate Facility Improvements	15320	226
Capital Program for Projects Costing Less Than \$250,000 for FY2014/15 through FY2015/16	15489	228
Capital Program for Projects Costing Less Than \$250,000 for FY2016/17 through FY2017/18	15498	229
Capital Program for Projects Costing Less Than \$250,000 for FY2018/19 through FY2019/20	18908	230
Chlorine Containment and Handling Facilities	15346	231
Conveyance and Distribution System - Rehabilitation	15377	233

Appropriation Title	Appropriation No.	Page No.
Conveyance and Distribution System - Rehabilitation for FY2006/07 through FY2011/12	15441	236
Conveyance and Distribution System - Rehabilitation for FY2012/13 through FY2017/18	15480	240
Conveyance and Distribution System - Rehabilitation for FY2018/19 through FY2023/24	18902	248
CRA - Conveyance Reliability	15373	256
CRA - Discharge Containment	15385	258
CRA - Electrical/Power Systems Reliability	15384	260
CRA Main Pump Reliability	15481	262
CRA - Reliability for FY2006/07 through FY2011/12	15438	266
CRA - Reliability for FY2012/13 through FY2017/18	15483	269
CRA - Reliability for FY2018/19 through FY2023/24	18901	273
Dam Rehabilitation & Safety Improvements	15419	277
Delta Wetlands Properties (Delta Islands)	15494	279
Demonstration-Scale Recycled Water Treatment Plant	15493	281
Diemer Water Treatment Plant - Improvements	15380	282
Diemer Water Treatment Plant - Improvements for FY2006/07 through FY2011/12	15436	284
Diemer Water Treatment Plant - Improvements for FY2012/13 through FY2017/18	15478	286
Diemer Water Treatment Plant - Improvements for FY2018/19 through FY2023/24	18903	288
Diemer Water Treatment Plant - Oxidation Retrofit	15389	290
DVL Recreation Facilities	15334	292
Enhanced Bromate Control	15472	294
Enterprise Content Management	15500	296
Enterprise Data Analytics	18910	298
Hayfield and Lake Perris Groundwater Recovery	15402	299
Hydroelectric Power Plant Improvements	15458	300
Information Technology System - Business, Finance, and HR	15411	303
Information Technology System - Infrastructure	15376	304
Information Technology System - Security	15378	306

Appropriation Title	Appropriation No.	Page No.
Infrastructure Reliability Information System	15501	308
IT Infrastructure Reliability	15487	311
Jensen Water Treatment Plant - Improvements	15371	314
Jensen Water Treatment Plant - Improvements for FY2006/07 through FY2011/12	15442	317
Jensen Water Treatment Plant - Improvements for FY2012/13 through FY2017/18	15486	319
Jensen Water Treatment Plant - Improvements for FY2018/19 through FY2023/24	18904	322
LaVerne Shop Facilities Upgrade	15395	325
Metropolitan Security System Enhancements	15499	327
Mills Water Treatment Plant - Improvements	15381	328
Mills Water Treatment Plant - Improvements for FY2006/07 through FY2011/12	15452	329
Mills Water Treatment Plant - Improvements for FY2012/13 through FY2017/18	15479	331
Mills Water Treatment Plant - Improvements for FY2018/19 through FY2023/24	18905	333
Operations Support Facilities Improvement	15495	334
PCCP Rehabilitation and Replacement	15471	337
Perris Valley Pipeline	15425	339
Pipeline Rehabilitation and Replacement	15482	340
Power Reliability and Energy Conservation	15391	341
Project Controls and Reporting System	15490	342
Reservoir Cover Replacement	15417	343
Right of Way & Infrastructure Protection	15474	347
Second Lower Feeder PCCP Rehab	15497	350
Sepulveda Feeder PCCP Rehab	15496	353
Skinner Water Treatment Plant Improvements for FY2006/07 through FY2011/12	15435	354
Skinner Water Treatment Plant Improvements for FY2018/19 through FY2023/24	18906	355
System-Wide Paving & Roof Replacements for FY2018/19 through FY2019/20	18909	357
Union Station Headquarters Improvements	15473	359
Verbena Property Acquisition	15492	361

Appropriation Title	Appropriation No.	Page No.
Water Delivery System Improvements	15488	362
Water Operations Control	15467	364
Weymouth Water Treatment Plant - Improvements	15369	367
Weymouth Water Treatment Plant - Improvements for FY2006/07 through FY2011/12	15440	370
Weymouth Water Treatment Plant - Improvements for FY2012/13 through FY2017/18	15477	372
Weymouth Water Treatment Plant - Improvements for FY2018/19 through FY2023/24	18907	376
Weymouth Water Treatment Plant - Oxidation Retrofit	15392	379
Whitewater Siphon Protection	15341	381

Allen McColloch Pipeline, Calabasas Feeder, and Rialto Pipeline PCCP Rehabilitation

15502

Total Appropriation Estimate: \$986,976,000 Biennial Estimate: \$8,351,296

Appropriated Amount 9/30/2017: \$0 Cost Through 9/30/2017: \$0

Purpose

To maintain the reliability of the Allen-McColloch Pipeline, Calabasas Feeder, and Rialto Pipeline through specific PCCP repair and rehabilitation projects.

Scope

This appropriation was established to plan and implement projects to rehabilitate PCCP portions of the Allen-McColloch Pipeline, Calabasas Feeder, and Rialto Pipeline.

Accomplishments for FY 2016/17 and FY 2017/18

New Projects Initiated Last Period:

- Allen-McColloch Pipeline PCCP Rehabilitation
- Calabasas Feeder PCCP Rehabilitation
- Rialto Pipeline PCCP Rehabilitation

Major Milestones Achieved Last Period:

- Allen-McColloch Pipeline PCCP Rehabilitation - Started preliminary design
- Calabasas Feeder PCCP Rehabilitation - Started preliminary design
- Rialto Pipeline PCCP Rehabilitation - Started preliminary design

Projects Completed To Date:

- No projects have been completed.

Objectives for 2018/19 and FY 2019/20

Project	Total Project Estimate	Estimated Completion	Major Milestones
Allen-McColloch Pipeline PCCP Rehabilitation	247,275,000	2034	Complete preliminary design
Calabasas Feeder PCCP Rehabilitation	92,125,000	2028	Complete preliminary design
Rialto Pipeline PCCP Rehabilitation	557,851,000	2037	Complete preliminary design

Authorized Projects

Allen-McColloch Pipeline PCCP Rehabilitation

The planned rehabilitation work involves lining the existing PCCP segments with steel liner pipe designed as a stand-alone pipeline which can accommodate full internal and external pressures on the line. The project includes restoring the Allen-McColloch Pipeline to “As Like New Conditions” as possible. This would include relocation of all air release and vacuum valves (AR/VV) that have not already been relocated above ground and replacing all valves: sectionalizing, service connection turnout, pumpwell, AR/VV, shutoff, blowoff, etc. In addition, all master meters will be evaluated and possibly replaced, and sectionalizing and meter structures modified or replaced. Preliminary design was authorized by the Board in January 2018.

Calabasas Feeder PCCP Rehabilitation

The planned rehabilitation work involves lining the existing PCCP segments with steel liner pipe designed as a stand-alone pipeline which can accommodate full internal and external pressures on the line. The project includes restoring the Calabasas Feeder to “As Like New Conditions” as possible. This would include relocation of all air release and vacuum valves (AR/VV) that have not already been relocated above ground and replacing all valves: sectionalizing, service connection turnout, pumpwell, AR/VV, shutoff, blowoff, etc. In addition, all master meters will be evaluated and possibly replaced, and sectionalizing and meter structures modified or replaced. Preliminary design was authorized by the Board in January 2018.

Rialto Pipeline PCCP Rehabilitation

The planned rehabilitation work involves lining the existing PCCP segments with steel liner pipe designed as a stand-alone pipeline which can accommodate full internal and external pressures on the line. The project includes restoring the Rialto Pipeline to “As Like New Conditions” as possible. This would include relocation of all air release and vacuum valves (AR/VV) that have not already been relocated above ground and replacing all valves: sectionalizing, service connection turnout, pumpwell, AR/VV, shutoff, blowoff, etc. In addition, all master meters will be evaluated and possibly replaced, and sectionalizing and meter structures modified or replaced. Preliminary design was authorized by the Board in January 2018.

Planned Projects

No additional projects are planned.

Business Operations Improvement

15484

Total Appropriation Estimate:	\$11,900,000	Biennial Estimate:	\$1,608,002
Appropriated Amount 9/30/2017:	\$6,500,000	Cost Through 9/30/2017:	\$5,914,027

Purpose

To ensure reliability, efficiency and effectiveness of Metropolitan’s business applications.

Scope

This appropriation was established to assess and implement projects ensuring customer service, efficiency/ productivity, risk management and reliability of Metropolitan's business applications. Projects include replacing the budgeting system used to produce the biennial budget; updating the incident reporting system used to report incidents occurring on Metropolitan facilities including spills, injuries and accidents; and upgrading the employee learning management system which tracks required compliance training and offers other work-related curriculum to employees.

Accomplishments for FY 2016/17 and FY 2017/18

New Projects Initiated Last Period:

- No projects were initiated during the last biennium.

Major Milestones Achieved Last Period:

- Learning Management System - completed market assessment

Projects Completed To Date:

- Three projects have been completed.

Objectives for 2018/19 and FY 2019/20

Project	Total Project Estimate	Estimated Completion	Major Milestones
Budget System Replacement	1,800,000	2019	Begin design

Authorized Projects

No projects are currently authorized.

Planned Projects

Budget System Replacement

This project delivers a replacement system for the 10 year-old budgeting system, which produces the capital and O&M budgets.

Incident Reporting

This project delivers a replacement for the 15+ year-old Incident Reporting System. This system reports and tracks incidents that occur on Metropolitan property. Incidents include: safety, environmental, security and workers compensation related events.

Learning Management System Replacement

This project replaces the 8 year-old Learning Management System. This system supports Metropolitan's required compliance and safety training, mandatory employee training and other educational opportunities for employees.

MWDH20.com Redesign

The existing website will be replaced with a new site offering more functionality and capability to spread Metropolitan's mission of providing water to the public.

Cabazon Radial Gate Facility Improvements

15320

Total Appropriation Estimate:	\$535,000	Biennial Estimate:	\$0
Appropriated Amount 9/30/2017:	\$456,000	Cost Through 9/30/2017:	\$454,067

Purpose

To divert flow in the event of an emergency shutdown of the Colorado River Aqueduct into the San Gorgonio Wash, and ultimately into the Whitewater River.

Scope

This appropriation was established to convert the Cabazon Radial Gates Facility from an "active" spillway, which requires an operator to activate the gates, to a "passive" spillway which does not require an operator, by replacing both radial gates with a weir structure.

Accomplishments for FY 2016/17 and FY 2017/18

New Projects Initiated Last Period:

- No projects were initiated during the last biennium.

Major Milestones Achieved Last Period:

- No major milestones were achieved.

Projects Completed To Date:

- No projects have been completed.

Objectives for 2018/19 and FY 2019/20

Project	Total Project Estimate	Estimated Completion	Major Milestones
Cabazon Radial Gate Facility Improvements	5,032,000	Dec 2021	Deferred to continue after this biennium

Authorized Projects

Cabazon Radial Gate Facility Improvements

The Cabazon Radial Gate facility is located on the Colorado River Aqueduct (CRA) in the city of Cabazon within Riverside County and approximately one mile upstream of the San Jacinto Tunnel. The Cabazon Radial Gate facility was constructed in 1936 and consists of a 17-foot-wide by 16-foot-tall radial gate controlled by an electric motor actuator. The facility was designed to protect the downstream conduits and tunnels from becoming over-pressurized in the event of a blockage by diverting water into an 800-foot long, concrete-lined channel which flows into the San Gorgonio Wash. The existing radial gate, motor, and controls have reached the end of their service life and are no longer reliable.

This project will replace the discharge radial gate with a concrete weir structure. The weir system is a passive overflow system which will reject water above a set hydraulic grade and thereby prevent downstream over-pressurization. Approximately 100 feet of the approximately 800-foot-long discharge channel will be widened to accommodate the weir structure.

Planned Projects

No additional projects are planned.

Capital Program for Projects Costing Less Than \$250,000 for FY2014/15 through FY2015/16 15489

Total Appropriation Estimate: \$8,000,000 Biennial Estimate: \$1,067,653

Appropriated Amount 9/30/2017: \$8,000,000 Cost Through 9/30/2017: \$5,651,800

Purpose

To increase operational reliability and efficiency, and decrease maintenance costs.

Scope

This appropriation was established to implement capital projects costing less than \$250,000 on the distribution system, conveyance system, and treatment plants during FY 2014/15 - 2015/16. In addition to the scheduled projects, the need invariably arises for additional unscheduled capital projects where there is no viable alternative but to perform the work. The common driver for most of the projects in this appropriation is infrastructure reliability.

Accomplishments for FY 2016/17 and FY 2017/18

New Projects Initiated Last Period:

- No projects were initiated during the last biennium.

Major Milestones Achieved Last Period:

- 14 projects were completed during the last biennium.

Projects Completed To Date:

- 13 projects have been completed.

Objectives for 2018/19 and FY 2019/20

Project	Total Project Estimate	Estimated Completion	Major Milestones
Various projects costing less than \$250,000	8,000,000	2020	Continue design and construction of remaining projects

Authorized Projects

20 projects are currently active.

Planned Projects

No additional projects are planned.

Capital Program for Projects Costing Less Than \$250,000 for FY2016/17 through FY2017/18 15498

Total Appropriation Estimate:	\$10,000,000	Biennial Estimate:	\$4,741,612
Appropriated Amount 9/30/2017:	\$10,000,000	Cost Through 9/30/2017:	\$1,707,396

Purpose

To increase operational reliability and efficiency, and decrease maintenance costs

Scope

This appropriation was established to implement capital projects costing less than \$250,000 on the distribution system, conveyance system, and treatment plants during FY 2016/17 - 2017/18. In addition to the scheduled projects, the need invariably arises for additional unscheduled capital projects where there is no viable alternative but to perform the work. The common driver for most of the projects in this appropriation is infrastructure reliability.

Accomplishments for FY 2016/17 and FY 2017/18

New Projects Initiated Last Period:

- Thirty-three projects were initiated during the last biennium.

Major Milestones Achieved Last Period:

- Three projects were completed during the last biennium.

Projects Completed To Date:

- Three projects have been completed.

Objectives for 2018/19 and FY 2019/20

Project	Total Project Estimate	Estimated Completion	Major Milestones
Various projects costing less than \$250,000	10,000,000	2021	Continue design and construction of remaining projects

Authorized Projects

30 projects are currently active.

Planned Projects

No additional projects are planned.

Capital Program for Projects Costing Less Than \$250,000 for FY2018/19 through FY2019/20 18908

Total Appropriation Estimate: \$10,000,000 Biennial Estimate: \$3,404,097

Appropriated Amount 9/30/2017: \$0 Cost Through 9/30/2017: \$0

Purpose

To increase operational reliability and efficiency, and decrease maintenance costs

Scope

This appropriation will be established to implement capital projects costing less than \$250,000 during FY 2018/19 - 2019/20. In addition to the scheduled projects, the need invariably arises for additional unscheduled capital projects where there is no viable alternative but to perform the work. The common driver for most of the projects in this appropriation is infrastructure reliability.

Accomplishments for FY 2016/17 and FY 2017/18

New Projects Initiated Last Period:

- No projects were initiated during the last biennium.

Major Milestones Achieved Last Period:

- No major milestones were achieved. This is a new appropriation.

Projects Completed To Date:

- No projects have been completed.

Objectives for 2018/19 and FY 2019/20

Project	Total Project Estimate	Estimated Completion	Major Milestones
Various projects costing less than \$250,000	10,000,000	2023	Complete all projects within 3 years

Authorized Projects

None, this is a new appropriation.

Planned Projects

Various Projects Costing Less Than \$250,000

The Minor Capital Projects Program enables staff to expeditiously execute small capital projects that arise throughout each fiscal year. These projects often arise after preparation of the CIP budget, are of an urgent nature, and are relatively small or less complex. Once the Minor Capital Projects Program has been approved by the Board, individual projects meeting the criteria may be authorized by the General Manager without further Board action.

These projects typically address recent equipment failures, urgent safety or regulatory compliance concerns, or essential replacements and refurbishments. Types of infrastructure typically refurbished or replaced under the Minor Capital Projects Program include pumps, valves, meters, structural components, plumbing, electrical systems, and water treatment equipment. The timing of the work may be expedited in order to take advantage of shutdown opportunities.

Chlorine Containment and Handling Facilities

15346

Total Appropriation Estimate: \$164,255,000 Biennial Estimate: \$0

Appropriated Amount 9/30/2017: \$162,370,000 Cost Through 9/30/2017: \$158,920,610

Purpose

To enhance hazardous chemical safety by reducing the potential for exposure to plant personnel or the public of a release of chlorine, and ensure compliance with current California Fire Code requirements.

Scope

This appropriation was established to construct facilities that handle and contain chlorine to prevent a chlorine release and to comply with security and safety regulations; and other related facilities that handle chlorine to meet water treatment process requirements. Since its inception, new chlorine containment and handling facilities have been completed at all five water treatment plants.

Accomplishments for FY 2016/17 and FY 2017/18

New Projects Initiated Last Period:

- No projects were initiated during the last biennium.

Major Milestones Achieved Last Period:

- Chemical Unloading Facility (CUF) Chlorine Containment Facility - Completed construction
- Weymouth Filter Outlet Chlorination Capacity Increase - Completed construction

Projects Completed To Date:

- 13 projects have been completed.

Objectives for 2018/19 and FY 2019/20

Project	Total Project Estimate	Estimated Completion	Major Milestones
CUF Dechlorination System Upgrade	4,100,000	2023	Deferred to start after this biennium

Authorized Projects

Chemical Unloading Facility (CUF) Chlorine Containment

CUF is used to transfer liquid chlorine from vendor-supplied rail cars to cargo trailers, which will then be delivered to the three treatment plants that do not receive direct chlorine deliveries. Metropolitan's Board has adopted a policy to provide containment facilities where chlorine is handled or stored for safety and enhanced security. This project constructed an enclosed building to house chlorine rail cars, cargo trailers, trans-loading equipment, chlorinators and evaporators, and a number of supporting facilities to provide a consistent level of chlorine safety across Metropolitan facilities. Construction was authorized by the Board in March 2014 and has been completed. Production of record drawings is underway.

Weymouth Filter Outlet Chlorination Capacity Increase

When ozone disinfection is used, the required chlorine dosage at the filter outlet channel is increased in order to meet the Disinfectants/Disinfection By-Products Rule requirements and to control bacteriological growth in the distribution system. This project constructed a chlorine ejector building, increased the capacity of existing chlorinators serving the filter outlet injection points, and installed higher capacity ejectors. Design and construction were authorized by the Board in August 2010 and have been completed. Production of record drawings is underway.

Planned Projects

CUF Dechlorination System Upgrade

Evaluation of dechlorination options is needed to enhance compliance with discharge regulations and allow the transfer of liquid chlorine from rail cars to cargo trailers to occur over a wide range of operating conditions. This project will upgrade the existing system that neutralizes chlorine at CUF.

Conveyance and Distribution System - Rehabilitation

15377

Total Appropriation Estimate: \$127,927,000 Biennial Estimate: \$24,455,389

Appropriated Amount 9/30/2017: \$81,895,700 Cost Through 9/30/2017: \$78,372,247

Purpose

To maintain the reliability of the distribution system through specific repair and rehabilitation projects on Metropolitan's distribution pipelines, reservoirs, and control structures.

Scope

This appropriation was established to plan and implement multiple projects throughout the Distribution System. The common driver for many of the projects in this appropriation is infrastructure reliability.

Accomplishments for FY 2016/17 and FY 2017/18

New Projects Initiated Last Period:

- No projects were initiated during the last biennium.

Major Milestones Achieved Last Period:

- Garvey Reservoir Sodium Hypochlorite Upgrades - Completed design
- Hydroelectric Power Plant Discharge Elimination - Completed preliminary design
- Orange County Feeder Blow-Off Structure and Access Road Repair - Completed preliminary design
- Orange County Feeder Extension Lining Repair - Continued design/started valve procurement
- West Valley Feeder 1, Access Roads and Structures Improvements, Stage 3 - Started design
- West Valley Feeder No. 1 - Stage 2 Valve Structure Mod - Completed construction

Projects Completed To Date:

- 47 projects have been completed.

Objectives for 2018/19 and FY 2019/20

Project	Total Project Estimate	Estimated Completion	Major Milestones
Hydroelectric Power Plant Discharge Elimination	1,200,000	2020	Complete design & construction
Orange County Feeder Blow-Off Structure and Access Road Repair	2,413,000	2019	Complete design & construction
Orange County Feeder Extension Lining Repair	32,853,000	2020	Complete design
West Valley Feeder 1, Access Roads and Structures Improvements - Stage 3	5,000,000	2020	Complete design

Authorized Projects

Garvey Reservoir Sodium Hypochlorite Upgrades

Upgrades to the sodium hypochlorite feed system at Garvey Reservoir are needed to maintain treated water quality within the Central Pool portion of Metropolitan's distribution system. The existing hypochlorite system has exceeded its expected service life and has deteriorated over time, requiring frequent repairs. Failure of the chemical feed system would negatively affect water quality within the distribution system by not maintaining minimum chlorine residual. This project will replace the current hypochlorite system with new valves, piping, electrical systems, and instrumentation and updated controls that will allow both automated and remote control of the chemical feed system. Design was authorized by the Board in June 2013.

Hydroelectric Power Plant Discharge Elimination

This project consists of upgrades to the Foothill Power Plant to eliminate discharge of lubrication water flows into adjacent storm drains, as part of the Cross Connection Prevention Program, initiated in 2004. By eliminating the discharge, the increasingly costly and time-consuming tasks of monitoring and testing discharges for compliance with National Pollutant Discharge Elimination Standards (NPDES) permits will be sharply reduced, and discharge fees will no longer be required. Design and construction was authorized by the Board in August 2008.

Lake Skinner West Bypass Screening Structure Rehabilitation

The San Diego Canal West Bypass Screening Structure is located at the terminus of the San Diego Canal and is the starting point for water which bypasses Lake Skinner to downstream users. The bypass screening structure is fitted with an electrically powered revolving screen extending across the channel, which dips into the channel to intercept and collect algae mats and other floating debris. This system prevents algae mats and other debris from entering the treatment plant or member agency water systems via the bypass pipelines. The screening equipment was installed in the 1960s and has reached the end of its useful life. The screens' rotating components are currently inoperable, so they function as stationary screens; material collects on the screens until the debris is manually removed. Clogged screens may reduce deliveries to downstream users. Preliminary design was authorized by the Board in September 2007.

Orange County Feeder Blow-Off Structure and Access Road Repair

The existing blow-off structure on the Orange County Feeder enables the pipeline to be dewatered in the event of an emergency, and provides access for routine maintenance and inspection. Following 73 years of continuous operation in a moist environment near Upper Newport Bay, the blow-off valves and piping inside the structure have corroded and need to be replaced. In addition, due to ongoing erosion, the only road available to access the blow-off structure has been damaged and requires repairs. This project will restore access to the structure and replace its internal valves and piping. The planned repairs include regrading of the existing access road and reinforcement of crossings where the road intersects drainage channels; strengthening of the existing turn-around area adjacent to the blow-off structure, which will allow maintenance vehicles to set up for repair activities; installation of new valves and replacement of corroded piping; and modification of piping to ensure continued compliance with current California Division of Drinking Water regulations to prevent potential cross connections. Final design was authorized by the Board in March 2016.

Orange County Feeder Extension Lining Repair

The Orange County Feeder conveys treated water from the F. E. Weymouth Water Treatment Plant in La Verne to six member agencies in Los Angeles and Orange Counties. Recent internal inspections of the feeder have identified significant deterioration of the existing coal-tar enamel lining, which is 75 years old. While the pipeline's structural integrity remains sound at present, the interior lining displays blistering and disbonding, which expose the pipeline to accelerated rates of corrosion and eventual leakage. The lining needs to be repaired in order to maintain long-term reliability of the pipeline.

This project repairs the lining on the 11-mile-long Feeder, which is being accomplished in three stages. Stages 1 and 2 of this three-stage project have been completed, and rehabilitation of the remaining nine miles of the middle reach of the feeder will be completed under Stage 3. The stage 3 work includes replacement of the lining, welding of corroded pipe joints, and also replacement of 59 deteriorated valves along the feeder. Design was authorized by the Board in November 2014, and the valve procurement was authorized by the Board in September 2017.

West Valley Feeder No. 1, Access Roads and Structures Improvements - Stage 3

In 2001, a condition assessment of West Valley Feeder No. 1 identified that most of the blowoff valves, air release/vacuum valves, and sectionalizing valves were deteriorating and needed to be replaced. The existing valves were installed when the line was constructed in 1962 and no longer seal properly. Furthermore, several of the valves were directly buried and cannot be accessed without excavating the pipeline. This project will replace deteriorated valves, add valve structures, and improve access for maintenance and repairs. The work was prioritized and divided into three stages over multiple shutdown seasons to minimize the duration of pipeline outages. The first stage, which addressed 42 structures over four shutdown seasons, was completed in 2006. The second stage, which addressed 14 structures over two shutdown seasons, was completed in 2012. The third stage of work will add new valve structures in Chatsworth Park and replace valves located near Rinaldi Avenue. Design was authorized by the Board in October 2017.

Planned Projects

No additional projects are planned.

Conveyance and Distribution System - Rehabilitation for FY2006/07 through FY2011/12

15441

Total Appropriation Estimate: \$195,317,000 Biennial Estimate: \$3,823,564

Appropriated Amount 9/30/2017: \$100,589,000 Cost Through 9/30/2017: \$86,078,396

Purpose

To maintain the reliability of the distribution system through specific repair and rehabilitation projects on Metropolitan's distribution pipelines, reservoirs and control structures.

Scope

This appropriation was established to plan and implement multiple projects throughout the Conveyance and Distribution System. The common driver for many of the projects in this appropriation is infrastructure reliability.

Accomplishments for FY 2016/17 and FY 2017/18

New Projects Initiated Last Period:

- Santa Ana River Bridge Expansion Joint Replacement

Major Milestones Achieved Last Period:

- Etiwanda Pipeline Lining Repairs - Completed Stage 2 repairs & final design for Stage 3 repairs
- Palos Verdes Reservoir Sodium Hypochlorite Feed System Upgrade - Construction is 60% complete
- Glendale-01 Service Connection Rehabilitation - Completed construction
- DVL Inlet/Outlet Tower Fish Screen Replacement - Started construction
- San Gabriel Tower Seismic Upgrade & Spillway Improvement - Completed study
- Orange County Feeder Cathodic Protection - Began final design
- Santiago Lateral Station 216+40 BF Valve Replacement - Started preliminary design
- Lake Mathews Discharge Facilities Upgrade - Started preliminary design

Projects Completed To Date:

- 27 projects have been completed.

Objectives for 2018/19 and FY 2019/20

Project	Total Project Estimate	Estimated Completion	Major Milestones
Diamond Valley Lake (DVL) Inlet/Outlet Tower Fish Screen Replacement	2,960,000	2018	Complete construction
Etiwanda Pipeline Lining Repairs	46,723,000	2019	Complete Stage 3 repairs depending on SWP allocation
Glendale-01 Service Connection Rehabilitation	2,170,000	June 2018	Complete as-built
Lake Mathews Discharge Facilities Upgrade	10,000,000	2022	Preliminary & final design
Palos Verdes Reservoir Sodium Hypochlorite Feed System Upgrade	3,272,000	2018	Complete construction

Authorized Projects

DVL Inlet/Outlet Tower Fish Screen Replacement

DVL is Southern California's largest surface water reservoir and was completed in 2000. During lake withdrawals, fish screens are moved in front of the ports to prevent debris from entering the Inlet/Outlet Tower. Detailed inspection of the four fish screens identified that the coated carbon steel structural elements, including the hoist beam eye bars, support beams, and retaining pins, are severely corroded. The corrosion is likely caused by galvanic action between the stainless steel and carbon steel components of the screens. The corrosion damage is extensive, and continued deterioration of the structural components could impair the structural integrity of the screens. This project will include removal of the existing fish screen assemblies, fabrication of new stainless steel fish screens, and installation of the new assemblies on the tower. The Board authorized construction in June 2016.

Etiwanda Pipeline Lining Repairs

The Etiwanda Pipeline was constructed in 1993 to convey untreated water from the Rialto Pipeline to the Upper Feeder. This 6.4-mile-long welded steel pipeline is 144 inches in diameter. The northern portion of the pipeline, which is 5.4 miles long, conveys high-pressure water to the Etiwanda Power Plant. From that facility, the southern portion of the pipeline continues for one mile to an interconnection with the Upper Feeder. During an internal inspection conducted in 2008, staff discovered that approximately 37 percent of the northern portion of the line has missing or delaminated mortar lining. At the present time, the structural integrity of the pipeline remains sound. Over time, however, the loss of mortar lining will expose the pipeline to accelerated rates of corrosion and eventual leakage. The primary cause is believed to be the daily internal pressure fluctuation within the pipeline resulting from power generation at the Etiwanda Power Plant. This fluctuation of internal pressure likely produced stress cracking in the mortar lining. In addition, the seasonal variation in availability of State Water Project supplies resulted in prolonged periods when the pipeline was removed from service, creating drying and shrinkage cracks which exacerbated the situation. This project will remove existing and failing cement mortar lining and install a flexible polyurethane lining system. The replacement of the 5.5 miles of the lining will be conducted over three phases. The Board authorized construction of Stage 2 in February 2016.

Glendale-01 Service Connection Rehabilitation

The Santa Monica Feeder was constructed in 1941 as part of Metropolitan's original distribution system. The feeder is approximately 25 miles long, with a diameter ranging from 28 to 120 inches. The Santa Monica Feeder delivers treated water from the Eagle Rock Control Facility in the city of Los Angeles to four member agency service connections before reaching its terminus in the city of Santa Monica. Service connection G-01 consists of a 30-inch venturi meter located partially within a concrete vault structure. Gradual corrosion over the course of 73 years of operation has led to deterioration of the venturi meter and adjacent piping. Staff has attempted to repair the meter using localized welding and fiberglass wraps with limited success, due to the meter's age and continued deterioration. Leakage has progressively increased. Failure of the service connection could negatively impact deliveries to the city of Glendale and potentially damage surrounding properties. This project has replaced the leaking venturi meter and rehabilitated the meter structure and piping including enlargement of the vault to remove the existing venturi meter and fitted the new meter and associated piping; installed a new magnetic flow meter; upgraded the electrical system; and remediation of hazardous materials. Ongoing activities include preparation of record drawings. The Board authorized construction in August 2014.

Lake Mathews Discharge Facilities Upgrades

Lake Mathews is the terminus of Metropolitan's Colorado River Aqueduct (CRA) and was constructed in the 1930's. Untreated water stored in the reservoir is withdrawn through the lake's forebay and hydroelectric plant, and is then conveyed through the Upper Feeder and Lower Feeder to the Weymouth and Diemer plants, respectively. The Lake Mathews forebay discharge valves and outlet tower have gradually deteriorated over 75 years of operation. Portions of the facilities need to be replaced to maintain reliable deliveries from Lake Mathews into the Central Pool. The ten 32-inch-diameter Howell-Bunger valves that are used to withdraw water from the lake have gradually deteriorated through continuous use. The frequency of repairs is increasing, while replacement parts are difficult to obtain. These 60- to 75-year-old valves need to be replaced. The Board authorized preliminary design in February 2014.

Orange County Feeder Cathodic Protection

In 1974, Metropolitan installed an impressed current system on the 8.8-mile-long welded steel portion of the feeder. The impressed current system consists of deep-well anode groundbeds, rectifiers, and associated equipment. Recent testing performed by staff identified that three of the deep-well anode groundbeds no longer provide corrosion protection to the pipeline and need to be replaced. While the corrosion damage is not yet extensive, continued deterioration of the pipelines could lead to eventual leakage and possible rupture. This project will replace the existing cathodic protection system on the Orange County feeder to protect approximately 8.8 miles of pipeline. Ongoing design phase activities include utility verifications, preparation of drawings and specifications, local agency permitting development of a construction cost estimate, and receipt of competitive bids. The contract scope will include traffic control and street closures, drilling of vertical wells to install graphite anodes, installation of rectifier and electrical service cabinets, installation of electrical conduits, and street surface restoration. Metropolitan force activities will include procurement of rectifiers and remote monitoring units, final connection of the anodes to the pipelines, and start-up testing. The Board authorized design and installation in September 2016.

Palos Verdes Reservoir Sodium Hypochlorite Feed System Upgrade

The sodium hypochlorite system was constructed in 1993 to comply with drinking water standards. The system is old, getting outdated, and parts are hard to procure for repairs. Failure of these pump systems could jeopardize water quality. This project will replace outdated equipment and automate the sodium hypochlorite process to maximize efficiency, reliability, and maintainability while complying with applicable water quality standards. The Board authorized construction in November 2015.

San Gabriel Tower Seismic Upgrade

The San Gabriel Tower (SGT), 86-foot tall free-standing with a 24-foot by 14-foot rectangular base, was constructed in 1936, north of the city of Azusa. It sits at the base of the steep and weathered San Gabriel Mountains, between the west portal of Monrovia Tunnel No. 1 and the east portal of Monrovia Tunnel No. 2. The tower is surrounded by Angeles National Forest and is adjacent to Morris Reservoir. The function of the SGT is to regulate and isolate flows from the Weymouth Water Treatment Plant via the Upper Feeder pipeline to the Eagle Rock Control Facility located in the city of Los Angeles. It is situated between two active faults. The Sawpit and the Sierra Madre faults, which both capable of generating a magnitude 6.5 earthquake. While the tower was designed and constructed to the codes and standards in place during the 1930s, significant advancements have been made since that time in predicting the response and performance of structures as a result of seismic ground shaking. Seismic assessment and study are completed. The upgrades to the San Gabriel Tower will include: (1) reducing the height of the tower to increase its structural stability; (2) capping the tower with a protective slab designed to withstand a potential debris slide or rockfall; (3) adding new vacuum relief valves for surge protection; (4) replacing the slide gates and actuators to restore isolation capability for the Upper Feeder; (5) improving access to the tower and spillway, including the river crossing; (6) repairing the spillway's concrete; and (7) stabilizing the adjacent rocky slope. The Board authorized an initial investigation in December 2011.

Santiago Lateral Station 216+40 Butterfly Valve Replacement

The Santiago Lateral is a pre-cast concrete pipeline, ranging in size from 60-inch to 72-inch, and was constructed in 1955. It extends southerly from the Santiago Control Tower in the Anaheim Hills approximately 7.4 miles to Irvine Lake. The pre-cast concrete pipeline provides raw CRA water to Anaheim, IRWD and Irvine Lake. The 42-inch sectionalizing valve currently leaks at a rate of 0.5 to 1.0 cfs, and results in uncontrolled flows to the south portion of the Santiago Lateral. All leakage water from this location ultimately discharges to Irvine Lake at the terminus of the Santiago Lateral, which results in lost revenue to Metropolitan. This project will replace the valve and construct a bypass line to handle the lower flow rates. The location of the bypass line is not yet determined. A new vault upstream or downstream will be considered because there is not enough room in the current vault to construct a new bypass line, and the existing location does not provide room for expansion of the vault. The Board authorized preliminary design in August 2013.

OC-88 Pumping Plant Surge Tanks Upgrades

The OC-88 Pumping Plant was constructed in 1990 and is located in the city of Lake Forest. Treated water from the Diemer plant is conveyed through the Allen McColloch Pipeline (AMP) to the OC-88 Pumping Plant, which in turn pumps water directly into the Municipal Water District of Orange County's (MWDOC's) South County Pipeline. The surge tank system protects the AMP and the South County Pipeline from pressure surges. Two new surge tanks were added when the OC-88 Pumping Plant modifications were completed in 2005. However, the air compressor was not upgraded at that time. A recently completed high-flow test at the OC-88 Pumping Plant identified that a second air compressor should be installed to adequately protect the AMP and the South County Pipeline. This project will upgrade the OC-88 Pumping Plant's surge tank system and install a second air compressor. Preliminary design was authorized by the Board in August 2013.

Santa Ana Bridge Expansion Joint Replacement

The expansion joint located on the Upper Feeder as it crosses the Santa Ana River allows for thermal expansion and contraction of the pipeline. The existing expansion joint's seals have deteriorated from continuous use over a period of 80 years. The joint has a history of leaks and has required several repairs to date. A new expansion joint has been procured that will be more durable and will significantly reduce the level of maintenance required. Due to the importance of the Upper Feeder in delivering untreated water to the Weymouth plant, staff successfully installed a new joint during a shutdown of the feeder January 2018. The scope of the contract included removal of bridge structural members to access the pipe and joint; removal of the existing expansion joint from the pipeline by cutting and removing an eight-foot pipe segment; installation of the new bellows-type expansion joint; construction of a steel cage to provide lateral restraint at the joint; and minor adjustments to the bridge truss isolators. Metropolitan force activities included grading of the access road to the project site, support by divers to close the Upper Feeder gates at the Lake Mathews Forebay, dewatering of the feeder, final disinfection, and return of the line to service. A construction contract was awarded by the Board in August 2017.

Sepulveda Canyon Control Facility Seismic Upgrades

The Sepulveda Canyon Facility consists of a pressure control structure, hydroelectric plant, and two water storage tanks. The pressure control structure was constructed in the early 1970s to reduce pressure in the 9-foot-diameter Sepulveda Feeder as it conveys treated water from the Jensen plant. The two water tanks have a combined capacity of 18 million gallons of water and are used to regulate flows through the pipeline. The hydroelectric plant, which was constructed in 1982, takes advantage of excess pressure in the Sepulveda Feeder to generate up to 8.6 megawatts of electricity with its single turbine. The facility is located on top of a large pad that was constructed by filling a steeply sloped V-shaped ravine. The pad is approximately 120 feet above the toe of the slope. The site is located within one mile of the Santa Monica Fault, which is capable of generating a 6.8 magnitude earthquake. Preliminary slope analyses indicate that the fill could slide down the slope during a major earthquake, causing significant damage to the pressure control structure, the water tanks, and the hydroelectric plant. This project will consolidate all seismic upgrade efforts for the entire Sepulveda Canyon Control Facility and seismically upgrade the facility. The Board authorized preliminary design in May 2011.

Planned Projects

No additional projects are planned.

Conveyance and Distribution System - Rehabilitation for FY2012/13 through FY2017/18 15480

Total Appropriation Estimate: \$335,454,000 Biennial Estimate: \$39,928,716

Appropriated Amount 9/30/2017: \$48,210,000 Cost Through 9/30/2017: \$29,753,679

Purpose

To maintain the reliability of the distribution system through specific repair and rehabilitation projects on Metropolitan's distribution pipelines, reservoirs and control structures.

Scope

This appropriation was established to plan and implement multiple projects throughout the Conveyance and Distribution System. The common driver for many of the projects in this appropriation is infrastructure reliability.

Accomplishments for FY 2016/17 and FY 2017/18

New Projects Initiated Last Period:

- Casa Loma Siphon Barrel 1 Joint Repair
- Colorado River Aqueduct Casa Loma Siphon Barrel No. 1 Project 2 - Permanent Repairs
- East Orange County Feeder No. 2 Service Connection A-6 Rehabilitation
- Electrical Upgrades at 15 Structures in the Orange County Region
- Fairplex and Walnut Pressure Control Structure Valves Replacement
- Lake Mathews Electrical Upgrades
- Wadsworth Pumping Plant Yard Piping Lining Repairs
- West Orange County Feeder OC-09 Rehabilitation
- West Orange County Feeder Valve Replacement

Major Milestones Achieved Last Period:

- Casa Loma Siphon Barrel No. 1 Joint Repair - Completed construction
- Casa Loma Siphon No 1, Casa Loma Canal & San Diego Canal Flow Meter Replacement - Completed construction
- DVL East Dam Electrical Upgrades - Completed construction
- Garvey Reservoir Control Valves Replacement - Completed construction
- Middle Feeder Relocation for SCE Mesa Substation - Completed construction
- Rialto Pipeline Service Connections CB-12 and CB-16 Valve Replacement - procurement of valves for MFE to contractor - Completed construction
- San Diego Pipeline No. 3 Piping Modifications - Completed construction
- Upper Feeder - Structural Protection - Completed construction

Projects Completed To Date:

- No projects have been completed.

Objectives for 2018/19 and FY 2019/20

Project	Total Project Estimate	Estimated Completion	Major Milestones
Allen-McColloch Pipeline OC-76 Turnout	1,670,000	2020	Complete construction
Colorado River Aqueduct Casa Loma Siphon Barrel No. 1 Project No. 2 - Permanent Repairs	7,000,000	2023	Complete preliminary investigation
Conveyance and Distribution System - Electrical Upgrade	90,176,000	2027	Begin investigation
Electrical Upgrades at 15 Structures in OC Region	3,432,000	2020	Complete construction
Fairplex and Walnut Pressure Control Structure Valves Replacement	873,000	2019	Complete construction
Garvey Reservoir Drainage & Erosion Control Improvements	4,400,000	2021	Drainage improvements for Zones 1 & 5
Hollywood Tunnel North Portal Equipment Upgrades	4,150,000	2021	Begin design
Lake Mathews Electrical Reliability	5,782,000	2022	Begin design
Lake Skinner Area Distribution System Valve Replacement	900,000	2020	Begin procurement
Lakeview Pipeline Repairs	82,000,000	2021	Begin design
Orange County Area Distribution System Valve Replacement	2,400,000	2020	Begin procurement
Orange County C&D Team Support Facility	12,747,000	2020	Construction
Rialto Pipeline Service Connections CB-12 and CB-16 Valve Replacement & Electrical Upgrades	4,030,000	2020	Complete design
San Dimas and Red Mountain Power Plants Standby Diesel/Engine Generator Replacements	1,700,000	2021	Begin design
Sepulveda Canyon Control Facility Bypass	50,000,000	2021	Complete design
West Orange County Feeder OC-09 Rehabilitation	3,700,000	2021	Begin design
West Orange County Feeder Valve Replacement	2,000,000	2020	Begin design and valve procurement

Authorized Projects

Allen-McColloch Pipeline OC-76 Turnout

The Allen-McColloch Pipeline (AMP) delivers treated water from the Diemer plant in Yorba Linda to southern Orange County. Metropolitan acquired the AMP, including Service Connection OC-76, from MWDOC in the mid-1990s. OC-76 has a nearly two-mile-long connecting pipeline between the AMP turnout and the service connection meter. A section of the connecting pipeline has become exposed due to erosion in Serrano Creek. While the line is currently intact, it could be undermined by continued erosion or could be damaged by debris flows in the creek. The project will bypass the exposed portion of the connecting pipeline by relocating the AMP turnout from the north side of Serrano Creek to the south side and eliminate 6,850 feet of pipeline, including the exposed section in the creek. An isolation butterfly valve and two air release/vacuum valve assemblies will be installed. Construction was authorized by the Board in October 2017.

Colorado River Aqueduct Casa Loma Siphon Barrel No. 1 Project No. 2 - Permanent Repairs

In November 2016, leaks were detected on Barrel No. 1 of the Casa Loma Siphon. It was determined that the pipe has had significant horizontal and vertical movements. The leaks do not immediately jeopardize the structural integrity of the aqueduct but if repairs are not performed, the continued leakage over time could erode soil, undermine the siphon, and cause damage to the siphon structures. The Casa Loma Siphon Barrel No. 1 is vital to Metropolitan's conveyance system moving water from the desert pumping plants to Lake Mathews. The work is conducted in two stages. Under Project 1, internal seals were installed on 13 joints as an interim measure to address the leaks. These repairs were completed in February 2017, during a planned shutdown of the CRA. Project 2, will develop options to permanently repair the pipe joints within the siphon. The potential repairs may include installation or replacement of the existing sleeve-type couplings, or installation of recently developed earthquake-resistant pipe joints. Construction for Project 1 and preliminary investigations for Project 2 were authorized by the Board in January 2017.

DVL East Dam Electrical Upgrades

Diamond Valley Lake (DVL) was completed in 2000. During the original construction of DVL, a permanent electrical system was installed to power the dam monitoring equipment at Owen Dam and the Saddle Dam. However, only a temporary system was installed to serve the monitoring system at the East Dam. This project installed permanent electrical system at the East Marina and East Dam area to reliably support the dam monitoring equipment, the WAN system, and security throughout the area. Construction was authorized by the Board in May 2016 and has been completed. Production of record drawings is in progress.

East Orange County Feeder No. 2 Service Connection A-6 Rehabilitation

The A-06 Valve and Meter structure is a service connection for the City of Anaheim and is located on the East Orange County Feeder #2. The meter is a 24-inch venturi meter with a design capacity of 40 CFS. The meter was first put into service in August of 1964. During routine maintenance, staff noticed a leak from a weld-o-let near the bottom of the venturi meter. The Materials and Metallurgy Team inspected the meter in June 2014, and recommend replacement the venturi meter. The scope of work is to replace the A-06 Venturi meter, valve, steel grating, and adjacent piping that is deteriorated. The work will also include replacing the sump pump and identifying and restoring all electrical components to like new condition. Procurement and design were authorized by the Board in May 2017.

Electrical Upgrades at 15 Structures in the Orange County Region

Fifteen service connection structures within the Orange County operating region of Metropolitan's distribution system contain deteriorated electrical components. The conduits and electrical equipment inside the structures have corroded and no longer provide adequate grounding. In addition, the wiring inside the conduits may be compromised. These electrical components have been in continuous service in a damp, underground environment for over 50 years, and need to be upgraded. The upgrades will prevent the loss of sensitive electronic equipment and data, improve reliability, and enhance safety. The planned work includes replacing the existing service panels, conduits, wiring lights, and receptacles; and providing new grounding systems, sump pumps, exhaust fans, and remotely monitored flood alarms at each structures. This is part of the overall Conveyance and Distribution System Electrical Structures Rehabilitation. This initial upgrade addresses the highest priority structures. Design was authorized by the Board in September 2016.

Fairplex and Walnut Pressure Control Structure Valves Replacement

The Fairplex and Walnut Pressure Control Structures regulate upstream pressure and control flows within the Orange County Feeder. These structures are located in the cities of Pomona and Walnut. Each structure has two trains of piping that contain two 24-inch isolation valves and one 24-inch pressure-control valve. The eight isolation valves have deteriorated and leak excessively, preventing staff from performing maintenance on the control valves without shutting down the feeder. These shutdowns impact deliveries to eight service connections located between the Weymouth plant and Orange County Reservoir. The eight butterfly valves will be replaced during an upcoming shutdown of the northern reach of the feeder. The four control valves will then be refurbished in a sequential manner while the feeder remains in service. The scope of work includes: (1) procurement of valves and materials; (2) fabrication of fittings; (3) installation of the new valves; (4) rehabilitation of the existing control valves; and (5) shutdown activities. Construction was authorized by the Board in September 2017.

Garvey Reservoir Drainage & Erosion Control Improvements

Garvey Reservoir was constructed in 1954 as a component of the Middle Feeder system. The reservoir receives treated water from the Weymouth plant and has a maximum storage volume of 1,600 acre-feet. The reservoir is located within the city of Monterey Park on a hill that is surrounded on the west and south by residential properties that are lower in elevation. During significant storm events, surface runoff collects and flows downhill through improved drainage systems and natural drainage courses to Metropolitan's property boundaries. Connecting off-site drainage systems that were constructed by developers more than 50 years ago do not meet current minimum design standards and have deteriorated over time. Recognizing the mutual benefit of addressing runoff issues from the reservoir, Metropolitan entered into an agreement with the city of Monterey Park to implement drainage and erosion control improvements both within Metropolitan's property, and improvements to drainage in city streets. There are 14 separate drainage outlets emanating from the 11 geographically defined drainage zones at Garvey Reservoir to be mitigated. Construction for the two drainage zones around the reservoir was authorized by the Board in August 2017.

Lake Mathews Electrical Reliability

The existing electrical distribution system at Lake Mathews constructed during the 1930s needs to be upgraded for reliability. This system has been in service for over 75 years and serves the lake's outlet towers and junction shaft, hydroelectric plant, forebay, chlorination system, administrative offices, and maintenance and repair shops. The electrical distribution system is outdated, has experienced numerous overloads, and lacks capacity for planned additional equipment. The system needs to be upgraded to maintain reliability and meet future power demands. Planned upgrades include replacing the underground and overhead distribution lines; replacing the existing unit power centers and adding additional unit power centers where needed; and integrating the new electrical system with Metropolitan's system-wide supervisory control and data acquisition system. Preliminary design was authorized by the Board in March 2017.

Lake Skinner Area Distribution System Valve Replacement

The valves on the Lake Skinner Outlet Conduit, San Diego Pipeline No. 3, San Diego Pipeline No. 4, and San Diego Pipeline No. 5 have been in service up to 50 years, and have reached the end of their useful and expected service life. Failure of these valves or their associated components may result in an unplanned emergency shutdown of one of these pipelines impacting delivery to our member agencies. The scope of work is to replace approximately 30 deteriorated valves ranging in size from 8 to 12 inches in diameter on multiple pipelines in the Skinner Distribution System.

Lakeview Pipeline Repairs

The Lakeview Pipeline was constructed in 1973 to provide water from the East Branch of the State Water Project (SWP) to the Skinner area. Since it was completed, the Lakeview Pipeline has been shut down on numerous occasions to repair leaking joints. The line has experienced significant deformation which has caused leaks at pipe joints and loss of mortar lining. Due to the significant potential for corrosion of the pipeline, and the lack of structural integrity in many locations, permanent repairs should proceed expeditiously. In March 2015, in response to the ongoing state-wide drought, the Stage 1 repairs were completed. This work included lining a one-mile portion of the Lakeview Pipeline known as the Bernasconi Tunnel with a steel liner. In conjunction with the recently completed Lakeview Pipeline/Inland Feeder intertie, this improvement enables up to 200 cubic feet per second (cfs) of water stored in Diamond Valley Lake to be delivered to the Mills plant. The Stage 2 work includes lining 3.7 miles of the Lakeview Pipeline between the Inland Feeder's PC-1 control structure and the Perris Control Facility, along with installation of a 1,000-foot-long reach of 9.5-foot-diameter pipe to bypass the Perris Control Facility. Upon completion of the Stage 2 work, the Lakeview Pipeline will be capable of delivering up to 340 cfs from Devil Canyon through the Inland Feeder to the Mills plant, providing an alternate delivery route to the plant as backup to the Santa Ana Valley Pipeline. The future Stage 3 repairs will include lining the remaining 6.7 miles of the Lakeview Pipeline that extends from PC-1 to the San Diego/Casa Loma Canal junction structure. Stage 2 final design was authorized in December 2015.

Orange County Area Distribution System Valve Replacement

The valves on the Second Lower Feeder, Orange County Feeder, East Orange County Feeder, Lower Feeder, Santiago Lateral, and the Allen-McColloch Pipeline have been in service up to 50 years, and have reached the end of their useful and expected service life. Failure of these valves or their associated components may result in an unplanned emergency shutdown of one of these pipelines impacting delivery to our member agencies. The scope of work is to replace approximately 70 deteriorated valves ranging in size from 1 to 12 inches in diameter on various pipelines in the Orange County Distribution System. Construction was authorized by the Board in September 2017.

Orange County C&D Team Support Facility

O&M support functions for the 700-square-mile Orange County region of the distribution system are being performed from temporary trailers, shipping containers, and an aging warehouse. A permanent service center is required and will provide local storage of materials and equipment, house staff, and contain shops for minor repairs. A permanent facility will provide a safer and more efficient workplace to support shutdowns, routine maintenance activities, and urgent repairs. In February 2018, staff completed the final design for the new 12,000 square foot building and award of a construction contract for the building is planned. The scope of the construction contract includes: (1) site development work includes vehicle parking; perimeter lighting; storm water system; utility extensions including potable water, sewer, natural gas, and electrical service; and hazardous material storage; and (2) building construction which includes: offices and workspace for approximately 24 staff; a welding/fabrication shop with specialized equipment including a drill press, band saw, grinder, welder, parts cleaner, welding hood, and 3-ton bridge crane; a pipe and conduit-bending area; work bench and parts cleaning areas; and tool crib and storage areas for fabrication and welding supplies.

Rialto Pipeline Service Connections CB-12 and CB-16 Valve Replacement and Electrical Upgrades

The Rialto Pipeline is a 96-inch-diameter PCCP Feeder that was constructed in 1972. It supplies State project water to the Weymouth plant and directly serves member agencies through 11 service connections including, CB-12 and CB16. Service connection CB-12 and CB-16 valves are no longer operating correctly. The 48-inch-diameter isolation valves no longer seal and continuously leak. Repair of the butterfly valves is not possible, since the rubber seats are vulcanized and no longer available. This project will install new isolation valves and perform electrical upgrades at the two service connections. Design and procurement were authorized by the Board in August 2016.

San Diego Canal Radial Gate (VO-8) Rehabilitation

The San Diego Canal Turnout Radial Gate VO-8 is an integral component in the operation of the system that conveys Colorado River water to the San Diego Canal from the Casa Loma Canal. This radial gate controls flows and isolates the Casa Loma Canal from the San Diego Canal. The radial gate was completely replaced during the San Diego Canal Enlargement Project in the early 1990's. The original coating/corrosion protection is in a state of failure and no longer protecting the steel from corrosion. The scope of work is to remove and replace the VO-8 radial gate, strengthen or replace steel members as needed, prepare and coat steel surfaces with a galvanic coating.

San Dimas and Red Mountain Power Plants Standby Diesel/Engine Generator Replacements

The emergency generator at Red Mountain Hydroelectric plant was installed during the original plant construction in 1983. The generator at the San Dimas Hydro Electric Power Plant was installed during original Pressure Control Structure construction in 1975. These generators are necessary to ensure all operating equipment performs the required flow transfers between the Hydroelectric Power Plant (HEP) and the Pressure Control Structure (PCS) during un-scheduled HEP interruptions and SDGE station-power failures. The scope of work is to design, procure, and construct two standby diesel engine generators, one each at the San Dimas and Red Mountain Power Plants. The project scope includes removal of the existing generators and fuel tanks, construction of a new unloading facility with spill containment, steel overhead canopies, and electrical and mechanical system upgrades to the replacement generator to meet current emission and fire code.

Sepulveda Canyon Control Facility Bypass

The Sepulveda Canyon Control Facility is located in the Sepulveda Pass and was constructed in 1970. The facility consists of a hydroelectric power plant, a pressure control structure, two water storage tanks, and a chlorination station. All of the water conveyed by the Sepulveda Feeder passes through the facility and its storage tanks. There is presently no means to bypass the tanks. The scope of work is to add a bypass to the existing facility and to perform seismic upgrades and slope remediation below the tanks. The improvements will accommodate planned future upgrades including lining of the pre-stressed concrete cylinder pipe (PCCP) portions of the Sepulveda Feeder, and the potential addition of a pump station to provide a backup source of supply for the western portion of the distribution system. Preliminary design was authorized by the Board in July 2015.

Wadsworth Pumping Plant Yard Piping Lining Repairs

The yard piping system at Wadsworth Pumping Plant connects the pump/turbine units within the pump house to Diamond Valley Lake's (DVL) outlet conduit, pressure control structure, the Eastside Pipeline, and the pumping plant forebay. This piping network is designed for multiple flow configurations that allow power generation, filling of DVL, or withdrawal from the lake. The yard piping consists of a 144-inch-diameter main conduit with 54-inch-diameter manifold pipes at the pumping plant; a 144-inch-diameter main conduit with 66-inch-diameter manifold pipes at the pressure control structure; and a lake outlet conduit that varies in diameter from 90 to 192 inches. The scope of work is to replace the existing epoxy coating with a polyurethane lining on the internal surfaces of the Wadsworth yard piping. Design was authorized by the Board in September 2016.

West Orange County Feeder OC-09 Rehabilitation

The West Orange County Feeder was constructed in 1956 as a component of the Lower Feeder system. It delivers treated water from the Robert B. Diemer Water Treatment Plant in Yorba Linda to the northwestern portion of Orange County. Service Connection OC-09 on the West Orange County Feeder consists of a turnout tee, a venturi meter, and a shutoff valve. The turnout tee is encased in concrete and is located beneath the traffic lanes of Katella Avenue in the city of Garden Grove, adjacent to the boundary line with the city of Stanton. The meter vault is located below Dale Street. This structure contains a 14-inch conical plug valve, a venturi meter, and associated piping and electrical systems. Gradual corrosion from over 60 years of operation in a damp underground environment has led to deterioration of the equipment within the vault. This equipment needs to be replaced to maintain reliable deliveries from the service connection. Preliminary Design Phase was authorized by the Board in October 2017.

West Orange County Feeder Valve Replacement

The West Orange County Feeder was constructed in 1956 as a component of the Lower Feeder system. It delivers treated water from the Diemer plant in Yorba Linda to the northwestern portion of Orange County. A recent condition assessment identified that 13 structures require rehabilitation, including the replacement of air release/vacuum valve assemblies and adjacent plug valves. These valves were installed during the original construction of the feeder, and have been in service for over 60 years. Six of the air release/vacuum valves will also be relocated from a manhole to an above ground cabinet within the street-side parkway zone to prevent the potential of treated water in the distribution system becoming exposed to contaminants under certain operating conditions. Relocation is needed to comply with California State Water Resources Control Board requirements. Design and valve procurement were authorized by the Board in October 2017.

Planned Projects

Conveyance and Distribution System Electrical Structures Rehabilitation

Metropolitan's distribution system includes over 1,000 structures which house equipment used to measure pipeline flow, control pipeline flow and/or pressure, relieve pressure or vacuum, and isolate or sectionalize a pipeline. The conduits and electrical equipment inside the structures have corroded and no longer provide adequate grounding. In addition, the wiring inside the conduits may be compromised. These electrical components have been in continuous service in a damp, underground environment for over 50 years, and need to be upgraded. The rehabilitation for the Conveyance and Distribution System Electrical Structures has been prioritized and will be completed in five stages. The Stage 1 upgrades will upgrade 15 highest priority service connection structures within the Orange County. Stage 2 improvements will upgrade remaining 244 structures within the Orange County. Stage 3 improvements will upgrade 258 structures in northern Los Angeles County. Stage 4 improvements will upgrade 258 structures in southern Los Angeles County. Stage 5 improvements will upgrade 301 structures in Riverside, San Diego, and San Bernardino Counties. The planned work includes replacing the existing service panels, conduits, wiring lights, and receptacles; and providing new grounding systems, sump pumps, exhaust fans, and remotely monitored flood alarms at each structure.

Corona Hydroelectric Plant Seepage Remediation

The Corona Hydroelectric Plant was constructed in 1982 along the Lower Feeder and can generate up to 2.8 megawatts. A sinkhole appeared on the east side of the Corona Hydroelectric Plant accompanied by groundwater intrusion into the plant building. Damage to the structure rebar of the south wall of the plant prompted immediate repairs to damaged rebar and concrete around them. Groundwater seepage into the power plant is causing failure of the east wall of the Corona HEP, compromising the reliability and operational continuity of the conveyance system in general and loss of power generation capability of the power plant in particular. The scope of work consists of drilling of monitoring wells, demolition of existing obsolete Chlorine Injection building, excavation of the existing sinkhole area and backfilling it with compacted soil up to the existing grade along with waterproofing of the exterior wall upstream of the Corona HEP structure.

East Lake Skinner Bypass & Bypass #2 Screening Structure Upgrade

The East Lake Skinner Bypass Slide Gates were built 50 years ago in 1967 and are in need of rehabilitation. The gates are binding during operation which is rendering them in-operable. In addition, the East Lake Skinner Bypass Afterbay Trash Rack needs to be replaced with a new stainless steel rack to minimize the corrosion which caused the existing galvanized material to collapse under the weight of a severe algae bloom during bypass operations. The scope of work consists of reconditioning the East Lake Skinner Bypass Slide Gates (3 of them), and to replace the East Lake Skinner Bypass After-bay trash rack which is severely corroded and partially collapsed. In addition, this project will modify the East Lake Skinner Bypass Algae Screening Mechanisms Discharge Piping to bypass the Algae Shakers, and upgrade the Lake Skinner Bypass #2 Forebay Trash Rack Lifting Mechanisms.

East Orange County Feeder #2 Seismic Retrofit at Diemer Water Treatment Plant

A recent assessment identified a slope near the south western pad at the Diemer plant as having the potential to damage the EOCF2 pipeline during a significant earthquake. The pipeline may no longer meet current seismic codes and regulations. This structure requires further analysis to ensure that it meets Metropolitan's current structural standards and the facility is reliable in the event of seismic activity. This project will assess, design, and complete seismic retrofit construction near the south western pad at the Diemer plant.

Hollywood Tunnel North Portal Equipment Upgrades

Built as part of the Santa Monica Feeder in 1937, the North Portal of the Hollywood Tunnel is one of three control points along the feeder, which delivers water to the cities of Burbank, Beverly Hills, Los Angeles, and Santa Monica. The valves and mechanical control system at the North Portal of the Hollywood Tunnel are obsolete. Repair parts are not available and must be fabricated at a machine shop. This project will replace the existing sleeve valves and hydraulic actuators at the North Portal of the Hollywood Tunnel with new control valves with electric actuators. The upgrade includes replacing the mechanical controls with electronic, PLC/SCADA controls, which will allow the facility to be monitored and controlled from the Eagle Rock Operations Control Center.

Live Oak Reservoir Bypass Pipeline Cathodic Protection

Constructed in 1973, the Live Oak Reservoir Bypass (LORB), Inlet, and Outlet Pipelines are dielectrically coated welded steel pipelines with a diameter of 97-inches and are approximately 0.6 miles long. The 24-inch dielectrically coated Desilting pipeline ties in to the Outlet pipeline, crosses the Bypass pipeline and is approximately 800 feet long. The LORB connects the prestressed reaches of the Rialto Pipeline to the east and the west. The pipeline is one of the few reaches of welded steel pipe that is not yet cathodically protected. A failure of the Live Oak Reservoir Bypass would inhibit Metropolitan's ability to convey water through its system and potentially disrupt Metropolitan's ability to deliver water to several member agencies. The scope of work is to design and install a comprehensive cathodic protection system in the Live Oak Reservoir Bypass.

Olinda Pressure Control Structure and Santiago Tower Emergency Generators

The Santiago Control Tower, constructed in 1955, acts as a control and diversion facility for water supplied to the Santiago Lateral, the Santiago Lateral Spillway, and the Lower Feeder. The Olinda Pressure Control Structure was constructed in 1969 to provide regulation of flows in the Lower Feeder between the Santiago Control Tower and Diemer Filtration Plant. This project will procure and install emergency generators at the Olinda Pressure Control Structure (OPCS) and the Santiago Control Tower (SCT) on the Lower Feeder. The SCT and OPCS are a vital link in the delivery of water in the Lower Feeder, from Lake Mathews to the Diemer Treatment Plant. In the event of a power outage in the Yorba Linda area, control of flow will be lost until a portable generator can be delivered and connected.

Santa Monica Feeder Cathodic Protection

The Santa Monica Feeder is a mortar coated welded steel pipeline with a diameter of 49-inches and is approximately 4.25 miles long. The pipeline is one of the few reaches of welded steel pipe that is not yet cathodically protected. A failure of the Santa Monica Feeder would inhibit Metropolitan's ability to convey water through its system and potentially disrupt Metropolitan's ability to deliver water to several member agencies. The scope of work is to design and install a comprehensive cathodic protection system in the Santa Monica Feeder.

Skinner Bypass Pipelines Cathodic Protection

The Lake Skinner Bypass Pipeline # 1 (97-inch diameter), Lake Skinner Bypass Pipeline #3 (49-inch diameter), and Skinner Plant effluent Conduit # 1 (7-inch diameter) alignments have portions traversing inside and outside of the Skinner Treatment Plant property. The three pipelines are dielectrically coated steel pipelines. The original impressed current cathodic protection system was installed in 1980. The system was turned off as concerns emerged about exposing prestressed pipelines to cathodic protection. In addition, several modifications to the pipelines made the existing system unsuitable for the present pipeline configurations. The existing cathodic protection system requires full rehabilitation to adequately protect the pipeline from corrosion. A failure of the Feeders would inhibit Metropolitan's ability to convey water through its system and potentially disrupt Metropolitan's ability to deliver water to several member agencies. The scope of work is to design and install a comprehensive cathodic protection system in the feeders.

West Orange County Feeder Cathodic Protection

The West Orange County Feeder (WOCF) was constructed in 1956, and is mortar and dielectrically coated welded steel pipeline with a diameter of 43-inches and 55-inches. The pipeline is approximately 13 miles long. The WOCF connects to the cathodically protected Orange County Feeder (OCF), prestressed and steel reaches of the Second Lower Feeder (SLF), and the cathodically protected Lower Feeder (LF). The pipeline is one of the few reaches of welded steel pipe that is not yet cathodically protected. A failure of the WOCF would inhibit Metropolitan's ability to convey water through its system and potentially disrupt Metropolitan's ability to deliver water. The scope of work is to design and install a comprehensive cathodic protection system in the WOCF.

Conveyance and Distribution System - Rehabilitation for FY2018/19 through FY2023/24

18902

Total Appropriation Estimate: \$124,438,000 Biennial Estimate: \$4,062,137

Appropriated Amount 9/30/2017: \$0 Cost Through 9/30/2017: \$0

Purpose

To maintain the reliability of the distribution system through specific repair and rehabilitation projects on Metropolitan's distribution pipelines, reservoirs and control structures.

Scope

This appropriation will be established to plan and implement multiple projects throughout the Conveyance and Distribution System. The common driver for many of the projects in this appropriation is infrastructure reliability.

Accomplishments for FY 2016/17 and FY 2017/18

New Projects Initiated Last Period:

- No projects were initiated during the last biennium.

Major Milestones Achieved Last Period:

- None, this appropriation will be initiated in FY 2018/19.

Projects Completed To Date:

- No projects were completed.

Objectives for 2018/19 and FY 2019/20

Project	Total Project Estimate	Estimated Completion	Major Milestones
108th Street Pressure Control Structure Valve Replacement	700,000	2021	Begin preliminary design
Appian Way Valve Replacement	900,000	2021	Begin preliminary design
Foothill Feeder - Castaic Valley Blow-off Valves Replacement	535,000	2019	Complete construction
Lake Mathews Aboveground Storage Tank Replacement	555,000	2020	Begin preliminary design
Lake Mathews Outlet Tower No. 2 Valve Rehabilitation	347,000	2020	Study
Lake Mathews Sodium Hypochlorite Injection System	4,220,000	2020	Begin preliminary design
Lake Mathews Sodium Hypochlorite Tank Replacement	762,000	2020	Begin preliminary design
Live Oak Reservoir Rehabilitation	5,920,000	2022	Begin preliminary design
Olinda Pressure Control Structure Valve Replacement	3,073,000	2022	Begin preliminary design
Sepulveda-West Basin Interconnection Valve Replacements	945,000	2021	Begin preliminary design

Authorized Projects

None, this appropriation will be initiated in FY 2018/19.

Planned Projects

108th Street Pressure Control Structure Valve Replacement

The 108th Street Pressure Control Structure (PCS) located on the Palos Verdes Feeder was constructed in 1941. The pipeline has a design capacity of 80 CFS in this area and provides the flexibility to deliver water through the Inglewood Lateral and Culver City Feeders to member agencies, including the city of Los Angeles, Central Basin Municipal Water District, and West Basin Municipal Water District. This project will replace two failing valves at the 108th Street PCS. The work will include replacing a corroded ladder, catwalk grating, and identify and restore all electrical components to new condition. Electrical components consist of electrical panel boards and grounding, sump pumps, and associated instrumentation.

Appian Way Valve Replacement

The Appian Way Sectionalizing Valve Structure on the Palos Verdes Feeder was constructed in 1937. The pipeline has a design capacity of 60 CFS in this area and delivers water to Metropolitan's member agencies, Central Basin Municipal Water District, and the city of Los Angeles. The sectionalizing valve provides Metropolitan the flexibility to isolate flows on the Palos Verdes Feeder between the Long Beach Lateral Turnout Structure and Appian Way Sectionalizing Valve Structure to perform preventive maintenance, planned shutdowns, and emergency activities if required. This operational reliability allows for continued delivery of water to Metropolitan's central pool. The failing sectionalizing valve is 80 years old. Over the past few years, the 24-inch valve has been rebuilt several times to extend its service life. This valve can no longer be rebuilt and has become extremely difficult to operate as it gets stuck and does not fully open or close. The body and cone have eroded, which prevents the valve from properly sealing. This project will replace two failing valves, dresser couplings, corroded pipe spools, and install a new precast concrete roof slab at the Appian Way Sectionalizing Valve Structure. Additionally, the project would identify and restore all electrical components. Electrical components include electrical panel boards and grounding system, sump pumps, and associated instrumentation.

Cathodic Protection of the Orange County Feeder from Sta. 1467+15 to Sta. 2053+97

The Orange County Feeder conveys treated water from the F. E. Weymouth Water Treatment Plant in La Verne to its terminus at service connection CM-1 in Newport Beach. The feeder is approximately 41 miles long and was installed in 1942. The feeder consists of approximately 21 miles of welded and un-bonded steel pipe, 19 miles of precast concrete pipe, and one mile of prestressed concrete cylinder pipe. Previously, cathodic protection could not be effectively applied to the subject reach; however, recent pipeline rehabilitation has made cathodic protection a viable option to prevent external corrosion and thus prevent future pipe leaks. This project will install a new cathodic protection system on the Orange County feeder to protect approximately 11.2 miles of feeder. The scope of work includes design and installation of the anodes and rectifier system.

Coyote Creek Hydroelectric Plant/PCS Emergency Standby Generator Replacement

The existing emergency stand-by generator was installed when the Hydroelectric Plant/Pressure Control Structure (HEP/PCS) was constructed in 1982. The emergency generator is 34 years old and has deteriorated with age. This project will replace the existing emergency generator with a new 150 kW, 3-phase 480-volt, diesel engine driven generator and construct an additional manual transfer switch outside the stationary generator room to provide for a secondary portable generator hookup. The project scope will include electrical and mechanical system upgrades to the generator building to meet current emission and fire code regulations under the Environmental Protection Agency's Tier 3 Emission and Fuel Standards Program.

Diamond Valley Lake Oxygenation System

This project will construct a liquid oxygen (LOX) storage and feed system at Diamond Valley Lake to improve water quality, reduce impacts of cyanobacterial blooms, and maintain operational flexibility to ensure reliable and high-quality water deliveries under drought and emergency conditions. The LOX system will maintain oxygenated conditions in the deeper waters of DVL and prevent the formation of reduced compounds (sulfides, metals) that interfere with water treatment processes. This will allow for high-quality water to be released from the reservoir year-round. The system consists of: (1) a LOX tank; (2) evaporators to convert LOX to gas; (3) supply lines to deliver oxygen; (4) diffusers to mix the oxygen; (5) and a control system to regulate oxygen flow.

Eastern Region - C&D Maintenance & Fleet Vehicle Service Center

These facilities service the Eastern Region Conveyance & Distribution (C&D) Team, Eastern Region Fleet Unit, and other maintenance staff. Over the past 40 years maintenance of equipment and structures has increased, requiring additional space to house spare parts, materials, specialty tools, and space to break down equipment for repair. Currently, because of space restrictions, maintenance teams use areas throughout the facility to do maintenance and store equipment and materials. Equipment must be sent or transported to other facilities for repair due to lack of room and lifting capabilities. This fragmentation of work areas and storage drastically reduces worker efficiency.

East Orange County Feeder No. 2 Service Connection OC-44A Valve Replacement

The East Orange County Feeder #2 is a 25-mile-long pipeline which delivers treated water from the Diemer plant to the cities of Anaheim, Orange, Santa Ana, and Irvine. Service Connection OC-44A, which is located in Newport Beach, was constructed in 1967 and delivers water to the Municipal Water District of Orange County. Gradual corrosion and wear from over 50 years of operation has led to the deterioration of the 16-inch plug valve. The valve is currently leaking and needs to be replaced. The plug valve shaft was installed in the horizontal position to allow placement of the valve within the vault. This unconventional position may have accelerated the deterioration of the valve. This project will replace a 16-inch-diameter plug valve, flowmeter, and appurtenant piping as required in the Service Connection OC-44A Structure. The work will also identify and restore all electrical components to new condition. Electrical components consist of electrical panel boards and grounding system, sump pump, and associated instrumentation.

East Valley Feeder Valve Structure Electrical Upgrade

The East Valley valve structure is located on the north sidewalk of the Rinaldi Street and Hayvenhurst Avenue intersection in Granada Hills. During the wet season, this structure receives intrusive storm water leakage causing the junction boxes, electrical enclosures, and conduits to corrode and short circuit. The extent of damage has accelerated, and storm water now enters the structure through damaged high voltage electrical conduits. This project will install new wiring and control panels for operation of the existing valve, remove the existing aboveground disconnect switch and install a new power distribution panel, install new duct banks and conduits to supply power to each of the critical structures, install additional bollards around the distribution panel to minimize damage from vehicles, repair damaged sidewalk, and assess potentially relocating the existing metering structures.

Etiwanda Reservoir Rehabilitation

The Etiwanda Reservoir has been in operation for 26 years. The liner and appurtenances are in need of refurbishing to maintain their integrity and prevent excessive seepage as noted during periodic inspections. This project will rehabilitate the reservoir by replacing the reservoir liner with a geomembrane liner, replacing the sub-drain sump pump system, and installing new electronic monitoring instrumentation and equipment to better monitor operational status of the sump pump system. The project scope will also include inspection and evaluation of: 1) the asphalt pavement for the reservoir perimeter roads and parking lot for rehabilitation as needed; and 2) the isolation drop gates, emergency discharge slide gate, effluent gate, and reservoir sleeve valves.

Flowmeter Replacement

Metropolitan has over 500 flowmeters used for water revenue metering at service connections, operation of the conveyance and distributions, and for process control. Many flowmeters have been in operation over 50 years. Some of these meters are exhibiting signs of deterioration. Spare parts for older meters are increasingly difficult to procure.

This project will be conducted in three stages. Under Stage 1, a comprehensive evaluation of the flowmeters will be conducted to assess their current condition and availability of spare parts. Under Stage 2, deteriorating meters in critical services will be replaced. Under Stage 3, a comprehensive, risk-based approach will be implemented to replace the remaining flow meters.

Foothill Feeder - Castaic Valley Blow-off Valves Replacement

The Foothill Feeder pipeline's Castaic valley blow-off structure was constructed in 1967 and has two existing 16-inch 150-lb plug valves that are extremely difficult to operate. The blow-off structure is one of several critical blow-offs used to dewater the downstream side of the Foothill Feeder Pressure Control facility and pipeline during planned shutdowns, periodic maintenance operations, and in emergency scenarios. This blow-off is the only one available to the Foothill Feeder prior to entering the Castaic tunnel. The two plug valves are 50 years old. They are not repairable, pose operational difficulties, and may not be suitable to efficiently drain the pipeline when needed especially during an urgent or emergency situation. This project will replace two failing 16-inch plug valves in the Castaic Valley Blow-off Valve Structure located on the Foothill Feeder. The work will include modifying the top of the valve structure for easier access to accommodate maintenance, repairs, and replacement of valves.

Lake Mathews Aboveground Storage Tank Replacement

The Lake Mathews existing diesel aboveground storage tank does not conform to current regulations and needs to be removed from service. In its present condition the tank cannot be operated in a safe manner. The Lake Mathews Spill Prevention Countermeasure and Control Plan cannot be certified as long as the diesel aboveground storage tank remains in service. This project will replace the existing 10,000-gallon diesel fuel aboveground storage tank (AST) with its associated containment dike, venting, fill system, level monitoring, fuel dispensing system, catwalk, and continuous release detection system with a new 6,000-gallon AST system, and design and construct a roof over the storage tank containment and unloading area.

Lake Mathews Junction Shaft Gate Hydraulic Power Unit Study - Outlet Tower No. 2 Isolation

The roller gates at the Lake Mathews junction shaft do not operate consistently and reliably. The large isolation gates utilize hydraulic power units to operate under normal conditions and store energy for use in emergency conditions when electric power is not available. Although maintained in accordance with the manufacturer's recommendations, the gates no longer function as designed. This project will evaluate the two roller gate operators at the Lake Mathews junction structure that provide isolation for Outlet Tower No. 2. The study will focus on the condition of hydraulic power unit equipment, safety elements related to pressurized hydraulic reservoirs/tanks, and operating procedures/practices.

Lake Mathews Outlet Tower No. 2 Valve Rehabilitation

The outlet tower valves operate intermittently do not open and close completely. Without proper operation of the valves, tier selection and flow rates are impacted which may adversely affect system operations including raw water quality, water treatment processes at the downstream Weymouth and Diemer plants, and secure isolation of the tower from the lake needed for maintenance and inspection work. This project will complete a comprehensive study and implement recommendations on replacement or refurbishment of the butterfly valves on the Lake Mathews Outlet Tower No. 2.

Lake Mathews Reservoir Dredging and Emergency Dewatering Facilities

Sediment has accumulated in the reservoir since it was first built and filled in 1938. Sediment is a result of continual erosion within the Lake Mathews watershed and has led to increased turbidity at water treatment plants, reservoir storage loss, and plugged the main dam diversion tunnel into Cajalco Creek. In addition, the California Department of Water Resources, Division of Safety of Dams (DSOD), has specific outlet dewatering requirements for large dams/reservoirs that impound over 5,000 acre-feet of water. Although the current dewatering method at the forebay meets DSOD's requirement, there is a possibility that the Upper Feeder and Lower Feeder that take water from the forebay may be damaged and become unusable during a seismic event. It is now necessary to reestablish access to the diversion tunnel at the bottom of the main dam by dredging. This project will evaluate dredging options for Lake Mathews Reservoir. Dredging will remove decades of accumulated sediment that reduces reservoir storage capacity, contributes to decreased water quality, and blocks access to dewatering infrastructure at both Outlet Tower No. 1 and the main dam diversion tunnel. The evaluation will identify and prioritize dredging locations through bathymetric surveys and other remote methods, as well as identify mitigation options for the environmental hazards of dredging. The project will also determine the condition of the main dam diversion tunnel and all its mechanical equipment.

Lake Mathews Sodium Hypochlorite Injection System

Update and redesign the Lake Mathews sodium hypochlorite injection system to relocate the injection point to a location that will minimize the impacts of chlorine injection on the forebay and appurtenant structures. The design will also consider effective Quagga Mussel control, enhancing safety and reliability of the injection system, and adherence to water quality goals and requirements. The project will develop options to replace the existing interim sodium hypochlorite system at the Lake Mathews Forebay with a system at Lake Mathews Outlet Tower No. 1 and Outlet Tower No. 2, and to provide continuous chemical injections from the towers through the Lake Mathews Forebay, Power Plant, and into the Upper and Lower Feeders.

Lake Mathews Sodium Hypochlorite Tank Replacement

The Lake Mathews sodium hypochlorite tanks are an integral part of Metropolitan's Quagga Mussel control program. The tanks are at the end of their service life and need replacement. This project will replace two 16,700 gallon fiber-reinforced plastic sodium hypochlorite storage tanks and replace two sodium hypochlorite chemical feed pumps.

Live Oak Reservoir Rehabilitation

The Live Oak Reservoir has a 2500 acre-foot capacity and is located in the city of La Verne. The main purpose of the reservoir is to allow peaking of the Devil Canyon Power Plant and to provide for outages. The reservoir water surface controls the upstream hydraulic gradient for the San Dimas Hydroelectric Power Plant. An inspection identified the following: 1) several valves that are leaking; 2) the reservoir liner is damaged in several areas; 3) the emergency backup generator is no longer manufactured and parts are obsolete; 4) the existing HVAC system including the ductwork for the control room has exceeded its expected service life; 5) improvements to provide access control, intrusion alarm, surveillance are needed; and 6) improvements to the grading, surface drainage, and paved roads adjacent to the Live Oak Reservoir are also needed. This project will replace three leaking butterfly valves, spot repair the existing asphalt concrete (AC) liner, replace the existing Emergency Standby Generator, replace the existing Heating, Ventilation, and Air Conditioning (HVAC) system, improve erosion controls for the facility, identify and restore all electrical components to new condition, including electrical, panel boards and grounding, sump pumps, and associated instrumentation, and conduct a security assessment of the facility to reinforce or upgrade physical features and protect infrastructure. This includes replacement of the inner fencing for the reservoir with security type fencing.

Olinda Pressure Control Structure Valve Replacement

The Olinda Pressure Control Structure was constructed in 1969 to provide regulation of flows in the Lower Feeder between the Santiago Control Tower and Diemer Filtration Plant. This project will replace two conical plug valves to increase efficiency, reliability, and mitigate the vibrations caused by operating the valves. Replacing the existing 49 year old valves will improve operational control of the Lower Feeder between the Santiago Control Tower and the Diemer plant.

Palos Verdes Feeder - Long Beach Lateral Turnout Structure Sta. 1442+15 Valve Replacements

The Palos Verdes Feeder - Long Beach Lateral turnout structure, located in the County of Los Angeles, was constructed in 1938. The Long Beach Lateral turnout structure consists of seven valves that allows Metropolitan to continue delivering water upstream and downstream to member agencies during preventive maintenance, shutdowns, and emergencies. This project will replace the seven valves on the Palos Verdes Feeder/Long Beach Lateral Turnout Structure that are 80 years old. The structure will also be refurbished and include replacing the existing catwalk grating, a new precast concrete roof slab, lifting mechanism, security type entry hatches, and identify and restore all electrical components to like new condition. Electrical components consist of electrical panel boards and grounding system, sump pump and associated instrumentation.

Rio Hondo Pressure Control Structure Valve Replacements

The Rio Hondo Pressure Control Structure (PCS) on the Middle Feeder pipeline was constructed in 1983. Construction of the Rio Hondo PCS incorporated an existing valve structure, so the valves at this location have been in operation since 1953 as part of the original underground valve structure. The existing valves have been in continuous service for approximately 65 years, and over time have required frequent repairs/rebuilding.

The Eagle Rock Operations Control Center utilizes the Rio Hondo PCS to maintain the lower pressure zone on the southern half of the Middle Feeder, and to assure deliveries to member agency water demands in the southwestern service area. This project will replace thirteen failing valves at the Rio Hondo PCS. The work will include replacing dresser couplings, pipe spools, and pipe supports; providing adequate ventilation for the structure; rehabilitating the existing wastewater system; and identifying and restoring all electrical components to new condition. Electrical components consist of electrical panel boards and grounding system, sump pumps, and associated instrumentation.

San Diego Canal Radial Gate V-06 Rehabilitation

The protective coatings on the radial gate at the San Diego Canal and the operating components of the gates have begun to fail, and significant metal loss has occurred. In addition, the performance of the existing motor actuators used to open and close the gates has diminished. Should this gate fail, there would be loss of control to regulate flow into Lake Skinner from the San Diego Canal, along with loss of control in surface elevation that regulates flows through the Lake Skinner Bypass screening structures. The bypass structures supply the Skinner area raw water pipelines and the Skinner plant when Lake Skinner is being bypassed, typically due to a taste and odor issue in the lake. This project will rehabilitate or replace the San Diego Canal Radial Gate V0-6. The rehabilitation may include strengthening or replacing steel members as needed, replacing the radial gate actuator and controls, and preparing and coating steel surfaces with an approved coating, such as a galvanic metalized coating.

San Jacinto Diversion Structure Slide Gate V-03

The San Jacinto Diversion Structure, located at the base of the San Jacinto Mountains, was constructed in 1939. The diversion structure is located at the west portal of the San Jacinto Tunnel on the Colorado River Aqueduct (CRA). This gate was designed to shutoff flow to the San Jacinto pipeline. The slide gate does not fully close to provide isolation, when needed, or flow regulation. This project will replace or rehabilitate and modify the existing V-03 cast iron slide gate and its appurtenances at the diversion structure.

Santa Ana River Discharge Pad - Upper Feeder

Severe storm events eroded the north slope of the Santa Ana River near the Upper Feeder crossing. This damage resulted in large voids in the river bank to the footing supporting the bridge span and the foundation of the emergency discharge bunker valve. Continued erosion may create safety risks to the public that accesses the popular hiking area. This project will construct a concrete discharging pad to prevent erosion from storms and discharge from the bunker valve.

Santa Monica Feeder and Calabasas Feeder Bypass for Sectionalizing Valves

The lack of a bypass line at the Santa Monica Feeder and Calabasas Feeder creates the potential for damage to the valves and their operators due to the inability to equalize pressure across the valves before operating. Further operation of these valves, without installing a bypass, will continue to place the valves and pipeline at risk for damage and potentially emergency or unplanned shutdown. This project will design, fabricate, and install bypass lines at three sectionalizing valve locations that currently do not have a bypass line.

Santiago Control Tower Seismic Improvements Study

The Santiago Control Tower acts as a control and diversion facility for water supplied to the Santiago Lateral pipeline, the Santiago Lateral Spillway Discharge Pipeline, and the Lower Feeder pipeline. This project will evaluate the Santiago Control Tower's ability to resist expected seismic forces based on the latest geotechnical and geological considerations. A detailed geotechnical analysis is required to determine the structure's interaction with surrounding soil and analyze the soil stability of the structure. The structure is located in close proximity to the Whittier Fault on a raised area adjacent to a slope.

Sepulveda Canyon Power Plant and Control Facility - 3-D Infrastructure Mapping of Underground Facilities Phase 1

With advancements in information technology, such as Building Information Modeling (BIM) and Geographical Information System (GIS), Metropolitan has the opportunity to update and centralize its underground infrastructure database. This will provide the accuracy needed when routing pipes, duct banks, trenches or buried structures. The project will purchase hardware and software to develop a comprehensive 3-D infrastructure map that includes underground utilities at critical Metropolitan facilities along our conveyance and distribution system. This map will show the exact locations of Metropolitan's underground utilities and intelligent 3-D models of the facilities, pipelines, and structures, which will aid operations, design, and disaster response and recovery. Phase 1 of the project will develop a comprehensive 3-D infrastructure map of the Sepulveda Canyon facility that includes underground utilities, pipelines, and structures.

Sepulveda-West Basin Interconnection Valve Replacements

The Sepulveda-West Basin Interconnection was constructed in 1970. The interconnection allows Metropolitan's Sepulveda Feeder pipeline the flexibility to convey supplemental flow to the West Basin Feeder. The structure includes two 16-inch lines with sleeve valves and one 12-inch line with a globe valve. Each line may be isolated at the either end with plug valves. This project will replace three failing valves at the Sepulveda-West Basin Interconnection structure. The work will include replacing associated dresser couplings, pipe spools, and pipe supports. Additionally, work on the structure will include installing a new precast concrete roof slab, providing adequate ventilation for the structure, replacing a sump pump, structure modifications to address algae accumulation on adjacent sidewalk due to frequent water discharge from the sump pump, and identifying and restoring all electrical components to new condition. Electrical components will consist of electrical panel boards and grounding, sump pumps, and associated instrumentation.

Service Connection LA-17 Rehabilitation

Service Connection LA-17 is located in the city of Los Angeles at the terminus of the Eagle Rock Lateral. It includes three lines: 1) 17A is a 24-inch line with a capacity of 30 cfs, 2) 17B is a 48-inch line with a capacity of 100 cfs, and 3) 17C is an 85-inch line with a capacity of 310 cfs. Three venturi tubes at the LA-17 service connection have been in service for more than 60 years and require significant rehabilitation or replacement.

Significant coating deterioration and metal loss with extensive pitting and corrosion were identified on the bottom side of the 48-inch venturi tube. The wall thickness of this venturi tube is approximately 30% of its original thickness. Failure to replace this venturi tube will lead to eventual leakage, flooding the structure, and impacting water deliveries to the member agency. This project will replace the deteriorating LA-17B welded steel venturi tube located at the Service Connection LA-17 structure. The work will also recoat the LA-17A and LA-17C venturi tubes within this structure. Additionally, work will include replacing the sump pump and identifying and restoring all electrical components to new condition. Electrical components will consist of electrical panel boards and grounding, and associated instrumentation.

Upper Feeder Relining across Santa Ana Bridge

The Upper Feeder was constructed between 1933 and 1941 with a 116-inch-diameter steel pipe and lined with coal tar enamel liner (CTE). This portion of the Upper Feeder is located above ground and crosses the river bed via a bridge. Exposure to the sun subjects the pipeline to a thermal cycle that is continuous heating and cooling of the pipe material. Over the past five years, staff have performed inspections on this segment of the Upper Feeder and determined that approximately 90% of the pipe's internal lining has failed. Mild to moderate pitting on the interior of the pipe indicate rust tuberculation and corrosion. This project will reline approximately 1,000 feet of the 116-inch diameter pipeline with an approved liner material.

Wadsworth Pumping Plant Stop Logs

The Wadsworth Pumping Plant was built with 12 pump/generation units. Units 1, 5, and 9 were decommissioned to allow DVL generation to be certified as "renewable energy" by the California Energy Commission. Hydroelectric plants are required to have a nameplate capacity of 30 MW or less to be certified. At 3.3MW per unit, the nine remaining units provide a generation capacity of 29.7MW. Generated energy must be certified renewable for electric utilities to meet the requirement that 33% of their energy come from renewable resources by 2020. The stop logs would provide a means to isolate the three decommissioned pumps from the DVL forebay keeping them out of the water and dry. Isolating the pumps from water contact reduces corrosion damage to the pumps and provides flexibility in the event pump/generation units need to be re-commissioned or repaired. This project will fabricate three sets of stop logs to isolate three decommissioned Wadsworth plant generation/pumping units from the forebay. Each set of stop logs consists of three stop log sections, for a total of nine sections of stop logs to isolate three pump units.

Washington Street Pressure Control Structure Valve Replacements

The Washington Street Pressure Control Structure (PCS) located on the Palos Verdes Feeder was constructed in conjunction with the Palos Verdes Feeder pipeline in 1941. The pipeline has a design capacity of 100 CFS in this area. This project will replace two failing hydraulically operated globe valves at the Washington Street PCS. The work will include identifying and restoring all electrical components to new condition. Electrical components consist of electrical panel boards and grounding, sump pump, and associated instrumentation. Additionally, a security assessment of the facility will be conducted to determine the need to reinforce or upgrade physical features for enhanced infrastructure protection.

Willits Street Pressure Control Structure

The Willits Street Pressure Control Structure (PCS), located in the city of Santa Ana, was built in 1944. This pressure control structure located on the Orange County feeder regulates pressure and conveys treated water to the Irvine Regulating Structure. This PCS is an underground structure consisting of three parallel trains of pressure control valves. At full capacity, two trains are in operation while the third train acts as a stand-by. The existing structure is congested and does not provide suitable access for maintenance, repairs or the replacement of valves. The maintenance access was impacted during street widening that required the size of the structure to be reduced. The modified structure configuration does not have a lifting mechanism to remove or transport these valves out of the structure for replacement or repairs. Additionally, the existing catwalk does not have adequate coverage. This project will construct a new pressure control structure to replace the existing Willits street PCS located on the Orange County Feeder. The work includes a new concrete substructure, relocating and replacing the control and isolation valves, new sampling connections for water quality and all necessary electrical and ventilation equipment. Once the new structure is complete, the older structure will be abandoned and the pipeline will be attached to the new structure during a brief outage.

CRA - Conveyance Reliability

15373

Total Appropriation Estimate:	\$125,567,000	Biennial Estimate:	\$11,065,587
Appropriated Amount 9/30/2017:	\$101,128,000	Cost Through 9/30/2017:	\$99,949,731

Purpose

To ensure the reliability and operational efficiency of the Colorado River Aqueduct (CRA).

Scope

This appropriation was established to plan and implement multiple projects throughout the Colorado River Aqueduct Conveyance System. The common driver for many of the projects in this appropriation is infrastructure reliability.

Accomplishments for FY 2016/17 and FY 2017/18

New Projects Initiated Last Period:

- No projects were initiated during the last biennium.

Major Milestones Achieved Last Period:

- CRA Sand Trap Rehabilitation - Completed construction
- Copper Basin and Gene Wash Reservoirs Discharge Valve Rehabilitation - Completed design

Projects Completed To Date:

- 10 projects have been completed

Objectives for 2018/19 and FY 2019/20

Project	Total Project Estimate	Estimated Completion	Major Milestones
Copper Basin and Gene Wash Reservoirs Discharge Valve Rehabilitation	11,500,000	2020	Begin construction
CRA Pumping Plants - Surge Chamber Slide Gates for Delivery Line Bypass pipes	5,700,000	2020	Complete construction

Authorized Projects

Copper Basin and Gene Wash Reservoirs Discharge Valve Rehabilitation

The Gene Wash and Copper Basin Reservoirs provide critical storage that enables flowrates along the CRA to be stabilized and controlled. If the reservoirs needed to be drained rapidly in the event of an emergency, the discharge valves located at the base of each dam would be opened to safely release the water. Following 70 years of continuous service, the valves have begun to leak and need to be replaced. Both dams are under the jurisdiction of the California Division of Safety of Dams (DSOD), which requires that the discharge valves be fully operational at all times. The project scope includes replacement of the fixed cone valves at the base of the dams; upgrade of the electrical systems; and access improvements to safely enable construction personnel, materials, and equipment to reach the work site. Design was authorized by the Board in February 2015.

CRA Pumping Plants - Surge Chamber Slide Gates for Delivery Line Bypass Pipes

At each of the CRA pumping plants, whenever maintenance or repairs are required for the main pump delivery lines, the pumping plant must be shut down and long reaches of the aqueduct must be drained. This project adds a slide gate on each of the delivery line bypass pipes within the surge chamber on the hill above each pumping plant that would allow for safe entry into individual pump delivery lines while the adjacent lines remain in service. Construction was authorized by the Board in December 2017.

Copper Basin Reservoir Outlet Structure Rehabilitation

This project rehabilitates the outlet structure at Copper Basin Reservoir that regulates flow out of Copper Basin into the aqueduct. In January 2012, Metropolitan's Board authorized construction which has since been completed. Completion of record drawings is in progress.

CRA Sand Trap Rehabilitation

This project replaced deteriorated sand trap equipment located upstream of Iron Mountain, Eagle Mountain, and Hinds Pumping Plants. The sand trap's traveling bridge system had been in operation for almost 75 years. The scope of work included the replacement of the traveling bridges, deck and truss supports, control cabins, rails, pump hoist, and dredge pumps. In addition, a concrete slab, perimeter fencing, guard rails, and new power cables and supports was installed. Construction was authorized by the Board in October 2015 and had been completed. Production of record drawings is in progress.

Iron Mountain Tunnel Rehabilitation

The Iron Mountain Tunnel was constructed between 1933 and 1938 as part of the CRA system. The tunnel is located downstream of the Iron Mountain pumping plant, and is eight miles long. The tunnel's cross-section is horseshoe-shaped, with overall dimensions of 16 feet high by 16 feet wide. Longitudinal and transverse cracks up to 1 inch wide have developed along a 2,500-foot-long stretch of the tunnel. This project will repair the cracks with focus on tunnel strengthening and corrosion protection. Preliminary design was authorized by the Board in October 2010.

Planned Projects

No additional projects are planned.

CRA - Discharge Containment

15385

Total Appropriation Estimate:	\$20,589,000	Biennial Estimate:	\$8,253,405
Appropriated Amount 9/30/2017:	\$7,864,000	Cost Through 9/30/2017:	\$7,039,903

Purpose

To decrease risk of discharging chemicals and waste to the environment and violating regulations.

Scope

This appropriation was established to plan and implement multiple projects throughout the Colorado River Aqueduct. The common driver for many of the projects in this appropriation is regulatory compliance.

Accomplishments for FY 2016/17 and FY 2017/18

New Projects Initiated Last Period:

- No projects were initiated during the last biennium.

Major Milestones Achieved Last Period:

- Pumping Plant Wastewater System Replacement (Intake) -Completed preliminary design
- Pumping Plant Wastewater System Replacement (Gene and Iron Mountain) - Completed preliminary design

Projects Completed To Date:

- Four projects have been completed.

Objectives for 2018/19 and FY 2019/20

Project	Total Project Estimate	Estimated Completion	Major Milestones
CRA Pumping Plant Wastewater System Replacement - Gene and Iron Mountain	8,543,000	2020	Start construction

Authorized Projects

CRA Pumping Plant Wastewater System Replacement - Gene and Iron Mountain

Gene and Iron Mountain pumping plants are located in remote areas of San Bernardino County, where municipal wastewater collection and treatment facilities are not available. These plants are served by a community on-site wastewater system. These on-site systems collect, treat, and dispose of domestic wastewater generated from bathrooms, kitchen facilities, maintenance buildings, guest lodges, and staff residences at the plants. The on-site systems consist of three primary components: community septic tanks and leach fields; collector lines located throughout the pumping plants which convey wastewater to the septic tanks and sewer laterals which convey wastewater from individual buildings to the collector lines. The existing wastewater systems at these plants have deteriorated through continual use and need to be replaced. This project will replace the wastewater systems at the Gene and Iron Mountain pumping plants. The systems will include new main-line pipes, building laterals, septic tanks and leach fields. Design was authorized by the Board in December 2012.

CRA Pumping Plant Wastewater System Replacement - Intake

Intake pumping plant is located on the Colorado River in a remote area of San Bernardino County and is served by a community on-site wastewater system which includes collector lines, laterals, a septic tank and a leach field. Similar to Gene and Iron Mountain Pumping Plants, the on-site system is deteriorated through continual use and needs to be replaced. This project will upgrade the existing wastewater system at the Intake pumping plant by replacing the entire main and lateral sewer lines, manholes, and cleanouts; including a new wastewater storage and treatment system. Preliminary design was authorized by the Board in January 2012.

Planned Projects

No additional projects are planned.

CRA - Electrical/Power Systems Reliability

15384

Total Appropriation Estimate: \$137,788,000 Biennial Estimate: \$20,209,822

Appropriated Amount 9/30/2017: \$23,565,000 Cost Through 9/30/2017: \$21,655,311

Purpose

To ensure reliability of the power systems along the Colorado River Aqueduct (CRA) by repairing or replacing aging and/or deteriorated electrical equipment/parts.

Scope

This appropriation was established to plan and implement multiple projects throughout the CRA's electrical and power systems. The common driver for many of the projects in this appropriation is infrastructure reliability.

Accomplishments for FY 2016/17 and FY 2017/18

New Projects Initiated Last Period:

- CRA Pumping Plant Auxiliary Power Systems

Major Milestones Achieved Last Period:

- CRA Over-Current Relay Replacement - Completed construction
- CRA UPS Replacement - Completed final design
- CRA 6.9 kV Power Cable Replacement - Completed final design

Projects Completed To Date:

- Eight projects have been completed.

Objectives for 2018/19 and FY 2019/20

Project	Total Project Estimate	Estimated Completion	Major Milestones
CRA 6.9 kV Power Cable Replacement	43,365,000	2021	Begin Construction
CRA Main Transformer Rehabilitation	40,520,000	2024	Complete Preliminary Design
CRA Pumping Plant Auxiliary Power Systems	20,360,000	2024	Begin Design
CRA UPS Replacement	2,530,000	2019	Complete Construction

Authorized Projects

CRA 6.9 kV Power Cable Replacement

There are a total of 45 primary pumps and motors at the five CRA pumping plants. Power is transmitted to the motors via 3-inch-diameter cables which run through a tunnel that connects each switch house to each pump house. The quantity of cables varies from nine to twenty-seven per plant. These cables were installed in four phases from 1939 through 1959. After 55 to 75 years of continuous service, the power cables have deteriorated and need to be replaced. Oil has begun to leak through cracks in the lead jacket, at the cable connection joints, and at the cable termination points. Frequent repairs are required to address the leaks and maintain the cables' insulating capacity. This project includes the replacement of the deteriorated main power cables at each of the five CRA pumping plants. Final design was authorized by the Board in June 2014.

CRA Main Transformer Rehabilitation

Six transformers provide electrical power to each CRA pumping plant to maintain continuous operation. All existing transformer units are original equipment, with many dating from the 1940s. Recent inspections revealed oil leakage and other signs of aging for some of the transformers. Failure of an existing transformer would disrupt power supply to a pumping plant and interrupt water delivery. The scope of the project includes rehabilitation of existing transformers, replacement of transformers, or the addition of spare transformers along with spill containment structures. This work also includes replacement of leaky circulating oil pumps that are used to cool the transformers and construction of secondary spill containment for the transformer banks. Preliminary investigations were authorized by the Board in March 2004.

CRA Pumping Plant Auxiliary Power Systems

All five CRA pumping plants have medium and low voltage systems that were constructed to the design standards of the 1930s-1950s. They provide power for general lighting, cranes, computers, shop equipment, and critical equipment such as the pumping plant sump pumps and lubrication oil pumps. Over the years, numerous additional electrical loads have been added to the auxiliary power systems. As a result, the distribution panel capacity limits have been exhausted, and some wiring is now undersized. The scope of this project includes upsizing the distribution panels to allow additional capacity and space for future loads, and replacing the cables and conduits to comply with current National Electrical Code and safety standards. Preliminary investigations were authorized by the Board in March 2016.

CRA UPS Replacement

Each CRA pumping plant has an Uninterruptable Power Supply (UPS) system to prevent fluctuations in power quality and to serve as a backup power supply in case of loss of station power. The UPS systems continuously protect computers, servers, telecommunication equipment, and process control equipment from power disruptions which could cause damage to equipment or loss of critical data or process control. The existing UPS systems at the five pumping plants are 20 years old and are beginning to fail. The existing UPS units are also undersized based on current power demands at the plants, and lack up-to-date features typical of newer systems, such as built-in redundancy. The planned upgrades include replacement of the UPS units with larger capacity units that are more efficient, reliable, and economical. In addition, UPS panels will be installed to allow flexible control of loads, and to allow for future expansion. Final design was authorized by the Board in June 2014.

Planned Projects

No additional projects are planned.

CRA - Main Pump Reliability

15481

Total Appropriation Estimate:	\$184,908,000	Biennial Estimate:	\$16,583,366
Appropriated Amount 9/30/2017:	\$12,090,000	Cost Through 9/30/2017:	\$2,333,080

Purpose

To complete rehabilitation work necessary to ensure reliability and operation performance, provide operational flexibility and prolong the useful life for the pumping plants.

Scope

This appropriation was established to continue to implement multiple projects throughout the Colorado River Aqueduct (CRA) Pumping plants. The common driver for many of the projects in this appropriation is infrastructure reliability.

Accomplishments for FY 2016/17 and FY 2017/18

New Projects Initiated Last Period:

- CRA Main Pumping Plants Discharge Line Isolation Bulkhead Couplings
- CRA Pumping Plants Crane Improvements
- CRA Main Pump Rehabilitation (Stage 1)
- CRA Main Pump Rehabilitation (Stage 1 - Demonstration Project)

Major Milestones Achieved Last Period:

- CRA Pumping Plants Crane Improvements - Completed preliminary design

Projects Completed To Date:

- No projects have been completed.

Objectives for 2018/19 and FY 2019/20

Project	Total Project Estimate	Estimated Completion	Major Milestones
CRA Main Pumping Plants Discharge Line Isolation Bulkhead Couplings	13,628,000	2021	Complete design
CRA Main Pump Rehabilitation (Stage 1)	6,200,000	2021	Begin Investigations
CRA Main Pump Rehabilitation (Stage 1 - Demonstration Project)	1,400,000	2020	Begin design
CRA Pumping Plants Crane Improvements	9,518,000	2019	Complete design

Authorized Projects

CRA Main Pumping Plants Discharge Line Isolation Bulkhead Couplings

Each of the nine main pumps at the five CRA pumping plants discharges the water into an individual 6-foot diameter discharge line. The nine discharge lines then merge into three 10-foot diameter pipelines that convey flow to the top of the lift and discharge into a headgate structure which empties the water into the next section of the aqueduct. Isolation of a single pump or its discharge valve, currently requires a lengthy flow reduction where three pumps have to be removed from service while cutting and welding activities are performed to install a steel bulkhead in one pump's 6-foot discharge line. This operation is labor-intensive and requires more than 72 hours to complete the isolation and removal of the isolation bulkhead. This project will install isolation couplings in the 6-foot discharge lines downstream of each main pump discharge valve. The discharge line couplings will allow individual pump units and discharge valves to be isolated significantly faster by eliminating the current cutting and welding process required to isolate a unit; thus, minimizing impacts to overall pumping capacity. Design was authorized by the Board in January 2016.

CRA Main Pump Rehabilitation (Stage 1)

Each of the five CRA pumping plants has nine main pumps that lift the water to the required elevation necessary to continue flow down the aqueduct. The 45 main pumps rely on multiple auxiliary systems including lubricating oil systems, circulating water systems, instrumentation, electrical and control panels, and individual equipment components. In the mid-1980s, a major rehabilitation project was undertaken on the 45 main pumps. As a result, the 45 main pumps have performed well over the nearly 30 years since the rehabilitation work was completed. However, the pumps are now showing signs of deterioration caused by continuous operation over that length of time. While that project successfully extended the service life of the pumps and increased their hydraulic capacity, the pump auxiliary systems were not addressed at that time. The pump auxiliary systems are from the original CRA construction and are now deteriorating and need to be replaced. This project will perform a comprehensive condition assessment of all 45 main pumps and their auxiliary systems at all five CRA pumping plants. The assessment will capture current operating conditions, create updated baseline documents of all existing equipment and systems, and provide replacement or rehabilitation recommendations for all pump and auxiliary system components. Preliminary investigations were authorized by the Board in October 2016.

CRA Main Pump Rehabilitation (Stage 1 - Demonstration Project)

A comprehensive condition assessment is underway on the 45 main CRA pumps, their motors and on the multiple auxiliary systems that the main pumps rely on. To ensure a successful rehabilitation of all the main pumps, motors and their multiple auxiliary systems, a single main pump unit and its support equipment at just one pumping plant will be completed in its entirety as a demonstration project. The information and experience gained from this demonstration project will be invaluable for planning and design of the large-scale rehabilitation of the remaining pump units. This project will rehabilitate Pump Unit No. 1 at the Gene Pumping Plant as a demonstration project. Design was authorized by the Board in October 2016.

CRA Pumping Plants Crane Improvements

All five CRA Pumping Plants have a single overhead bridge crane which spans the motor room floor and a portable bridge crane for the individual pump bay below the motor room floor. These overhead cranes were installed in the pumping plants during the original CRA construction and have been in operation since 1939. The cranes are used to raise, shift, and lower main pump components and motors for maintenance and replacement. These cranes were rehabilitated in the late 1980s. They have now reached the end of their service life where spare parts for the original crane components are difficult to obtain or no longer available. Parts which were replaced in the 1980s are outdated and the electronic features are no longer supported by vendors. This project will replace all the overhead bridge cranes on the motor room floor and the portable pump-bay cranes below the motor room floor at all five pumping plants. The replacement includes the bridges, trolleys, hoists, drive trains and the system controls. Design was authorized by the Board in January 2016.

Planned Projects

CRA Main Pump and Motor Refurbishment

Each of the five CRA pumping plants has nine main pumps that lift the water to the required elevation necessary to continue flow down the aqueduct. In the mid-1980s, a major rehabilitation project was undertaken on the 45 main pumps. The pumps have performed well over the past 25 years since the rehabilitation work was completed. Since then these pumps and their motors have been in continuous operation and are now showing signs of deterioration. This project will refurbish the main pumps and their motor systems. Pump refurbishment will include recoating the pump casing, replacing the upper rotating and stationary wear rings, and refurbishing the impeller. Motor refurbishment will include refurbishing the fan wheel; refurbishing the rotor and stator; and refurbishing the upper guide bearing, thrust block, thrust runner, and thrust shoes.

CRA Main Pump Controls and Instrumentation Upgrades

The CRA main pump controls and instrumentation systems have enabled decades of reliable pump operation. The systems, which are from the original CRA construction, use industrial quality relays, switches, and instrumentation that are maintained on a regular basis. Over the years, industry standards have changed and many of the replacement parts for the original instrumentation are extremely difficult to obtain. This project will rehabilitate and upgrade the CRA main pump controls and instrumentation systems. The new systems will follow modern industry open standards, be consistent with Metropolitan's current electrical protection and control system practices and be compatible with Metropolitan-wide supervisory control and data acquisition system.

CRA Main Pump Discharge Valve Refurbishment

Each of the nine main pumps at the five CRA pumping plants discharges water into an individual 6-foot diameter discharge line. Each pump has a 42-inch conical plug discharge valve located immediately downstream of the pump. The valve is used to isolate the pump from the 6-foot-diameter discharge line to perform routine maintenance and to protect the pump following an unplanned shutdown. The valves are from the original CRA construction. In the mid-1980s, a major rehabilitation project was undertaken on the 45 discharge valves and they have been in continuous operation since then. The valves are now showing signs of deterioration and are leaking. This project will refurbish the 45 main pump discharge valves. Refurbishment may include the replacement or repair of internal valve components, valve seats, upper and lower shaft bearings, bearing lubricator piping, and grease fittings. An automatic valve lubricator system may be added.

CRA Main Pumping Plant Sand Removal System Upgrades

At each of the five CRA pumping plants, water is withdrawn from the CRA, filtered to remove large debris and sand, and then pumped through a circulating water system. The circulating water system feeds the pump house service water system, the cooling system at each pump unit, the fire water system, the irrigation water system, and the domestic water treatment system. The existing filtration system is not designed to strain out fine silts. Consequently, the fine silt has built up as sediment in the circulating water systems leading to excessive wear and failure of equipment such as pump packing, cooling water piping, and heat exchangers. This project will upgrade the filtration system to remove fine silt and eliminate sediment build up.

CRA Main Pumping Plant Unit Coolers and Heat Exchangers Refurbishment

Each of the five CRA pumping plants has nine main pumps. Each main pump has a cooling system to cool various components of the pump system. At each pump house, water is pumped through a circulating water system, which feeds multiple unit coolers and heat exchangers for each individual main pump unit. Over the years, the unit coolers have developed many leaks. Lack of sufficient cooling water could cause equipment overheating, and the leaks could damage nearby electrical equipment. This project will replace, refurbish, or upgrade the cooling system at each pump unit.

CRA Pump Plants Circulation Water Systems

Each of the five CRA pumping plants has nine main pumps. Each of these pump units use cooling equipment to cool various components of the pump system that feeds from the plant's circulating water system. This system has a loop with branch connections and an isolation valve at each unit. The piping and the valves that supply the circulating water systems run through the entire length of the plants and are all from the original CRA construction. The piping and the valves are now showing signs of deterioration. They are clogged, corroded and leaking. This project will replace and upgrade the circulation water systems for each pumping unit.

CRA Pump Plants Secondary Cooling Water System

Each of the five CRA pumping plants has nine main pumps. Each of the pumping plant uses a circulating water system to cool various components of the pump units. Each pumping plant also has a secondary cooling water system to enhance reliability. The secondary cooling water systems include approximately 400 linear feet of eight inch diameter piping, three manual isolation valves and two electrically actuated valves at each plant. Most of the piping and valves are original CRA construction and have begun to show signs of deterioration. Staff has replaced approximately 25 percent of existing pipe, however, pipes continue to corrode and leak. This project will replace and upgrade the secondary cooling water system at each pumping plant.

CRA - Reliability for FY2006/07 through FY2011/12

15438

Total Appropriation Estimate: \$146,849,000 Biennial Estimate: \$17,606,900

Appropriated Amount 9/30/2017: \$78,364,000 Cost Through 9/30/2017: \$69,155,128

Purpose

To ensure the reliability and operational efficiency of the Colorado River Aqueduct (CRA) and related facilities and equipment.

Scope

This appropriation was established to continue to implement multiple projects throughout the CRA system. The common driver for many of the projects in this appropriation is infrastructure reliability.

Accomplishments for FY 2016/17 and FY 2017/18

New Projects Initiated Last Period:

- No projects were initiated during the last biennium.

Major Milestones Achieved Last Period:

- Canal Improvements - Completed construction
- Intake Pumping Plant 2.4 kV Power Line Relocation - Completed design
- Seismic Upgrade of 6.9kV Switch Houses - Completed design

Projects Completed To Date:

- Four projects have been completed.

Objectives for 2018/19 and FY 2019/20

Project	Total Project Estimate	Estimated Completion	Major Milestones
Intake Pumping Plant 2.4kV Power Line Replacement	6,000,000	2019	Complete construction
Mile 12 Flow and Chlorine Monitoring Station Upgrades	1,556,000	2019	Complete construction
Pumping Plant Sump System Rehabilitation	29,500,000	2020	Complete construction
Pump Plant Flow Meter Replacement	1,878,000	2019	Complete construction
Switch House Buildings Seismic Upgrades	17,128,000	2018	Complete construction

Authorized Projects

CRA Radial Gates Rehabilitation

There are a total of 14 hydraulic radial gates located along the CRA. The gates are needed to dewater and isolate various reaches of the CRA for maintenance and repairs. Inspections have identified that eight gates are corroded and require refurbishment or replacement. Protective coatings on various components of the gates have begun to fail. The existing motor actuators used to open and close the gates have also deteriorated from 70 years of use in the harsh desert environment. This project will involve refurbishment or replacement of eight radial gates. The motor actuators and the gates' electrical and control equipment will also be replaced. In addition, the concrete walls and floors within the diversion channels will be repaired. Design was authorized by the Board in May 2014. One of the eight gates is located at Eagle Mountain Reservoir. This gate is used to dewater the reservoir for maintenance and repairs, and to safely release water in case of an emergency. Due to its deteriorated condition, the spillway gate at Eagle Mountain Reservoir has been prioritized for replacement in advance of the seven other CRA gates. Construction for this location was authorized by the Board in December 2017.

Intake Pumping Plant 2.4 kV Power Line Replacement

The 2.4 kV power electrical service to Intake Pumping Plant is conveyed by over a 3-mile-long overhead power line originating at Gene Pumping Plant. The poles for this line were installed during the original construction of the Colorado River Aqueduct (CRA) for use as a telephone line. In the 1950s, power cables were added and the poles were retrofitted with extensions and cross arms to provide adequate clearance between the power and communication cables. The existing wood poles have deteriorated due to weathering in the desert environment and need to be replaced. The scope of the project includes relocating portion of the power and communication cablesline from steep mountain slopes to areas adjacent to existing patrol and maintenance roads within Metropolitan's fee property. The relocated power and communication lines will include 50 new utility power poles. Final design was authorized by the Board in June 2013 and had been completed. Construction was authorized by the Board in February 2018.

Mile 12 Flow and Chlorine Monitoring Station Upgrades

One of the CRA's critical points for monitoring flow rates and chlorine levels is located at Mile Marker 12 (Mile 12) along the aqueduct. Monitoring equipment includes a set of flowmeters with instrumentation, chlorine analyzers, communication equipment, solar panels, and batteries. Although the equipment has performed well, it has exceeded its life span and is beginning to fail. This project will replace the existing deteriorated flow meters with new ultrasonic models that are compatible with other meters in use throughout the CRA; relocate the data and communications equipment from the underground manhole to a new aboveground monitoring station with air-conditioned cabinets to enable stable operation; and construct a reliable power source. Construction was authorized by the Board in August 2010.

Pumping Plant Sump System Rehabilitation

Each of the five CRA pumping plants has two independent main sumps that collect water leakage from the main pumps and discharge valves. Each main sump is approximately 9 feet wide, 20 feet long, and 35 feet deep, and can hold up to 48,000 gallons, or approximately one day's worth of leakage water. The sump system pumps this water back to the pumping plant's main intake manifold or to its forebay, depending on the plant. The 70-year-old sump piping systems and support structures are deteriorating and have exceeded their service lives. Failure of the sump piping systems has the potential to cause extensive flooding and damage to valves and pumps within the pumping plants. This project will rehabilitate the pumping plant sump systems, including replacement of corroded sump mechanical equipment, piping, and access structures at all five CRA pumping plants. Access features will be upgraded by replacing corroded catwalks, ladders and handrails within the sumps. This project will also rehabilitate circulating water equipment and piping systems, which are in the sump area. Design was authorized by the Board in October 2014; and replacement of the gate valves in advance of the sump rehabilitation work to allow isolation of the circulating water system and to minimize disruptions to CRA operations was authorized by the Board in January 2017.

Pumping Plant Flow Meter Replacement

Acoustic flow meters are installed at each of the five Colorado River Aqueduct (CRA) pumping plants on each 10-foot-diameter delivery lines. Flow measurements are used to adjust pumping rates and balance the flows from plant to plant. The existing meters units have begun to deteriorate due to their age and exposure to harsh desert conditions. Continued loss of accuracy could lead to incorrect flow adjustments or unsynchronized pumping rates, which could cause flooding at the plants or overtopping of the aqueduct. This project will install new acoustic flow meters on the delivery lines which will connect to nearby flow meter consoles housed inside new pre-fabricated equipment enclosures. Construction was authorized by the Board in June 2013.

Pumping Plant Standby Generators Replacement

Back-up power for critical auxiliary systems at the Iron Mountain, Gene, and Intake pumping plants is provided by stand-by diesel generators. The standby generators are over 50 years old, require frequent repairs, and have reached the end of their service lives. In addition, upgrades to the generator's ancillary equipment are planned to meet current fire codes and environmental regulations. This project will improve the reliability of emergency power for critical auxiliary systems at the pumping plants. The scope of the project includes relocation and installation of new generators. The replacement generator will include alarms, valves, meters, and a control system capable of automatic start-up upon loss of primary power, automatic transfer back to primary power once the normal source is reestablished, and remote status monitoring. Preliminary design for all three pumping plants' standby generators was authorized by the Board in April 2008; and final design and equipment procurement for Iron Mountain standby generator was authorized by the Board in March 2012.

Switch House Buildings Seismic Upgrades

The 6.9 kVilovolt switch houses located at each of the five Colorado River Aqueduct (CRA) pumping plants contain critical electrical circuit breakers and other equipment used to control, protect, and isolate the high voltage power that serves the nine aqueduct pumps located in the nearby pump house. The switch houses were constructed in 1938 and are essential to maintaining reliable water deliveries from the CRA. A seismic risk assessment of the 6.9 kVilovolt switch houses identified that these structures are vulnerable to damage during a major seismic event, such as a magnitude 8 earthquake on the San Andreas Fault. This project will seismically upgrade the Hinds, Eagle Mountain, and Iron Mountain 6.9 kVilovolt switch houses including bracing of walls to support the steel towers mounted on the roofs; reinforcement of roof decks; addition of an exterior buttress wall; bracing of interior partition walls; and injection grouting of cracks in the walls and roof decks. For the Gene switch house, seismic upgrades will include bracing of walls, reinforcement of the roof deck, and injection grouting of cracks in the walls and roof deck. For the Intake switch house pumping plant, the only seismic upgrade is injection grouting of cracks.

Planned Projects

Seismic Upgrades of CRA Support Structures

A recent initial seismic risk assessment has revealed that several CRA support structures may be vulnerable from a major seismic event. These support structures include office and maintenance buildings, guest lodges, and dining and recreation halls located at Hinds, Eagle Mountain, Iron Mountain and Gene Pumping Plants. This project will perform detailed seismic assessments and retrofit the support structures if necessary.

CRA - Reliability for FY2012/03 Through FY2017/18

15483

Total Appropriation Estimate: \$145,204,000 Biennial Estimate: \$29,355,966

Appropriated Amount 9/30/2017: \$11,620,000 Cost Through 9/30/2017: \$6,723,116

Purpose

To ensure the reliability and operational efficiency of the Colorado River Aqueduct and related facilities and equipment.

Scope

This appropriation was established to implement multiple projects throughout the Colorado River Aqueduct system. The common driver for many of the projects in this appropriation is infrastructure reliability.

Accomplishments for FY 2016/17 and FY 2017/18

New Projects Initiated Last Period:

- CRA Pumping Plant Storage Buildings
- CRA and Iron Mountain Reservoir Panel Repairs

Major Milestones Achieved Last Period:

- CRA Delivery Line Expansion Joint Repairs - Completed construction
- CRA Pumping Plant - Drainage Improvements - Began design
- CRA Conduit Erosion Control Improvements - Began design
- CRA Domestic Water Distribution System Replacement - Began design

Projects Completed To Date:

- One project has been completed.

Objectives for 2018/19 and FY 2019/20

Project	Total Project Estimate	Estimated Completion	Major Milestones
CRA Conduit Structural Protection	7,650,000	2019	Complete construction
CRA Domestic Water Distribution Systems Replacement	7,000,000	2020	Complete construction
CRA Domestic Water Treatment System Replacement	11,000,000	2021	Complete design
CRA Pumping Plant Storage Buildings	4,317,000	2020	Complete construction
CRA and Iron Mountain Reservoir Panel Repairs	4,500,000	2019	Complete construction

Authorized Projects

CRA Conduit Erosion Control Improvements

The CRA is comprised of 55 miles of cut-and-cover conduits. The cut-and-cover conduits are arch or horseshoe shape, unreinforced, cast-in-place concrete. In most locations along the CRA, the overlying soil protects the cut-and-cover conduits from rock and debris flows. However, at narrow ravine crossings, heavy storm events often erode the soil and expose the conduits making them vulnerable to structural damage from the rock and debris flows. This project will provide erosion protection features such as gabion structures or concrete slabs; including grading of the eroded areas to protect the conduit. In addition, diversion berms or concrete swales will be constructed to divert storm flows over the concrete slabs. Preliminary Design was authorized by the Board in January 2016.

CRA Conduit Structural Protection

The CRA has 55 miles of cut-and-cover conduits where vehicles and storm water flows can cross over the aqueduct. These conduits are unreinforced concrete horseshoe-shaped structures placed upon an invert slab. At some locations, these conduits are subject to heavy vehicle loading. Few locations include existing dirt roads that cross the aqueduct with insufficient soil cover over the conduit; including locations where heavy equipment must be placed over or near the conduit for access into tunnels or siphons. This project will install new protective structures such as reinforced concrete slabs that span over the unreinforced conduits at specific locations. The slabs will protect the conduits from damage by distributing the equipment loading to the surrounding soil. Design was authorized by the Board in January 2016.

CRA Domestic Water Distribution Systems Replacement

All five of Metropolitan's Pumping Plants are located in remote areas of Riverside and San Bernardino Counties where municipal water distribution systems are not available. Each plant is instead served by a community on-site water treatment system. Water from the CRA is treated and conveyed to each village house and to the industrial portions of the pumping plants through a gravity-fed water distribution system which consists of distribution piping, isolation valves and valve boxes. Recent inspections of the distribution systems have found blockages, leaks, taste and odor problems, and root intrusion. This project will replace the domestic water distribution systems at all five CRA pumping plants which include the main line pipes, building laterals, new backflow prevention devices, valves, meters and remote water quality analyzers. Final design was authorized by the board in December 2017.

CRA Domestic Water Treatment System Replacement

All five of Metropolitan's Pumping Plants are located in remote areas of Riverside and San Bernardino Counties where municipal water treatment systems are not available. Each plant is instead served by a community on-site water treatment system. These on-site treatment systems are skid-mounted membrane filtration units that include a strainer, a pair of activated carbon vessels, and a domestic water storage tank. These systems have been in continuous operation for 25 years and now suffer from frequent membrane and pipe failures. This project will replace the skid-mounted water treatment systems in its entirety. Preliminary design was authorized by the board in January 2016.

CRA Nonpotable Water Distribution Systems Replacement

The CRA nonpotable water distribution systems supply: (1) untreated water for all cooling water needs at each pump house; (2) service water to buildings such as storage warehouses, fleet services, machine shops, and carpenter shops; and (3) irrigation water for the pumping plants and villages. The existing nonpotable water systems were installed during the original construction of the CRA and have recently experienced numerous leaks and breaks. This project will replace the nonpotable water distribution systems at all five CRA pumping plants which include the main line pipes, building laterals, valves, and meters. Final design was authorized by the board in December 2017.

CRA Pumping Plant Drainage Improvements

The five CRA pumping plants are located in remote areas of the California desert which are periodically subjected to flash floods that carry high volumes of water, silt, and debris. During major storm events, the pumping plants' pump houses and support facilities are susceptible to flooding and deposition of silt and debris. In recent years, at several of the plants, debris flows have affected various critical electrical facilities. This project will include site grading, addition of perimeter drainage channels to intercept offsite flows, upsizing of storm drain culverts and extension of patrol roads to access the new storm drain facilities for maintenance. Design was authorized by the Board in January 2016.

CRA Pumping Plant Storage Buildings

Between 1950 and 1955, several metal-sided buildings with timber frames were built at the CRA pumping plants to store equipment, spare parts, and maintenance supplies. Two of these buildings have been replaced at the Gene Pumping Plant; however, four original buildings still remain in service. These buildings have deteriorated after 65 years of service in the harsh desert environment and no longer seal properly to prevent rain and dust from entering the interiors. This project will replace the four remaining deteriorated storage buildings. As part of the design considerations, an assessment will be conducted to determine space requirements for storage of equipment and parts to support ongoing maintenance activities and upcoming capital rehabilitation work at the pumping plants. Preliminary design was authorized by the board in August 2016.

CRA Roadway Pavement Replacement

The asphalt roadways at the pumping plants provide access between buildings and the villages for Metropolitan staff, residents, and visitors. There is a total of approximately 30 acres of asphalt-paved roadways and surfaces at all five pumping plants, and these asphalt surfaces are over 30 years old. Due to the harsh desert conditions and deterioration of the subgrade over time, potholes and cracks have developed throughout the villages. The planned upgrades to the roadway pavement include placement of a new layer of asphalt on less distressed areas throughout the CRA villages; removal and replacement of more heavily damaged roadways; and grading and installation of culverts to improve drainage. Preliminary design was authorized by the board in December 2017.

CRA and Iron Mountain Reservoir Panel Repairs

The CRA is a 242-mile-long conveyance system which consists of five pumping plants, 124 miles of tunnels, 63 miles of canals, and 55 miles of conduits, siphons, and reservoirs. The aqueduct is routinely shut down and inspected for signs of deterioration and to perform needed repairs. Recent inspections of the Iron Mountain Reservoir found that concrete panels at two locations along the embankment have deteriorated and need to be replaced. In addition, approximately 60 locations along a 100-mile reach of the canal were found to be cracked and buckling. This project will remove and replace the distressed panel sections with new concrete along the canal and at the Iron Mountain Reservoir. Design was authorized by the board in June 2017.

Whitewater Tunnel No. 2 Seismic Upgrades

The CRA is a 242-mile-long conveyance system which consists of five pumping plants, 124 miles of tunnels, 63 miles of canals, and 55 miles of conduits, siphons, and reservoirs. One of the tunnels, CRA Whitewater Tunnel No. 2, is a 1.5-mile long; 16-feet high by 16-feet wide horseshoe-shaped tunnel that parallels closely to the southern San Andreas Fault and crosses a splay of the fault approximately one-third mile from its west portal. A recent seismic risk assessment of the CRA identified that this tunnel is vulnerable to major damage from a strong earthquake on the southern San Andreas Fault. This project will perform near-term upgrades to strengthen vulnerable tunnel sections at the east and west portals of this tunnel and will improve access at the west portal. Furthermore, in order to expedite post-earthquake repairs of damaged tunnel sections, the design of a new bypass tunnel will be prepared in advance, steel sets will be procured and stockpiled, and tunnel repair contractors will be prequalified so that specialized equipment and crews may mobilize rapidly. Preliminary design was authorized by the board in December 2017.

Planned Projects

CRA Pump Plants 2.3kV and 480V Switch Rack Rehabilitation

All five CRA Pumping Plants have a 2.3kV and 480 V switch racks that are the central power distribution for the 2.3kV, 480V and 120V that feed multiple medium and low voltage critical equipment within the pumping plants. These switch racks have been in service since the original construction of the CRA. The equipment is old, obsolete and replacement parts are difficult to obtain. This project will rehabilitate the 2.3kV and the 480V switch racks at all five CRA pumping plants to ensure the equipment meets the current safety and electrical codes and provides a reliable power supply to the plants.

Desert Pump Plant Reservoir Spillway Auto Rejection - Iron Mountain and Eagle Mountain

The Iron Mountain and Eagle Mountain Reservoirs are located on the upstream side of the Iron Mountain and Eagle Mountain pumping plants, respectively. The reservoirs dampen fluctuations in flow between the five pumping plants. Each reservoir contains a spillway which allows discharge of water to the desert in the event of a power outage of the main pumps. The two spillways were designed in the 1930s to safely reject up to approximately 1,200 cubic feet per second (cfs). The pumping plants were expanded in the 1950s and the aqueduct can now operate up to approximately 1,750 cfs. Rejection of flows greater than 1,200 cfs would cause uncontrolled release of water at these two reservoirs, which could damage nearby facilities and public roads or property. This project will modify the reservoir spillways to allow safe rejection of up to 1,750 cfs of water in the event of a power outage of the main pumps.

Electrical Upgrades to the Station Power Systems

At each of the CRA pumping plants, most of the incoming electrical power is used to operate the main pumps. However, a portion provides power to the cooling water pumps, lubrication oil pumps, control systems, water treatment equipment, and general lighting. Sufficient power for the treatment systems is available at each pumping plant. However, a new connection from each 2.3 kV switchyard will be necessary to power the new water treatment equipment. The electrical upgrades will include a new transformer, distribution panels, and ductbanks at each pumping plant. The electrical upgrades will be incorporated into the same multi-staged contracts used for the domestic water system replacement.

Gene & Intake Pumping Plant Outlet Structure Gates Re-coating

Each of the five CRA pumping plants has nine main pumps that lift water from the pump house through a series of converging delivery lines that convey water from the pump house to a headgate structure located at the top of a hill. These structures then convey water to the downstream portion of the aqueduct. Flow from each headgate structure is regulated by three nine-foot square steel gates. Recent inspections at the Intake and Gene pumping plants have revealed that the protective coatings on various components of the gates have begun to crack and peel. This project will recoat the six headgate structure outlet gates at the Intake and Gene pumping plants in order to prevent metal loss due to corrosion.

CRA - Reliability for FY2018/19 Through FY2023/24

18901

Total Appropriation Estimate: \$58,462,000 Biennial Estimate: \$3,957,175

Appropriated Amount 9/30/2017: \$0 Cost Through 9/30/2017: \$0

Purpose

To ensure the reliability and operational efficiency of the Colorado River Aqueduct and related facilities and equipment.

Scope

This appropriation will be established to implement multiple projects throughout the Colorado River Aqueduct system. The common driver for many of the projects in this appropriation is infrastructure reliability.

Accomplishments for FY 2016/17 and FY 2017/18

New Projects Initiated Last Period:

- No projects were initiated during the last biennium.

Major Milestones Achieved Last Period:

- None, this appropriation will be initiated in FY 2018/19.

Projects Completed To Date:

- No projects have been completed.

Objectives for 2018/19 and FY 2019/20

Project	Total Project Estimate	Estimated Completion	Major Milestones
CRA Region Security Improvements	3,900,000	2020	Begin design
Hinds Pumping Plant Discharge Valve Pit Platform Replacement	5,830,000	2020	Begin design

Authorized Projects

None, this appropriation will be initiated in FY 2018/19.

Planned Projects

CRA 230kV Transmission Line Improvements

The CRA has an extensive 230 kV transmission system that supplies power to all five pumping plants that originates from Hoover Dam. This 305 mile long transmission system was installed in the 1930s and consists of approximately 75-foot-high steel towers with concrete and wood footings, aluminum and copper conductors and supports to attach the conductors and insulators to the towers. Spans between the towers average 1,200 feet with varying ground elevations. Vertical clearances between the lowest conductor and the ground in a span can vary with temperature, wind speeds, and power loads. Over the years, operating under maximum power loads and extreme desert temperatures has led to insufficient vertical clearances as required by the current electrical standards. This project will assess ground clearances of the conductor spans and increase clearances, as needed, by raising the heights of existing towers and/or adding new towers between spans; thus, increasing not only the reliability of the transmission lines but also the vertical clearances.

CRA 230 kV Transmission System Regulatory and Operational Flexibility Upgrades

The CRA has an extensive 230 kV transmission system that includes approximately 305 miles of North American Electric Reliability Corporation (NERC) regulated transmission lines that supply power to all five pumping plants. Two parallel lines span from the Mead Substation near Hoover Dam to Metropolitan's Camino Switching Station. From the Camino Switching Station, one line, the Camino West Line extends to Iron Mountain, Eagle Mountain, and Hinds pumping plants. A second line, the Camino East Line extends to the Gene Pumping Plant. The Camino West Line does not conform to current NERC standards which require stability in US transmissions systems in the event of a fault. This project will upgrade the West Line to not only meet current regulatory requirements but also to provide operational reliability and flexibility to the transmission system. Additionally, as part of this project Metropolitan will purchase some existing electrical equipment from Southern California Edison that is located within Metropolitan's 230kV switchyards at Eagle Mountain and Gene Pumping Plants.

CRA Flowmeter Access and Safety Improvements

All five CRA pumping plants have flow meters installed on the 10-foot-diameter delivery lines that continuously measure each plant's water output into the aqueduct. Flow rates are used to determine adjustments which then control the pumping rates and balance flows throughout the CRA system. The delivery lines are located in steep, rocky, ungraded pathways. The flowmeter transducers, which are located high on the delivery lines, can only be accessed by a ladder, are difficult to maintain. Maintenance occurs during hot summer when temperatures can rise to up to 120 degrees. This project will provide safe, permanent and code-compliant access to the flowmeter transducers located along the delivery lines at all five pumping plants.

CRA Pumping Plant Delivery Line Rehabilitation

Each of the nine main pumps at the five CRA pumping plants discharges the water into individual six-foot diameter discharge lines. The nine discharge lines then merge and transition into three 10-foot diameter pipelines, Delivery Lines No. 1, 2 and 3, that convey flow to the top of the lift and then discharge into a headgate structure which empties the water into the next section of the aqueduct. These delivery lines vary in length from 500 feet to 1,400 feet up steep and rocky slopes. The five Delivery Line No. 1s were constructed in the 1930s and were lined with coal tar enamel to protect the interior of the pipe from corrosion. After 80 years of service, the existing coal tar enamel lining on Delivery Line No. 1 at each plant is cracking, flaking, and the steel is starting to corrode. The mortar linings for Delivery Line Nos. 2 and 3 are still in good condition and do not require repair. Additionally, depending on the length of each delivery line there are a total of three or four expansion joints located along the line. These expansion joints are deteriorated and showing signs of corrosion. This project provides a comprehensive rehabilitation of the delivery lines at each of the five CRA pumping plants including replacement of the coal tar enamel with a cement mortar lining, expansion joints, and minor coating repairs.

CRA Region Security Improvements

CRA facilities are critical components of Metropolitan’s water delivery system. These facilities include five pumping plants and the El Camino Electrical Substation. These facilities have inadequate perimeter fencing. Over the past six years, there have been approximately 37 reported incidents of trespassers or security threats. This project will install physical security improvements such as fencing, cameras, motion detectors, remote speakers, card readers, and lighting at Metropolitan’s CRA pumping plants and at the El Camino Electrical Substation.

CRA Tunnels - Seismic Resilience Upgrades

The CRA is a 242-mile-long conveyance system that transports water from the Colorado River to Lake Mathews in Riverside County, including 124 miles of tunnels which were constructed in the late 1930s and was placed into service in 1941. While the CRA was constructed in accordance with current seismic codes of that time, recent seismic risk assessments of the CRA identified that some tunnels are vulnerable to damage from a strong earthquake on the southern San Andreas Fault. The scope of this project includes detailed seismic evaluations and completion of upgrades to strengthen vulnerable tunnel sections.

Desert Region Facilities ADA Assessment

The CRA includes a variety of facilities need to support water deliveries. This includes office buildings, shops, and ancillary support features such as restrooms, stairs, drinking fountains, corridors and parking areas. Most of these facilities were constructed in the 1940s and 1950s before the advent of modern American Disabilities Act (ADA) standards. This project will conduct an ADA needs assessment of the desert facilities and upgrade facilities as necessary to ensure compliance with federal and local ADA standards and policies.

Eagle Lift & Eagle West Siphons Seismic Improvements

The CRA is a 242-mile-long water conveyance system that was placed into service in 1941. As the aqueduct traverses the desert, it must cross numerous drainage channels, ravines, and other natural depressions. At each crossing, the aqueduct’s open channel transitions into a buried conduit (an inverted siphon) which drops below ground and passes beneath the natural surface feature. At the downstream end of the siphon, water re-emerges into the open aqueduct. Typically, siphons are cast-in-place reinforced concrete conduits, which vary in length from 150 feet to 5 miles. An initial assessment of the Eagle Lift and Eagle West Siphons identified potential slope failure of the soil covering the siphons as a result of a strong seismic event. This project will perform a detailed slope stability analysis and evaluate mitigation options.

Hinds Pumping Plant Discharge Valve Pit Platform Replacement

At each of the CRA pumping plants water is pumped from the plants’ intake manifold, through the main pumps and out of the discharge valves. From the discharge valves, water travels through the delivery lines and into the aqueduct. The discharge valves are located in small concrete pits below the pump plant floor room. At the Hinds Pumping Plant, the concrete pit is equipped with a raised platform due to the deep pit. The platform is necessary to maintain the discharge valve’s ancillary equipment. After over 75 years of service in a humid environment created mainly from the pump cooling water discharge, the metal platform has corroded significantly and needs to be replaced. This project will replace the discharge valve platform and relocate cooling water discharge piping in all nine discharge pits at the Hinds Pumping Plant.

Intake Pump Plant Road Improvements

The 1.75 mile long asphalt access road into the Intake Pumping Plant travels between a large hill and Lake Havasu. At approximately the midpoint of the access road, it crosses a culvert that drains storm runoff from the hillside into the lake. This culvert is undersized, has partially collapsed, and fills with debris from an unlined wash during rain events. After rain events, Metropolitan staff must clear debris from the culvert in order to prevent rain water from overtopping the culvert and eroding the access road. This project will replace the existing culvert with a new culvert and deteriorated portions of the asphalt road.

Iron Mountain Maintenance Vehicle Canopy

The Iron Mountain Pumping Plant serves as the primary headquarters for storage of equipment for the CRA system. Items stored at the plant include cranes, excavators, road graders, heavy utility trucks and backhoes. These vehicles are required to support CRA maintenance activities and capital projects. This equipment is stored in direct sunlight, which results in accelerated deterioration. This project will install a metal canopy, approximately 40-feet wide by 300-foot long, on a concrete foundation to provide shade to protect the equipment.

Iron Mountain Pumping Plant Hazardous Waste Containment

Hazardous wastes such as chemicals, oil, paint, paint thinners and antifreeze are generated through routine operations at the Iron Mountain Pumping Plant. Hazardous wastes are collected and placed into either metal or plastic drums ranging in size from five to 55 gallons. The existing hazardous wastes are then stored in a fenced temporary storage area. This project will replace the existing hazardous waste storage facility with a prefabricated, code-compliant, hazardous waste storage container.

Dam Rehabilitation & Safety Improvements

15419

Total Appropriation Estimate:	\$31,724,000	Biennial Estimate:	\$11,075,672
Appropriated Amount 9/30/2017:	\$7,450,000	Cost Through 9/30/2017:	\$4,899,229

Purpose

To implement multiple projects that will facilitate monitoring, and assess stability, risks, and capacities of Metropolitan's dams and reservoirs.

Scope

This appropriation was established to review the adequacy of Metropolitan's dams, evaluate risks, and identify alternative solutions to minimize risks. Under this appropriation, the seismic adequacy of dams and their appurtenant structures are being assessed, and the hydraulic adequacy of dams' spillway and hydraulic structures under up-to-date hydrologic conditions are being evaluated.

Accomplishments for FY 2016/17 and FY 2017/18

New Projects Initiated Last Period:

- Dam Monitoring System Upgrades at Lake Mathews and Lake Skinner
- Assessment of Dam Structures at Lake Mathews and Lake Skinner

Major Milestones Achieved Last Period:

- DVL Dam Monitoring System Upgrade - Began construction of Stage 1
- Dam Monitoring System Upgrades at Lake Mathews and Lake Skinner - Started design
- Assessment of Dam Structures at Lake Mathews and Lake Skinner - Started assessments

Projects Completed To Date:

- Two projects have been completed.

Objectives for 2018/19 and FY 2019/20

Project	Total Project Estimate	Estimated Completion	Major Milestones
Assessment of Dam Structures at Lake Mathews and Lake Skinner	2,000,000	2018	Complete assessments
Dam Monitoring System Upgrades at Lake Mathews and Lake Skinner	17,000,000	2020	Complete design
Diamond Valley Lake Dam Monitoring System Upgrade - Stage 2	2,700,000	2018	Complete construction
Diamond Valley Lake Dam Monitoring System Upgrade - Stage 3	4,000,000	2019	Start design

Authorized Projects

Assessment of Dam Structures at Lake Mathews and Lake Skinner

Following the recent incidents at Oroville Dam, the California Division of Safety of Dams (DSOD) is now requiring that dam owners in California assess the condition of dam spillways to confirm that they meet minimum safety standards. In July 2017, DSOD issued an initial list of 93 dams requiring comprehensive spillway assessments to evaluate hydraulic capacity, geotechnical stability, structural integrity, and potential erosion from dam releases. Of the 20 Metropolitan facilities that are permitted by DSOD, two have been directed to undergo the comprehensive assessments: Lake Mathews and Lake Skinner.

Metropolitan submitted the required work plans for re-evaluation of the spillways at Lake Mathews and Lake Skinner, and received approval of those plans in September 2017. For each dam, a comprehensive spillway assessment report will be prepared and submitted to DSOD for review. As part of these comprehensive assessments, re-evaluation of the outlet tower and conduit at Lake Skinner is recommended to identify potential risks and vulnerabilities of lowering the reservoir pool after a major seismic event. Due to its integral role in withdrawing water from the reservoir, the spillway work plan will be expanded to include the Lake Skinner outlet tower and conduit. The assessments were authorized by the Board in December 2017.

Dam Monitoring System Upgrades at Lake Mathews and Lake Skinner

Metropolitan relies on extensive instrumentation and regular inspections as a cornerstone of its dam monitoring program. The instrumentation provides warning signs of dam distress and provides real-time monitoring of the embankments and foundations. Extensive monitoring equipment has been installed at Lake Skinner and Lake Mathews over the last 44 years and 79 years, respectively. Recent inspections have noted that several of the piezometers and weirs at these facilities no longer function reliably and require rehabilitation or replacement.

Field surveys and condition assessments will be conducted at both dams to develop a staged replacement schedule. Based on the results of the assessments, installation of automated dam monitoring systems at each dam may be required. Design was authorized by the Board in December 2017.

Diamond Valley Lake Dam Monitoring System Upgrade

The three rock-fill dams which form Diamond Valley Lake (DVL) are monitored continuously by the facility's geodetic deformation monitoring system, which transmits real-time displacement data to Metropolitan's Headquarters at Union Station and to the Operations Control Center at Eagle Rock. This data is collected to provide early indication of a potential problem within the dam embankments or foundations, and to prepare mandatory reports on the dams' performance for submission to DSOD. After 17 years of continuous operation, the existing monitoring equipment has deteriorated and needs to be replaced. The planned upgrades will maintain the capability to continuously monitor dam performance in compliance with the DSOD operating permit.

Upgrades to the dam monitoring network at DVL will be accomplished in three stages. The Stage 1 work includes: (1) procurement and installation of the weir level sensors and strong motion accelerographs; (2) design and preparation of procurement documents for the geodetic deformation monitoring system; and (3) design and preparation of procurement documents for the facility-wide automated data acquisition system. Stage 2 construction was authorized by the Board in September 2017.

Planned Projects

No additional projects are planned.

Delta Wetlands Properties (Delta Islands)

15494

Total Appropriation Estimate:	\$196,000,000	Biennial Estimate:	\$2,015,733
Appropriated Amount 9/30/2017:	\$196,000,000	Cost Through 9/30/2017:	\$176,501,868

Purpose

To support water supply reliability, emergency response, climate change and ecosystem activities associated with our northern California supply via the State Water Project.

Scope

Purchase real property owned by Delta Wetlands Properties in Contra Costa, San Joaquin, and Solano Counties. Performance of ongoing title due diligence activities such as preparation and review of chains of title; conducting environmental site assessments; levee assessments, preliminary water rights analyses; and other investigations of Property. Resolution of title issues, levees, Delta Wetlands settlement agreements, and legal challenges that might arise after closing of escrow. Future land use studies, planning, and interim property management.

Accomplishments for FY 2016/17 and FY 2017/18

New Projects Initiated Last Period:

- No projects were initiated during the last biennium.

Major Milestones Achieved Last Period:

- Delta Wetlands Properties (Delta Islands) - Acquired property

Projects Completed To Date:

- No projects have been completed.

Objectives for 2018/19 and FY 2019/20

Project	Total Project Estimate	Estimated Completion	Major Milestones
Delta Wetlands Properties (Delta Islands)	179,500,000	2020	Aerial survey and mapping; title reports, clear title and restrictive encumbrances, habitat restoration, and levee assessments

Authorized Projects

Delta Wetlands Properties (Delta Islands)

Purchase of certain property from Delta Wetlands Properties in Contra Costa, San Joaquin, and Solano Counties. Also, authorized ongoing title due diligence, land studies, and legal defense allocation after close of escrow.

Planned Projects

Delta Islands Infrastructure Improvements - Regulatory Compliance

Recent legislation (SB 88) requires monitoring and reporting of certain diversions within the Delta. Metropolitan's Delta properties will need to comply. This project will investigate existing diversion points, identify permanent meter locations, coordinate with the Delta Watermaster, and install approximately 40 meters.

Demonstration-Scale Recycled Water Treatment Plant 15493

Total Appropriation Estimate:	\$17,000,000	Biennial Estimate:	\$4,192,261
Appropriated Amount 9/30/2017:	\$17,000,000	Cost Through 9/30/2017:	\$1,624,050

Purpose

To enhance water supply reliability by providing a new resource that would help maintain groundwater recharge and storage for Metropolitan's service area.

Scope

This appropriation was established to plan and implement a demonstration-scale recycled water treatment plant and to establish the framework of terms and conditions for development of a regional recycled water program.

Accomplishments for FY 2016/17 and FY 2017/18

New Projects Initiated Last Period:

- Water Purification Demonstration Project

Major Milestones Achieved Last Period:

- Water Purification Demonstration Project - Completed design and started construction

Projects Completed To Date:

- No projects have been completed.

Objectives for 2018/19 and FY 2019/20

Project	Total Project Estimate	Estimated Completion	Major Milestones
Water Purification Demonstration Project	17,000,000	2020	Complete construction and demonstration testing

Authorized Projects

Water Purification Demonstration Project

The Regional Recycled Water Advanced Purification Center will be located at the County of Los Angeles Sanitation Districts' Joint Water Pollution Control Plant in Carson. The 0.5 mgd demonstration plant will test the effectiveness of various advanced water treatment processes for approximately one year to gather the required technical data for regulatory approval of the regional recycled water program. The demonstration plant will also establish design criteria and confirm treatment costs for a full-scale facility, and will support the program's public outreach effort. Construction of the demonstration plant was authorized by the Board in July 2017.

Planned Projects

No additional projects are planned at this time.

Diemer Water Treatment Plant - Improvements

15380

Total Appropriation Estimate: \$241,468,000 Biennial Estimate: \$6,991,310

Appropriated Amount 9/30/2017: \$159,996,600 Cost Through 9/30/2017: \$151,293,019

Purpose

To maintain reliability and ensure regulatory compliance of the Diemer plant.

Scope

This appropriation was established to plan and implement multiple projects at the Diemer Plant. The common driver for many of the projects in this appropriation is infrastructure reliability.

Accomplishments for FY 2016/17 and FY 2017/18

New Projects Initiated Last Period:

- No projects were initiated during the last biennium

Major Milestones Achieved Last Period:

- Diemer Basin Rehabilitation - Completed construction of the east basins and design of the west basins
- Diemer Filter Outlet Conduit Seismic Upgrades - Completed design
- Diemer Electrical Improvements Stage 2 - Completed construction

Projects Completed To Date:

- 18 projects have been completed.

Objectives for 2018/19 and FY 2019/20

Project	Total Project Estimate	Estimated Completion	Major Milestones
Diemer Basin Rehabilitation	63,500,000	2021	Begin construction of the west basins
Diemer Filter Outlet Conduit Seismic Upgrades	7,833,000	2020	Complete construction
Diemer Washwater Reclamation Facilities Reliability Improvement	48,386,000	2024	Complete design

Authorized Projects

Diemer Basin Rehabilitation

The mechanical, structural, and electrical components of the basins at the Diemer plant have deteriorated from over 50 years of continuous use. They need to be rehabilitated in order to maintain reliable treated water deliveries. Key components to be upgraded include basin inlet gates; flocculator drives and shafting; baffle boards and supports; turntable assemblies, rakes, and catwalks; launders; and structural supports for the equipment. The electrical systems also need to be modified for compliance with current code. In addition, the flexible joint sealant and its adjacent concrete within the basins will be removed and replaced to comply with federal Toxic Substances Control Act (CSCA) regulations. The work will be completed in two phases in order to minimize operational impacts on the plant. Final design was authorized by the Board in February 2013; construction of the east basin rehabilitation was authorized by the Board in July 2015 and has been completed.

Diemer Filter Outlet Conduit Seismic Upgrades

A section of the Diemer plant's filter outlet conduit passes along the north side of Basin No. 4, where it crosses a zone of fill material. Detailed structural and geotechnical analyses have concluded that during a major earthquake, the soil which supports this 10-foot-diameter pipeline could slide down the plant's north slope, potentially rupturing the line. The most cost-effective solution to strengthen the slope within the zone of fill material is to construct a concrete-caisson retaining wall to restrain the soil that supports the pipeline. Other components of the work include: relocation of water lines, temporary shoring, re-vegetation, and final paving. Construction was authorized by the Board in December 2017.

Diemer Washwater Reclamation Facilities Reliability Improvement

Approximately 40 percent of Diemer plant's existing Washwater Reclamation Plant (WWRP) is constructed on long slender piles and earthen fill, which form a level surface at the top of a slope. Seismic rehabilitation is required to ensure reliability of the WWRP facility. In addition, submerged WWRP equipment is continually subjected to abrasive and corrosive operating conditions caused by the solids in the used filter backwash water. The WWRP's two identical treatment trains share a common influent channel and both will have to be removed from service during maintenance. This project will install seismic stabilization facilities and retrofit the WWRP with reliability improvements, including new coal grit removal facility and new headwork's to allow independent shut-down of each individual process trains. The project also includes modifications to the existing chemical feed system, sludge line, and utilities at the west slope. Final design was authorized by the Board in May 2006.

Diemer Electrical Improvements Stage 2

Upgrades to the existing electrical system at the Diemer plant were needed because the electrical equipment had gradually deteriorated over 50 years of continuous use, was difficult to maintain and repair, and required improvements in backup capability. The project installed new electrical conduits, duct banks, unit power centers and motor control centers, redistributed power feeds, upgraded the grounding system, and replaced obsolete standby generator. Construction was authorized by the Board in August 2013 and has been completed. Production of record drawings is in progress.

Planned Projects

No additional projects are planned.

Diemer Water Treatment Plant - Improvements for FY2006/07 through FY2011/12

15436

Total Appropriation Estimate: \$86,401,000 Biennial Estimate: \$8,843,577

Appropriated Amount 9/30/2017: \$61,939,000 Cost Through 9/30/2017: \$46,905,242

Purpose

To maintain reliability and ensure regulatory compliance of the Diemer plant.

Scope

This appropriation was established to plan and implement multiple projects at the Diemer plant. The common driver for many projects in the appropriation is infrastructure reliability.

Accomplishments for FY 2016/17 and FY 2017/18

New Projects Initiated Last Period:

- No projects were initiated during the last biennium.

Major Milestones Achieved Last Period:

- Diemer Filter Building Seismic Upgrades - Completed construction of seismic upgrades for the east filter building and design of the west filter building
- Diemer Filter Valve Replacement - Completed construction of valve replacement for the east filters and design of the west filters
- Diemer Water Sampling System Improvements - Completed design

Projects Completed To Date:

- 15 projects have been completed.

Objectives for 2018/19 and FY 2019/20

Project	Total Project Estimate	Estimated Completion	Major Milestones
Diemer Chemical Feed System Improvements	6,608,000	2021	Begin construction
Diemer Filter Building Seismic Upgrades	32,500,000	2021	Begin construction of west filter building
Diemer Filter Valve Replacement	13,400,000	2021	Begin construction of west filters
Diemer Water Sampling System Improvements	3,450,000	2020	Begin construction

Authorized Projects

Diemer Chemical Feed System Improvements

The chemical feed equipment for ammonia, alum/ferric chloride, sodium hydroxide, liquid polymer, and dry polymer at the Diemer plant has aged and its reliability has deteriorated over the years. Most equipment is over 20 years old and has experienced various and repeated failures resulting in unscheduled shutdowns and costly maintenance. Some of the repair parts are no longer manufactured and are difficult to obtain. Loss of chemical feed or inadequate feeding capacity would disrupt plant operations. In addition, design criteria for some of the chemicals have changed and the existing equipment is unable to cover the required range for chemical feed. This project will replace the worn-out feed equipment and optimize the system design to improve system reliability and to protect treated water quality. Design was authorized by the Board in March 2011.

Diemer Filter Building Seismic Upgrades

Structural evaluations of the two filter buildings at the Diemer plant concluded that the filter buildings are seismically vulnerable and should be upgraded to reduce the risk of damage from a major seismic event. This project will upgrade the Diemer plant's Filter Buildings to provide operational reliability. This project will reinforce concrete columns in each filter control building, reinforce each clerestory at the roof line, and add new concrete piers within the sump area below the filters. As part of the filter upgrades, some existing mechanical and electrical equipment in the filter control buildings will be relocated. Construction of the east filter upgrades was authorized by the Board in February 2015, and has been completed. Construction of the west filter upgrades will start in late 2018.

Diemer Filter Valve Replacement

The original filter valves at the Diemer plant have deteriorated from over 50 years of continuous operation. The valve bodies exhibit corrosion and the rubber seats are worn. This project will replace the obsolete filter valves in the west and east modules of the plant with new valves that conform to American Water Works Association (AWWA) standards. In addition, the existing valve actuators in the west filters will be replaced. The actuators removed from the west filter valves will be refurbished and re-installed on the recently replaced east filter valves. Procurement of the valve actuators was authorized by the Board in September 2017. Installation of the west filter valves will start in late 2018.

Diemer Water Sampling System Improvements

The existing sample lines at the Diemer plant do not meet the 10-minute turnover rate requirement from sample point to laboratory sample taps due to long sample lines and pressure limit for the existing polypropylene tubing used to transport the samples. This project will upgrade the existing sample lines and all sample pumps to allow higher operational pressure to shorten the transport time. In addition, new chlorine analyzers, turbidimeters, and pH analyzers will be installed closer to the sample locations to eliminate variable analytical results caused by algae growth, solids deposition, temperature variation, and excessive detention time in the sample lines. These local analyzers will reduce distances from sample point to analyzer to better represent actual conditions in the process stream. Design was authorized by the Board in August 2011.

Diemer Administration Building Seismic Upgrades

Seismic analyses of the Diemer plant's Administration Building identified that the building was vulnerable and should be upgraded to reduce the risk of damage from a major earthquake. In addition, the building was not equipped with a fire detection and occupant notification system. This project will provide seismic and fire safety upgrades to the building in order to enhance safety and reduce the risk of damage or disruption to plant operations in the event of a major earthquake or fire. Construction was authorized by the Board in November 2016 and is underway.

Planned Projects

No additional projects are planned.

Diemer Water Treatment Plant - Improvements for FY2012/13 through FY2017/18 **15478**

Total Appropriation Estimate: \$13,281,000 Biennial Estimate: \$409,877

Appropriated Amount 9/30/2017: \$375,000 Cost Through 9/30/2017: \$370,610

Purpose

To maintain reliability and ensure regulatory compliance of the Diemer plant.

Scope

This appropriation was established to plan and implement multiple projects at the Diemer plant. The common driver for many projects in this appropriation is infrastructure reliability.

Accomplishments for FY 2016/17 and FY 2017/18

New Projects Initiated Last Period:

- No projects initiated during the last biennium.

Major Milestones Achieved Last Period:

- Diemer Caustic and Fluoride Tank Farm Improvements - Continued preliminary design

Projects Completed To Date:

- No projects have been completed.

Objectives for 2018/19 and FY 2019/20

Project	Total Project Estimate	Estimated Completion	Major Milestones
Diemer Slope Erosion Rehabilitation	3,760,000	2021	Begin design

Authorized Projects

Diemer Caustic and Fluoride Tank Farm Improvements

A canopy over the caustic soda tank farm and a new fluoride tank farm are needed to improve operations at the Diemer plant. Heat tracing around caustic feed lines is required to feed 50% caustic soda during the winter months. However, rainwater trapped within the chemical containment area could submerge the heat tracing wires. A canopy will minimize rainwater accumulation within the containment area and eliminate electrical hazards. The plant's fluoride tanks have reached the end of their service life and lack access for inspection and maintenance. This project will install a canopy over the existing caustic soda feed equipment; and replace the two fluoride storage tanks, associated feed equipment, and the roof over the fluoride tank farm. Preliminary design was authorized by the Board in August 2012.

Planned Projects

Diemer Slope Erosion Rehabilitation

The Diemer plant is located on the top of a hill in the city of Yorba Linda and consists of numerous fill slopes. Due to the large water-bearing structures at the Diemer plant, some of these slopes are within the State of California Department of Water Resources Division of Safety of Dams (DSOD) jurisdiction. Some slopes within the Diemer plant have eroded and are in need of rehabilitation. This project will provide site improvements for grading, drainage, and erosion/sediment control to erosion-damaged slopes at the plant site.

Diemer Water Treatment Plant - Improvements for FY2018/19 through FY2023/24

18903

Total Appropriation Estimate: \$4,876,000 Biennial Estimate: \$1,366,688

Appropriated Amount 9/30/2017: \$0 Cost Through 9/30/2017: \$0

Purpose

To maintain reliability and ensure regulatory compliance of the Diemer plant.

Scope

This appropriation will be established to plan and implement multiple projects at the Diemer plant. The common driver for many of the projects in this appropriation is infrastructure reliability.

Accomplishments for FY 2016/17 and FY 2017/18

New Projects Initiated Last Period:

- No projects were initiated during the last biennium.

Major Milestones Achieved Last Period:

- None, this appropriation will be initiated in FY 2018/19.

Projects Completed To Date:

- No projects have been completed.

Objectives for 2018/19 and FY 2019/20

Project	Total Project Estimate	Estimated Completion	Major Milestones
Diemer Emergency Ozone Backup Disinfection	1,843,000	2021	Complete design & begin construction

Authorized Projects

None, this appropriation will be initiated in FY 2018/19.

Planned Projects

Alternative Water Source for Ozone Generator Open Loop Cooling Water

Diemer plant's ozone generator cooling water process is made up of two systems: open loop and closed loop. The current source for the open loop cooling water is raw water taken from the plant inlet. This water source is under the influence of returned washwater, water treatment chemicals, and other impurities. As a result, open loop cooling water equipment experiences frequent plugging. This project will identify an alternate water source and replace the existing supply for the open-loop cooling water system.

Diemer Administration Building HVAC Replacement

The existing HVAC system in the Diemer plant's Administration Building consists of two 20-ton, chilled and hot water coiled air-handling units, which maintain multi-zone work-space environments on both floors. The 55-year-old units are beyond their expected operating life and have caused issues with regular maintenance activities. This project will replace the existing 20-ton HVAC units with new energy efficient units and upgrade the temperature control system for the building. Seismic anchorage will be incorporated to meet the current building code.

Diemer Electrical Upgrades - Panels and Loads

There are 53 existing power and distribution panels that were installed during the original Diemer plant construction, making the equipment more than 50 years old. These panels, circuit breakers, and feeder conductors (wires that feed the panels) have exceeded their normal life span and have deteriorated beyond a safe and reliable operating condition. This project will upgrade the aged electrical equipment to meet the current electrical code and enhance the plant's reliability. The improvements will allow the electrical equipment to be taken out of service for preventive maintenance, replacement, and testing in a safe working condition.

Diemer Emergency Ozone Backup Disinfection

The Diemer plant's existing ozone backup disinfection system was designed to use a low concentration sodium hypochlorite solution to be injected at the plant inlet in the event of an unplanned ozone system shutdown. However, the existing sodium hypochlorite storage is only sufficient to provide three hours of back-up disinfection. Manually switching to the liquid chlorine feed system is required after the three hours to meet the disinfection requirement. The sodium hypochlorite system has also proven susceptible to vapor locking. This project will modify the existing plant chlorine system to be used as backup disinfection system in the event of an ozone system shutdown.

Diemer Water Treatment Plant - Oxidation Retrofit 15389

Total Appropriation Estimate: \$370,192,400 Biennial Estimate: \$1,849,584

Appropriated Amount 9/30/2017: \$370,192,400 Cost Through 9/30/2017: \$365,654,143

Purpose

To reduce the level of disinfection by-products in the treated water supplied by the Diemer plant in order to meet state and federal standards and provide consistent and equitable high quality treated water to all of Metropolitan’s member agencies.

Scope

This appropriation was established to design and construct all systems and facilities that are required to provide ozone disinfection capability and to integrate those systems and facilities into the existing plant operations at the Diemer plant.

Accomplishments for FY 2016/17 and FY 2017/18

New Projects Initiated Last Period:

- No projects were initiated during the last biennium.

Major Milestones Achieved Last Period:

- Diemer Oxidation Retrofit Program (ORP), Construction of Ozonation Facilities - Completed construction

Projects Completed To Date:

- Eight projects have been completed.

Objectives for 2018/19 and FY 2019/20

Project	Total Project Estimate	Estimated Completion	Major Milestones
Diemer Oxidation Retrofit Program, Completion Activities	4,400,000	2019	Complete construction

Authorized Projects

Diemer Oxidation Retrofit Program, Completion Activities

To enable the ozonation facilities to commence operation, a series of key integration activities between the new and existing facilities at the Diemer plant are needed. These activities are performed by Metropolitan forces, which is more cost-effective than the use of a construction contract due to the greater flexibility in scheduling of construction activities around plant operations, and reduced risk of contractor impacts or delays. These activities include modification of life safety systems; integration of plant control, communication, and chemical systems; calibration and testing of ozone process instruments; and preparation of operational schematics for use by plant staff. Construction was authorized by the Board in March 2015.

Diemer Oxidation Retrofit Program, Construction of Ozonation Facilities

The addition of ozone at each of Metropolitan's treatment plants removes blend restrictions and substantially lowers disinfection by-product levels for compliance with both Stage 1 and Stage 2 of the U.S. Environmental Protection Agency's Disinfectants/Disinfection By-Products Rule. Use of ozone also enhances Metropolitan's ability to treat water with variable source-water quality, and provides critical operational flexibility to meet varying treatment challenges resulting from periodic occurrences such as drought and State Water Project (SWP) pumping limitations. Furthermore, ozonation provides the capability to control taste-and-odor causing compounds that may be present from time to time. The project consists of constructing the Ozone Generation Building, ozone contactors, contactor inlet and outlet conduits, contactor rejection tunnel, LOX storage and feed system, Phase 2 of the chemical feed facilities, the plant electrical switchgear and emergency generator buildings, large-diameter yard piping and conduits; installing flow meters; replacing used washwater pumps; adding and modifying plant utilities and controls; performing demolition, grading, and paving; completing tie-ins to existing facilities; placing the landscaping; and installing and commissioning the ozone equipment furnished by Metropolitan. Construction was authorized by the Board in July 2008 and has been completed. Production of record drawings is in progress.

Planned Projects

No additional projects are planned.

DVL Recreation Facilities

15334

Total Appropriation Estimate:	\$92,800,000	Biennial Estimate:	\$799,999
Appropriated Amount 9/30/2017:	\$92,800,000	Cost Through 9/30/2017:	\$63,454,710

Purpose

To implement the Metropolitan’s Board directives on recreation and associated development at Diamond Valley Lake (DVL).

Scope

This appropriation was established to enhance the Diamond Valley Lake property which will serve to extract value from the property while ensuring that Metropolitan’s core business is protected. The proposed budget will install infrastructure to encourage future development opportunities within the DVL properties consistent with board-approved objectives.

Accomplishments for FY 2016/17 and FY 2017/18

New Projects Initiated Last Period:

- DVL East Marina Sanitation Facility
- DVL East Marina Utilities Study

Major Milestones Achieved Last Period:

- Memorandum of Intent (MOI) executed with Metropolitan, Valley Wide Park & Recreation District, Eastern Municipal Water District, City of Hemet, and Riverside County Regional Park & Open Space District. The MOI is a uniform vision for implementing a series of self-sustaining private and/or public sector recreational improvements in the DVL East Recreational Area and is a tool for planning and coordination purposes.
- Completed DVL to Lake Skinner Trails Study

Projects Completed To Date:

- 17 projects have been completed.

Objectives for 2018/19 and FY 2019/20

Project	Total Project Estimate	Estimated Completion	Major Milestones
DVL East Marina Utilities	11,000,000	2021	Complete design and construction
DVL Visitor Experience Improvements	4,000,000	2021	Complete study and design; and begin construction

Authorized Projects

DVL East Marina Sanitation Facility

Construction of a prefabricated concrete restroom facility and below-grade wastewater holding tank with spill containment, level indication, and alarms. Construction was authorized by the Board in May 2016.

Planned Projects

DVL East Marina Utilities

DVL offers recreational opportunities to the region including boating, fishing, hiking, and biking. The facility supports 4,500 acres of on-water activity, 28 miles of trails, and 13,500 acres of protected open space. This project will extend the existing water, sewer, gas, and communication facilities from the intersection of Searl Parkway and Angler Avenue to the DVL East Marina to support existing operations and future development. The construction of the new infrastructure will replace existing failing tanks which are filled with trucked-in water to service the Marina store, enhance utility service reliability, and serve to comply with flows and pressures required to develop the Marina into a self-sustainable recreational facility.

DVL East Marina Wave Attenuator

The existing floating wave attenuator (FWA) has been operational since 2006 as part of a two phase approach. Phase 1 was completed by installing one 800 foot FWA. Phase 2 was to provide an additional attenuation system but was not implemented. Water levels at Diamond Valley Lake have fluctuated with severity and frequency for the last several years due to draw-down activities during drought conditions, then rebounding during the rainy seasons. Due to age and changing conditions, the concrete sections of the FWA have significantly degraded and the reinforcing bars are exposed to the elements which have accelerated corrosion of the existing FWA system.

DVL Visitor Experience Improvements

This project will enhance the visitor experience at DVL. Multiple projects will be studied, planned and implemented to expand recreational and educational outreach enhancing Metropolitan's resource protection and conservation message. An initial study on the recreation and educational opportunities at the DVL properties will be used to document and prioritize the various investment options. There are various outreach opportunities to be evaluated including updated signage at the lake and trails; outdoor classrooms; augmented reality kiosks to introduce watersheds and protected open space; and facility and exhibit improvements to the DVL Visitor Center, formerly known as "The Center for Water Education." Funding aimed at updating existing educational facilities and designing future outreach opportunities within the DVL.

Trails Connecting DVL and Lake Skinner

This project will create a regional network of trails connecting DVL and Lake Skinner as identified in the DVL MOI. The Lakeview Trail and North Hills Trail at DVL and certain trails at Lake Skinner already exist. Metropolitan jointly funded a trails study with Riverside County Regional Park and Open-Space District to investigate trail alignments connection feasibility through a Consultant agreement. The proposed trail alignments minimize impacts to the Southwestern Riverside County Multi-Species Reserve and link DVL and Lake Skinner using existing roads to the greatest extent possible. Trail uses under consideration include hiking, biking, bicycling, and horseback riding

Enhanced Bromate Control

15472

Total Appropriation Estimate: \$11,050,000 Biennial Estimate: \$116,680

Appropriated Amount 9/30/2017: \$10,240,000 Cost Through 9/30/2017: \$7,206,312

Purpose

To control the formation of bromate, which is a regulated disinfection by-product, during the ozonation process, and reduce chemical costs.

Scope

This appropriation was established to determine the feasibility, study, preliminary design, and construct necessary facilities for the ammonia-chlorine bromate control process at the Diemer, Jensen, Mills, Skinner, and Weymouth plants.

Accomplishments for FY 2016/17 and FY 2017/18

New Projects Initiated Last Period:

- No projects were initiated during the last biennium.

Major Milestones Achieved Last Period:

- Weymouth Bromate Control Facilities - Continued construction

Projects Completed To Date:

- No projects have been completed.

Objectives for 2018/19 and FY 2019/20

Project	Total Project Estimate	Estimated Completion	Major Milestones
Weymouth Enhanced Bromate Control Facilities	8,747,000	2018	Complete construction

Authorized Projects

Mills Enhanced Bromate Control Facilities

The Mills plant is currently using a temporary system built from salvaged parts for bromate reduction. This system has been running successfully and has proven the effective use of chloramines in bromate control and the reduced operational costs over a wider range of influent water quality conditions. This project will replace the temporary feed, metering, monitoring, and injection (chlorine and ammonia) system with a permanent system which will incorporate new piping, double wall containment, new chlorinators, and new analyzers. The project also includes replacement of two existing chlorinators with new units for lower chlorine dosage control flexibility. Final design was authorized by the Board in February 2013.

Weymouth Enhanced Bromate Control Facilities

Upgrades to the sodium hypochlorite and the ammonia feed systems are required to support Weymouth plant's new ozone disinfection process. The use of chloramines has proven to be the most cost-effective strategy to control bromate formation. This project will install new bromate control facilities, including five chemical storage tanks, chemical feed pumps, covered containment areas, an unloading facility, and instrumentation and controls. Construction was authorized by the Board in August 2015.

Planned Projects

No additional projects are planned.

Enterprise Content Management

15500

Total Appropriation Estimate:	\$9,988,000	Biennial Estimate:	\$2,379,997
Appropriated Amount 9/30/2017:	\$1,900,000	Cost Through 9/30/2017:	\$0

Purpose

To ensure reliability, efficiency and effectiveness of Metropolitan’s enterprise content management system.

Scope

This appropriation was established to assess and implement projects ensuring customer service, efficiency/productivity, and reliability of Metropolitan’s enterprise content management initiative. This effort is to lead Metropolitan to a paperless environment starting with optimizing network files share, developing a new file structure, updating the record retention schedule, and implementing a system to manage all electronic files, in compliance with policy.

Accomplishments for FY 2016/17 and FY 2017/18

New Projects Initiated Last Period:

- Enterprise Content Management Phase I

Major Milestones Achieved Last Period:

- No major milestones have been achieved in the last biennium.

Projects Completed To Date:

- No projects have been completed.

Objectives for 2018/19 and FY 2019/20

Project	Total Project Estimate	Estimated Completion	Major Milestones
Enterprise Content Management Phase I	1,900,000	2019	Complete deployment
Enterprise Content Management Phase II	2,480,000	2020	Begin design

Authorized Projects

Enterprise Content Management Phase I

The Enterprise Content Management (ECM) application will classify and manage electronic documents and other media to allow for easy retrieval, review, and destruction of information in accordance with Metropolitan's records retention schedule. In addition, the new ECM application will allow Metropolitan to more effectively and efficiently manage its digital asset needs for business needs to respond to requests under the California Public Records Act (CPRA), and for eDiscovery purposes, and will automate compliance with records retention policies. This project includes designing a taxonomy for storing unstructured data and the development of a thesaurus to support the implementation of Metropolitan's ECM application. Phase I was authorized by the Board in July 2017.

Planned Projects

Enterprise Content Management Phase II

This project delivers the initial deployment of the enterprise content management software into the Metropolitan environment. The system will allow for the organization, collaborations and automated enforcement of records retentions policies to non-structured electronic media.

Enterprise Content Management Phase III

This project delivers the balance of the deployment of the enterprise content management software throughout Metropolitan.

Enterprise Data Analytics

18910

Total Appropriation Estimate:	\$3,294,000	Biennial Estimate:	\$2,766,791
Appropriated Amount 9/30/2017:	\$0	Cost Through 9/30/2017:	\$0

Purpose

To ensure reliability, efficiency and effectiveness of Metropolitan’s enterprise data analytics system.

Scope

This appropriation will be established to assess and implement projects ensuring customer service, efficiency/productivity, risk management and reliability of Metropolitan’s enterprise data analytics applications.

Accomplishments for FY 2016/17 and FY 2017/18

New Projects Initiated Last Period:

- No projects were initiated during the last biennium.

Major Milestones Achieved Last Period:

- None, this appropriation will be initiated in FY 2018-19.

Projects Completed To Date:

- No projects have been completed.

Objectives for 2018/19 and FY 2019/20

Project	Total Project Estimate	Estimated Completion	Major Milestones
Enterprise Data Analytics	3,690,000	2020	Complete deployment

Authorized Projects

None, this appropriation will be initiated in FY 2018/19.

Planned Projects

Enterprise Data Analytics

Building an Enterprise Data Warehouse & Analytics to answer both operational and strategic questions facing Metropolitan. The Data Warehouse will be built of individual data marts modeling a specific business area providing integrated reporting through Extract/Transform/Load (ETL) procedures and common dimensions. This Enterprise Data Warehouse will contain both business and operational data. It will be designed to combine these two data types in order to provide a financial dimension to operational data. By linking data like EBS (Financial), SCADA, GIS and Water Supply/Demand, Staff can model different scenarios to answer questions and to discover trends and anomalies previously not visible due to isolated reporting.

Hayfield and Lake Perris Groundwater Recovery

15402

Total Appropriation Estimate:	\$32,310,000	Biennial Estimate:	\$1,767,342
Appropriated Amount 9/30/2017:	\$29,215,000	Cost Through 9/30/2017:	\$15,590,781

Purpose

To store and extract Colorado River Aqueduct (CRA) water into and from the Hayfield groundwater basin and to convey Lake Perris' State Water Project (SWP) leakage water from State Department of Water Resources (DWR) groundwater extraction facilities to the CRA.

Scope

Design and construction of facilities that enable both the storage and retrieval of CRA water in the Hayfield groundwater basin and the conveyance of SWP leakage water from DWR facilities in the vicinity of Lake Perris to the CRA.

Accomplishments for FY 2016/17 and FY 2017/18

New Projects Initiated Last Period:

- Lake Perris Seepage Water Conveyance Pipeline

Major Milestones Achieved Last Period:

- Lake Perris Seepage Water Conveyance Pipeline - Started preliminary design

Projects Completed To Date:

- Four projects have been completed.

Objectives for 2018/19 and FY 2019/20

Project	Total Project Estimate	Estimated Completion	Major Milestones
Lake Perris Seepage Water Conveyance Pipeline	6,500,000	2018	Continue design

Authorized Projects

Hayfield Groundwater Extraction Project

The Hayfield groundwater basin is located south of the Julian Hinds Pumping Plant, adjacent to the CRA. In 2000, Metropolitan's Board authorized a feasibility study for storing surplus CRA water in the Hayfield basin for future extraction. The Hayfield Groundwater Extraction Project includes geotechnical investigations and construction of extraction wells.

Lake Perris Seepage Water Conveyance Pipeline

Metropolitan and DWR have partnered to design and construct facilities to capture and convey Lake Perris leakage water to the CRA. DWR will design and construct a seepage collection wellfield near the foot of the Lake Perris Dam, and this project will design and construct a conveyance pipeline extending from the DWR wellfield to the CRA. Metropolitan's Board authorized preliminary design in April 2017.

Planned Projects

No additional projects are planned.

Hydroelectric Power Plant Improvements

15458

Total Appropriation Estimate:	\$55,425,000	Biennial Estimate:	\$3,719,641
Appropriated Amount 9/30/2017:	\$8,797,000	Cost Through 9/30/2017:	\$6,671,028

Purpose

To ensure reliability of Metropolitan's hydroelectric power plants.

Scope

This appropriation was established to implement a comprehensive rehabilitation plan that will enhance infrastructure reliability, ensure compliance with regulatory requirements, improve plant efficiency, and reduce maintenance on all hydroelectric power plants.

Accomplishments for FY 2016/17 and FY 2017/18

New Projects Initiated Last Period:

- Valley View Hydroelectric Plant Generator Refurbishment

Major Milestones Achieved Last Period:

- Etiwanda Hydroelectric Plant Rehabilitation - Construction completed

Projects Completed To Date:

- Two projects have been completed.

Objectives for 2018/19 and FY 2019/20

Project	Total Project Estimate	Estimated Completion	Major Milestones
Etiwanda Hydroelectric Plant Rehabilitation	2,954,000	2018	Complete construction
Valley View Hydroelectric Plant Generator Refurbishment	1,724,000	2020	Complete construction

Authorized Projects

Etiwanda Hydroelectric Plant Rehabilitation

The Etiwanda Hydroelectric Plant (HEP) was constructed in 1994, and is located in Rancho Cucamonga. The plant is exhibiting signs of wear and tear and replacement parts have become difficult to obtain, have long lead times for delivery, and commercially available parts require modifications. This project will rebuild the needle valves, rehabilitate the hydraulic control units, install on-line data acquisition and monitoring instrumentation, and refurbish or replace other deficient equipment. Construction was authorized by the Board in July 2014.

Foothill Hydroelectric Plant Rehabilitation

The Foothill Hydroelectric Plant was constructed in 1981. The electrical and mechanical systems are exhibiting signs of normal wear and tear after 30 years of service. The scope of work is to refurbish electrical protection relays, control relays, mechanical piping for the generator cooling water systems, and add a Programmable Logic Controller. This project will install on-line data acquisition and monitoring instrumentation, and refurbish or replace other deficient equipment. Design was authorized by the Board in March 2012.

Foothill Hydroelectric Plant Seismic Upgrade

The Foothill Hydroelectric Plant was constructed in 1981. An assessment has identified that the facility is seismically vulnerable and should be upgraded. The scope of work is to complete reinforcing the roof, replacing a cracked beam, and install connectors and seismic restraints to the roof, columns, and walls. Retrofit work will also include upgrades for non-structural components such as equipment anchors, pipe/conduit supports, and crane rail bracing. This project will install on-line data acquisition and monitoring instrumentation, and refurbish or replace other deficient equipment. Design was authorized by the Board in December 2014.

San Dimas Hydroelectric Plant Rehabilitation

The San Dimas Hydroelectric Plant was constructed in 1981, and the electrical and mechanical systems are exhibiting signs of normal wear and tear after 30 years of service. The scope of work is to refurbish electrical protection relays, control relays, mechanical piping for the generator cooling water systems, and add a Programmable Logic Controller. This project will install on-line data acquisition and monitoring instrumentation, and refurbish or replace other deficient equipment. Design was authorized by the Board in March 2013.

Sepulveda Canyon Control Facility Electrical and Mechanical Rehabilitation

The Sepulveda Canyon Hydroelectric Plant was constructed in 1982, and the electrical and mechanical systems are exhibiting signs of normal wear and tear after 30 years of service. The scope of work is to refurbish electrical protection relays, control relays, mechanical piping for the generator cooling water systems, and add a Programmable Logic Controller. This project will install on-line data acquisition and monitoring instrumentation, and refurbish or replace other deficient equipment. Design was authorized by the Board in March 2013.

Sepulveda Canyon Control Facility Seismic Assessment

The Sepulveda Canyon Facility consists of a pressure control structure, hydroelectric plant, and two water storage tanks. The pressure control structure was constructed in the early 1970s to reduce pressure in the 9-foot-diameter Sepulveda Feeder as it conveys treated water from the Jensen Plant. The two water tanks have a combined capacity of 18 million gallons of water and are used to regulate flows through the pipeline. The hydroelectric plant, which was constructed in 1982, takes advantage of excess pressure in the Sepulveda Feeder to generate up to 8.6 megawatts of electricity with its single turbine. The facility is located on top of a large pad that was constructed by filling a steeply sloped V-shaped ravine. The pad is approximately 120 feet above the toe of the slope. The site is located within one mile of the Santa Monica Fault, which is capable of generating a 6.8 magnitude earthquake. Preliminary slope analyses indicate that the fill could slide down the slope during a major earthquake, causing significant damage to the pressure control structure, the water tanks, and the hydroelectric plant. This project will consolidate all seismic upgrade efforts for the entire Sepulveda Canyon Control Facility and seismically upgrade the facility. Design was authorized by the Board in March 2013.

Valley View Hydroelectric Plant Generator Refurbishment

The Valley View Hydroelectric Plant was constructed in 1985, and can produce up to 4.1 megawatts of power with its single turbine. In October 2016, the plant was taken out of service due to a failure on the generator rotor assembly. Repairs to the generator are required before the plant can return to operation. The scope of the project includes refurbishment by contractor services of the following equipment: 1) generator components, including the rotor assembly and keyway sections; 2) bearings; and 3) the overhead bridge crane to allow safe disassembly, removal, and reassembly of plant components. Additionally, Metropolitan forces construction will: 1) disassemble the generator and needle valves; 2) refurbish the two needle valves including replace the worn or damaged components, replace the seals and rubber gaskets, sandblast and recoat the valve bodies, and recoat the plunger, spring, actuator shaft, and deflector plate; 3) replace the grout on the baseplates; 4) reassemble the generator's rotor assembly and needle valves; and 5) test and recommission the plant. The Board authorized final design and construction in January 2018.

Valley View Hydroelectric Plant Rehabilitation

This project addresses long-term improvements needed for auxiliary systems at the Valley View Hydroelectric Plant. A detailed assessment was performed that identified the need for a full rehabilitation of the unit to prevent further damage and ensure reliable operation for the long-term. The scope of the project includes replacement or rehabilitation of auxiliary mechanical and electrical systems including: 1) the electrical protection and control relays; 2) the generator transformer; 3) the cooling water system, including the copper piping which supplies cooling water to the generator enclosure; 4) isolation and control valves; and 5) the generator and turbine brake systems. Specific improvements to extend the service life and improve reliability of the plant will be identified during site investigations in the preliminary design phase. Preliminary design was authorized by the Board in January 2018.

Venice Hydroelectric Plant Rehabilitation

The Venice Hydroelectric Plant (HEP) was constructed in 1982, and the electrical and mechanical systems are exhibiting signs of normal wear and tear after 30 years of service. The scope of work is to refurbish electrical protection relays, control relays, mechanical piping for the generator cooling water systems, and add a Programmable Logic Controller. This project will install on-line data acquisition and monitoring instrumentation, and refurbish or replace other deficient equipment. Design was authorized by the Board in March 2013.

Planned Projects

Hydroelectric Plant Rehabilitation

Metropolitan owns and operates 15 hydroelectric power plants with a total installed capacity of 130 megawatts. Approximately 10% of Metropolitan's income is derived from these power plants. The first plant to be commissioned was the Greg Avenue Power Plant in 1979, and the last was the Wadsworth Hydroelectric Power Plant in 2002. Many of these plants have been in operation over 35 years and have not undergone refurbishment or upgrade. Several plants are beginning to show signs of deterioration. A comprehensive approach to rehabilitation of the hydroelectric plants is needed to protect Metropolitan assets and fortify infrastructure reliability.

This project will assess and evaluate Metropolitan's hydroelectric plants, determine the rehabilitation requirements for each plant, identify needed pilot efforts, prioritize the needed rehabilitation, and develop a multi-phase plan to complete the rehabilitation. For each hydroelectric plant, the assessment will evaluate the following equipment and systems: turbine, generator, power equipment and switchyard, control system, protection system, auxiliary systems such as lube oil and cooling water, and the overall facility.

Red Mountain Hydroelectric Generator Refurbishment

The Red Mountain Hydroelectric Plant was constructed in 1986, and can produce up to 5.9 MW with its single turbine. In 2016, the Hydroelectric Plant underwent routine maintenance, testing, and inspection. Inspection results discovered worn bearings. In addition, high machine vibration was experienced during startup. The scope of work includes turbine and generator refurbishment which includes bearing refurbishment and retrofit with high lift thrust system, balancing, alignment, stator cleaning, refurbishment of wicket gates and bushings, cooling water upgrades, and upgrade of field devices.

Yorba Linda Power Plant Reliability Upgrades

The Yorba Linda Power Plant is located on the Yorba Linda Feeder at the inlet to the Diemer plant and can generate up to 5 megawatts. Installation of a new turbine generator was authorized in November 2013. This project will provide for needed equipment features and enhancements not included in the scope of original generator replacement project. The features will increase the plant's reliability and longevity, and address future maintenance and repair aspects of the Yorba Linda Power Plant. The scope of work includes design and construction of the following improvements: Enclosure modifications to protect the generator unit and equipment from water intrusion; emergency shutdown, alarm, and public address system improvements; upgrades to the Human Machine Interface (HMI) panel; and procurement of critical spare parts.

Information Technology System - Business, Finance and HR 15411

Total Appropriation Estimate: \$22,468,230 Biennial Estimate: \$893,136

Appropriated Amount 9/30/2017: \$22,468,230 Cost Through 9/30/2017: \$21,000,250

Purpose

To ensure reliability, efficiency, and effectiveness of Business, Finance, and HR applications. To ensure reliability, efficiency, and effectiveness of Business, Finance, and HR applications.

Scope

This program was established to assess and implement multiple projects to ensure the regulatory adherence, customer service, cost efficiency/productivity, risk management and reliability of Metropolitan's Business, Finance and Human Resources applications. Numerous projects have been incorporated into this program and completed including Integrated Budget Management System, Water Billing System, and Fleet Management.

Accomplishments for FY 2016/17 and FY 2017/18

New Projects Initiated Last Period:

- Digital Asset Optimization Project

Major Milestones Achieved Last Period:

- Digital Asset Optimization - Awarded consultant contract

Projects Completed To Date:

- 13 projects have been completed.

Objectives for 2018/19 and FY 2019/20

Project	Total Project Estimate	Estimated Completion	Major Milestones
Digital Asset Optimization	1,610,000	2019	Complete deployment

Authorized Projects

Digital Asset Optimization

The Digital Asset Optimization project will remove redundant, obsolete and trivial (ROT) information from files on Metropolitan's network files shares (NFS). This work is being performed to allow for more effective and efficient searching and collection of information as it pertains to public requests, legal requests and other Metropolitan needs for information. Additionally, the data will be categorized and metadata captured for easier retrieval capabilities.

Planned Projects

No additional projects are planned.

Information Technology System - Infrastructure

15376

Total Appropriation Estimate: \$50,041,000 Biennial Estimate: \$12,857

Appropriated Amount 9/30/2017: \$50,041,000 Cost Through 9/30/2017: \$42,563,336

Purpose

To ensure reliability of IT infrastructure for critical business applications.

Scope

This appropriation was established to implement multiple projects to ensure the reliability and efficiency of the Information Technology Infrastructure in support of Metropolitan's operational and business applications.

Accomplishments for FY 2016/17 and FY 2017/18

New Projects Initiated Last Period:

- Standby Generator Relocation at Six WAN Sites

Major Milestones Achieved Last Period:

- Communication Infrastructure Reliability Upgrade - Completed deployment at Headquarters, Soto Street, Weymouth, Eagle Rock, Sunset Garage, Chemical Unloading Facility, Sacramento, Etiwanda, Live Oak and San Dimas.
- Lake Mathews Disaster Recovery Facility - Completed Preliminary Design Report

Projects Completed To Date:

- 18 projects have been completed.

Objectives for 2018/19 and FY 2019/20

Project	Total Project Estimate	Estimated Completion	Major Milestones
Communication Infrastructure Reliability Upgrade	7,991,000	2018	Complete deployment at field sites
Standby Generator Relocation at Six WAN Sites	1,250,000	2018	Complete construction

Authorized Projects

Communication Infrastructure Reliability Upgrade

This project addresses the need to replace Metropolitan's Siemens/Rolm 9751PBX-based telephone system. The current telephone switches are over 18 years old and are at the end of service life.

The scope of this project is to develop a request for proposals, select the VoIP vendor, complete the technical design, work side-by-side with the telephone technicians while installing the new equipment, test the new system, and perform project management; a professional services agreement for consulting services to design and build the new telephone system; upgraded equipment and software for the new system and related IT unified communications components; training and incidental costs. The Board approved this project in February 2008.

Lake Mathews IT Disaster Recovery Facility (DRF) Environmental Upgrade

The Lake Mathews DRF was expanded as part of the Business Systems Data Recovery project funded by the Board in April 2004. The original DRF structure was a communications room that was not designed to be an IT data center.

The scope includes equipping the IT Lake Mathews Disaster Recovery Facility (DRF) with needed data center environmental system upgrades such as Air Conditioning (HVAC), uninterruptible electrical power supplies (UPS), fire suppression system, emergency generator, and remote monitoring capabilities. Also, seismic upgrades will be conducted due to recently identified seismic deficiencies. The last Board Action for this project was in December 2016.

Standby Generator Relocation at Six WAN Sites

Metropolitan's Wide Area Network (WAN) provides a critical communication and data link between facilities across the distribution system. The Standby generators at six WAN sites must be relocated for consistency with the current fire codes and to enhance safety. These generators are needed to provide backup power in the event of loss of primary power. The planned improvements will reduce the risk of damage to communication equipment and the buildings in the event of a fuel leak.

Metropolitan forces will relocate the standby generators at six WAN sites to reduce the risk of fire damage to Metropolitan's communication systems. The standby generators will be moved to new locations in separate outdoor enclosures, consistent with current fire codes. Relocation was authorized by the Board in August 2016.

Planned Projects

No additional projects are planned.

Information Technology System – Security

15378

Total Appropriation Estimate: \$8,846,000 Biennial Estimate: \$2,988,473

Appropriated Amount 9/30/2017: \$7,446,000 Cost Through 9/30/2017: \$5,348,074

Purpose

To implement technologies that provide most cost-effective and threat reducing benefits to Metropolitan with public safety and security represented at all levels.

Scope

This appropriation was established to enhance and upgrade the functionality, reliability, security and to protect against cyber threats of Metropolitan’s business and SCADA systems.

Accomplishments for FY 2016/17 and FY 2017/18

New Projects Initiated Last Period:

- MWD Cyber Security Upgrades

Major Milestones Achieved Last Period:

- MWD Cyber Security - Completed Define Phase

Projects Completed To Date:

- Eight projects have been completed.

Objectives for 2018/19 and FY 2019/20

Project	Total Project Estimate	Estimated Completion	Major Milestones
Cyber Security II	4,900,000	2020	Begin Define Phase
MWD Cyber Security Upgrade	1,465,000	2018	Begin Deployment Phase

Authorized Projects

Cyber Security II

This capital project will assess and remediate exposures and cyber threats throughout Metropolitan with special emphasis on the business and SCADA networks. Cyber security remains a high priority and is a key part of the Information Technology Strategic Plan. Cyber criminals, including cyber terrorists from rogue nations, are launching increasingly sophisticated threats targeting critical infrastructure agencies such as water utilities. Maintaining a secure computing infrastructure requires application of ongoing cyber countermeasures to protect against new cyber threats that are identified on a continual basis.

The scope of this project will include engaging an outside security consultant(s) to perform independent assessments of different aspects of MWD's IT infrastructure and environment to identify potential vulnerabilities and make recommendations for strengthening our cyber security

MWD Cyber Security Upgrade

Cyber security remains a high priority at Metropolitan and is a key part of the Information Technology Strategic Plan. Maintaining a secure computing environment requires regular enhancements and upgrades to Metropolitan's IT information security infrastructure to ensure protection against continually evolving cyber threats. This project will implement Information Technology Cyber Security Upgrades to reduce information security risk to Metropolitan's business computer systems and Supervisory Control and Data Acquisitions (SCADA) systems by implementing additional countermeasures to help protect against unauthorized access. Implementation was authorized by the Board in December 2016.

Planned Projects

No additional projects are planned.

Infrastructure Reliability Information System

15501

Total Appropriation Estimate:	\$11,036,000	Biennial Estimate:	\$2,836,982
Appropriated Amount 9/30/2017:	\$840,000	Cost Through 9/30/2017:	\$5,727

Purpose

To maintain reliability of information systems supporting Metropolitan’s operations and engineering applications by incorporating improved data and information flow and processing, and providing decision making tools related to Metropolitan’s major Infrastructure Reliability and Asset Maintenance initiatives.

Scope

This appropriation is established to update and integrate equipment maintenance reporting tools to enhance management and tracking of assets, improve maintenance and engineering work planning, and track equipment performance data by integrating data from several information systems to support condition-based equipment maintenance and improved selection of replacement equipment.

Accomplishments for FY 2016/17 and FY 2017/18

New Projects Initiated Last Period:

- Maximo Upgrade project

Major Milestones Achieved Last Period:

- No major milestones have been achieved during the last biennium.

Projects Completed To Date:

- No projects have been completed.

Objectives for 2018/19 and FY 2019/20

Project	Total Project Estimate	Estimated Completion	Major Milestones
Asset Monitoring and Management System	523,000	2019	Complete deployment
Fuel Management System Upgrade	1,490,000	2019	Complete deployment
Maximo Mobile Computing Upgrade	630,000	2019	Complete deployment
Maximo Upgrade	762,000	2019	Complete deployment

Authorized Projects

Maximo Upgrade

This project will upgrade the Maximo system, Metropolitan’s enterprise-wide asset management program that is used for planning, scheduling, and reporting required maintenance of equipment deployed throughout the treatment plants and conveyance & distribution system. This project includes software upgrades and new hardware to accommodate this upgrade. This project was authorized by the Board in July 2017.

Planned Projects

Asset Monitoring and Management System

This project will establish the foundation for leveraging data already maintained by Metropolitan (under multiple different software platforms) into a common framework in order to efficiently conduct future infrastructure reliability projects and assessments across Metropolitan. This project is needed to support a common condition monitoring framework across Engineering Services (ESG) and Water System Operations (WSO) groups, as well as to support condition-based maintenance initiatives as part of General Manager's initiatives and WSO's business plan.

This project includes building software tools to access and aggregate ESG, WSO, and other asset-related data, such as data from finance, to facilitate infrastructure reliability investigations on one class of assets such as emergency generators. The project will coordinate closely with the infrastructure reliability committee's efforts on developing a common condition monitoring framework. Eventually, the software tools developed as a part of this project will be used for future condition assessments in ESG and WSO.

Energy Management System Upgrade

This project will upgrade the Energy Management System (EMS) which was implemented in 2007 and has reached the end of life. The current EMS system is used for power scheduling and energy reconciliation for Metropolitan's Hydroelectric Power Recovery Plants and the Colorado River Aqueduct Pumping Operation accounting for nearly \$50 million per year in Metropolitan's energy sales and purchases. The current EMS system is built on no-longer-supported software. This project will replace obsolete software with newer, supportable, and more flexible tools to address changing business requirements.

Engineering Information System Upgrade

The goal of this project is to upgrade ProjectWise (Engineering's Information System) to the latest version, install and configure additional ProjectWise modules, and integrate ProjectWise with other Metropolitan systems such as Geographic Information System (GIS), Outlook, SharePoint, and Deliverables Management to implement additional functionalities in ProjectWise. The intent is to streamline the workflow in Engineering design and improve access to information and documents in ProjectWise.

Enterprise GIS Disaster Recovery

This project will add the Enterprise GIS (EGIS) infrastructure to the Metropolitan IT Disaster Recovery Facility (DRF) in Riverside County. This includes the purchase, installation, and configuration of new hardware and software to meet Business Impact Analysis (BIA) study requirements for the EGIS infrastructure. The current recovery time for EGIS infrastructure is estimated at greater than a week. The BIA Recovery Time Objective (RTO) for the EGIS infrastructure is less than 72 hours, meaning that the EGIS infrastructure should be functional within 72 hours after an outage. This project will reduce the RTO for the EGIS infrastructure from 72 hours to 1 hour, so that EGIS data could potentially be used to assist in emergency operations.

Enterprise GIS Infrastructure Upgrade

This project will upgrade the EGIS infrastructure to accommodate increasing demand for big data services. Big data services include the real time display of time series data (e.g., from the Supervisory Control and Data Acquisition (SCADA) system), three-dimensional "point cloud" data, and self-service online map-making that include large amounts of Metropolitan data. This project includes procuring, installing, and configuring improved infrastructure which will allow data intensive GIS applications to run seamlessly on mobile devices. These components will vastly increase the performance and improve the reliability of our EGIS technologies and are required for end-users to take full advantage of increasing three-dimensional and time series data.

Flow Scheduler

Metropolitan's Operations Control Center team operates and manages Metropolitan's distribution and conveyance systems; this includes making real time control decisions to meet member agency demands. As a part of this responsibility, the operators must respond to member agencies' requests for flow changes. This project includes the development of a software tool which would allow member agencies to submit flow change requests via a web page. This new software system would deliver the request to Metropolitan operators electronically, and would document the interaction with the member agency representative. The system would also automatically update operational logs, and document that a flow change has been successfully implemented.

Fuel Management System Upgrade

This project's objective is to upgrade the ten-year-old Fuel Management System (FMS), which is no longer supported by manufacturer. The FMS provides essential management controls over fuel inventories, dispensing, and security. It identifies and authorizes the dispensing of fuel and records fuel transactions and fuel tank data in a centralized database. This project will replace the necessary hardware and software to upgrade the FMS and to integrate it with Maximo.

Hydraulic Modeling Analysis Toolkit and Water Quality Calibration

Metropolitan's Engineering Services Group completed development of a system-wide hydraulic model in January 2017 after a multi-year development effort. Even while model development was still underway, many uses for the hydraulic model were identified. This project includes developing tools to support hydraulic model analysis to increase efficiency and enhance productivity while using the hydraulic model for analysis. The project also includes development and calibration of water quality modeling capabilities, specifically adding the chlorine residual prediction to the hydraulic model.

Maximo Mobile Computing Upgrade

The goal of this project is to replace existing mobile devices used in WSO with latest tablet technology and deploy additional devices to Engineering. The project will enable the use of capabilities of the existing mobile software system that are not available on the existing hardware devices.

The project includes an initial pilot evaluation with a purchase of 30 units to evaluate different models and test features. The overall goal will be to purchase 290 devices following the completion of the pilot evaluation. The new devices will eliminate or reduce the need for desktop computers at field sites and vastly increase the functionality of the existing Maximo mobile devices.

Water Quality Monitoring and Planning System (WQ MaPS)

Existing distribution system online water quality analyzers, installed in 2002-03, are obsolete and in need of replacement. Instrumentation measures total chlorine, conductivity, pH, turbidity, ultraviolet absorption, and total ammonia. Data from analyzers is monitored by the Operations Control Center through the SCADA system and by Water Quality through a contaminant warning system. The WQ MaPS project will enable Metropolitan's continued use of online data to quickly identify water quality anomalies resulting from normal operations or emergency situations to minimize risk of water quality issues and potential compliance violations. This project will implement the action items identified in the WQ MaPS action plan to improve data reliability and increase customer access to data. This project will upgrade obsolete water quality analyzers at 21 locations and install analyzers at 14 additional locations, incorporate output from the existing water quality event detection system into an innovative GIS dashboard, integrate output from the ESG's hydraulic model into the GIS dashboard, and provide a self-service portal for internal and external customers to access approved water quality data.

IT Infrastructure Reliability

15487

Total Appropriation Estimate:	\$39,351,000	Biennial Estimate:	\$13,855,363
Appropriated Amount 9/30/2017:	\$11,240,000	Cost Through 9/30/2017:	\$10,320,019

Purpose

To ensure reliability of IT infrastructure for critical business applications.

Scope

This appropriation is established to implement multiple projects to ensure the reliability and efficiency of the Information Technology Infrastructure in support of Metropolitan's operational and business applications.

Accomplishments for FY 2016/17 and FY 2017/18

New Projects Initiated Last Period:

- HQ Data Center SAN Upgrade Phase I

Major Milestones Achieved Last Period:

- HQ Data Center SAN Upgrade Phase I - Completed deployment phase
- IT Network Reliability Upgrades - Complete sub-projects 1 and 2

Projects Completed To Date:

- One project has been completed.

Objectives for 2018/19 and FY 2019/20

Project	Total Project Estimate	Estimated Completion	Major Milestones
Data Center Modernization Upgrade Phase 2	8,350,000	2021	Begin design
Desert Microwave Tower Site Upgrades	3,910,000	2020	Begin design
Headquarters WiFi Upgrade	3,800,000	2020	Begin design
Information Technology Disaster Recovery Upgrades	3,400,000	2019	Begin design
MWD HQ Boardroom Technology Upgrade	5,400,000	2019	Begin design

Authorized Projects

HQ Data Center SAN Upgrades - Phase I

This project is to replace and upgrade EMC Cor. Data storage devices at Headquarters' data center installed in 2006. About three-quarters of the current equipment will reach the end of service life in December 2016. This replacement is the first phase of a two-phased project with the overall goal of assessing, redesigning, and upgrading the data center to provide sufficient computing power and modernize the data center to meet current and future needs. The Board authorized storage system upgrades in December 2016.

Information Technology Disaster Recovery Upgrades

Upgrade the Disaster Recovery Facility with additional servers, storage, Oracle database licenses, and needed equipment to meet, or exceed, the 2017 Business Impact Analysis (BIA) business system recovery requirements. Upgrade compatible DBMS applications for a high availability 24x7 infrastructure for identified mission critical applications. The Board authorized the upgrades in December 2017.

Network Reliability Upgrades

Metropolitan's communication network hardware is aging, which has led to increased maintenance. Based on the rise in failure rates of older equipment, staff has determined that existing network hardware and associated network room support systems need to be upgraded to support ongoing projects, maintain reliability, and meet future needs. The Board authorized final design of electrical, cooling, and backup power system upgrades for network rooms located on each floor of Metropolitan's Headquarters Building. It also authorized preliminary design and field assessments of network equipment. The Board authorized a contract to upgrade the network rooms at Headquarters in August 2015.

Planned Projects

Data Center Modernization Upgrade Phase 2

The purpose of this project is to assess, redesign, and upgrade the MWD Headquarters and Lake Mathews data centers to provide sufficient computing power and modernize the data centers to meet current and future capacity and reliability needs.

This project will conduct a detail assessment, final design, and funding estimate to relocate the HQ and Lake Mathews data centers to improve their long-term reliability from Tier-1 to Tier-3.

Desert Microwave Tower Site Upgrades

This two-phase project will improve the reliability, performance, and capacity of Metropolitan's microwave radio wide-area-networks (WANs). Phase 1 involves \$3.91M out of the \$12M total project budget to address the most critical components that need to be replaced or upgraded in the Desert Region microwave tower sites.

Phase 1 will upgrade the most critical Desert sites and Phase 2 will upgrade LA Basin sites, plus remaining Desert sites. Lessons learned from the Diamond Valley Lake (DVL) microwave proof-of-concept, scheduled to be completed in third-quarter 2017, will be used in this project. The microwave network uses wireless transmission over radio frequency energy in the 6-18 Giga Hertz range.

Enterprise IT Emergency Power Upgrade

This project will implement power, grounding, and HVAC upgrades to computer rooms and communications facilities to ensure that critical IT, WSO and business systems remain operational for required emergency durations in the event of a temporary electrical power outage.

This project will assess and upgrade the electrical resiliency of enterprise systems based on their criticality, power, and runtime requirements. Phase 1 will identify, prioritize, and remediate those conditions for the most critical 20 of the estimated 70 sites where IT equipment is housed.

Headquarters Cellular Upgrade

Metropolitan’s directors, member agencies, contractors, consultants, and staff are located throughout Southern California. In today’s business environment, cellular devices are one of the primary means in which business is conducted. Users have noted very poor reception in certain areas inside the building and almost no reception inside the elevators, P1, P2, and some areas, creating risk that important calls could get dropped in the middle of business conversations. Therefore, by improving cellular communications in the Headquarters building, Metropolitan will be enhancing its ability to conduct business and improve customer service. The objective is to provide reliable cellular coverage at Metropolitan’s Headquarters building by enhancing the cellular signal for the major carriers.

The scope of this project will include installing outdoor antennas, infrastructure cabling to support both internal and external antennas, mounting internal antennas for all high rise floors, wing floors, P1 and P2. This includes installing bi-directional amplifiers (BDA) for all major carriers such as AT&T, Verizon, Sprint, T-Mobile, and acquiring carrier approval for the amplifiers. Also included are power injectors for longer cable runs, server rack space, conduit runs, and aesthetics of antennae placements.

Headquarters WiFi Upgrade

This WiFi Upgrade project will improve the reliability, performance, and capacity to Metropolitan’s wireless access point (WAP) local-area-networks (LANs) at Headquarters and various field facilities. It will also provide a secure, reliable and robust WiFi System to support increasing business demands and reliance on Metropolitan’s wireless infrastructure.

The scope for this project includes (1) migration and implementation design plan, (2) removal of obsolete access points and controllers, (3) installation of cable in building ceiling for access points, (4) installation of new access points, and (5) configuration and installation of new controllers.

Information Technology Service Management System

Metropolitan’s Information Technology Group (ITG) currently uses several different systems for managing Information Technology incidents (e.g., a computer not turning on) and work requests (e.g., new software needing to be installed). While this approach works well in meeting each team’s specific needs, one of the major disadvantages is that gathering metrics for management is a tedious process involving coordination with multiple teams, learning multiple software packages, and manual correlation and data gathering. This project will implement a service management system to track and manage service requests and incidents. As an added benefit, this will allow the expedited future implementation of self-service capabilities for several of the more common ITG service requests (e.g., automatic software installs for commonly used software packages) and provide future integration capability with various monitoring tools currently in use.

MWD HQ Boardroom Technology Upgrade

The existing equipment in the board and committee rooms is over nine years old and several components are reaching the end of useful life. The Board of Directors and external organizations use the board and committee rooms on a regular basis and the technology supporting these meetings must be reliable and the sound and video must be of high quality.

This project will upgrade audio visual (AV) and information technology-related equipment in the main Board room and committee rooms in Metropolitan’s headquarters building at Union Station.

Jensen Water Treatment Plant - Improvements 15371

Total Appropriation Estimate: \$77,677,000 Biennial Estimate: \$5,979,987

Appropriated Amount 9/30/2017: \$47,352,000 Cost Through 9/30/2017: \$46,474,945

Purpose

To maintain reliability and ensure regulatory compliance of the Jensen plant.

Scope

This appropriation was established to plan and implement multiple projects at the Jensen plant. The common driver for many of the projects in this appropriation is infrastructure reliability.

Accomplishments for FY 2016/17 and FY 2017/18

New Projects Initiated Last Period:

- No projects were initiated during the last biennium.

Major Milestones Achieved Last Period:

- Jensen Module No. 1 Filter Valve Replacement - Completed construction
- Jensen Solids Transfer System - Completed construction

Projects Completed To Date:

- 13 projects have been completed.

Objectives for 2018/19 and FY 2019/20

Project	Total Project Estimate	Estimated Completion	Major Milestones
Jensen Caustic Tank Farm Containment Upgrades	19,717,000	2022	Complete design

Authorized Projects

Jensen Caustic Tank Farm Containment Upgrades

This project will provide modifications to the Jensen plant's caustic containment area to enhance compliance with California's safety and environmental regulations for spill control and secondary containment for hazardous material liquids. This project includes replacement of existing asphalt pavement with cast-in-place concrete pavement sloped to a new sump; replacement of unreinforced block walls with taller reinforced concrete walls and an improved foundation; application of chemical-resistant seal coating within the tank farm; disposal of contaminated soil; removal of the existing industrial waste neutralizing tank and installation of two containment tanks; and replacement of the existing spill containment tank liner. Final design was authorized by the Board in August 2012.

Jensen Entrance Security Improvements

Both main Jensen plant gates at San Fernando and Balboa entrances need to be redesigned to improve security and traffic flow consistent with Metropolitan's other Treatment Plants. This project will enhance security of the Jensen plant's entrances. Project scope includes replacement of security gates; installation of traffic control devices to improve security at the entrance points of the Jensen plant; and installation of fire resistant plants and irrigation along the west side of the plant. Final design was authorized by the Board in December 2006.

Jensen Module No. 1 Filter Valve Replacement

This project replaced 78 deteriorated filter valves within Module No. 1 at the Jensen plant, with new Metropolitan-furnished AWWA-standard valves. Construction was authorized by the Board in January 2015 and has been completed. Production of record drawings is in progress.

Jensen Module No. 1 Traveling Bridge Repairs

The traveling bridges in Jensen Module No. 1 remove residual solids from the settling basins and were installed as part of the original plant construction in 1971. This equipment has exceeded its expected operating life and has experienced many failures of the mechanical drive system components and the electrical power systems. This project will modify the configuration of the four bridges by replacing the existing 10-pump system with a 3-pump system similar to Module Nos. 2 and 3, and will replace deteriorated components including electrical power rack bars, drive gears, and chain drive parts. These improvements are intended to reduce future outages and provide corrective repairs. This project will also upgrade the control systems on all four traveling bridges and will enhance the level of automation. Preliminary design was authorized by the Board in August 2001.

Jensen Module Nos. 2 and 3 Traveling Bridge Repairs

Jensen Module Nos. 2 and 3 traveling bridges have been in operation since the plant was expanded in the early 1990s. This project will address the frequent misalignment issues associated with Jensen Module Nos. 2 and 3 traveling bridges in order to improve solids removal efficiency and reduce maintenance costs. Misalignment of the traveling bridge wheels will be corrected by removing the current end trucks and replacing them with pre-aligned "plug-and-play" end trucks. These "plug-and-play" end trucks will be a common design for each of the eight bridges, and will require minor modifications to the existing bridge truss and drive system design. Preliminary design was authorized by the Board in March 2014.

Jensen Solids Transfer System

This project added a new solids transfer system to convey the Jensen solids to four existing LADWP lagoons at their LAAFP to support 500-mgd Jensen plant operation. Construction was authorized by the Board in July 2014 and has been completed. Production of record drawings is in progress.

Jensen Washwater Return Pump Modifications

Constructed in 1991, the washwater return pumping station receives used filter backwash water that has been treated in the Washwater Reclamation Plants (WWRPs) Nos. 1 and 2, and discharges the reclaimed water back to the inlet of the Jensen plant. The station has five fixed-speed pumps with a combined capacity of 33 mgd. For certain plant flow conditions, the output from a single fixed-speed pump is too high for the station's small collection sump. This project will replace the existing fixed-speed motor drives with variable frequency motor drives (VFDs), allowing the existing pumps to operate over a larger range of fluctuating flow conditions within the confines of the existing small sump. VFDs on the existing pumps will reduce the number of times that the motors are started, prolonging motor life and ensuring efficient and continued operation of the station. Design and construction were authorized by the Board in November 2001. Construction will be completed as part of the Stage 2 Jensen Electrical Upgrades project.

Planned Projects

No additional projects are planned.

Jensen Water Treatment Plant - Improvements for FY2006/07 through FY2011/12

15442

Total Appropriation Estimate:	\$104,673,000	Biennial Estimate:	\$2,003,971
Appropriated Amount 9/30/2017:	\$53,476,000	Cost Through 9/30/2017:	\$42,987,092

Purpose

To maintain reliability and ensure regulatory compliance of the Jensen plant.

Scope

This appropriation was established to plan and implement multiple projects at the Jensen plant. The common driver for many of the projects in this appropriation is infrastructure reliability.

Accomplishments for FY 2016/17 and FY 2017/18

New Projects Initiated Last Period:

No projects were initiated during the last biennium

Major Milestones Achieved Last Period:

- Jensen Electrical Upgrades Stage 1 - Continued construction

Projects Completed To Date:

- Three projects have been completed.

Objectives for 2018/19 and FY 2019/20

Project	Total Project Estimate	Estimated Completion	Major Milestones
Jensen Electrical Upgrades	69,616,000	2026	Complete Stage 1 and begin Stage 2 construction
Jensen Modules 2 and 3 Flocculator Rehabilitation	7,907,000	2020	Begin construction

Authorized Projects

Jensen Electrical Upgrades

The Jensen plant's electrical system was designed to meet then-current electrical codes when the plant was constructed over 40 years ago. The aging electrical equipment has deteriorated through long-term continuous use, lacks redundancy, and is difficult to maintain and repair. Much of the equipment is underrated by current standards and does not have adequate short-circuit interrupting capability, which results in an elevated risk of unplanned outages and equipment damage. This project will replace aging equipment, and provide needed redundancy for critical components of the plant's electrical system. To expedite completion of the most critical electrical upgrades while minimizing impacts to plant operations, the upgrade work has been prioritized and staged. The Stage 1 work will improve the medium voltage switchgear on the western portion of the plant and provide electrical infrastructure for the Jensen Solar Power Plant. Stage 2 improvements will upgrade UPC-7, UPC-9, and their associated motor control centers to support critical process equipment such as the washwater pumps, service water pumps, washwater return pumps, filters, thickeners, sludge pumps, and ammonia facilities. Stage 3 improvements will upgrade the remaining components of the electrical system on the eastern portion of the plant. Construction of Stage 1 was authorized by the Board in December 2015 and is underway.

Jensen Filters Nos. 1-20 Surface Wash Upgrades

This project replaced the Jensen Module No. 1 surface wash system with a new fixed nozzle system, and the plant's service water pumps. Construction was authorized by the Board in January 2013 and has been completed. Production of record drawings is in progress.

Jensen Module Nos. 2 and 3 Flocculator Rehabilitation

Module Nos. 2 and 3 flocculators have been in continuous service since their original installation in the early 1990s. The shafts have become misaligned and the metallic components have gradually deteriorated due to corrosion. This project will rehabilitate the flocculators in Jensen Module Nos. 2 and 3 by refurbishing the intermediate shafts, paddle arms, and paddle wheel hubs; replacing existing stub shafts and through shafts with stainless steel shafts; and replacing the basin pillow block housings and bushings. Improvements also include new FRP paddle blades, new stainless steel lock collars, new couplings, and new stuffing box assemblies. The dry well bearing housing will also be refurbished and new bronze bushings will be provided in kind. Final design was authorized by the Board in March 2014.

Planned Projects

No additional projects are planned.

Jensen Water Treatment Plant - Improvements for FY2012/13 through FY2017/18

15486

Total Appropriation Estimate: \$7,376,000 Biennial Estimate: \$1,299,694

Appropriated Amount 9/30/2017: \$3,549,000 Cost Through 9/30/2017: \$1,220,098

Purpose

To maintain reliability and ensure regulatory compliance of the Jensen plant.

Scope

This appropriation was established to plan and implement multiple projects at the Jensen plant. The common driver for many of the projects in this appropriation is infrastructure reliability.

Accomplishments for FY 2016/17 and FY 2017/18

New Projects Initiated Last Period:

- Jensen Chemical Tank Replacement
- Jensen Ozone System PLC Control & Communication Equipment Upgrade Project

Major Milestones Achieved Last Period:

- Jensen Filter Backwash Biological Control System - Finished design
- Jensen Inlet Water Quality Instrumentation Upgrades - Finished design

Projects Completed To Date:

- No projects have been completed.

Objectives for 2018/19 and FY 2019/20

Project	Total Project Estimate	Estimated Completion	Major Milestones
Jensen Caustic Metering and Control Facilities	1,126,000	2022	Complete design
Jensen Filter Backwash Biological Control System	943,000	2018	Complete construction
Jensen Fluoride Tank Replacement	1,313,000	2018	Complete construction
Jensen Inlet Water Quality Instrumentation Upgrades	2,250,000	2019	Complete construction
Jensen Liquid Polymer Containment Upgrades	1,662,000	2022	Complete design
Jensen Ozone System PLC Control & Communication Equipment Upgrade Project	1,395,000	2018	Complete construction

Authorized Projects

Jensen Caustic Metering and Control Facilities

The current caustic metering and control facility is located within the tank farm containment area. The building is a 40-year old uninsulated sheet metal building housing the caustic pumps, flow control modules, instrumentation, HVAC equipment, remote control equipment, and electrical supply equipment. With the completion of the caustic containment area upgrades project, these metering and pumping facilities will be located within the tank farm's containment walls and will be submerged in the event of a chemical leak. This project will replace the existing sheet metal caustic pump house building located within the caustic tank farm with a pre-fabricated metal enclosure. The enclosure will be located above the new containment wall elevation and will house new electrical and control equipment for the caustic feed system. New caustic feed pumps will be installed on top of a raised platform, and a new electrical duct bank will be installed to power the relocated caustic feed system. Final design was authorized by the Board in August 2014.

Jensen Filter Backwash Biological Control System

The Jensen filters are currently operated as biologically active filters. Their biomass is controlled by backwashing with chlorinated water, which is accomplished by injecting sodium hypochlorite into the backwash water. The delivery system consisted of two storage tanks, three pumps, metering valves, and flow control for each filter module. Several chemical leaks have been detected during the last five years. Planned upgrades include replacing the existing piping with new double contained piping; adding an eductor system in lieu of the metering pumps system; and replacing the 3,000-gallon fiberglass reinforced plastic (FRP) tanks for the storage of sodium hypochlorite. Design was authorized by the Board in April 2017.

Jensen Fluoride Tank Replacement

The Jensen plant relies on two 9,000-gallon cross-linked high-density polyethylene (HDPE) tanks for the storage of fluorosilicic acid. Internal inspections have identified cracks in the two fluorosilicic acid tanks. This project will replace the fluoride tanks with tanks of the same capacity and improved mechanical properties to provide an expected service life of 20 years. Design was authorized by the Board in April 2017.

Jensen Inlet Water Quality Instrumentation Upgrades

The Jensen plant's inlet flow meter, water quality analyzers, and flow meter for service connection LA-35 are used to control the chemical addition and to balance water flows throughout the plant. Both of the flow meters need to be replaced. The existing models are obsolete, the manufacturer no longer supports the flow meter consoles, and spare parts are difficult to obtain. Furthermore, the water quality analyzers and plant inlet flow meter consoles are wall-mounted on the exterior of the plant inlet structure, where they are exposed to harsh ambient conditions, resulting in accelerated wear. The flow meter console for service connection LA-35 is located in a deep, confined vault. Two trained personnel with safety equipment are required to perform any maintenance within the vault. The environmentally-controlled enclosure will house the water quality instrumentation, the plant inlet flow meter console, the service connection LA-35 flow meter console, and related electrical equipment including a motor control center, power panel, and communication cabinet. Design was authorized by the Board in August 2014.

Jensen Liquid Polymer Containment Upgrades

The Liquid Polymer Building at the Jensen plant is over 40 years old and has deteriorated. Furthermore, the adjacent unloading facility for liquid polymer does not have a permanent spill containment system. The liquid polymer storage facilities are located adjacent to both the caustic soda and chlorine containment facilities. Since caustic soda is used in the chlorine containment scrubber, the chlorine containment facility includes a caustic soda unloading containment pad. The location of this pad and the adjacent ferric chloride facilities significantly restrict routine access for chemical truck-trailers and emergency access for fire department vehicles. This project will provide a permanent single concrete unloading facility for both chlorine neutralizing caustic soda and liquid polymer chemicals, equipped with a new sump and discharge piping to provide secondary containment. In addition, the ferric chloride handling facility and the Liquid Polymer Building will be removed. These improvements will enhance access for response to unplanned releases of caustic soda and liquid polymer. Final design was authorized by the Board in May 2013.

Jensen Ozone System PLC Control & Communication Equipment Upgrade Project

The Jensen plant ozonation equipment utilizes a type of Programmable Logic Controller (PLC) that was introduced to the commercial market in 1988. Computer hardware from that era is now outdated, and the PLC manufacturer has announced that it will no longer produce or support this equipment. In addition, inventories of spare parts will no longer be maintained once exhausted. Failure of a PLC and/or its communication module could cause a disruption in the ozone control system. This project will replace the equipment and modify the software to operate with the new equipment for the Jensen ozone control system. The upgraded system will feature Metropolitan-standardized PLC's in an open-architecture approach that staff will be able to maintain and upgrade in the future. Construction was authorized by the Board in December 2016.

Planned Projects

No additional projects are planned.

Jensen Water Treatment Plant - Improvements for FY2018/19 through FY2023/24

18904

Total Appropriation Estimate: \$19,701,000 Biennial Estimate: \$4,268,073

Appropriated Amount 9/30/2017: \$0 Cost Through 9/30/2017: \$0

Purpose

To maintain reliability and ensure regulatory compliance of the Jensen plant.

Scope

This appropriation will be established to plan and implement multiple projects at the Jensen plant. The common driver for many of the projects in this appropriation is infrastructure reliability.

Accomplishments for FY 2016/17 and FY 2017/18

New Projects Initiated Last Period:

- No projects were initiated during the last biennium.

Major Milestones Achieved Last Period:

- None, this appropriation will be initiated in FY 2018/19.

Projects Completed To Date:

- No projects have been completed.

Objectives for 2018/19 and FY 2019/20

Project	Total Project Estimate	Estimated Completion	Major Milestones
Jensen Ozone PSU and Critical Component Upgrades	3,590,000	2021	Complete construction
Jensen Site Security Upgrade	1,800,000	2020	Complete construction
Jensen Solids Lagoon Nos. 9 and 10	8,600,000	2022	Complete design and EIR

Authorized Projects

None, this appropriation will be initiated in FY 2018/19.

Planned Projects

Jensen Bull Creek Repair

The Bull Creek channel located on the east side of the Jensen plant has suffered significant erosion from continued stormwater flow during the past wet seasons. Large voids have developed under the concrete banks causing failure of multiple sections of the bank. Future slope failures due to continued erosion would likely impact the LADWP property on the eastern side of the Bull Creek, and eroded material and debris would likely be transported downstream to the neighboring LADWP site. This project will rehabilitate approximately 800 feet of the Bull Creek channel to prevent erosion. The work includes installation of rip rap and slurry backfill along the channel; repairing damaged concrete liner on the channel sides, and restoration of the broken apron next to the railroad bridge. In addition, a catch basin will be constructed along the San Fernando service road to the Jensen plant, to mitigate excessive erosion on the north bank of the Bull Creek.

Jensen Ozone PSU and Critical Component Upgrades

The winter storms of 2016-2017 resulted in an abundance of water from the California State Water Project and in response the Jensen plant operated at higher flow capacities. However, the critical systems associated with ozone generation have deteriorated or have become obsolete after 12 years of operation and need to be upgraded. This project will upgrade the units that provide power to the Jensen plant's ozone generators, and will replace outdated components of other critical systems associated with the plant's ozone generation, which have reached the end of their service life, and are no longer supported by the original equipment manufacturer. The systems to be upgraded include the following areas: (1) power supply unit; (2) nitrogen supply system; (3) ozone destruct units; (4) dissolved ozone; (5) cooling water loop; and (6) Ozone Generator No. 1.

Jensen Site Security Upgrade

The outdated Jensen plant's security system needs an upgrade to minimize risk of an intrusion. The existing camera system is undersized, aged, and does not provide adequate resolution when zoomed based on today's design standards. Planned upgrade includes installation of additional card readers in sensitive areas; upgrade to existing aging security cameras with high resolution cameras; addition of new cameras to monitor the perimeter of the plant; replacement of security signage to meet current code; security upgrades of first floor windows; addition of horizontal structural support (beam/angle iron) to strengthen the existing gates; and addition of a new defensive barrier plants and trees to screen the west side of the Jensen plant.

Jensen Solid Handling System Upgrades

Efficient recovery of water from residual solids is critical for the operation and efficiency of the Jensen plant. The solids thickeners play a key role in the recovery of water from the residual solids. During thickener operation, operators rotate valves to divert flow of residual solids to different thickeners. Access to the valves in Solids Pump Station No. 2 and the solids splitter vault, required on a daily basis, needs to be improved to enhance process and safety. In addition, Thickeners Nos. 1 and 2 are currently out of service due to aging and corrosion. This project will reconfigure Solids Pump Station No. 2 to allow better access to the valves; upgrade the solids splitter vault to facilitate remote operation, and rehabilitate Thickeners Nos. 1 and 2 and return them to service.

Jensen Solids Lagoon Nos. 9 and 10

Metropolitan has an ongoing lagoon use agreement with Los Angeles Department of Water and Power (LADWP), which allows for Metropolitan's use of four of the lagoons located at the Los Angeles Aqueduct Filtration Plant (LAAFP) to process solids generated and conveyed from the Jensen plant. Under this agreement, two of the lagoons can be used until October 1, 2062, and the other two until October 1, 2022. To reliably support the Jensen plant operation and provide operational flexibility during unfavorable source-water quality or higher water demand, two new lagoons need to be constructed to replace the two existing lagoons that have to be returned to LADWP for its use in 2022. This project will design and construct two new lagoons, consisting of an earthen floor with rip-rap banks and reinforced concrete access ramps. The project will include piezometers with data loggers to monitor groundwater under the lagoons, manholes with pumps to convey overflow, decant, and underdrain water to the lagoon inlet distribution system, and electrical & control systems. Lagoon Nos. 9 & 10 will be located on the LAAFP site.

La Verne Shop Facilities Upgrade

15395

Total Appropriation Estimate: \$50,959,000 Biennial Estimate: \$7,754,967

Appropriated Amount 9/30/2017: \$40,750,000 Cost Through 9/30/2017: \$40,448,234

Purpose

To modernize the machine, coatings, and fabrication shops so that they can continue to provide emergency response service, support routine maintenance throughout Metropolitan, and perform fee-for-service work for member agencies and the California Department of Water Resources (DWR).

Scope

This appropriation was established to modernize the Maintenance Support Unit facilities at La Verne and will evaluate, recommend, design and build new or remodel shop building facilities, and upgrade through refurbishment or replacement aging shop equipment.

Accomplishments for FY 2016/17 and FY 2017/18

New Projects Initiated Last Period:

- No projects were initiated in the last biennium.

Major Milestones Achieved Last Period:

- La Verne Machine, Fabrication and Coating Shop Equipment Design and Procurement

Projects Completed To Date:

- 12 projects have been completed

Objectives for 2018/19 and FY 2019/20

Project	Total Project Estimate	Estimated Completion	Major Milestones
La Verne Machine, Fabrication and Coating Shop Equipment Design and Procurement	4,200,000	2021	Begin installation
La Verne Shops - Stage 4 Building Completion and Equipment Procurement	8,000,000	2021	Begin construction

Authorized Projects

La Verne Machine, Fabrication, and Coating Shop Equipment Design and Procurement

As part of the shop modernization program that started in 2002, which included the building expansions and upgrades, the shop equipment was evaluated to determine if the equipment needed replacement or refurbishment. Most of the shop equipment was found to be 25 to 35 years old, with a few pieces close to 45 years old. A 20-year-plan to replace and refurbish the shop equipment was developed. This project focuses on design and procurement of shop equipment which will be installed under the Stage 4 Building completion contract. This equipment includes a hydraulic shear, hydraulic press brake, waterjet cutting system, and vertical milling. In January 2018, the Board awarded procurement contracts for three of these machines. Procurement of a vertical milling center will be the subject of a future board action.

La Verne Shops - Stage 4 Building Completion and Equipment Procurement

The La Verne Shops are located on the grounds of the F. E. Weymouth Water Treatment Plant and have been in service since 1941. The shops were expanded in the 1960s, and were expanded again in the 1980s to support a major rehabilitation of the pumps along the Colorado River Aqueduct (CRA). This project completes the second shop's expansion portion of the new shop modernization program that started in 2002, which included expanding the existing shop buildings, upgrading portions of the existing buildings, and replacing and refurbishing shop equipment. The Stage 4 building completion scope of work includes water line extensions, a new electrical circuit and unit power center, an air compressor and air lines, shop heaters, and safety enhancements including walkways and roof access ladders. In addition to the building work, the scope includes procurement and installation of a horizontal and vertical band saw, plasma cutter, and floor mill and blast booth refurbishment. The Board authorized design in December 2015.

Planned Projects

La Verne Machine Shop Equipment Replacement Project

Five additional pieces of shop equipment need to be replaced and refurbished to maintain Metropolitan's ability to respond to emergencies and perform planned maintenance. This is the final project to complete a 20-year shop modernization program. The following equipment has been identified for replacement or refurbishment: One medium and one large lathe to replace two existing lathes one new medium sized floor mill to replace a non-functioning floor mill, a new very large floor mill to work on Metropolitan's largest hydraulic machinery, like the pumps on the CRA system, and refurbishment of the large existing floor mill.

Metropolitan Security System Enhancements 15499

Total Appropriation Estimate:	\$9,731,000	Biennial Estimate:	\$6,429,823
Appropriated Amount 9/30/2017:	\$2,000,000	Cost Through 9/30/2017:	\$530

Purpose

To mitigate security threats and improve the security of Metropolitan personnel and property.

Scope

This appropriation was established to upgrade Metropolitan’s physical security control measures to defend its facilities from intrusion. Projects within this appropriation will address electronic and physical security measures.

Accomplishments for FY 2016/17 and FY 2017/18

New Projects Initiated Last Period:

- Security System Upgrade

Major Milestones Achieved Last Period:

- No major milestones were achieved during the last biennium.

Projects Completed To Date:

- No projects have been completed.

Objectives for 2018/19 and FY 2019/20

Project	Total Project Estimate	Estimated Completion	Major Milestones
Security System Upgrade	1,959,000	2018	Complete upgrades
Headquarters Security Upgrades	7,331,000	2019	Complete design

Authorized Projects

Security System Upgrade

The electronic security system is the backbone of Metropolitan’s physical security system. Studies indicate that replacement of the 15-year-old system is not yet required; however, incremental upgrades are needed to extend the life of the system. Work includes hardware and software upgrades to network controllers, computer servers, card readers, and the video management system. Design and installation was authorized by the Board in May 2017.

Planned Projects

Headquarters Security Upgrades

Security assessments have identified several recommended security upgrades to reduce security risk for Metropolitan’s Headquarters facility at Union Station and to ensure protection of people and assets. This project will perform comprehensive security upgrades at the headquarters building.

Mills Water Treatment Plant - Improvements

15381

Total Appropriation Estimate:	\$12,430,000	Biennial Estimate:	\$0
Appropriated Amount 9/30/2017:	\$5,695,000	Cost Through 9/30/2017:	\$5,317,540

Purpose

To maintain reliability and ensure regulatory compliance of the Mills plant.

Scope

This appropriation was established to plan and implement multiple projects at the Mills plant. The common driver for many of the projects in this appropriation is infrastructure reliability.

Accomplishments for FY 2016/17 and FY 2017/18

New Projects Initiated Last Period:

- No projects were initiated during the last biennium.

Major Milestones Achieved Last Period:

- No major milestones were achieved during the last biennium.

Projects Completed To Date:

- Five projects have been completed.

Objectives for 2018/19 and FY 2019/20

Project	Total Project Estimate	Estimated Completion	Major Milestones
Mills Basin Solids Removal Improvements	6,980,000	2021	Deferred to continue after this biennium

Authorized Projects

Mills Basin Solids Removal Improvements

Currently, the Mills plant removes solids from each sedimentation basin using a bridge-mounted siphon system, and discharges the solids to the retention basins. However, the siphon flow cannot be adequately controlled. As a result, excessive amounts of water are often siphoned to the retention basins, causing increased solids drying time and reduced retention basin capacity. This project will upgrade the traveling bridges' solids removal equipment and controls to improve the solids removal process at the Mills plant's Modules Nos. 3 and 4. The new equipment and controls will allow the plant to optimize its solids removal process by simultaneously reducing the amount of water removed from the basin and reducing excessive solids build-up in the basins. Preliminary design was authorized by the Board in June 2005.

Planned Projects

No additional projects are planned.

Mills Water Treatment Plant - Improvements for FY 2006/07 through FY 2011/12 15452

Total Appropriation Estimate: \$33,654,000 Biennial Estimate: \$3,025,715

Appropriated Amount 9/30/2017: \$20,599,000 Cost Through 9/30/2017: \$14,044,490

Purpose

To maintain reliability and ensure regulatory compliance of the Mills plant.

Scope

This appropriation was established to plan and implement multiple projects at the Mills Water plant. The common driver for many of the projects in this appropriation is infrastructure reliability.

Accomplishments for FY 2016/17 and FY 2017/18

New Projects Initiated Last Period:

- No projects were initiated in the last biennium.

Major Milestones Achieved Last Period:

- Mills Electrical Upgrades Stage 1 - Completed design
- Mills Industrial Wastewater Handling Facilities Improvements - Completed construction

Projects Completed To Date:

- Three projects have been completed.

Objectives for 2018/19 and FY 2019/20

Project	Total Project Estimate	Estimated Completion	Major Milestones
Mills Electrical Upgrades Stage 1	\$19,700,000	2020	Complete construction
Mills Modules 3 & 4 Flash Mix Chemical Containment Upgrades	1,750,000	2020	Complete construction

Authorized Projects

Mills Electrical Upgrades

The electrical system at the Mills plant has deteriorated through long-term use, is difficult to maintain and repair, and needs improved backup capability. Failure of a single electrical device could impact the treatment process. The electrical upgrades at the Mills plant will be completed in three stages. Stage 1 upgrades will address the highest priority work, including replacement of obsolete circuit breakers and improvement of power reliability for key process equipment. Stage 2 upgrades will add a second incoming 12 kV service from Riverside Public Utilities, and upgrade the plant's main switchgear and standby generator switchgear. Stage 3 upgrades will modify electrical manholes, replace digital metering modules for all motor control centers, and add fiber optic cabling. Construction of Stage 1 project was authorized by the Board in August 2017.

Mills Modules 3 & 4 Flash Mix Chemical Containment Upgrades

The existing flash mix areas at Mills Plant Modules 3 & 4 contain chemical feed equipment for ammonia, polymer, caustic, alum, sodium hypochlorite and chlorine. The equipment is contained within a low concrete curb. To reduce the risk of chemical releases, improved containment is needed. This project will replace the chemical piping in the area with double-walled piping with a leak detection system, replace flow meters and valves, relocate control panels, and install flow meter display units in a weatherproof enclosure outside of the containment areas. Final design was authorized by the Board in October 2016.

Planned Projects

No additional projects are planned.

Mills Water Treatment Plant - Improvements for FY 2012/13 through FY 2017/18 15479

Total Appropriation Estimate:	\$6,697,000	Biennial Estimate:	\$3,242,340
Appropriated Amount 9/30/2017:	\$3,200,000	Cost Through 9/30/2017:	\$2,305,629

Purpose

To maintain reliability and ensure regulatory compliance of the Mills plant.

Scope

This appropriation was established to plan and implement multiple projects at the Mills plant. The common driver for many of the projects in this appropriation is infrastructure reliability.

Accomplishments for FY 2016/17 and FY 2017/18

New Projects Initiated Last Period:

- Mills Chemical Tank Replacement
- Mills Plant Perimeter Security and Erosion Control Improvements

Major Milestones Achieved Last Period:

- Mills Chemical Tank Replacement - Continued final design

Projects Completed To Date:

- No projects have been completed.

Objectives for 2018/19 and FY 2019/20

Project	Total Project Estimate	Estimated Completion	Major Milestones
Mills Chemical Tank Replacement	1,600,000	2020	Complete construction
Mills Plant Perimeter Security and Erosion Control Improvements	2,600,000	2021	Complete design and start construction

Authorized Projects

Mills Chemical Tank Replacement

The Mills plant relies on two 6,250-gallon cross-linked high-density polyethylene (HDPE) tanks for the storage of fluorosilicic acid. These tanks have a recommended service life of 10 years, and have been in service since 2007. Recent inspections have identified leakage at the bolted connections of both tanks. This project will replace the fluorosilicic acid storage tanks with tanks of the same capacity and improved mechanical properties to provide an expected service life of 20 years. Design was authorized by the Board in April 2017.

Mills Plant Perimeter Security and Erosion Control Improvements

The Mills plant has approximately 14,500 linear feet of perimeter fencing that is primarily a chain link with a height of six to eight feet. The fencing and several of the entry gates are deteriorating and may be vulnerable to security breaches. In addition, stormwater runoff has eroded an area on the southern boundary of the plant. This project will replace 7,700 feet of the existing fence with eight-foot-tall security fencing along the plant's southern, northern and western boundaries, and replace three existing gates with taller security gates with surveillance cameras. Grading and erosion control improvements, such as installation of v-ditches and flow re-direction, will also be performed to prevent sediment from leaving the site. All improvements will be consistent with Mills plant's architectural design guidelines, and with Metropolitan's approach to facility security. Preliminary design was authorized by the Board in October 2017.

Planned Projects

No additional projects are planned.

Mills Water Treatment Plant - Improvements for FY 2018/19 through FY 2023/24 18905

Total Appropriation Estimate: \$1,559,000 Biennial Estimate: \$1,417,000
 Appropriated Amount 9/30/2017: \$0 Cost Through 9/30/2017: \$0

Purpose

To maintain reliability and ensure regulatory compliance of the Mills plant.

Scope

This appropriation will be established to plan and implement multiple projects at the Mills plant. The common driver for many of the projects in this appropriation is infrastructure reliability.

Accomplishments for FY 2016/17 and FY 2017/18

New Projects Initiated Last Period:

- No projects were initiated during the last biennium.

Major Milestones Achieved Last Period:

- No major milestones were achieved during the last biennium.

Projects Completed To Date:

- No projects were completed.

Objectives for 2018/19 and FY 2019/20

Project	Total Project Estimate	Estimated Completion	Major Milestones
Mills Ozone PLC Control and Communication Equipment Upgrade	1,630,000	2019	Complete construction

Authorized Projects

None, this appropriation will be initiated in FY 2018/19.

Planned Projects

Mills Ozone PLC Control and Communication Equipment Upgrade

The Mills plant ozonation equipment utilizes a type of Programmable Logic Controller (PLC) that was introduced to the commercial market in 1988. Computer hardware from that era is now outdated, and the PLC manufacturer has announced that it will no longer produce or support this equipment. In addition, inventories of spare parts will no longer be maintained once exhausted. Failure of a PLC and/or its communication module could cause a disruption in the ozone control system. This project will replace the equipment and modify the software to operate with the new equipment for the Mills ozone control system. The upgraded system will feature Metropolitan-standardized PLCs in an open-architecture approach that staff will be able to maintain and upgrade in the future.

Operations Support Facilities Improvement

15495

Total Appropriation Estimate:	\$64,945,000	Biennial Estimate:	\$8,933,357
Appropriated Amount 9/30/2017:	\$11,820,000	Cost Through 9/30/2017:	\$2,669,575

Purpose

To replace or expand support facilities to meet current and future operations and maintenance needs.

Scope

This appropriation was established to plan and construct facilities used to support Metropolitan's operations. Work includes site improvements at Lake Mathews, housing facilities at the Colorado River Aqueduct (CRA) pumping plants, and seismic upgrades to operations support buildings at Metropolitan's La Verne facility.

Accomplishments for FY 2016/17 and FY 2017/18

New Projects Initiated Last Period:

- CRA Housing Improvements - Renovation of Houses
- CRA Housing Improvements - Renovation of Short-Term Accommodations at Eagle Mtn and Iron Mtn Pumping Plants
- Lake Mathews Wastewater System Replacement

Major Milestones Achieved Last Period:

- CRA Housing Improvement - Addition of Ten New Houses - Started construction
- CRA Housing Improvements - Renovation of Houses - Started design and construction
- CRA Housing Improvements - Renovation of Short-Term Accommodations at Eagle Mtn and Iron Mtn Pumping Plants - Started final design
- La Verne Water Quality Laboratory and Field Engineering Building Seismic Upgrades and Building Improvements - Completed preliminary design
- Lake Mathews Wastewater System Replacement - Started preliminary design

Projects Completed To Date:

- No projects have been completed.

Objectives for 2018/19 and FY 2019/20

Project	Total Project Estimate	Estimated Completion	Major Milestones
CRA Housing Improvements - Addition of Ten New Houses	7,621,000	2018	Complete construction
CRA Housing Improvements - Renovation of Houses	5,440,000	2019	Complete pilot project
CRA Housing Improvements - Renovation of Short-Term Accommodations at Eagle Mtn and Iron Mtn Pumping Plants	4,524,000	2020	Complete design and begin construction
Eagle Rock Facility Improvements	755,000	2020	Begin design
Eagle Rock Security	937,000	2020	Begin preliminary design
Lake Mathews Wastewater System Replacement	3,412,000	2020	Complete design

Authorized Projects

CRA Housing Improvements - Addition of Ten New Houses

This project will construct ten new manufactured houses. These houses will be used as temporary residences for employees while existing Metropolitan-owned staff housing is rehabilitated and be made permanent residences after the rest of the staff housing has been rehabilitated. These ten new houses will be located as follows: two at Gene Pumping Plant, four at Iron Mountain Pumping Plant, two at Eagle Mountain Pumping Plant, and two at Hinds Pumping Plant. Construction of eight new houses was authorized by the Board in May 2017, and construction of two additional houses was authorized by the Board in July 2017.

CRA Housing Improvements - Renovation of Houses

Metropolitan owns and rents 89 houses throughout the five CRA pumping plants to employees involved in operation and maintenance of the CRA. Due to the remoteness of the CRA facilities, on-site housing is provided to staff to ensure an appropriate response time in the event of an emergency that could jeopardize aqueduct flows, damage equipment, or present a safety risk to employees or the general public. The aging houses are deteriorated and in need of repairs and renovations. The planned renovations for the 89 desert houses may include: upgrading electrical and plumbing systems; installing new doors and windows; installing new cabinetry and countertops for kitchens and bathrooms; replacing roofs and HVAC units; repairing structural components such as roof joists and floor foundations; replacing and upgrading flooring; interior and exterior painting; and abatement of hazardous materials, as needed. The extent of renovations will depend on the condition and needs of each house. Renovation of up to 89 houses was authorized by the Board in May 2017.

CRA Housing Improvements - Renovation of Short-Term Accommodations at Eagle Mtn and Iron Mtn Pumping Plants

Eagle Mountain and Iron Mountain Pumping Plants have kitchens and guest lodges that are used by staff during shutdowns and construction projects, and during extended periods of condition assessments and design of rehabilitation work. These facilities will be used frequently over the next decade as the planned rehabilitation of the 45 main CRA pumps moves forward.

The kitchen at Iron Mountain Pumping Plant has been in service for decades and while still functioning, its equipment is deteriorated and obsolete. The kitchen at Eagle Mountain Pumping Plant does not currently meet San Bernardino County Health Services' requirements for large-scale food storage, refrigeration, or handling. As a result, it has been removed from service. The 10-room guest lodge at Eagle Mountain Pumping Plant and the 16-room guest lodge at Iron Mountain Pumping Plant have both deteriorated after more than 40 years of service, and require frequent short-term repairs. The planned kitchen renovations include replacement and refurbishment of existing floor and wall coverings, shelving, plumbing, electrical components, sinks, ranges, freezers, and walk-in refrigerators. At the guest lodges, the needed improvements include electrical, plumbing, and HVAC improvements and roof replacement. Design was authorized by the Board in May 2017.

La Verne Water Quality Laboratory and Field Engineering Building Seismic Upgrades and Building Improvements

This project addresses seismic upgrades and other building improvements for the Field Engineering Building and Water Quality Laboratory at Metropolitan's La Verne facility. Both buildings were constructed in accordance with the building codes at the time of construction. However, industry knowledge of earthquakes and seismic design has greatly improved over the years, leading to the development of more stringent, modern seismic codes. To minimize the risk of damage to these key facilities during a major earthquake, seismic upgrades are needed.

The Water Quality Laboratory seismic retrofit includes the replacement of existing diagonal steel bracing with new buckling-restrained braces and associated steel frame and foundation upgrades. Seismic anchorage and bracing of key non-structural elements are also included. Other building improvements include fire protection upgrades and replacement of the building's roof; drywall repairs throughout the older portions of the laboratory; and accessibility improvements to meet current building code requirements.

The Field Engineering Building seismic retrofit includes the addition of exterior steel-braced frames supported on drilled pile foundations, strengthening of the roof diaphragm, and horizontal steel bracing at the interior mezzanine level. Other building improvements include hazardous materials abatement of lead and asbestos; security improvements; lighting improvements; accessibility improvements to meet current building code requirements; and heating, ventilation, and air conditioning improvements.

Final design of seismic upgrades and building improvements for the Water Quality Laboratory and Field Engineering Building was authorized by the Board in January 2018.

Lake Mathews Wastewater System Replacement

The existing wastewater system at Lake Mathews has been in operation for over 50 years and is showing signs of failure. There have been repeated instances of slow-draining toilets, broken and clogged pipes, septic tank backups, and clogged leach fields. The leach fields are at the end of service life. This project will replace the existing leach field system with a new sewer system piped directly to the local municipal sewer system. Preliminary design was authorized by the Board in May 2017.

Planned Projects

Eagle Rock Facility Improvements

The Eagle Rock Operations Control Center and Emergency Operations Center are the hub for the operation of Metropolitan's water distribution system, as well as a central location for meetings with member agencies. The roads serving these facilities are over 70 years old and are exhibiting distress including severe cracking and potholing of the asphalt surface, and damage to the road base. These facilities are adjacent to vegetated canyons in a high fire danger area, but may not have adequate fire suppression systems. Potable water lines are corroded and in need of replacement. An existing timber retaining wall has deteriorated and is in need of replacement. This project will reconstruct the Eagle Rock facilities roadways, replace corroded water piping, and replace a deteriorated retaining wall.

Eagle Rock Security

The Eagle Rock Operations Control Center and Emergency Operations Center are the hub for the operation of Metropolitan's water distribution system, as well as a central location for meetings with member agencies. This site is susceptible to intrusion by trespassers due to the lack of adequate property-line security. This project will provide new security fencing and lighting, a new vehicular access gate, and a new security camera and intercom for the access gate.

Etiwanda Test Facility

Metropolitan needs a facility to test valves, meters, coatings, instrumentation, and other water treatment and distribution devices to ensure the equipment meets specifications, to verify their performance, and to develop specifications for new equipment. Outside test facilities cannot reproduce the operating conditions experienced in Metropolitan's system.

This project will construct an equipment test facility at the Etiwanda Reservoir. This test facility will utilize water from the Etiwanda Feeder and discharge the test water into the Etiwanda Reservoir bypass channel. The test facility will consist of inlet piping, valves and flow meters; test piping, isolation valves, fittings, and control equipment in three diameters (8, 12 and 24 inches) for mounting test equipment and meters; energy dissipation and collection tanks; electrical equipment and control equipment; and a storage building to house computers, instrumentation readouts, instruments, and tools. The new test facility will be used to evaluate water treatment and distribution system equipment, train staff in the use of that equipment, and potentially provide services to member agencies or outside agencies such as the California Department of Water Resources.

New La Verne Warehouse

The Central Stores Warehouse at La Verne is Metropolitan's main warehouse for storing materials, supplies, and equipment for use by field personnel to support District operations. The warehouse is no longer adequate to support Metropolitan's assets management plan and future infrastructure rehabilitation needs. Due to the nature of its structural deficiencies, the Central Stores Warehouse building will be replaced in its entirety. The new warehouse at La Verne will support Metropolitan's Prestressed Concrete Cylinder Pipe (PCCP) Rehabilitation Program, existing operations and maintenance, and future infrastructure upgrades. It will provide a controlled space to protect Metropolitan's existing assets and future investments, increase operational efficiency, and reduce overall expenditure on rental facilities and assets refurbishment. The new facility will also ensure that field personnel are able to quickly and efficiently obtain equipment and supplies that are in optimal condition to support District infrastructure and operations. This project will provide a new centralized warehouse facility at La Verne to address site-wide storage needs.

PCCP Rehabilitation and Replacement

15471

Total Appropriation Estimate:	\$62,000,000	Biennial Estimate:	\$3,896,673
Appropriated Amount 9/30/2017:	\$24,943,350	Cost Through 9/30/2017:	\$17,329,502

Purpose

To identify pipelines whose age, location and condition warrant refurbishment/replacement to insure long-term reliability of Metropolitan's Prestressed Concrete Cylinder Pipe (PCCP) lines water delivery.

Scope

This appropriation was established to plan and implement reliability projects throughout the Conveyance and Distribution System which will include structural engineering evaluation of all 163 miles of PCCP, conduct pilot testing installation of fiber optic acoustic monitoring system, prepare programmatic CEQA documents to cover PCCP Rehabilitation and to initiate refurbishment and replacement projects for at-risk pipelines.

Accomplishments for FY 2016/17 and FY 2017/18

New Projects Initiated Last Period:

- No projects were initiated during the last biennium.

Major Milestones Achieved Last Period:

- Electromagnetic Inspections of PCCP Lines - Completed electromagnetic inspections on 9 PCCP feeders
- Program CEQA - Certification of the Final Programmatic Environmental Impact Report (Final PEIR)

Projects Completed To Date:

- Eight projects have been completed.

Objectives for 2018/19 and FY 2019/20

Project	Total Project Estimate	Estimated Completion	Major Milestones
Electromagnetic Inspections of PCCP Lines	26,014,000	2037	Continue study
Foothill Feeder Acoustic Fiber Optic PCCP Monitoring	3,117,000	2020	Complete construction
PCCP Rehabilitation - Program Management	16,081,000	2037	Continue study
Sepulveda Feeder Stray Current Drain Stations	227,000	2020	Complete construction

Authorized Projects

Electromagnetic Inspections

All PCCP lines within the distribution system are inspected every three to seven years. The frequency is based on the condition and history of repairs for each feeder. Three cycles of electromagnetic testing have been completed to date on Metropolitan's PCCP feeders. This project will perform the fourth cycle of inspections over the next five years. Planned activities for the inspections include: scheduling and coordination of shutdowns; conducting the electromagnetic inspections; conducting internal visual inspections; shutting down and dewatering the feeders, and returning them to service; analyzing the inspection results; and preparing comprehensive inspection reports.

PCCP Rehabilitation - Program Management

This project will develop a comprehensive, long-term plan for managing the risk of deteriorating PCCP lines in the distribution system.

Planned Projects

Foothill Feeder Acoustic Fiber Optic PCCP Monitoring

The proposed acoustic fiber optic system would provide continuous monitoring for wire breaks for at least 10 years, eliminating the need to dewater for PCCP inspections and significantly reducing the likelihood of pipeline rupture. The scope of this project includes design, installation, and start-up an acoustic fiber optic (AFO) prestressed concrete cylinder pipe (PCCP) monitoring system for the Foothill Feeder, including ten years of monitoring services.

Sepulveda Feeder Stray Current Drain Stations

This project is intended to prevent the corrosion, deterioration, and potential rupture of the Sepulveda Feeder. PCCP ruptures invariably cause significant disruption to day-to-day Operations. A rupture at any of the subject locations would necessitate an extended pipeline shutdown to facilitate repairs. In addition, a rupture would result in significant flooding and third-party impacts. The scope of this project includes design, installation, and start-up three stray current mitigation drain stations on the Sepulveda Feeder.

Perris Valley Pipeline

15425

Total Appropriation Estimate:	\$151,000,000	Biennial Estimate:	\$318,998
Appropriated Amount 9/30/2017:	\$129,100,000	Cost Through 9/30/2017:	\$124,897,135

Purpose

Expand service to Eastern Municipal Water District (EMWD) and Western Municipal Water District (WMWD). and optimize operations of the Mills and Skinner plants.

Scope

This appropriation was established to design and construct a 6.5-mile, 96-inch diameter pipeline from the Mills plant to EMWD’s boundary, southeast of the Mills plant. This pipeline will have four new service connections. The project will be undertaken as a cooperative effort between Metropolitan, EMWD, and WMWD.

Accomplishments for FY 2016/17 and FY 2017/18

New Projects Initiated Last Period:

- No projects were initiated during the last biennium.

Major Milestones Achieved Last Period:

- Perris Valley Pipeline Interstate 215 Crossing - Completed preliminary design

Projects Completed To Date:

- Six projects have been completed.

Objectives for 2018/19 and FY 2019/20

Project	Total Project Estimate	Estimated Completion	Major Milestones
Perris Valley Pipeline Interstate 215 Crossing	24,375,000	2020	Complete design

Authorized Projects

Perris Valley Pipeline Interstate 215 Crossing

The objective of the Perris Valley Pipeline is to supply additional water deliveries from Mills plant to EMWD and WMWD per their request. Construction of this 6.5-mile-long pipeline was initiated in 2007, to be implemented under two contracts: the North Reach consisting of 2.7 miles of pipeline and two service connections (WR-24 and EM-23), and the South Reach consisting of 3.8 miles of pipeline and two additional service connections (WR-35 and EM-24). In 2009, the North Reach was completed and placed in service. In 2010, 3.3 miles of the South Reach were completed. The Perris Valley Pipeline Interstate 215 Crossing project will complete a remaining half-mile-long section of pipeline approximately midway along the South Reach and enable placing the South Reach in service. This project includes an approximately 700-foot-long tunnel beneath Interstate 215, in the vicinity of the Van Buren Boulevard Interchange. Design of this portion of the Perris Valley Pipeline was authorized by the Board in 2006.

Planned Projects

No additional projects are planned.

Pipeline Rehabilitation and Replacement

15482

Total Appropriation Estimate:	\$2,178,000	Biennial Estimate:	\$0
Appropriated Amount 9/30/2017:	\$0	Cost Through 9/30/2017:	\$0

Purpose

To identify pipelines whose age, location, and condition warrant rehabilitation or replacement to enhance long-term water delivery reliability.

Scope

This appropriation is established to plan and implement multiple projects throughout the Conveyance and Distribution System for all non-prestressed concrete cylinder pipe (PCCP) lines. The projects will rehabilitate and replace at-risk pipelines, and update the appropriation estimate annually based on rehabilitation and replacement options. The common driver for all projects in this appropriation is infrastructure reliability.

Accomplishments for FY 2016/17 and FY 2017/18

New Projects Initiated Last Period:

- No projects were initiated during the last biennium.

Major Milestones Achieved Last Period:

- No major milestones were achieved during the last biennium.

Projects Completed To Date:

- No projects have been completed.

Objectives for 2018/19 and FY 2019/20

Project	Total Project Estimate	Estimated Completion	Major Milestones
Field Survey & Assessment for Metallic and Concrete Pipelines: Phase 1 for Select High Priority Feeders	1,980,000	2021	Deferred to start after this biennium

Authorized Projects

None, this appropriation will be initiated in FY 2018/19.

Planned Projects

Field Survey & Assessment for Metallic and Concrete Pipelines: Phase 1 for Select High Priority Feeders

Metropolitan’s water delivery system consists of 830 miles of pipelines, of which 670 miles are comprised of reinforced concrete, welded steel, and cast iron pipe. The majority of Metropolitan’s non-PCCP lines were installed over 50 years ago. Experience has shown that degradation from corrosion of reinforced concrete and metallic pipelines can often develop undetected. Some of these pipelines are also showing signs of deterioration, as evidenced by several recent lining and joint repair projects (e.g., Etiwanda Pipeline, Orange County Feeder, and Lakeview Pipeline).

Phase 1 for high priority pipelines, including Santa Monica Feeder, Upper Feeder, Lower Feeder, and Middle Feeder, will include a complete risk assessment and prioritization of pipeline inspections, condition assessment of these high priority pipelines using prequalified inspection technologies, and recommendations for inspection technologies to be used for future condition assessments.

Power Reliability and Energy Conservation 15391

Total Appropriation Estimate: \$54,892,050 Biennial Estimate: \$24,406

Appropriated Amount 9/30/2017: \$54,892,050 Cost Through 9/30/2017: \$51,437,729

Purpose

To reduce purchased electrical energy and costs, provide sufficient and reliable power, and reduce carbon-based emissions.

Scope

This appropriation was established to implement multiple power and energy related projects throughout Metropolitan’s system. Since its inception, several projects have been incorporated into this appropriation and completed, including the OC-88 Energy Savings Modifications Project which modified the pump station to reduce the energy required for pumping and provides significant energy savings, and the one-megawatt Skinner Solar Power Facility project.

Accomplishments for FY 2016/17 and FY 2017/18

New Projects Initiated Last Period:

- No projects were initiated during the last biennium.

Major Milestones Achieved Last Period:

- Jensen Solar Power Plant - Completed construction
- La Verne Solar Power Plant - Completed construction

Projects Completed To Date:

- Eight projects have been completed.

Objectives for 2018/19 and FY 2019/20

Project	Total Project Estimate	Estimated Completion	Major Milestones
La Verne Solar Power Plant	12,833,000	2022	Continue required monitoring and reporting

Authorized Projects

La Verne Solar Power Plant

This project added a three megawatt solar photovoltaic system at the Weymouth Water Treatment Plant. Construction was authorized by the Board in June 2015 and had been completed.

Jensen Solar Power Plant

This project added a one-megawatt solar power plant on the grounds of the Jensen plant. Construction was authorized by the Board in August 2016 and had been completed. Production of record drawings is underway.

Planned Projects

No additional projects are planned.

Project Controls and Reporting System 15490

Total Appropriation Estimate:	\$6,440,000	Biennial Estimate:	\$2,319,035
Appropriated Amount 9/30/2017:	\$1,330,000	Cost Through 9/30/2017:	\$1,136,774

Purpose

To ensure the accuracy, efficiency, and effectiveness for enterprise-wide project controls, scheduling, budgeting, resource management, and management reporting.

Scope

This appropriation was established to replace outdated project reporting systems. Some of the tools in use today lack key fundamental capabilities, such as earned value and resource utilization reporting, and, due to the upgrades of other applications, have lost the former integration, impacting timely reporting. Currently, the primary deliverable of this appropriation is the implementation of an enterprise-wide Project Controls System to provide schedule and resource management and replace the Project Management Information System (PMIS).

Accomplishments for FY 2016/17 and FY 2017/18

New Projects Initiated Last Period:

- No projects were initiated during the last biennium.

Major Milestones Achieved Last Period:

- Project Controls and Reporting System - Completed design and initiated deployment

Projects Completed To Date:

- No projects have been completed.

Objectives for 2018/19 and FY 2019/20

Project	Total Project Estimate	Estimated Completion	Major Milestones
Project Controls and Reporting System	6,125,000	2019	Complete deployment

Authorized Projects

Project Controls and Reporting System

The Project Controls and Reporting System (PCRS) will replace Metropolitan’s existing project control system that is now functionally obsolete. The PCRS will integrate data from multiple components of Metropolitan’s financial and CIP scheduling systems, and integrate this data in a new data warehouse. The PCRS will create standardized reports and dashboards, and produce forecasts and resource requirement reports. This data warehouse will be an enterprise-wide tool that will also support other future corporate reporting applications. Deployment of the PCRS was authorized by the Board in October 2017.

Planned Projects

No additional projects are planned.

Reservoir Cover Replacement

15417

Total Appropriation Estimate: \$148,495,000 Biennial Estimate: \$20,203,979

Appropriated Amount 9/30/2017: \$46,616,000 Cost Through 9/30/2017: \$26,465,688

Purpose

To replace reservoir covers and roofs that have exceeded their useful life or are increasingly difficult to repair.

Scope

This appropriation was established to perform studies, prepare construction documents, and coordinate with regulators for the replacement of reservoir covers at multiple locations. The scope for floating reservoir covers includes removing existing covers, repairing reservoir lining, modifying inlet and outlet structures, installing underdrain leakage collection systems, installing new geocomposite drainage course, installing new flexible membrane liners and floating covers, and upgrading reservoir electrical systems and surface drainage to accommodate new cover dewatering pumps. For rigid reservoir covers, the scope of work includes removal of existing roofing materials, concrete repair, seismic upgrades, and installation of new roofing materials.

Accomplishments for FY 2016/17 and FY 2017/18

New Projects Initiated Last Period:

- Mills Finished Water Reservoir Rehabilitation
- Jensen Finished Water Reservoir No. 1 Cover Rehabilitation
- Jensen Finished Water Reservoir No. 2 Floating Cover Rehabilitation

Major Milestones Achieved Last Period:

- Palos Verdes Reservoir Rehabilitation - Continued construction
- Mills Finished Water Reservoir Rehabilitation - Started design
- Jensen Finished Water Reservoir No. 1 Cover Rehabilitation - Started design
- Jensen Finished Water Reservoir No. 2 Floating Cover Rehabilitation - Started design

Projects Completed To Date:

- No projects have been completed.

Objectives for 2018/19 and FY 2019/20

Project	Total Project Estimate	Estimated Completion	Major Milestones
Garvey Reservoir Rehabilitation	55,886,000	2018	Begin design
Jensen Finished Water Reservoir No. 1 Cover Rehabilitation	1,392,000	2019	Complete construction
Jensen Finished Water Reservoir No. 2 Floating Cover Rehabilitation	5,323,000	2019	Complete design
Mills Finished Water Reservoir Rehabilitation	14,155,000	2020	Complete design
Palos Verdes Reservoir Rehabilitation	47,481,000	2019	Complete construction

Authorized Projects

Jensen Finished Water Reservoir No. 1 Cover Rehabilitation

The Jensen plant has two 50-MG finished water reservoirs. Reservoir No. 1 is a concrete structure with a concrete roof that was completed in 1972. The concrete roof of Reservoir No. 1 has a bituminous built-up roofing system and lightweight concrete cap made of perlite. Portions of the perlite cap have deteriorated over time due to weathering. Any further deterioration may result in ponded rainwater leaking into the reservoir, leading to the reservoir being removed from service in order to maintain treated water quality. The rehabilitation work will replace the damaged perlite with a thin concrete layer, which will extend the cover life for approximately 20 years. Design was authorized by the Board in April 2017.

Jensen Finished Water Reservoir No. 2 Floating Cover Rehabilitation

The Jensen plant has two 50-MG finished water reservoirs. Reservoir No. 2 has a polypropylene floating cover that was installed in 1997. The floating cover at Reservoir No. 2 is showing significant signs of wear and needs to be replaced. In addition, modifications to the Reservoir No. 2 inlet are needed, as turbulent flow at the inlet has torn holes in the floating cover on several occasions near the corners of the fixed metal air vents. The rehabilitation work will include installation of a new finished water reservoir liner and floating cover with a rainwater removal system and improvement of the existing inlet configuration. Design was authorized by the Board in April 2017.

Mills Finished Water Rehabilitation

The Mills plant relies on two finished water reservoirs with floating covers and geomembrane liners to provide storage for the downstream distribution system. Their capacity is approximately 25 million gallons (MG) each. The Hypalon cover on Reservoir No. 1 was installed in 1997, while the polypropylene cover on Reservoir No. 2 was installed in 1996. Over the past three years, an increasing number of rips and pinhole leaks in the covers were discovered and repaired. Due to their deterioration, the floating covers and geomembrane liners at both reservoirs need to be replaced. The rehabilitation work will include installation of new finished water reservoir liners and floating covers with a rain removal system, refurbishment or replacement of existing reservoir gates, installation of a new drop gate, and installation of enhanced security features. Design was authorized by the Board in April 2017.

Palos Verdes Reservoir Cover Replacement

Palos Verdes Reservoir was constructed in 1939 to provide operational storage and hydraulic flexibility within the distribution system. Metropolitan installed a geomembrane floating cover in 1988 to preserve water quality and reduce evaporative losses from the reservoir. Following a detailed inspection of that facility in 2011, the reservoir was removed from service because of damage to its floating cover. Due to its age and deteriorated condition, the synthetic rubber could not be repaired. The scope of the project includes removal of the reservoir's existing concrete lining; regrading of the clay sub-liner; modification of the existing spillway structure, inlet/outlet tower, and secondary inlet and outlet structures; installation of a new sub-drain system, asphalt concrete lining, geomembrane liner, and geomembrane floating cover; modification of the existing 480-volt electrical service, sodium hypochlorite feed system, rainwater removal system, and drainage piping; installation of a new valve and flowmeter upstream of the reservoir; and addition of a precast concrete instrumentation and water quality structure. Construction was authorized by the Board in November 2015.

Planned Projects

Garvey Reservoir Rehabilitation

Garvey Reservoir was placed into operation in 1954. It is located at the junction of the Middle Feeder and the Garvey-Ascot Cross Feeder in the city of Monterey Park. Garvey Reservoir provides hydraulic grade stabilization, pressure relief, and operational and emergency storage for the Central Pool portion of the distribution system. A flexible membrane liner and reservoir floating cover were installed in 1999. The service life of a reservoir floating cover is normally determined by the ability to effectively repair the material, and is approximately 20 years. The existing floating cover at Garvey Reservoir has become increasingly difficult to repair and is in need of replacement.

This project will replace the reservoir's aging floating cover and flexible membrane liner. In addition, the existing inlet/outlet tower will be removed; circulation piping will be modified; the inlet and outlet control valves will be replaced; and the on-site water quality laboratory will be refurbished.

Jensen Reservoir Nos. 1 and 2 Mixing Improvements

The Jensen plant has two finished water reservoirs with storage capacity of 50 million gallons each. Inadequate mixing within the reservoirs contributes to chloramine decay, which in turn increases the nitrite levels within the reservoirs and downstream distribution system. In accordance with the Water Quality Action Response Guidelines, elevated nitrite levels will require additional monitoring, as they may result in bacterial regrowth, and may require operational changes to mitigate chlorine decay. This project will conduct a study of the mixing characteristics of Reservoirs Nos. 1 and 2 and will test and implement solutions for mixing improvements, including installation of stationary mixers equipped with chlorine injection inside the reservoirs to enhance mixing and reduce the occurrence of nitrification within the reservoirs. The project will also include installation of new electrical panels to provide power to the new mixers, and modification to the Supervisory Control and Data Acquisition (SCADA) program to add operational control and status monitoring of the mixers.

Mills Finished Water Reservoir Mixing Improvements

The Mills plant relies on two finished water reservoirs with floating covers and geomembrane liners to provide storage for the downstream distribution system. Their capacity is approximately 25 million gallons (MG) each. These reservoirs are not baffled and this can result in short-circuiting, dead zones, and inadequate mixing. During low flow conditions, there is an increase in detention times and this can accelerate chloramine decay and nitrification. Nitrification is a biological process by which free ammonia is converted to nitrite and nitrate. Nitrification that occurs after the water leaves the plant can contribute to chloramine decay in the distribution system, increase bacterial growth, and operational changes to mitigate chlorine decay. Therefore, adequate mixing has been identified as the primary method to prevent chloramine decay in the reservoirs.

This project will perform computational fluid dynamics (CFD) model analyses to determine the current mixing characteristics of FWR 1 and 2. It will also perform CFD analyses on modified inlet and outlet designs for the reservoirs and determine mixing improvements. This project will make recommendations on modifications to the reservoirs' inlets and outlets in order to improve mixing characteristics.

Palos Verdes Reservoir Groundwater Management

This project will address long-term groundwater management at the Palos Verdes Reservoir. This project will evaluate monitoring and disposal options for groundwater seepage, install monitoring instrumentation, and develop a groundwater handling system, which may include a connection to the sewer system.

Weymouth Finished Water Reservoir Rehabilitation

The Weymouth plant was placed into service in 1941 with an initial capacity of 100 million gallons per day (mgd), and was expanded twice to its current capacity of 520 mgd. The plant delivers a blend of waters from the Colorado River and State Water Project to Metropolitan's Central Pool portion of the distribution system, and to an exclusive service area. The plant's 50 million gallon finished water reservoir was built in 1964. Because the finished water reservoir's concrete roof was constructed with no expansion joints, numerous cracks in the roof slab continue to open and close with the expansion/contraction cycles caused by daily fluctuation in temperature. Repair is required to protect the concrete, to prevent corrosion of the exposed reinforcing steel, and to reduce the potential of cross connection.

This project will repair cracked and spalling concrete on the underside of the finished water reservoir roof slab, support beam connections, and entry staircase. The project will concurrently perform any needed seismic retrofit to meet the latest Division of Safety of Dams (DSOD) requirements.

Right of Way and Infrastructure Protection

15474

Total Appropriation Estimate:	\$109,381,000	Biennial Estimate:	\$12,386,260
Appropriated Amount 9/30/2017:	\$23,830,000	Cost Through 9/30/2017:	\$20,741,406

Purpose

To assess and resolve the known encroachments and rights-of-way gaps, develop best management practices, and install security measures.

Scope

The RWIP Program was created to address right-of-way issues; prepare environmental documentation and acquire permits to perform needed repairs and allow maintenance activities to proceed without delay; execute repairs; and identify and address security issues throughout Metropolitan's distribution system.

Accomplishments for FY 2016/17 and FY 2017/18

New Projects Initiated Last Period:

- No projects were initiated during the last biennium.

Major Milestones Achieved Last Period:

- RWIPP Programmatic Environmental Documentation for the Orange County Operating Region - CEQA documentation certified
- Acquisition of right-of-way and real property in support of capital improvement projects in the Orange County Operating Region - Authorized by MWD Board in July 2017

Projects Completed To Date:

- No projects have been completed.

Objectives for 2018/19 and FY 2019/20

Project	Total Project Estimate	Estimated Completion	Major Milestones
Detailed Reliability Improvements of the Los Angeles County Operating Region	9,548,000	2027	Complete Preliminary Design
Detailed Reliability Improvements of the Orange County Operating Region	24,059,000	2020	Complete Construction
Detailed Reliability Improvements of the Riverside & San Diego County Operating Region	33,211,000	2024	Complete Preliminary Design
Detailed Reliability Improvements of the Western San Bernardino County Operating Region	15,061,000	2022	Complete Final Design
ROWIPP Programmatic Environmental Documentation for the Los Angeles Operating Region	1,967,000	2025	Complete development
ROWIPP Programmatic Environmental Documentation for the Orange County Operating Region	3,424,000	2018	Obtain permits
ROWIPP Programmatic Environmental Documentation for the Riverside/San Diego Co. Operating Region	2,221,000	2021	Complete development
ROWIPP Programmatic Environmental Documentation for the Western San Bernardino County Operating Region	2,448,000	2019	Complete development

Authorized Projects

Detailed Reliability Improvements of the Los Angeles County Operating Region

This project identifies and addresses right-of-way and security issues; and identifies and executes needed repairs within the Los Angeles County Operating Region. Planned improvements under the RWIP Program are being executed in five stages. Stage 3 includes final design of planned improvements, including preparation of detailed drawings and specifications, and development of construction cost estimates. Stage 3 activities were authorized by the Board in August 2014.

Detailed Reliability Improvements of the Orange County Operating Region

This project identifies and addresses right-of-way and security issues; and identifies and executes needed repairs within the Orange County Operating Region. Planned improvements under the RWIP Program are being executed in five stages. Stage 3 includes final design of planned improvements, including preparation of detailed drawings and specifications, and development of construction cost estimates. Stage 3 activities were authorized by the Board in August 2014.

Detailed Reliability Improvements of the Riverside & San Diego County Operating Region

This project identifies and addresses right-of-way and security issues; and identifies and executes needed repairs within the Riverside/San Diego County Operating Region. Planned improvements under the RWIP Program are being executed in five stages. Stage 3 includes final design of planned improvements, including preparation of detailed drawings and specifications, and development of construction cost estimates. Stage 3 activities were authorized by the Board in August 2014.

Detailed Reliability Improvements of the Western San Bernardino County Operating Region

This project identifies and addresses right-of-way and security issues; and identifies and executes needed repairs within the Western San Bernardino Operating Region. Planned improvements under the RWIP Program are being executed in five stages. Stage 3 includes final design of planned improvements, including preparation of detailed drawings and specifications, and development of construction cost estimates. Stage 3 activities were authorized by the Board in August 2014.

Environmental Regulatory Agreements

Prepare and execute agreements with environmental regulatory agencies to assist in development, and review and approve environmental documentation, and issue applicable permits. These activities were authorized by the Board in April 2013.

Real Property Acquisitions for all Operations Regions

Procurement of right-of-way or property to support access, or needed repairs to pipelines and facilities.

Right of Way Survey and Mapping

Provide surveying and mapping services needed to identify right-of-way issues, prepare pre-appraisal documentation for acquisition of easements and right-of-way; conduct field surveys and topographic mapping; ordering and reviewing title reports and supporting recorded documents. Stage 2 activities include developing conceptual solutions, layout drawings, and final design criteria of needed improvements; preparing pre-appraisal documentation for acquisition of easements and right-of-way; conducting field surveys and topographic mapping; ordering and reviewing title reports and supporting recorded documents; initiating consultations with permitting agencies for required permits; preparing legal descriptions, exhibit maps, and other exhibits as needed for acquisition planning, permits, and real estate negotiations; completing right-of-way mapping and preparing Record of Survey maps to be filed with the county of origin; and setting monuments and witness posts. Stage 2 activities were authorized by the Board in August 2014.

ROWIPP Programmatic Environmental Documentation for the Los Angeles Co. Operating Region

Prepare environmental documentation and acquire regional programmatic environmental permits for the Los Angeles County Operating Region to enable needed repairs and maintenance activities to proceed without delay. Stage 2 includes preparing notices of preparation (NOPs) and programmatic EIRs; initiating consultations with permitting agencies for required permits; preparing legal descriptions, exhibit maps, and other exhibits as needed for acquisition planning, permits, and real estate negotiations; negotiating and obtaining entry permits necessary for engineering, environmental and appraisal purposes. Stage 2 activities were authorized by the Board in August 2014.

ROWIPP Programmatic Environmental Documentation for the Orange County Operating Region

Prepare environmental documentation and acquire regional programmatic environmental permits for the Orange County Operating Region to enable needed repairs and maintenance activities to proceed without delay. Stage 4 includes certification of programmatic EIRs and acquisition of environmental permits. In addition, needed right-of-way and local agency permits will be acquired. Stage 4 activities were authorized by the Board in April 2016.

ROWIPP Programmatic Environmental Documentation for the Riverside/San Diego Co. Operating Region

Prepare environmental documentation and acquire regional programmatic environmental permits for the Riverside/San Diego County Operating Region to enable needed repairs and maintenance activities to proceed without delay. Stage 2 includes preparing notices of preparation (NOPs) and programmatic EIRs; initiating consultations with permitting agencies for required permits; preparing legal descriptions, exhibit maps, and other exhibits as needed for acquisition planning, permits, and real estate negotiations; and negotiating and obtaining entry permits necessary for engineering, environmental and appraisal purposes. Stage 2 activities were authorized by the Board in August 2014.

ROWIPP Programmatic Environmental Documentation for the Western San Bernardino County Operating Region

Prepare environmental documentation and acquire regional programmatic environmental permits for the Western San Bernardino County Operating Region to enable needed repairs and maintenance activities to proceed without delay. Stage 2 includes preparing notices of preparation (NOPs) and programmatic EIRs; initiating consultations with permitting agencies for required permits; preparing legal descriptions, exhibit maps, and other exhibits as needed for acquisition planning, permits, and real estate negotiations; negotiating and obtaining entry permits necessary for engineering, environmental and appraisal purposes. Stage 2 activities were authorized by the Board in July 2013.

Planned Projects

No additional projects are planned.

Second Lower Feeder PCCP Rehab

15497

Total Appropriation Estimate: \$495,361,000 Biennial Estimate: \$77,608,010

Appropriated Amount 9/30/2017: \$98,486,650 Cost Through 9/30/2017: \$28,304,977

Purpose

To maintain the reliability of the Second Lower Feeder (SLF) through specific prestressed concrete cylinder pipe (PCCP) repair and rehabilitation projects.

Scope

This appropriation was established to plan and implement projects to rehabilitate PCCP portions of the Second Lower Feeder.

Accomplishments for FY 2016/17 and FY 2017/18

New Projects Initiated Last Period:

- No projects were initiated during the last biennium.

Major Milestones Achieved Last Period:

- Second Lower Feeder PCCP 2016 Urgent Repairs - Completed
- Second Lower Feeder PCCP Rehabilitation Reach 1 - Began construction
- Second Lower Feeder PCCP Rehabilitation Reach 2 - Began design
- Second Lower Feeder PCCP Rehabilitation Reach 3 - Began design

Projects Completed To Date:

- Three projects have been completed.

Objectives for 2018/19 and FY 2019/20

Project	Total Project Estimate	Estimated Completion	Major Milestones
Second Lower Feeder PCCP Rehabilitation - Preliminary design	7,373,000	2019	Complete preliminary design
Second Lower Feeder PCCP Rehabilitation - Reach 1	54,430,000	2018	Complete construction
Second Lower Feeder PCCP Rehabilitation - Reach 2	34,675,000	2020	Complete design
Second Lower Feeder PCCP Rehabilitation - Reach 3	47,332,000	2022	Complete design
Second Lower Feeder PCCP Rehabilitation - Reach 4	23,108,000	2023	Begin design
Second Lower Feeder PCCP Rehabilitation - Reach 5	28,115,000	2024	Begin design

Authorized Projects

Second Lower Feeder PCCP Rehabilitation - Preliminary Design

The scope of this project includes preliminary design to rehabilitate the PCCP portion of the SLF. The SLF is the initial PCCP line to be addressed due to that feeder's condition, its history of repairs, the presence of corrosive soils and third-party stray currents, and its high internal operating pressure. Construction will take place over an 8- to 10-year period to minimize water delivery impacts to Metropolitan's member agencies. This strategy will improve reliability of the pipeline incrementally with the completion of each reach. Preliminary design was authorized by the Board in January 2015.

Second Lower Feeder PCCP Rehabilitation - Reach 1

This project includes design, procurement of steel pipe, and rehabilitation of approximately 23,100 feet of existing PCCP between stations 1269+65 to 1475+25. The scope includes rehabilitation of appurtenances to make the facility "like new" (i.e., modification of blowoff structures, relocation of below grade air release/vacuum valve (AR/VV), and replacement of existing isolation valves for AR/VV, blowoff, and pumpwell structures). Construction was authorized by the Board in August 2017.

Second Lower Feeder PCCP Rehabilitation Reach 2

This project includes design and rehabilitation of approximately 23,800 feet of existing PCCP between stations 1589+40 to 1859+80. The scope includes rehabilitation of appurtenances to make the facility "like new" (i.e., modification of blowoff structures, relocation of below grade AR/VV, and replacement of existing isolation valves for AR/VV, blowoff, and pumpwell structures). Final design was authorized by the Board in January 2015.

Second Lower Feeder PCCP Rehabilitation Reach 3

This project includes design and rehabilitation of approximately 24,200 feet of existing PCCP between stations 1859+80 to 2116+84. The scope includes rehabilitation of appurtenances to make the facility "like new" (i.e., modification of blowoff structures, relocation of below grade AR/VV, and replacement of existing isolation valves for AR/VV, blowoff, and pumpwell structures). Final design was authorized by the Board in January 2015.

Second Lower Feeder PCCP Rehabilitation Reach 4

This project includes design and rehabilitation of approximately 10,049 feet of existing PCCP between stations 1859+80 to 1865+41 and 1174+77 to 1269+65. The scope includes rehabilitation of appurtenances to make the facility "like new" (i.e., modification of blowoff structures, relocation of below grade AR/VV, and replacement of existing isolation valves for AR/VV, blowoff, and pumpwell structures). Final design was authorized by the Board in January 2015.

Second Lower Feeder PCCP Rehabilitation Reach 5

This project includes design and rehabilitation of approximately 11,378 feet of existing PCCP between stations 1865+41 to 1902+95 and 2040+60 to 2116+84. The scope includes rehabilitation of appurtenances to make the facility "like new" (i.e., modification of blowoff structures, relocation of below grade AR/VV, and replacement of existing isolation valves for AR/VV, blowoff, and pumpwell structures). Final design was authorized by the Board in January 2015.

Second Lower Feeder PCCP Rehabilitation Reach 6

This project includes design and rehabilitation of approximately 13,765 feet of existing PCCP between stations 1902+95 to 2040+60. The scope includes rehabilitation of appurtenances to make the facility "like new" (i.e., modification of blowoff structures, relocation of below grade AR/VV, and replacement of existing isolation valves for AR/VV, blowoff, and pumpwell structures). Final design was authorized by the Board in January 2015.

Second Lower Feeder PCCP Rehabilitation Pipe Procurement

This project includes design, preparation of bid documents, advertising, and award of steel liner for PCCP rehabilitation of SLF's six procurement contracts. Design for pipe procurement was authorized by the Board in January 2015.

Second Lower Feeder PCCP Rehabilitation ROW Acquisition

This project includes acquiring permanent right of way for PCCP rehabilitation of the SLF. Property acquisition was authorized by the Board in January 2015.

Second Lower Feeder PCCP Rehabilitation Valve Procurement

This project includes design, advertising, award, and procurement of valves for PCCP rehabilitation of the SLF contracts. Design for valve procurement was authorized by the Board in January 2015.

Planned Projects

Second Lower Feeder PCCP - Phase II: Reaches 7, 8, &10

The project includes restoring the SLF to “As Like New Conditions” as possible. This would include relocation of all AR/VV’s that have not already been relocated above ground, replacing all valves; sectionalizing, service connection turnout, pumpwell, AR/VV, shutoff, blowoff, etc. In addition, all master meters will be evaluated and possibly replaced and sectionalizing and meter structures modified or replaced. Reaches 7, 8, and 10 include design, procurement of steel pipe, valve procurement, construction or modification of master meter structure, replacement of turnout valve for service connection, and rehabilitation of approximately 30,000 linear feet of existing PCCP.

Second Lower Feeder PCCP Rehabilitation - Phase I: Reach 9

The project includes design of a seismic resilient section of feeder to account for the challenges of crossing the Newport-Inglewood Fault and other entities such as a freeway, light rail line, ground water recharge basin, the Los Angeles River, and possible area of contaminated soil. The scope includes design, procurement of steel pipe, valve procurement, construction, and rehabilitation of approximately 3,400 linear feet of existing PCCP. Isolation zone will be from Stations 1475+25 to 1589+40.

Second Lower Feeder PCCP Rehabilitation - Phase I: Reach 11

The project includes the Oak Street and Carbon Creek Pressure Control Structures (PCS) which will be modified in order to assure that the Second Lower Feeder can be operated at its maximum potential. This will include replacing all the valves and possibly the type of valves within the existing structures and possible modification of the piping arrangement. The existing pressure vessels will be inspected to evaluate their condition

Sepulveda Feeder PCCP Rehab

15496

Total Appropriation Estimate:	\$655,044,000	Biennial Estimate:	\$2,496,240
Appropriated Amount 9/30/2017:	\$16,830,000	Cost Through 9/30/2017:	\$15,198,633

Purpose

To maintain the reliability of the Sepulveda Feeder through specific PCCP repair and rehabilitation projects.

Scope

This appropriation was established to plan and implement projects to rehabilitate PCCP portions of the Sepulveda Feeder.

Accomplishments for FY 2016/17 and FY 2017/18

New Projects Initiated Last Period:

- Sepulveda Feeder PCCP Rehabilitation

Major Milestones Achieved Last Period:

- Sepulveda Feeder PCCP 2016 Urgent Repairs - Completed construction
- Sepulveda Feeder PCCP Rehabilitation - Started preliminary design

Projects Completed To Date:

- One project has been completed.

Objectives for 2018/19 and FY 2019/20

Project	Total Project Estimate	Estimated Completion	Major Milestones
Sepulveda Feeder PCCP Rehabilitation	581,678,000	2035	Complete preliminary design

Authorized Projects

Sepulveda Feeder PCCP Rehabilitation

The planned rehabilitation work involves lining the existing PCCP segments with steel liner pipe designed as a stand-alone pipeline which can accommodate full internal and external pressures on the line. The project includes restoring the Sepulveda Feeder to make the facility "like new" (i.e., modification of blowoff structures, relocation of below grade air release/vacuum valve (AR/VV), and replacement of existing isolation valves for AR/VV, blowoff, and pumpwell structures). In addition, all master meters will be evaluated and possibly replaced, and sectionalizing and meter structures modified or replaced. Preliminary design was authorized by the Board in January 2018.

Planned Projects

No additional projects are planned.

Skinner Water Treatment Plant - Improvements for FY2006/07 through FY2011/12

15435

Total Appropriation Estimate: \$3,860,000 Biennial Estimate: \$356,332

Appropriated Amount 9/30/2017: \$3,860,000 Cost Through 9/30/2017: \$1,609,354

Purpose

To maintain reliability and ensure regulatory compliance of the Skinner plant.

Scope

This appropriation was established to plan and implement multiple projects at the Skinner plant. The common driver for many of the projects in this appropriation is infrastructure reliability.

Accomplishments for FY 2016/17 and FY 2017/18

New Projects Initiated Last Period:

- No projects were initiated during the last biennium.

Major Milestones Achieved Last Period:

- Skinner Water Treatment Plant - Replacement of Plant 1 Filter Gate Stems and Nuts - Continued construction.

Projects Completed To Date:

- Four projects have been completed.

Objectives for 2018/19 and FY 2019/20

Project	Total Project Estimate	Estimated Completion	Major Milestones
Skinner WTP - Replacement of Plant 1 Filter Gate Stems and Nuts	823,000	2020	Complete construction

Authorized Projects

Skinner WTP - Replacement of Plant 1 Filter Gate Stems and Nuts

Skinner's Plant No. 1 has a total of 54 granular multi-media filters that were constructed in 1976 (Modules Nos. 1 and 2) and 1979 (Module No. 3). Each filter is equipped with a filter drain gate which allows filter backwash water to drain out into the filter backwash sump, and then to the washwater reclamation plants. Each drain gate has a vertical stainless steel stem connected to a valve actuator that rotates the stem to operate the gate. The threads on these gate stems are excessively worn. Incidences of replacement and repair of the stems have increased, resulting in unscheduled filter shutdowns. This project will replace 54 worn filter drain gate stems and nuts in Modules Nos. 1 to 3 (Plant 1) to enhance plant reliability. Construction was authorized by the Board in February 2007.

Planned Projects

No additional projects are planned.

Skinner Water Treatment Plant - Improvements for FY2018/19 through FY2023/24

18906

Total Appropriation Estimate: \$6,851,000 Biennial Estimate: \$2,710,999

Appropriated Amount 9/30/2017: \$0 Cost Through 9/30/2017: \$0

Purpose

To maintain reliability and ensure regulatory compliance of the Skinner plant.

Scope

This appropriation will be established to plan and implement multiple projects at the Skinner plant. The common driver for most of the projects in this appropriation is infrastructure reliability.

Accomplishments for FY 2016/17 and FY 2017/18

New Projects Initiated Last Period:

- No projects were initiated during the last biennium.

Major Milestones Achieved Last Period:

- No major milestones were achieved during the last biennium.

Projects Completed To Date:

- No projects have been completed.

Objectives for 2018/19 and FY 2019/20

Project	Total Project Estimate	Estimated Completion	Major Milestones
Skinner Ozone PLC Hardware	2,378,500	2022	Complete design & construction

Authorized Projects

None, this appropriation will be initiated in FY 2018/19.

Planned Projects

Skinner Finished Water Reservoir Slide Gates Rehabilitation

The three operational slide gates (Inlet, Outlet, and Bypass) that control the inlet and outlet flows from the Skinner Finished Water Reservoir have been exposed to a corrosive and wet environment since 1991. Visual inspections identified leaking gates and continuing deterioration of the slide gates' exterior coatings. These gates have been in service for 26 years and have not been blasted or recoated. This project will rehabilitate the three Skinner Finished Water Reservoir slide gates. The gates will be removed from the gate frames, thoroughly inspected for carbon steel material loss, blasted and recoated to extend their service life.

Skinner Ozone Contactor Roof Elastomeric Coating

Leakage through cracks in Skinner plant's ozone roof deck was found in 2010. Cracks in the concrete roof deck can allow rain and nuisance water to be drawn down into the contactors which then mixes with the freshly ozonated water, creating a potential cross-connection. The water and air penetrating through the existing concrete roof decks exposes the rebar & structural steel in the decks, creating the potential of eventual structural failure to the roof decks. In addition, in order to keep the constant vacuum in the Contactors, the Ozone Destruct Units have to work excessively which consumes additional electricity and affects the Destruct Units reliability & long term life span. This project will abrasive blast, apply primer, and coat 61,000 square-feet of the Ozone Contactor Building concrete roof deck with an elastomeric coating to reduce potential structural damage and operational impact.

Skinner Ozone PLC Hardware

The Skinner plant ozonation equipment utilizes a type of Programmable Logic Controller (PLC) that was introduced to the commercial market in 1988. Computer hardware from that era is now outdated, and the PLC manufacturer has announced that it will no longer produce or support this equipment. In addition, inventories of spare parts will no longer be maintained once exhausted. Failure of a PLC and/or its communication module could cause a disruption in the ozone control system. This project will replace the equipment and modify the software to operate with the new equipment for the Skinner ozone control system. The upgraded system will feature Metropolitan-standardized PLC's in a new code format to enable future maintenance and modifications as may be operationally necessary.

Skinner Plant 1 - Concrete Joint Sealant Replacement

Concrete joint sealant throughout Skinner Plant 1 is cracked, delaminating, degraded, or missing as it has exceeded its service life. The degradation has allowed vegetation growth and moisture, sediment, and other outside contaminants to enter and penetrate into the concrete joints. This project will remove severely degraded concrete joint sealant throughout Plant 1, prepare and primer the existing joints, and replace with new concrete joint sealant.

Skinner Plant 1- Modules 1, 2, & 3 Filter Weir Rehabilitation

Filter weirs at the Skinner Plant 1 (Modules Nos. 1, 2, and 3) maintain water levels within the Module's filter weir forebays for appropriate backwash head pressure. Adjustment to the weirs heights is required as water temperatures change throughout the year and as the volume of water being treated changes. All 24 weirs in three modules are adjusted together to maintain a balanced flow from Plant 1. Weir heights need to be carefully adjusted to prevent frequent backwashes or loss of filter media. The current design only allows safe adjustment while the Module is at zero flow or is shut down for service. This project will rehabilitate Modules 1, 2, and 3 filter weirs (24 total) from stackable wooden 2x4s to mechanically operated weirs. The existing concrete weir openings will be modified to accept a stainless steel weir gate guide and a double panel weir gate. A double panel weir gate will be installed with one panel stationary and one panel adjustable that allows flow adjustments. The weir gate is to be mechanically operated by tandem pedestal lifts mounted above the gate on the existing concrete deck.

System-Wide Paving and Roof Replacements for FY2018/19 through FY2019/20 18909

Total Appropriation Estimate: \$11,700,000 Biennial Estimate: \$1,397,216

Appropriated Amount 9/30/2017: \$0 Cost Through 9/30/2017: \$0

Purpose

To maintain the asphalt concrete paving and roofing at Metropolitan’s facilities.

Scope

This appropriation will be established to plan and implement multiple paving and roof replacement projects throughout Metropolitan’s facilities. Projects under this appropriation will implement various paving and roof replacements to be authorized by the General Manager in a manner similar to the Minor Capital Projects Program. Construction contracts up to \$250,000 will be authorized under the General Manager’s authority. Contracts greater than \$250,000 will require Board approval.

Accomplishments for FY 2016/17 and FY 2017/18

New Projects Initiated Last Period:

- No projects were initiated during the last biennium.

Major Milestones Achieved Last Period:

- No major milestones were achieved during the last biennium.

Projects Completed To Date:

- No projects have been completed.

Objectives for 2018/19 and FY 2019/20

Project	Total Project Estimate	Estimated Completion	Major Milestones
CRA Pumping Plant Asphalt Replacement	2,950,000	2024	Begin design
Skinner Facility Area Paving	7,354,000	2022	Begin design
Various paving & roof replacement projects for FY2018/19 through FY2019/20	1,200,000	2023	Complete all projects within 3 years

Authorized Projects

None, this appropriation will be initiated in FY 2018/19.

Planned Projects

CRA Pumping Plant Asphalt Replacement

The asphalt roadways at the pumping plants provide access between buildings and the villages for Metropolitan staff, residents, and visitors. There is a total of approximately 30 acres of asphalt-paved roadways and surfaces at all five pumping plants, and these asphalt surfaces are over 30 years old. Due to the harsh desert conditions and deterioration of the subgrade over time, potholes and cracks have developed throughout the villages. Some portions of the pavement will be replaced as a part of the potable water and sewer installation project, which is underway under Appropriation No. 15483. The project will include repair and replacement of the damaged roadways and drainage improvements throughout the CRA pumping plants and villages.

Skinner Facility Area Paving

Following 40 years of service, the paved roads around and on top of Lake Skinner Dam have begun to deteriorate due to aging and surface wear. The roads are used to perform dam surveillance; monitor dam safety instrumentation such as seismic accelerometers, settlement monuments, seepage weirs, piezometers, and groundwater wells; and perform routine operation and maintenance activities such as collection of water quality samples. In addition, roads throughout the Skinner plant area have begun to deteriorate. The deteriorated pavement exhibits raveling caused by wear and tear under traffic loads; surface deterioration; and fatigue and edge cracking caused by saturated subgrades from poor drainage and standing water. This project includes repair and replacement of the damaged roadways and drainage improvements in and around Lakes Skinner Dam and the Skinner plant.

Various Paving and Roof Replacement Projects for FY2018/19 through FY2019/20

This appropriation is recommended to allow various paving and roof replacement projects throughout Metropolitan's facilities to be expeditiously executed under the General Manager's authority.

These projects often arise after preparation of the CIP budget and are relatively small and less complex than other infrastructure projects. Once this appropriation is approved by the Board, individual projects may be authorized by the General Manager without further Board action.

Union Station Headquarters Improvements

15473

Total Appropriation Estimate:	\$77,022,000	Biennial Estimate:	\$24,263,295
Appropriated Amount 9/30/2017:	\$16,920,000	Cost Through 9/30/2017:	\$8,322,233

Purpose

To implement seismic upgrades to Metropolitan's Headquarters Building which will enhance its ability to withstand a major earthquake.

Scope

This appropriation was established to implement seismic upgrades to Metropolitan's Headquarters Building at Union Station in Los Angeles. These upgrades will increase the level of seismic performance of the Headquarters Building in accordance with current earthquake projections and updated building codes.

Accomplishments for FY 2016/17 and FY 2017/18

New Projects Initiated Last Period:

- No projects were initiated during the last biennium.

Major Milestones Achieved Last Period:

- Headquarters Improvements - Started design

Projects Completed To Date:

- One project has been completed.

Objectives for 2018/19 and FY 2019/20

Project	Total Project Estimate	Estimated Completion	Major Milestones
Headquarters Improvements	65,000,000	2022	Begin construction

Authorized Projects

Headquarters Improvements

Analysis has confirmed that the Headquarters Building does not meet current building code criteria for an Essential Facility. The building remains safe to occupy, but seismic strengthening to meet updated code levels are recommended in order for operations and business functions to continue following a major earthquake. This upgrade will increase the Headquarters Building's level of seismic performance and safety to that of an existing state-owned building, and will reduce the risk of significant damage and resulting business interruption due to a major earthquake.

Construction of the seismic upgrades will pose logistical challenges associated with the major retrofit of a high-rise building while the facility remains operational. During the anticipated three-year duration of construction, two to three floors of the high-rise tower will be vacated sequentially to allow a contractor to execute the repairs. Metropolitan staff will be relocated in stages to the five-story wing of the building.

Seismic upgrade work provides an opportunity to complete improvements to specific building systems in a cost-effective manner, while the floors are unoccupied and building finishes are removed. The Headquarters Building is almost 20 years old, and some of its features need to be upgraded or replaced. These features include the fire/life safety systems, some of the kitchen equipment and ceiling/wall finishes, and restroom facilities on several floors. Final design was authorized by the Board in August 2017.

Planned Projects

Headquarters Building Automation System Modernization

The building automation system controls all lighting, HVAC, and associated mechanical equipment in Metropolitan's Headquarters Building. The system is required to operate the building in an energy efficient manner, consistent with Title 24 energy efficiency standards. In the event of a building automation system failure, thermal control within the data center would be lost and garage exhaust fans within the parking garage would become inoperable, resulting in damage to critical facilities and unsafe conditions, respectively. The existing building automation system is obsolete, and is no longer supported by the manufacturer.

This project will replace the existing building automation system with a new nonproprietary system and will support integration of the new fire and smoke control systems that will be installed under the Headquarters improvements project.

Headquarters Fire Sprinkler Piping Replacement - Parking Garage P1 Level

The existing fire sprinkler piping at the parking garage provides water for the fire suppression system for the Headquarters Building from the fire hydrants around the building at the roadway through the parking garage, to the 12-story tower and 5-story wing. Full operation of the fire sprinkler system must be maintained to comply with the requirements of the City of Los Angeles Fire Department and Building and Safety Department. The pipes in the P1 level have experienced multiple failures due to corrosion resulting in pinhole leaks at various locations.

This project will replace all existing horizontal fire sprinkler piping, ancillary valves, and connections to existing fire hydrants at the parking garage.

Verbena Property Acquisition

15492

Total Appropriation Estimate: \$264,000,000 Biennial Estimate: \$3,442,698

Appropriated Amount 9/30/2017: \$264,000,000 Cost Through 9/30/2017: \$257,524,037

Purpose

To enhance supply reliability.

Scope

This appropriation was established to acquire various properties in Riverside and Imperial Counties.

Accomplishments for FY 2016/17 and FY 2017/18

New Projects Initiated Last Period:

- No projects were initiated during the last biennium.

Major Milestones Achieved Last Period:

- 10 Records of Survey have been recorded.

Projects Completed To Date:

- One project has been completed.

Objectives for 2018/19 and FY 2019/20

Project	Total Project Estimate	Estimated Completion	Major Milestones
Verbena Land Acquisition	159,921,000	2021	Survey and Property Recordation

Authorized Projects

Verbena Land Acquisition

Purchase real property from Verbena LLC in Riverside and Imperial Counties. Perform Records of Survey and Encumbrance Mapping. Acquisition was authorized by the Board in July 2015.

Planned Projects

No additional projects are planned.

Water Delivery System Improvements

15488

Total Appropriation Estimate:	\$96,080,000	Biennial Estimate:	\$1,587,963
Appropriated Amount 9/30/2017:	\$32,070,000	Cost Through 9/30/2017:	\$26,055,843

Purpose

To improve the reliability and flexibility of delivering Colorado River water during drought or other State Water Project (SWP) delivery constraints.

Scope

This appropriation is established to provide flexibility to distribute Colorado River water portions of the service area that currently rely exclusively on deliveries from the SWP.

Accomplishments for FY 2016/17 and FY 2017/18

New Projects Initiated Last Period:

- No projects were initiated during the last biennium.

Major Milestones Achieved Last Period:

- Greg Avenue Pump Station Rehabilitation - Continued design and started pump procurement
- Inland Feeder and Lakeview Pipeline Intertie - Completed valve procurement & design and started valve installation

Projects Completed To Date:

- One project has been completed.

Objectives for 2018/19 and FY 2019/20

Project	Total Project Estimate	Estimated Completion	Major Milestones
Greg Avenue Pump Station Rehabilitation	25,000,000	2020	Complete construction depending on SWP allocation
Inland Feeder and Lakeview Pipeline Intertie	26,376,000	2018	Complete valve installation

Authorized Projects

Greg Avenue Pump Station Rehabilitation

The Greg Avenue Pump Station was originally constructed in the early 1960's to pump treated Colorado River Aqueduct (CRA) water from the Weymouth plant into the West Valley area, and was then modified in the mid-1970s to include hydroelectric power generation capability to generate up to one megawatt by replacing one of the pumps with a pump/turbine. Since that time, the remaining original pump at this facility was operated intermittently during operational tests or when the Jensen plant was out of service. Over the past year, cracks have developed on the pump's mounting brackets and at the support gussets. These pumps need to be replaced, the inlet and outlet pipe manifolds need to be reconfigured, the electrical and control systems need upgrading, and the surge tanks need to be replaced.

In addition to the rehabilitating the mechanical, electrical, and control components of the pump station to improve reliability of the facility, this project includes construction of a new control building is proposed to replace the existing control building that houses mechanical and electrical equipment, and maintenance shop, which is seismically vulnerable. Design was authorized by the Board in May 2014 and pump procurement was authorized by the Board in March 2017.

Inland Feeder and Lakeview Pipeline Intertie

The Mills plant delivers treated water to Eastern Municipal Water District and Western Municipal Water District of Riverside County. Under normal conditions, the plant receives untreated deliveries exclusively from the East Branch of the SWP via the Devil Canyon Afterbay. During the critical drought conditions of 2014/15, which resulted in a low allocation of SWP deliveries, Metropolitan constructed an intertie between the Lakeview Pipeline and the Inland Feeder to provide a backup source of untreated water for the Mills plant. This intertie enabled water stored in Diamond Valley Lake (DVL) to be directed to the plant.

Construction of the piping portion of the intertie was completed in October 2014. To allow the intertie to commence operation quickly, three removable pipe spools were installed in advance of procurement of the shutoff and control valves. For efficient long-term operation, these valves need to be installed in order to isolate reaches of the piping for maintenance, and to control the flowrate. The three valves have been manufactured, and installation of the valves was authorized by the Board in August 2017.

Planned Projects

Sepulveda & Venice Pump Back Pump Stations

Metropolitan currently supplies the western Los Angeles (LA) service area from the Jensen plant, which supplies the Sepulveda Feeder, and from the Eagle Rock Control Structure (ERCS), which supplies the Santa Monica Feeder (SMF) and the East Valley Feeder (EVF).

For the West Valley area, which depends on raw water deliveries from the West Branch of the SWP, up to 50 cubic feet per second (cfs) of treated CRA water can be delivered via the Greg Avenue Pump Station. The secondary source of water to this area is critical during drought seasons. This project will provide up to 100 cfs of a secondary alternative source of water from the Central Pool to the West Valley area utilizing existing infrastructure as much as possible. This can be done by redistributing flows from Central Pool to the Venice Pressure Control Structure and construction of two new pump stations to increase supply to the Sepulveda Feeder at the EVF/WVF No. 1 Interconnection.

Water Operations Control

15467

Total Appropriation Estimate:	\$155,447,000	Biennial Estimate:	\$19,416,461
Appropriated Amount 9/30/2017:	\$47,760,000	Cost Through 9/30/2017:	\$12,873,438

Purpose

Maintain the reliability and integrity of Metropolitan’s control system.

Scope

This appropriation is established to further coordinate the capabilities of Metropolitan's control system, Supervisory Control and Data Acquisition (SCADA) with operational and business needs. The appropriation will focus on maintaining system reliability, system integration, and improving operational and business capabilities and efficiencies.

Accomplishments for FY 2016/17 and FY 2017/18

New Projects Initiated Last Period:

- SCADA RTU CPU & OS Replacement
- Control System Upgrade
- Wadsworth Pumping Plant Control & Protection Upgrade Installation

Major Milestones Achieved Last Period:

- Wadsworth Pumping Plant Control & Protection Upgrades Design - Completed prototype deployment

Projects Completed To Date:

- Three projects have been completed.

Objectives for 2018/19 and FY 2019/20

Project	Total Project Estimate	Estimated Completion	Major Milestones
Control System Upgrade Phases 1 & 2 Preliminary Investigations and Conceptual Design	4,465,000	2019	Complete development
Control System Upgrade Phase 3 Prototype	1,550,000	2019	Complete testing
Control System Upgrade Phases 4 & 5 Preliminary Design and Selection	2,100,000	2020	Complete development
Control System Upgrade Phase 6 Design and Implementation (of one treatment plant)	12,388,000	2022	Begin design
RTU CPU and OS Replacement	3,755,000	2018	Complete deployment
Wadsworth Pumping Plant Control & Protection Upgrade Installation	22,540,000	2020	Begin installation

Authorized Projects

Control System Upgrade Phases 1 & 2 Preliminary Investigations and Conceptual Design

Metropolitan's control system spans the Colorado River Aqueduct (CRA), Metropolitan's five water treatment plants, and the entire conveyance and distribution system. The system-wide control system upgrade is planned to be implemented in a phased approach through the following projects to upgrade hardware, software, and a communications network.

- Control System Upgrade Phases 1 & 2 Preliminary Investigations and Conceptual Design
- Control System Upgrade Phase 3 Prototype
- Control System Upgrade Phases 4 & 5 Preliminary Design and Selection
- Control System Upgrade Phase 6 Design and Implementation - One Water Treatment Plant
- Control System Upgrade Phase 7 Design and Implementation - Remaining Facilities

The Phases 1 & 2 project includes conducting a detailed inventory of the existing control system, development of functional requirements and new system architecture, planning for proof-of-concept testing of the proposed new architecture and technologies, and preparation of a system migration plan. Preliminary investigations were authorized by the Board in March 2017 and conceptual design was authorized by the Board in June 2017.

RTU CPU and OS Replacement

This project is upgrading over 330 SCADA Remote Terminal Unit (RTU) field computers with an updated operating system and hardware that will utilize solid state drive technology. This current replacement is intended to serve as a bridge until a full SCADA system upgrade is deployed. Procurement and installation were authorized by the Board in March 2017.

Wadsworth Pumping Plant Control & Protection Upgrade Installation

This project is the final phase of the Wadsworth Pumping Plant/DVL control system upgrade and includes replacement of the entire Diamond Valley Lake (DVL) control and communications systems, the protection relay system, vibration monitoring system, and pump/turbine drive controls. This phase of the project was authorized by the Board in April 2017.

Planned Projects

AMR System RTUs and Radio Modem Upgrade Project

The Automatic Meter Reading (AMR) system is a critical component for transmitting meter information to allow for billing of member agency water deliveries and analysis of official meter instrumentation. The current system was mostly installed between 2008 and 2009. Portions of the AMR System must be updated because of equipment obsolescence and diminishing vendor support, as they are approaching their end of life. This project is planned to be completed in two phases. The first phase will consist of replacement of the radio modems and radio master stations, including procurement, configuration, installation, project management, and internal labor to support implementation. The second phase will consist of replacement of the AMR RTUs. It is anticipated that the Control System Upgrade Conceptual Design project will recommend that the technology used in the AMR system be made consistent with the technology used in the SCADA (Supervisory Control and Data Acquisition) system. Thus, the second phase (AMR RTUs) will be started after the Control System Upgrade Conceptual Design is completed. The second phase will consist of replacement of RTUs, operator interface terminals, digital displays, configuration laptops, battery chargers, networking equipment, along with associated configuration, installation, and implementation.

Control System Upgrade Phase 3 Prototype

This phase of the System-wide Control System Upgrade will consist of design and implementation of a control system prototype comprised of a small number of representative sites and/or unit processes that cover the full range of existing and new control system technology employed by Metropolitan. This is proposed to be done at multiple facilities within the distribution or conveyance system as well as at (a subset of) one of Metropolitan's treatment plants. Exact details of what will be tested will be determined during the conceptual design project; for instance, the prototype will also test the remote control and reporting capabilities of the control system. This may or may not be conducted with multiple vendors, depending on decisions made during the conceptual design project.

Control System Upgrade Phases 4 & 5 Preliminary Design and Selection

These phases of the System-wide Control System Upgrade, Preliminary Design and selection of provider, are intended to wrap up any remaining decisions or planning from the results of the previous phase (Phase 3). Based on preliminary planning, the overall control system upgrade will likely be separated into separate projects for implementation and design. For some projects, the control system upgrade is fairly straightforward and can move onto design and implementation directly (without the preliminary design phase). However, for more detailed projects, such as the water treatment plants, there will be some additional data gathering, equipment investigation, cost estimating, phasing, or cutover strategy development that will need to take place prior to final design of individual sites. Some of the tasks that will be included in this project are preparation of a RFP for selection of standardized Metropolitan equipment (if necessary), finalization of standardization on equipment for projects going forward (if necessary), planning for implementation of middleware (the software connecting various remote sites together), developing alternatives for any fatal flaws identified in the prototyping phase (if necessary), planning cutover/migration strategies for operating both control systems in later phases, detailed cost estimates of later phases, and any deferred tasks necessary for creating biddable packages.

Control System Upgrade Phase 6 Design and Implementation (of one treatment plant)

This phase of the control system upgrade project will consist of final design and installation efforts to upgrade an existing treatment plant control system. Contracting strategy for implementation of the project will be determined in Phases 2 through 5, and may impact whether this phase will consist of a single treatment plant or multiple sites. Implementation in a limited subset of the overall system (e.g., one treatment plant) is planned to reduce overall program risk; however, complete cutover strategy will be developed during Phase 4. This phase of the project will include design, preparation of a requisition for a new control system, including development of deliverables to support installation activities, installation of the hardware, and software configuration of the new control system.

Control System Upgrade Program (remaining phases)

These phases of the control system upgrade project will consist of final design and installation efforts to upgrade the control system in the remaining four treatment plants as well as sites within the conveyance and distribution systems. The grouping and schedule of these phases will be determined in Phase 4. The remaining phases will include design, preparation of a requisition for a new control system, including development of deliverables to support installation activities, installation of the hardware, and software configuration of the new control system.

Weymouth Water Treatment Plant - Improvements

15369

Total Appropriation Estimate: \$248,726,000 Biennial Estimate: \$13,010,134

Appropriated Amount 9/30/2017: \$178,039,802 Cost Through 9/30/2017: \$175,730,779

Purpose

To maintain reliability and ensure regulatory compliance of the Weymouth plant.

Scope

This appropriation was established to plan and implement multiple projects at the Weymouth plant. The common driver for many of the projects in this appropriation is infrastructure reliability.

Accomplishments for FY 2016/17 and FY 2017/18

New Projects Initiated Last Period:

- No projects were initiated during the last biennium.

Major Milestones Achieved Last Period:

- Weymouth Washwater Tank Seismic Upgrades - Completed construction of the east tank
- Weymouth Filter Valve Replacement - Started procurement

Projects Completed To Date:

- 20 projects have been completed.

Objectives for 2018/19 and FY 2019/20

Project	Total Project Estimate	Estimated Completion	Major Milestones
Weymouth Administration and Control Building Seismic Upgrades	13,838,000	2022	Complete design
Weymouth Filter Valve Replacement-Filter Bldg. No. 2	24,500,000	2022	Complete construction
Weymouth Washwater Tank Seismic Upgrades	6,238,000	2019	Complete construction
Wheeler Gates Security Improvements	3,006,000	2022	Begin design

Authorized Projects

Weymouth Administration and Control Building Seismic Upgrades

The Weymouth Administration Building has been in service since 1941 and houses the plant's control room and administrative staff. The building needs to be seismically upgraded to current standards since this building is over 75 years old and is a critical facility to the operation of the water treatment plant. The project includes reinforcement of the walls for the plant's filter outlet channel and abandoned inlet channel.

In conjunction with the seismic upgrades, the California Building Code (CBC) requires the installation of a fire sprinkler system and accessibility improvements. Electrical, mechanical, and plumbing components impacted by the upgrades will also be reconfigured. The Weymouth plant's water quality sampling laboratory and office space will also be updated and optimized where required. The existing laboratory has been in continuous service for nearly 30 years. The Board authorized final design of the building upgrades in January 2018.

Weymouth Basins 1 & 2 Rehabilitation

Basins Nos. 1 & 2 were built in 1939 as part of the original Weymouth plant construction. Each basin has a treatment capacity of 57.5 million gallons per day. These basins were originally designed to treat Colorado River Water (CRW). With the addition of State Project Water (SPW), the plant periodically requires higher coagulant dosages than CRW. As a result, the basins operated at a higher solids loading rate than the rate for which the basins were originally designed. This situation has dramatically increased run time on the basins' circular sludge rake, which removes sludge from the basins. As originally designed, the sludge rakes only operated 1 to 2 hours every 4-7 days. Under current conditions, the sludge rakes are operated 6 to 12 hrs each day which results in more frequent maintenance. These basins also have had issues with low solids-settling rates within the basins and high particle loading to the filters, or short-circuiting. The project includes the rehabilitation of the flocculation basins, settling basins, sludge collection equipment, baffling, and edge weirs. Study and preliminary design were authorized by the Board in September 2004.

The project includes the rehabilitation of the flocculation basins, settling basins, sludge collection equipment, baffling, and edge weirs. Study and preliminary design were authorized by the Board in September 2004.

Weymouth Filter Valve Replacement - Filter Bldg. No. 2

The original filter valves in Building No. 1 were installed in two stages in 1941 and 1949, and were replaced in the early 1970s with similar valves. These valves are not consistent with modern American Water Works Association (AWWA) standards. The filter valves in Building No. 2 were installed during the second plant expansion in 1962, and are similar in dimension to the valves in Building No. 1. The existing filter valve bodies exhibit corrosion, the rubber seats are worn, and many valves leak after 45 to 55 years of continuous operation. In addition, the frequency of repairs to the actuators is increasing, and spare parts are difficult to obtain. This project will replace all filter valves and actuators in both Filter Building Nos. 1 and 2, with Metropolitan furnished AWWA-standard valves and current industry-standard actuators. Award of the procurement contract was authorized by the Board in November 2017.

Weymouth Washwater Tank Seismic Upgrades

Seismic investigations of the washwater tanks at the Weymouth plant identified that they are seismically vulnerable, based on current seismic codes, and require upgrades to enable continued operation in the event of a significant earthquake. This project will provide structural upgrades for the tanks to improve their ability to withstand a significant seismic event. The upgrades will include adding a supplemental anchorage system and extending the existing footings; installing flexible couplings on each 42-inch diameter outlet pipe for each tank; replacement of the west tank roof; replacement of the 42-inch tank isolation valves and actuators; and recoating as needed. Construction of the east tank was completed in 2016, and construction of the west tank was authorized by the Board in February 2018.

Wheeler Gates Security Improvements

Construction vehicles and chemical delivery trucks access the Weymouth plant through the Wheeler entrance gate. This project will provide security improvements to the Weymouth plant's Wheeler gate, including construction of a new guard enclosure; and improved lighting and communication features. This project is the third phase of the Weymouth plant's perimeter improvements. Final design was authorized by the Board in November 2006. Phases 1 and 2 are complete.

Planned Projects

No additional projects are planned.

Weymouth Water Treatment Plant - Improvements for FY2006/07 through FY2011/12 15440

Total Appropriation Estimate: \$79,124,000 Biennial Estimate: \$1,664,479

Appropriated Amount 9/30/2017: \$17,438,000 Cost Through 9/30/2017: \$16,723,644

Purpose

To maintain reliability and ensure regulatory compliance of the Weymouth plant.

Scope

This appropriation was established to implement multiple projects at the Weymouth plant. The common driver for many of the projects in this appropriation is infrastructure reliability.

Accomplishments for FY 2016/17 and FY 2017/18

New Projects Initiated Last Period:

- No projects were initiated during the last biennium.

Major Milestones Achieved Last Period:

- Weymouth Basin 5-8 Refurbishment - Completed preliminary design
- Finished Water Reservoir Gate Replacement - Completed construction

Projects Completed To Date:

- Five projects have been completed.

Objectives for 2018/19 and FY 2019/20

Project	Total Project Estimate	Estimated Completion	Major Milestones
Weymouth Basin 5-8 Refurbishment	48,512,000	2022	Complete design
Weymouth Dry Polymer System	10,828,000	2024	Restart design

Authorized Projects

Weymouth Basin 5-8 Refurbishment

The Weymouth Treatment Basins Nos. 5-8 consist of four 500-foot long by 100-foot wide basins, which are each divided into a 100-foot long flocculation section and a 400-foot long sedimentation section. Basins Nos. 5-8 were constructed in 1962 during the plant's second expansion and have shown signs of deterioration. Inspections have identified that the wooden baffle walls have deteriorated after repeated wet and dry cycles and have shown a propensity to support algae and microbial growth. In the sedimentation section, the scrapers do not reach the corners of the cells, allowing residual solids to accumulate on the floor along the wall.

The project includes repairing the steel guides; replacing the drive and paddle shaft assemblies; replacing the baffle boards, supports, and paddle wheel boards in the flocculation section. The project also includes filling the interior corners of each cell with sloping concrete fillets to direct residual solids into the path of the rotating scrapers; refurbishing the structural members of the catwalks; refurbishing the sedimentation Basins Nos. 5-8 sludge collectors; and replacing launders in the sedimentation section. Additionally, the coal tar-coated rotating steel sludge rakes will be replaced with stainless steel rakes. Basin inlet gates and inlet channel structural improvements are also part of this project. Preliminary design was authorized by the Board in February 2013.

Weymouth Dry Polymer System

Cationic polymers are used as a coagulant aid for the washwater reclamation plant, and nonionic polymers are needed to meet filter performance regulations when treating high State Project Water (SPW) blends. Depending on the quality of the source water, both dry polymers may need to be applied simultaneously. However, the current dry polymer system only has one mixing train available. Since these feed systems share a common polymer mixer, it is difficult to operate both systems at the same time. Additionally, the existing dry polymer mixer uses a type of batch mixer that can only make a single batch at a time and frequently clogs. The mixer is housed in a metal structure that does not meet current seismic codes.

The project includes installation of a dry polymer mixing system to allow simultaneous mixing and feeding of cationic and nonionic polymers, independently; construction of a new building designed to current seismic standards to house the dry polymer mixing system; and construction of a covered containment area to house feed equipment and new polymer storage tanks. Final design was authorized by the Board in September 2014.

Planned Projects

No additional projects are planned.

Weymouth Water Treatment Plant - Improvements for FY2012/13 through FY2017/18 15477

Total Appropriation Estimate: \$85,028,000 Biennial Estimate: \$11,627,405

Appropriated Amount 9/30/2017: \$53,566,950 Cost Through 9/30/2017: \$47,671,526

Purpose

To maintain reliability and ensure regulatory compliance of the Weymouth plant.

Scope

This appropriation was established to plan and implement multiple projects at the Weymouth plant. The common driver for many of the projects in the appropriation is infrastructure reliability.

Accomplishments for FY 2016/17 and FY 2017/18

New Projects Initiated Last Period:

- No projects were initiated during the last biennium.

Major Milestones Achieved Last Period:

- Weymouth East Washwater Tank Pumps Replacement - Completed construction
- Weymouth Filter Rehabilitation - Completed construction
- Weymouth Scrubber Platform - Completed construction

Projects Completed To Date:

- One project has been completed.

Objectives for 2018/19 and FY 2019/20

Project	Total Project Estimate	Estimated Completion	Major Milestones
Weymouth Chlorine System Upgrade	9,237,000	2020	Complete construction
Weymouth Domestic and Fire Water System Improvements	6,900,000	2020	Complete construction
Weymouth Water Quality Instrumentation Improvements	2,538,000	2020	Begin construction

Authorized Projects

Weymouth Basin Gates Improvements

Influent gates for the Weymouth plant's eight sedimentation basins are between 55 to 77 years old and at the end of their service lives. The existing coal tar coating on each gate has deteriorated resulting in corrosion and leaking. The inability to provide a water-tight seal when isolating basins requires the use of sandbags and pumping to keep nuisance water out of the basins in order to perform maintenance. Additionally, the local controls used for the basin gates make it time consuming to open or close the gates. This makes it difficult to respond to sudden changes in plant flow.

This project will replace the deteriorated inlet gates in Basins Nos. 1-4 with stainless steel slide gates, install new gate actuators capable of SCADA monitoring and control from the plant control room, and construct a new influent conduit to Basins 3 & 4. Preliminary design was authorized by the Board in July 2012.

Weymouth Chlorine System Upgrade

The chlorine feed system must be operational at all times to meet State Division of Drinking Water requirements. Chlorine is added downstream of the filters to form a chloramine residual and maintain disinfection in the distribution system. In addition, chlorine serves as the back-up primary disinfectant for the plant. There is insufficient chlorine capacity to meet these needs. In addition, maintenance of the feed equipment can only be performed during low-flow periods.

This project will upgrade the chlorine evaporator system at the Weymouth plant to enhance reliability, safety and meet water quality design criteria. The upgrade includes constructing six additional evaporators housed in a new structure adjacent to the existing chlorine containment building. The six new evaporators would serve as the second chlorine process train. Two additional chlorinators will also be installed to provide additional capacity redundancy and improve reliability. Final design was authorized by the Board in May 2016.

Weymouth Domestic and Fire Water System Improvements

The La Verne site does not have a complete domestic/firewater loop. On the north side of the site, the domestic/firewater is only supplied from the east side. Original construction included a 16" cast iron pipe with leaded joints along the west side of the Weymouth plant that provided filtered water to the plant at washwater tank pressure that has since been abandoned. This project would replace this abandoned portion with cement-mortar-lined steel pipeline. Additionally, three of the five existing domestic water pumps have experienced failures or required significant repairs. These three pumps are the original domestic water pumps that were installed with the finished water reservoir over 40 years ago. Having a full complement of domestic water pumps is critical to meeting plant potable water demands, meeting fire code requirements, and providing service water for chlorine injection.

This project will install a surge vessel and several vacuum air release valves to address issues with water hammer; install fire hydrants at several locations to address fire code requirements; install a utility water loop for the filters; install 16-inch cement mortar lined steel pipe to complete the domestic/firewater loop on the north and west sides of the plant; replace three domestic pumps along with their associated variable frequency drives motors and electrical equipment; install a new pre-fabricated metal electrical enclosure to protect the new equipment; and install earthquake resistant ductile iron pipe for evaluation and testing. Final design was authorized by the Board in October 2014.

Weymouth East Washwater Tank Pumps Replacement

The Weymouth plant has two washwater tanks that store filtered water for use in backwashing the plant's filters. Backwashing is an essential step in the filtration process to cleanse the filter media. The east washwater tank is filled by three washwater pumps that are over 50 years old and have deteriorated through continuous use. Construction to replace the three pumps was authorized by the Board in January 2016 and is in progress.

Weymouth Inlet Channel Structural Upgrades

The basin inlet channels deliver water to each of the Weymouth plant's eight flocculation/sedimentation basins. The inlet channel serving Basins Nos. 1-4 is a concrete box culvert constructed in 1940, while the inlet channel serving Basins Nos. 5-8 was constructed in 1962. A structural assessment of the basin inlet channels has found that they should be upgraded to reduce the risk of damage from a major seismic event. This project will strengthen a portion of 500-foot-long north-south inlet conduit to Basins Nos. 2 and 4, by providing 9-inch of additional concrete along with adequate horizontal and vertical reinforcing to the existing wall. The south wall of Basin Nos. 5-8 adjacent to the east-west inlet conduit, will be also strengthened with a 9-inch additional concrete layer and proper reinforcement. In addition, a new dividing wall may be added to the north-south inlet channel to provide independent rapid mix trains to each of the basin pairs. The basin influent channel would be reconfigured so that one rapid mix structure will feed Basins Nos. 1 and 2 and another rapid mix structure will feed Basins Nos. 3 and 4. Final design was authorized by the Board in September 2014.

Weymouth Oxidation Demonstration Plant Rehabilitation Project

The Oxidation Demonstration Plant (ODP) was put into service in 1992 and refurbishment and rehabilitation of the ODP is needed to maintain its long-term function of performing demonstration-scale studies to optimize full-scale plant operations and test alternative treatment technologies. Studies at ODP have resulted in significant cost-savings for Metropolitan (e.g., avoiding installation of GAC at the full-scale plants following ozone retrofits, and the testing of the ammonia-chlorine process for bromate control which already has resulted in significant chemical cost savings at the Mills plant). Future studies will include assessing treatability of compounds on USEPA's Contaminant Candidate List 3 (CCL 3) to ensure compliance at Metropolitan's full-scale plants with new and potentially more stringent regulations.

This project will support Metropolitan's continued use of ODP to develop cost-effective solutions to optimize operations, evaluate emerging constituents and alternative treatment technologies, and improve water quality to ensure 100 percent compliance with current and future drinking water regulations at the full-scale plants. Preliminary design was authorized by the Board in October 2014.

Weymouth Storm Water Pollution Prevention Improvements

The Weymouth plant must comply with stormwater quality requirements as part of the City of La Verne's MS4 stormwater discharge permit. This project will implement long term engineering best management practices (BMPs) to meet stormwater regulations and improve stormwater management at the Weymouth plant. A study was conducted to review existing storm water pollution prevention plans to meet current regulatory requirements and future mandated requirements. Recommended improvements include modification of Outfall 003 to reduce pollutant loads to the City's MS4 and downstream receiving waters. Preliminary design was authorized by the Board in March 2013.

Weymouth Washwater Pump Station Improvements

When ozone is used as the plant's primary disinfectant, the ozone generators will produce the amount of ozone needed based on flow into the plant. The plant inlet flow can experience fluctuations when the washwater return pumps that send flow back to the head of the plant, cycle on and off. Ideally, the flow to the ozone contactors would be consistent. However, the existing pump station has a small forebay as compared to the capacity of the washwater pumps. The forebay receives flow from both the Washwater Reclamation Plant and the Oxidation Demonstration Plant (ODP) clearwell. Significant changes in flow from these two facilities may increase fluctuation in ozone dose requirements.

This project will modify the ODP clearwell pumps with variable speed pumps; improve washwater pump station pump programming to moderate changes in pump speed; reconfigure the ODP clearwell pumps so that one pump is dedicated for backwash, one pump is dedicated for pumpback, and one pump as a spare for either of the two pumps; and relocate the ODP clearwell pump discharge point to a point downstream of the forebay. Preliminary design was authorized by the Board in May 2014.

Weymouth Water Quality Instrumentation Improvements

Existing instrumentation used for process control of Title 22 regulatory monitored constituents, including turbidity, fluoride, chlorine, ammonia, pH, conductivity, dissolved oxygen, and temperature is currently located in the basement of the Weymouth Administration Building. This location is subject to flooding in the event that existing sump pumps fail and is over 500 feet from the sampling locations, which can cause inaccurate water quality results and a delay in receiving accurate data. A new instrumentation enclosure will be constructed to provide redundancy and isolation for maintenance purposes, and will be in close proximity to the sample locations. Shorter sample lines to online analytical instrumentation would minimize the potential for interference of continuous measurements due to biological growth within the sample lines and provide more accurate results.

This project will construct a new water quality instrumentation enclosure closer to the sample points at the Finished Water Reservoir, purchase and install new sample pumps at the Reservoir Inlet, relocate the Reservoir Inlet sample points closer to the inlet gates to provide a more representative sample, and purchase and install new water quality monitoring instrumentation to provide reliable real time water quality monitoring of the Reservoir Inlet, Orange County Feeder, and the Upper Feeder. Final design was authorized by the Board in May 2014.

Planned Projects

Weymouth Filter Sump Sparger Rehabilitation

Build-up of coal and sand in filter sumps requires removal via vacuum trucks during planned plant outages. This operation is costly and labor intensive. The sludge, coal, and sand can accumulate for a significant period of time before the sump may be removed from service for cleaning. During this time, the accumulated sludge and filter media may transition to anaerobic conditions and negatively affect water quality.

This project will rehabilitate the sparger located in the Filter Building Nos. 1 and 2 sump wells. This will require installing a means of eliminating the build-up of coal and sand that collects in the sump. In-filling the corners and building sloped concrete "angle of repose" structures as well as rehabilitating sparger piping will be evaluated to prevent sludge build-up in the corners and facilitate the transfer of media to the coal removal structure.

Weymouth Water Treatment Plant - Improvements for FY2018/19 through FY2023/24 **18907**

Total Appropriation Estimate: \$10,578,000 Biennial Estimate: \$323,171
 Appropriated Amount 9/30/2017: \$0 Cost Through 9/30/2017: \$0

Purpose

To maintain reliability and ensure regulatory compliance of the Weymouth plant.

Scope

This appropriation will be established to plan and implement multiple projects at the Weymouth plant. The common driver for many of the projects in the appropriation is infrastructure reliability.

Accomplishments for FY 2016/17 and FY 2017/18

New Projects Initiated Last Period:

- No projects were initiated during the last biennium.

Major Milestones Achieved Last Period:

- No major milestones were achieved during the last biennium.

Projects Completed To Date:

- No projects have been completed.

Objectives for 2018/19 and FY 2019/20

Project	Total Project Estimate	Estimated Completion	Major Milestones
Weymouth Hazardous Waste Staging and Containment	812,000	2021	Complete design

Authorized Projects

None, this appropriation will be initiated in FY 2018/19.

Planned Projects

Weymouth Filter Outlet Mixing Improvements

At the Weymouth plant, the combined filter outlet splits into two concrete channels upstream of the finished water reservoir. One channel, which is 140 inches wide, and continues to the east, the other channel, which is 120 inches wide, continues south. Proper mixing of caustic soda, ammonia, and chlorine occurs only when all of the plant's filter outlet flow is directed either to the 140-inch or the 120-inch channel. However, when the plant flow exceeds 300 million gallons per day (MGD), flow is divided between the two channels which results in poor mixing due to the proximity of the chemical injection points to the intersection of the 140-inch and 120-inch channels.

This project will evaluate mixing in the filter outlet channel, perform hydraulic studies, and assess options to improve mixing in the channels. These options may include operational changes, rehabilitation or replacement of valves and gates, structural modifications, and relocation of chemical injection points.

Weymouth Hazardous Waste Staging and Containment

The existing hazardous waste storage area requires a number of upgrades to enhance compliance with current codes and to provide enhanced safety measures, such as providing spill containment, eyewashes and safety shower, a canopy, leak detection, and sump. These utilities are all available at the existing sulfuric acid tank farm, which is no longer utilized. As the existing hazardous waste storage area does not provide containment to capture spills or leaks there is potential for hazardous waste to runoff to the storm drain system as well as exposure to plant personnel.

This project will relocate the existing Hazardous Waste Staging and Containment Facility to the existing sulfuric acid tank farm in order to account for deficiencies at the existing facility. The existing sulfuric acid tank farm, located approximately 100 feet from the existing hazardous waste area, is a 30' x 30' containment area with a roof, sump, SCADA controls, eyewash station, power, and potable water that can be cost effectively utilized to relocate the hazardous waste facility.

Weymouth Solids Handling Rehabilitation

Residual solids generated during the water treatment process are sent to the gravity thickeners to separate water from the solids before being sent to belt presses in the solids handling facility for further dewatering. Dewatered solids are then pumped to elevated hoppers for storage prior to offsite disposal. Mechanical equipment at the solids handling facility has experienced frequent failures, and the facility itself requires full-time staffing to operate. Regular failures occur with the system's bridge breakers, which break apart dewatered solids so that they can be pumped to the hoppers. The facility also experiences frequent issues with the hoppers. After the belt presses dewater the solids, polymer solution is added to the discharge side of the cake pumps to facilitate pumping. This produces a cake-like material that often sticks to the hoppers' mechanical components and impedes opening and closing of the hopper gates. Rehabilitation of the solids handling facility is necessary to maintain its long-term function, reduce maintenance and operational labor costs, and reduce chemical costs.

This project will identify and implement the most feasible rehabilitation of the facility and to evaluate the capacity of the facility's decant lines. Options for rehabilitation include: 1) eliminating the existing cake pumps and installing a conveyor belt system to transfer the dewatered solids to the hopper system without the addition of liquid polymer; and 2) transferring solids via a conveyor belt to stockpile where the solids are held prior to being hauled offsite. This project will also evaluate modifications within the building that would facilitate future equipment repairs and replacement.

Weymouth Temporary Solids Storage

Currently, dewatered solids generated from the treatment process can be disposed of in three different ways: 1) dewatered solids from belt presses can be pumped to an upper level of the solids handling facility by cake pumps and conveyed to hoppers that empty to trucks at ground level for offsite disposal; 2) thickened solids from the gravity thickeners can be conveyed via pipeline to a Los Angeles County sewer connection; and 3) thickened solids are conveyed to a detention basin located south of the ozone generation facility for temporary storage prior to offsite disposal. However, the detention basin's primary purpose is to manage the emergency overflow for the ozone contactors in the event of a plant upset. If the basin receives the emergency overflow while thickened solids are in the basin, there is potential for this material to be discharged into Marshall Creek.

This project will design and construct a separate concrete storage area where dewatered solids from the belt presses can be conveyed and stored prior to offsite disposal.

Weymouth Water Treatment Plant - Oxidation Retrofit 15392

Total Appropriation Estimate: \$251,482,000 Biennial Estimate: \$1,325,311

Appropriated Amount 9/30/2017: \$251,482,000 Cost Through 9/30/2017: \$242,943,914

Purpose

To reduce the level of disinfection by-products in the treated water supplied by the Weymouth plant in order to meet state and federal standards and provide consistent and equitable high quality treated water to all of Metropolitan’s member agencies.

Scope

This appropriation was established to design and construct all systems and facilities that are required to provide ozone disinfection capability and to integrate those systems and facilities into the existing plant operations at the Weymouth plant.

Accomplishments for FY 2016/17 and FY 2017/18

New Projects Initiated Last Period:

- No projects were initiated during the last biennium.

Major Milestones Achieved Last Period:

- Weymouth Oxidation Retrofit Program (ORP) - Ozone Equipment Procurement - Completed construction.
- Weymouth Ozonation Facilities - Completed construction, start-up & commissioning

Projects Completed To Date:

- Two projects have been completed.

Objectives for 2018/19 and FY 2019/20

Project	Total Project Estimate	Estimated Completion	Major Milestones
Weymouth Hypochlorite Feed Facilities	14,000,000	2018	Complete construction
Weymouth Ozonation Facilities and Completion Activities	162,700,000	2018	Complete project

Authorized Projects

Weymouth Hypochlorite Feed Facilities

At the Weymouth plant, chlorine is currently added upstream of the filters to provide disinfection. Once ozone is employed as the primary disinfectant, chlorine will instead be added downstream of the filters, allowing the filters to become biologically active. Chlorination of the filter backwash water will be needed to control filter biomass build-up and to prevent excessive pressure drop through the filters. To accomplish this, a new sodium hypochlorite facility located near the washwater storage tanks is required. This approach represents the most cost-effective means to control filter biomass build-up at the plant.

The scope of the project includes installation of storage tanks, chemical feed pumps, and instrumentation and controls; construction of covered containment areas and unloading facilities; and relocation of chemical piping and electrical panels. The project also includes installation of sodium hypochlorite piping in the plant's filter galleries, Supervisory Control and Data Acquisition (SCADA) system integration, and testing and start-up of the new systems. Construction contract was authorized by the Board in August 2015.

Weymouth ORP Inlet Conduit

The Weymouth plant was constructed in 1941 and its original inlet conduit passed directly below the Administration Building. The inlet conduit was relocated in order to meet current seismic codes and to enable the addition of the ozone contactors within the plant's existing hydraulic conditions. Construction was authorized by the Board in August 2009 and has been completed. Production of record drawings is in progress.

Weymouth Ozonation Facilities and Completion Activities

The addition of ozone as the primary disinfectant at each of Metropolitan's treatment plants substantially reduces the formation of disinfection by-products for compliance with the U.S. Environmental Protection Agency's Disinfectants/Disinfection By-Products Rule (DBPs). The use of ozone also enhances Metropolitan's ability to treat water with varying source-water quality, and provides critical operational flexibility to meet treatment challenges resulting from periodic water supply events such as drought or other source-water limitations. Furthermore, ozonation is effective in controlling taste-and-odor causing compounds which may be present from time to time, as well as some pharmaceuticals/personal care products, endocrine disruptors, and algal toxins. In addition to these overall water quality benefits, the use of ozone provides important operational advantages, allowing Metropolitan to eliminate blend restrictions of State Water Project (SWP) and Colorado River Aqueduct (CRA) source waters. The Weymouth plant is Metropolitan's final facility to receive the ozone disinfection process.

The scope of the project includes the systems, facilities, and site work that are required to provide ozone disinfection capabilities. The project also includes the addition of a liquid oxygen storage facility; ozone generation building; ozone contactors; ozone off-gas destruct system; hydrogen peroxide storage and feed facilities; ancillary systems; and general site improvements. The ozonation facilities will be rated for the plant's design capacity of 520 MGD. This includes outfitting of Contactors Nos. 3 and 4 for ozone service, the addition of a sulfuric acid storage and feed facility as a change order to the existing construction contract, start-up/commissioning, and as-built/completion phase activities. Completion activities were authorized by the Board in December 2016.

Planned Projects

No additional projects are planned.

Whitewater Siphon Protection

15341

Total Appropriation Estimate:	\$10,585,000	Biennial Estimate:	\$2,940,513
Appropriated Amount 9/30/2017:	\$10,585,000	Cost Through 9/30/2017:	\$3,534,902

Purpose

To prevent damage to the Whitewater Siphon due to storm flows on the Whitewater River and to ensure deliveries of CRA water.

Scope

This appropriation was established to design and construct a protective barrier for the Whitewater siphons to prevent further erosion of streambed from undermining the siphons, and remediate the Whitewater Mining Pit in accordance with State regulations and prevent head-cutting of the mining pit from undermining the siphons in the event of a major flood.

Accomplishments for FY 2016/17 and FY 2017/18

New Projects Initiated Last Period:

- No projects were initiated during the last biennium.

Major Milestones Achieved Last Period:

- Began construction

Projects Completed To Date:

- No projects have been completed.

Objectives for 2018/19 and FY 2019/20

Project	Total Project Estimate	Estimated Completion	Major Milestones
Whitewater Siphons Protection	8,775,000	2019	Complete construction

Authorized Projects

Whitewater Siphons Protection

The Colorado River Aqueduct (CRA) passes beneath the Whitewater River north of the city of Palm Springs and west of the city of Desert Hot Springs via double-barreled reinforced concrete siphons, which are approximately 2,200 feet long, with diameters of 133 inches and 156 inches. The Whitewater Siphons are buried from 4 feet to 15 feet beneath the river bed. Over time soils above the siphons eroded away, and a protective slab that had been added to protect the siphon deteriorated from stream flow erosion.

This project will improve the erosion control structures that protect the Whitewater Siphons from flood damage. The erosion protection work includes construction of east and west gabion berms, an access road, and a gabion drop structure; placement of cellular concrete to protect overloading of the CRA siphon; and modification of earthen berms, concrete slabs, and grouted riprap. The Board authorized construction in March 2017.

Planned Projects

No additional projects are planned.