RECOMMENDATION
This is an informational report to facilitate UAC discussion on recycled water expansion. There is no staff recommendation at this time.

EXECUTIVE SUMMARY
The proposed Phase 3 Expansion Project (Phase 3) is a non-potable water pipeline extending the current recycled water distribution system to the Stanford Research Park. The Business Plan for Phase 3, which presents the costs, benefits and budgetary impacts of Phase 3 as modeled by the City’s consultant, Woodward and Curran, is included as Attachment A with appendices in Attachment B.

The Phase 3 Business Plan is part of a larger Northwest County Recycled Water Strategic Plan which entails a broader evaluation of alternatives for using the recycled water from the City’s Regional Water Quality Control Plant (RWQCP). Because the Northwest Recycled Water Strategic Plan is not complete, there is no staff recommendation at this time.

BACKGROUND
In November 2016 Council adopted the Sustainability and Climate Action Plan (S/CAP) Framework (Staff Report #7304) including four water-specific goals, all of which have implications for water reuse:

1. Utilize the right water supply for the right use;
2. Ensure sufficient water quantity and quality;
3. Protect the Bay, other surface waters, and groundwater; and
4. Lead in sustainable water management

Two relevant strategies identified in S/CAP are:

1. Verify Ability to Meet City’s long term water needs; and
2. Investigate all potential uses of Recycled Water

In December 2017 Council adopted the Sustainability Implementation Plan (Staff Report #8487). Key actions included developing a recycled water strategic plan and exploring the most
effective uses of recycled water, both inside and outside Palo Alto. All of the work regarding Phase 3 and the other alternative uses for recycled water are tantamount to the water-related sustainability goals adopted by the City.

The proposed Phase 3 project, shown in Figure 1, includes over 10 miles of transmission and distribution pipelines, two pump stations, and customer connections to deliver around 1,000 acre feet per year (AFY) of recycled water from the Regional Water Quality Control Plant (RWQCP) to the Stanford Research Park in the southwest area of Palo Alto. The project was first identified in a 2008 Recycled Water Facility Plan that was then converted to a Title XVI-compliant Feasibility Study in May 2012. The Program Environmental Impact Report for the Phase 3 project facilities was certified by the Palo Alto City Council in September 2015 (Resolution 9548). The primary purpose of extending the recycled water system would be to maximize the availability of recycled water as a supplemental water supply, reducing the water system’s reliance on imported supplies and improving the water supply reliability of the system in the event of a drought. Expansion of the use of recycled water would also reduce the amount of effluent discharged to the San Francisco Bay from the RWQCP.
The Phase 3 Business Plan is part of the Northwest County Recycled Water Strategic Plan being undertaken in collaboration with the Santa Clara Valley Water District (District). The scope includes high-level assessments of a variety of projects for RWQCP-related water reuse projects including purifying the water for groundwater recharge, direct potable reuse, and the expanded distribution of non-potable water beyond Phase 3. Because there are many treatment options, water quality types, and applications for water reuse, a reference sheet along with a map of the local recycled water distribution are provided in Attachment C.

It should be noted that the Business Plan presented here is offered to facilitate a discussion of the economic feasibility of this project under various scenarios. It is separate and distinct from a
cost of service study, which will fully determine the amount of project costs to be allocated system-wide, as well a constitutionally compliant recycled water rate.

**DISCUSSION**

**Potential Positive Impacts of the Project**

By substituting recycled water for potable water in the areas to be served by Phase 3, the City can reduce the demand for potable water (and reserve potable water supplies for uses for which recycled water would be inappropriate). Reductions in potable demand will improve the supply reliability of the potable system, potentially translating to less severe cut-backs being needed from all customers during a drought. Additionally, the project will create an additional, local and renewable water supply source, reduce dependence on the Tuolumne River, Palo Alto’s potable water source, and permit public and commercial landscapes and trees to remain green and lush during a water supply shortage.

Questions Answered by the Woodward and Curran analysis

- **What are the long-term recycled water demands for potential recycled water uses in the vicinity of the Phase 3 Expansion?** The total average annual recycled water demand for uses that would be served by Phase 3, including uses in the Embarcadero Road area near the RWQCP, is 924 acre-feet per year (AFY). In the future, if dual-plumbing uses at Stanford University are also served, demand increases by about 17 AFY.

- **What are the updated costs for construction of the Phase 3 facilities considering updated demand projections and various construction challenges?** Construction cost is estimated to be $36,800,000 in 2020 dollars. The unit cost of the Phase 3 Project (without any outside funding or financing) is estimated to be $3,030/AF in 2020 dollars, over the life of the project, which is higher than some similar projects with limited distribution system piping, but lower than other similar projects in urban settings.

- **What is the economic feasibility of implementing the Phase 3 Expansion Project?** The Phase 3 project includes direct costs of construction, other capital costs, energy, operation, maintenance and revenue lost from lost potable water sales. Project revenues and new funding sources include external funding such as loans or grants, the avoided cost of wastewater discharges and SFPUC purchases, recycled water revenues, and system reliability enhancement benefits incorporated into potable water rates.

Figure 2 shows the cost and benefit components.

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1 One acre-foot per year is equal to roughly 450 hundred cubic feet (CCF) or 326,000 gallons. For comparison, Palo Alto’s total annual water consumption is 11,000 AFY
The Business Plan analysis considers the project economically feasible if the total monetized value of benefits exceeds the total cost to construct and operate the Phase 3 system at full build-out. One benefit of expanding recycled water distribution is referred to as the Potable, or System Reliability Enhancement, which is measured as the improvement in reliability of the potable water supply and resulting reduction in the need for conservation measures, particularly in drought conditions. Quantifying this benefit can support the allocation of some project costs from potable water revenues.

Outside funding, in the form of a low interest loan and/or a grant, is also a significant factor in the economic feasibility of this project. If a low interest loan can be secured, the Potable Reliability Enhancement rate is estimated at $150 per AF. $150 per AF ($0.34 per ccf) represents approximately a 3-4 percent increase on a typical residential bill in 2018. Absent grants or loans, the analysis indicates that a reliability rate of about $225 per AF ($0.52 per ccf) would be required in the early years of the project. Figure 3 shows the Potable Reliability Enhancement rate at different points in time for various outside funding scenarios.
One significant design choice that needs to be made is whether to include the outermost section of the Phase 3 pipeline in the project. A cemetery located at the end of the Phase 3 pipeline currently uses groundwater, rather than potable water. The cemetery paid a groundwater production charge of $1,072/AF for this pumped water over the past year (by 2020 this rate is expected to go up to $1,414/AF), and also incurs energy costs for pumping. Thus, substitution of recycled water for pumped water could be a substantial additional expense for the cemetery and would not reduce the City’s reliance on its potable water source. A preliminary rate analysis showed that the cemetery could pay approximately the same for Phase 3 recycled water after switching from District groundwater, if the recycled water rate is approximately 60 percent of Palo Alto’s potable water rate. A scenario excluding the cemetery and some smaller customers nearby was explored. The simplified analysis assumed lower capital costs for a shorter pipeline, and studied project feasibility with a recycled water rate of 95% of Palo Alto’s potable water rate. For this scaled down project, the reliability rate would be lower. At this point, no final conclusions have been drawn regarding the appropriate rate design, expected recycled revenue requirement, nor ultimate economic feasibility, although various scenarios have been outlined in the report. A robust cost of service study will need to be conducted in order to fully ascertain the proper recycled water rate, including all cost and benefits of the project system-wide.
What are the variations in ranges of potential costs and benefits for the Phase 3 Expansion Project and what are the resulting impacts to the potable water customer base? A Risk Assessment Model was developed specifically for this analysis to evaluate the costs of Phase 3 given the range of estimates for the individual components that make up the costs and benefits of the project. Additional details about the model are included in the final report.

Generally, the annual net cost of the project is expected to decrease over time as the capital debt service is held constant but SFPUC wholesale and Palo Alto retail water rates increase. This is seen in aggregate for the various model runs in Figure 4. The farther into the future, the greater likelihood that the reliability rate will trend towards zero.

**Figure 4: Probability of Reliability Rate at Different Time Steps**

![Probability of Reliability Rate](image)

- What are the risks to economic feasibility if changes occur related to demands, water costs, and external funding—in other words, what is the risk of the Phase 3 pipeline becoming a stranded asset? Construction costs, recycled water demand, and outside funding are all significant variables that impact the economic feasibility of Phase 3. For the early years of the project, a Potable Enhancement Reliability rate between $60 and $225 per AF is adequate 90 percent of the time. The economic feasibility of the project is expected to improve over time as Palo Alto’s retail potable water rate converges with SFPUC’s wholesale rate.
What are potential risk mitigation strategies to improve project feasibility or repurpose Phase 3 Project facilities if future changes negate the economic feasibility of planned recycled water use? Phase 3 was found to be economically feasible for several scenarios where external funding is received. However, if continued operation of the recycled water project becomes infeasible, there are three key mitigation strategies: (1) increasing the recycled water rate, if supported by a cost of service study; (2) increasing recycled water throughput by expanding distribution beyond Phase 3; and (3) finding an alternative use for the Phase 3 Expansion Project facilities. The alternative uses for the Phase 3 pipeline will be developed under the Recycled Water Strategic Plan and as a high level assessment of recycled water distribution opportunities beyond Phase 3.

Based upon the work conducted in the Business Plan the following will be undertaken:

- Evaluate a scaled-down project that excludes the customer currently using groundwater that takes into consideration the water reuse alternative results in the Recycled Water Strategic Plan.
- Conduct a rigorous cost of service study to refine the estimated recycled water revenue, and update the cost versus benefit calculation.
- Continue aggressive pursuit of external funding, including grants and low interest loans.
- Continue identification and evaluation of additional uses that might be served by recycled water from the Phase 3 Expansion Project.
- Evaluate incorporation of Phase 3 facilities into a future groundwater recharge project in the Indirect Potable Reuse Feasibility Study.
- Evaluate incorporation of Phase 3 facilities into a future Direct Potable Reuse (DPR) facility as part of the Northwest County Recycled Water Strategic Plan.
- Complete the Northwest County Recycled Water Strategic Plan to compare Phase 3 to other recycled water use alternatives.

**POLICY IMPLICATIONS**

While there is no recommendation at this time, expanding the use of recycled water would be consistent with the Sustainability Climate Action Plan Framework (Staff Report #7304) and the Sustainability Implementation Plan (Staff Report #8487).

**ENVIRONMENTAL REVIEW**

The UAC’s review of the concepts in the forthcoming Business Plan for Phase 3 Expansion does not require California Environmental Quality Act review, because the review does not meet the definition of a project under Public Resources Code 21065. The Program Environmental Impact Report for the Phase 3 project facilities was certified by the Palo Alto City Council in September 2015 (Resolution 9548).
ATTACHMENT
A. Phase 3 Business Plan
B. Phase 3 Business Plan Appendices
C. Recycled Water Reference Sheet

PREPARED BY:  V.O Karla Dailey, Senior Resource Planner

REVIEWED BY:  Jonathan Abendschein, Assistant Director, Resource Management

DEPARTMENT HEAD:  
Ed Shikada
Utilities General Manager