City of Santa Barbara
Public Works Department

Supplemental Report

DATE: December 15, 2020

SUBJECT: Enhanced Urban Water Management Plan Supplemental Report

Executive Summary

The Enhanced Urban Water Management Plan (EUWMP) will replace the City's 2011 Long Term Water Supply Plan and meet California Department of Water Resources requirements for its 2020 Urban Water Management Plan. Since commencing the project in February 2020, the project team has completed a significant amount of the analyses and planning for the EUWMP. Major work efforts include: development of projected water demands through 2050, analysis of the City's existing water supply portfolio and its performance under potential future risks, and analysis of potential future themed water supply portfolios. The in-depth analyses were used to create an adaptive water supply and management plan for the next 30 years. The process included a deliberate, transparent, and inclusive community engagement process that has been invaluable with helping guide the City's future water supply decisions and policies.

The first major work effort was to analyze the City's current water supply. The analyses demonstrated that the City's current water supply can adequately meet demands under current supply and demand conditions. However, the analyses concluded that the City's ability to adequately meet demands during extended drought periods becomes increasingly challenging as demands increase and or supplies are reduced because of threats or risks. As a result, the planning effort makes several recommendations to help ensure the City is prepared to adapt to changing water supply conditions in the future. One notable change recommends that desalination be considered not just an emergency drought supply, but a regular element of the City's water supply portfolio, whereby desalination would serve as a drought preparedness, drought response, and drought recovery supply. Utilizing desalination in this expanded capacity would bolster the City's ability to prepare for a drought, and sustain the community through an extended drought.

The final major work effort presented a broad range of thematic water supply portfolios that were analyzed using a triple bottom line approach. A triple bottom line analyses is a broadly accepted method of measuring the portfolio's performance against social, environmental, and financial criteria. For this work effort, input from the community engagement process directly resulted in certain portfolio themes, such as minimize environmental impact or minimize cost. In summary, Portfolio 8 scored the highest in the TBL analysis and was the best performing new future supply option. This option was one of three that looked to optimize the best attributes of the City's diverse water supply sources. Portfolio 8 is an adaptive management approach that has the City leveraging water conservation and the City's current supplies, in a scenario where demands have significantly increased or existing supplies have been diminished, before considering expansion of the Desal Plant to 5,000 acre-feet per year

(AFY). Potable reuse also scored well, but given the lack of regulations and higher costs, it is recommended that it be re-evaluated when conditions change. Timing of the needed expansion of desal from 3,125 acre-feet per year (AFY) to 5,000 AFY would depend on the pace of demand growth, and the ongoing availability and reliability of existing supplies.

Although this work effort looks at the water supply needs of the City for 30 years, it is expected that this document will be revisited every 10-15 years to ensure the recommendations reflect the current state of the City's water supplies, water demands, climate change, and regulations.

Background

For over 25 years, the City's primary water supply management tool has been its Long Term Water Supply Plan (LTWSP). The goal of the LTWSP is to evaluate the adequacy and reliability of the City's water supply and provide a long-term view of how the City's water supplies would be managed. Since the last LTWSP update in 2011, several key changes have arisen that have the potential to affect the availability of the City's current water supplies moving forward. These changes include changes to Lake Cachuma and Gibraltar supplies and operations, the role of desalination, groundwater management, expanded use of recycled water, and the impacts of climate change, which include the need to define a new critical drought period and average annual rainfall.

In the past, the City also developed and submitted an Urban Water Management Plan (UWMP) to the California Department of Water Resources (DWR) every five years as required by the California Water Code, with the basis of supply planning for the UWMP being the LTWSP. Over time, UWMP-mandated requirements have increased, which has given cause to having only one water supply planning tool to reference for City-wide planning efforts. Therefore, the City is working to meld the supply planning efforts of the LTWSP into the development of its 2020 UWMP. The result will be an Enhanced Urban Water Management Plan (EUWMP). The State-mandated deadline for submission of the EUWMP to DWR is July 1, 2021.

Staff first presented the EUWMP planning effort to Council in February 2020, when a contract was awarded to the firm Water Systems Consulting (WSC) to assist staff in the planning process and development of the EUWMP. Staff returned to Council in April 2020 to provide an update on the project, including the Stakeholder Communication and Engagement Plan, branded "Water Vision Santa Barbara," which outlined the robust efforts to engage community members in the planning process. In November, Council received a presentation on the Water Conservation Strategic Plan, which is a foundational document to the EUWMP. It establishes baseline water demands for the next 30 years, and recommends conservation measures for the City moving forward. The project team has completed a significant amount of the analyses and planning for the EUWMP. This memorandum provides a broad summary of that work effort, including results, and makes recommendations for the City's water supply moving forward.

Technical Memorandums

A collection of draft technical memorandums (TM) have been created to detail every phase of the water supply planning effort to date. For anyone wishing to dive deeper on the

analyses and planning effort, the TMs are available for review on the City's Water Vision Santa Barbara webpage, www.SantaBarbaraCA.gov/WaterVision under the Water Planning Publications Tab. The TMs include the following topics:

- Draft WVSB Future Portfolio Analysis TM (This is the primary document with all other TMs supporting this document).
- Draft WVSB Communications and Engagement Summary TM
- Draft WVSB Demand Projections TM
- Draft WVSB Water Supply and Climate Change Analysis for Lake Cachuma and Gibraltar Reservoir TM
- Draft WVSB Groundwater Management Recommendations TM
- Draft WVSB State Water Project Exchange and Storage Options TM
- Draft WVSB Cost Basis TM

Stakeholder Engagement

While the City has engaged stakeholders in past water supply planning efforts, the EUWMP includes a more deliberate and inclusive approach to community involvement and transparency that aligns with the City's One Water approach to water management. A goal of the stakeholder engagement process, "Water Vision Santa Barbara," is to engage a diverse group of water users and uses within the community in the planning process, as well as those who would be most affected by the City's water decisions. To achieve the EUMP's stakeholder engagement goals, stakeholders were grouped into four segments, each with a different outreach approach, as described below:

- Water Vision Santa Barbara (WVSB) Stakeholder Group: an appointed group of community leaders representing the diverse issues, challenges, needs, uses and users of water within the City who were asked to participate in five virtual stakeholder workshops.
- General Public: any member of the public who was not involved in the WVSB Stakeholder Group. During the month of October, these stakeholders were encouraged to participate in Water Vision Month by attending Lunch and Learn presentations, watching self-paced videos on the project webpage, and recording their thoughts and ideas on the project's Social Pinpoint ideas board. All of these engagement opportunities were made available in both Spanish and English. The general public is also encouraged to engage by providing comments at Water Commission and City Council meetings. The WVSB webpage is updated regularly to keep interested parties informed of engagement opportunities.
- Water Commission: Council-appointed Water Commissioners serve as advisors to City Council on water policy decisions in a manner that reflects the community's values/needs and the project goals. To date, Water Commission has received in-depth updates on the EUWMP in April, July, September, and twice in November. An additional update is calendared for January 2021.
- City Council: elected officials responsible for making water policy decisions that reflect the community's values, needs, and the project goals. To date, Council has

received updates on the EUWMP in February and April 2020. In addition to this December update, another update is calendared for February 2021.

To date, the stakeholder engagement activities have directly informed the EUWMP. The Five Pillars Informing Water Vision Santa Barbara, developed by the WVSB stakeholder group, inspired future portfolio themes for evaluation, as well as the evaluation criteria for the future portfolio analysis. Additionally, the activities helped forge new relationships with key constituencies that have been underrepresented in earlier planning efforts, including: Persons of Color, Disadvantaged Communities, and Human Rights to Water. For a much more detailed description of the stakeholder engagement process and outcomes to date, please see the Draft WVSB Communications and Engagement Summary TM found on the project webpage.

Demand Analysis

The development of a water demand projection allows the City to know how much water it must produce annually to supply its customers in the future based on economic and population growth projections, among other factors. The EUWMP demand analysis started with the future baseline water demands for the period 2020-2050. The future baseline water demands were developed by Maddaus Water Management (MWM) in partnership with City Water Supply and Community Development staff for the Water Conservation Strategic Plan (presented to Council November 17, 2020, the Planning Commission October 15, 2020 and Water Commission July 16, 2020). There are uncertainties associated with assumptions used to make any demand projection, which resulted in the EUWMP project team working with MWM to develop a “demand envelope” to explore a range of potential demand scenarios that account for the uncertainties with the largest potential impact to the projections. Specifically, uncertainty with population projections, employment projections, and post-drought demand rebound were analyzed.

Results of the demand analysis indicate that the post-drought demand-rebound variable has the largest impact of demand projections. This variable is dependent on the water use behavior of existing customers. Human behavior is notoriously difficult to predict, as some people made permanent water-saving changes in response to the drought. Water Supply staff will continue to monitor water use to update demand projections and adjust water supply strategies as part of the City’s adaptive management approach. The EUWMP considers this demand uncertainty in the development, analysis, and recommendations of future supply portfolios. For a more detailed description of the demand analysis, please see the Draft WVSB Demand Projections TM found on the project webpage.

Existing Portfolio Analysis

The City’s current water supply portfolio was modeled using historical Santa Ynez River hydrology, including factors like stream flows, storage in Lake Cachuma, and precipitation, from 1942-2019. The modeling effort incorporated a ten year “design drought,” adding an extra three years to the City’s recent prolonged drought, to understand how the portfolio would perform in the next major drought. Future projections of individual water supplies were then modified based on risks and uncertainties, including climate change, potential future regulatory action (such as the pending Biological Opinion at Cachuma), and

increasing sedimentation in Gibraltar Reservoir. Results of the modeling were compared against the future water demand envelope to identify any gaps the City's current water supply portfolio may have with meeting future demands.

Overall, results of the modeling effort indicate that the City's current water supply portfolio performs well under current water supply and demand conditions. However, as demands increase, or risks decrease water supplies in the future, it will be more difficult for the City's current portfolio to meet demands, especially during drought. Additional conclusions from the existing portfolio analysis include:

- The City's biggest water supply challenge is providing sufficient supplies to meet demands in drought years. Desalination, groundwater, and State Water Project supplies are essential to meeting demands during a drought without drastic mandatory conservation. Desalination also provides supply flexibility benefits when prioritized as an annual baseline supply.
- The City's biggest water supply opportunity is the potential to capitalize on surplus water supply assets during normal and wet periods, while also always preparing for future drought conditions.

The largest water supply variables are incremental reductions in water supply reliability resulting from climate change, significant reduction in existing supplies caused by potential future regulatory action, and existing customer post-drought demand rebound.

Several near term recommendations for each of the City's water supplies, summarized below, arise from the existing portfolio analysis.

- Water Demand and Conservation: Implement the recommended conservation program from the City's Water Conservation Strategic Plan (Program B), which estimates 1,740 AF of passive conservation (e.g., plumbing code updates) savings by 2050 and 880 AF of active conservation savings by 2050. In addition, monitor demand trends for indications of post-drought demand increases, or rebound, from existing customers.
- Cachuma Project: Preserve the ability to store carryover water and non-Project water in Lake Cachuma. The lake is the City's largest and closest year-over-year storage option, which allows the City to better manage the use of its other supplies, and prepare for a drought. The ability to store non-Project supplies, such as Gibraltar Reservoir pass-through water (see next item), SWP water, or other surface water conveyed to the lake, would provide the City additional operational flexibility and provide cost-effective reliability during drought conditions.
- Gibraltar Reservoir: Obtain a Warren Act contract from USBR to store Gibraltar water in Lake Cachuma to offset the supply impact of increased sedimentation in Gibraltar Reservoir, as stipulated in the Upper Santa Ynez River Operations Agreement (Pass Through Agreement). The benefits are primarily in non-drought periods when Gibraltar is spilling. However this "pass through" allows the City to better manage the use of its other supplies and prepare for a drought.
- Groundwater: Work with the USGS to update the City's sustainable yield estimate and drought storage estimate for the Foothill Basin and Storage Unit 1. In addition,

the City should prepare an annual report that describes current basin conditions to inform annual water management planning. After preparing the first annual report, the City should consider whether to prepare a Groundwater Sustainability Plan (GSP) in compliance with the Sustainable Groundwater Management Act (SGMA), or an equivalent GSP that meets the City's needs, but is outside of SGMA compliance and reporting.

- State Water Project (SWP): SWP and supplemental water are essential during a drought, but the City's only existing option for storing SWP water is in San Luis Reservoir, which is not preferable for long-term storage since the water is lost when the reservoir spills. In addition, the use of San Luis Reservoir for carryover storage will be severely limited if the Delta Conveyance Project is implemented. Finally, long-term reliability of SWP water continues to decline, especially in drought years. The City should work with the Central Coast Water Authority to identify the City's preferred method for increasing certainty of SWP or supplemental water availability during extended drought conditions – whether via groundwater banking or long-term water purchase agreements. This effort could also identify opportunities to annually sell SWP water supplies when they are unneeded for City use in that year, or for future drought year supplies.
- Non-Potable Recycled Water: The City should update the recycled water market assessment documented in the 2009 Water Supply Planning Study and prepare updated cost estimates to expand the recycled water system. Up to 200 AFY of non-potable demand could potentially be served cost effectively, offsetting potable water demand, depending on the water market and cost updates.
- Potable Reuse: Once raw water augmentation regulations are issued by the State, the City should revisit the assumptions from the 2017 Potable Reuse Feasibility Study and cost estimates documented in the Draft WVSB Future Portfolios TM. Uncertainty in future regulations required multiple assumptions that must be revisited once regulations are in place. Then, the City can update its future supply comparison with desalination and the higher conservation program.

Please see Sections 4 and 5 of the WVSB Draft Future Portfolios Analysis TM for a more detailed description of the existing water supply analysis and recommendations.

Future Portfolio Analysis

Several potential future supply portfolio themes emerge from the deficiencies of the existing portfolio and feedback obtained by the WVSB stakeholder group and Water Commission, such as maximizing reliability or minimizing environmental impact. The next step was to develop and evaluate a variety of themed portfolios to ultimately define an optimal future water supply portfolio for the City. The future water supply portfolio analysis included two important steps – the future portfolio simulation, which simulates the themed portfolios over the same hydrology as in the existing portfolio analysis, and the triple bottom line (TBL) analysis, which considers economic, social, and environmental impacts and benefits. This approach allows for the comparison of water supply portfolios and the evaluation of the trade-offs between them.

The following six themed portfolios were initially developed for analysis:

1. Existing Portfolio (Baseline Supplies)
2. Baseline Supplies Prioritized
    - Prioritization of desalination (desal) and SWP water over Cachuma water
3. Maximize Reliability
    - 2,900 acre-feet per year (AFY) of potable reuse
    - Enhanced State Water Project (SWP) reliability through groundwater banking
    - Prioritization of desal and SWP water over Cachuma water
4. Minimize Cost
    - Existing portfolio
    - Higher water conservation program
5. Minimize Environmental Impacts
    - Minimize Cachuma water, SWP water, and desalination
    - 6,000 AFY potable reuse
    - Higher water conservation program
6. Maximize Local Control
    - No SWP water (sell all SWP water on spot market)
    - 5,000 AFY desal
    - 2,900 AFY potable reuse
    - Higher water conservation program

An initial evaluation of the first six portfolios highlighted the tradeoffs between reliability, cost, and environmental impact. A more reliable portfolio was typically much more expensive and typically scored comparatively poor on environmental criteria. Three additional portfolios were developed based on this initial evaluation. These optimized portfolios sought to balance TBL scores among the three criteria – financial, social, and environmental – to create a portfolio that is reliable, resilient, affordable, does the least harm to the environment, and meets important social considerations. The following three optimized portfolios were developed for further analysis:

7. Optimized Portfolio A
    - 2,900 AFY potable reuse
    - Recommended water conservation program “B”
    - Reduced desal use

8. Optimized Portfolio B
    - Non-Potable system expansion (200 AFY)
    - 5,000 AFY desal (from 3,125 AFY)
    - Recommended water conservation program “B”

9. Optimized Portfolio C
    - Similar toPortfolio 8
    - Minimize Cachuma and SWP water
    - Non-Potable Expansion (200 AFY)
    - Recommended water conservation program “B”
    - High Cachuma Carryover usage

More information on the development and analysis of the themed future water supply portfolios can be found in Section 6 of the Draft WVSB Future Portfolio Analysis TM.

The TBL analysis was used to evaluate the future portfolios against social, environmental, and financial criteria. The TBL scoring was based on baseline criteria weighting developed by City staff and stakeholders. This is a departure from past water supply planning efforts at the City, which only evaluated portfolios based on cost. To account for different perspectives and priorities, three additional weightings were developed to perform a sensitivity analysis on the criteria weighting. These new weightings each emphasize a different aspect of the TBL analysis - affordability, social benefit, and environmental benefit. A detailed description of the TBL criteria and scoring and sensitivity analysis is in Sections 3.2, 3.2.1, 7.1, and 7.2 of the WVSB Draft Future Portfolios Analysis TM.

Results of the TBL sensitivity analysis demonstrate Portfolio 8 (Optimized B) consistently ranks first, regardless of the weighting scenario, except for the environmental benefit weighting, which ranks Portfolio 4 (Minimize Costs) first. Portfolio 7 (Optimized A) consistently ranks as the second highest in most weighting scenarios. Portfolio 8 (Optimized B) has several benefits over Portfolio 7 (Optimized A):

- Lowest cost (the analysis should be revisited once potable reuse regulations are finalized).
- Higher speed of implementation, since the Desal Plant has been reactivated.
- Lower permitting complexity, since the Desal Plant is permitted for 10,000 AFY.

On the other hand, Portfolio 7 has less energy consumption and ocean desalination than Portfolio 8.

Best Performing Portfolio

The EUWMP future portfolio analysis evaluated nine different themed and optimized water supply portfolios to meet the range of expected future demands. Portfolio 8 (Optimized B) scored the highest in the TBL analysis and was the best performing future supply option. This option was one of three that looked to optimize the best attributes of the City's diverse water supply sources. In the TBL analysis, Portfolio 8 best balanced the three TBL criteria; it is reliable and resilient, affordable, minimizes harm to the environment, and meets important social considerations. Portfolio 8 is an adaptive management approach that has the City leveraging water conservation and the City's current supplies, in a scenario where demands have significantly increased or existing supplies have been diminished, before considering expansion of the Desal Plant to 5,000 acre-feet per year (AFY). Timing of the needed desal expansion from 3,125 acre-feet per year (AFY) to 5,000 AFY will depend on the pace of demand growth, the ongoing availability and reliability of existing supplies, and as may be necessary to implement the long-term water supply agreement with the Montecito Water District. Additionally, new regulations and/or advancements in treatment technology may increase the favorability of Portfolio 7 (Optimized A), which also scored well in this analysis, however the higher capital costs and lack of State regulations caused Portfolio 7 to score lower.

Policy Recommendation

The primary policy recommendation supported by results of both the existing portfolio analysis and the future portfolio analysis is to change desalination operations from an emergency/drought supply to regular element of the City's water supply portfolio, whereby desalination would serve as a drought preparedness, drought response, and drought recovery supply. The desal plant may not necessarily be operated every year, but rather, the desal plant could be put into standby mode in the event that the proposed minimum water reserve thresholds are met:

- There are currently sufficient supplies to meet demands
- There are currently sufficient amounts of stored groundwater
- Cachuma storage volumes are 180,000 AF or greater

If these thresholds are met, City staff can make the decision to place the desal plant in standby mode, and will still be in a strong position to meet demands, even in a dry year. If dry conditions continue for multiple years and minimum thresholds are not met, the City could reactivate the desal plant to prepare for drought conditions or as necessary to meet its obligations under the long-term water supply agreement with the Montecito Water District. The decision to operate the desal plant in the new water year (October 1, 2021) would need to be made at the end of the prior rainy season, in April 2021. This means that if storage in Cachuma is at 180,000 AF or less in April, it would be at approximately 140,000 AF or less in October when the plant is reactivated after downstream releases and Member Unit use during the summer.

Adaptive Implementation Plan

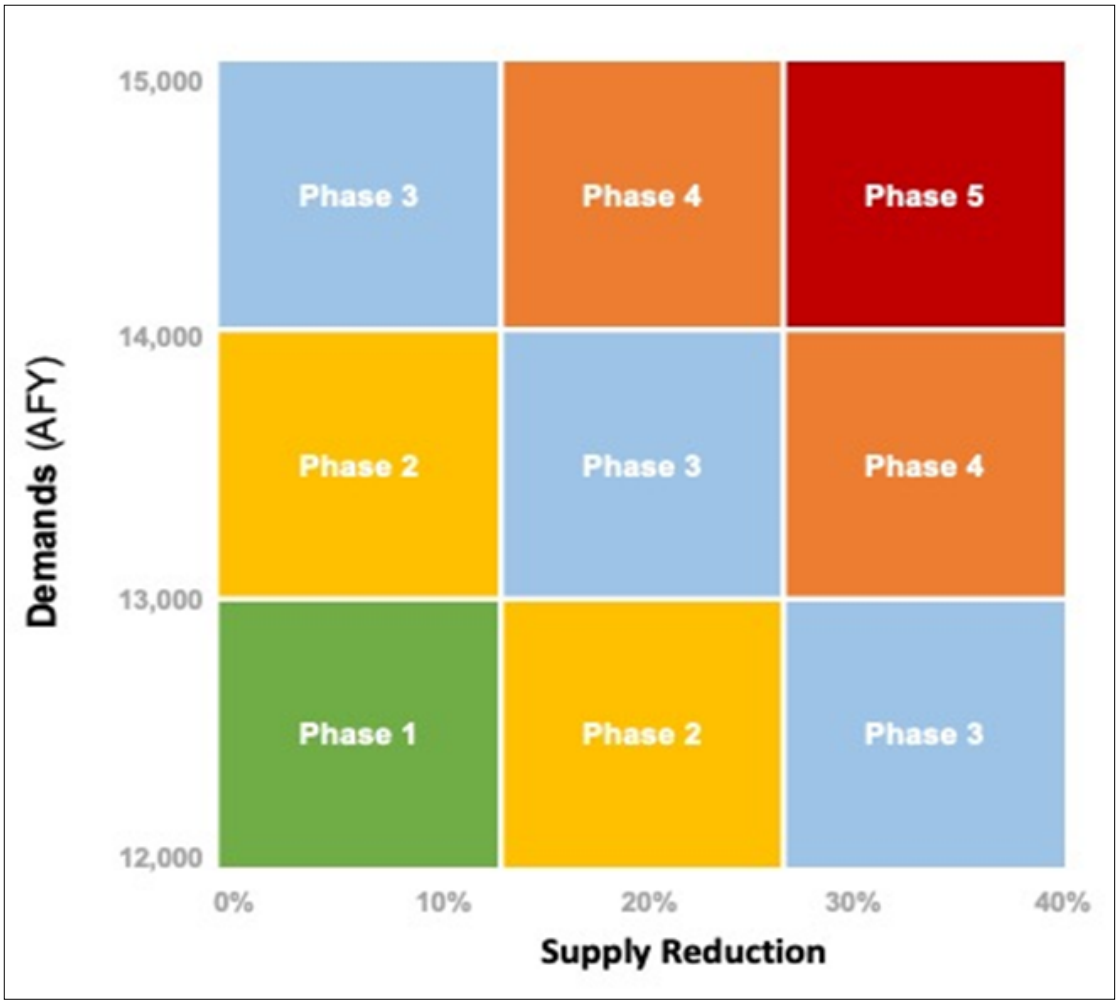
The EUWMP includes an Adaptive Implementation Plan which outlines phases and corresponding next-steps to assist the City with adapting to future changes in water supplies and demands, and with making timely investments. The phases are illustrated in Figure 1 and described below. More information on the adaptive implementation plan can be found in Section 9 of the Draft WVSB Future Portfolio Analysis TM.

- Phase 1 (Existing Conditions): Monitor demand and supply conditions, particularly the potential post-drought demand rebound. Implement recommendations for Gibraltar (Warren Act Pass-Through Agreement), groundwater (updated yield estimates), SWP (water management strategies), recycled water (update non-potable water market assessment; track potable reuse regulations). Operate desal plant until minimum reserve thresholds are met, demonstrating sufficient supply reserves are in place.
- Phase 2: Begin planning for a new supply for implementation in Phase 3. Update desalination operational costs and expansion considerations. Re-evaluate potable reuse based on any new potable reuse regulations. Determine if pursuing higher conservation rates is a realistic and economically feasible path for managing demands to avoid new supply investments.
- Phase 3: If demands are a driving factor in entering Phase 3, implement a new supply (desalination expansion or potable reuse) because an additional reliable

supply is required during drought conditions. If supply reductions are the driving factor for entering Phase 3, plan to operate desalination continuously because the supply is needed during non-drought conditions to meet demands.

- Phase 4: Implement both a new supply (desal expansion or potable reuse) and plan to operate desalination continuously. Begin to identify additional new supply opportunities for Phase 5.
- Phase 5: Implement new supplies beyond those identified in this plan, such as additional desalination expansion, potable reuse, or higher conservation.

Figure 1: Adaptive Implementation Plan Phases



Water Commission

Updates on the EUWMP were presented to the City's Water Commission in April 2020, July 2020, September 2020, and at two meetings in November 2020. The Water Commission participated in in-depth work sessions on several components of the EUWMP effort, including the multifaceted stakeholder engagement process, water demand forecasting, current water supply portfolio analysis, future portfolio analysis, adaptive implementation plan, and plan recommendations.

In response to the November presentations, Commissioners highlighted that the City's water supply planning needs to continue to use an adaptive management approach, whereby the City will actively work to minimize the need for future desal expansion through optimization of existing supplies and demand reductions via conservation efforts. They also noted that the portfolios using Potable Reuse scored well, but because of the lack of available regulations and steep costs, it should be revisited in the next EUWMP update.

Next Steps

The WVSB Stakeholder Group will hold its final workshop on December 10, 2020, allowing stakeholders to provide feedback on the selected portfolio, recommendations, and Adaptive Implementation Plan. Staff will return to the Water Commission in January 2021 to receive any additional input and final recommendations. Staff will then return to Council in February 2021 to request approvals and policy direction. These approvals will form the basis for the public draft Enhanced Urban Water Management Plan, which will be brought to Council in May 2021 for review, and again in June for adoption to meet the July 1, 2021 due date set by the California Department of Water Resources.