



Santa Clara Valley Water District

File No.: 19-0303

Agenda Date: 4/9/2019

Item No.: 5.2.

BOARD AGENDA MEMORANDUM

SUBJECT:

Calero Reservoir Operations and System Reliability.

RECOMMENDATION:

- A. Receive an update on the operation and use of Calero Reservoir; and
- B. Direct staff to proceed with the Calero Seismic Retrofit Project.

SUMMARY:

In 2012, a seismic evaluation of the Calero Dam determined the need to modify the facility to provide seismic stability from earthquake events. Accordingly, the California Department of Water Resources Division of Safety of Dams (DSOD) mandated operational restrictions, limiting reservoir storage to 46 percent of its normal capacity. A retrofit of the 80-year-old dam and associated facilities is necessary to address seismic safety concerns, satisfy Santa Clara Valley Water District (Valley Water) operational requirements, remove the interim storage restriction, and restore normal water supply capacity.

Staff recommends that Valley Water proceed with the Calero Seismic Retrofit Project, as outlined in the proposed FY 2020-2024 Capital Improvement Program, based on the Operations and System Reliability Analysis presented below. This information has also been presented for discussion to the Board's Capital Improvement Program Committee on March 11, 2019.

Background

Over the past 90 years, Valley Water has built an integrated and flexible water supply and conveyance system to provide a reliable water supply to the residents of Santa Clara County (County). The network of ten surface water reservoirs, 19 major water rights, two imported water supplies, groundwater recharge facilities, treatment plants and conveyance pipelines work together to meet the water supply needs of the County.

Valley Water's ability to supply water depends on the ongoing use and function of these past investments and, as they age, ongoing investment is required. In recognition of the value of, and Valley Water's dependence on, these assets, the Valley Water Board has adopted policies to protect and maintain these critical facilities for the long-term benefit of the community. Specifically, Board Ends Policy E-2.1 requires maintenance of local surface water supplies and Executive Limitation EL-6 directs that the Valley Water Board Appointed Officers (BAOs) protect the Valley Water's water

rights. In addition, Valley Water facilities, including reservoirs, must be operated and maintained consistent with regulatory requirements and mandates. Together, these policies and regulatory requirements require that Valley Water's surface water reservoirs be maintained and restored to their full operational capacity.

Calero Reservoir is among the oldest of Valley Water's reservoirs. Built in 1935, it has been a key element of Valley Water's raw water supply and transmission network. Calero Reservoir contributes to both annual water supply and operational flexibility and reliability. On an annual basis, Calero Reservoir is capable of providing up to 9,500 acre-feet (AF) of water supply through exercising Valley Water's local appropriative water rights.

Calero Reservoir has a storage capacity of 9,738 AF. However, due to structural deficiencies found in the dam, the reservoir is under a seismic restriction limiting normal storage to 4,414 AF. A capital project, currently at approximately 60% design, will address the structural deficiencies, restoring the reservoir's full storage capacity as well as expanding the reservoir outlet capacity to provide additional operational flexibility.

Because Calero Reservoir is centrally located, it provides a local water supply source which is used to recharge the groundwater basin and can also supply raw water directly to Valley Water's surface water treatment plants. This helps in responding to imported water outages and is critical to Valley Water's disaster recovery plan.

Water Supply

Surface water diversions from Calero Creek into Calero Reservoir is authorized by an appropriative water right of 3,500 AF per year. In addition, Calero Reservoir is the terminus for the Almaden-Calero Canal which has a separate water right that allows up to 6,000 AF to be transferred from Almaden Reservoir each year into Calero Reservoir. Combined, these two water rights can provide up to 9,500 AF each year towards meeting the County's overall water supply needs. Since 2004, these two water rights have provided an average of about 4,400 AF of water supply each year.

Calero Reservoir also provides local storage for imported water supplies, typically Central Valley Project (CVP) supplies conveyed from San Luis Reservoir. From a turnout on the Cross Valley Pipeline, CVP supplies (as well as water from Anderson Reservoir) can be released directly into Calero Reservoir for storage and later use. This adds flexibility to Valley Water's raw water system, providing an in-County storage option allowing Valley Water to take delivery of imported water supplies which might otherwise be lost in high CVP allocation years (due to full-capacity storage, or "spill" conditions, in San Luis Reservoir). Local or imported water stored in Calero Reservoir can then be put to beneficial use by releasing into Calero Creek for groundwater recharge or into the Almaden Valley Pipeline for delivery to Valley Water's surface water treatment plants.

Calero Reservoir's interconnection with the raw water distribution system, as shown in Attachment 1, positions it as one of only two reservoirs, the other being Anderson Reservoir, that can be used to both store imported water and deliver local surface water directly into the raw water system to supply Valley Water's treatments plants, making it a key facility in Valley Water's raw water system.

Operational Reliability

Calero Reservoir's ability to supply raw water to Valley Water's surface water treatment plants is important during a CVP outage. When Valley Water is not able to deliver CVP supplies from San Luis Reservoir, due to a low point event, Pacheco Pumping Plant outage or other condition, the Valley Water utilizes locally-stored supplies at Calero and Anderson Reservoirs to supply the treatment plants with raw water until CVP deliveries can be restored. Without these local supplies, SWP deliveries alone will not be enough to meet treated water demands and Valley Water's water retailers may, in a long outage, be required to rely on their own groundwater wells to serve their customers until CVP deliveries can be restored to the treatment plants.

Calero-stored surface water is also used to blend with imported water to address poor imported water quality and to improve the treatability of imported water when the quality of imported water degrades.

The flexibility and redundancy provided by Calero Reservoir greatly improves the reliability of Valley Water's raw water system and overall water supply reliability. The reliability provided by the reservoir will be especially critical during the construction of the Anderson Dam Seismic Retrofit Project. Anderson Reservoir is expected to be drained for a 3-year period during the seismic retrofit construction; Calero Reservoir will be the only in-County supply of water available when there is an interruption in Valley Water's imported CVP supplies from San Luis Reservoir.

Infrastructure Reliability Study

Calero Reservoir is also critical to Valley Water's recovery plan after a major earthquake. In a very strong seismic event, it is assumed that the South Bay Aqueduct would sustain significant damage (the pipeline passes through areas prone to landslides) and would require extensive time (longer than 60 days) for the State to make repairs and restore deliveries. In such an event, Valley Water's strategy would be to prioritize restoring supplies from the South.

Calero Reservoir is the closest source of water to Valley Water's water treatment plants with the ability to deliver water via the Almaden Valley Pipeline (AVP). The top priority for restoring the raw water distribution system after a major earthquake would be to repair the AVP. The 2005 Infrastructure Reliability Study estimated it would take less than 30 days to repair the AVP following a significant seismic event. After such repair, Calero Reservoir could provide source water to the treatment plants. This would restore treated water production and delivery of minimum winter demands to retailers within 30 days, which is an acceptable service level for Valley Water's water retailer customers following a seismic event. As the closest supply source, approximately four miles from the Santa Teresa Water Treatment Plant, deliveries from Calero Reservoir would be the first priority. Repairs on other pipelines would then progress southwards, restoring deliveries from Anderson Reservoir, about 15 miles away, and finally, from San Luis Reservoir just over 50 miles away. Without Calero Reservoir, service outages would likely be extended as additional miles of pipeline would have to be repaired and returned to service.

Other Calero Reservoir Benefits

In addition to annual water supply and operational reliability benefits, Calero Reservoir provides other benefits to the Community. As a watershed reservoir, it provides incidental flood protection to downstream residents. Although the reservoir will not be operated specifically for flood protection, in

most years, it does provide some level of flood protection. The reservoir does not drain a large watershed, during high rainfall events, peak runoff flows are attenuated in the reservoir before being discharged downstream.

Calero Reservoir is also one of only three in-County reservoirs that allow power boating and other recreational uses. It is heavily used by the public, and during the past season when Anderson Reservoir was not open to boating, Calero Reservoir was one of the only boating locations available to the entire County. This boating opportunity will be particularly important during construction of the Anderson Dam Seismic Retrofit Project, when both Anderson and Coyote Reservoirs will be unavailable for recreational use by the public.

Future Operations with Pacheco Reservoir

Construction of the Pacheco Reservoir Expansion Project (Pacheco Project) will provide additional emergency water supply during dry and critically dry years. In the future, once the Pacheco Reservoir is complete, Calero Reservoir will complement the operation of Pacheco Reservoir by allowing emergency supplies stored in Pacheco to be coordinated with Calero Reservoir for in-County supplies. This will increase the likelihood, particularly in times of drought, that there are ample local supplies near Valley Water's water treatment plants to respond to emergency conditions, and maximize both the efficiency and storage capacity of Pacheco Reservoir. Additionally, because of Pacheco Reservoir's location at the South end of the County, it is anticipated that during a major seismic event Calero Reservoir would remain the primary water supply source while pipeline repairs are completed as outlined above in the Infrastructure Reliability discussion. In an extended outage, Pacheco Reservoir's ability to sustain recharge in the Coyote and Llagas subbasins will also help avoid worrisome drawdown of the water table in the Coyote Valley and Morgan Hill areas.

Alternative to a Seismic Retrofit

Two recent efforts have looked at the alternative to retrofitting a Calero Dam. As a high-level evaluation, both efforts acknowledged that it would not be acceptable to the resource agencies to leave a Calero Dam as-is, and some significant level of effort would be required in lieu of retrofitting.

As part of the Calero Dam Seismic Retrofit Project, a white paper was prepared looking at the "No Project" alternative. Two "no-project" alternatives were identified, notching the spillway and decommissioning the Calero Dam, and ranged in cost from \$60 million to \$120 million respectively. The notched spillway alternative was proposed, but may not be feasible or permissible, and this concept has not been presented to Division of Safety of Dams - California Department of Water Resources (DSOD). In addition, one element that was not addressed in the white paper analysis of the notched spillway alternative is post construction operation of Calero reservoir. Although Valley Water staff has been attempting to constrain the scope of the regulatory action on all dam seismic retrofits to only the construction impacts associated with the retrofit of the facility, the regulatory agencies with jurisdictional authority have given strong indication that post construction operational impacts will also need to be considered and addressed. As a result, the potential for additional mitigation requirements for operational impacts will likely be imposed on the project and must be coordinated with Valley Water's Calero Reservoir operations under the Fisheries and Aquatic Habit Collaboration Effort (FAHCE). Under this scenario, the project cost for the notched spillway alternative is likely to increase significantly. Consequently, the two "no-project" alternatives have a

total cost comparable with, or exceeding, the estimated total retrofit project cost of \$100 million.

To reference a separate example, in the Guadalupe Dam Planning Study the project consultant prepared an analysis of various project alternatives. This included partial dam removal and full dam removal options. The Study estimated that the cost of partial dam removal would be about the same as the dam retrofit option. The cost of full dam removal is estimated at 1.6 times the cost of a dam retrofit. The high costs of partial or full dam removal are due to the large amount of material that would have to be moved, as well as issues related to the mercury-laden sediments in the reservoir from historic upstream mining operations. The decommissioning of a dam would likely require significant mitigation and restoration efforts to meet resource agencies' permit conditions.

These two independent evaluations confirm that if the decision was made to not retrofit Calero Dam, a significant investment would still be required in addition to the impacts of losing use of the asset.

Impacts without Calero Reservoir

To consider the option of not repairing Calero Dam, several factors would have to be evaluated. In addition to the capital costs of a dam removal alternative, the 9,500 AF of annual water rights would also need to be replaced or modified to accommodate other means of diversions from Calero Creek and the Almaden-Calero Canal. The value of 4,400 AF of annual water supply provided by these water rights can range from \$600 to \$2,000 per acre-foot depending on possible options. This cost is equivalent to \$2.6 to \$8.8 million per year of additional water supply investment.

In terms of reliability, if Calero Reservoir was removed from Valley Water's water system, Valley Water would be fully reliant on Anderson Reservoir as its only local water supply for deliveries to Valley Water water treatment plants during imported water interruptions. This would reduce the Valley Water water system reliability and reduce the total amount of backup and emergency supplies available to Valley Water. The absence of Calero Reservoir would also reduce Valley Water's ability to store imported water, potentially resulting in more carryover supply in San Luis Reservoir and the associated risk of losing that supply.

In addition, the recovery of Valley Water's water supply system from a major earthquake would likely be delayed by several weeks, extending the period of time water retailers in the County would be required to rely on groundwater to meet community demands.

FINANCIAL IMPACT:

There is no financial impact associated with this item.

CEQA:

Providing the Board an update on the operation and use of Calero Reservoir does not constitute a project under CEQA because it does not have a potential for resulting in direct or reasonably foreseeable indirect physical change in the environment.

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ATTACHMENTS:

Attachment 1: PowerPoint

UNCLASSIFIED MANAGER:

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