



PROJECT DESCRIPTIONS

Foothill Municipal Water District Capital Improvement Program

PUMP STATIONS

Emergency Backup Generator at the Arroyo Pumping Station (P-1)

Estimated Cost: \$702,000 (Based on 2006 estimate from Master Plan of \$650,000 with an annual 4% inflation factor)

Schedule: Fiscal Year 2010-2011

Project: Replacement of two 1970s vintage emergency power generators which no longer comply with air quality regulations. As a consequence of obsolete and unsupported electrical controls, these units can only provide 50% of the intended electrical output.

Project Details: The Arroyo Pumping Station has two backup generators for high voltage electrical power. These twin diesel-powered, 500 kW generators can no longer be electrically synchronized and, as a consequence, their output is limited. System demands can exceed 30 cubic feet per second (cfs)¹ and the existing emergency generators can only provide sufficient power to pump less than half that amount (14.0 cfs).

The Master Plan recommends backup generators capable of minimally supporting a 22 cfs output and the generator replacement costs are based on that recommendation.

These 1970's vintage generators are non-compliant with existing South Coast Air Quality Management District regulations (Rule 1470).

An adequately sized generator at the Arroyo Pumping Station will enable Foothill MWD to meet high system demands during a power outage.

Generator Set Design & Replacement at Berkshire Pumping Station (P-2)

Estimated Cost: \$702,000 (Based on the 2006 Master Plan estimate of \$650,000 and utilizing a 4% annual inflation factor).

Schedule: Fiscal Year 2010-2011

Project: Replace undersized emergency generator which no longer provides adequate power to meet peak demands during an electrical outage.

¹ One cubic foot per second equals 448.8 gallons per minute.

Project Details: Currently, if electrical power were to be interrupted, the existing backup generator could only power one of four pumps at the Berkshire Pumping Station, providing only 4 cfs of water. The plants design capacity is approximately 16 cfs. Under emergency conditions, an appropriately sized generator would be better able to provide emergency water supplies to our member agencies.

Rehabilitate Booster 4B – Pump only

Estimated Cost: \$35,000 (Cost estimate based on past experience with rehabbing pump)

Schedule: Fiscal Year 2010-2011

Project: Rehabilitation or replacement (if necessary) of 10 stage pump.

Project Details: Booster pump 4B (4 cfs output) has a relatively new 300hp motor but its pump has surpassed the rehabilitation limit for removal, evaluation, and repair or replacement. This maintenance limit is placed on the District's to avoid the far greater costs associated with a pump failure. This preventative guideline has been found to ensure continued reliability and to reduce overall costs.

Pump costs are estimates. Prices are variable based on the market cost of materials and amount of rehabilitation needed.

Rehabilitate/Replace Booster 3 West – Pump (Replace) and Motor (Rehabilitate)

Estimated Cost: \$75,000 (Staff cost estimate)

Schedule: Started in May 2009. To be completed by July 2010.

Project: Replacement of a (2 stage) booster pump and complete rehabilitation of 250 horsepower, 2400 volt motor.

Project Details: This booster which was first installed in the early 1970s has never been completely rehabilitated. This 30-year old pump (7 cfs), when removed and evaluated, evidenced significant impeller wear and serious overall deterioration. It could no longer be cost effectively repaired or rehabilitated and replacement was deemed the appropriate course of action since the needed individual components exceeded the cost of an entire replacement unit. Additionally, the design was evaluated and modified to better suit system requirements and improved pumping efficiency.

Rehabilitate Booster 4 East – Pump and Motor

Estimated Cost: \$20,000 (Staff cost estimate)

Schedule: Started in May 2009, Completed October 2009

Project: Complete rehabilitation of 100 horsepower, electric motor and 5 stage booster pump.

Project Details: Evaluation of this booster revealed deterioration due to extended use. The pump was rehabilitated and it was returned to service October 2009. The 2400 volt motor was completely rewound and the rotor bearings were replaced.

Final costs were \$31,499.

Rehabilitate Booster 2 West – Pump Only

Estimated Cost: \$15,000 (Staff cost estimate)

Schedule: Fiscal Year 2010-2011

Project: Rehabilitation of 5 stage pump only.

Project Details: The pump (7 cfs) has exceeded the established maintenance limit and needs rehabilitation to avoid serious and costly damage. Pump rehabilitation costs are estimates and may fluctuate based on the market cost of materials and amount of repair work required.

Rehabilitation of 1 West – Pump and Motor

Estimated Cost: \$25,000 (Staff cost estimate)

Schedule: Fiscal Year 2009-2010

Project: Rehabilitation of 5 stage pump and 250 horsepower, 2400 volt motor.

Project Details: This 7.0 cfs pump and motor have exceeded the recommended maximum service hours and both need to be evaluated and repaired before unnecessary damage occurs. Should such damage occur, costs can be significantly greater than if the rehabilitation guidelines had been followed. Pump and motor rehabilitation costs are estimates. Prices are variable based on the market cost of materials and the extent of needed repairs.

Repainting of Arroyo Pumping Station

Estimated Cost: \$75,000 (Cost estimate from painting contractor)

Schedule: Fiscal Years 2010-2012

Project: Paint water delivery infrastructure (pipelines, booster enclosures, generator housing, and other appurtenances) and associated structures to protect infrastructure from corrosion.

Project Details: Repainting the Arroyo Pumping Station is overdue as this station has exceeded the lifespan of its coatings. Industrial coatings protect infrastructure and ensure maximum service life of equipment and enclosures. The painting must be

completed before there is significant damage to paint or underlying facilities and structures. Repainting costs will continue to escalate as the current coating continues to degrade. Additionally, current air quality standards require different paint formulations which are more labor intensive and difficult to apply thus increasing costs further.

Pump/Motor Control Center Rehabilitation - Arroyo Station

Estimated Cost: \$30,000 (Estimate is from an electrical contractor)

Schedule: Fiscal Year 2010 – 2011

Project: Initiate evaluation and replacement of obsolete and unsupported pump and motor control equipment with current technology.

Project Details: The existing pump control equipment has been repeatedly modified as water demands on this station increased. This equipment lacks standardization, documentation and support resources. Replacement control technologies will facilitate SCADA integration within the panels, allow for reliable operation, and eliminate existing electrical safety hazards.

P-1 Booster Rehabilitation

Estimated Cost: \$30,000 per year, adjusted with 4% inflation factor

Schedule: Fiscal Years 2010 – 2014

Project: Scheduled evaluation, repairs and/or rehabilitation of booster pumps and motors at 40,000 hour run time.

Project Description: This program maximizes the reliable operation of the 10 motors and pumps at the Arroyo Station. Individual boosters are scheduled for routine rehabilitation when they reach the 40,000 hour guideline. This procedure minimizes possible damage to the pumps and/or motors.

INTERCONNECTIONS

CVWD – LADWP Interconnection

Estimated Cost: \$65,000 (Estimate is from CVWD consulting engineering firm and estimate of new pump)

Schedule: Proposed Start Date for this portion, Fiscal Year 2009-2010

Project: Replace and upgrade undersized portable pump.

Project Details: This is part of a larger project where Crescenta Valley Water District has received Proposition 50 grant funding from the State of California to construct an interconnection between their system and that of the Los Angeles Department of Water and Power. The interconnection can be used during shutdowns and emergencies to deliver water from LADWP into Crescenta Valley's system and from there into Foothill's distribution system. The water in CVWD's distribution system can flow by gravity to Foothill's La Canada reservoirs and Arroyo Pumping Station. However, from there, it must be pumped into the east side of the District's distribution system.

The current pump is undersized for adequate delivery of water supplies to the eastside pressure zone. A new and appropriately sized pump will deliver significantly more water in the event of an emergency. This portable pump may also be used in other applications such as providing water to Pasadena through the CalTrans system interconnection. Additionally, should an earthquake damage the boosters at the Arroyo Pumping Station, this pump can be used to move water to either side of Foothill's service area.

Sheldon Pressure Zone Interconnection

Estimated Cost: \$133,000 (Cost estimates from City of Pasadena)

Schedule: Proposed Start Date, Fiscal Year 2010 – 2011

Project: Design and construct a new interagency gravity-fed connection and associated pipeline and appurtenances

Project Details: This interagency connection would be located upstream of the Arroyo Pumping Station and would allow for the connection of the Pasadena Sheldon pressure zone to the District's Arroyo Seco gravity main. This interconnection would allow the District an additional water supply option to our only Metropolitan water source. In the event of a shutdown or emergency, water which cannot be delivered through Metropolitan's system could potentially be delivered through this interconnection. Utilizing this interconnection, up to 15 cfs of water could be made available to the Arroyo Pumping Station from Pasadena and then lifted to our east or west pressure zones.

It should be noted that Pasadena may not be able to provide water when needed at a specific interconnection. Based on their own system requirements, Pasadena reserves the right to deny deliveries to Foothill through interconnections. The redundancy established by having more than one interconnection with Pasadena increases the likelihood that Foothill would be able to receive deliveries from Pasadena during an emergency.

Windsor Reservoir Zone Interconnection

Estimated Cost: \$54,000 (Cost estimates from City of Pasadena)

Schedule: Proposed Start Date, Fiscal Year 2009-2010

Project: Design and construct a new interagency connection, associated pipeline and appurtenances.

Project Details: This interagency connection could provide a flexible water source to either Foothill MWD or the City of Pasadena. During shutdowns and emergencies, Foothill MWD would receive the water on the east side of its service area when water cannot be provided from the Arroyo Pump Station. This water can also be moved to the Westside of the District's service area through a bypass at the Arroyo Pumping Station. The District could also provide water to the City of Pasadena should it be necessary. About 12 cfs of water could flow through the connection.

Costs for this interconnection, associated pipeline and appurtenances will be apportioned between the City of Pasadena and the District. Total project costs are \$525,000 with Foothill MWD's share at \$54,000.

It should be noted that Pasadena may not be able to provide water when needed at a specific interconnection. Based on their own system requirements, Pasadena reserves the right to deny deliveries to Foothill through interconnections. The redundancy established by having more than one interconnection with Pasadena increases the likelihood that Foothill would be able to receive deliveries from Pasadena during an emergency.

SCADA

Estimated Cost: \$365,000 (Estimate from IT consultant and contractor)

Schedule: Fiscal Years 2009-2013

Project: Replace outdated and unsupported portions of the existing SCADA system.

Project Details: SCADA (Supervisory Control and Data Acquisition), in this application, refers to an infrastructure control system that collects data from various sensors throughout the water distribution system and transmits this data to a central computer. From this central computer, system operators control and monitor water delivery to the District's retail member agencies. Components of this SCADA system in need of replacement include programmable logic controllers (PLC's), Remote Terminal Units (RTU's), Control Software (Human Machine Interface or HMI), and various related communications equipment. Most of the existing SCADA dates from the mid 1990's and replacement parts and service are increasingly difficult to access. With increasing frequency we are finding that parts and maintenance services are no longer available.

Costs estimates for this major replacement were provided by consultants. These estimates are substantially lower than those for a completely new SCADA system recommended in the Master Plan (\$550,000).

RESERVOIRS

Earthquake Valves Design and Construction

Estimated Cost: \$250,000 (estimate based on design, parts and construction costs provided by consultant)

Schedule: Fiscal Years 2009-2011

Project: Design and install seismic isolation / elevation control valves and associated control equipment.

Project Details: The District has a total of six reservoirs equally distributed at three locations in our service area. In the event of a major earthquake, the impacted reservoirs will quickly dewater without seismically actuated isolation valves in place to control water outflow. By isolating a designated reservoir at each site, these valves would function to ensure the retention of an emergency water supply and mitigate possible downstream flooding damage.

In addition to their emergency application, these valves would also function as water elevation control valves at the La Cañada and Altadena reservoir locations. At these sites, the top elevation of one reservoir is higher than its paired reservoir, limiting the height of the water in the higher reservoir to the height of the water in the lower reservoir. The installation of elevation control valves would allow the District to utilize this currently unavailable storage capacity.

La Canada East Reservoir Rehabilitation

Estimated Cost: \$350,000 (Cost estimate from engineering firm)

Schedule: Fiscal Years 2009-2011

Project: Remove (sandblast) the existing coal-tar interior coating of the 1 million gallon La Cañada East reservoir and apply a new three-coat epoxy system to protect interior walls against corrosion and maximize the reservoir lifespan.

Project Details: The current interior coating of this 100' X 18' reservoir is in poor condition and is no longer effectively preventing metal degradation. The interior coating protection should be replaced as soon as possible to avoid unnecessary corrosion damage to the structure of the reservoir. The lifespan of this coating has been lengthened through an aggressive maintenance program to over fifty years from the expected thirty. However, based on the results of the last inspection, the District's consulting engineer strongly recommended that the entire reservoir interior be sandblasted to near "white metal" and recoated.

Reservoir Rehabilitation

Estimated Cost: \$70,000 per year, with a 4% inflation factor (Staff estimate of costs)

Schedule: Fiscal Years 2011-2014

Project: Reservoir inspection and Rehabilitation

Project Description: This is an ongoing program consisting of regular condition assessment and implementing the recommended repairs to maximize the lifespan of the reservoirs.

La Canada West Design and Construction (Side Wall Fracture Repair)

Estimated Cost: \$250,000

Schedule: Fiscal Years 2009-2011

Project: Repair fractures (interior & exterior) located on the upper portion of the reservoir side walls.

Project Details: Approximately fifteen to twenty percent of this 1.2 million gallon reservoir cannot be utilized because of water seepage through cracks in the upper sections of the reservoir walls. The repairs will necessitate enlarging and then filling the fractures with sealant so that the concrete is again made water tight.

Additional Storage Design and Construction

Estimated Cost: \$2,630,000 (Cost estimate from Master Plan with a 4% annual inflation factor)

Schedule: Fiscal Years 2012-2014

Project: Development of emergency water supplies made possible either by developing facilities to introduce groundwater into Foothill's distribution system during emergencies or construction of a new reservoir.

Project Details: The California Department of Public Health has recommended that Foothill MWD increase available water storage to accommodate system demands. The District Master Plan also makes this recommendation.

The construction of additional reservoirs is the standard approach to increasing storage. However, there are problems associated with simply adding storage. As water use drops during different times of the year, the "turnover" of the stored water inside the reservoirs could be insufficient to maintain a high quality of water and to comply with stringent State and Federal regulations. Even with the limited storage currently available, reservoirs are sometimes removed from service to avoid water quality degradation resulting from various causes including nitrification.

It will likely be less intrusive on surrounding residents to construct facilities to introduce groundwater into Foothill's system during emergencies. The cost estimate referenced

above is for construction of a reservoir only (not including land costs). The estimated costs of increasing storage by using wells, has not yet been evaluated. However, the cost of drilling one 2000 gpm well including the cost of design, equipment and some piping is approximately \$1,500,000.

TRANSMISSION MAINS

La Crescenta Force Main Rehabilitation (Alta Canyada Freeway Overpass)

Estimated Cost: \$420,000 (Cost Estimate from engineering firm)

Schedule: Fiscal Year 2009-2010

Project: Install HDPE liner to the Alta Canyada Freeway Overpass segment of the La Crescenta Force Main

Project Details: In October 2005, a leak was discovered in the La Crescenta Force Main. This 24" diameter water main is located in the Alta Canyada Freeway Overpass just north of Verdugo Boulevard. Emergency repairs were made to the southern sections of this pipeline. A video company was hired to inspect other portions of this water main and the results revealed more locations with corroded joints and potential failure points. In the early 1970's, this portion of the pipeline was relocated to accommodate the 210 Freeway. This pipeline, running inside the Alta Canyada bridge, has several joints throughout its 700 feet length that are in need of replacement. The recommended solution to the existing problem is to line the interior of the existing pipe. The shutdown of this pipeline for repairs will impact two of Foothill's member agencies: Crescenta Valley Water District and La Canada Irrigation District. Crescenta Valley WD will utilize their City of Glendale interconnection during this shutdown. To assist La Canada Irrigation District, a temporary "highline" (pipeline bypass) will be constructed to provide water deliveries. The construction portion of this project is estimated to last approximately 10 days.

The delay of these essential pipeline repairs could result in catastrophic failure of this pipeline and an extended and unplanned interruption to our agencies. This would result in substantially higher costs for emergency repairs and a greater risk of insufficient water supplies for retail customers.

Video Camera and Repair Windsor Avenue Pipeline

Estimated Cost: \$50,000 (Staff estimate of engineering, construction and videoing costs)

Schedule: Fiscal Year 2010-2011

Project: Install access man-ways to facilitate entry and pipeline inspection.

Project Details: This pipeline, similar to the La Crescenta Force Main described immediately above, is within a CalTrans freeway overpass. This pipeline and overpass construction took place at approximately the same time as the Alta Canyada Freeway Overpass. Because of its similar history and construction techniques, there is reason to assume that it may suffer from the same weaknesses. This project involves cutting an entry into the pipe to assess the needed repairs.

ADMINISTRATION AND OPERATIONAL SUPPORT

Emergency Generator & UPS (battery backup) at Administrative/Operational Center

Estimated Cost: \$82,000 (Cost estimate from IT consultant and contractor)

Schedule: Fiscal Years 2009-2011

Project Description: Installation of an emergency backup power generator, a battery backup system (UPS) and an automatic electrical transfer switch for the Operations Center and Administrative building.

Project Details: Currently, there is no backup electrical power that can be supplied to the Administrative and Operations Center of the District in the event of a service interruption. The emergency power generator and associated equipment that had been purchased and placed at this site is not AQMD permitted and has been removed from service. Without a backup generator, the District's ability to withstand outages at the Operations Center is reduced to the limited power that can be provided by a battery backup system for the SCADA computers. At present, there is no lighting should an outage occur during the evening.

FMWD needs to be able to maintain operations for our system and to coordinate with other agencies during emergencies. This project is being done in two stages: the first stage is to install a battery backup of the electrical systems so that operations can continue to run smoothly for a limited period of time, and second is to provide an emergency backup power generator with automatic switching from the battery to the emergency power so that operations can run smoothly for a longer period of time.

Project Name: Rehabilitation to Administrative Building

Estimated Cost: \$122,000 (Cost estimate from Master Plan with a 4% annual inflation factor)

Schedule: Fiscal Year 2012-2013

Project Description: Rehabilitate administrative building.

Project Details: The District's headquarters is a residential structure dating from the 1950's. Improvements need to be made to make it more suitable for continued use as an administrative building. The building requires roof repairs and employee workspaces modifications. Additionally, the structure needs to have the heating and air conditioning system replaced and the electrical wiring needs to be brought up to current standards. Substantial energy savings can be realized with the installation of proper insulation.