APPROVED 12-18-2024

WATER TREATMENT INFRASTRUCTURE IMPROVEMENTS PLAN

Water Treatment Impact Fee Methodology

The steps to calculate the Water Treatment Impact Fee can be summarized as follows:

- Determine the need for water treatment facilities necessary to serve new development anticipated during the period of 2025 – 35. The Land Use Assumptions used for the Water Treatment IIP provide a forecast of new development by land use type, location, and relative timing (see supplemental report: *Growth Projections and Land Use Assumptions 2024 Update*, Applied Economics, July 19, 2024).

- Land Use Assumptions are translated to water demand (volume) to inform treatment capacity requirements. The Water Services Department retained Keen Independent Research to update water demand estimates and calculate Equivalent Demand Units (EDUs) for 'planning' purposes (see supplemental report: *City of Phoenix 2024 Equivalent Demand Unit Study Final Report*, Keen Independent Research LLC, March 2024).

- Since the production capacity for Advanced Water Purification (AWP) is effectively constrained by wastewater influent volumes, it was decided to employ the 'incremental expansion' method using 230 gallons per EDU per day (the same volume used for wastewater treatment).

- The costs for advanced water purification (AWP) are based on the weighted average unit cost estimates for 91st Ave WWTP ultimate improvements, Cave Creek WRP Phase II, and North Gateway WRP Phase I (See supplemental report: *Water and Wastewater Unit Cost Study*, Carollo Engineers, June 2024). Cost assumptions have been escalated at 3% per year to 2028 dollars. The Capital Cost per EDU for water treatment is calculated by multiplying the incremental demand per EDU by the unit cost per EDU.

- An analysis of the existing fund balance is performed to determine the amount, if any, that needs to be applied toward the 10-Year Plan. Any portion of the existing fund balance that is needed or reserved for current service deficiencies or earmarked in the city's approved CIP for an impact fee eligible facility that is not included in the proposed fee update, is not applied to the 10-Year Plan. Any fund balance that does not meet the criteria is divided by the 10-Year EDU to determine the fund balance adjustment (see supplemental report: *2025 Development Impact Fee Update, Fund Balance Adjustment Report, December 6, 2024*). If applicable, the fund balance adjustment is subtracted from the capital cost per EDU to calculate the gross fee per EDU.

- Alternative revenue offsets are calculated and applied for water rate revenue that is applied toward facilities provided through the water treatment impact fee program. This includes water rate revenue to pay outstanding debt service, as well as water rate revenue to pay for AWP. The offset per EDU is calculated by dividing the existing and potential debt service attributed to AWP by citywide EDUs. Arizona impact fee rules require cities to forecast the alternative revenue generated by new development over the 10-year infrastructure planning horizon. This is done by multiplying the water rate offset per EDU by the anticipated 10-year EDUs in each designated impact fee service area (see supplemental report: *2025 Development Impact Fee Update, Alternative Revenue Offsets Report*, December 6, 2024).

- The Water Development Occupational Fee (DOF) will be phased out in conjunction with adoption of the citywide Water Treatment Impact Fee. As such, the offset previously applied for DOF charges will no longer be applicable.

- Total combined offsets per EDU are subtracted from the gross impact fee per EDU. The resulting 'net' impact fee per EDU is assessed to all new services connections within the designated impact fee service areas that will place demand on the city's water treatment system.

LEVEL OF SERVICE (LOS)

Definitions of level of service associated with water services are difficult to summarize because of the numerous metrics used to evaluate potable water treatment and transmission. Once the city legally accepts the transfer of water facilities from a developer, the city is obligated to meet all state and federal regulatory requirements and strives to always provide reliable and high-quality water services to all customers. The city also endeavors to meet a wide range of standards that are not legally required, but which it seeks to attain. For example, the Water Services Department has the following types of objectives that must be considered as being part of the level of service for water transmission:

- Water quality standards: water chemistry. The City achieves or exceeds minimum federal and state water quality standards in terms of water chemistry (usually measured in the form of dissolved salts, metals, or organic material at the point of discharge from a water treatment plant or advanced water purification facility).

- Water quality standards: diseases and pathogens. The City also achieves or exceeds minimum water quality standards in terms of the presence of disease and pathogens that are a threat to customers, measured both at the treatment plants and throughout the transmission and transmission network.

- Water quality standards: treatment residuals. The City also achieves or exceeds minimum water quality standards in terms of chlorine residuals and other potentially dangerous compounds that are formed in the transmission and transmission network after water has left treatment plants.

The assumptions used to establish the proportionate amount of infrastructure required to serve an EDU are summarized below. Additional detail on the methods used to calculate 'planning' EDU Factors can be found in supplemental report: *City of Phoenix 2024 Equivalent Demand Unit Study Final Report*, Keen Independent Research LLC, March 2024). An additional **'peak-demand' adjustment factor of 1.5** is applied for water treatment capacity requirements.

Table WP.1 – Water Demand Assumptions and Planning EDU Factors

Land Use	Gal/Unit/Day	EDU Factor
Single-Family	289	**1.00**
Multifamily	162	**0.56**
Retail	52	**0.47**
Office	28	**0.25**
Industrial	57	**0.51**
Public / Other	41	**0.37**

WATER TREATMENT PLANT IMPACT FEE SERVICE AREAS

(see supplemental report: Map #6, *Impact Fee Service Area Maps*, September19, 2024)

- Citywide

LAND USE ASSUMPTIONS

The following tables display the forecasted water treatment 'planning' EDUs for the required geographic areas and time periods.

Table Source Data and Calculation:

- Unit Counts are listed in the Land Use Assumptions Report and come from the Applied Economics study. They represent the amount of growth in housing units or 1,000 square feet of non-residential construction in an impact fee area (see supplemental report: *Growth Projections and Land Use Assumptions 2024 Update*, Applied Economics, July 19, 2024).

- The 'planning' EDU factors come from the Keen Independent study. EDU factors convert dwelling units and non-residential floor area to units equivalent to the average water demand of a single family home (see supplemental report: *City of Phoenix 2024 Equivalent Demand Unit Study Final Report*, Keen Independent Research LLC, March 2024).

- The number of EDUs is calculated by multiplying development units (dwellings and non-residential floor area) from the Applied Economics' study by the 'planning' EDU Factors from the Keen Independent Research study.

Table WP.2 – Citywide, Equivalent Demand Units

	SFR	MFR	Retail	Office	Industrial	Public	Other	Total
Planning EDU Factor	*1.00*	*0.56*	*0.47*	*0.25*	*0.51*	*0.37*	*0.53*	
Estimate Year	405,334	154,213	45,137	28,897	96,144	36,205	23,390	789,320
10-Year Growth	32,838	24,372	3,991	2,959	14,004	845	1,302	80,311
End of Planning Horizon	438,172	178,585	49,128	31,856	110,148	37,050	24,692	869,631
Buildout	516,525	207,977	63,037	43,919	139,756	39,398	26,586	1,037,198

WATER TREATMENT COST PER EDU

The following tables contain the water treatment cost per EDU using the incremental expansion method. The cost estimates shown are based on the Carollo Engineers' unit cost study. For a detailed breakdown of unit cost estimates, see supplemental report: *Water and Wastewater Unit Cost Study*, Carollo Engineers, June 2024. Table WP.3 provides the incremental capital cost for the water treatment component, based on Advanced Water Purification. Water demand estimates are from the Keen Independent study (see supplemental report: *City of Phoenix 2024 Equivalent Demand Unit Study Final Report*, Keen Independent Research LLC, March 2024), and include the 1.5 peak flow adjustment factor (153 gal/day/EDU X 1.5 = 230 gal/day/EDU)

Table WP.3 – Water Treatment Cost per EDU

Description	North Gateway (Buildout)	Cave Creek (Phase 2)	91st Ave (Buildout)	All Plants
Advanced Water Treatment ($/gal)	16.00	14.00	15.00	
Concentrate Management ($/gal)[1]	29.00	0.00	0.00	
Treated Water Conveyance	8.94	0.00	0.00	
Combined Capital Cost ($/gal)	**53.94**	**14.00**	**15.00**	
Capacity (MGD)	16.0	8.0	43.7	
Weighted Avg. Water Resiliency Capital Cost ($/Gal)				**$24.08**
Escalation Factor (1/2028 Dollars)				*1.1091*
Inf-Adj Water Resiliency Capital Cost ($/Gal)				**$26.71**
Gal per EDU				230
Water Treatment Capital Cost per EDU				**$6,144**

Table WP.4 provides the debt service cost per EDU that is attributed to existing capacity at Lake Pleasant WTP that will benefit future development.

Table WP.4 – Debt Service Cost per EDU

Description		Amount
Total Outstanding Debt for Available WTP Capacity		182,443,784
Future Citywide EDU 2025 - Buildout	÷	247,878
Debt Service Cost ($/EDU)		**736**

POTENTIAL WATER TREATMENT CAPITAL COST PER EDU

The potential Water Treatment capital cost per EDU is the sum of the Water Treatment Cost per EDU from Table WP.3 and Debt Service Cost per EDU from Table WP.4.

Table WP.5 – Citywide, Potential Water Treatment Capital Cost per EDU

Water Resiliency Cost per EDU ($)	6,144
Debt Service Cost per EDU ($)	736
Water Treatment Impact Fee ($ per EDU)	**6,880**

FUND BALANCE ADJUSTMENT AND POTENTIAL GROSS IMPACT FEE

The potential capital cost per EDU from Table WP.5 is adjusted by the qualifying fund balance to determine the Gross Fee per EDU. The fund balance adjustment calculation can be found in supplemental report: 2025 Development Impact Fee Update, *Fund Balance Adjustment Report,* December 6, 2024.

Table WP.6 – Water Treatment, Potential Gross Impact Fee per EDU

	($ per EDU)		
Impact Fee Service Area	**Capital Cost**	**Fund Balance[2]**	**Gross Fee**
Citywide[1]	6,880	975	**5,905**

1) Capital cost includes $736 per EDU for outstanding debt associated with available capacity at Lake Pleasant Water Treatment Plant, and $6,144 per EDU for capital costs attributed to expanded water treatment capacity.

2) See supplemental report: 2025 Development Impact Fee Update, Fund Balance Adjustment Report, December 6, 2024.

POTENTIAL NET IMPACT FEE

The potential net fee per EDU is calculated by subtracting alternative revenue offsets from the potential gross fees from Table WP.6. For a detailed breakdown of water treatment offsets, see supplemental report: 2025 Development Impact Fee Update, *Alternative Revenue Offsets Report,* December 6, 2024.

Table WP.7 – Water Treatment, Potential Net Impact Fee per EDU

	($ per EDU)		
Impact Fee Service Area	**Gross Fee**	**Rate Offset**	**Net Fee**
Citywide	5,905	1,518	**4,387**

WATER TREATMENT IMPACT FEE ASSESSMENTS

The Water Treatment fee schedule for single-family, multifamily, non-residential, and irrigation uses is shown below. Water Treatment fees for residential uses are assessed per dwelling unit. All other uses are assessed by water meter size.

Table WP.8 – Water Treatment, Net Impact Fee Schedule

Meter Type	EDU Factor	Citywide Assessment
MFR (per DU)	0.36	$1,579
SFR (per DU ≤ 1" meter)	1.00	$4,387
SFR (per DU 1.5" meter)	2.18	$9,564
3/4-Inch (per meter)	1.23	$5,394
1-Inch (per meter)	2.12	$9,300
1 1/2-Inch (per meter)	4.62	$20,275
2-Inch (per meter)	6.17	$27,064
3-Inch (per meter)	19.27	$84,541
4-Inch (per meter)	33.92	$148,807
6-Inch (per meter)	53.95	$236,696
8-Inch (per meter)	107.93	$473,485
10- or 12-Inch (per meter)	212.00	$930,044

SUMMARY OF PLANNED IMPROVEMENTS

A.R.S. 9-463.05 requires that impact fees collected must be spent on either 1) new projects that serve new development, or 2) to repay debt incurred to fund the construction of projects that serve new development.

A summary of planned improvements and anticipated funding for each water treatment service area is shown in the following tables. The planned improvements listed below are eligible to be funded with water treatment impact fee collections, as calculated within this IIP.

Table WP.8 – Water Treatment Planned Improvements

Infrastructure Improvement Description	Amount
91st Ave (43.7 MGD AWP)	655,500,000
Cave Creek Phase II (8 MGD)	112,000,000
N. Gateway Phase (16 MGD)	863,040,000
Escalation Factor (3 yrs @ 3%)	*1.1091*
Design & Construction Cost	**1,808,431,914**
10-Year Debt Service (Lake Pleasant WTP)	182,443,784
Total IIP Cost	**1,990,875,698**
Forecasted 10-Year Impact Fee Revenue	*352,326,164*
Estimated 10-Year Water Rate Revenue	*121,912,098*
Available Fund Balance	*78,330,150*
Borrowing Requirement for Future Development	**1,438,307,286**