

100 North Canyons Parkway Livermore, CA 94551 (925) 454-5000

ZONE 7 BOARD OF DIRECTORS WATER RESOURCES COMMITTEE

DATE: March 21, 2023

TIME: 3:00 p.m.

LOCATION: Boardroom Zone 7 Administration Building 100 North Canyons Parkway Livermore, California

Director Figuers Director Gambs Director Palmer

AGENDA

- 1. Call Meeting to Order
- 2. Public Comment on Items Not on the Agenda
- 3. Chain of Lakes Pipeline Alignment Study Final Report
- 4. 2022 Water Supply Evaluation Update Draft Report
- 5. Verbal Reports
- 6. Adjournment

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DATE: March 21, 2023

TO: Water Resources Committee

FROM: Sal Segura, Associate Civil Engineer

SUBJECT: Chain of Lakes Pipeline Alignment Study Update

SUMMARY:

To support the mission to "Deliver safe, reliable, efficient, and sustainable water and flood protection services," and implement Strategic Initiative #1: Establish a diversified water supply plan, Zone 7 has embarked on the Chain of Lakes Pipeline Alignment Study to route a raw water pipeline to convey water into and out of the Chain of Lakes for storage and recharge, and emergency/drought supply.

The purpose of the study is to find the most feasible alignment option to install a future pipeline to help Zone 7 manage its water resources by connecting the Del Valle Water Treatment Plant, the South Bay Aqueduct, and the Chain of Lakes. This link will enable operators to maximize storage in the Chain of Lakes when supplies are available and provide emergency/drought relief when supplies are limited.

- Zone 7 retained HydroScience Engineers in April 2020 to complete the Chain of Lakes Pipeline Alignment Study. HydroScience has since performed a fatal flaw analysis and initial screening of potential alignments with staff input.
 - A preliminary environmental checklist has been developed by subconsultant, ESA Inc.
 - California Engineering and Geology Inc completed the geotechnical investigation.
 - Subsequently, HydroScience completed a more detailed evaluation of short-listed alternative alignments and selected a preferred alignment with staff input.
 - HydroScience has completed the conceptual design and prepared a preliminary project construction cost estimate ranging between \$108M and \$133M depending on pipe diameters based on 2022 pricing.
- Outreach efforts with Cities of Livermore and Pleasanton, Alameda County, Steelwave Inc and Amazon have been held.
- Staff will present the current findings from the study, including the routes considered, the evaluation of their benefits and limitations, the proposed route alignment, and the basis for the selection. Staff will make a recommendation on next steps.

FUNDING:

No funding is requested at this time.

RECOMMENDED ACTION:

Provide direction to staff.

ATTACHMENT:

Chain of Lakes Pipeline Proposed Alignment – March 2023

Attachment 1: Chain of Lakes Pipeline Proposed Alignment - March 2023





Figure 3 Recommended Alignment



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TTEM NO

DATE: March 21, 2023

TO: Water Resources Committee

FROM: Lillian Xie, Associate Civil Engineer

SUBJECT: 2022 WSE Update - Draft Report

SUMMARY:

To support the mission to "Deliver safe, reliable, efficient, and sustainable water and flood protection services," and implement the Strategic Plan Initiative No. 1: Establish a diversified water supply plan and Initiative No. 2: Evaluate and develop appropriate new water supply and reliability opportunities, Zone 7 Water Agency (Zone 7) has been developing the 2022 Water Supply Evaluation Update (2022 WSE Update).

- In 2019, the 2019 Water Supply Evaluation Update (2019 WSE Update) was completed to evaluate a number of water supply and storage reliability projects including desalination, California WaterFix, Los Vaqueros Reservoir Expansion, potable reuse, and Sites Reservoir. To support continued evaluation of such projects, Zone 7 retained EKI and Hazen & Sawyer to develop a new water supply risk model with enhanced capability.
- The new risk model has been completed and staff has developed the 2022 WSE Update based on the new model's analysis, which incorporates new information from the various projects that have become available since 2019.
- In August 2022, staff presented the preliminary findings from the 2022 WSE Update to the Board to support the water rate setting process.
- Staff has completed the draft executive summary for the 2022 WSE Update and will present the draft findings and recommendations of the study.

FUNDING:

No funding is requested at this time.

RECOMMENDED ACTION:

Provide direction to staff.

ATTACHMENT:

Draft 2022 WSE Update Executive Summary

Executive Summary

Zone 7 periodically conducts Water Supply Evaluation Updates (WSE Updates) to evaluate water supply conditions in the Tri-Valley to support Zone 7's planning for long-term water supply reliability. Past WSE Updates utilized an Excel-based Water Supply Risk Model to simulate the risk of water supply shortages on an annual timestep. In June 2021, Zone 7 initiated the development of a new model to replace the old version. The New Risk Model runs on RiverWare, a water supply modeling platform, and operates at a finer monthly timestep to simulate monthly variations and constraints on supply and demand. The 2022 Water Supply Evaluation Update (2022 WSE Update) utilizes the New Risk Model to test its capabilities for long-term water supply planning. Additionally, the 2022 WSE Update supersedes the 2019 Water Supply Evaluation Update (2019 WSE Update) by capturing the latest assumptions for Zone 7's demands, Zone 7's system, State Water Project (SWP) reliability, and potential future water supply reliability projects. This evaluation is a high-level assessment, and the 2022 WSE Update is intended to communicate current reliability of Zone 7's water system to stakeholders and the general public, identify actions needed, and inform recommendations to the Zone 7 Board of Directors.

Prior WSE Updates concluded that Zone 7's Water Supply Reliability Policy is unlikely to be met by implementing a single water supply reliability project, and that implementing a portfolio of several water supply reliability projects would be required to meet the Water Supply Reliability Policy. Therefore, the 2022 WSE Update evaluates a range of portfolios, an approach that is consistent with State-level trends and is in-step with long-term water supply planning strategies being implemented by Zone 7's wholesale peer agencies. A Baseline portfolio was developed to represent Zone 7's existing system that includes the planned future addition of new wells. Next, eight multi-project portfolios were developed by layering combinations of water transfers and potential future projects on top of the Baseline. The potential future projects considered were Sites Reservoir Project (Sites), Los Vaqueros Reservoir Expansion (LVE), Bay Area Regional Desalination Project (BARDP or Desal), Potable Reuse, and Delta Conveyance Project (DCP). One single-project portfolio containing only DCP was developed to compare against multi-project portfolios that also contain DCP. Table ES-1-1 summarizes the projects included in the non-Baseline portfolios.

Project	Average New Supply	New Storage	New Conveyance (Not Modeled)	Online Date
Sites	8,000 acre-feet per year (AFY)	62,340 acre- feet (AF)	-	2030
Desal	5,600 AFY	-	None, but can be paired with LVE and/or EBMUD Reliability Intertie (see Section 4.2.4) for conveyance	2030
Potable Reuse	8,800 - 9,600 AFY	-	-	2030 with expansion in 2040
Transfers	10,000 AFY	-	-	2023-2030
LVE	-	10,000 AF	Transfer-Bethany Pipeline with total capacity of 300 cubic feet per second (cfs)	2030
DCP	6,500 AFY of restored SWP supply	-	Single tunnel with total capacity of 6,000 cfs	2040

Table	ES-1-1:	Summarv	of Pro	iects
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The New Risk Model does not simulate Delta outages (i.e., outages of SWP facilities in the Sacramento-San Joaquin Delta), which would prevent Zone 7 from importing water without alternative conveyance to circumvent the Delta. Therefore, the alternative conveyance component of DCP and LVE (i.e., direct deliveries via the Transfer-Bethany Pipeline), was not modeled. Instead, DCP was modeled as an increase in SWP reliability and LVE was modeled as new storage capacity.

The portfolios were evaluated for their ability to meet Zone 7's Water Supply Reliability Policy. The reliability goals are stated in terms of probability of water supply shortage below.

- **90% chance of shortage reliability goal:** 90% chance of no Municipal and Industrial (M&I) or treated water shortage (or 10% chance of any level of M&I or treated water shortage)
- **99% chance of shortage reliability goal:** 99% chance of a M&I or treated water shortage of up to 15% (or 1% chance of M&I or treated water shortage greater than 15%)

While the policy is directed towards M&I customers, total water shortages, which include treated (i.e., M&I), and untreated water shortages, were evaluated against the policy goals. In general, the effects of water supply reliability projects on reducing potential shortages are not fully realized until around 2045, given that the entire roster of projects is not fully operational until around 2040. Therefore, the portfolios were compared at 2045 conditions. Note that "buildout", which is when Tri-Valley development is expected to cease, is expected around 2040.

The New Risk Model runs 94 "traces" in which each forecasted demand year (2023-2081) is assigned a historical year of hydrology drawn from 1922 to 2015 that was adjusted to capture climate change conditions in 2040. The 94 traces were then used to determine the probability of shortage in each future year for each portfolio. Figures ES-1-1 and ES-1-2 summarize modeled shortage probability for the year 2045. Figure ES-1-1 presents, for each portfolio, the maximum level of shortage that occurred across 90% of model traces for that portfolio. Figure ES-1-2 presents, for each portfolio, the maximum level of shortage are higher at a 99% chance because the 99% chance captures 9% more traces with less likely but more unfavorable outcomes than the 90% chance.

For a portfolio to meet the 90% chance of shortage reliability goal, it must have a 90% chance of a 0% shortage in Figure ES-1-1. The Baseline has a 90% chance of a shortage up to 55% or 30,200 AF and does not meet the 90% chance of shortage reliability goal in 2045. The multi-project portfolios show significant improvements, with a 90% chance of shortages up to 2-4% or 900-2,200 AF. The 2-4% shortage levels are small enough that they likely could be mitigated through optimization of Zone 7's operations. Therefore, all eight multi-project portfolios are considered to meet the 90% chance of shortage reliability goal in 2045 because 90% of the time, shortage does not *substantially* exceed 0%. The only non-Baseline portfolio that does not meet the 90% chance of shortage reliability goal is DCP alone, which has a 90% chance of a shortage up to 30% or 16,600 AF. While DCP provides better reliability than the Baseline, DCP alone will not meet the reliability goal, underlining the finding that more than one project is required to meet Zone 7's Water Supply Reliability Policy.



Figure ES-1-1: 90% Chance Conditions in 2045 for all Portfolios



2045: 99% Chance



For a portfolio to meet the 99% chance of shortage reliability goal, it must have a 99% chance of a shortage of up to 15% in Figure ES-1-2. The Baseline has a 99% chance of a shortage up to 76% or 41,800 AF and does not meet the 99% chance of shortage reliability goal in 2045. The other portfolios have a large range of maximum shortages at a 99% chance. Sites + LVE and DCP are two portfolios that offer minor improvements relative to the Baseline with shortages of 70% or 38,600 AF and 69% or 38,100 AF, respectively. The remaining portfolios perform significantly better than the Baseline with much smaller maximum shortage levels ranging from 5% to 48%. Generally, the portfolios with a larger number of projects perform better than those with a smaller number of projects. There are only three portfolios

that meet the 99% chance of shortage reliability goal in 2045: Sites + LVE + Potable Reuse + Transfers has a 99% chance of a shortage up to 12% or 6,600 AF, Sites + DCP + Potable Reuse has a 99% chance of a shortage up to 10% or 5,400 AF, and Sites + LVE + Potable Reuse + Transfers + DCP has a 99% chance of a shortage up to 5% or 3,000 AF.

The range of shortages that could occur in 2045 for each portfolio, shown in Figure ES-1-3, provides further detail on portfolio performance.



2045: Shortage Distribution

Figure ES-1-3: Distribution of Shortages in 2045 by Portfolio

The 99th percentile plotted in Figure ES-1-3 represents the shortage that is greater than 99% of all potential shortages in 2045 and is equivalent to shortages plotted in Figure ES-1-2. If a portfolio's shortage at the 99th percentile falls at or below the 15% shortage limit, then it will meet the 99% chance of shortage reliability goal. The 90th percentile plotted in Figure ES-1-3 represents the shortage that is greater than 90% of all potential shortage in 2045 and is equivalent to shortages plotted in Figure ES-1-1. If a portfolio's shortage at the 90th percentile falls at or below the 0% shortage limit, then it will meet the 90% chance of shortage reliability goal.

Most portfolios have a large difference between the shortage at the 99th and 90th percentile, indicating that there is a large range of shortages that could occur in the worst 1% to 10% of outcomes. To better visualize the distribution of shortages, the shortage at the 95th percentile (yellow circle) was plotted as a "midpoint" between the 99th and 90th percentiles. The shortage at the 95th percentile represents the shortage that is greater than 95% of all potential shortages (i.e., there is a 95% chance that shortages do not exceed this volume). For all non-Baseline portfolios, the shortage at the 95th percentile is much

closer to the 90th percentile compared to the 99th percentile, indicating that risk of extreme shortage is concentrated above the 95th percentile. Additionally, all eight multi-project portfolios have shortages at the 95th percentile that fall at or below 15% (i.e., they have a 95% chance that shortages will not exceed 15%). If the 99% chance of shortage reliability goal was instead replaced by a goal allowing a 95% chance of shortages up to 15%, then eight out of nine non-Baseline portfolios would be considered to meet the goal.

The key findings and recommendations from the 2022 WSE Update are listed below in no particular order.

- The New Risk Model can be maintained and updated to support Zone 7's water supply planning. Therefore, Zone 7 should incorporate new information as it becomes available from the State Water Project, water supply reliability projects, Zone 7's groundwater investigations, etc.
- All eight multi-project portfolios meet the 90% chance of shortage reliability goal at 2045, assuming that the minor shortages can be remedied with optimized operations. The 99% chance of shortage reliability goal at 2045 is more difficult to meet. Portfolios containing a larger number of projects perform better; the only three portfolios to meet the 99% chance of shortage reliability goal at 2045 contain at least three projects. Therefore, Zone 7 should continue to evaluate new opportunities to diversify its water supply portfolio and:
 - Continue to pursue investigation of potable reuse
 - Continue to investigate brackish water desalination with other agencies
 - Continue participation in Sites Reservoir Project for average reservoir releases of 10,000 AFY
 - Continue participation in Los Vaqueros Reservoir Expansion and evaluate participation level for storage (Los Vaqueros Reservoir) and conveyance (Transfer-Bethany Pipeline)
 - Continue participation in the Delta Conveyance Project.
- At 2045, five multi-project portfolios have a 99% chance of maximum shortages much greater than 15% and a 95% chance of maximum shortages up to 15%. The current 99% chance of shortage reliability goal sets a maximum shortage limit associated with extreme and very rare conditions that may be unreasonably difficult or costly to achieve. Therefore, Zone 7 should consider revising the 99% chance of shortage reliability goal.
- Most new supply alternatives are not anticipated to be available until at least 2030. Transfers before 2030 help bolster storage, benefit long-term reliability, and result in reductions in the 99% chance shortages beyond 2030. Therefore, Zone 7 should pursue transfers (an average of 10,000 AFY) until additional long-term supply sources become available.