Mobility & Infrastructure Committee Memorandum

City of Arts & Innovation

TO: **MOBILITY & INFRASTRUCTURE COMMITTEE** **DATE:** **JUNE 12, 2025**

FROM: **PUBLIC UTILITIES DEPARTMENT** **WARDS: ALL**

SUBJECT: **UPDATE ON PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS) REGULATIONS AND WATER TREATMENT APPROACHES**

ISSUE:

To receive a report on Per- and Polyfluoroalkyl Substances (PFAS) regulations and water treatment approaches.

RECOMMENDATIONS:

That the Mobility and Infrastructure Committee:

1. Receive a report on Per- and Polyfluoroalkyl Substances (PFAS) regulations and water treatment approaches;

2. Recommend a report on Per- and Polyfluoroalkyl Substances (PFAS) regulations and water treatment approaches be presented to the Board of Public Utilities and to the City Council; and

3. Direct staff to bring to the Board of Public Utilities a proposal to conduct a cost of service and rate design study to address the funding requirements to comply with the Per- and Polyfluoroalkyl Substances (PFAS) regulations.

BACKGROUND:

Per- and Polyfluoroalkyl Substances (PFAS), a collective term for a large group of synthetic organic chemicals, are comprised of more than 12,000 substances of emerging contaminants of concern. They are human-made chemical compounds designed to repel oil and water. They have a wide range of applications, from use in firefighting foam to consumer products designed to be waterproof, stain-resistant, and nonstick. Due to their persistence in the environment, PFAS are known as “forever chemicals”. They bioaccumulate in living organisms, which has the potential to cause adverse human and ecological health effects. Some known health effects include thyroid disease, liver damage, hormone disruption, reproductive and developmental complications, and kidney and testicular cancer.

The United States Environmental Protection Agency (EPA) has delegated authority to individual states as a primacy agency to implement and enforce the safe drinking water act. Primacy agencies (State) must adopt regulations equal to or more stringent than the Federal (EPA)

regulations. The State of California (CA) has delegated primacy to the State Water Resources Control Board (SWRCB) Division of Drinking Water (DDW) to issue new regulations requiring public water agencies to test and monitor for PFAS. Health and Safety Code section 116455 authorizes SWRCB to issue notification and response levels for contaminants in drinking water delivered for human consumption in the absence of an established maximum contaminant level (MCL).

Adopted Federal drinking water regulations will require compliance with MCL for PFAS compounds by 2031 while concurrently meeting the current State PFAS notification levels, response levels, and health advisories. The items below show the progression of these regulations and RPU's actions in preparation.

- In May 2016, the EPA issued a lifetime health advisory for perfluorooctane sulfonic acid (PFOS) and perfluorooctanoic acid (PFOA) for drinking water, advising municipalities that they should notify their customers of the presence of levels over 70 parts per trillion (ppt) in community water supplies. The EPA recommended that customer notifications include information on the increased risk to health, especially for susceptible populations.

- In July 2018, DDW established an interim notification level of 14 ppt for PFOA and 13 ppt for PFOS and a single response level of 70 ppt for the combined concentrations of PFOA and PFOS.

- In August 2019, DDW revised the notification levels to 6.5 ppt for PFOS and 5.1 ppt for PFOA. The single health advisory level (for the combined values of PFOS and PFOA) remained at 70 ppt.

- On October 28, 2019, RPU's Board approved a PFAS study to evaluate PFAS as an emerging contaminant.

- On February 6, 2020, DDW issued updated drinking water response levels of 10 ppt for PFOA and 40 ppt for PFOS based on a running four-quarter average.

- On March 5, 2021, DDW issued a drinking water notification level and response level of 0.5 parts per billion (ppb) and 5 ppb, respectively for perfluorobutane sulfonic acid (PFBS).

- On May 23, 2022, the Board of Public Utilities received and filed an update on the per- and polyfluoroalkyl substances.

- On October 31, 2022, DDW issued a drinking water notification level and response level of 3 parts per trillion (ppt) and 20 ppt, respectively for perfluorohexane sulfonic acid (PFHxS).

- On November 4, 2022, HDR Consulting completed the study evaluating a long-term approach to the treatment of PFAS in the City's water supply.

- On November 14, 2022, staff updated the Board on the results of the Granular Activated Carbon (GAC) demonstration PFAS removal study at the Palmyrita water treatment plant (WTP)

- On March 14, 2023, EPA announced its proposed National Primary Drinking Water Regulation (NPDWR) that suggests proposed MCL’s for six (6) compounds:

Chemical	Maximum Contaminant Level Goal (MCLG)	Maximum Contaminant Level (MCL)
PFOA	0 ppt	4.0 ppt
PFOS	0 ppt	4.0 ppt
PFHxS	10 ppt	10 ppt
HFPO-DA (Gen X)	10 ppt	10 ppt
PFNA	10 ppt	10 ppt
Mixture of two or more: PFHxS, Gen X and PFBS**	Hazard Index of 1 (unitless)	Hazard Index of 1 (unitless)

*Compliance is based on a Running Annual Average at the sampling point starting in 2031.

**The Hazard Index is made up of a sum of fractions. Each fraction compares the level of each PFAS measured in the water to the highest level determined not to have risk of health effects. These highest levels are PFHxS 10 ppt, PFNA 10 ppt, PFBS 2000 ppt, Gen X 10 ppt.

- On April 28, 2025, the Board of Public Utilities recommended that the City Council approve RFP No 2415 for Design and Construction Management services for the first PFAS treatment plant, Palmyrita Ion Exchange (IX) WTP.
- On May 14, 2025, the US EPA extended MCL compliance deadlines for PFOA and PFOS to 2031 as well as rescinded to reconsider the regulatory determinations for PFHxS, PFNA and GenX.
- On May 15, 2025, Mayor Patricia Lock Dawson and City Manager Mike Futrell met with the EPA to discuss PFAS regulations and compliance timelines.
- On May 20, 2025, the City Council approved the RFP No 2415 for Design and Construction Management services for the first PFAS treatment plant, Palmyrita IX WTP.
- Reduced DDW Notification Levels for PFAS compounds are anticipated to be released in summer 2025, with MCLs to follow.

DISCUSSION:

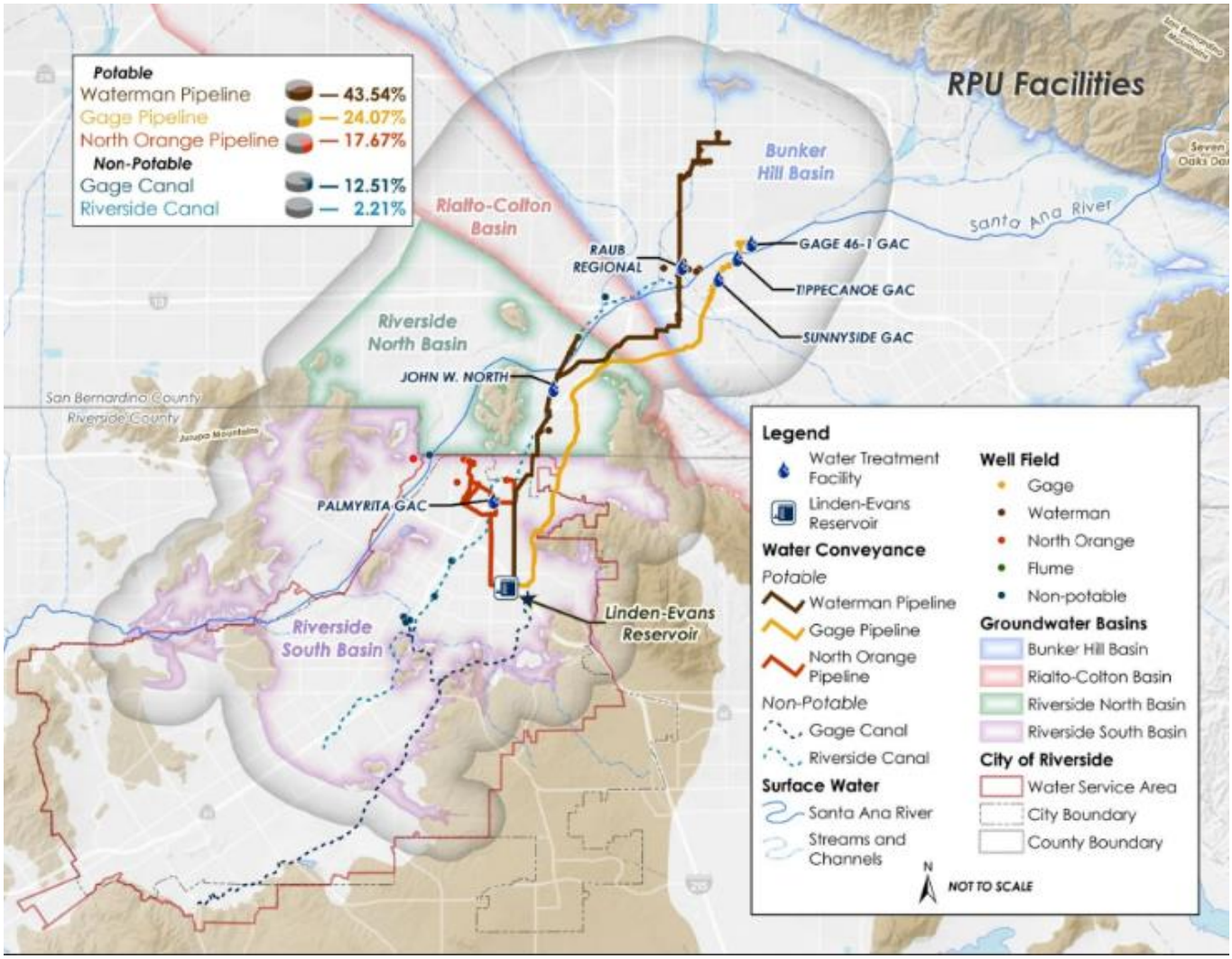
The City of Riverside has a long history of proactively managing its water supply, acquiring water rights, and drilling groundwater wells to ensure a stable and reliable water source. In 2008, RPU completed the construction of the John W. North (JWN) WTP marking a significant milestone that enabled the City to reduce its reliance on imported water. This reduction in dependence has not only made the City more self-sufficient but also saved substantial costs. The JWN WTP has enabled RPU to be 100% water-independent since 2009, eliminating the need to purchase costly imported water.

RPU utilizes 45 groundwater wells to extract water rights in the Riverside, Rialto-Colton, and Bunker Hill groundwater basins, meeting the City's water demands. Several wells are treated using GAC and/or IX treatment systems to reduce anthropogenic compounds, including dibromochloropropane (DBCP), perchlorate, and trichloroethene (TCE). In addition to the well-specific GAC/IX physical removal of contamination, three transmission mains (TM), Gage TM, Waterman TM, and North Orange TM, convey the City's domestic groundwater to a 32 million-gallon central reservoir complex (Linden/Evans), where all groundwater receives final treatment via blending and disinfection before being delivered to customers. Please see Figure 1 below from RPU’s 2021 Groundwater Atlas.

Water samples from more than 30 city wells exceed the State's notification levels for PFAS at the source prior to water treatment. The City's current treatment systems and blending capacity are reducing PFAS concentrations below the State's current notification levels. However, with the proposed Federal and State regulations, further advanced water treatment will be required.

Complying with the lower PFAS limits will be particularly more difficult during summer high water demand periods, which will exceed the proposed PFAS Federal limits without additional treatment or turning off wells with high PFAS concentrations. Shutting down wells to meet the new standards during peak summer water demands will reduce groundwater supplies. Without the addition of new treatment systems, RPU may need to purchase more expensive imported water from the Metropolitan Water District of Southern California via Western Municipal Water District.

Figure 1. 2021 Groundwater Atlas



In anticipation of more stringent regulations on the horizon, RPU staff have attended EPA and State webinars, participated in Association of California Water Agencies (ACWA) and American Water Works Association (AWWA) PFAS Workgroups and closely monitor regulatory changes.

RPU also studied the long-term approaches to treat the PFAS in its drinking water supply. RPU hired a consultant (HDR Engineering, Inc.) to prepare a study to identify a long-term, cost effective strategy for the treatment and reduction of the concentration of PFOA and PFOS (two regulated PFAS compounds at that time) below the current CA notification levels at RPU's point of compliance.

The HDR study identified three (3) alternatives with two (2) commercially and readily available PFAS treatment technologies. Granular activated carbon (GAC) and ion exchange (IX) were identified as the best technologies to reduce the concentrations to about half the notification levels for PFOA and PFOS at RPU's compliance point. The alternatives include one regional treatment site at the former Riverside Golf Course and a combination of two local treatment sites among three locations: North Orange (inactive Garner B water treatment plant (WTP)), inactive Palm Meadows WTP, and J.W. North WTP. Among these alternatives, the combination of North Orange and Palm Meadows with IX technology showed the most optimal and cost-effective alternative for a net present value (2022) estimated capital cost of $24M.

The table below summarizes the design capacity, capital cost, operation and maintenance (O&M), total present value (PV), and the annual cost of treatment per 1,000 gallons ($/kgal) for each alternative. This table shows that the GAC 20-Year Life Cycle cost estimate is higher than the IX:

GAC vs IX 20-Year Life Cycle Cost Estimate

Parameter	Granular Activated Carbon			Ion Exchange		
	Alt 1 – Regional	Alt 2 – North Orange & Palm Meadows	Alt 3 – North Orange & JWN	Alt 1 – Regional	Alt 2 – North Orange & Palm Meadows	Alt 3 – North Orange & JWN
Design Capacity (gpm)	23,458	10,850	12,454	23,458	10,850	12,454
Capital Cost	$84 M	$35 M	$38 M	$63 M	$24 M	$27 M
NPV Total O&M	$238 M	$107 M	$117 M	$248 M	$108 M	$124 M
Total PV	$322 M	$142 M	$156 M	$311 M	$132 M	$151 M
Annual $/kgal Treated	$1.30	$1.24	$1.19	$1.26	$1.16	$1.15

With the new State regulations after October 2022 setting notification level and response level for a new compound (PFHxS) and the March 14, 2023 US EPA proposed MCL's for six (6) PFAS compounds, RPU staff started conducting new analysis regarding RPU's status to the new regulations and a variation to the alternatives previously recommended by the consultant (HDR). The Table below summarizes the status of the PFAS concentrations at the compliance point; it shows that RPU's immediate concerns relate to PFOA, PFOS, and PFHxS.

Status of PFAS Concentrations at RPU Compliance Point

Units in parts per trillion (ppt)	PFOA	PFOS	GenX	PFBS	PFNA	PFHxS	HI (<100%)
CA Notification Level	**5.1**	**6.5**		500		**3**	
Compliance Point (7th & Chicago) *	**ND - 4.7**	**ND - 6.4**	ND	ND - 4	ND	**ND -5.5**	
Health-Based Value and Proposed MCL	**4**	**4**	10	2000	10	**10**	
Hazard Index (HI) in %			0%	0-0.002%	0%	**0-61%**	0-61%

*Data ranges 2019-current. SWRCB-DDW proposed MCLs are anticipated this year.

Staff ran current condition scenarios using the maximum concentrations collected at each groundwater well for three PFAS compounds to evaluate what will be needed to meet the new 2031 EPA MCLs. The analysis revealed that an additional local treatment plant would be

necessary to treat the Waterman supply, in addition to the optimum alternative proposed by the consultant HDR. RPU staff also modified the Garner B treatment facility proposal to expand the current Palmyrita WTP, which will provide PFAS treatment on the North Orange TM. The Palmyrita IX WTP alternative provides an additional co-benefit treatment to perchlorate, another regulated constituent, if IX technology is used to meet the PFAS regulations. This option enables expedited construction and additional treatment capacity, as the space is currently available, and further reduces effluent PFAS concentrations from the Palmyrita GAC WTP, along with the treatment of four additional wells. Staff is currently working on the planning report and request for proposals for design and construction management services for the Palm Meadows WTP, which will treat groundwater wells on the Gage TM. JWN WTP will be the last PFAS WTP, and planning and obtaining design services will be initiated after the Palm Meadows WTP. The JWN WTP will provide PFAS reduction on Waterman TM. This phased approach will allow capital construction costs to be spread over a longer time frame and incorporate operational and maintenance costs as each plant is completed.

The table below shows the blending results by the percent reduction from the required CA notification level and the 2031 EPA MCLs when treatment is applied.

Percentage Reduction in PFAS Concentration

Units in parts per trillion (ppt)	PFOS	PFOA	PFHxS
CA Notification Level (NL)	5.1	6.5	3
Percent Reduction to NL	38%	24%	70%
Proposed EPA MCL	4	4	10*
Percent Reduction to MCL	62%	31%	23%

*PFHxS MCL is part of the Hazard Index (HI)

On February 22, 2022, the City Council adopted nine water quality policy principles (Attachment 1). These policy principles are designed to ensure that the water served to RPU's customers consistently meets the highest quality standards and complies with all applicable state and federal water quality regulations. They guide RPU in its compliance with Drinking Water Standards, as well as its coordination with Federal and State Policies and agreements with responsible parties. RPU is actively pursuing responsible parties through litigation, collaborating with regulatory agencies, and has been proactively evaluating and developing treatment options to reduce PFAS levels and meet regulatory requirements.

A 2023 AWWA report by the consulting firm Black and Veatch estimated that the cost for water systems to install treatment systems to remove PFOA and PFOS to levels required by the proposed EPA regulation would exceed $3.8 billion annually. The scale of this financial burden is significant, with the approximate costs estimated to impact the City’s drinking water customers at $145-$160 per household per year as reported in the AWWA report.

Compliance with the Federal PFAS MCLs is estimated to cost Riverside the following:

- Capital costs of three treatment plants $110,000,000
- Annual operating and maintenance costs of $15,600,000
- Financing costs of $105,000,000 over 30 years without settlement revenue

The estimated annual rate impacts for the City's drinking water customers in the first five years beginning July 1, 2026, to meet the estimated funding levels are listed below. Annual rate increases will most likely be necessary beyond the first five years.

Estimated Annual Rate Increase Effective Date	7/1/2026	7/1/2027	7/1/2028	7/1/2029	7/1/2030
PFAS Treatment – without settlement proceeds (100% bond funded)	4.5%	4.5%	4.5%	4.5%	4.5%

A cost of service and rate design study will be needed to address the funding requirements to ensure compliance with the Per- and Polyfluoroalkyl Substances (PFAS) regulations and water treatment approaches. The resulting rate increases may augment the existing water five-year rate plan (October 1, 2023-June 30, 2028) as early as July 1, 2026, to fund the design, construction, and operation of the PFAS treatment plants.

The City's success in mitigating higher treatment costs by successfully holding polluters responsible for groundwater contamination has significantly contributed to RPU's low water rates. Over the last 30 years, this effort has provided funding for five of the six water treatment plants to reduce contamination from DBCP, perchlorate, and TCE in our groundwater. As with other contaminants, RPU is actively participating in litigation to reduce the impacts of PFAS treatment costs.

Staff recognizes both the operational and financial challenges associated with treating existing groundwater supply sources to current potable water standards. This summary presentation details the latest requirements and actions taken by staff. Future projects will be added to department capital plans, budgets, and rate plans. All of these actions will require future approval from the Board of Public Utilities and the City Council.

STRATEGIC PLAN ALIGNMENT:

The PFAS Update contributes to **Priority No. 4 - Environmental Stewardship** and **Goal 4.2** - Sustainably manage local water resources to maximize 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** – By being transparent and communicating this potential future impact, RPU can plan the best course of action to move forward.

2. **Equity** – This evolving regulation affects all customers supplied by RPU water; any planning effort or future remediation of PFAS compounds benefits all customers.

3. **Fiscal Responsibility** – RPU wants to provide high quality water at a low cost to customers. The approach RPU is preparing is a cost effective and optimized long-term treatment approach.

4. **Innovation** – RPU is assessing the commercially and readily PFAS treatment technologies,

optimizing their use and determining how and where they can be implemented.

5. **Sustainability & Resiliency** – RPU's water supply must meet all State and Federal regulations, keeping engaged with evolving regulations and their potential impact facilitates meaningful conversations on our best course of action to preserve our water resources for current and future generations.

FISCAL IMPACT:

There is no fiscal impact associated with this informational report. Per- and Polyfluoroalkyl Substances (PFAS) regulations and water treatment approaches will continue to be evaluated and cost estimates will continue to be developed.

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Approved by:	Rafael Guzman, Assistant City Manager
Approved as to form:	Rebecca McKee-Reimbold, Interim City Attorney

Attachments:

1. Water Quality Policy
2. Definitions
3. Presentation