- **Board of Directors**
  Engineering and Operations Committee

February 8, 2000 Board Meeting

8-2

Subject

Appropriate $673,200 to Finance Capital Projects Costing Less Than $250,000 During Fiscal Year 1999/00

Description

The Capital Program for Fiscal Year 1999/00 included a $4,000,000 program for the purpose of completing capital projects costing less than $250,000 that are identified during the fiscal year. Last August the board appropriated $1,475,000 for projects identified at that time. Approval of this recommendation will appropriate an additional $673,200 and allow the General Manager to undertake all work for the design, purchase of equipment, and construction for five more small projects under this program. See **Attachment 1** for descriptions of the five projects and their estimated project costs.

Policy

Administrative Code Article 5108: Appropriations.

Board Options/Fiscal Impacts

Option #1

Appropriate $673,200 to a total of $2,148,200 for the five additional proposed projects, costing less than $250,000 each, for FY 1999/2000, and determine that the proposed minor capital projects qualify for a Categorical Exemption pursuant to CEQA.
Fiscal Impact: $673,200

Option #2

Approve each small capital project individually.
Fiscal Impact: $673,200 and increased administrative costs

Option #3

Not fund an increase in the program budget at this time; however, not performing the work this year may negatively impact operational performance and reliability.
Fiscal Impact: This option will defer costs

Staff Recommendation

Option #1

Roy L. Wolfe — 1/14/2000
Roy L. Wolfe — *Date*
Acting Manager, Corporate Resources

Ronald R. Gastelum — 1/24/2000
General Manager — *Date*

Attachment 1 – Detailed Report

Detailed Report

The Board has annually approved a single appropriation to cover all costs of small capital projects costing less than $250,000. This allowed the General Manager to complete the projects without individual project approval of the Board, provided that the General manager reported quarterly to the Engineering and Operations Committee on the status of each project. In past fiscal years the Board has authorized up to $4,000,000 annually for this program.

This program was budgeted at $4,000,000 for Fiscal Year 1999/00. However, at an interim point in the year, the Capital Improvement Program Review Committee recommended funding only those projects that they had approved and were identified in Board Action No. 1 for a total of $1,475,000. New projects are now deemed necessary, and it is therefore recommended that the Board approve an additional $673,200 to this appropriation for a total of $2,148,200.

The following describes the proposed minor capital projects for Board Action No. 2:

Weymouth Filtration Plant

Settled-Water Conduit Roof Beam and Decking Repairs

Project Cost $85,000

Project Description

Make structural repairs to the Weymouth Filtration Plant Filter Building No.1 Settled-Water Influent Conduit Roof Decking. Repair and replace damaged reinforcing steel (rebar) as feasible and repair damaged concrete.

Purpose/Justification

During recent inspections, extensive and ongoing damage involving concrete spalling and rebar corrosion was found at numerous locations on the underside of the settled-water conduit roof deck. The inspections and subsequent analysis have revealed that the damaged portions of the conduit have lost a significant amount of their structural load-bearing capacity. Further deterioration and subsequent weakening will ultimately lead to a collapse of the roof deck. Allowing the deck to collapse would result in an extended shutdown of the filter building and a significant reduction in plant production capacity until repairs are made.

Background

The F. E. Weymouth Filtration Plant (Weymouth) was constructed in the late 1930's and has operated continuously since 1941. During a recent inspection of the treatment portions of the plant, as part of the Weymouth Rehabilitation Program, the settled water conduit, which enters Filter Building No.1, was found to have suffered serious corrosion damage. The damage, primarily in the form of concrete spalling and rebar corrosion, was located on the underside of the conduit decking. Damage was evident on 17 of the conduit's concrete roof beams and at 33 locations on the concrete decking.

The filter-building settled-water conduit is an integral part of the water treatment process. As such, this conduit is in continuous use and inspections and work on this area of the plant require significant portions of the plant to be taken out of service and dewatered. For these reasons, the condition of the beams and decking slab was only recently discovered during a limited plant shutdown.

Due to the critical nature of this portion of the facility, shutdowns for remediation work must be carefully planned with plant and overall system operations. Consequently, there is a limited window of time, ending this March in 2000, that the required repairs can be implemented. After that time, the conduit can not be taken out of service for repair due to the flow demands that are placed on the Weymouth plant for the remainder of the high-demand portion of the year.

Alternatives Considered

Defer repairs to Filter Building No. 1 concrete beams and decking slab. Deferring repairs will allow the beams and slab to continue to degrade at a potentially accelerated rate. The influent portion of the filter building would then have to be closed because it has become structurally unsafe. This event will reduce the Weymouth treatment plant capacity.

Milestones

- March 2000 – Begin and complete construction during a planned plant shut-down

Skinner Filtration Plant – Effluent Water Quality Monitoring Structure

$132,600

Project Description

Design and construct a new 20-foot x 20-foot prefabricated Effluent Water Quality Monitoring Structure and related infrastructure. The new structure shall comply with current Cal-OSHA requirements for equipment access and allowable working space. Construction includes structure design, structure procurement and installation by a contractor. Additional District Forces work includes the installation of: electrical power hookups, control data link systems, communication lines, a water quality sample system, and a drainage system.

Purpose/Justification

The existing 8-foot x 12-foot structure is no longer in compliance with Cal-OSHA regulations due to an increased number of water quality equipment and instruments that have been installed in the structure to comply with regulatory monitoring requirements. Installation of the new structure will correct this deficiency and provide space for future equipment.

Background

The existing Effluent Water Quality Monitoring Structure was constructed in 1983 to continuously monitor the quality of finished water leaving the plant and to adjust plant operations accordingly. Originally, the facility was sized to be in compliance with Cal-OSHA requirements based upon the number of water quality instruments that were required at that time. Subsequently, the regulatory requirements related to water quality monitoring have increased significantly. This has resulted in numerous additional pieces of monitoring equipment being installed in the existing structure. The structure was originally constructed to house three pieces of monitoring equipment. Today, a total of twelve water quality monitoring devices are now installed and there is the likelihood that additional equipment will be installed in the future. The addition of this equipment has resulted in the structure not being compliant with Cal-OSHA Electrical Safety Orders, Section 2340-16, WorkSpace Around Electrical Equipment. The safety order states that suitable access and working space shall be provided and maintained about all electrical equipment to permit ready and safe operation and maintenance of such equipment. The wall space is not sufficient for the installation of two turbidity meters, and therefore the meters have been placed on the floor.

The project costs of $132,600 can be apportioned into 1) structure costs and 2) infrastructure costs at $41,650 and $90,950, respectively. The building cost includes the following: building procurement and installation, air conditioner procurement and installation, foundation design/installation, engineering and project management. The infrastructure costs include electrical power hookups, control data link systems, communication lines, a water quality sample system, and a drainage system, all of which requires extensive trenching.

The estimated construction costs of $41,650 equate to a structure which costs approximately $104 per square foot. On a per-square-foot basis, this amount is consistent with industry standard pricing for this type of structure. Staff has validated these costs for the structure with an independent review of the building costs by an outside architect.

Currently, monitoring instruments, spare parts and repair equipment must be stored throughout the plant, wherever space is available. After construction of the new structure, the old structure will be used as a convenient location to spare parts and equipment adjacent to where they are used.

Alternatives Considered

Defer project and save $132,600. However, the deferment results in continued use of the existing structure which is not in compliance with Cal-OSHA Electrical Safety Orders.

Schedule

- May 2000 - Complete final design
- September 2000 - Complete delivery of equipment
- February 2001 - Complete installation of building and monitoring equipment

Skinner Filtration Plant – Source Water Quality Sample System
$49,700

Project Description

Design and install a new water quality sample system and relocate the sample point which accurately monitors influent water quality for Skinner Plant No. 2. The new system includes the installation and relocation of; 700-foot of piping, electrical cable, water quality monitoring equipment, a pump system, instrumentation, control hardware, and electrical support hardware.

Purpose/Justification

The existing Plant No. 2 sample system has serious physical deficiencies which result in water quality samples from the influent conduit entering the laboratory that do not represent the actual quality of the water entering the plant. The unrepresentative samples produce less efficiency in the operation of the treatment plant. A more representative sample of the influent water will enhance the treatment process including optimized chemical dosing of the water.

Because accurate water quality samples cannot be obtained from the influent conduit through the sample line, plant personnel must take additional time to physically go out to the influent conduit and obtain samples. Weekly manual sampling is required under normal water quality conditions and daily manual sampling is necessary during unusual water quality conditions. This process is far more labor intensive than obtaining samples in the laboratory.

Background

The Skinner Filtration Plant is operated as two distinct plants; Plant No. 1 and Plant No. 2. The water quality for each plant's influent water line is monitored continuously to determine source water quality and to adjust plant operations accordingly. Plant No.2's water samples are not representative of actual water conditions, due to deficiencies in the existing water quality sample system. Test results from the sample system have turbidity readings that are lower, and taste and odor readings that are higher than those for the actual influent water. These false readings result from:

- Low sample water velocities due to excessively large sampling line diameters that result in excessively long delivery times. This condition causes particulates in the water to prematurely settle out, thereby yielding low turbidity readings; and
- Water sample temperatures that are higher than the plant influent water because the sampling line is located too close to the ground surface. This condition exacerbates bacteria growth in the line resulting in false taste and odor readings.

Alternatives Considered

Defer installing the new water quality sample system, thereby saving $49,700. However, unrepresentative samples yield less efficient operation of the treatment plant and manual collection is considerably more labor intensive than installing a new sample line.

Schedule

- May 2001 - Complete installation of sample system.

San Diego Canal Piezometers

Project Cost $238,000

Project Description

The scope of this project involves the installation of twenty–three piezometer wells along the San Diego Canal. This project includes preliminary and final design, procurement of construction materials, procurement of electronic sensing and data acquisition equipment, construction of piezometer wells and installation and testing of the equipment. All of the work will be performed by district forces with the exception of the piezometer well construction, which will be performed by a qualified well driller registered with the County of Riverside. Because the wells penetrate the groundwater basin, the design and construction of the project shall comply with the County of Riverside.

Purpose/Justification

The piezometers will allow staff to establish water levels within the canal embankments and determine the differential level between the water level in the canal and in the embankments. The data gathered from the piezometers will be used to allow safe operating criteria for the canal during sizeable fluctuations in water levels. To take advantage of non-peak energy rates for pumping water during the initial rapid filling of Diamond Valley Lake (DVL), water will be drawn from the canal at the maximum rate allowable. A study was performed to determine the potential benefits of installing piezometers along the San Diego Canal. The results indicated that the use of piezometers would enable staff to maximize the use of off-peak energy rates for pumping water would pay for the piezometer project and yield a net savings of $132,000 over the initial-fill period of two to three years. Supplemental unquantified benefits derived from proceeding with this project include:

- Providing an additional means to insure the integrity of the San Diego Canal,
- Gaining the ability to make rapid flow rate changes on the northern half of the San Diego Canal thereby allowing different blends of State project water deliveries to Lake Skinner and Diamond Valley Lake, and
- Permitting the capability for rapid drawdown of the canal which enhances Metropolitan's ability to selectively deliver water in and out of the reservoir to enhance power operations at existing and future energy recovery facilities.

Background

In the past, rapid changes in water levels in the San Diego Canal have caused damage to the canal liner and greatly increased maintenance needs. These flow changes will occur should Metropolitan take full advantage of lower electrical rates for pumping water during off-peak periods during initial fill of DVL. The existing lining was constructed to resist erosion only, and not designed to withstand external groundwater pressures caused by rapidly fluctuating water surface elevations. These pressures occur when the water surface in the canal is dropped too rapidly and the external water from canal leakage does not have sufficient time to drain back into the canal, thereby potentially overstressing the lining. Should this occur, panels would be displaced into the waterway. By installing piezometers, staff can monitor the falling groundwater elevations in the embankment and adjust canal flows accordingly, and the structural integrity of the canal can be maintained. Without the piezometers, staff has no way of knowing how close the lining is to failure until it is too late and are therefore limited to making gradual flow changes.

The installation of the piezometers along the San Diego Canal would enable staff to continuously monitor adjacent groundwater elevations within the embankment that supports the canal lining. The

approximately four week construction period will include drilling and placing of piezometer well casings by a contractor and installing well caps and electronic instruments by district forces. Rapid filling of DVL by utilizing lower electricity rates during non-peak periods has potential net savings of $132,000 over the initial-fill period of two to three years. This estimate was based on the interruptible energy rate schedule and projected DVL fill rates. Two modeling scenarios were developed that estimated the cost of initial-fill assuming no peaking on the San Diego Canal versus maximum allowable peaking on the San Diego Canal. The cost of initial-fill with no peaking on the San Diego Canal was $8.25 million while the cost with partial peaking was $7.88 million. The cost differential of the two scenarios ($370,000) is the estimated benefit.

Alternatives Considered

Defer installation of the twenty-three piezometers and continue to operate the San Diego Canal under the existing guidelines.

Schedule

- ❒ May 1999 - Completed study
- ❒ February 2000 - Board Authorization
- ❒ February 2000 - Complete Final Design
- ❒ March 2000 – Begin Construction
- ❒ May 2000 – Project Completion

Skinner Filtration Plant – Chlorine Mass Flow Meters

$167,900

Project Description

Upgrade the plant's chlorination system by designing, procuring, and installing chlorine mass flow meters in the chlorine gas line of the Skinner Filtration Plant's twelve chlorinator units. These activities include the installation of a special pipe connector with flow element probe, flow meter, remote flow transmitter, electrical conduit, control signals, and completing pipe modifications. The plant chlorine system drawings will be revised as required by Cal-OSHA for Acutely Hazardous Materials.

Purpose/Justification

The purpose of this project is to upgrade the existing chlorine monitoring system to prevent the loss of chlorine feed into the treatment process. The existing chlorine monitoring system is unreliable because the vacuum switch that detects vacuum pressure is a mechanical device having a higher chance of failure over an electronic device. The proposed mass flow meter is an electrical device that directly measures chlorine gas flow. The use of chlorine mass flow meters, in lieu of the existing equipment, will provide a highly reliable monitoring system to immediately notify the plant's operators in the event that chlorine feed into the treatment process is lost. Similar mass flow meters have already been installed at three of Metropolitan's five treatment plants and have performed extremely well in this application.

Background

On October 4, 1999, the Skinner plant experienced a loss of chlorine to Plant No. 1. The existing chlorine monitoring system failed to notify the operators of the incident in a timely manner. Due to the inadequacy of the chlorine monitoring system, chlorine feed into the treatment process was interrupted, causing Plant No. 1 to shutdown for approximately 30 minutes.

As a result of the incident, a Metropolitan Event Review investigation found that the existing chlorine monitoring system is unreliable. To correct this deficiency, the investigation team recommended the installation of chlorine mass flow meters at each of the chlorinators to prevent reoccurrence in the future. This project provides for the implementation of those recommendations.

Alternatives Considered

Defer procurement and installation of chlorine mass flow meters saving $167,900. However, deferment could lead to continued chlorine system feed failures and a reduced level of reliability in meeting drinking water standards.

Schedule

- May 2000 - Complete final design
- September 2000 – Procure equipment
- March 2001 - Complete mass flow meter installation

Summary of Estimated Project Cost

Description	Amount
Weymouth Filtration Plant – Repair Filter Building # 1 Influent Concrete Decking & Beams	85,000
Skinner Filtration Plant – Effluent Water Quality Structure	132,600
Skinner Filtration Plant – Source Water Quality Sample System	49,700
San Diego Canal Piezometers	238,000
Skinner Filtration Plant – Chlorine Mass Flow Meters	167,900
Total	$673,200

Financial Statement

Board Action No. 2 for Appropriation No. 15335 to finance design, purchase of equipment, and construction of capital projects costing less than $250,000 during Fiscal Year 1999/00 is shown below:

	Board Action No. 1 (Aug 1999)	Board Action No. 2 (Feb 2000)
Engineering Design	$ 153,000	$ 212,000
District Forces Construction	730,000	1,078,000
Water Quality	0	4,000
Environmental Compliance	9,000	12,000
Material and Supplies	210,000	386,200
Incidental Expenses	9,000	16,000
Operating Equipment	13,000	31,000
Construction Contract	351,000	409,000
Total	**$ 1,475,000**	**$ 2,148,200**

FUNDING REQUEST

Program Name:	Capital Program for Capital Projects Costing Less than $250,000 for Fiscal Year 1999/00				
Source of Funds:	Pay-As-You-Go Fund				
Appropriation No.:	15335	**Board Action No.:**	2	**Budget:**	$ 4,000,000
Requested Amount:	$ 673,200	**Capital Program No.:**	15335-A		
Total Appropriated Amount:	$ 2,148,200	**Capital Program Page No.:**	E-12		
Total Program Estimate:	$ 4,000,000	**Program Category:**	A-Asset/System Integrity		

CEQA Compliance / Environmental Documentation

Pursuant to the California Environmental Quality Act (CEQA) and State CEQA Guidelines. Each project proposed under the Minor Capital Projects Program was reviewed and determined to qualify for a Categoric Exemption in accordance with the following classes of projects (15301 Existing facilities, 15302 Replacement or reconstruction, 15303 New Construction or conversion of Small Structures, 15304 Minor Alterations to Land, 15306 Information Collection.