City of Arts & Innovation

# Mobility & Infrastructure Committee Memorandum

**TO:** **MOBILITY & INFRASTRUCTURE COMMITTEE** **DATE: MARCH 13, 2025**

**FROM:** **PUBLIC UTILITIES DEPARTMENT** **WARD(S): ALL**

**SUBJECT:** **RECEIVE AND FILE AN OVERVIEW OF THE CITY OF RIVERSIDE'S NON-POTABLE AND RECYCLED WATER RESOURCES**

## ISSUE:

Receive and file an overview of the City of Riverside's non-potable and recycled water resources.

## RECOMMENDATION:

That the Mobility & Infrastructure Committee receive and file this overview of the City of Riverside's non-potable and recycled water resources.

## BACKGROUND:

In response to public comments, the City Council requested staff to provide additional information on the use of non-potable and recycled water for irrigation needs. Non-potable water and recycled water have been studied extensively over the past 30 years beginning with the 1992 Recycling Master Plan, by MWH. Subsequent studies include the 2003 Recycled Water Phase I Feasibility Study and Citywide Master Plan by Parsons, the 2005 Non-Potable Water Supply Assessment by MWH, the 2011 Recycled Water Facilities Plan by HDR, two in-house staff-prepared planning reports on smaller recycled water implementations, and most recently, the Non-Potable/Recycled Water Master Plan by Carollo completed in March 2024. These studies looked at various options of implementing non-potable and recycled water, including the use of decentralized treatment plants, non-potable wells in the Riverside South/Arlington Basins, the Riverside Canal, and smaller localized recycled water implementations in the vicinity of the City's Regional Water Quality Control Plant (RWQCP). Overall, the reports recommended a phased approach to implementation of a recycled/non-potable system with considerations of outstanding issues (supply, reliability, public health protection, conversion costs, water quality issues, etc.) to ensure that projects are technically and economically feasible.

Consequently, non-potable and recycled water use implementation has been done on a limited basis due to the relatively high cost of the projects compared to other water resources projects. Of the tertiary treated recycled water produced by the RWQCP, most of it is required by the 1969 Santa Ana River Judgment and environmental obligations to be discharged into the Santa Ana River. A small portion of the remaining water is currently distributed through the City of Riverside Public Utilities' (RPU)'s existing recycled water system primarily for irrigation use.

Non-potable water implementation has consisted of the Gage Exchange and the use of the Olivewood Wells to supply non-potable water to the Gage Canal, and the Riverside Canal to supply non-potable water to Western Municipal Water District (WMWD). The Gage Exchange allowed for the transfer of non-potable water from the Riverside Canal to the Gage Canal in exchange for potable water, however, this system has not been in operation since the cancellation of the Gage Exchange Agreement in 2021. The Olivewood wells consist of three non-potable wells located at Riverside City College which currently supply non-potable water to the Gage Canal. Two RPU-owned wells (Johnson 4 and First Street Wells) and a leased well (Palm Well) currently provide non-potable water to the Riverside Canal, which is wheeled/wholesaled to WMWD.

## DISCUSSION:

*History of Non-Potable and Recycled Water*

The history of Riverside's non-potable and recycled water is better understood when presented within the context of the City's overall water supply portfolio, which consists of groundwater, surface water, and recycled water. Local groundwater is produced from wells within the Bunker Hill, Rialto-Colton, Riverside North, and Riverside South basins, and is the source for both the City's potable and non-potable water supplies. Local groundwater extraction rights total 85,773 acre-feet per year (AFY). Surface water consists of imported water from the State Water Project via a connection with WMWD from their Mills Treatment Plant which can provide up to 21,700 AFY. Riverside has strategically planned water supply projects to minimize its operational reliance on imported water and insulate its customers from external pressures faced by other communities dependent on imported water while appropriately advocating for a viable state water and Colorado River aqueduct supply system. Thus, Riverside has not had to purchase imported water since 2009. Recycled water is produced from the RWQCP, the City's wastewater treatment plant.

The Riverside Canal was constructed in 1871 by the Riverside Water Company, and the Gage Canal was constructed in 1885 by Matthew Gage, a private developer. Both canals provided the water needed for the early citrus industry of La Placita, High Grove and Riverside. Whereas the Gage Canal was built to facilitate citrus irrigation, the Riverside Canal also served the domestic water supply needs of the original "Mile Square" Riverside Colony. In 1961, the City of Riverside acquired the Riverside Canal Company and its facilities, and in 1983 the Riverside Water Company was dissolved. As the canal had ceased to perform its historical function of delivering irrigation water to Riverside through the years, it was in the early 1980s that a Riverside Canal Abandonment Task Force was established by the City Manager along with participants from the Public Works, Development, and Public Utilities Departments; the Mayor's Office; and the Riverside County Flood Control District to analyze options of abandoning the Riverside Canal. The Task Force found that while the Riverside Canal no longer served its original purpose of delivering irrigation water, portions of the canal had incidental and successor uses which require continued maintenance and operation costs. It was recommended that wherever possible, these uses should be removed and the canal abandoned. The portion of the canal from the headgates to Jefferson Street was identified with several water-carry obligations, which did not make near-term abandonment possible; this portion of the canal continues to remain in use for wheeling/wholesaling irrigation water to WMWD along with conveying storm run-off. Portions of the Riverside Canal downstream of Jefferson Street, however, were able to be sold, removed and/or filled in, in alignment with the Task Force recommendations.

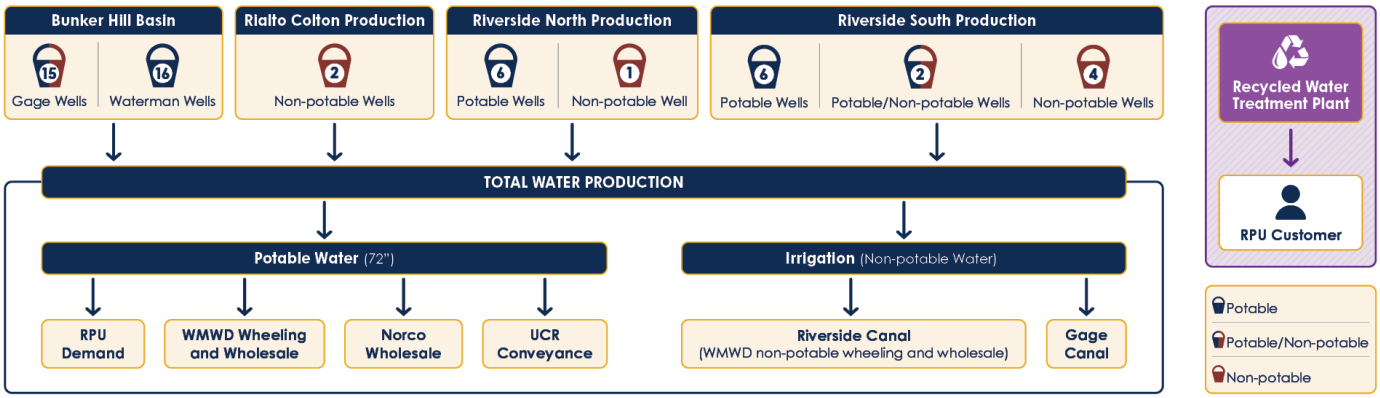
Unlike the Riverside Canal, the Gage Canal continued operation through the years. In 1959, the

City filed a “friendly” condemnation action, and in 1965 acquired the Gage facilities (with some exceptions of the canal south of McAllister and miscellaneous portions of property). In 1973, the City undertook a project to convert the Upper Gage canal from an open channel to an enclosed pressurized pipeline, allowing previously ‘non-potable’ water to be re-classified as ‘potable’, for domestic use to serve the City’s growing needs. Since that time, the City was also able to successfully litigate for the construction and operation of several groundwater treatment plants by the potentially responsible parties to treat for chemical contaminants found in RPU’s wells resulting from alleged historic land uses. Under a 1965 Operating Agreement with the Gage Canal, the Gage wells, pipeline and canal are operated by the Gage Canal Company, while the City retains ownership of the Gage facilities and property (Canal right-of-way, wells, pipelines and Mockingbird Canyon Lake and property). RPU maintains the upper pipeline section of the Gage system (headworks to the Linden Street turnout), while the lower agricultural canal section is maintained by Gage Canal Co., with exceptions of portions of the canal that have been converted to trails. In 1991, in response to a drought, an agreement was made between RPU and Gage Canal Co. for the exchange of agricultural water for domestic water. Under the agreement, RPU was able to receive up to 6,400 AFY of potable water from the Gage Canal in exchange for a maximum of 8,000 AFY of agricultural water pumped from the Riverside Canal at the Olivewood Booster Station; this pump station and associated piping comprised the Gage Exchange system. The agreement was in place until 2021, when the agreement was terminated by the Gage Canal Co.

As previously mentioned in the Background section, RPU has investigated opportunities to deliver recycled water going back to 1992, when MWH completed the first Recycling Water Master Plan. The study focused on evaluating recycled water quantity, quality, use options, market assessment, development of a core distribution system, and excess recycled water management. This plan was never formally adopted, but the City has since then gradually increased the use of recycled water in areas near the RWQCP on a case-by-case basis. Early customers included the Van Buren Golf Center, the Van Buren Urban Forest and the Toro Manufacturing Company. In 2008, the City obtained a Wastewater Change Petition from the State Water Resources Control Board (SWRCB) that permitted it to remove some of its wastewater discharge from the Santa Ana River for non-potable supply purposes. The permit was granted; however, the minimum wastewater discharge was increased from the Judgment[1] amount of 15,250 AFY to 25,000 AFY due to environmental legal challenges from the Center for Biological Diversity and the California Department of Fish and Wildlife. The additional 9,750 AFY above the required discharge was slated for habitat benefits. However, with the Great Recession, coupled with California's drought declaration and consequent permanent water conservation measures, flows at the plant have been much lower than projected. Currently flows at the RWQCP are around 30,000 AFY, with approximately 3,000-5,000 AFY of recycled water available for RPU’s use. The State's new proposed performance standards for *Making Conservation a California Way of Life*, are expected to further reduce available flow at the RWQCP over time. A summary of Riverside’s water supply is shown below.

[1] Under the 1968 Agreement with WMWD supporting the 1969 Santa Ana River Judgment, 15,250 acre-feet per year (AFY) of treated wastewater from the RWQCP must be discharged to the Santa Ana River to meet obligations to Orange County and the State Water Resources Control Board.

## RPU WATER PRODUCTION SCHEMATIC




*RPU's Water System*

RPU's potable water system consists of 44 active wells, 6 treatment plants, approximately 993 miles of pipeline, 16 reservoirs, 31 pump stations and 25 pressure reducing stations, which serve over 69,000 service connections in a service area of 75 square miles. RPU's potable water system provides a high level of service with a dependable supply of water at a minimum service pressure of 40 pounds per square inch (psi) and is able to satisfy maximum day and peak hour demands, including fire flow demands for the customer's facility receiving water service. RPU's non-potable water system consists of 6 non-potable wells, approximately 6 miles of pipeline and 14 miles of canal. The recycled water system consists of approximately 8 miles of recycled water pipeline within portions of Jurupa Avenue, Van Buren Boulevard, Jackson Street, Magnolia Avenue, and Monroe Street. The non-potable and recycled water systems do not have the same level of service as the potable system, and deliveries of non-potable and recycled water may be interrupted due to maintenance or plant shutdowns (in the case of recycled water). Improvements to the level of service would require storage reservoirs, filtration systems and pump stations to be added to these systems.

In FY2023-24, approximately 7,981 AFY of non-potable groundwater was produced. Of this amount, 544 AFY was produced from the Riverside Basin and delivered to WMWD through the Riverside Canal, and the remaining 7,437 AFY produced from the Bunker Hill Basin and Riverside groundwater basins was utilized for agricultural water deliveries to Gage customers. Approximately 170 acre-feet (AF) of recycled water was delivered to RPU's 15 recycled water service connections. For the calendar year 2024, total water production for the year (non-potable and potable water) was 75,868 AF and the peak day demand was 84.7 million gallons.

Non-potable water production has declined over the past several years, mainly as a result of the termination of the Gage Exchange Agreement. The Riverside Canal currently wheels water produced by Elsinore Valley Municipal Water District's (EVMWD)'s Palm Well, which is leased to WMWD. RPU's Johnson 4 Well and First St. Well produce non-potable water which is wholesaled to WMWD. Under California Water Code (Sections 1810-1815), RPU is required to allow an entity to wheel water through unused capacity through RPU's system; the City, in turn, is able to receive fair compensation for costs incurred through the use of the conveyance system. A short segment of the Riverside Canal will be used to wheel water from WMWD's non-potable Well 7 (located off Hoover Street) once construction of the well has been completed. Additional investment in non-potable infrastructure (irrigation wells, reservoirs, pump stations and on-site irrigation

conversions) will need to be evaluated on a project-by-project basis. Aging equipment, wells and canals affect the level of service for non-potable water supply and distribution. Water quality is another issue for consideration, as non-potable water is not subject to the same water quality standards and testing requirements as the potable system. The use of an open canal for conveyance of non-potable water is subject to urban runoff and storm water flows which enter the canal and can adversely impact water quality. Lastly, planned and unplanned maintenance of the non-potable system reduces the reliability and overall level of service of the non-potable system; the Riverside Canal is subject to such shutdowns to clean up debris, make repairs, and remove algae and aquatic weeds.

*Non-potable / Recycled Water Plan Findings*

The Non-potable/Recycled Water Master Plan completed in 2024 by Carollo identified a potential non-potable water project to move water from the Riverside Canal to provide irrigation water for the Olivewood Memorial Park and some other users off of the existing 8-inch recycled water pipeline within Central Avenue using the Olivewood pump station and a filtration system. This option would need further investigation by RPU to further determine the feasibility of this option. On the recycled water side, the study identified a phased approach to recycled water infrastructure development to build on the existing facilities. In addition, the study incorporated the on-going work between RPU and San Bernardino Municipal Valley Water District (Valley District) on the Riverside Habitat Parks and Water Project (RHPWP), which is a regional multi-agency project to strengthen the health and resilience of natural resources within the Upper Santa Ana River Watershed and mitigate impacts associated with the construction and maintenance activities of current and future water supply projects in the region. The RHPWP seeks to provide up to 14,450 AFY of recycled water to habitat and RPU customer sites, with recycled water from the RWQCP. This will require a wastewater change petition to be approved by the SWRCB to modify its 25,000 AFY wastewater flow commitment to 15,250 AFY, freeing up 10,000 AFY for habitat and RPU customer use. This would provide the City with up to an additional 4,500 AFY of recycled water, which will be needed for future expansion of the City's recycled water system.

The Recycled Water system development was divided into three phases: Phase 1 projects which would roughly follow with the implementation of the RHPWP-West Branch project, and had a timeframe of 0 to 5 years out; Phase 2 projects which aligned with the implementation of the RHPWP-East Branch project and would have a timeframe of 5 to 15 years out; and Phase 3 projects, which were more than 15 years out.

Phase 1 projects include potential recycled water customers along the constructed Jackson St. recycled water pipeline, customers identified as part of the RHPWP-West Branch Project, and three habitat sites: Hidden Valley Creek, Hidden Valley Wetlands, and Hole Creek. A total of 4,865 AFY of recycled water demand would be divided with 4,488 AFY for habitat use and 377 AFY for RPU retail use.

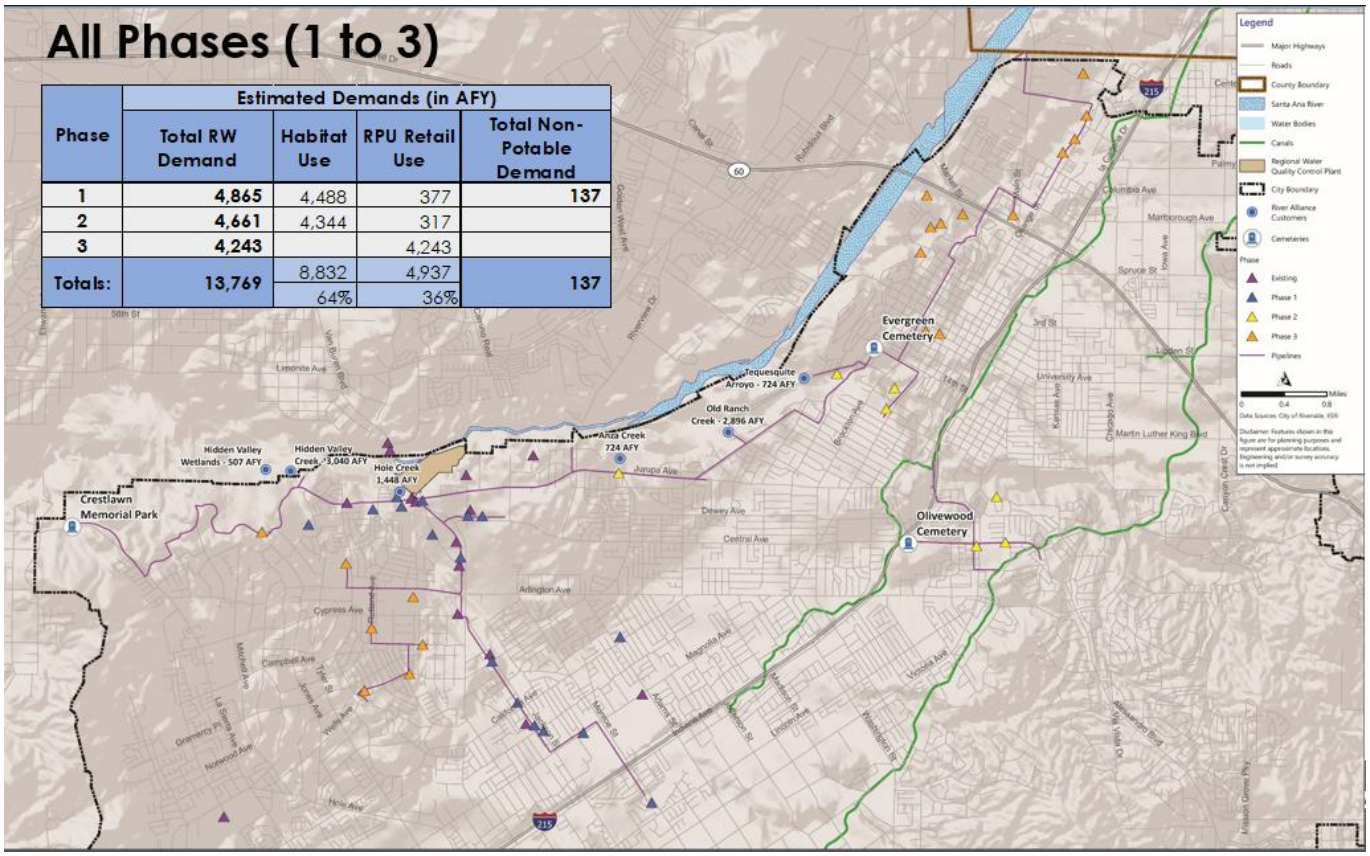
Phase 2 projects include the RHPWP-East Branch habitat sites: Anza Creek, Old Ranch Road, Tequesquite Arroyo, and associated recycled water customers along the pipeline alignment. A total of 4,661 AFY of recycled water use was identified, with 4,344 AFY for habitat use and 317 AFY for RPU retail use.

Phase 3 projects include the complete build-out of the recycled water system extending westerly through the Rancho La Sierra development to Crestlawn Memorial Cemetery, and a northerly extension of the recycled water line past Fairmount Park to the Ab Brown Sports Fields. Additional

projects would be evaluated based on having sufficient supplies of recycled water and the CIP budget to expand the recycled water system. A total demand of 4,243 AFY was estimated for full system build-out.

The study identified a total capital cost of approximately $185M for the full implementation of the proposed non-potable/recycled water program; a figure summarizing all three phases is shown below.

Non-Potable/Recycled Water Master Plan – Phase 1 to 3 Projects




The study also identified several challenges for implementation, including the potential reduction of available recycled water due to the impacts from the State's water use efficiency standards for indoor water use (a reduction in wastewater going the RWQCP reduces the supply of tertiary treated recycled water available as recycled water). Another challenge is the need to secure the approval of the wastewater change petition from the SWRCB to free up additional recycled water resources for the RHPWP and RPU customer use. Also, the lack of a significant cost differential between the potable and recycled water rates does not make it financially attractive for existing customers to switch over to recycled water for their landscaping needs.

Additionally, on the non-potable side, the costs to continue to maintain and operate an ageing system compete with the investments needed to maintain the potable water system. The cost of drilling and equipping a non-potable well is the same as that for a potable water well, however, the economic return that is provided to fund RPU's system is not, with the non-potable return on investment being much lower. Water produced for non-potable or potable uses both get accounted against RPU's limited water rights in the same manner; thus it is more cost effective to invest in maintaining/improving the potable system than the non-potable system.

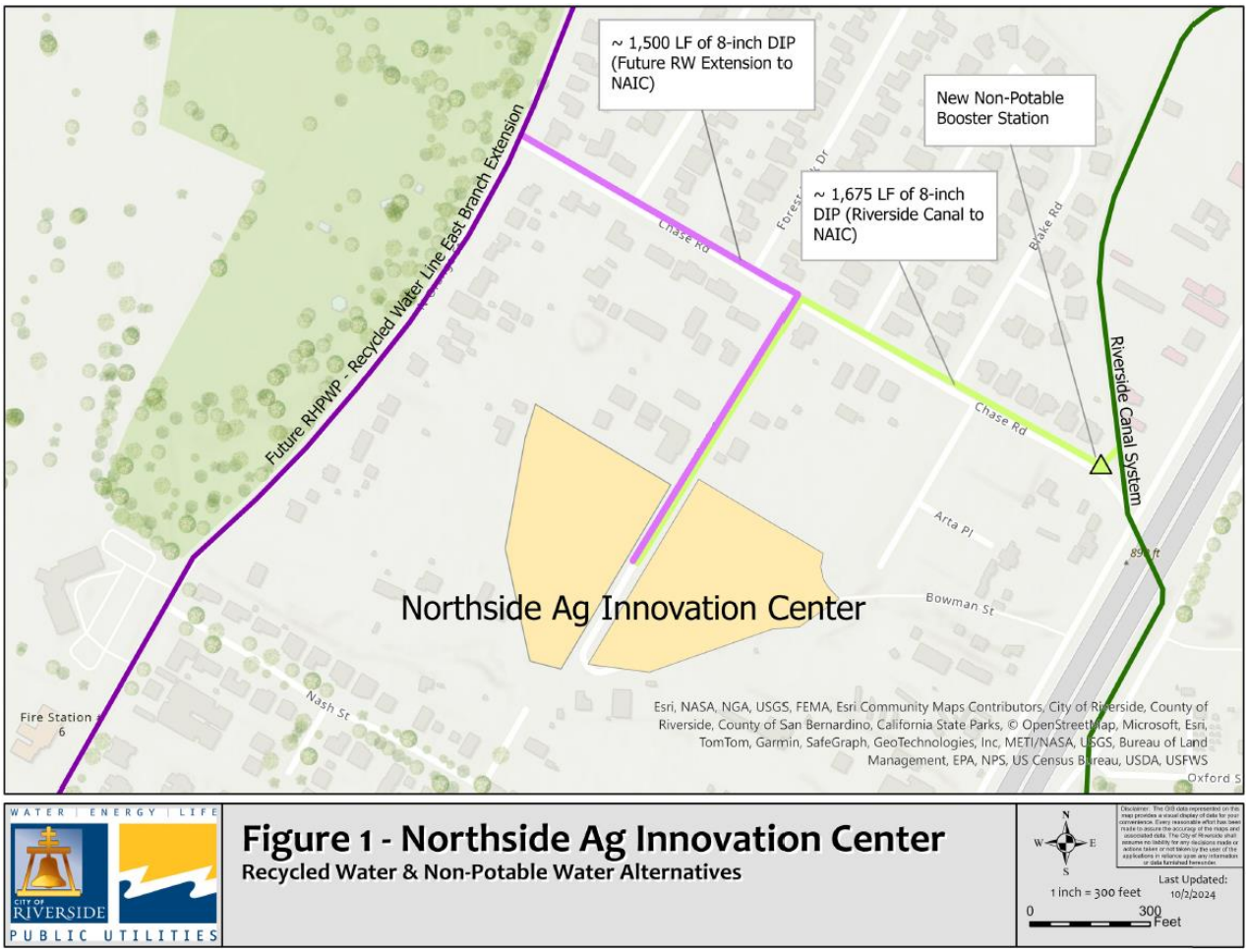
*Project Analysis - Northside Ag Innovation Center and Central Ave. Recycled Water Line*

In response to public feedback received, Staff evaluated the use of non-potable and recycled water alternatives to supply water to two sites: the Northside Agricultural Innovation Center (NAIC) and the Central Avenue recycled water line.

For the NAIC, the first item for consideration would be the water quality needed to irrigate the proposed edible crops at the site. In addition to the contaminants introduced into the canal from urban and storm water runoff, the water quality from untreated non-potable wells would need to comply with the needs of the NAIC. Assuming satisfactory water quality conditions, the use of non-potable water from the Riverside Canal would require modifications to the existing canal for a turnout, construction of approximately 1,675 LF of non-potable pipeline, filtration/screening equipment, and a small booster station. Due to reliability issues associated with the non-potable system and depending on the pressure needs at the site, additional on-site improvements including a 25,000-gallon storage tank, on-site strainer/filtration system and booster pump were included. To provide redundancy to the non-potable well supplying water to this reach of the canal, a dedicated non-potable well was added as an additional option. Costs for supplying non-potable water to the NAIC ranged from $1.4M (without well) to $8.1M (with dedicated non-potable well). As this infrastructure would solely benefit only this development, these costs would be borne by the developer. Assuming an annual demand of 4 AFY for the site, and an average cost differential of $0.26 per centum cubic foot (748 gallons) between the WA-6 rate (commercial metered service) and the WA-10 rate (Recycled Water), an annual savings of approximately $452 per year would be possible. However, the costs of the initial infrastructure investment, ($1.4M or $8.1M), make cost recovery for these options unfeasible.

In looking at the use of recycled water at the NAIC, water quality is less of a concern as the state does allow the use of Title 22 recycled water for the irrigation of organic crops provided that it meets all the applicable requirements. The required infrastructure needed to supply the site would include approximately 1,500 LF of pipeline, along with on-site filtration/screening. The estimated cost for this option is $1M. This option, however, would not be feasible until Phase 3 of the recycled water system improvements have been completed (as identified in the Non-Potable/Recycled Water Master Plan referenced above), when the recycled water system is extended to Reid Park.

Northside Agricultural Innovation Center




The Central Avenue recycled water line was constructed around 2007 as part of a joint street improvement project with Public Works to save on construction costs. The project was planned to provide recycled water to the Olivewood Cemetery, Riverside Poly High School, Alcott Elementary School and associated street median landscaping along the recycled water alignment. With the 2011 Water Facilities Master Plan (HDR) study, however, it was decided that the proposed full-build out of the recycled water system (which would ultimately supply recycled water to the constructed pipeline) was too costly, and a series of internal RPU staff-produced studies were undertaken to develop a scaled-back phased implementation of recycled water focusing on sites closer in proximity to the RWQCP (i.e., the Jackson St. Recycled Water Main, Phase I Project). As an interim measure, the constructed recycled line was tied into the potable system to place the line in use until a recycled water source could be supplied to the line at an unspecified future time.

As referenced in the Non-Potable / Recycled Water Master Plan, the use of the non-potable water from the Riverside Canal utilizing the existing Olivewood Booster Station, with the Olivewood Wells serving as a redundant source of water was analyzed. As the Central Avenue recycled waterline has the capability of serving the seven customers listed on the table below, these demands were used for the basis of sizing the system pumping and storage improvements which include: modifications to the canal, piping, and pump station; addition of a screen/filtration system; new electrical/SCADA work; and construction of a 0.5 million gallon storage reservoir and new pump station for a total cost of $4.9M. This does not include the property acquisition costs for the reservoir and new pump station which would be needed to provide the appropriate level of service in terms of reliability and minimum supplied water pressure to the sites. Water quality considerations would need to be further investigated to ensure that they meet customer needs. Customers would need to bear the costs of site conversions of their existing landscape irrigation

systems, if needed, to comply with cross-connection prevention standards.

Potential Central Avenue Non-Potable/Recycled Water Customers

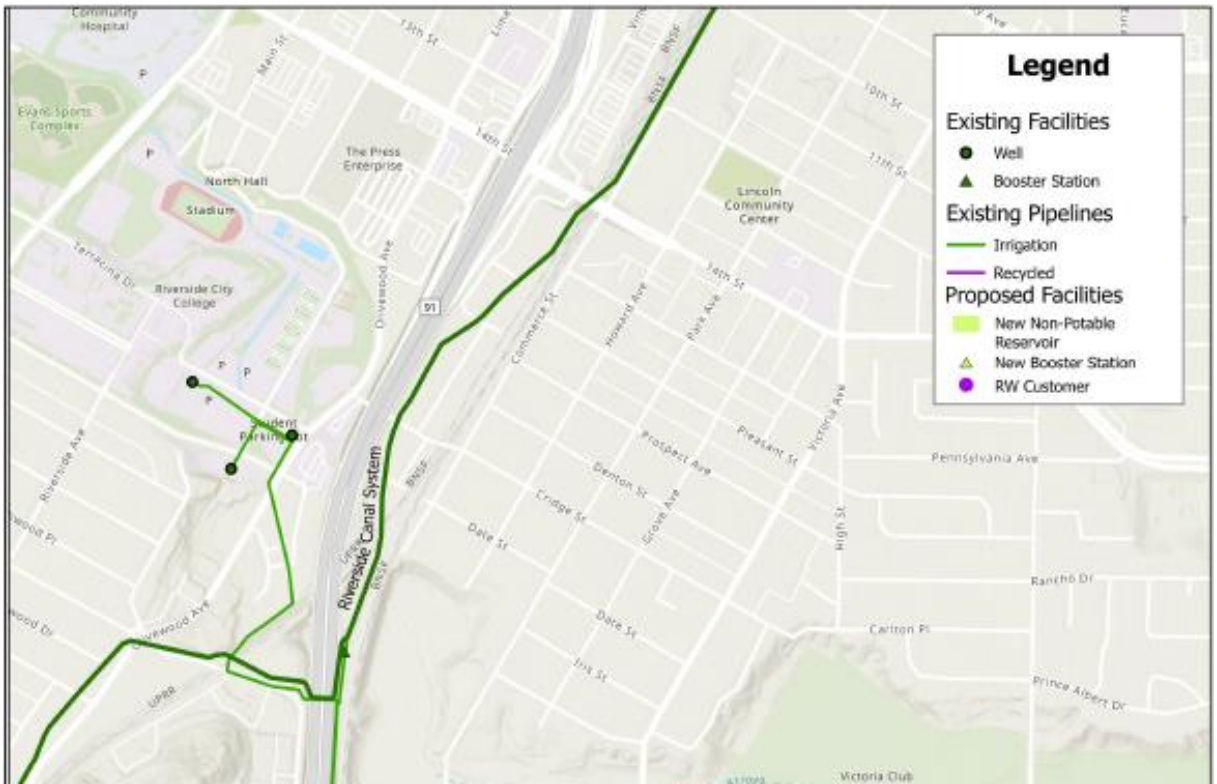
| SITE_ID | Site Type | Recycled Water Demand (AFY)[1] | Recycled Water Demand (GPM) | Peak RW Demand (GPM) |
|---|---|---|---|---|
| 1 | Cemetery | 51.3 | 31.80 | 218.1 |
| 2 | School | 30.6 | 18.96 | 130.1 |
| 3 | School | 5.9 | 3.68 | 25.3 |
| 4 | Church/School | 8.8 | 5.46 | 37.4 |
| 5 | Church/School | 10.0 | 6.20 | 42.5 |
| 6 | Street Median Landscaping | 22.2 | 13.76 | 94.4 |
| 7 | Street Median Landscaping | 8.7 | 5.36 | 36.8 |
| | **Totals** | **137.5** | **85** | **585** |

**Note:**

1. Landscape Meter/Service or Recycled Water Meter/Service - Recycled Water Demand was determined from Enquesta.

The use of recycled water was a less desirable option due to the lack of nearby recycled water infrastructure based on the proposed full system build out in the Non-Potable/Recycled Water Master Plan. Use of recycled water would require completion of the RHPWP-East Branch project in Phase 2 of the master plan. An additional 13,100 LF of pipeline would need to extend service to tie into the existing 8-inch recycled water line within Central Avenue. The estimated cost for the additional pipeline work is $8.8M. As with the non-potable system, customers would need to bear the costs of site conversion work of their existing irrigation systems, if needed.

Central Avenue Recycled Water Line



*Conclusion/Next Steps*

Based on the findings of subsequent non-potable/recycled water studies, staff will continue the phased approach to recycled water/non-potable water projects and evaluate project opportunities on a case-by-case basis to ensure they are cost effective prior to pursuing further studies for implementation. The non-potable system will continue to operate to serve wheel/wholesale water to WMWD to monetize this asset until a more beneficial use or project opportunity is identified.

Historically, non-potable and recycled water projects have not been pursued due to their cost relative to other water resources projects. The use of non-potable/recycled water is an important piece of the City's water supply portfolio, but it has a specific use and, through carefully phased implementation in conjunction with other opportunities for outside funding, projects can be leveraged to provide additional significant benefits to make them more financially attractive. As in the case of the RHPWP, additional selected benefits include the securing of environmental credits for future RPU water supply projects along the Santa Ana River, additional recycled water supply for the City through a wastewater change petition, and the potential to exchange potable water resources with Valley District in kind for the upstream discharges of RPU's recycled water. Lastly, the implementation of recycled water for the irrigation needs of commercial, industrial, and institutional facilities helps offset the demand placed on the City's potable water supplies and preserve valuable drinking water resources for future needs.

## STRATEGIC PLAN ALIGNMENT:

This item contributes to Strategic Priority No. 4 – Environmental Stewardship and Goal 4.2 – Sustainably manage local water resources to maximize reliability and advance water reuse to ensure safe, reliable and affordable water to our community.

This item aligns with each of the five Cross-Cutting Threads as follows:

1. **Community Trust** – This update and discussion supports building community trust by informing the public on the progress of the planning efforts of non-potable and recycled water infrastructure and allows for public comment to be received.

2. **Equity** – The use of alternative water resources will ultimately help keep parks, schools, and nature-based assets greener for the City's residents to use and enjoy during times of drought and mandatory water conservation restrictions.

3. **Fiscal Responsibility** – RPU carefully manages the investments in its water supply and distribution infrastructure to ensure that the benefits of implementing non-potable and recycled water can be realized in a financially responsible manner while maintaining high-quality and affordable public services.

4. **Innovation** – Using under-utilized resources cost-effectively helps to ensure and protect potable water resources for the City's future needs.

5. **Sustainability & Resiliency** – Non-potable and recycled water projects are a part of the City's water supply portfolio that help to provide a reliable and sustainable water supply for current and future needs and reduce the City's dependence on imported water.

**FISCAL IMPACT:**

There is no fiscal impact associated with this item.

| | |
|---|---|
| Prepared by: | David A. Garcia, Utilities General Manager |
| Certified as to availability of funds: | Kristie Thomas, Finance Director/Assistant Chief Financial Officer |
| Approved by: | Rafael Guzman, Assistant City Manager |
| Approved as to form: | Jack Liu, Interim City Attorney |

Attachment: Presentation