APPROVED 12-18-2024

# WASTEWATER TREATMENT INFRASTRUCTURE IMPROVEMENTS PLAN

## Wastewater Treatment Impact Fee Methodology

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

- Determine the need for wastewater treatment facilities necessary to serve new development anticipated during the period of 2025 – 40. The Land Use Assumptions used for the Wastewater 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 wastewater generation (volume) to inform treatment capacity requirements. The Water Services Department retained Keen Independent Research to update wastewater generation 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).

- The 'incremental expansion' method uses the max day wastewater generation per EDU to determine the wastewater treatment capacity required to serve 1 EDU.

- The costs for wastewater treatment facilities needed to serve the North of CAP impact fee service area are based on the weighted average unit cost estimates for Cave Creek WRP Phase II, and North Gateway. Costs associated with expanding solids handling capacity, that will have citywide benefits, are based on 91$^{st}$ Ave WWTP ultimate improvements, (See supplemental report: *Water and Wastewater Unit Cost Study*, Carollo Engineers, June 2024). All cost assumptions have been escalated at 3% per year to 2028 dollars. The Capital Cost per EDU for wastewater 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 impact fee per EDU.

- Alternative revenue offsets are calculated and applied for sewer rate revenue that is applied toward facilities provided through the wastewater treatment impact fee program. This includes sewer rate revenue to pay outstanding debt service. The offset per EDU is calculated by dividing the outstanding 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 wastewater 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).

- Elimination of the existing Sewer Development Occupational Fee (DOF) will be proposed in-conjunction with the citywide wastewater treatment impact fee. If approved this will also eliminate the offset that is currently applied for DOF charges.

- 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 wastewater treatment systems.

## LEVEL OF SERVICE (LOS)

Definitions of level of service associated with wastewater services are difficult to summarize because of the numerous metrics used to evaluate wastewater collection and treatment. However, as a general rule, once the City legally accepts the transfer of wastewater facilities from a developer, the City is obligated to meet all state and federal regulatory requirements, and it attempts to provide reliable and high quality wastewater services to all customers at all times. The City also endeavors to meet a wide range of standards that it is not legally required to, but which it seeks to attain. For example, the City's Water Services Department has the following types of objectives that must be considered as being part of the level of service for wastewater:

- **Collection.** The City collects all wastewater produced by customers that are connected to the City's wastewater system and transports it to treatment facilities using a network of lift stations and interceptors.

- **Capacity management.** The City ensures that the wastewater system does not generate surplus situations where wastewater levels exceed capacities and sewage is discharged through manholes into streets or washes, even during extreme storm events that result in massive inflow and infiltration situations.

- **Capacity standards.** The City complies with U.S. Environmental Protection Agency and Arizona Department of Environmental Quality standards regarding maximum sewer capacity use and associated system sampling and modeling requirements.

- **Wastewater treatment: liquid discharges.** The City treats all wastewater collected in the network and converts that wastewater into treated water that can be used either for safe disposal in the Salt River or for reclaimed water uses such as agricultural irrigation, cooling water at the Palo Verde nuclear plant, groundwater recharge, or other beneficial uses.

- **Wastewater treatment: solid discharges.** The City processes, separates and then disposes of solids found in the wastewater on farms, in energy production units, in landfills or at other appropriate locations.

- **Wastewater treatment standards.** The City achieves or exceeds minimum treated water and solids standards established by the U.S. Environmental Protection Agency and Arizona Department of Environmental Quality.

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-flow' adjustment factor of 1.5** is applied for wastewater treatment plant sizing.

Table WWP.1 – Wastewater Generation Assumptions and Planning EDU Factors

| Land Use | Gal/Unit/Day | EDU Factor |
|---|---|---|
| Single-Family | 153 | **1.00** |
| Multifamily | 103 | **0.67** |
| Retail | 35 | **0.59** |
| Office | 19 | **0.32** |
| Industrial | 38 | **0.65** |
| Public/Other | 27 | **0.47** |

## WASTEWATER TREATMENT IMPACT FEE SERVICE AREAS

(see supplemental report: Map #7, *Impact Fee Service Area Maps*, September 19, 2024)

- North of CAP Canal
- South of CAP Canal

## LAND USE ASSUMPTIONS

The following tables display the forecasted wastewater 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 wastewater generation 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 WWP.2 – North of CAP Canal, Wastewater Treatment Equivalent Demand Units

| | SFR | MFR | Retail | Office | Industrial | Public | Other | Total |
|---|---|---|---|---|---|---|---|---|
| *EDU Factor* | *1.00* | *0.67* | *0.59* | *0.32* | *0.65* | *0.47* | *0.47* | |
| **Estimate Year** | 31,056 | 9,995 | 3,536 | 1,029 | 3,650 | 1,620 | 1,936 | **52,822** |
| **10-Year Growth** | 18,974 | 7,930 | 1,135 | 1,798 | 5,013 | 383 | 483 | **35,716** |
| **End of Planning Horizon** | 59,101 | 20,930 | 5,155 | 4,018 | 9,313 | 2,145 | 2,688 | **103,350** |
| **Buildout** | 121,360 | 38,318 | 13,246 | 14,324 | 30,259 | 3,836 | 3,105 | **224,448** |

### Table WWP.3 – South of CAP Canal, Wastewater Treatment Equivalent Demand Units

| | SFR | MFR | Retail | Office | Industrial | Public | Other | Total |
|---|---|---|---|---|---|---|---|---|
| *EDU Factor* | *1.00* | *0.67* | *0.59* | *0.32* | *0.65* | *0.47* | *0.47* | |
| **Estimate Year** | 374,278 | 174,510 | 53,125 | 35,958 | 118,886 | 44,369 | 27,776 | **828,902** |
| **10-Year Growth** | 13,864 | 21,229 | 3,875 | 1,990 | 12,836 | 691 | 1,171 | **55,656** |
| **End of Planning Horizon** | 390,488 | 202,718 | 59,102 | 38,926 | 135,797 | 45,333 | 29,384 | **901,748** |
| **Buildout** | 395,165 | 210,512 | 65,885 | 41,893 | 147,862 | 46,210 | 30,666 | **938,193** |

## WASTEWATER TREATMENT PLANT EXPANSION COST PER EDU

The following tables contain the wastewater 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 WWP.4 provides the full incremental capital cost of wastewater treatment, including solids handling. The cost per EDU shown in Table WWP.4 may be assessed to areas north of the Central Arizona Project (CAP) canal. Wastewater generation 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 WWP.4 – Wastewater Treatment Plant Expansion Cost per EDU

| | **North Gateway (Buildout)** | **Cave Creek (Phase 2)** | **91st Ave (Buildout)** | | **All Plants** |
|---|---|---|---|---|---|
| Wastewater Treatment ($/gpd) | 37.125 | 23.00 | 0.00 | | |
| Solids Handling ($/gpd) | 3.75 | 3.75 | 3.75 | | |
| **Combined Treatment Cost ($/gpd)** | **40.88** | **26.75** | **3.75** | | |
| *Capacity (MGD)* | *16.0* | *8.0* | *50.0* | | |
| **Weighted Avg WWTP Capital Cost ($/Gal)** | | | | | **$14.26** |
| *Escalation Factor (1/2028 Dollars)* | | | | *x* | *1.1091* |
| **Inf-Adj WWTP Capital Cost ($/Gal)** | | | | | **$15.82** |
| Max Day WW Gal per EDU | | | | x | 230 |
| **WW Treatment Capital Cost per EDU** | | | | | **$3,639** |

Table WWP.5 provides the incremental capital cost per EDU for solids handling only. The cost per EDU shown in Table WWP.5 may be assessed to areas south of the CAP canal.

### Table WWP.5 – Solids Handling Cost per EDU

| | | |
|---|---|---|
| Inf-Adj Solids Handling Capital Cost ($/Gal) | | $4.16 |
| Max Day WW Gal per EDU | x | 230 |
| **Solids Handling Cost per EDU** | | **$957** |

Table WWP.6 provides the debt service cost per EDU that is attributed to existing capacity at 91st Ave WWTP that will benefit future development. This cost may be assessed citywide (i.e. north and south of the CAP canal).

### Table WWP.6 – Debt Service Cost per EDU

| | | |
|---|---|---|
| Total Outstanding Debt Service for Available WWTP Capacity | | 140,088,467 |
| Future Citywide EDU 2025 - Buildout | ÷ | 280,917 |
| **Debt Service Cost ($/EDU)** | | **499** |

## POTENTIAL WASTEWATER TREATMENT CAPITAL COST PER EDU

The potential Wastewater Treatment capital cost per EDU for areas north of the CAP canal is the sum of the Wastewater Treatment Capital Cost shown in Table WWP.4 and the Debt Service Cost shown in Table WWP.6.

### Table WWP.7 – Potential Wastewater Treatment Capital Cost per EDU – North of CAP Canal

| | | |
|---|---|---|
| WW Treatment Capital Cost per EDU | | 3,639 |
| Debt Service Cost per EDU | + | 499 |
| **Potential Capital Cost per EDU** | | **4,138** |

The potential wastewater treatment capital cost per EDU for areas south of the CAP canal is the sum of the Solids Handling Cost shown in Table WWP.5 and Debt Service Cost shown in Table WWP.6.

### Table WWP.8 – Potential Wastewater Treatment Capital Cost per EDU – South of CAP Canal

| | | |
|---|---|---|
| Solids Handling Cost per EDU | | 957 |
| Debt Service Cost per EDU | + | 499 |
| **Potential Capital Cost per EDU** | | **1,456** |

## FUND BALANCE ADJUSTMENT AND POTENTIAL GROSS IMPACT FEE

The potential capital cost per EDU from Tables WWP.7 and WWP.8 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 Report, December 6, 2024.*

### Table WP.9 – Wastewater Treatment, Potential Gross Impact Fee per EDU

| | *($ per EDU)* | | |
|---|---|---|---|
| **Impact Fee Service Area** | **Capital Cost** | **Fund Balance[3]** | **Gross Fee** |
| North of CAP Canal[1] | 4,138 | 241 | **3,897** |
| South of CAP Canal[2] | 1,456 | 241 | **1,215** |

1) North of CAP Capital Cost includes $499 per EDU for outstanding debt associated with available capacity at 91st Avenue Wastewater Treatment Plant, and $3,639 per EDU for capital cost attributed to expanded wastewater treatment and solids handling capacity.
2) South of CAP Capital Cost includes $499 per EDU for outstanding debt associated with available capacity at 91st Avenue Wastewater Treatment Plant, and $957 per EDU for capital cost attributed to expanded solids handling capacity.
3) 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 WWP.9. For a detailed breakdown of wastewater treatment offsets, see supplemental report: *2025 Development Impact Fee Update, Draft Alternative Revenue Offsets Report, December 6, 2024*.

### Table WWP.10 – Wastewater Treatment, Potential Net Impact Fee per EDU

| | *($ per EDU)* | | |
|---|---|---|---|
| **Impact Fee Service Area** | **Gross Fee** | **Rate Offset[1]** | **Net Fee** |
| North of CAP Canal | 3,897 | 144 | **3,753** |
| South of CAP Canal | 1,215 | 144 | **1,071** |

1) See supplemental report: 2025 Development Impact Fee Update, Alternative Revenue Offsets Report, December 6, 2024.

### WASTEWATER TREATMENT IMPACT FEE ASSESSMENTS

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

Table WT.11 – Wastewater Collection, Net Impact Fee Schedule

| Meter Type | EDU Factor | North of CAP Assessment | South of CAP Assessment |
|---|---|---|---|
| MFR (per DU) | 0.67 | 2,515 | 718 |
| SFR (per DU ≤ 1" meter) | 1.00 | 3,753 | 1,071 |
| SFR (per DU 1.5" meter) | 2.18 | 8,182 | 2,335 |
| 3/4-Inch (per meter) | 1.31 | 4,898 | 1,398 |
| 1-Inch (per meter) | 2.25 | 8,444 | 2,410 |
| 1 1/2-Inch (per meter) | 4.91 | 18,408 | 5,253 |
| 2-Inch (per meter) | 6.55 | 24,573 | 7,012 |
| 3-Inch (per meter) | 20.45 | 76,758 | 21,905 |
| 4-Inch (per meter) | 36.00 | 135,108 | 38,556 |
| 6-Inch (per meter) | 57.26 | 214,906 | 61,328 |
| 8-Inch (per meter) | 114.55 | 429,897 | 122,680 |
| 10- or 12-Inch (per meter) | 225.00 | 844,425 | 240,975 |

## 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 wastewater collection service area is shown in the following tables. The planned improvements listed below are eligible to be funded with wastewater collection impact fee collections, as calculated within this IIP.

Table WWP.12 – Wastewater Treatment Planned Improvements – North of CAP Canal

| Infrastructure Improvement Description | Amount |
|---|---|
| Cave Creek Phase II (8 MGD) | 214,000,000 |
| N. Gateway Phase (16 MGD) | 327,000,000 |
| 91st Ave WWTP Solids Handling (24 MGD) | 90,000,000 |
| *Escalation Factor (3 yrs @ 3%)* | *1.1091* |
| **Design & Construction Cost** | **699,842,100** |
| Debt Service (10-Year) | 17,822,284 |
| **Total IIP Cost** | **717,664,384** |
| *Forecasted 10-Year Impact Fee Revenue* | *134,042,148* |
| *Estimated 10-Year Wastewater Rate Revenue* | *5,143,104* |
| *Available Service Area Fund Balance* | *8,601,633* |
| **Borrowing Requirement for Future Development** | **569,877,499** |

Table WWP.13 – Wastewater Treatment Planned Improvements – South of CAP Canal

| **Infrastructure Improvement Description** | **Amount** |
|---|---|
| 91st Ave WWTP Solids Handling (26 MGD) | 97,500,000 |
| *Escalation Factor (3 yrs @ 3%)* | *1.1091* |
| **Design & Construction Cost** | **108,137,250** |
| Debt Service (10-Year) | 27,772,344 |
| **Total IIP Cost** | **135,909,594** |
| *Forecasted 10-Year Impact Fee Revenue* | *59,607,576* |
| *Estimated 10-Year Wastewater Rate Revenue* | *8,014,464* |
| *Available Service Area Fund Balance* | *13,397,082* |
| **Borrowing Requirement for Future Development** | **54,890,472** |