Hearing Report

Development Impact
Fee Program and Nexus Studies

The Economics of Land Use

Prepared for:
City of Sacramento
Department of Utilities

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1. Executive Summary

Introduction and Background

In 2011 and 2019, the City of Sacramento (City) Department of Utilities (DOU) prepared Development Impact Fee (DIF) programs using consultants Wildan Financial Services and NBS, respectively. These programs addressed methodologies, costs, maximum justifiable fees, and legal compliance to serve new development in each of the four utility systems administered by DOU: Water, Separated Sewer, Combined Sewer, and Storm Drainage. For a variety of reasons, these efforts were not implemented. In 2022, DOU engaged Economic & Planning Systems, Inc. (EPS) to refresh these efforts in their entirety.

Establishing impact fees requires the identification of the proportional share of improvement costs for current and future customers for existing and planned capital improvements. This measurement of equity, followed with the implementation of the maximum justifiable fees, assures that rate payers do not subsidize new growth and vice versa. With these basic considerations, discussed in general below and in detail in later chapters and supporting appendices, are the data elements, methodologies, and considerations used to determine proportional shares, funding requirements, and impact fees for each of the four utility systems. Accompanying each section is the required structure and focus of a Nexus Study under the State of California's Mitigation Fee Act (CA Government Code Section 66000 and following), which prescribes the means by which public agencies may impose and adopt development impact fees.

The remainder of this section covers the following topics:

- Draft 2040 General Plan Linkage
- Impact Fee Methodology, Types, and Limits
- Infrastructure Needs, Facility Standards, Level of Service, and Deficiencies
- Standard Cost Adjustment Methodology
- Systemwide versus Special Benefit
- Nexus Requirements
- Summary of Findings
- Organization of the Report

This section will be followed by chapters for each utility system.

2040 General Plan Linkage

The current timing of the DIF effort coincides with that of the City's draft 2040 General Plan Update (2040 Update). The parcel-specific Housing and Employment projections through the 2040 planning horizon are used to establish the likely demand for utility services for this period. Importantly, projected development in the 2040 Update is for the period 2016-2040 for employment and 2017-2040 for housing. This report adjusts these projections by accounting for development that has occurred through April 2022 as evidenced by completed building permits. The projections in this study are for the period 2022-2040 or 2023-2040, depending on what is being projected. In all cases, the 2040 General Plan data provides the primary drivers. In the Water system, the Water Master Plan drives the demand projection and draws on the same 2040 Update projections.

The projections of new and existing demand vary by the geographic area served by each system and, in the Separated Sewer System and the Storm Drainage System, by each subbasin. Only the Water System is citywide. The citywide Housing and Employment projections used in this report are as shown on **Table 1-1**.

Table 1-1. Housing by Type and Employment

		2040 General Plan		
	2017 American Community Survey	**As of April 2022**	**General Plan 2040 Net New Growth**	**2040 Totals**
Units				
Single Family Detached	117,570	118,670	11,900	130,570
Single Family Attached	12,900	13,300	8,700	22,100
Multifamily	64,300	70,600	40,600	111,200
Total Housing Units	**194,800**	**202,570**	**61,200**	**263,870**

Employment	**2015 Estimated**	**As of April 2022**	**2040 New Employment**	**2040 Totals**
City of Sacramento	**300,067**	**307,019**	**69,660**	**376,679**

Sources: City of Sacramento Community Development Department and EPS Exec_1

Importantly, much of the new development is projected for parcels with existing development. These parcels will be developed more intensively. Any reductions in employment or housing caused by this intensification are deducted from the protected growth. The projection is net growth.

The projections for each utility system and basin are provided in each relevant section and in the appendices of this report.

Housing by type and employment by standard industry classifications (SICs)[1] are used to estimate water demand and sewer and drainage capacity requirements. Housing type and employment by the SICs are associated with land use types. For nonresidential properties, employment by land use establishes a square footage requirement for new employees. The conversion factors are included as **Appendix A-1**. With square footage values and housing unit data associated with land use types, there are standard and customary measures of demand by land use for all utility systems in this report. Also, the location data in the General Plan projection is an important determinant of demand. Location determines the service received, as well as basin location and parcel size, all of which are important drivers of demand. All of these demand indicators for each service are as shown on **Table 1-2**.

Table 1-2. 2040 General Plan Projection Data and Utility Demand Indicator

Utility System	2040 General Plan Projection	Demand Indicator
Water	Housing Units and Commercial Square Feet by Land-Use Type	Maximum Daily Demand (MDD) in Equivalent Meters (EM)
Separated Sewer	Basin, Housing Units and Commercial Square Feet by Land-Use Type	Equivalent Standard Dwelling (ESD)
Combined Sewer (Sewer)	Housing Units and Commercial Square Feet by Land-Use Type	Equivalent Standard Dwelling (ESD)
Combined Sewer (Drainage)	Parcel Size, Housing Units and Commercial Square Feet	New Impermeable Square Feet
Storm Drainage	Basin, Parcel Size, Housing Units and Commercial Square Feet	New Impermeable Square Feet

Sources: DOU, City of Sacramento Community Development Department and EPS *Exec_2*

Each demand indicator has demand factors that adjust by the expected capacity requirement of a land-use type or by the measured new impermeable surface. In the Water System, the Separated Sewer System, and the sewer service of the Combined Sewer System, the factors used (EMs and ESDs) adjust by land use from a base of 1 for the typical requirements of single-family detached dwellings for the service received. The Storm Drainage System and the drainage aspect of the Combined Sewer System use new impermeable surface as the demand indicator. The impermeable surface demand indicator is always site-specific to actual, measured new impermeable surfaces. An illustration of the demand

[1] North American Industry Classification System, OMB 2022.

indicators with examples of some of the associated demand factors is shown in **Table 1-3**.

Table 1-3. Demand Indicators and Factors by Utility System

Utility System	Demand Indicator	Demand Factors: Single Family Detached Dwelling	Demand Factors: 10,000 Square Foot Office
Water	EM	1	3.2
Separated Sewer	ESD	1	3.3
Combined Sewer (Sewer)	ESD	1	3.3
Combined Sewer (Drainage)	New Impermeable Surface	Site Specific	Site Specific
Storm Drainage	New Impermeable Surface	Site Specific	Site Specific

Sources: DOU and EPS *Exec_3*

All of the demand factors for all land uses are discussed for each utility in the chapters that follow.

In general, all of the demand factors, applied to all current and future land uses, measure the existing and future capacity requirements of all systems. These requirements are shared between current and future development in proportion to the demands placed by current and future development.

Impact Fee Methodology, Types, and Limits

The Buy-In and Incremental Approaches

Improvement costs for which a proportionate share can be determined include both existing and future improvements. A new water connection, for example, is benefitting from all of the past investment made by existing rate payers to acquire, produce, and deliver water. The current value of those assets is an investment value, or cost, in which new development should participate. A future improvement to increase water production capacity would be a responsibility of new growth if that capacity is not also required to improve an existing capacity deficiency, in which case, a shared responsibility would be required.

The two types of improvement costs and the proportional share considerations they involve describe two different impact fee methodologies: the Buy-In approach and the Incremental Cost approach. **The Buy-In approach** determines the value of current assets and allocates on a reasonable-relationship basis a proportionate share of the assets new growth will use. For example, the basis used in this report for the Water System is the total future water Equivalent Meters, which vary by land use as a size difference and is a reasonable measure of the demand requirement. The new growth percentage share of those meters by land use is the allocation mechanism for sharing existing facility costs.

The Incremental approach determines the planned infrastructure costs necessary to provide adequate levels and standards of service to current and new customers. Proportionate shares are typically an engineering determination of who benefits. These shares can be determined by the percentage approach used in the Buy-In approach, if that is reasonable. This, in fact, is the approach used in some of the future capital projects in the Water System. Other projects are assigned a specific percentage based on project-specific benefit. The Water System model allocates some of its projects in this manner. The Separated and the Combined Sewer Systems allocate all future capital projects directly to new growth because the identified projects are required to create the storage capacity necessary to accommodate new growth.

A simple matrix of the impact fee methodologies used in this report is shown on **Table 1-4**.

Table 1-4. Impact Fee Methodology by Utility System

Utility System	Methodologies	
Water	Buy In	Incremental
Separated Sewer	-	Incremental
Combined Sewer (Sewer)	-	Incremental
Combined Sewer (Drainage)	-	Incremental
Storm Drainage	Buy In	-

Source: EPS *Exec_4*

The Limits of Impact Fee Methodologies and the Need for Regular Updates

The methodology used, whether the Buy-In approach, the Incremental approach, or a combination (known as **the Combined approach**) is determined by data availability, feasibility, and management discretion. These factors define the scope, type, and limits of the impact fee methodology. There are, for example, substantial existing assets in the Combined Sewer System with significant current value. However, a Buy-In approach is not being used because of the difficultly in valuing these assets or their replacement cost. Some of the assets are more than 100 years old. The service area is also highly developed with complex underground infrastructure that is not always well documented. As a result, actual replacement costs on a systemwide basis cannot be reasonably estimated. In this circumstance, the existing Combined Sewer assets are improved through projects on an as-needed basis with other funding means, including with development or other agreements, bond financing, revolving funds, lines of credit, or other rate-based funding.

The limitations imposed by the condition and amount of information regarding existing infrastructure largely determine the methodologies that can be used. These considerations are just one element in the careful construction of a development impact fee program, which requires scrupulous attention to the substantive and procedural requirements of the Mitigation Fee Act.

Methodologies are also limited by constantly changing circumstances in actual growth, cost inflation, and other changes. Impact fees are calculated assuming a level of demand growth that almost always will be different than that projected. As discussed further below, the infrastructure costs in this report are based on January 2022 dollars, which will automatically adjust annually on an index basis. However, that mechanism is rarely adequate in matching actual costs, which cannot be known with precision without actual construction. Indexes are also lagging indicators, whereas construction contracts are real-time. For these and other reasons, actual costs rarely match predicted costs. Finally, the need for a project can change as service priorities and technologies adapt. The reality of these circumstances underscores the importance of regular updates that account for actual project costs and reassess planned projects, growth demands, and readjusts impact fees as appropriate. State law requires updates every 8 years. The complexity and issues involved in the impact fee programs in this report may indicate updates on a much more frequent basis.

Infrastructure Needs, Facility Standards, Level of Service, and Deficiencies

All infrastructure in this report is identified and prioritized under operating standards that take one, or both, of two forms: "standards of service" or "level of service". Standards of service refer to adopted policies in law or professional practice that are either in place for a particular service or are intended to be. Level of service refers to the actual service benefits in place. When the benefits received are less than the standards of service, a deficiency exists.

As mentioned above, new development cannot be required to fund deficiencies for existing customers. However, deficiencies in facilities that serve both new and existing customers can be split on a proportional share basis. In these instances, the level of service is, and must be, improved for all customers.

In most instances in this report the planned capital projects have been identified either to maintain existing levels of service as growth occurs or to not perpetuate deficiencies. Utility services are unique in that new customers create a direct, immediate impact on the capacity requirements of the service being provided. There must be sufficient capacity in these systems to provide a consistent level of service for all customers at the appropriate service standard.

Standard Cost Adjustment Methodology

Throughout this report, dollar values are stated in January 2022 dollars for all existing system assets values, for all estimates of future capital costs, and for all fee calculations. The adjustment methodology is a simple average of two widely used Construction Cost Indexes (CCIs) published by the Engineering News-Record (ENR):

- ENR-CCI for San Francisco as of January.
- ENR-CCI 20 California Cities Average as of January.

The use of this method dampens price spikes in any one city, although San Francisco is given more weight because its economics have a significant influence on the City due to its size and proximity.

Annual Adjustment

Any adopted development impact fees will adjust annually on July 1 in accordance with the methodology.

Systemwide Versus Special Benefit

Whether directed at existing deficiencies or capacity improvements for new development, all projects in this report also create systemwide capacities. Specific development projects required to extend water distribution lines or sewer collection lines or to install self-contained drainage systems are required to self-fund these improvements.

Nexus Requirements

The purpose of a Nexus Study is to establish the legally required nexus (or reasonable relationship) between projected new residential and nonresidential development in the City through General Plan buildout and the capital facilities that will be required to serve that new development.

The nexus requirements for imposing development impact fees were established under Assembly Bill (AB) 1600 legislation, as codified by the Mitigation Fee Act (the Act; California Government Code section 66000 and following). The Act sets forth the procedural requirements for establishing and collecting development impact fees. These procedures require that "the impact fee advances a legitimate state interest, that a proper nexus between the impacts caused by the development and the condition which advances the governmental interest has been demonstrated".[2]

Section 66001 of the Act specifies:

(a) In any action establishing, increasing, or imposing a fee as a condition of approval of a development project by a local agency, the local agency shall do all of the following:

(1) Identify the purpose of the fee.

(2) Identify the use to which the fee is to be put. If the use is financing public facilities, the facilities shall be identified. That identification may, but need not, be made by reference to a capital improvement plan as specified in Section 65403 or 66002, may be made in applicable general or specific plan requirements, or may be made in other public documents that identify the public facilities for which the fee is charged.

(3) Determine how there is a reasonable relationship between the fee's use and the type of development project on which the fee is imposed.

(4) Determine how there is a reasonable relationship between the need for the public facility and the type of development project on which the fee is imposed.

(b) In any action imposing a fee as a condition of approval of a development project by a local agency, the local agency shall determine how there is a reasonable relationship between the amount of the fee and the cost of the public facility or portion of the public facility attributable to the development on which the fee is imposed.

Important for water and sewer impact fees, Section 66013 of the Act applies the principles of Section 66001 to water and sewer connection fees. Section 66013(a) states, in part, "when a local agency imposes fees for water connections or sewer connections, or imposes capacity charges, those fees or charges shall not exceed the estimated reasonable cost of providing the service for which the fee or charge is imposed." The Nexus Study sections in the Water, Separated Sewer, and Combined Sewer chapters will address the nexus requirements in Section 66013 terms.

In addition, in 2021, AB 602 amended the requirements for drainage services by creating a "standards and practices" section to the Act, codified as Government Code Section 66016.5. This provision is both declaratory of previously existing law and added certain new requirements. A new provision that pertains to this report

[2] A Short Overview of Development Impact Fees, League of California Cities, 2003.

requires that a nexus study "shall calculate a fee imposed on a housing development project proportionately to the square footage of proposed units of the development" [66016.5(a)(5)(A)], and "large jurisdictions shall adopt a capital improvement plan as a part of the nexus study" [66016.5(a)(6)].

Water and sewer systems are specifically exempt from the requirements of Section 66016.5. Storm drainage, however, is subject to the provisions but may exercise an exemption to the square footage allocation method if the nexus study makes findings that include all of these:

- An explanation as to why square footage is not an appropriate metric to calculate fees imposed on a housing development project.
- An explanation that an alternative basis of calculating the fee bears a reasonable relationship between the fee charged and the burden posed by the development.
- That other policies in the fee structure support smaller developments, or otherwise ensure that smaller developments are not charged disproportionate fees.

Both the Storm Drainage and the Combined Sewer utilities have a drainage component. The nexus findings in each chapter of these utilities will address the exemption requirements. In both cases, the standard and customary method to establish a reasonable relationship between the fee and the burden to development is focused on impermeable surfaces. This allocation methodology supports equity among development of any size, density and land use.

Summary of Findings

Presented below are high-level comparative summaries of all proposed fees and the fees of surrounding jurisdictions for single-family, retail, and office land uses on a per unit and per acre basis. For the per unit comparison, single-family dwellings are presented on **Table 1-5a**, Retail land uses on **Table 1-5b**, and Office land uses on **Table 1-5c**. For the per acre comparisons, single-family dwellings are presented on **Table 1-6a**, Retail land uses on **Table 1-6b**, and Office land uses on **Table 1-6c**. Companion charts to these tables are provided in **Appendix A-2**. For each utility, all land uses and all fees are discussed in the chapters that follow, along with comparisons with surrounding jurisdictions.

Table 1-5. Summary of Water, Sewer, and Storm Drainage Development Impact Fees per Unit—Single-Family, Retail, and Office

Per Unit Fees	Single Family Fees per Dwelling Unit				
Jurisdiction	Water	Local Sewer	Regional Sewer	Drainage	**Totals**
Sacramento - Combined Sewer System [1]	$12,910	$7,635	$6,479	-	$27,024
Sacramento - Separated Sewer and Gravity Drainage	$12,910	$3,565	$6,479	$530	$23,484
Sacramento - Separated Sewer and Pumped Drainage	$12,910	$3,565	$6,479	$847	$23,801
Sacramento - SASD and Gravity Drainage	$12,910	$3,194	$6,479	$530	$23,113
Sacramento - SASD and Pumped Drainage	$12,910	$3,194	$6,479	$847	$23,430
Sacramento - All Areas Average [2]	**$12,910**	**$4,231**	**$6,479**	**$688**	**$24,170**
Sacramento County - Uninc.	$19,535	$3,194	$6,479	$2,994	$32,202
Folsom	$4,647	$1,073	$6,479	$1,037	$13,236
Roseville	$7,366	$447	$9,664	$279	$17,756
West Sacramento	$18,006	$7,011	$6,479	$6,185	$37,681
Woodland	$5,770	$7,125	-	$1,362	$14,257
Average Excluding Sacramento [2]	**$11,065**	**$3,770**	**$7,275**	**$2,371**	**$23,026**
Sacramento +/- Percent of Comparative Entities	**17%**	**12%**	**-11%**	**-71%**	**5%**

Source: EPS Exec_5a

Notes:
[1] Includes Drainage under Local Sewer.
[2] Averages exclude cities where the services are not provided.

Per Unit Fees	Retail Fees per 1,000 Building Square Feet [1]				
Jurisdiction	Water	Local Sewer	Regional Sewer	Drainage	**Totals**
Sacramento - Combined Sewer System [2]	$7,587	$4,047	$1,296	-	$12,929
Sacramento - Separated Sewer and Gravity Drainage	$7,587	$1,889	$1,296	$543	$11,315
Sacramento - Separated Sewer and Pumped Drainage	$7,587	$1,889	$1,296	$867	$11,639
Sacramento - SASD and Gravity Drainage	$7,587	$2,053	$1,296	$543	$11,479
Sacramento - SASD and Pumped Drainage	$7,587	$2,053	$1,296	$867	$11,803
Sacramento - All Areas Average [3]	**$7,587**	**$2,386**	**$1,296**	**$705**	**$11,833**
Sacramento County - Uninc.	$16,394	$2,053	$1,296	$2,465	$22,209
Folsom	$5,190	$316	$1,296	$579	$7,380
Roseville	$11,302	$149	$3,221	$303	$14,975
West Sacramento	$11,545	$2,078	$1,296	$5,446	$20,365
Woodland	$3,391	$2,908	-	$1,400	$7,699
Average Excluding Sacramento [3]	**$9,564**	**$1,501**	**$1,777**	**$2,039**	**$14,525**
Sacramento +/- Percent of Comparative Entities	**-21%**	**59%**	**-27%**	**-65%**	**-19%**

Source: EPS Exec_5b

Notes:
[1] Most juridictions assess fees on demand volume for each particular site and land use. The square-footage basis used for Retail and Office uses is for comparative purposes only for all fees across all jurisdictions and is based on a 1-acre parcel with a structure covering 25 percent of the parcel (i.e., a F.A.R of .25) for Retail and 35 percent for Office.
[2] Includes Drainage under Local Sewer.
[3] Averages exclude cities where the services are not provided.

Per Unit Fees	**Office Fees per 1,000 Building Square Feet [1]**				
Jurisdiction	Water	Local Sewer	Regional Sewer	Drainage	**Totals**
Sacramento - Combined Sewer System [2]	$5,419	$2,520	$1,296	-	$9,235
Sacramento - Separated Sewer and Gravity Drainage	$5,419	$1,176	$1,296	$361	$8,252
Sacramento - Separated Sewer and Pumped Drainage	$5,419	$1,176	$1,296	$576	$8,467
Sacramento - SASD and Gravity Drainage	$5,419	$1,467	$1,296	$361	$8,542
Sacramento - SASD and Pumped Drainage	$5,419	$1,467	$1,296	$576	$8,758
Sacramento - All Areas Average [3]	**$5,419**	**$1,561**	**$1,296**	**$468**	**$8,651**
Sacramento County - Uninc.	$11,710	$1,467	$1,296	$1,761	$16,233
Folsom	$3,707	$226	$1,296	$413	$5,642
Roseville	$8,073	$149	$3,221	$216	$11,659
West Sacramento	$8,246	$2,078	$1,296	$3,611	$15,232
Woodland	$2,422	$1,744	-	$1,000	$5,166
Average Excluding Sacramento [3]	**$6,832**	**$1,133**	**$1,777**	**$1,400**	**$10,786**
Sacramento +/- Percent of Comparative Entities	**-21%**	**38%**	**-27%**	**-67%**	**-20%**

Source: EPS Exec_5c

Notes:
[1] Most juridictions assess fees on demand volume for each particular site and land use. The square-footage basis used for Retail and Office uses is for comparative purposes only for all fees across all jurisdictions and is based on a 1-acre parcel with a structure covering 25 percent of the parcel (i.e., a F.A.R of .25) for Retail and 35 percent for Office.
[2] Includes Drainage under Local Sewer.
[3] Averages exclude cities where the services are not provided.

Table 1-6. Summary of Water, Sewer, and Storm Drainage Development Impact Fees per Acre—Single-Family, Retail, and Office

Per Acre Fees	**Single Family Fees at 7 Units per Acre**				
Jurisdiction	Water	Local Sewer	Regional Sewer	Drainage	**Totals**
Sacramento - Combined Sewer System [1]	$90,370	$53,448	$45,353	-	$189,171
Sacramento - Separated Sewer and Gravity Drainage	$90,370	$24,954	$45,353	$3,508	$164,185
Sacramento - Separated Sewer and Pumped Drainage	$90,370	$24,954	$45,353	$5,725	$166,402
Sacramento - SASD and Gravity Drainage	$90,370	$22,360	$45,353	$3,508	$161,591
Sacramento - SASD and Pumped Drainage	$90,370	$22,360	$45,353	$5,725	$163,808
Sacramento - All Areas Average [2]	**$90,370**	**$29,615**	**$45,353**	**$4,616**	**$169,031**
Sacramento County - Uninc.	$136,745	$22,360	$45,353	$20,959	$225,417
Folsom	$32,529	$7,511	$45,353	$7,259	$92,652
Roseville	$51,561	$3,129	$67,648	$1,953	$124,291
West Sacramento	$126,042	$49,077	$45,353	$43,294	$263,766
Woodland	$40,390	$49,875	-	$9,531	$99,796
Average Excluding Sacramento [2]	**$77,453**	**$26,390**	**$50,927**	**$16,599**	**$161,184**
Sacramento +/- Percent of Comparative Entities	**17%**	**12%**	**-11%**	**-72%**	**5%**

Source: EPS Exec_6a

Notes:
[1] Includes Drainage under Local Sewer.
[2] Averages exclude cities where the services are not provided.

Per Acre Fees	**Retail Fees per Acre [1]**				
Jurisdiction	Water	Local Sewer	Regional Sewer	Drainage	**Totals**
Sacramento - Combined Sewer System [2]	$82,620	$44,069	$14,111	-	$140,800
Sacramento - Separated Sewer and Gravity Drainage	$82,620	$20,575	$14,111	$5,586	$122,893
Sacramento - Separated Sewer and Pumped Drainage	$82,620	$20,575	$14,111	$9,118	$126,424
Sacramento - SASD and Gravity Drainage	$82,620	$22,360	$14,111	$5,586	$124,678
Sacramento - SASD and Pumped Drainage	$82,620	$22,360	$14,111	$9,118	$128,209
Sacramento - All Areas Average [3]	**$82,620**	**$25,988**	**$14,111**	**$7,352**	**$128,601**
Sacramento County - Uninc.	$178,536	$22,360	$14,111	$26,844	$241,851
Folsom	$56,516	$3,438	$14,111	$6,302	$80,367
Roseville	$123,077	$1,623	$35,080	$3,298	$163,078
West Sacramento	$125,723	$22,629	$14,111	$59,309	$221,773
Woodland	$36,926	$31,668	-	$15,248	$83,842
Average Excluding Sacramento [3]	**$104,156**	**$16,344**	**$19,354**	**$22,200**	**$158,182**
Sacramento +/- Percent of Comparative Entities	**-21%**	**59%**	**-27%**	**-67%**	**-19%**

Source: EPS Exec_6b

Notes:
[1] Most juridictions assess fees on demand volume for each particular site and land use. The acreage basis is for comparative purposes only for all fees across all jurisdictions and is based on a 1-acre parcel with a structure covering 25 percent of the parcel (i.e., a F.A.R of .25).
[2] Includes Drainage under Local Sewer.
[3] Averages exclude cities where the services are not provided.

Per Acre Fees	**Office Fees per Acre [1]**				
Jurisdiction	Water	Local Sewer	Regional Sewer	Drainage	**Totals**
Sacramento - Combined Sewer System [2]	$82,620	$38,415	$19,756	-	$140,791
Sacramento - Separated Sewer and Gravity Drainage	$82,620	$17,935	$19,756	$5,197	$125,508
Sacramento - Separated Sewer and Pumped Drainage	$82,620	$17,935	$19,756	$8,482	$128,793
Sacramento - SASD and Gravity Drainage	$82,620	$22,360	$19,756	$5,197	$129,932
Sacramento - SASD and Pumped Drainage	$82,620	$22,360	$19,756	$8,482	$133,217
Sacramento - All Areas Average [3]	**$82,620**	**$23,801**	**$19,756**	**$6,839**	**$131,648**
Sacramento County - Uninc.	$178,536	$22,360	$19,756	$26,844	$247,496
Folsom	$56,516	$3,438	$19,756	$6,302	$86,012
Roseville	$123,077	$2,272	$49,112	$3,298	$177,759
West Sacramento	$125,723	$31,681	$19,756	$55,061	$232,220
Woodland	$36,926	$26,589	-	$15,248	$78,763
Average Excluding Sacramento [3]	**$104,156**	**$17,268**	**$27,095**	**$21,351**	**$164,450**
Sacramento +/- Percent of Comparative Entities	**-21%**	**38%**	**-27%**	**-68%**	**-20%**

Source: EPS Exec_6c

Notes:
[1] Most juridictions assess fees on demand volume for each particular site and land use. The acreage basis is for comparative purposes only for all fees across all jurisdictions and is based on a 1-acre parcel with a structure covering 35 percent of the parcel (i.e., a F.A.R of .35).
[2] Includes Drainage under Local Sewer.
[3] Averages exclude cities where the services are not provided.

There are many features to these comparisons that will be touched on in the chapters that follow. In the above tables, two points of Sacramento's fee structure stand out in contrast to comparable jurisdictions. Sacramento has extraordinarily high sewer fees in its Combined Sewer System Utility. This is due to the high cost of managing a sewer system that mixes wastewater and stormwater runoff. The other "outlier", and in contrast, is the drainage fee set. Drainage fees are very low for reasons to be discussed in the Storm Drainage System Utility chapter. This is in light of the fact that the hydrology of Sacramento is very challenging, complex, and expensive to drain because of the flat, low-lying, delta topography.

Also significant is the comparison set used. The Water System Utility uses a broader set then that presented in the above multi-service comparison, and is likely a fairer comparison for this system. This broader set is discussed in that chapter and is used for comparative purposes with the Water services of other jurisdictions.

Organization of Report

This report is divided into 5 chapters and 5 appendices:

- **Chapter 1** includes this Executive Summary.
- **Chapter 2** details the Water System Development Impact Fee, Methodology, and Nexus Findings.
- **Chapter 3** details the Separated Sewer System Development Impact Fee, Methodology, and Nexus Findings.
- **Chapter 4** details the Combined Sewer System Development Impact Fee, Methodology, and Nexus Findings.
- **Chapter 5** details the Storm Drainage System Development Impact Fee, Methodology, and Nexus Findings.
- **Appendix A** provides supporting detail and documentation for the Executive Summary.
- **Appendix B** provides supporting detail and documentation for the Water System Utility.
- **Appendix C** provides supporting detail and documentation for the Separated Sewer System Utility.
- **Appendix D** provides supporting detail and documentation for the Combined Sewer System Utility.
- **Appendix E** provides supporting detail and documentation for the Storm Drainage System Utility.

2. The Water System Utility

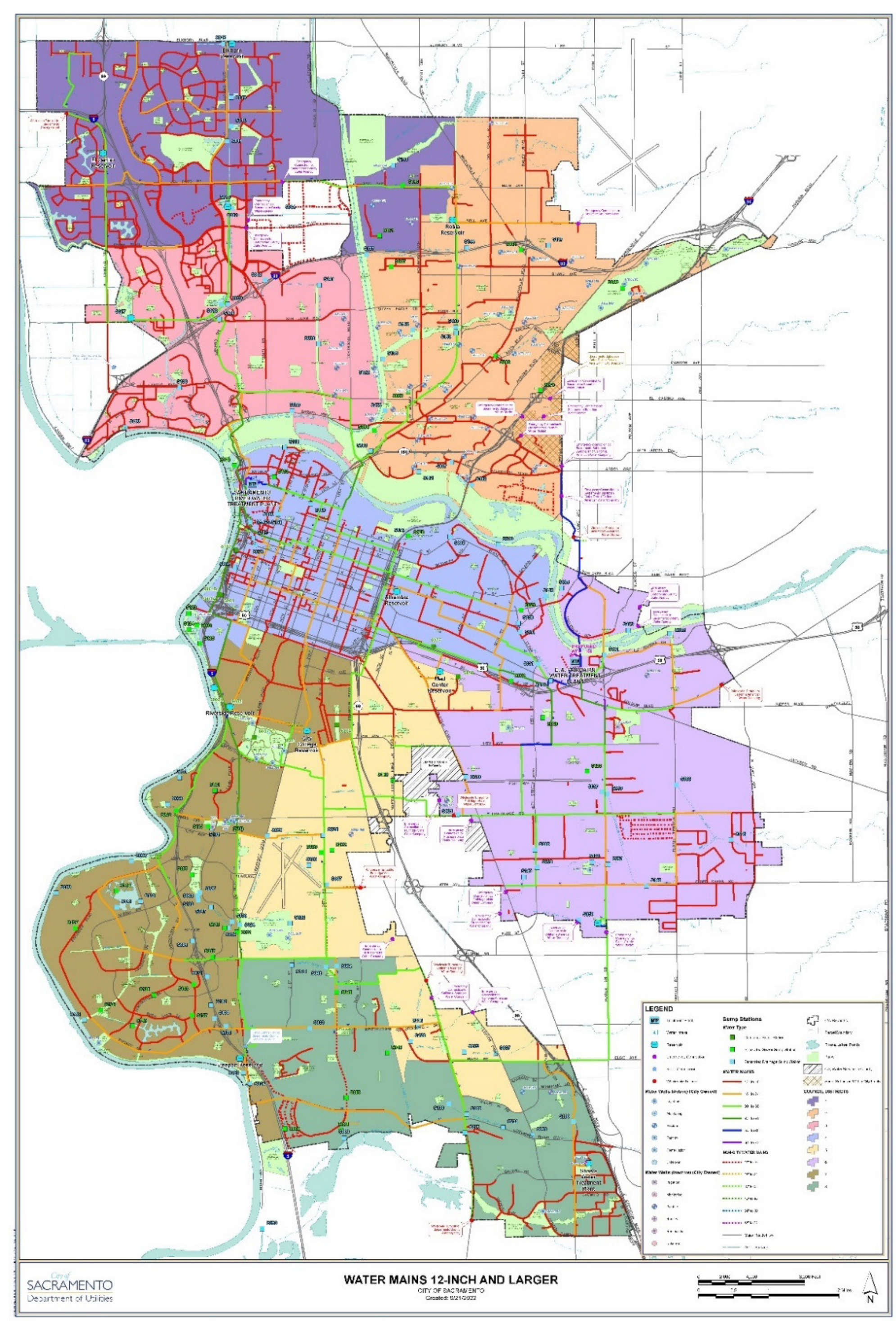
Introduction and Description

The City's Water System is maintained and operated by DOU and implements comprehensive drinking water programs that focus on the supply, production, storage, and distribution of high-quality drinking water; on system maintenance and improvements; and on water conservation. The Water System produces more than 25 billion gallons of drinking water annually acquired through the 25,000 square-mile watersheds of the American and Sacramento Rivers. DOU maintains 2 water treatment plants, 28 active ground water wells, storage facilities, and more than 1,500 miles of water mains. DOU operates under legal and policy mandates to ensure that all delivered water meets or exceeds all state and federal drinking water standards. Also critical in times of drought is demand management by way of efforts to increase water efficiency throughout the City with education, incentives, resources, and information for home and business owners. Further, detailed information on the Water System is available online at https://www.cityofsacramento.org/Utilities/Water.

The Water System currently serves a resident population of 525,000 in approximately 203,000 housing units. The total population served is estimated to be up to 25 percent higher on weekdays because of commercial and government employment of surrounding-area residents. Total employment is approximately 307,000 in 83 million square feet of space. All water services to this residential and nonresidential population are provided through 142,000 metered accounts, including metered connections of various sizes.

The Water System service area is generally contiguous with the incorporated boundaries of the City. The map of the service area is shown in **Figure 2-1**.

Figure 2-1. Water System Boundaries and Key System and Geographic Characteristics



Growth, Demand, and Allocations

In the summer of 2021, Sacramento City Council adopted an Urban Water Management Plan (UWMP) that identified the projected water demands and necessary water entitlements to meet that demand based on the draft 2040 General Plan update (2040 Update). In early 2023, the update to the Water Master Plan (WMP)[3], which identifies needed infrastructure consistent with the UWMP, was completed by DOU based on the draft 2040 Update. As noted in the **Executive Summary** of this document, the 2040 Update is the basis for all the projections used for each of the utilities in this study. Thus, the UWMP, WMP and demand calculations in this document are based on the same projection of future demand – anchored to the 2040 Update.

Maximum Daily Demand (MDD) is a standard and customary unit of measurement for water capital facility planning. The metric is applicable to the measurement of current and future capacity demands from existing and new users. Based on information in the WMP, **Table 2-1** illustrates existing and future capacity requirements measured in millions of gallons per day based on MDD.

Table 2-1. Change in Maximum Daily Demand

Retail Only to 2040 **Capacity Requirements**	*formula*	**Millons of Gallons Per Day (MGD)**
Existing MDD [1]	*a*	150.50
Future Development MDD [2]	*b*	41.90
Total Requirement	*c = a + b*	**192.40**
Percent Increase in Existing	*d = b / a*	**27.8%**
Percent Future of Total	*e = b / c*	**21.8%**

Source: DOU *water_1*

Notes:

[1] WMP Table 6-1 plus 2% to account for future climate change per the American River Basin Study, discussed in detail below.

[2] WMP Table 7-2 adjusted per Note 1.

The forecasted capacity necessary to serve new growth is 41.9 MGD. Of the 41.9 MGD, 34.9 MGD is available within the existing treatment and conveyance system, which leaves a remaining 7 MGD. This demand forecast aligns with the draft 2040 Update. The WMP contemplated the possibility for higher overall system demands if drought rebound factors were assumed. This would have the effect of increasing the demand from existing users, thereby decreasing remaining capacity in the existing system for new growth, and thus triggering a

[3] Water Master Plan Update, West Yost, Final Report January 2023.

larger incremental increase in production facilities to accommodate that new growth. Given statewide water efficiency mandates, the City is not electing to assume future water demands return to past practices. All water demand forecasts have also embedded expected water efficiency practices.

The WMP indicates the existing water system includes approximately 35 mgd of excess capacity available to serve future development. The remaining 7 mgd in future capacity requirements to 2040 will necessitate DOU to construct or acquire additional capacity via acquisition or construction of new water sources, treatment, and storage and conveyance facilities. The capital projects to be discussed below are designed to meet the retail capacity requirements both in terms of quality and quantity for both existing and future customers.

For the City's retail water customers, water delivery is almost exclusively via metered connections. Meters of different sizes vary by delivery capacity as measured by maximum allowable flow, expressed as either Flow Factor or Equivalent Meter (EM). The typical meter size for the capacity required for a single-family residence is a standard 1" meter with a Flow Factor or EM of 1. Meters can be up to 10" in diameter with 84 times the flow capacity of a standard 1" meter.

For capacity charge purposes, costs are expressed per EM where the projection of future EMs is based on the WMP and draft 2040 Update projections. The future EM projection and the existing and future growth shares of 2040 capacity are shown on **Table 2-2**.

Table 2-2. Equivalent Meter Projection and new Growth Share

Equivalent Meters	*formula*	**Factor**
Existing Equivalent Meters [1]	*a*	181,226
Future % Increase [2]	*b*	27.8%
Future New Equivalent Meters	***c = a * b***	**50,454**
Total Equivalent Meters	*d = a + c*	231,680
Percent Future of Total	***e = c / d***	**21.8%**
Percent Existing of Total	***f = 100% - e***	**78.2%**

Sources: DOU and EPS *water_2*

Notes:
[1] See Appendix B-1.
[2] See Table 2-1.

This demand profile of existing and future capacity requirements drives the allocation of current and future shares of existing capacity as well as future capacity requirements and their costs. The share percentages in **Table 2-2** apply for assets of common benefit to all customers.

Via the Buy-In approach, discussed in detail in the **Executive Summary,** future development is buying into existing water system assets that have common (or shared) benefit. As described in more detail below, the current depreciated value of the existing system is allocated proportionately between existing and new development using the percentages in **Table 2-2**.

Buy-In Methodology and Fee per Equivalent Meter

The Buy-In approach is used to determine existing asset shares. Existing assets that will benefit future customers (existing treatment plants, wells, reservoirs, and transmission lines) have been paid for by current rate payers. Future customers will "buy in" to 21.8 percent of these assets by way of a buy-in development capacity charge. The assets are depreciated, and developer contributions and assets financed with long-term debt are removed so only the remaining useful life of assets directly paid by rates is allocated.

An option exists in the determination of buy-in development capacity charges to include current assets that are systemwide benefits and qualify as assets as defined under Generally Accepted Accounting Principles. These are fairly wide-ranging standards and include all buildings, equipment and improvements, land including easements, equipment, core software, rolling stock and related equipment, and intangible assets such as franchise licenses and water rights. This allowable scope extends to all core functions (i.e., treatment plants, wells, and transmission lines) and to peripheral support functions including corporation yards and administration buildings. Although a broader suite of existing improvements would qualify, the approach used in this study is narrower. The assets included are tangible and unambiguously used for water production, storage, and transmission. Not included are any assets that are not directly used for water system purposes, such as administration buildings or corporation yards, all of which are indirectly used. Also not included are local distribution lines or service meters because these items benefit individual developments or parcels, instead of the system as a whole.

To value the included water assets, DOU engaged the engineering firms of West Yost and Carollo to provide estimates of value for the treatment plants, storage facilities, and wells under the general guidance established by the Association for Advancement of Cost Engineering (AACE). City staff developed estimates of value for the transmission mains using essentially the same methodology. The detail of all assets and methodologies is provided in **Appendix B-2**. Other assets included are related to rolling stock and software, both of which have been valued from the City's accounting records. The summary results of the water system current asset valuation are shown on **Table 2-3**.

Table 2-3. Existing Assets

Summary [1] Category	Replacement Cost	Depreciation	Current System Value
Transmission Mains	$569,160,101	$334,676,965	$234,483,136
Wells [2]	$156,875,500	$141,954,001	$14,921,499
Reservoirs	$361,600,000	$234,500,000	$127,100,000
Treatment Plants			
Sacramento River	$1,218,300,000	$468,000,000	$750,300,000
E. A. Fairbairn	$1,079,100,000	$597,100,000	$482,000,000
Software	$3,491,478	$1,088,462	$2,403,016
Vehicles	$10,102,308	$5,444,536	$4,657,772
		Subtotal	$1,615,865,423
Less Outstanding Principal Debt			($232,147,747)
Less Developer Contributions			($2,972,534)
Totals	**$3,398,629,387**	**$1,782,763,964**	**$1,380,745,142**

Sources: Carollo, West Yost, DOU, City of Sacramento *Water_3*

Note:
[1] The full detail of the estimates and methodologies are provided in Appendix B-1.
[2] The total Current System Value excludes Wells 165, 166 and 167 on the West Yost valuation analysis because these wells are not in service.

Each component of an asset has been depreciated in accordance with the standard useful life of that component. Treatment plants, for example, have many components with different useful lives. The current value of each component is determined in one of two ways, depending on the circumstances:

- If the original cost and installation date are available, the original cost is depreciated on a straight-line basis for years in service. The remaining value is then adjusted to 2022 dollars using the standard cost adjustment methodology, which is defined in the **Executive Summary** chapter.
- If the original cost is not available but the installation date is known, the replacement cost is estimated in 2022 dollars using the AACE protocols. This value is then depreciated for years in service.

In either case of valuing, each of the components are accumulated into the summaries shown in **Table 2-3**. Detailed depreciation of the assets and the component depreciation standards can be found in **Appendix B-2**.

As mentioned above, outstanding principal debt has been included as a deduction to asset value because the underlying assets are in service but have not been paid for by current rate payers. All existing and future customers will pay for these debt-financed assets through future rate revenue. Deductions are also made for developer contributions because these assets were not directly funded by rate payers through rates. The asset values for developer contributions have been depreciated for time in service.

The fee per EM calculation for the proportional share for new growth is shown in **Table 2-4**.

Table 2-4. Equivalent Meter Buy-In Fee

	Current System
2022 Value	$1,380,745,142
New Growth Share %	21.80%
New Growth Share	$301,002,441
Future Equivalent Meters	50,454
Fee per Equivalent Meter	**$5,966**

Source: DOU, EPS *Water_4*

The fee will be used for capital expenses related to the use by new growth of existing assets included in the calculation of current value in **Table 2-3**. The projects, and the process by which they are established, are described in the next section under Capital Improvement Projects (CIPs). Use of the fee will be accounted for and reported in accordance with Government Code section 66013 and as discussed in the **Nexus Findings** section below.

The Buy-In fee is combined with the Incremental Fee, discussed below, for the total base Water System Development Impact Fee per EM. The calculation combining the two fees is shown on **Table 2-8** later in this chapter. The allocation of the combined fee per EM by meter size is presented in **Table 2-9**, also later in this chapter.

Incremental Methodology and Fee per Equivalent Meter

Future asset requirements are allocated through engineering determinations of proportional demands. If an asset has an equal demand from, or benefit to, all users, the allocation percentage for in-common facilities (21.8%) is used. If the asset benefits growth more than existing customers, or vice versa, the allocation is adjusted accordingly. The capital improvement plan presented below and in **Appendix B-3** details future projects and the specific allocation used.

Capital Improvement Program

DOU maintains Capital Improvement Program (CIP) plans for the Water System. The CIP includes projects that are expected to be complete from within the next year to projects expected to be programmed for implementation as far into the future as 30 years. Because the planning horizon for the purpose of this study is 2040, or 18 years, anticipated annual expenditures after this date are not included.

The CIP draws on documents and processes as follows:

- Updated facility plans and the related short-term projects adopted through the annual budget process.
- UWMP identified water conservation practices, future water demands, water supplies, water efficiency practices, water shortage contingencies, and climate change adaptation considerations.
- Both the 2013 WMP and the current WMP are consistent with the demand projections in the 2035 General Plan Update and draft 2040 Update, respectively.
- CIPs to implement the Master Plans and adapt the water system to future demand requirements and best practices as identified in the 5 year and 30 year budgets.
- Other facility cost estimates and updated assessments of facility needs and costs as of September 2022. Related projects are incorporated into the formal CIP as appropriate.

In all aspects of the CIP planning and implementation process, the City is required by state law to provide safe, clean, affordable, and accessible water. Long-range water demand projections have identified a potential shortage of water treatment capacity within approximately the next 18 years. To prepare for and meet projected demand, the City needs to develop additional capacity, both in terms of quantity and quality.

To achieve the objectives of state law efficiently and effectively, a key methodology used by DOU is the **Water+ Programmatic Approach**.
The elements of this program guide the identification of system needs and subsequent actions and projects:

- Align the City's water treatment capacity with the City's continued growth and economic development.
- Protect the City's drinking water against anticipated climate change impacts and other risks.
- Maintain water supply resiliency through conjunctive use of surface and groundwater supplies.

- Expand the community's confidence in its affordable, safe, clean, and reliable drinking water.
- Engage the community in support of long-range planning for drinking water infrastructure.
- Equitably balance funding needs through development impact fees, customer water rates, grants, and loans.

The CIP consists of 18 project types, or cost centers, for multiple individual projects of the same type, and totals $1,880,533,268. All proposed projects, costs, allocations, and descriptions are included in **Appendix B-3**. Major projects are discussed below.

Resiliency Projects, as a category of projects, are increasingly important because of changing regulations, continued climate change, wildfires in the watershed, river pollution and algal toxins, among other risks impacting the City's ability to reliably deliver high-quality drinking water. Development and implementation of Resiliency Projects will help protect the City's water supply from these risks.

For the purposes of this study, Resiliency Projects address improvements common to all customers; thus, costs will be shared proportionately. Below are examples of upcoming Resiliency Projects:

- Ozone treatment capability in both water treatment plants to implement available technologies to enhance the capacity to mitigate risks from chemical contaminants, viruses, bacteria, and other microorganisms and to improve taste and smell. Ozone treatment will also provide for compliance with key anticipated future regulations for finished water quality.
- Fairbairn improvements to return 100 million gallons per day (mgd) firm from the existing 80 mgd and 120-mgd hydraulic capacity as one of the most cost-effective approaches to adding capacity for new growth.
- Replacement of the chlorine gas system with a safer means of chlorine disinfection at all water supply facilities.

All of the Resiliency Projects have a cost of $882,352,352. The proportional share for new growth is 21.8 percent, or $192,352,813.

The American River Basin Study (ARBS) and Climate Change

Climate change has the potential to alter local climatic patterns and meteorology. As part of the draft 2040 General Plan, the City's Climate Adaptation Plan (CAP) has been updated to be a standalone document to provide framework for Greenhouse Gas reduction and establish the City as a leader of climate action.

Along with the draft 2040 General Plan Update, the CAP is also available for public review on request.

Incorporated into the Draft 2040 CAP are the results of a 2022 study published by the United States Bureau of Reclamation (USBR). The 2022 American River Basin Study (ARBS) was the product of a multi-year study to identify water supply-demand imbalances and climate change adaptation strategies specific to the American River Basin (Basin). The ARBS can be located at: https://www.usbr.gov/watersmart/bsp/arbs/.

Overall results of the ARBS indicate the region can expect:

- A probability of fewer wet years and increased temperatures with earlier run-off times.
- In dry years, increased evapotranspiration rates for irrigation, changed snowpack and runoff dynamics and more frequently triggered legal flow criteria on the lower American River that results in an annualized reduction of diversions at the Fairbairn Water Treatment Plant.

As a result of increased temperature, the ARBS projects a 2-4 % increase in water demands through 2050, and upwards of 7% through 2070. Growth related water demands included in this document incorporate the lowest escalator (2%) to factor in climate change pressure. This factor was not previously included in water planning documents.

The ARBS also predicts warmer source water conditions in the future. Warmer source water conditions degrade the quality of the water. This Nexus Study incorporates the addition of advance Ozone Treatment to adapt to changing conditions.

The "RiverArc" Project is a Capacity and Resiliency Project, that will provide significantly improved backup and flexibility to water sources available for existing customers, new growth, and to surrounding communities. The project will divert water through an existing water intake structure from the Sacramento River to offset water currently diverted from the American River. Reduction of draws from the American River has been identified as a potential mitigation measure for climate change impacts to water supply in the American River watershed as described in the ARBS. In 2015 and 2021, Folsom Reservoir levels were very close to not being able to meet minimum municipal water supply intake elevations. The flow of the Sacramento River, which is many times the size of the American River, has the capacity to reduce reliance on the American River. The proposed action will provide 30 mgd of additional water supply capacity to the City that does not convey the same triggers that the City's Fairbairn Water Treatment facility on the lower American River experiences during dry years or low flow rates that significantly limits that facility's ability to divert the full permitted capacity.

In addition, RiverArc will help facilitate the recharge of the groundwater storage basin via "direct" or "in-lieu" recharge in wet years for use in years when surface water supplies are depleted due to drought-like conditions and the water supply demands of the City, the region, and potentially other areas in northern California are strained. On the whole, RiverArc will better secure the ability to accommodate growth in the City and will benefit regional water suppliers, increase the sustainability of regional groundwater supplies, and provide additional environmental protection of the American River Watershed. The flexibility provided by RiverArc could allow for water to be delivered through raw water pipelines to a new regional water treatment plant, where it will be distributed through new and existing pipelines to the City and regional partners.

The estimated cost of RiverArc is $214,491,870 for an additional 30 million gallons of capacity dedicated to the City. All other costs related to regional RiverArc partners are excluded from this report because these other costs are not attributable to new growth within the City's Water System. The portion attributable to the minimum City capacity requirement before 2040 is one-half of the 30 million gallon capacity, or 15 million gallons. Of this amount, new growth will require 7 of the 15 million gallons, or 46.67 percent of the 15-million-gallon, pre-2040 capacity requirement. The remaining capacity - 8 million gallons - addresses demand reliability common to all customers in the City Water System because of the resiliency benefits. The 8-million-gallon portion will be shared proportionately between existing development and new growth. The calculations of attributable benefits and costs are shown in **Table 2-5**.

Table 2-5. RiverArc Capacity, Benefit, and Cost Allocation

RiverArc Benefit Allocation	*formula*	Capacity Allocation [1]	Proportional Benefit Allocation [2]	Cost
Capacity Benefit to 2040	*a*	15.0	50.00%	107,245,935
Capacity Benefit after 2040	*b*	15.0	50.00%	107,245,935
Capacity and Total Cost	*c = a + b*	30.0	100.00%	214,491,870
New Growth and Shared Allocation to 2040				
Capacity Benefit Cost to 2040	*d = a*	15.0	100.00%	107,245,935
New Growth	*e = (7 / 15) * d*	7.0	46.67%	50,048,103
Existing Development	-	-	-	-
Shared	*f = (8 / 15) * d*	8.0	53.33%	57,197,832
Shared Allocation to 2040				
Shared	*g = f*	8.0	100.00%	57,197,832
New Growth	*h = g * 21.8%*	1.7	21.80%	12,469,127
Existing Development	*i = g * 78.2%*	6.3	78.20%	44,728,705
New Growth and Existing Development Allocation to 2040				
New Growth	*j = e + h*	8.7	58.29%	**62,517,230**
Existing Development	*k = i*	6.3	41.71%	**44,728,705**
Capacity and Total Cost	*l = j + k*	15.0	100.00%	**107,245,935**

Sources: DOU, EPS *Water_5*

Note:

[1] In millions of gallons per day (mgd), rounded to the nearest tenth.

[2] Up to half of the capacity benefit (50%) could be available beyond the forecast horizon (2040).

The RiverArc project is proposed for completion towards the end of this decade.

An alternative to the RiverArc project, termed the **Sacramento River Water Treatment Plant (SRWTP)**, is under consideration as a substitute for allocation to new growth but is not incorporated in any of the calculations for new growth at this time. The capital project summary for the SRWTP alternative is provided in **Appendix B-3**. RiverArc, although it involves a more complex governance structure, is the preferred alternative for allocation as it provides a potentially greater global benefit and the potential for reduced initial investment than SRWTP expansion. Essentially, the SRWTP focuses on capacity improvements. These are the major components:

- The development of an additional 75 million gallons per day (mgd) of increased capacity at the SRWTP. The 75 mgd project could be completed as one project or broken into two phases.
- Capacity improvements across the water main transmission system.
- The addition of a new or replacement intake structure within the Sacramento River with a facility to support the additional supply needs.

The total cost of the SRWTP alternative is estimated at $489 million. Should the SRWTP become the priority for allocation, the Nexus Study would be amended.

In addition to the portion of RiverArc allocated solely to new growth, other, exclusively new growth projects, include $75,493,000 for trunk main distribution lines and $13,229,000 for a new reservoir. All of these projects are detailed in **Appendix B-3**.

A final category of capital planning and the Water+ Programmatic Approach is improvements to the distribution system at an estimated cost of $858,297,551. These projects are also detailed in **Appendix B-3**. None of these projects are being allocated to the incremental portion of the Water System development impact fee. There are capacity-related projects in the distribution system improvements that could be funded with a proportional share from the Buy-In development impact fee or other sources.

A summary of all CIPs, costs, and proportional shares is shown on **Table 2-6** below.

Table 2-6. CIP Summary of Proportional Allocations and Costs

		Proportional Allocation			
		Percent		Cost	
Projects [2]	**Estimated Cost**	**Existing**	**New**	**Existing**	**New**
formula	*a*	*b*	*c*	*d = a * b*	*e = a * c*
Resiliency	$882,352,352	78.2%	21.8%	$689,999,539	$192,352,813
Growth	$138,770,103	0.0%	100.0%	-	$138,770,103
Distribution	$858,297,551	100.0%	0.0%	$858,297,551	-
Annual Misc.	$1,113,262	78.2%	21.8%	$870,571	$242,691
Total	**$1,880,533,268**	**82.38%**	**17.62%**	**$1,549,167,661**	**$331,365,607**

Sources: DOU, EPS *Water_6*

Notes:
[1] Totals may not agree with detailed allocations and numbers due to rounding effects.
[2] Details are provided in Appendix B-3. The elements that constitute the RiverArc project are shown on Table 2-5.

Capital Costs, Allocation, and Cost per Equivalent Meter

All CIP Costs, the allocation of these costs to existing and future customers, and the cost per EM is shown in **Table 2-7**.

Table 2-7. Future Demand Shares

		Proportional Allocation			
		Current Development		New Growth	
	Totals	**%**	**$**	**%**	**$**
formula	*a*	*b*	*c = a * b*	*d*	*e = a * d*
Demand Shares					
Future Assets [1]	$1,880,533,268	82.38%	$1,549,167,661	17.62%	$331,365,607
2040 Equivalent Meters [2]	231,680		181,226		50,454
Cost per Equivalent Meter	**$8,117**		**$8,548**		**$6,568**

Sources: DOU, EPS *Water_7*

Notes:
[1] See Table 2-6.
[2] From Table 2-4.

As shown, the cost per EM for future customers is $7,124. The allocation of the per EM fee by meter size is presented in **Table 2-9** on the next page.

Water System Development Impact Fee

The cost and fee per EM for the benefits of the existing system and the future requirements are shown on **Table 2-8**. Future customers will pay their share through the development impact fee.

The total fee by meter size is shown on **Table 2-9**.

Table 2-8. Equivalent Meter Buy-In and Future Cost Allocation

	Current System	**Future Capital Costs**	**Totals**
Source:	*Table 2-4*	*Table 2-7*	
2022 Value	$1,380,745,142	$1,880,533,268	$3,261,278,409
New Growth Share %	21.80%	17.62%	19.4%
New Growth Share	$301,002,441	$331,365,607	$632,368,048
Future Equivalent Meters	50,454	50,454	50,454
Fee per Equivalent Meter	**$5,966**	**$6,568**	**$12,534**

Source: DOU, EPS *Water_8*

Table 2-9. Buy-In and Future Cost Fee Schedule for New Development

Size	Flow Factor	Equivalent Meters	Fee Per Equivalent Meter	Fee Per Meter		
				Base Fee	Admin	w/ Admin
formula	*a*	*a*	*c*	*d = a * c*	*e = d * .03*	*f = d + e*
5/8-inch	1.0	1.0	$12,534	$12,534	$376	$12,910
3/4-inch	1.0	1.0	$12,534	$12,534	$376	$12,910
1-inch	1.0	1.0	$12,534	$12,534	$376	$12,910
1.25-inch	1.5	1.5	$12,534	$18,800	$564	$19,364
1.5-inch	2.0	2.0	$12,534	$25,067	$752	$25,819
2-inch	3.2	3.2	$12,534	$40,107	$1,203	$41,310
3-inch	7.0	7.0	$12,534	$87,735	$2,632	$90,367
4-inch	12.6	12.6	$12,534	$157,923	$4,738	$162,661
6-inch	26.0	26.0	$12,534	$325,872	$9,776	$335,648
8-inch	56.0	56.0	$12,534	$701,879	$21,056	$722,935
10-inch	84.0	84.0	$12,534	$1,052,819	$31,585	$1,084,404

Sources: DOU, EPS *Water_9*

Comparison with Surrounding Communities

The comparison of the water fee with surrounding jurisdictions is shown on the following two tables. **Table 2-10** shows comparative information by typical meter size for single-family residential, retail, and office uses. **Table 2-11** includes the single-family land use and office and retail uses on a per 1,000 square foot basis and on a per acre basis. For both tables, complete comparative information in chart form is presented as **Appendix B-3**. High-level summaries for all fees in all jurisdictions, but on a narrower set of comparables for water fees, are presented in **Chapter 1**, the **Executive Summary**.

Table 2-10. Fee Comparisons by Land Use and Meter Size

	Site Specific		
Jurisdiction	Single Family	Retail	Office
Typical:	*1-inch meter*	*2, 2-inch meters*	
Sacramento	**$12,910**	**$82,620**	**$82,620**
Sacramento County - Uninc.	$19,535	$178,536	$178,536
Folsom	$4,647	$56,516	$56,516
Orangevale	$8,813	$58,398	$58,398
Roseville	$7,366	$123,077	$123,077
Rocklin	$19,987	$319,792	$319,792
Lincoln	$17,634	$358,360	$368,501
West Sacramento	$18,006	$125,723	$125,723
Woodland	$5,770	$36,926	$36,926
Stockton	$11,542	$86,939	$86,939
Average Excluding Sacramento	**$12,589**	**$149,363**	**$150,490**
Sacramento +/- Percent [1]	**3%**	**-45%**	**-45%**

Source: EPS *Water_10a*

Note:

[1] Retail and Office uses have similar percent differences because all entities typically use 2, 2-inch meters for these land uses.

Table 2-11. Fee Comparisons by Land Use and Area

Jurisdiction	Site Area			Per Acre		
	Single Family	Retail	Office	Single Family [2]	Retail	Office
	per unit	*per 1,000 sq. ft. [1]*				
Sacramento	**$12,910**	**$7,661**	**$5,472**	**$91,250**	**$83,429**	**$83,429**
Sacramento County - Uninc.	$19,535	$16,394	$11,710	$136,745	$178,536	$178,536
Folsom	$4,647	$5,190	$3,707	$32,529	$56,516	$56,516
Orangevale	$8,813	$5,363	$3,830	$61,691	$58,398	$58,398
Roseville	$7,366	$11,302	$8,073	$51,561	$123,077	$123,077
Rocklin	$19,987	$29,366	$20,975	$139,909	$319,792	$319,792
Lincoln	$17,634	$32,907	$24,170	$123,436	$358,360	$368,501
West Sacramento	$18,006	$11,545	$8,246	$126,042	$125,723	$125,723
Woodland	$5,770	$3,391	$2,422	$40,390	$36,926	$36,926
Stockton	$11,542	$7,983	$5,702	$80,797	$86,939	$86,939
Average Excluding Sacramento	**$12,589**	**$13,716**	**$9,871**	**$88,122**	**$149,363**	**$150,490**
Sacramento +/- Percent [3]	**3%**	**-44%**	**-45%**	**4%**	**-44%**	**-45%**

Source: EPS *Water_10b*

Note:

[1] City of Sacramento's water fee is assessed based on meter size. The Retail and Office fee values listed in this table are for comparative purposes only to allow comparison across all jurisdictions by area for a hypothetical development of a 1-acre parcel with a structure covering 25 percent of the parcel (i.e., a F.A.R of .25) for Retail, and 35 percent for Office. This methodology is also used in the Executive Summary tables.

[2] Based on 7 units per acre.

[3] Retail and Office uses have similar percent differences because all entities use 2, 2-inch meters for these uses.

The proposed fee in Sacramento is on par with the average for single-family land uses and significantly less for nonresidential land uses.

Nexus Findings

For the Water System Utility, this section addresses the following requirements of the Mitigation Fee Act (California Government Code section 66000 et seq.).

Per California Government Code Section 66001

1. Identify the purpose of the fee.
2. Identify how the fee is to be used.
3. Determine how a reasonable relationship exists between the fee's use and the type of development project on which the fee is imposed.
4. Determine how a reasonable relationship exists between the need for the facility and the type of development project on which the fee is imposed.
5. Demonstrate a reasonable relationship between the amount of the fee and the cost of the facility or portion of the facility attributable to the development on which the fee is impose.

The Water System Development Impact Fee applies to all development in the service area in proportion to the measured expectation of water flow by land-use type.

1. Purpose of the Fee

The purpose of the Water System Development Impact Fee is to fund capacity improvements to accommodate projected new residential and non-residential development as detailed in **Chapter 2**.

2. Use of Fee

The Water System Development Impact Fee will be used to fund water facilities needed to secure, treat, store and transmit water for demand generated by development in the service area. The Buy-In portion of the fee will be used for capital expenses related to the use by new growth of existing assets included in the calculation of current value in **Table 2-3**. The incremental portion of the fee will be used for capacity enhancements and in the proportion of cost for the enhancement benefitting new development.

3. Reasonable Relationship between Use of Fee and Type of Development on Which the Fee is Imposed

The Water System Development Impact Fee varies by development type based on measured expectation of water demand by development type as measured by delivery volume requirements. This proportional fee will be used to fund capital projects identified in **Chapter 2** and **Appendix B.** All improvements are designed to meet Federal, State and City requirements for standards of service in the most cost-effective manner to accommodate projected new residential and nonresidential development in the service area.

A reasonable relationship therefore exists between the use of the Water System Development Impact Fee and the type of development on which the fee is imposed.

4. Reasonable Relationship between Need for Facility and Type of Project on Which the Fee is Imposed

New residential and nonresidential projects in the service area are required to connect to the City's water system. New residents, employees, and patrons of the new developments will generate demand for increased water supply, treatment, storage and delivery. The water facilities needed to accommodate this demand were determined through the standards and criteria of the City's capital planning process, the **Water+ Programmatic Approach** as described in **Chapter 2**.

A reasonable relationship therefore exists between the need for water facilities and new residential and nonresidential development projects on which the Water System Development Impact Fee is imposed because the portion of water facilities funded by the Water System Development Impact Fee is based on the amount of water demand generated by projected residential and non-residential development.

5. Reasonable Relationship between Amount of Fee and Cost of Facilities or Portion of Facilities Attributed to Development on Which Fee is Imposed

The total cost of existing and future water facilities attributable to development and funded by the Water System Development Impact Fee is allocated by development type based on measured expectation of water demand by development type as measured by delivery volume requirements. Requirements are indexed in Equivalent Meters where an Equivalent Meter of one is the volume requirement of a typical single-family home. Higher, typical volume requirements equate to higher expected Equivalent Meter requirements. The Water System Development Impact Fee is based on a per Equivalent Meter basis, so is therefore both proportional to the expected demand and proportional with the cost of required facilities.

A reasonable relationship therefore exists between the amount of the Water System Development Impact Fee and the cost of the water facilities attributed to the residential and nonresidential development on which the fee is imposed because the costs are allocated based on the demand generated by new development for water facilities as measured by the demand generated by each development type.

Per California Government Code Section 66013

1. Subsection (a): *Notwithstanding any other provision of law, when a local agency imposes fees for water connections or sewer connections, or imposes capacity charges, those fees or charges shall not exceed the estimated reasonable cost of providing the service for which the fee or charge is imposed, unless a question regarding the amount of the fee or charge imposed in excess of the estimated reasonable cost of providing the services or materials is submitted to, and approved by, a popular vote of two-thirds of those electors voting on the issue.*

Finding on the Base Fee: The capital cost portion of Water System Development Impact Fee (Base Fee) does not exceed the estimated reasonable cost of providing the service for which the fee or charge is imposed. Costs are estimated for new, existing and improved facilities necessary to accommodate the demand created by the water requirements from projected new residential and non-residential development. Future, periodic updates to the Water System Development Impact Fee will re-evaluate the costs expended and future needs and costs to ensure that the Base Fee has not and does not exceed the estimated reasonable cost of providing appropriate capital improvement services.

Finding on the Administrative Component: The administrative cost portion of Water System Development Impact Fee (Administration Fee) does not exceed the estimated reasonable cost of providing the service for which the fee or charge is imposed. The Administration Fee funds City costs associated with fee program administration and implementation including collection and accounting, annual reporting, capital planning, periodic updates to the Water System Development Impact Fee, and other related costs.

2. Subsection (c): *A local agency receiving payment of a charge as specified in paragraph (3) of subdivision (b) shall deposit it in a separate capital facilities fund with other charges received, and account for the charges in a manner to avoid any commingling with other moneys of the local agency, except for investments, and shall expend those charges solely for the purposes for which the charges were collected. Any interest income earned from the investment of moneys in the capital facilities fund shall be deposited in that fund.*

Finding: The City of Sacramento and the Department of Utilities has the systems in place to ensure compliance with Subsection c in accordance with Generally Accepted Accounting Principles, the Government Accounting Standards Board best practices and Generally Accepted Auditing Standards.

3. <u>Subsection (d):</u> *For a fund established pursuant to subdivision (c), a local agency shall make available to the public, within 180 days after the last day of each fiscal year, the following information for that fiscal year:*

(1) A description of the charges deposited in the fund.

(2) The beginning and ending balance of the fund and the interest earned from investment of moneys in the fund.

(3) The amount of charges collected in that fiscal year.

(4) An identification of all of the following:

(A) Each public improvement on which charges were expended and the amount of the expenditure for each improvement, including the percentage of the total cost of the public improvement that was funded with those charges if more than one source of funding was used.

(B) Each public improvement on which charges were expended that was completed during that fiscal year.

(C) Each public improvement that is anticipated to be undertaken in the following fiscal year.

(5) A description of each interfund transfer or loan made from the capital facilities fund. The information provided, in the case of an interfund transfer, shall identify the public improvements on which the transferred moneys are, or will be, expended. The information, in the case of an interfund loan, shall include the date on which the loan will be repaid, and the rate of interest that the fund will receive on the loan.

<u>Finding:</u> The requirements of Subsection d are acknowledged and consistent with existing systems and practices.

3. The Separated Sewer System Utility

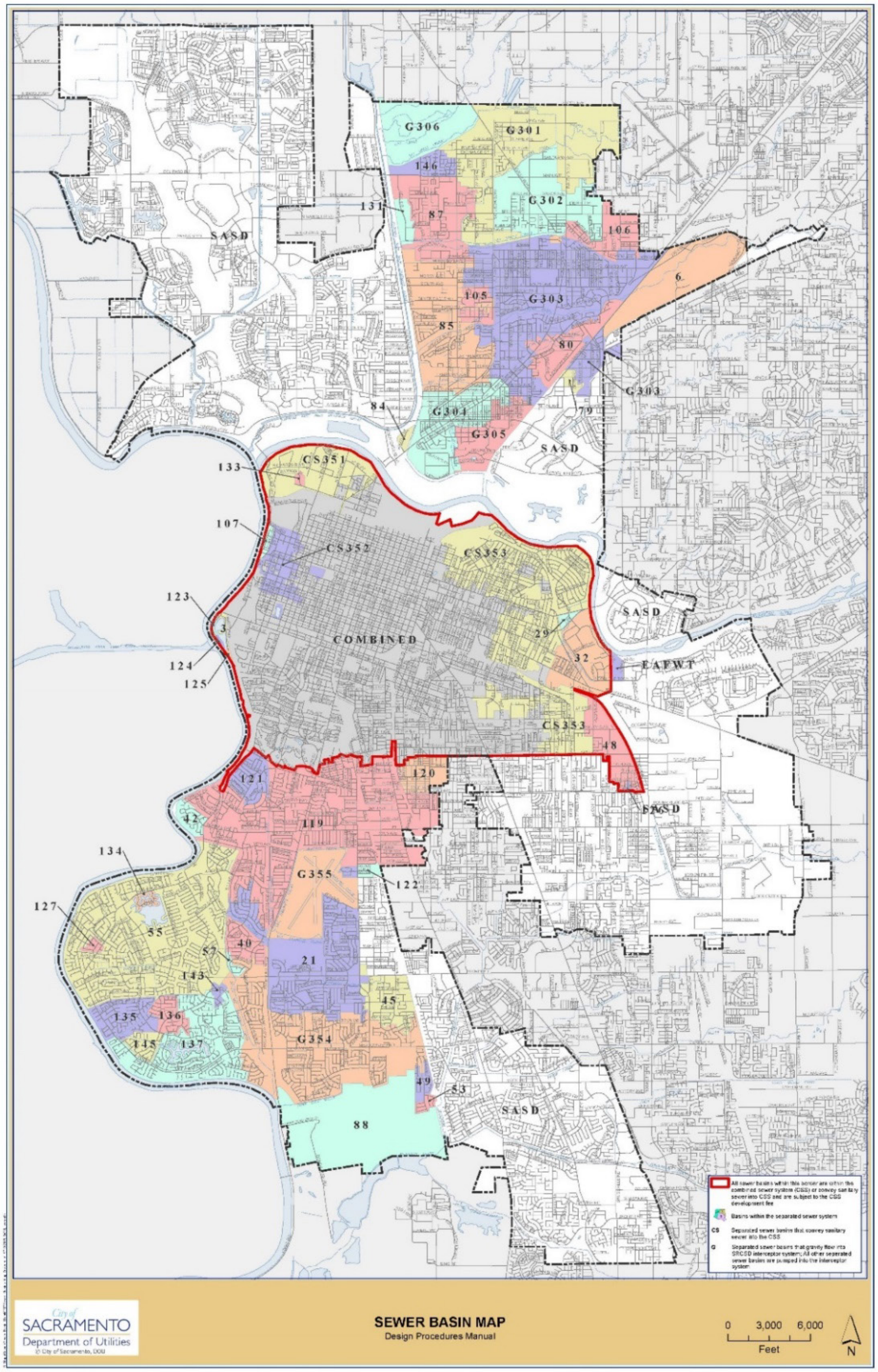
Introduction and Description

The Separated Sewer System (Separated System) provides wastewater services to approximately 50,600 commercial and residential properties located in the City. The Separated System includes approximately 813 miles of pipe and 32 wastewater pump stations in 40 sewer basins. This system is administered by DOU to provide safe and reliable collection and conveyance of wastewater and ensures the wastewater systems comply with all state and federal regulations.

The residential and commercial customers that receive service from the Separated System constitute approximately 33 percent of the total residential and commercial properties in the City. The balance is served by the City's Combined Sewer System or the Sacramento Area Sewer District (SASD), a separate entity not under control of the City. All of the effluent from the City systems and SASD are delivered to a regional treatment facility owned and operated by the Sacramento Regional County Sanitation District.

On the map below (**Figure 3-1**) the boundaries of the Separated System are the basins in color that are outside of the red line encircling the Combined Sewer System (labeled "Combined").

Figure 3-1. Separated Sewer System Utility Boundaries and Key System and Geographic Characteristics



Growth and Demand

For this study, the primary concern for the Separated System is the ability to accommodate growth through capacity improvements required for that growth. The existing system, in contrast, will be maintained and improved by existing rate payers. For new growth, an incremental approach to improvements is appropriate. Capital requirements for new growth are identified through a consistent methodology to evaluate the hydraulic capacity of infrastructure in each basin of the Separated System, termed the **Master Planning Dynamic Model (Dynamic Model)**. This process identifies improvements that will be needed to increase system capacity to accommodate projected sewer flows from new development. The infrastructure is of general benefit, or for use in common, and so excludes local collection lines. Also excluded are developments that are self-funding improvements through Mello-Roos districts or other funding agreements. The infrastructure that remains for this study is in basins without such agreements and includes pipes that serve relatively large tributary areas, manholes along backbone pipes, and pump stations.

The main driver to determine capital requirements is the projected new growth as of 2040 by each basin in the Separated System. The projections by land use are shown on **Table 3-1**.

Table 3-1. 2040 Projected Growth in Land Use

	Residential Units			Commercial and Other Square Feet in Thousands			
Basin	**Single Family Detached**	**Single Family Attached**	**Multifamily**	**Food and Retail**	**Office**	**Manufacturing and Other**	**Total Commercial [1]**
6	-	-	-	-	-	-	-
21	23	8	29	4	4	12	20
36	2	0	0	0	0	1	1
40	6	0	1	0	0	3	4
42	-	-	-	-	-	-	-
45	15	98	395	8	8	27	43
49	2	0	0	0	0	0	0
53	-	-	-	-	-	-	-
55	91	10	23	15	0	59	74
57	1	0	0	0	0	1	1
79	8	0	2	0	0	4	5
80	37	26	102	6	12	36	54
81	3	0	0	0	0	2	2
84	0	4	17	0	0	3	3
85	735	12	89	11	14	100	125
87	246	34	66	33	18	158	210
105	43	0	0	0	0	0	0
106	174	0	0	1	3	13	17
119	287	75	363	26	12	112	150
120	39	0	2	0	0	7	8
121	20	2	5	4	0	13	17
122	-	-	-	-	-	-	-
127	-	-	-	-	-	-	-
131	23	3	7	1	4	15	19
134	7	0	1	0	0	6	6
135	20	3	6	4	0	15	19
136	-	-	-	-	-	-	-
137	67	6	12	5	16	37	58
143	-	-	-	-	-	-	-
145	-	-	-	-	-	-	-
146	27	4	8	3	4	17	24
G301	380	28	64	80	63	637	780
G302	188	9	27	35	10	172	217
G303	631	108	354	92	44	358	494
G304	53	226	810	61	79	438	578
G305	53	83	312	74	125	211	410
G306	-	-	-	-	-	-	-
G354	279	165	582	25	12	63	99
G355	-	-	-	-	-	-	-
Totals	**3,460**	**904**	**3,277**	**486**	**428**	**2,523**	**3,437**

Sources: City of Sacramento Community Development Department and EPS *Separated_1*

Note:
[1] Totals may not add due to rounding.

There are 29 basins in the Separated System that are projected to have some level of growth and 10 basins that have no projected growth. The calculated fees will apply to all of these basins because actual growth will always vary from projected growth. Growth may occur in any of the basins and may require accommodation.

The common indicator of demand for wastewater services is Equivalent Standard Dwelling (ESD) or equivalent, where an ESD of 1 is the expectation of average sanitary flow from a single-family detached home using average daily winter water-use data. This data is used to factor the ESDs for any land use. The projection of growth for both residential units and nonresidential square feet by land use then determines the ESD demands by basin. In ESD terms, both the existing and new growth demands by basin are shown on **Table 3-2**.

Table 3-2. Existing and Projected Equivalent Standard Dwellings

Basin Number	Existing	Growth 2023-2040	2040 Land Use
6	145	-	145
21	4,326	67	4,393
36	115	2	117
40	553	8	561
42	222	-	222
45	1,437	400	1,837
49	251	2	253
53	175	-	175
55	9,692	144	9,836
57	119	1	120
79	126	11	137
80	2,369	153	2,522
81	29	4	33
84	8	16	24
85	3,750	692	4,442
87	2,614	398	3,012
105	545	100	645
106	787	154	941
119	9,650	642	10,292
120	905	45	950
121	649	42	691
122	110	-	110
127	94	-	94
131	362	36	398
134	153	10	163
135	962	34	996
136	570	-	570
137	4,043	110	4,153
143	103	-	103
145	587	-	587
146	575	45	620
G301	2,431	542	2,973
G302	1,032	436	1,468
G303	7,741	1,162	8,903
G304	2,482	1,006	3,488
G305	1,108	542	1,650
G306	Flood plain (no infrastructure)		-
G354	6,859	1,014	7,873
G355	Executive Airport (county maintained)		-
Totals	**67,681**	**7,818**	**75,499**
Share of 2040 ESDs	**90%**	**10%**	**100%**

Sources: *City of Sacramento DOU and Community Development Department and EPS.* *Separated_2*

Incremental Methodology and Fee per Equivalent Standard Dwelling

As noted above, DOU employs a consistent methodology to evaluate the hydraulic capacity of infrastructure. Both existing and future demand in each basin are evaluated to identify improvements that will be needed to increase system capacity to accommodate both existing and projected sewer flows. Improvements required for either the existing system or new growth can be isolated and identified by basin.

The methodology is maintained through the modelling of existing land uses, projected land uses, peak flows, existing and needed infrastructure, and costs. Recently, the model was refined with the introduction of variations in flows by time of day, along with other variations (e.g., flow regulators, parallel pipes, cycling of pumps, tailwater changes, and other items). The use of this “dynamic” hydraulic modeling allows for an improved alternative analysis to determine the recommended capacity improvements where benefits and costs for each alternative can be evaluated and compared efficiently. The current results of the modelling in terms of improvement costs are depicted on **Table 3-3**.

Table 3-3. System Value and Improvement Costs

Basin	Estimated Existing Value [2]	Improvements Required To Existing System	Improvements Required New Growth Only	2040 System Value
	funding:	*Existing Rate Payers*	*Future Growth*	
formula:	*a*	*b*	*c*	*d = a + b + c*
6	$2,788,513	-	-	$2,788,513
21	$110,542,909	-	-	$110,542,909
36	$2,723,943	-	-	$2,723,943
40	$14,969,841	-	-	$14,969,841
42	$8,103,581	-	-	$8,103,581
45	$21,646,974	$1,466,299	$300,867	$23,414,141
49	$5,950,988	-	-	$5,950,988
53	$6,928,764	-	-	$6,928,764
55	$204,051,780	$33,105,049	-	$237,156,829
57	$2,672,238	-	-	$2,672,238
79	$3,287,494	-	-	$3,287,494
80	$20,790,981	-	$4,012,490	$24,803,471
81	$1,080,586	-	-	$1,080,586
84	$2,359,483	-	-	$2,359,483
85	$78,882,442	$5,262,718	$588,644	$84,733,804
87	$45,242,858	$6,150,946	$30,548	$51,424,352
105	$7,644,179	-	-	$7,644,179
106	$18,651,957	$796,891	$237,994	$19,686,842
119	$250,984,661	$12,098,758	-	$263,083,419
120	$16,472,674	-	-	$16,472,674
121	$20,186,677	$1,141,364	-	$21,328,041
122	$3,564,001	-	-	$3,564,001
126	$1,200,980	-	-	$1,200,980
127	$3,360,372	-	-	$3,360,372
131	$3,300,596	-	-	$3,300,596
134	$3,640,660	-	-	$3,640,660
135	$26,203,942	-	-	$26,203,942
136	$15,231,501	-	-	$15,231,501
137	$87,165,355	$1,904,134	$145,815	$89,215,305
143	$2,389,704	-	-	$2,389,704
145	$10,910,560	-	-	$10,910,560
146	$14,242,145	-	-	$14,242,145
G301	$54,405,797	$1,783,252	$11,331,639	$67,520,689
G302	$23,313,834	$7,287,154	$2,978,144	$33,579,132
G303	$169,438,820	$3,463,134	$4,542,548	$177,444,502
G304	$52,967,474	$4,510,374	$1,235,754	$58,713,602
G305	$24,328,171	$498,192	$834,516	$25,660,879
G306	Flood plain (no infrastructure)		-	-
G354	$147,586,496	$7,022,097	$107,903	$154,716,496
G355	Ex. Airport	-	-	-
Totals	**$1,489,213,934**	**$86,490,363**	**$26,346,863**	**$1,602,051,159**

Source: *DOU* Separated_3

Notes:
[1] The main document initiating the methodolgy used is the Technical Memorandum, Department of Utilities, November 18, 2009, included in Appendix C-1.
[2] Estimated replacement value. Does not include depreciation or outstanding debt principal.

Only the New Growth costs, or $26,346,863, are being used to calculate a base fee for new growth. A sample of the improvements and costs for one basin are included as **Appendix C-2**. The base fee per ESD is shown on **Table 3-4**.
The new growth share of planning costs is calculated on **Table 3-5**.

Table 3-4. Improvement Cost per ESD

New Development Cost Allocation	Reference	*formula*	Cost
Improvement Cost to Serve Growth Only	Table 3	*a*	$26,346,863
Improvement Cost per ESD			
New Development ESDs	Table 2	*b*	7,818
Improvement Cost per ESD		*c = a / b*	**$3,370**

Sources: DOU and EPS *Separated_4*

Table 3-5. Cost per ESD with Planning Costs

Item	Reference	*formula*	Factors
2040 Existing and New ESDs [1]	Table 3-2	*a*	75,499
Master Planning Cost		*b*	$6,850,000
Master Planning Cost per ESD		*c = b / a*	$91
Improvement Cost per ESD	Table 3-4	*d*	$3,370
Total Cost per ESD		***e = c + d***	**$3,461**

Sources: DOU and EPS *Separated_5*
Notes:
[1] Planning costs are spread to all customers. The "non-fee funding requirement" amount is included on Table 3-7.

Planning costs involve ongoing hydraulic capacity analysis of peak flows associated with existing and projected land uses utilizing dynamic modeling approach. Hydraulic model results are utilized to assess alternative capital improvement projects to best address capacity issues for both existing and growth scenarios. Routine updates to flow input data and analysis are also conducted to ensure more accurate costing of capacity improvements to support growth. Planning costs of $6,850,000 are shared by existing and new development at a cost of $91 per ESD. The base and planning fee per ESD for new growth is $3,461.

The schedule of the fee by land use is shown on **Table 3-6**. A further detailed schedule is included as **Appendix C-3**.

Table 3-6. Development Impact Fee Schedule

	ESD	Factor	Cost per ESD	Cost by Land Use and Factor	Administrative Fee (3%)	Fee
Residential						
formula:	*a*		*b*	*c = a * b*	*d = c * .03*	*e = c + d*
Single Family Dwelling	1.00	per dwelling	$3,461	$3,461	$104	$3,565
Apartment	0.66	per dwelling	$3,461	$2,284	$69	$2,353
Hotel/Motel	0.43	per room	$3,461	$1,488	$45	$1,533
Duplex	0.83	per dwelling	$3,461	$2,873	$86	$2,959
College Dorm or Boarding House	0.4	per bed or resident	$3,461	$1,384	$42	$1,426
Nonresidential						
Retail	0.53	per 1,000 sq. ft.	$3,461	$1,834	$55	$1,889
Dine-in Restaurant	1.77	per 1,000 sq. ft.	$3,461	$6,126	$184	$6,310
Office (single story)	0.33	per 1,000 sq. ft.	$3,461	$1,142	$34	$1,176
Hospital	1.62	per bed	$3,461	$5,607	$168	$5,775
K-12 Schools	3.96	per 100 students	$3,461	$13,706	$411	$14,117
Heavy Industrial	0.30	per 1,000 sq. ft.	$3,461	$1,038	$31	$1,069
Colleges & Universities	0.76	per 1,000 sq. ft.	$3,461	$2,630	$79	$2,709
Church	0.22	per 1,000 square feet	$3,461	$761	$23	$784
Other Non-Residential	1.00	per 12,000 gal. (water/user/mo.)	$3,461	$3,461	$104	$3,565

Sources: DOU and EPS *Separated_6*

The following **Table 3-7** is informational only and calculates the total cost of improvements by 2040 to improve the existing system and to mitigate the impacts of new growth.

Table 3-7. 2040 Estimated Capital Requirements

		Reference	Costs
Total Funding Requirement	*Formula*		
Improvements to Accommodate New Growth	a	Table 3.3	$26,346,863
Improvements to the Existing System	b	Table 3.3	$86,490,363
Master Planning Costs	c	Table 3.5	$6,850,000
Total Funding Required	**d = a + b + c**		**$119,687,225**
Funding Elements			
Development Impact Fee			
New Growth ESDs	e	Table 3.2	7,818
Cost per ESD	f	Table 3.5	$3,461
Development Impact Fee Revenue	**g = e * f**		**$27,058,301**
Non-Fee Revenue Requirement			
Total Funding Required	d		$119,687,225
Non-Fee Revenue Requirement	**h = d - g**		**$92,628,924**

Sources: DOU and EPS *Separated_7*

Comparison with Surrounding Communities

The comparison of the Separated Sewer fee with surrounding jurisdictions is shown on **Table 3-8**. The table includes a single-family land use and office and retail uses on a per 1,000 square foot basis and the same land uses on a per acre basis. Complete comparative information in chart form is presented as **Appendix C-4**, and high-level summaries are in **Chapter 1**, the **Executive Summary**.

Table 3-8. Fee Comparisons

	Site Area			Per Acre		
Jurisdiction [1]	Single Family	Retail	Office	Single Family [2]	Retail	Office
	per unit	*per 1,000 sq. ft. [3]*				
Sacramento	**$3,565**	**$1,889**	**$1,176**	**$24,954**	**$20,575**	**$17,935**
Sacramento County - Uninc.	$3,194	$2,053	$1,467	$22,360	$22,360	$22,360
Folsom	$1,073	$316	$226	$7,511	$3,438	$3,438
Roseville	$447	$149	$149	$3,129	$1,623	$2,272
West Sacramento	$7,011	$2,078	$2,078	$49,077	$22,629	$31,681
Woodland	$7,125	$2,908	$1,744	$49,875	$31,668	$26,589
Average Excluding Sacramento	**$3,770**	**$1,501**	**$1,133**	**$26,390**	**$16,344**	**$17,268**
Sacramento +/- Percent [3]	**-5%**	**26%**	**4%**	**-5%**	**26%**	**4%**

Source: EPS *Separated_8*

Note:
[1] Does not include regional sewer fees. See table sets 1.5 and 1.6 in the Executive Summary and Appendix A-2 for comparative details that include regional sewer fees.
[2] Based on 7 units per acre.
[3] Comparisons for Retail and Office land uses are based on the assumption of a 1-acre parcel with a structure covering 25 percent of the parcel (i.e., a F.A.R of .25) for Retail, and 35 percent for Office. This construct is for comparative purposes only.

The proposed fee in Sacramento appears high for retail because of very low fees in Roseville and Folsom.

Nexus Findings

For the Separated Sewer System Utility, this section addresses the following requirements of the Mitigation Fee Act (California Government Code section 66000 et seq.).

Per California Government Code Section 66001

1. Identify the purpose of the fee.
2. Identify how the fee is to be used.
3. Determine how a reasonable relationship exists between the fee's use and the type of development project on which the fee is imposed.
4. Determine how a reasonable relationship exists between the need for the facility and the type of development project on which the fee is imposed.
5. Demonstrate a reasonable relationship between the amount of the fee and the cost of the facility or portion of the facility attributable to the development on which the fee is impose.

The Separated Sewer System Development Impact Fee applies to all development in the service area in proportion to the measured expectation of sanitary sewer flow by land use type.

<u>1. Purpose of the Fee</u>

The purpose of the Separated Sewer System Development Impact Fee is to fund capacity improvements to accommodate projected new residential and non-residential development as detailed in **Chapter 3**.

<u>2. Use of Fee</u>

The Separated Sewer System Development Impact Fee will be used to fund sewer facilities needed to convey sanitary sewage generated by development in the service area to trunk lines for the regional treatment facility owned and operated by the Sacramento Regional County Sanitation District.

<u>3. Reasonable Relationship between Use of Fee and Type of Development on Which the Fee is Imposed</u>

The Separated Sewer System Development Impact Fee varies by development type based on measured expectation of sanitary sewer flows by development type. This proportional fee will be used to fund sanitary sewer facilities identified in **Chapter 3, Appendix C** and as set forth in the **Dynamic Model** (included by reference herein), which are designed to accommodate expected sanitary flows from new residential and nonresidential development in all basins with projected growth.

A reasonable relationship therefore exists between the use of the Separated Sewer System Development Impact Fee and the type of development on which the fee is imposed.

4. Reasonable Relationship between Need for Facility and Type of Project on Which the Fee is Imposed

New residential and nonresidential projects in the service area are required to connect to the City's sewer system. New residents, employees, and patrons of the new developments will generate increased sewer flows. Sewer facilities needed to accommodate this demand were determined based on the modelling of sewage generated by projected residential and nonresidential development by basin as set forth in **Chapter 3**, **Appendix C** and the **Dynamic Model**.

A reasonable relationship therefore exists between the need for sanitary sewer facilities and new residential and nonresidential development projects on which the Separated Sewer System Development Impact Fee is imposed because the portion of sewer facilities funded by the Separated Sewer System Development Impact Fee is based on the amount of sewage generated by projected residential and non-residential development.

5. Reasonable Relationship between Amount of Fee and Cost of Facilities or Portion of Facilities Attributed to Development on Which Fee is Imposed

The total cost of sanitary sewer facilities funded by the Separated Sewer System Development Impact Fee is allocated amongst the projected new residential and nonresidential land uses in the service area based on the proportional demand each land use is anticipated to generate for the sanitary sewer facilities. The cost of sanitary sewer facilities is allocated to residential and nonresidential land uses based on the estimated proportionate demand each land use is anticipated to generate for the facilities. Demand for sewer facilities is measured by sewage generation rates for each land use category.

A reasonable relationship therefore exists between the amount of the Separated Sewer System Development Impact Fee and the cost of the sanitary sewer facilities attributed to the residential and nonresidential development on which the fee is imposed because the costs are allocated based on the demand generated by new development for sanitary sewer facilities as measured by the sewage generated by each development type.

Per California Government Code Section 66013

1. Subsection (a): *Notwithstanding any other provision of law, when a local agency imposes fees for water connections or sewer connections, or imposes capacity charges, those fees or charges shall not exceed the estimated reasonable cost of providing the service for which the fee or charge is imposed, unless a question regarding the amount of the fee or charge imposed in excess of the estimated reasonable cost of providing the services or materials is submitted to, and approved by, a popular vote of two-thirds of those electors voting on the issue.*

Finding on the Base Fee: The Separated Sewer System Development Impact Fee for capital improvements (Base Fee) does not exceed the estimated reasonable cost of providing the service for which the fee or charge is imposed. Costs are estimated for new facilities necessary to accommodate the demand created by modelled sewer flows from new residential and non-residential development by location and land use type.

Finding on the Administrative Component: The administrative cost portion of Separated Sewer System Development Impact Fee (Administration Fee) does not exceed the estimated reasonable cost of providing the service for which the fee or charge is imposed. The Administration Fee funds City costs associated with fee program administration and implementation including collection and accounting, annual reporting, capital planning, periodic updates to the Separated Sewer System Development Impact Fee, and other related costs.

2. Subsection (c): *A local agency receiving payment of a charge as specified in paragraph (3) of subdivision (b) shall deposit it in a separate capital facilities fund with other charges received, and account for the charges in a manner to avoid any commingling with other moneys of the local agency, except for investments, and shall expend those charges solely for the purposes for which the charges were collected. Any interest income earned from the investment of moneys in the capital facilities fund shall be deposited in that fund.*

Finding: The City of Sacramento and the Department of Utilities has the systems in place to ensure compliance with Subsection c in accordance with Generally Accepted Accounting Principles, the Government Accounting Standards Board best practices and Generally Accepted Auditing Standards.

3. Subsection (d): *For a fund established pursuant to subdivision (c), a local agency shall make available to the public, within 180 days after the last day of each fiscal year, the following information for that fiscal year:*

(1) A description of the charges deposited in the fund.

(2) The beginning and ending balance of the fund and the interest earned from investment of moneys in the fund.

(3) The amount of charges collected in that fiscal year.

(4) An identification of all of the following:

(A) Each public improvement on which charges were expended and the amount of the expenditure for each improvement, including the percentage of the total cost of the public improvement that was funded with those charges if more than one source of funding was used.

(B) Each public improvement on which charges were expended that was completed during that fiscal year.

(C) Each public improvement that is anticipated to be undertaken in the following fiscal year.

(5) A description of each interfund transfer or loan made from the capital facilities fund. The information provided, in the case of an interfund transfer, shall identify the public improvements on which the transferred moneys are, or will be, expended. The information, in the case of an interfund loan, shall include the date on which the loan will be repaid, and the rate of interest that the fund will receive on the loan.

Finding: The requirements of Subsection d are acknowledged and consistent with existing systems and practices.

4. The Combined Sewer System Utility

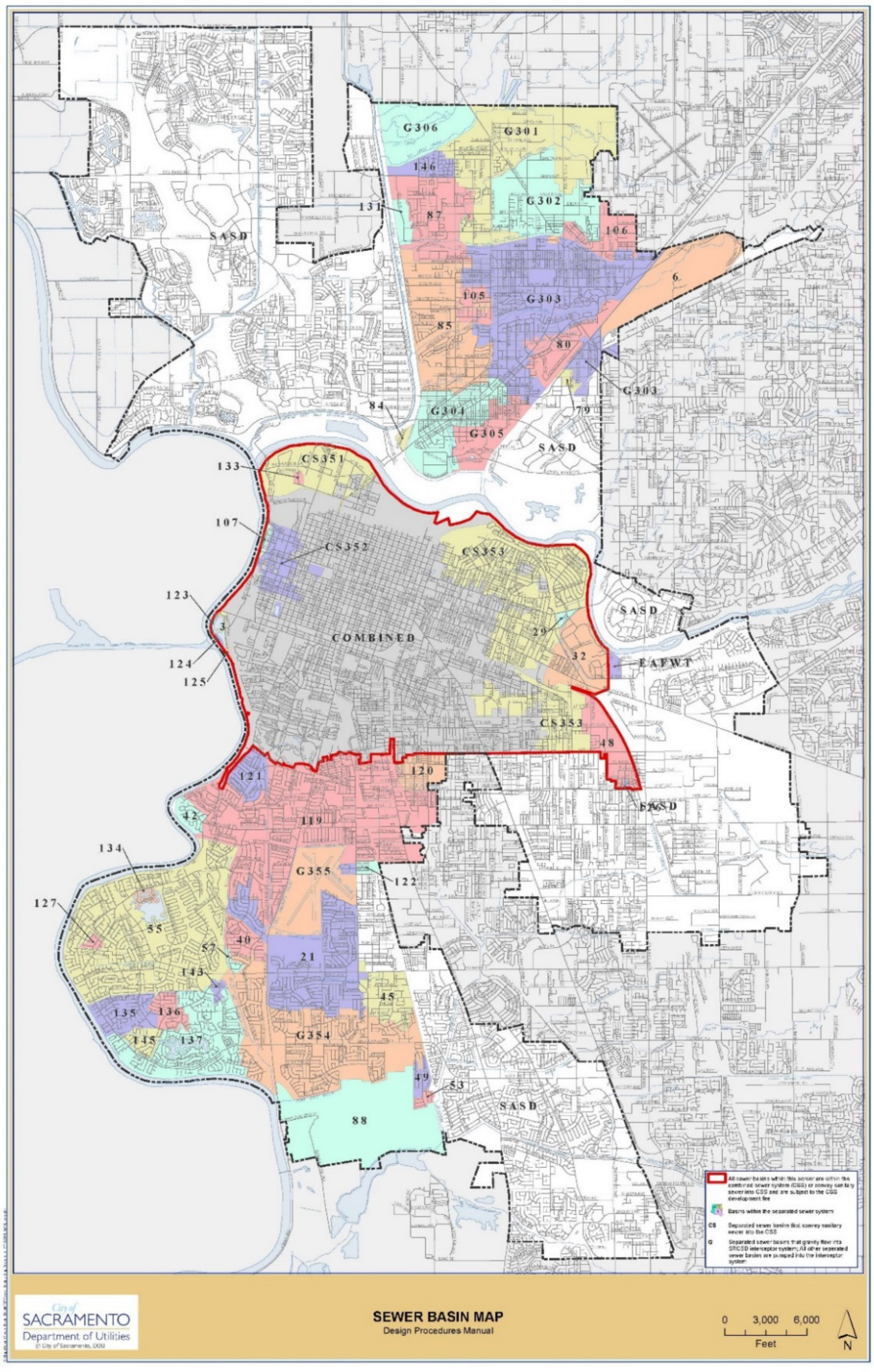
Introduction and Description

The Combined Sewer System Utility (CSS) provides wastewater and drainage services to approximately 34,000 commercial and residential properties located in the City. The CSS includes approximately 443 miles of pipe and 15 wastewater pump stations in 14 combined sewer basins. There are also 4 storage facilities, 2 of which also function as pump stations, and are included in the 15 pump stations noted above. The CSS includes treatment facilities that are used during significant wet-weather events. This system is administered by DOU to provide safe and reliable collection and conveyance of wastewater and to ensure the wastewater systems comply with all state and federal regulations.

The residential and commercial customers that receive service from the CSS constitute approximately 23 percent of the total residential and commercial customers in the City. The balance is served by the City's Separated Sewer System (discussed in **Chapter 3**) or the SASD, a separate entity not under control of the City. All of the effluent from the City systems and SASD are delivered to a regional treatment facility owned and operated by the Sacramento Regional County Sanitation District.

On the map below (**Figure 4-1**), the boundaries of the CSS are within the red line, labeled "Combined".

Figure 4-1. Combined Sewer System Utility Boundaries and Key System and Geographic Characteristics



Growth and Demand

Because the CSS mixes storm runoff and wastewater, the primary concern is to protect public health. In a storm event, the capacity of the system may be exceeded, causing outflows to the streets and overflows to the Sacramento River. Storage allows the mix of drainage and wastewater to be held for later release when the system has the capacity to deliver the flow to the regional treatment facility.

To manage the CSS, the City uses a variety of methods to increase storage capacity to minimize the frequency and severity of outflows. As growth occurs, the primary means to increase storage capacity is to enlarge pipes for in-line storage. Funding is secured through development impact fees for that purpose, or if a larger, areawide storage project is desired, the capacity required is secured through agreements.

For new growth, because the CSS manages a mix of wastewater and drainage runoff, both impacts of sewer flow and drainage must be measured to calculate the storage requirements for each new development. For in-line storage and the supporting fees, the demand for capacity is per project and is calculated on the following two demand indicators and associated demand factors:

- For wastewater, the demand indicator is ESD, where an ESD of 1 is the expectation of average sanitary flow from a single-family detached home using average daily winter water-use data. This data is used to factor the ESD expectation for any land use.
- For drainage runoff, the demand indicator is new impermeable surface acres, or square feet. The factor is the total in a new development.

As will be discussed in more detail below, there is an interaction between the two impacts of wastewater flow and drainage runoff. This is to ensure that a standard for runoff storage of 7,600 cubic feet per acre is met by a development regardless of the development's configuration of ESDs and new impermeable surface.
In effect, the storage required for wastewater mitigates a portion of the storage required for drainage, and vice-versa. Depending on a development's configuration, a development subject to a wastewater impact fee may not also require a drainage fee, or both fees may be necessary to meet the storage requirement.

Incremental Methodology and Cost per Equivalent Standard Dwelling and Impermeable Square Foot

The capital improvements required by the demands are incremental enlargements of piping to provide the storage capacity required on a per project basis. The calculation to determine the storage requirement and the cost per ESD and per impermeable square foot is shown on **Table 4-1**.

Table 4-1. Equivalent Standard Dwelling and New Impermeable Surface Storage Requirements and Costs

	formula	Factor
A. Sewerage		
Storage Capacity Requirement Per ESD [1]		
City Sanitary Sewage Standard (Gal./ESD) [2]	*a*	310
Maximum Sewer Generation Ratio [3]	*b*	0.401
Maximum Sewer Flow	*c = a * b*	124
Average Dilution Ratio [4]	*d*	0.067
Gallons per ESD of Storage Capacity Needed	***e = c / d***	**1,851**
Storage Cost Per ESD		
Per Foot of Pipe		
Required 48" New In-Line Storage Cost per Foot	*f*	$580
Existing 18" In-Line Storage Replacement Cost per Foot	*g*	$257
Net Cost of Required Pipe per Foot	***h = f - g***	**$323**
Per Cubic Foot of Pipe		
48" Pipe	*i*	12.56
18" Pipe	*j*	1.76
Net Cubic Feet of Required Pipe per Foot	*k = i - j*	10.80
Cost per Cubic Foot	***l = h / k***	**$29.93**
Required Storage Capacity and Cost per ESD		
Gallons of Storage Capacity Needed per ESD	*m = e*	1,851
Cubic Feet per Gallon	*n*	0.133681
Cubic Feet of Storage Capacity Needed per ESD	*o = m * n*	247.41
Cost per Cubic Foot	*l*	$29.93
Storage Capacity Cost per ESD	***p = o * l***	**$7,406**
B. Drainage		
New Impervious Surface Requirement and Cost Per Square Foot		
Storage Requirement per Acre (cu. ft.) [5]	*q*	7,600
Cost per Cubic Foot	*h*	$29.93
Cost Per Impervious Acre	*r = h * q*	$227,496
Cost Per Impervious Square Foot	***s = r / 43,560***	**$5.22**

Source: DOU *Combined_1*

Notes:

[1] The InfoWorks ICM Model determines maximum percentage of daily sanitary sewage generation expected during the height of a 10-year, 6-hour storm event.

[2] The current City of Sacramento Design and Procedures Manual, Section 9.4.7.

[3] The InfoWorks ICM Model estimates that the average flooding duration at areas with the worst outflows is approximately 7.2 hours. Based on the diurnal curve created from wastewater flow data in the combined sewer system, the maximum sewer generation during a 7.2 hour period is 40.1% of the total daily flow.

[4] Source files: City of Sacramento, InfoWorks ICM Model.

[5] The current Onsite Design Manual, Figure 10 storage requirement for detention in a 100-year storm event.

As can be seen in **Table 4-1**, each ESD requires the creation of 1,855 gallons for storage. With a full pipe, and after applying the dilution ratio (the letter "d" in the formula), that storage will be composed of 124.3 gallons of wastewater, and 1,731 gallons of drainage. The drainage mitigated of 1,731 gallons, or 231.4 cubic feet, can be used for the required drainage mitigation that comes from increasing the impervious area of the site being developed. This requirement is 7,600 cubic feet per acre of new impermeable surface. In square foot terms, 1,326.3 square feet of new impermeable surface is mitigated by one ESD [i.e., 1,326.3=(231.4/43,560)*7,600].

It is possible for a development with enough ESDs relative to its parcel size to satisfy the drainage storage requirement from the drainage storage created by mitigating for ESDs. Examples of a range of developments are shown on **Table 4-2**.

Table 4-2. Capacity Requirements Examples

	Formula	Examples 1	2	3	4
ESDs	*a*	1	6	60	250
New Impermeable Acreage	*b*	0.125	0.5	2	4
Required Mitigation in Cu. Ft.	*c = b * 7,600 cu.ft./acre*	950	3,800	15,200	30,400
Required Mitigation in Sq. Ft.	*d = (c / 7,600) * 43,560)*	5,445	21,780	87,120	174,240
Drainage Storage Mitigated by ESD Mitigation					
Drainage Mitigated in Cu. Ft.	*e = a * 231.4 cu.ft.*	231.4	1,388.4	13,884.0	57,850.0
Drainage Mitigated in Sq. Ft.	*f = (e / 7,600) * 43,560)*	1,326.3	7,957.7	79,577.2	331,571.8
Remaining Required Mitigation and Fee					
In Cubic Feet	*g = c - e cu.ft.*	718.6	2,411.6	1,316.0	(27,450.0)
In Square Feet	*h = d - f sq.ft.*	4,118.7	13,822.3	7,542.8	(157,331.8)
Sewer Fee		yes	yes	yes	yes
Drainage Fee		yes	yes	yes	none

Sources: DOU and EPS. *Combined_2*

Example number 4, with 250 ESDs on 4 acres, would satisfy the drainage requirement through ESDs alone. The drainage fee would be fully credited. The other examples would pay reduced drainage fees based on the drainage mitigated through the ESDs. These same examples are presented in dollar terms on **Table 4-6** later in this chapter, below the discussion of the fees.

Planning costs are being employed to help defray the cost of capacity improvements. These costs are being shared on a proportional basis between new growth and existing customers in accordance with the existing customer base by land use and the projected growth by land use in 2040.

The calculation of proportional shares is shown on **Table 4-3**. The allocation of planning costs to existing and new growth and the cost per ESD is shown on **Table 4-4**. Planning costs of $511,000 are shared by existing and new development at a cost of $7 per ESD. The base and planning fee per ESD for new growth is $7,413. The schedule of the fee by land use is shown on **Table 4-5**. A further detailed schedule is included as **Appendix D-1**.

Table 4-3. New and Existing ESDs

Residential

Units		2017 Units (Units)	2022 Units (Units)	2040 Units (Units)	Unit Growth (Units)	ESD Factors (ESDs)	Existing ESDs (ESDs)	ESD Growth (ESDs)
	formula:		*a*	*b*	*c = b - a*	*d*	*e = a * d*	*f = c * d*
Single Family Detached		12,327	12,357	12,646	289	1	12,357	289
Single Family Attached		4,417	4,724	10,981	6,257	0.5	2,362	3,129
Multifamily		23,648	28,244	53,118	24,874	0.5	14,122	12,437
Totals		**40,392**	**45,325**	**76,745**	**31,420**		**28,841**	**15,855**

Non-Residential

Employment	Square Feet per Employee	2017 Units (Units)	2022 Units (Units)	2040 Units (Units)	Unit Growth (Units)	ESD Factors (ESDs)	Existing ESDs (ESDs)	ESD Growth (ESDs)
formula:		*a*	*d*	*f*	*h = f - d*			
Retail/Food		23,313	23,494	28,329	4,835			
Office		199,822	200,023	217,489	17,466			
Manufacturing/Other		38,211	39,188	57,670	18,482			
Totals		**261,346**	**262,705**	**303,488**	**40,783**			
Square Feet (in 1,000s)								
formula:	*b*	*c = (a * b) / 1000*	*e = (d * b) / 1000*	*g = (f * b) / 1000*	*i = g - e*	*j*	*k = e * j*	*l = I * j*
Retail/Food [1]	500	11,657	11,747	14,165	2,418	0.25	2,937	605
Office	200	39,964	40,005	43,498	3,493	0.5	20,003	1,747
Manufacturing/Other [2}	500	19,105	19,594	28,835	9,241	0.25	4,899	2,310
Totals		**70,726**	**71,346**	**86,498**	**15,152**		**27,838**	**4,661**
ESD Totals							**56,679**	**20,516**

Sources: DOU and EPS *Combined_3*

Notes:
[1] Weighted average of Retail and Food land uses.
[2] Weighted average of Educational, Medical, Services and Industrial land uses.

Table 4-4. Cost per ESD with Planning Costs

	Reference	*Formula*	**Factors**
2022 Existing ESDs	*Table 4.3*	*a*	56,679
2040 New ESDs	*Table 4.3*	*b*	20,516
2040 Total ESDs		*c = a + b*	77,195
Master Planning Cost		*d*	$511,000
Master Planning Cost per ESD		*e = d / c*	$7
Storage Capacity Cost per ESD	*Table 4.1*	*f*	$7,406
Total Cost per ESD		***g = e + f***	**$7,413**

Sources: DOU and EPS *Combined_4*

Table 4-5. Development Impact Fee Schedule—Sewerage and Drainage

By Land Use	ESD	Factor	Cost per ESD	Cost by Land Use and Factor	Administrative Fee (3%)	Fee
Formula:	*a*		*b*	*c = a * b*	*d = c * 3%*	*e = c + d*
Sewerage						
Residential						
Single Family Detached	1.00	per dwelling	$7,413	$7,413	$222	**$7,635**
Apartment	0.66	per dwelling	$7,413	$4,893	$147	**$5,039**
Hotel/Motel	0.43	per room	$7,413	$3,188	$96	**$3,283**
Single Famity Attached, Duplex, Triplex, Quadplex and Similar	0.83	per dwelling	$7,413	$6,153	$185	**$6,337**
College Dorm or Boarding House	0.4	per bed or resident	$7,413	$2,965	$89	**$3,054**
Nonresidential						
Retail	0.53	per 1,000 sq. ft.	$7,413	$3,929	$118	**$4,047**
Dine-in Restaurant	1.77	per 1,000 sq. ft.	$7,413	$13,121	$394	**$13,515**
Office (single story)	0.33	per 1,000 sq. ft.	$7,413	$2,446	$73	**$2,520**
Hospital	1.62	per bed	$7,413	$12,009	$360	**$12,369**
K-12 Schools	3.96	per 100 students	$7,413	$29,355	$881	**$30,236**
Heavy Industrial	0.30	per 1,000 sq. ft.	$7,413	$2,224	$67	**$2,291**
Colleges & Universities	0.76	per 1,000 sq. ft.	$7,413	$5,634	$169	**$5,803**
Church	0.22	per 1,000 square feet	$7,413	$1,631	$49	**$1,680**
Other Non-Residential	1.00	per 12,000 gal. (water/user/mo.)	$7,413	$7,413	$222	**$7,635**
Drainage						
New Impervious Surface Cost per Square Foot - All Land Uses				$5.22	$0.16	**$5.38**

Sources: DOU and EPS Combined_5

Note:
[1] See the report text for an explanation of the interaction between the sewer fee and the drainage fee.

If the sewer fee is charged first on a project, the drainage fee is reduced or is not applied, depending on a project's configuration. A few examples are shown on **Table 4-6**.

Table 4-6. Fee Examples

	Formula	Examples 1	2	3	4
ESDs	*a*	1	6	60	250
New Impermeable Acres	*b*	0.125	0.5	2	4
New Impermeable Sq. Ft.	*c = b * a*	5,445	21,780	87,120	174,240
Sewer Fee per ESD	*d*	$7,635	$7,635	$7,635	$7,635
Drainage fee per Sq. Ft.	*e*	$5.38	$5.38	$5.38	$5.38
Sewer Fee	*f = a * d*	$7,635	$45,812	$458,123	$1,908,848
Drainage Fee	*g = c * e*	$29,290	$117,161	$468,642	$937,284
Drainage Credit	*h = See Note [1]*	($7,134)	($42,807)	($428,068)	($937,284)
Total Fee	***i = e + f - g***	**$29,791**	**$120,166**	**$498,698**	**$1,908,848**

Sources: DOU and EPS. *Combined_6*

Note:
[1] This is the value in drainage fees of the drainage mitigated by the sewer fee. The percent of the 7,600/acre standard for storage mitigated by ESDs (231.4 cu.ft./ESD) is converted to the land square feet mitigated (see Tables 4.1 and 4.2) and multiplied by the drainage fee per square foot. Credit is applied up to the full value of the drainage fee.

Drainage fees could be charged first, in which case, the relationships are reversed with the same cost outcome.

Table 4-7 is informational only and calculates the total cost of improvements by 2040 to mitigate the sewer impacts of new growth.

Table 4-7. 2040 Sewer Improvement Costs and Revenue at Buildout

	reference	*formula*	**Factors**
Total Cost per ESD	*Table 4.4*	*a*	$7,413
Total New 2040 ESDs	*Table 4.3*	*b*	20,516
Improvement Costs and Revenue with Buildout		***c = a * b***	**$152,083,255**

Sources: DOU and EPS Combined_7

Also for informational purposes, **Table 4-8** shows a forecast of the typical method to determine new impermeable surfaces.

Table 4-8. Vacant Acres and Impervious Surface

Maximum Impervious Surface

Land Use	Parcels	Acres	Impervious Surface Coeffient (ISC)	Impervious Surface Buildout Acres	Impervious Surface Buildout Square Feet
	formula:	*a*	*b*	*c = a * b*	*d = c * 43,560*
Industrial	174	180	85%	153	6,672,007
Irregular/Waste	207	39	90%	35	1,523,153
Office	94	73	90%	66	2,862,779
Public [1]	43	18	90%	16	697,562
Recreation [2]	4	9	5%	0	19,639
Residential	557	177	50%	89	3,860,476
Retail/Commercial	176	112	90%	101	4,409,061
Totals	**1,255**	**609**		**460**	**20,044,678**

Sources: DOU and EPS Combined_8

Notes:
[1] The Number of Parcels, and Area values for the "Public" landuse are left unchanged from the 2015 update.
[2] Recreation has had one parcel removed from the calculations, a 109 acre parcel in the railyards area. This area has had its area distributed to the office, residential, public, and retail land use calculations.

A standard expectation would be construction costs and revenue to approximate $105 million at $5.22 per square foot in the CSS service area. But as shown above, the drainage mitigation provided by the development of ESDs reduces or eliminates a drainage mitigation requirement.

Comparison with Surrounding Communities

The comparison of the CSS with surrounding jurisdictions is shown on **Table 4-9**. The table is for the sewer fee only and includes a single-family land use and office and retail uses on a per 1,000 square foot basis and the same land uses on a per acre basis. Complete comparative information in chart form is presented as **Appendix D-2**, and high-level summaries are in **Chapter 1**, the **Executive Summary**.

Table 4-9. Fee Comparisons

Jurisdiction [1]	Site Area Single Family	 Retail	 Office	Per Acre Single Family [2]	 Retail	 Office
	per unit	*per 1,000 sq. ft. [3]*				
Sacramento	**$7,635**	**$4,047**	**$2,520**	**$53,448**	**$44,069**	**$38,415**
Sacramento County - Uninc.	$3,194	$2,053	$1,467	$22,360	$22,360	$22,360
Folsom	$1,073	$316	$226	$7,511	$3,438	$3,438
Roseville	$447	$149	$149	$3,129	$1,623	$2,272
West Sacramento	$7,011	$2,078	$2,078	$49,077	$22,629	$31,681
Woodland	$7,125	$2,908	$1,744	$49,875	$31,668	$26,589
Average Excluding Sacramento	**$3,770**	**$1,501**	**$1,133**	**$26,390**	**$16,344**	**$17,268**
Sacramento +/- Percent [3]	**103%**	**170%**	**122%**	**103%**	**170%**	**122%**

Source: EPS *Combined_9*

Note:
[1] Does not include regional sewer fees. See table sets 1.5 and 1.6 in the Executive Summary and Appendix A-2 for comparative details that include regional sewer fees.
[2] Based on 7 units per acre.
[3] Comparisons for Retail and Office land uses are based on the assumption of a 1-acre parcel with a structure covering 25 percent of the parcel (i.e., a F.A.R of .25) for Retail, and 35 percent for Office. This construct is for comparative purposes only.

Importantly, a comparative table for the drainage element of the fee cannot be made because of the credit system in Sacramento. Typically, drainage fees are for all new impermeable surface, including buildings. In Sacramento, direct credits are given for drainage mitigation as a result of the sewer mitigation required for new ESDs. No jurisdiction in the area has a comparable system of any magnitude.

The proposed fees are the highest in the region because of the realities of a combined system: a high storage requirement to mitigate the health risks of the combined wastewater and drainage flows from the system.

Nexus Findings

For the Combined Sewer System Utility (CSS), this section addresses the following requirements of the Mitigation Fee Act (California Government Code section 66000 et seq.) as it relates to the Combined Sewer System Utility and as discussed in **Chapter 4**, which is incorporated here by reference.

Per California Government Code Section 66001

1. Identify the purpose of the fee.
2. Identify how the fee is to be used.
3. Determine how a reasonable relationship exists between the fee's use and the type of development project on which the fee is imposed.

4. Determine how a reasonable relationship exists between the need for the facility and the type of development project on which the fee is imposed.

5. Demonstrate a reasonable relationship between the amount of the fee and the cost of the facility or portion of the facility attributable to the development on which the fee is impose.

The Combined Sewer System Development Impact Fee includes two fees, one for sewer and one for runoff, and applies to all development in the service area. The sewer fee is in proportion to the measured expectation of sanitary sewer flow by land use type. The drainage portion is in proportion to new impermeable square footage and applies only if drainage is not mitigated by the sewer fee as explained below and in **Chapter 4**.

1. Purpose of the Fee

The purpose of the Combined Sewer System Development Impact Fee is to fund capacity improvements to accommodate projected new residential and non-residential development as detailed in **Chapter 4.**

2. Use of Fee

The Combined Sewer System Development Impact Fee will be used to fund sewer pipe capacity or equivalent improvements to convey and store sanitary sewage and drainage runoff generated by development in the service area to mitigate the risk of river, roadway and property contamination during storm events. Release of this combined storage is timed to coincide with available capacity for discharge to trunk lines connected to the regional treatment facility, which is owned and operated by the Sacramento Regional County Sanitation District.

3. Reasonable Relationship between Use of Fee and Type of Development on Which the Fee is Imposed

The Combined Sewer System Development Impact Fee varies by development type and parcel size. Development in the CSS typically creates net-new sewer flows and net-new impermeable surfaces, both of which impact the CSS. Because sewer and runoff mix in the CSS and require the same storage medium (48” in-line pipes), mitigated sewer flows also mitigate a measured volume of storm-event runoff. Please see **Table 4-1 in Chapter 4** for detailed calculations and discussion of these interactions. The Combined Sewer System Development Impact Fee takes these interactions into account by development type and parcel size in the calculation of the fee.

Sewer generation rates by land-use type are measured for typical flows by way of an index termed Equivalent Dwelling Unit (EDU) where the typical single-family home has a EDU of one. The sewer portion of the Combined Sewer System Development Impact Fee is a per EDU fee and is the cost to mitigate the impact of each EDU. A proposed development in the CSS will include the land-use type(s) and the required sewer EDUs and a measure of new impermeable surfaces on the parcel(s) involved. If the mitigation required for runoff is less than the runoff mitigation provided by the required EDUs, only the sewer portion of the Combined Sewer System Development Impact Fee applies. If drainage remains to be mitigated, the drainage portion of the Combined Sewer System Development Impact Fee is applied to the unmitigated portion on a per square foot basis. The fee is the cost of storage, using the same storage medium, to satisfy the established standard for runoff mitigation in the CSS to minimize the risks of contamination from storm events.

A reasonable relationship therefore exists between the use of the Combined Sewer System Development Impact Fee and the type of development on which the fee is imposed.

4. Reasonable Relationship between Need for Facility and Type of Project on Which the Fee is Imposed

New residential and nonresidential projects in the service area are required to connect to the CSS system. New residents, employees, and patrons of the new developments will generate increased sewer and drainage flows. Storage needed to accommodate this demand were determined based on the modelling of sewage and storm water runoff generated by existing and projected residential and nonresidential development.

A reasonable relationship therefore exists between the need for CSS storage facilities and new residential and nonresidential development projects on which the Combined Sewer System Development Impact Fee is imposed because the portion of storage facilities funded by the Combined Sewer System Development Impact Fee is based on the amount of sewage and runoff generated by projected residential and non-residential development.

5. Reasonable Relationship between Amount of Fee and Cost of Facilities or Portion of Facilities Attributed to Development on Which Fee is Imposed

The Combined Sewer System Development Impact Fee is the cost of storage capacity. The cost is allocated amongst the projected new residential and nonresidential land uses in the service area based on the proportional demand each development is anticipated to generate for storage capacity.

A reasonable relationship therefore exists between the amount of the Combined Sewer System Development Impact Fee and the cost of the sanitary sewer facilities attributed to the residential and nonresidential development on which the fee is imposed because the costs are allocated based on the demand generated by new development for storage capacity as measured by the new impermeable surface of development parcels and by the sewage generated by each development type.

Per California Government Code Section 66016.5 (AB 602)

The section is included to address the drainage element of the Combined Sewer System Development Impact Fee. Most requirements of the legislation are met in the findings under 66001. Those that are not yet addressed are as follows.

1. Exception requirement to the housing square footage basis:

a) An explanation as to why square footage is not an appropriate metric to calculate fees imposed on a housing development project.

b) An explanation that an alternative basis of calculating the fee bears a reasonable relationship between the fee charged and the burden posed by the development.

c) That other policies in the fee structure support smaller developments, or otherwise ensure that smaller developments are not charged disproportionate fees.

The findings for the exception are as follows:

a) An explanation as to why square footage is not an appropriate metric to calculate fees imposed on a housing development project.

New imperious surfaces drive the demand for drainage facilities. In housing developments, new impervious surfaces incorporate the footprint on a parcel, capturing ground floor living spaces as well as driveways, sidewalks, patios and other such surfaces. A square footage of proposed units basis would introduce inequities. For example, a two-story home with the same footprint as a single-story home would pay twice the fee while causing an identical impact on the drainage system. This inequity would be amplified in multistory apartment and condominium buildings or towers.

b) An explanation that an alternative basis of calculating the fee bears a reasonable relationship between the fee charged and the burden posed by the development.

For storm water runoff, the standard, customary and equitable method to establish a reasonable relationship between the fee charged, the facilities required, and the type of development on which the fee is imposed is with a direct measure of new impermeable surfaces. New runoff as a result of development establishes the demand for new or improved capacity, the cost of which is the basis of the fee.

c) That other policies in the fee structure support smaller developments, or otherwise ensure that smaller developments are not charged disproportionate fees.

A fee basis of impermeable square footage ensures equity for the allocation of the cost of the impact from development. The fee is proportional to the impact caused by new impermeable surfaces. Smaller developments with identical unit footprints will have the same fees. Smaller footprints will have proportionately lower fees. Similarly, multifamily apartment building and towers will have lower impacts and fees on a per unit basis as the size of the units decline and/or the number of floors increase.

2. Capital improvement plan requirement as part of a nexus study:

Capital improvements funded by the Combined Sewer System Development Impact Fee are limited to pipe enlargements on a per project basis or to periodic areawide storage facilities. Areawide improvements involve separate agreements with developers and may include a proportionate share funded by fee revenue. Project master planning and programming are carried out as part of the annual budget process.

3. Blanket statement on the remaining requirements of 66013:

The remaining requirements of 66013 are either addressed in the findings under **66001, 66013** below and in **Chapter 4**, all of which are incorporated herein by reference, or will be through the public outreach, public hearing and adoption process, implementation process and the accounting and reporting process, all of which are acknowledged.

Per California Government Code Section 66013

1. Subsection (a): *Notwithstanding any other provision of law, when a local agency imposes fees for water connections or sewer connections, or imposes capacity charges, those fees or charges shall not exceed the estimated reasonable cost of providing the service for which the fee or charge is imposed, unless a question regarding the amount of the fee or charge imposed in excess of the estimated reasonable cost of providing the services or materials is submitted to, and approved by, a popular vote of two-thirds of those electors voting on the issue.*

Finding on the Base Fee: The Combined Sewer System Development Impact Fee for capital improvements (Base Fee) does not exceed the estimated reasonable cost of providing the service for which the fee or charge is imposed. Costs are estimated for new facilities necessary to accommodate the demand created by modelled sewer flows from new residential and non-residential development by land-use type.

Finding on the Administrative Component: The administrative cost portion of Combined Sewer System Development Impact Fee (Administration Fee) does not exceed the estimated reasonable cost of providing the service for which the fee or charge is imposed. The Administration Fee funds City costs associated with fee program administration and implementation including collection and accounting, annual reporting, capital planning, periodic updates to the Combined Sewer System Development Impact Fee, and other related costs.

2. Subsection (c): *A local agency receiving payment of a charge as specified in paragraph (3) of subdivision (b) shall deposit it in a separate capital facilities fund with other charges received, and account for the charges in a manner to avoid any commingling with other moneys of the local agency, except for investments, and shall expend those charges solely for the purposes for which the charges were collected. Any interest income earned from the investment of moneys in the capital facilities fund shall be deposited in that fund.*

Finding: The City of Sacramento and the Department of Utilities has the systems in place to ensure compliance with Subsection c in accordance with Generally Accepted Accounting Principles, the Government Accounting Standards Board best practices and Generally Accepted Auditing Standards.

3. Subsection (d): *For a fund established pursuant to subdivision (c), a local agency shall make available to the public, within 180 days after the last day of each fiscal year, the following information for that fiscal year:*

(1) A description of the charges deposited in the fund.

(2) The beginning and ending balance of the fund and the interest earned from investment of moneys in the fund.

(3) The amount of charges collected in that fiscal year.

(4) An identification of all of the following:

(A) Each public improvement on which charges were expended and the amount of the expenditure for each improvement, including the percentage of the total cost of the public improvement that was funded with those charges if more than one source of funding was used.

(B) Each public improvement on which charges were expended that was completed during that fiscal year.

(C) Each public improvement that is anticipated to be undertaken in the following fiscal year.

(5) A description of each interfund transfer or loan made from the capital facilities fund. The information provided, in the case of an interfund transfer, shall identify the public improvements on which the transferred moneys are, or will be, expended. The information, in the case of an interfund loan, shall include the date on which the loan will be repaid, and the rate of interest that the fund will receive on the loan.

Finding: The requirements of Subsection d are acknowledged and consistent with existing systems and practices.

5. The Storm Drainage System Utility

Introduction and Description

The City DOU Storm Drainage System Utility (Storm Drainage System) is responsible for managing creeks, streams, and stormwater runoff to prevent flooding of streets and properties and to mitigate contamination from pollution and pathogens. Specifically, the Storm Drainage System is required to design improvements that:

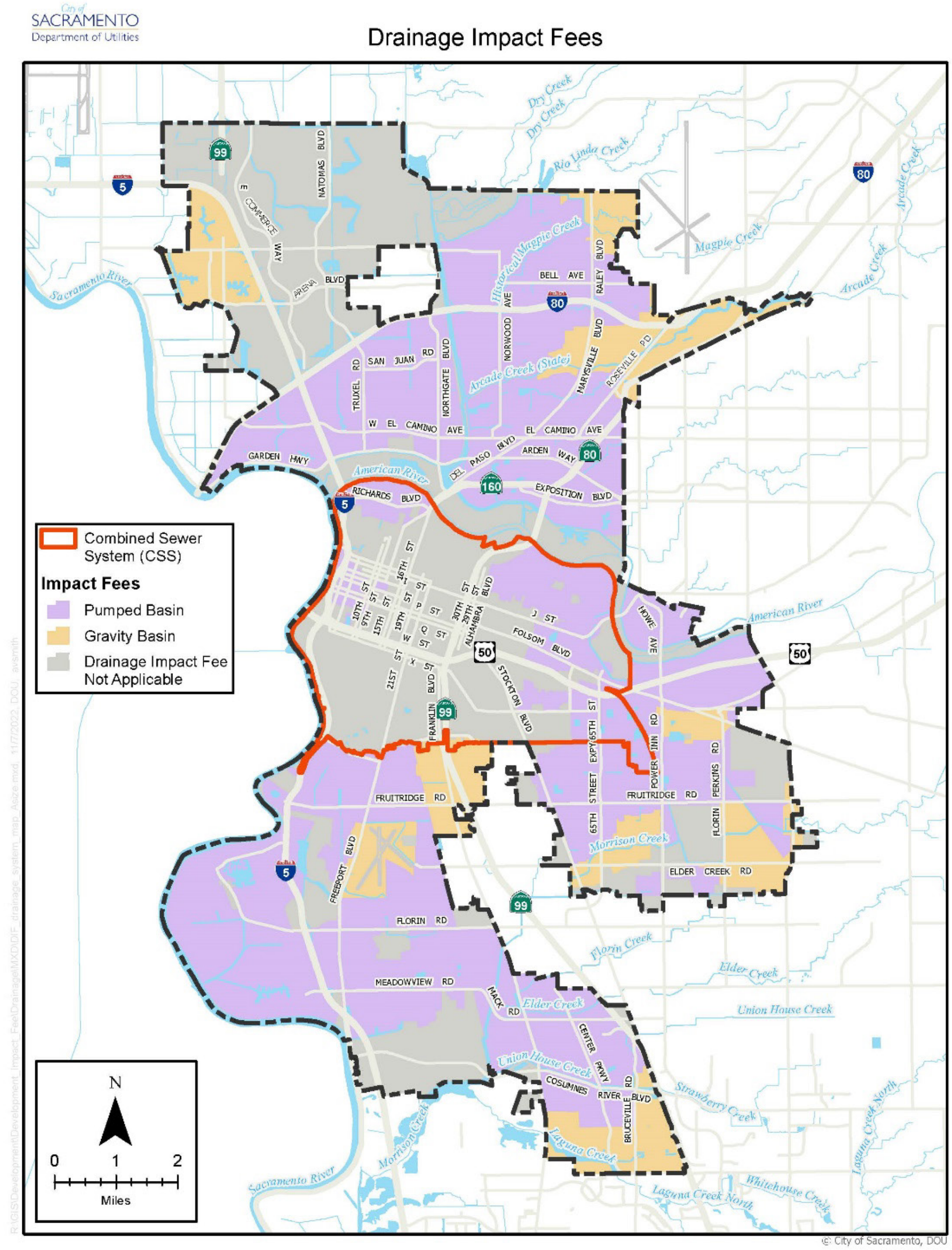
- Meet the needs of a growing community.
- Provide a minimum 100-Year Event protection to structures.
- Provide a minimum 10-Year Event protection to streets.
- Control urban runoff pollutants.
- Avoid public safety hazards.

Effective stormwater management is complicated in Sacramento by the City's mostly flat topography and location on a low-lying flood plain. More than all other cities in California, less reliance can be placed on gravity to manage runoff. A system of primary and secondary levees largely surrounds the City and is managed by the Sacramento Area Flood Control Agency (SAFCA) Joint Powers Authority, which includes the City as a member. The City's separate Storm Drainage System must often pump all runoff up through the levees to discharge to the rivers. Within the system itself, design considerations are focused on the capacity for temporary storage, as well as the normal considerations for conveyance. As a result, the system consists of local storm drains, in-line flow controls, levees, pumps, and pipes to collect, store, filter, and clean stormwater in 134 separate drainage basins serving approximately 155,000 parcels.

For land use, every parcel has an allowable runoff, as determined by the size and capacity of a basin. If a new development proposes to exceed that allowance, either onsite storage must be provided or an agreement must be entered into that provides for another mitigation measure. All of the above attributes of the Storm Drainage System are necessary to mitigate the risk of flooding and of polluting rivers and water sources. Adequate maintenance and capacity improvements are required for both existing and new development.

A map of the area affected by the storm drainage impact fee is shown on **Figure 5-1**.

Figure 5-1. Storm Drainage System Utility Boundaries and Key System and Geographic Characteristics



The areas labelled as "Pumped" or "Gravity" Basins denote basins with two different asset characteristics. Each basin type includes assets that are used in common, such as pump stations in Pumped Basins, and in all basins, main drainage lines, storage basins, or canals servicing a large area. Not included are smaller lines serving individual properties or large, master planned communities, where the drainage infrastructure has been installed and is maintained by separate agreements. Most of the North Natomas area and the Delta Shores development in the southern part of the City are examples of these excluded areas.

Growth, Demand, and Allocations

The key measure of demand for stormwater services is impermeable (or impervious) surface. New impermeable surface is driven primarily by the development of "greenfields" or the redevelopment of existing development to new or more intensives uses. Projected new growth in the service area by residential and nonresidential land uses through 2040 is displayed on **Table 5-1**.

Table 5-1. New Growth by Acreage, Residential Units, and Nonresidential Square Feet

Residential Units	Acres [1]	Units
Single Fam Residential (6 - 8 DU/acre)	905	5,891
Multifamily MDR (<30 DU/acre)	261	3,601
Multifamily HDR (30+ DU/acre)	548	15,808
Total	**1,714**	**25,300**
Non-Residential [2]		**Square Feet in Thousands (1000's)**
Retail/Food	155	2,461
Office/Services	450	4,604
Medical	264	2,746
Educational	46	1,438
Industrial	908	3,710
Total	**1,823**	**14,959**
Total Acreage	**3,536**	

Sources: City of Sacramento Department of Community Development, EPS. *Storm_1*

All new growth data is specific by parcel for land use type, for numbers of units or employees, for parcel size, and for other factors. As shown, **Table 5-1** summarizes acreage by land use and units of housing. Nonresidential land uses include estimated building square footage based on expectations of the space required per projected future employees. The factors, or "coefficients," used are provided in **Appendix A-1**.

Buy-In Methodology, Fee Calculation, and Credits

To accommodate the growth, an impact fee is proposed to participate in capital capacity improvements benefitting new growth or to create new capacity solely attributable to new growth. For these purposes, a buy-in approach to a development impact fee is being employed. As mentioned above, every parcel is assigned an allowable runoff, which is defined in the City's On-Site Design Manual. This allowable runoff is an allocation of available capacity in a basin to each parcel based on parcel size. Use of this allocation is also a use of a share of existing assets that has been paid for by current rate payers. Future customers will "buy in" to a proportional share of these assets by way of a buy-in development impact fee.

To determine an appropriate fee, this analysis includes only the key assets of the Storm Drainage System that could be efficiently valued (large diameter pipe mains and pump stations). Canals, ditches, drainage basins, and other assets for which replacement values or costs could not reasonably be obtained are not included. The assets used to establish value were classed into two types of basins, Zones, because of their similar assets: pumped or gravity basins. **Figure 5-1** above shows the location of these two Zones. City staff employed a two-step process to determine the estimated value of existing storm drainage assets. First, the estimated replacement cost in 2022 dollars was determined by City staff. Second, the existing values were depreciated based on their anticipated remaining useful life, so only the value of the remaining useful life is included as part of the fee calculation. **Table 5-2** shows the estimated total replacement value of system assets, the accumulated depreciation of those assets, and the current value by basin type.

Table 5-2. Existing Assets

Summary [1]	Replacement Cost	Depreciation	Current System Value
Pumped Basins Zone			
Pump Stations	$323,120,611	$265,152,773	$57,967,838
Drainage Mains	$272,920,396	$166,481,442	$106,438,954
Total Pumped Basins	**$596,041,007**	**$431,634,215**	**$164,406,792**
Gravity Basins Zone			
Drainage Mains	**$62,740,618**	**$38,271,777**	**$24,468,841**
Total Storm Drainage System	**$658,781,625**	**$469,905,992**	**$188,875,633**

Source: DOU *Storm_2*

[1] Details of the asset values by basin are included in Appendix E-1.

The depreciated value of existing Storm Drainage System assets is calculated by dividing the depreciated value of improvements by the total acreage in each respective basin Zone (gravity and pumped), as shown in **Table 5-3**.

Table 5-3. System Value per Acre by Basin Type [1]

	Factor
Pumped Basins Zone	
Current System Value	$164,406,792
Total Acreage	32,789
Value per Acre	**$5,014**
Gravity Basins Zone	
Current System Value	$24,468,841
Total Acreage	8,135
Value per Acre	**$3,008**

Source: DOU Storm_3

Note:
[1] Gross developable acres.

Given the value per acre of the capacity, a second step is necessary to allocate the value of the capacity equitably across all configurations of properties that affect runoff. The measure used for this purpose is impermeable surface.

To determine the current value of the Storm Drainage System on an impermeable surface basis, the entire system was evaluated to determine the weighted average impermeable surface for all land uses. The summary of that analysis is presented in **Table 5-4**.

Table 5-4. Weighted Average Impermeable Surface Coefficient [1]

Customer Class	Parcels	Gross Acres	ISC	Impermeable Acres
Agriculture	14	310.5	0.04	12.4
Airport	3	179.5	0.30	53.9
Cemetery	19	76.3	0.10	7.6
Churches & Welfare	556	1,322.0	0.80	1,057.6
Common Area	910	632.9	0.30	189.9
Golf	9	817.9	0.10	81.8
Industrial	2,065	4,011.2	0.86	3,449.6
MFR1	2,360	227.6	0.84	191.2
MFR2	10,736	2,745.7	0.70	1,922.0
MFR3	3,837	1,373.5	0.52	714.2
Miscellaneous	1,062	215.8	0.10	21.6
Office	1,792	2,017.1	0.80	1,613.6
Park	780	2,476.5	0.10	247.6
Personal Care & Health	118	228.1	0.80	182.5
Public & Utilities	1,093	2,919.6	0.44	1,284.6
Recreational	21	122.7	0.80	98.2
Retail / Commercial	3,202	2,436.6	0.86	2,095.5
SFR1	18,085	1,195.0	0.66	788.7
SFR2	94,051	14,425.4	0.54	7,789.7
SFR3	7,452	3,202.2	0.35	1,120.8
Vacant	5,754	5,763.9	0.10	576.4
Totals	**154,879**	**46,699.8**	**0.5032**	**23,499.3**

Sources: DOU, ***NBS [2]*** *and EPS* *Storm_4*

Note:
[1] The ISC is the proportion of land that is impermeable.
[2] The table is a compilation from data included in the NBS study for a Storm Drainage System maintenance fee: City of Sacramento Storm Drain Utility Property Related Fee Study, NBS, December 2021.

The average impermeable surface for all lands in the Storm Drainage System is 50.32 percent, or an Impervious Surface Coefficient (ISC) of 0.5032. The value of the capacity of the system on a per impermeable acre and square foot basis is as shown in **Table 5-5** for each basin Zones.

Table 5-5. System Value per Impervious Acre and Square Foot by Basin Type

Pumped Basins Zone	*formula*	**Factor**
Value per Gross Developable Acre [1]	*a*	$5,014
Average ISC	*b*	0.5032
Value per Impermeable Acre	***c = a / b***	**$9,964**
Value per Impermeable Square Foot	***d = c / 43.560***	**$0.2287**
Gravity Basins Zone		
Value per Gross Developable Acre [1]	*d*	$3,008
Average ISC	*e*	0.5032
Value per Impermeable Acre	***f = d / e***	**$5,978**
Value per Impermeable Square Foot	***g = f / 43.560***	**$0.1372**

Source: DOU Storm_5

Note:
[1] Table 5.3

The entitlement process in DOU requires the identification of new impermeable surface square feet for all new development. This is determined by City staff and the applicant either through a drainage study or other means such as an existing study in a master planned area. The values per impermeable square foot in **Table 5-5** are, therefore, also the base fees by basin type. To support planning for capacity improvements, the impact fee includes an additional $329 fee per acre, and the proposed fees will include a 3 percent administrative charge. These calculations and the final fee per square foot by Zone are shown in **Table 5-6**.

Table 5-6. Fee per Impervious Square Foot by Basin Type

Pumped Basins Zone	*formula*	Factor
Base Fee per Impervious Acre (Table 5)	*a*	$9,964
Master Planning Fee	*b*	$329
Subtotal	*c = a + b*	$10,293
Administrative Fee	*d*	3%
Fee per Impervious Acre	*e = (d + 1) * c*	$10,602
Fee per Impervious Square Foot	***f = e / 43,560***	**$0.2434**
Gravity Basins Zone		
Base Fee per Impervious Acre (Table 5)	*g*	$5,978
Master Planning Fee	*h*	$329
Subtotal	*i = g + h*	$6,307
Administrative Fee	*j*	3%
Fee per Impervious Acre	*k = (j + 1) * i*	$6,496
Fee per Impervious Square Foot	***l = k / 43,560***	**$0.1491**

Source: DOU and EPS Storm_6

As mentioned above, the identification of new impermeable surfaces would occur during the entitlement process. Full credits are applied to existing impermeable surfaces.

Fee per Developable Acre and Square Foot

The fee would apply on a per impermeable square foot basis. For informational purposes, the expected cost for a greenfield development is calculated below. These calculations are on a developable acre and square foot basis and are also used for comparative purposes with other jurisdictions.

For context, most new growth in Sacramento will not be greenfield development. The majority of new growth in Sacramento is projected to be reuse or the intensification of development. A 100 percent credit is applied to existing impermeable surfaces. Most properties will be levied lower fees, or even no fees, as a result.

The expected cost on a gross, greenfield developable acre and square foot basis requires a reasonable standard with which to project new impermeable surfaces by land use. That standard cannot be the actual, measured ISC for existing development in **Table 5-4** because new development is generally denser than has historically been the case.

The standard to be used is the ISC, but as standardized statewide through research by, and adopted by, the California Environmental Protection Agency.[4] Although similar in some respects to some of the actual, measured ISCs, the State of California standard specifies the expected impervious surface of all major land use types for future development.

The tables that follow apply the standard to projected development by land use type and calculate the base fee per developable acre and square foot. **Table 5-7** calculates the fee for the Pumped Basins Zone. **Table 5-8** calculates the fee for the Gravity Basins Zone.

Table 5-7. Pumped Basins Zone Fee Calculation by Land Use per Gross Developable Acre and Square Foot

Pumped Basins Zone	ISC Standard By Land Use		Impervious Square Feet Per Gross Developable Acre	Fee Per Impervious Square Foot [1]	Fee Per Gross Developable Acre	Fee Per Gross Developable Square Foot
Land Use	As Percent	As Ratio				
formula:	*a*	*b*	*c = b * 43,560*	*d*	*e = c * d*	*f = e / 43,560*
Residential:						
Single Fam Residential (6 - 8 DU/acre)	54%	0.54	23,522	$0.2434	$5,725	$0.1314
Multifamily HDR (30+ DU/acre)	84%	0.84	36,590	$0.2434	$8,906	$0.2044
Multifamily MDR (<30 DU/acre)	66%	0.66	28,750	$0.2434	$6,997	$0.1606
Non Residential:						
Retail	86%	0.86	37,462	$0.2434	$9,118	$0.2093
Hotel/Motel [2]	80%	0.80	34,848	$0.2434	$8,482	$0.1947
Office	80%	0.80	34,848	$0.2434	$8,482	$0.1947
Hospital	80%	0.80	34,848	$0.2434	$8,482	$0.1947
Schools	44%	0.44	19,166	$0.2434	$4,665	$0.1071
Church	80%	0.80	34,848	$0.2434	$8,482	$0.1947
Industrial	86%	0.86	37,462	$0.2434	$9,118	$0.2093
Parking lot [3]	86%	0.86	37,462	$0.2434	$9,118	$0.2093

Sources: DOU, EPS Storm_7

Notes:
[1] Table 5.6
[1] Uses the Office rate.
[2] Uses the Retail rate.

[4] User's Guide for the California Impervious Surface Coefficients, Office of Environmental Health Hazard Assessment, California Environmental Protection Agency, December 2010.

Table 5-8. Gravity Basins Zone Fee Calculation by Land Use per Gross Developable Acre and Square Foot

Gravity Basins Zone	ISC Standard By Land Use		Impervious Square Feet Per Gross Developable Acre	Fee Per Impervious Square Foot [1]	Fee Per Gross Developable Acre	Fee Per Gross Developable Square Foot
Land Use	As Percent	As Ratio				
formula:	*a*	*b*	*c = b * 43,560*	*d*	*e = c * d*	*f = e / 43,560*
Residential:						
Single Fam Residential (6 - 8 DU/acre)	54%	0.54	23,522	$0.1491	$3,508	$0.0805
Multifamily HDR (30+ DU/acre)	84%	0.84	36,590	$0.1491	$5,457	$0.1253
Multifamily MDR (<30 DU/acre)	66%	0.66	28,750	$0.1491	$4,287	$0.0984
Non Residential:						
Retail	86%	0.86	37,462	$0.1491	$5,586	$0.1282
Hotel/Motel [2]	80%	0.80	34,848	$0.1491	$5,197	$0.1193
Office	80%	0.80	34,848	$0.1491	$5,197	$0.1193
Hospital	80%	0.80	34,848	$0.1491	$5,197	$0.1193
Schools	44%	0.44	19,166	$0.1491	$2,858	$0.0656
Church	80%	0.80	34,848	$0.1491	$5,197	$0.1193
Industrial	86%	0.86	37,462	$0.1491	$5,586	$0.1282
Parking lot [3]	86%	0.86	37,462	$0.1491	$5,586	$0.1282

Sources: DOU, EPS Storm_8

Notes:
[1] Table 5.6
[1] Uses the Office rate.
[2] Uses the Retail rate.

The effective cost per square foot will be lower in most cases because of the application of credit for existing impermeable surfaces.

Use of Fees

Revenue from the proposed fees will be used to:

- Support storm drainage master planning.
- Participate in capital capacity improvements benefitting new growth with revenue from the fee and benefitting existing customers with rate-based or other funding.
- Create new capacity solely benefitting to new growth.
- Improvements to common facilities that primarily include:
  - New pipes 36" or greater
  - Pipe upsizing
  - New detention basins
  - Capacity improvements at pump stations
  - New pump stations.

Funding for capacity improvements that benefit existing and new development must be shared in proportion to the impact new growth and existing parcels have on the system. Master Planning for those capital activities must also be shared. With two classes of basins, a proportional share must be defined for each basin type. The proportional share by basin class is shown on **Table 5-9**.

Table 5-9. Proportional Shares by Basin Type for Shared Projects

Basin Class		Acres	Proportionate Shares
Pumped Basins Zone	*formula*		
New Development	*b*	2,491	**7.60%**
Existing Development	*a*	30,299	**92.40%**
Totals	*c = a + b*	32,789	100.00%
Gravity Basins Zone			
New Development	*g*	1,046	**12.85%**
Existing Acres	*h*	7,089	**87.15%**
Totals	*i = g + h*	8,135	100.00%

Source: DOU and EPS Storm_9

Capital projects and Master Planning that benefit new growth exclusively can be funded entirely with fee revenue withing the related Zone.

Comparison with Surrounding Communities

The comparison of the Storm Drainage System fee with surrounding jurisdictions is shown on **Table 5-10**. The table includes a single-family land use and office and retail uses on a per 1,000 square foot basis and all of these land uses on a per acre basis. All comparisons assume greenfield development. Complete comparative information in chart form is presented as **Appendix E-1**, and high-level summaries are in **Chapter 1**, the **Executive Summary**.

Table 5-10. Fee Comparisons

Green Field Development Only	Site Area			Fee per Acre		
Jurisdiction	Single Family	Retail	Office	Single Family [1]	Retail	Office
	per unit	*per 1,000 sq. ft. [2]*				
Sacramento - Pumped	$818	$837	$556	$5,725	$9,118	$8,482
Sacramento - Gravity	$501	$513	$341	$3,508	$5,586	$5,197
Sacramento County - Uninc.	$2,994	$2,465	$1,761	$20,959	$26,844	$26,844
Folsom	$1,037	$579	$413	$7,259	$6,302	$6,302
Roseville	$279	$303	$216	$1,953	$3,298	$3,298
West Sacramento	$6,185	$5,446	$3,611	$43,294	$59,309	$55,061
Woodland	$1,362	$1,400	$1,000	$9,531	$15,248	$15,248
Average Excl. Sacramento	**$2,371**	**$2,039**	**$1,400**	**$16,599**	**$22,200**	**$21,351**
Sacramento						
Pumped +/- Percent of Average	**-66%**	**-59%**	**-60%**	**-66%**	**-59%**	**-60%**
Gravity +/- Percent of Average	**-79%**	**-75%**	**-76%**	**-79%**	**-75%**	**-76%**

Source: EPS *Storm_10*

Notes:
[1] Based on 7 units per acre.
[2] Comparisons for Retail and Office land uses are based on the assumption of a 1-acre parcel with a structure covering 25 percent of the parcel (i.e., a F.A.R of .25) for Retail, and 35 percent for Office. This construct is for comparative purposes only.

The proposed fees in Sacramento are exceptionally low compared with neighboring jurisdictions. This is due to the high level of asset depreciation, to the limited scope of assets that can be reasonably valued at this time, and to the exclusive use of the Buy-In approach, which is also the only feasible approach at this time.

Nexus Findings

For the Storm Drainage Utility, this section addresses the following requirements of the Mitigation Fee Act (California Government Code section 66000 et seq.) as it relates to the Storm Drainage System Utility and as discussed in **Chapter 5**, which is incorporated herein by reference.

Per California Government Code Section 66001

1. Identify the purpose of the fee.
2. Identify how the fee is to be used.
3. Determine how a reasonable relationship exists between the fee's use and the type of development project on which the fee is imposed.

4. Determine how a reasonable relationship exists between the need for the facility and the type of development project on which the fee is imposed.

5. Demonstrate a reasonable relationship between the amount of the fee and the cost of the facility or portion of the facility attributable to the development on which the fee is impose.

The Storm Drainage Development Impact Fee differs by two zones (Zones), or subcomponents: one for gravity-dependent basins and one for pump-dependent basins. The fee Zones are legally, financially, and functionally independent of, and shielded from each other in the administration of the fee, to include the collection, accounting and use of funds.

1. Purpose of the Fee

The purpose of the Storm Drainage Development Impact Fee for each Zone is to fund storm drainage infrastructure and facilities within the respective Zone that are needed to maintain or improve the level of service as growth occurs to convey, contain, and discharge to the public drainage system stormwater generated by new residential and commercial development within the respective Zone of the Storm Drainage Utility Service Area (Area).

2. Use of Fee

The Storm Drainage Development Impact Fee for each Zone will be used to fund capital improvements within the respective zones to the storm drainage system consisting of master planning and the improvement or construction of new storm drainage facilities needed to collect, contain, and discharge to the public drainage system stormwater generated within the respective Zone.

3. Reasonable Relationship between Use of Fee and Type of Development on Which the Fee is Imposed

The Storm Drainage Development Impact Fee for each Zone will be used exclusively for the benefit of the Zone in which it is collected to fund the storm drainage facilities as described in this chapter, **Chapter 5**, in each respective Zone. New residential and nonresidential development in the Zones will generate more stormwater runoff by creating additional impervious surface area, generating the need for facilities that collect, contain, and discharge stormwater.

A reasonable relationship therefore exists between the use of the Storm Drainage Development Impact Fee and the type of development on which the fee is imposed because the fee will be used to construct new or improved storm drainage facilities that collect, contain, and discharge to the public storm drainage system stormwater runoff generated by the residential and nonresidential development.

4. Reasonable Relationship between Need for Facility and Type of Project on Which the Fee is Imposed

Development of residential and nonresidential properties will increase impervious surface area and associated storm water runoff, unless these properties have no new impervious surface, in which case the fee is waived. Storm drainage facility needs are established pursuant to the City of Sacramento Department of Utilities Capital Project and Master Planning process that establishes the drainage facilities needed to collect, contain, and discharge storm water based on the land uses anticipated to develop in the respective Zones. Specific requirements, or standards, are established by the Design and Procedures Manual which requires that City drainage improvements shall be designed to:

- Meet the needs of a growing community.
- Provide a minimum 100 Year Event protection to structures.
- Provide a minimum 10 Year Event protection to streets.
- Control urban runoff pollutants.
- Avoid public safety hazards.

A reasonable relationship therefore exists between the need for storm drainage facilities and new residential and nonresidential projects with net new impervious surfaces on which the Storm Drainage Development Impact Fee is imposed on a square foot basis. This is because each project that creates new impervious surface area will generate additional storm water runoff, and the storm drainage facilities are necessary to collect, contain, and discharge this level of increased storm water runoff in compliance with established standards of service.

5. Reasonable Relationship between Amount of Fee and Cost of Facilities or Portion of Facilities Attributed to Development on Which Fee is Imposed

As a Buy-In fee, the total current value of storm drainage facilities is divided by the total estimated impervious surface in the entire City of Sacramento to derive the current value per impervious square foot of each type of drainage system (pumped or gravity). The fee applies to any new, measured impervious square foot, as determined through the plan review process, that is not mitigated on site.

Collected fees will be used for improvements on a proportional match basis as specified in **Chapter 5** or used to construct new facilities that exclusively benefit new growth.

The Storm Drainage Development Impact Fee in each Zone does not exceed the estimated reasonable cost of providing the service for which the fee or charge is imposed. Future, periodic updates to the Storm Drainage Development Impact Fee will re-evaluate the costs expended and future needs and costs to ensure that the fee has not and does not exceed the estimated reasonable cost of providing appropriate capital improvement services.

Finding on the Administrative Component: The administrative cost portion of the Storm Drainage System Development Impact Fee (Administration Fee) does not exceed the estimated reasonable cost of providing the service for which the fee or charge is imposed. The Administration Fee funds City costs associated with fee program administration and implementation including collection and accounting, annual reporting, capital planning, periodic updates to the Separated Sewer System Development Impact Fee, and other related costs.

Per California Government Code Section 66016.5 (AB 602)

Most requirements of the legislation are met in the findings for 66001. Those that are not yet addressed are as follows:

1. Exception requirement to the housing square footage basis:

d) An explanation as to why square footage is not an appropriate metric to calculate fees imposed on a housing development project.

e) An explanation that an alternative basis of calculating the fee bears a reasonable relationship between the fee charged and the burden posed by the development.

f) That other policies in the fee structure support smaller developments, or otherwise ensure that smaller developments are not charged disproportionate fees.

The findings for the exception are as follows:

d) An explanation as to why square footage is not an appropriate metric to calculate fees imposed on a housing development project.

New imperious surfaces drive the demand for drainage facilities. In housing developments, new impervious surfaces incorporate the footprint on a parcel, capturing ground floor living spaces as well as driveways, sidewalks, patios and other such surfaces. A square footage of proposed-units basis would introduce inequities. For example, a two-story home with the same footprint as a single-story home would pay twice the fee while causing an identical impact on the drainage system. This inequity would be amplified in multistory apartment and condominium buildings or towers.

b) An explanation that an alternative basis of calculating the fee bears a reasonable relationship between the fee charged and the burden posed by the development.

For storm water runoff, the standard, customary and equitable method to establish a reasonable relationship between the fee charged, the facilities required, and the type of development on which the fee is imposed is with a direct measure of new impermeable surfaces. The current plan review process requires the identification of new impermeable square feet. New runoff as a result of development establishes the demand for new or improved capacity, the cost of which is the basis of the fee.

c) That other policies in the fee structure support smaller developments, or otherwise ensure that smaller developments are not charged disproportionate fees.

A fee basis of impermeable square footage ensures equity for the allocation of the cost of the impact from development. The fee is proportional to the impact caused by new impermeable surfaces. Smaller developments with identical unit footprints will have the same fees. Smaller footprints will have proportionately lower fees. Similarly, multifamily apartment buildings and towers will have lower impacts and fees on a per unit basis as the size of the units decline and/or the number of floors increase.

2. Capital improvement plan requirement as part of a nexus study:

Capital improvements funded by the Storm Drainage System Development Impact Fee are limited to the amounts and purposes as described in the **66001** findings and **Chapter 5**. Project master planning and programming are carried out as part of the annual budget process.

APPENDICES

APPENDIX A:

Executive Summary

Appendix A-1

Square Feet per Employee Coefficients

Table A-1a Coefficients for Square Feet per Employee-All Nonresidential Land Uses

Land Use	Square Feet per Employee
Education	700
Food	600
Government	500
Office	200
Retail	450
Services	500
Medical	350
Industrial	1,000

Source: BAE Appendix_A.1

Note:
[1] Sacramento General Plan Update, Existing Conditions Technical Memorandum: Market Demand Study, Bay Area Economics July, 2019.

Appendix A-2

Companion Charts to Table Sets 1-5 and 1-6.

Chart to Table 1-5a

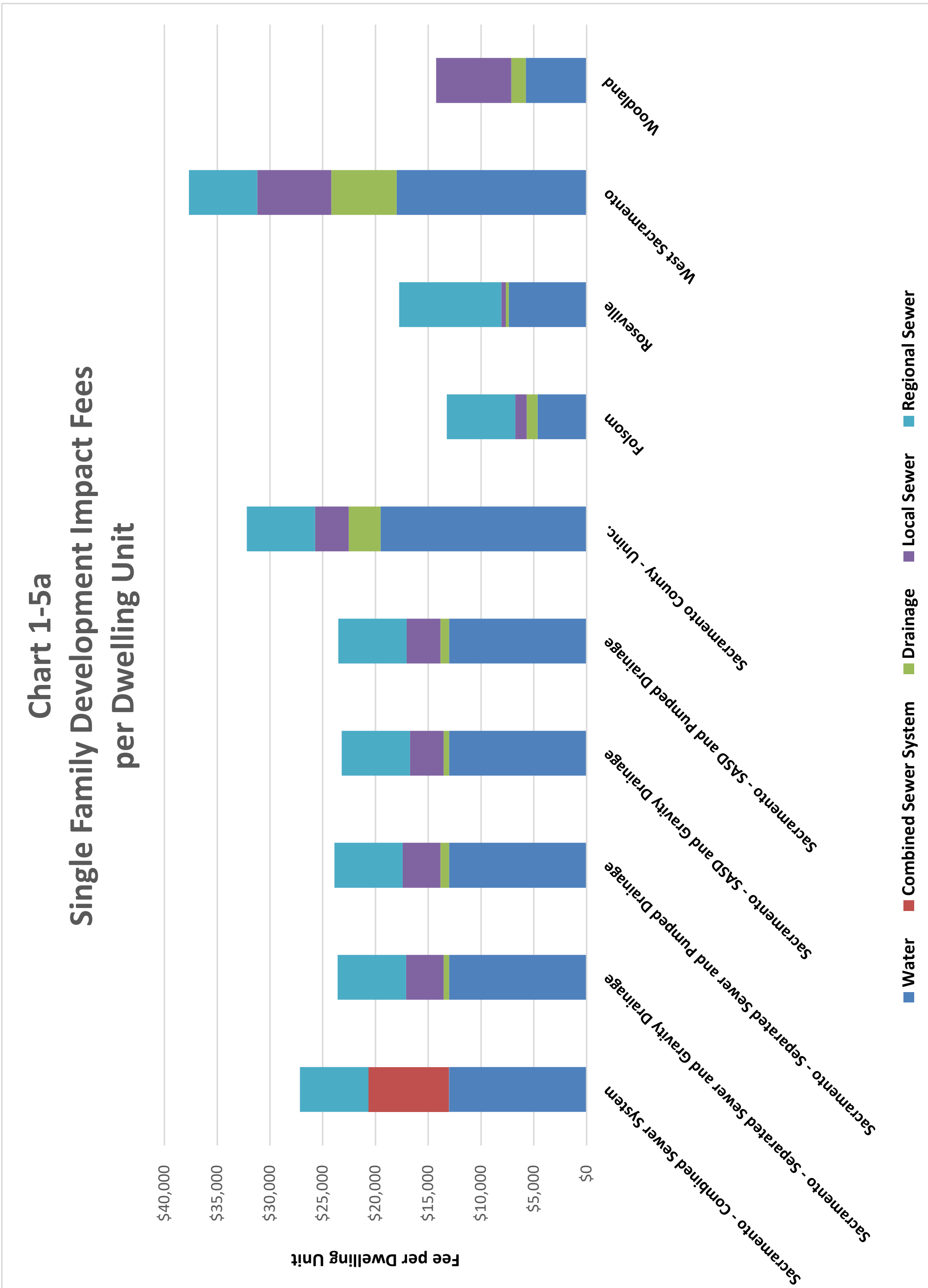
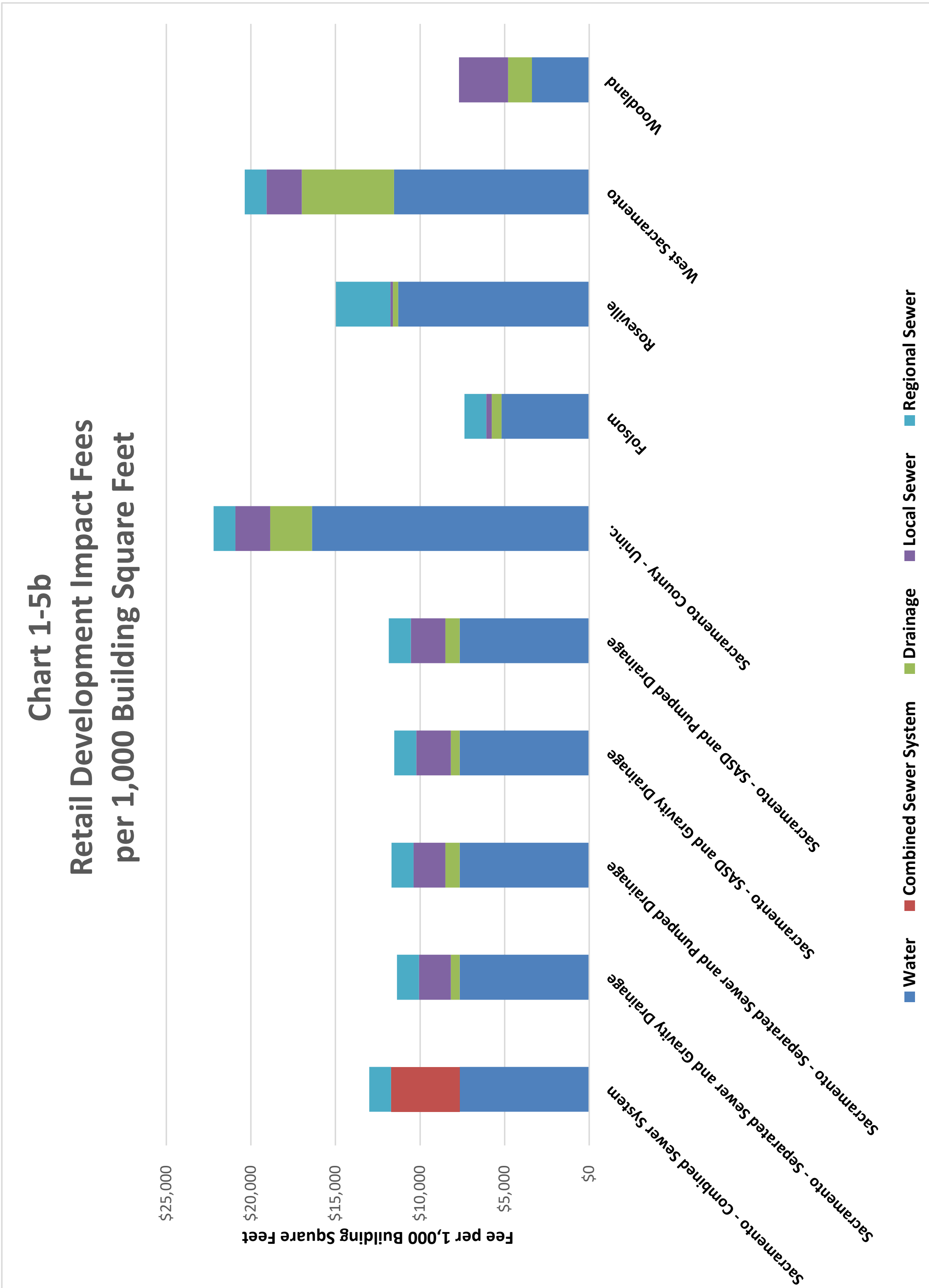


Chart to Table 1-5b



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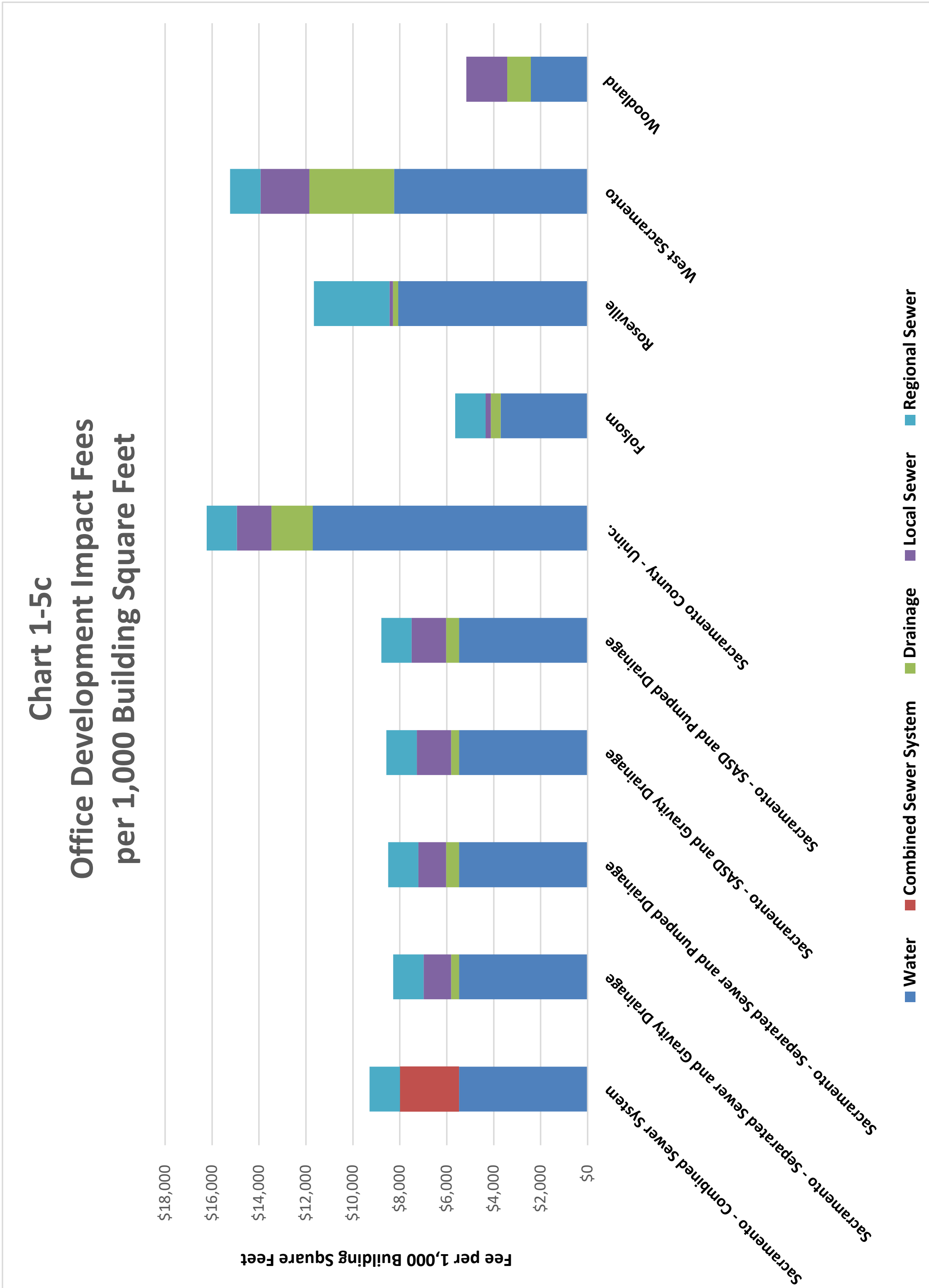


Chart to Table 1-6a

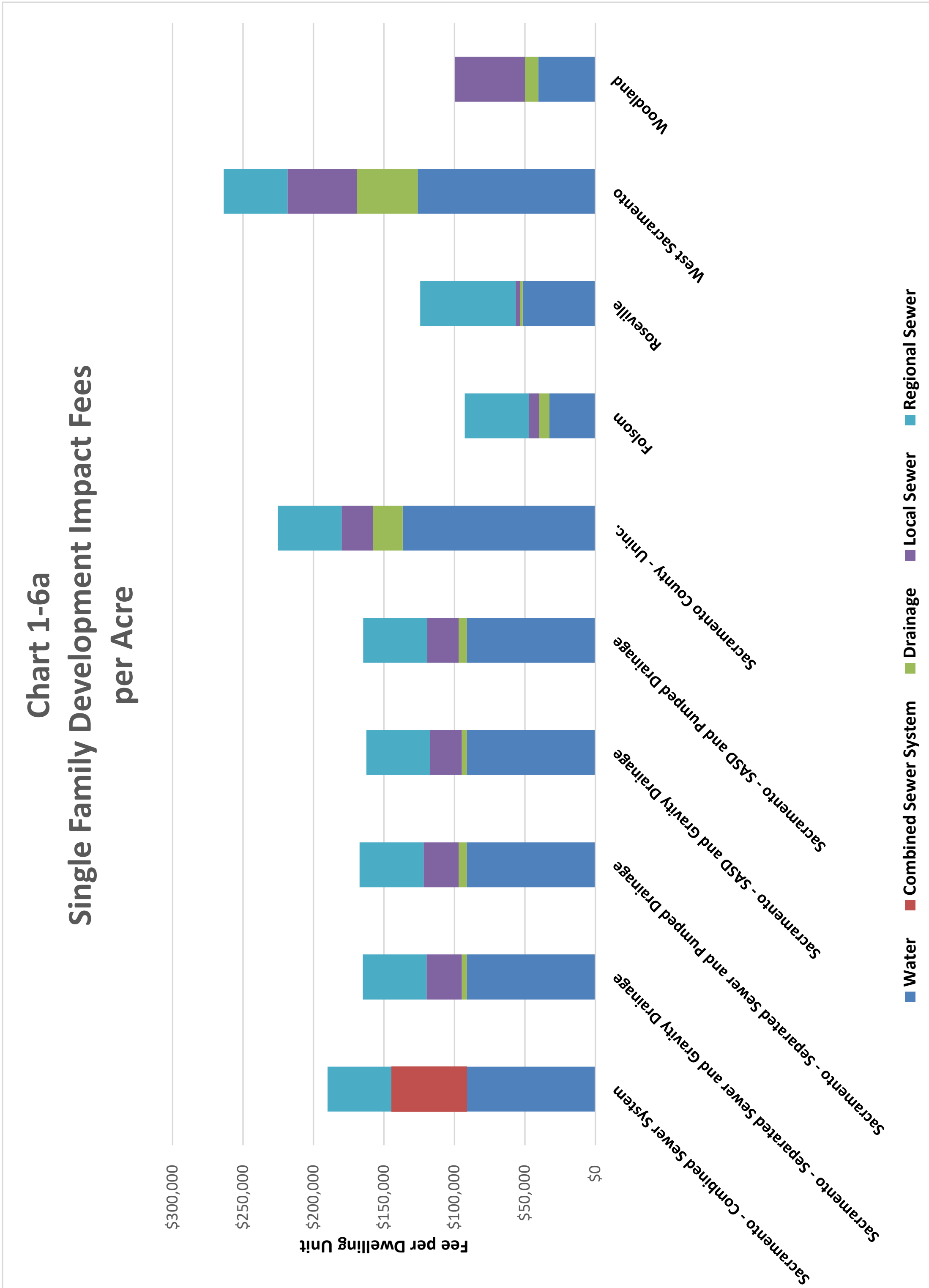


Chart to Table 1-6b

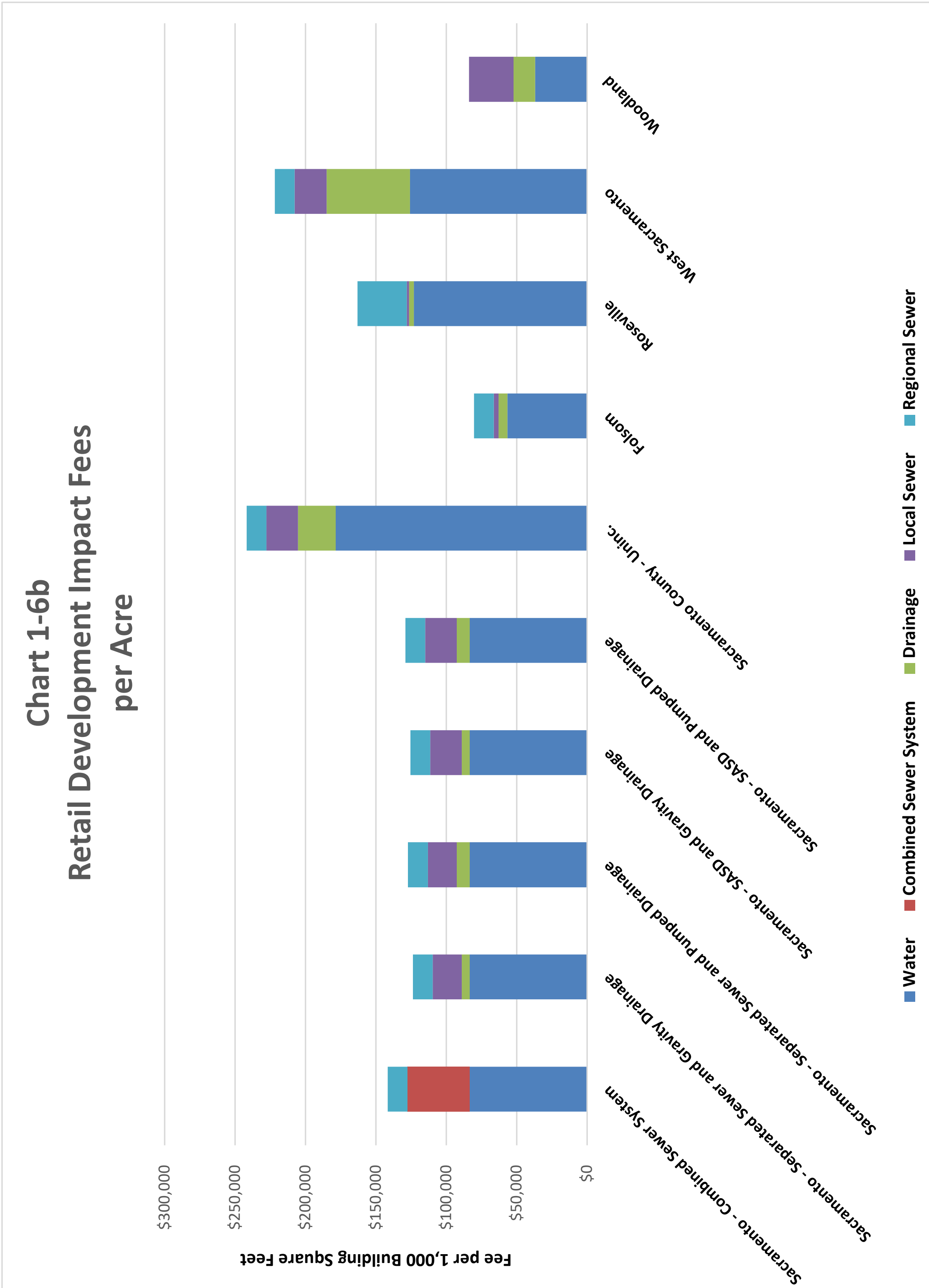
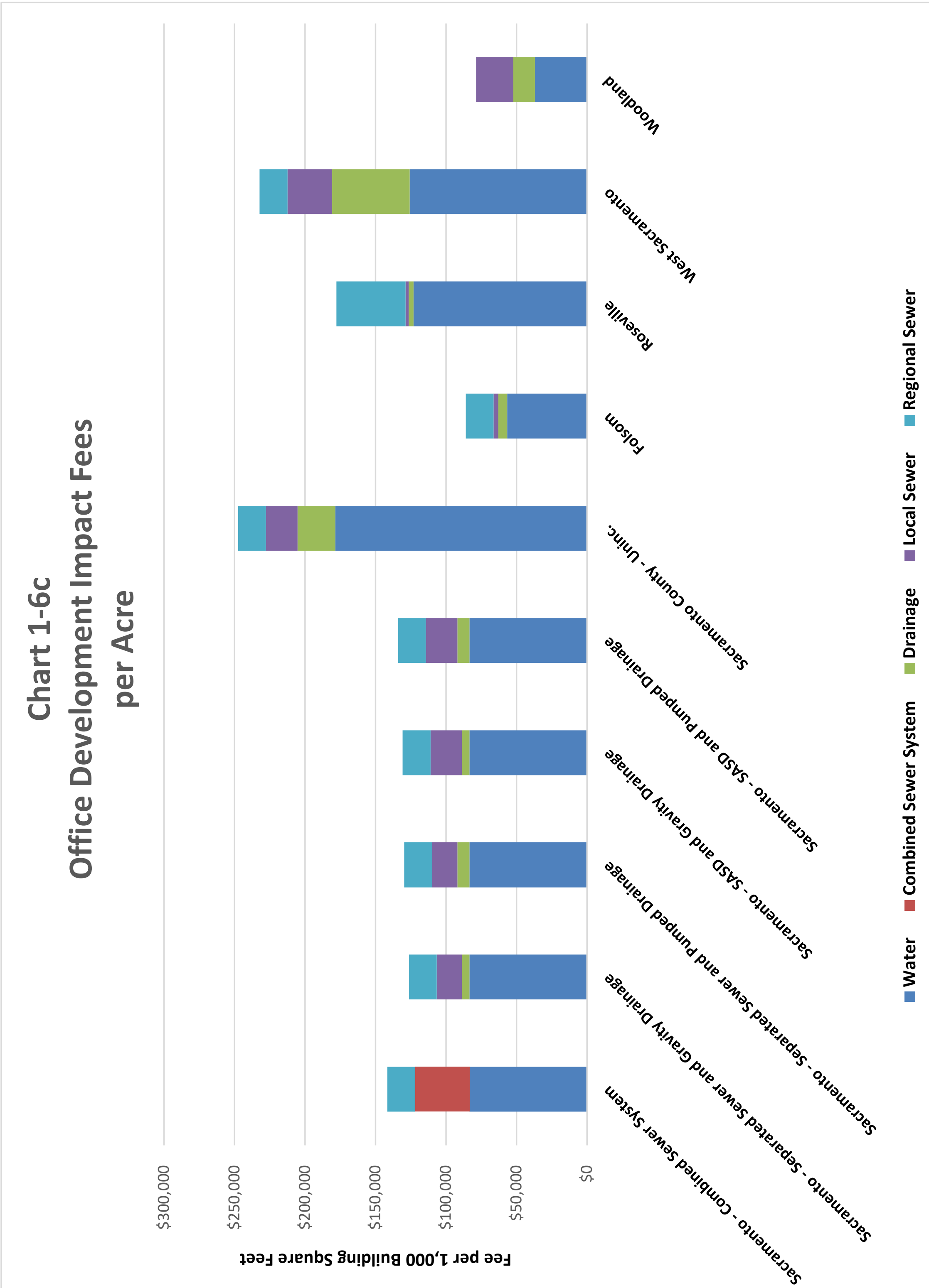


Chart to Table 1-6c



APPENDIX B:

Water System Utility

Appendix B-1

Existing Equivalent Meters

Size	Current Count	Type	Flow Factor	Equivalent Meters
formula	*a*		*b*	*c = a * b*
5/8-inch	174	*Displacement*	1.0	174
3/4-inch	178	*Displacement*	1.0	178
1-inch	131,511	*Displacement*	1.0	131,511
1.25-inch	0	*Displacement*	1.5	0
1.5-inch	3,910	*Displacement*	2.0	7,820
2-inch	4,357	*Displacement*	3.2	13,942
3-inch	802	*Turbine Class I*	7.0	5,614
4-inch	698	*Turbine Class I*	12.6	8,795
6-inch	208	*Turbine Class I*	26.0	5,408
8-inch	112	*Turbine Class II*	56.0	6,272
10-inch	18	*Turbine Class II*	84.0	1,512
12-inch	0	*Turbine Class II*	106.0	0
Totals	**141,968**		**--**	**181,226**

Source: DOU, EPS *Appendix_B.1*

Appendix B-2

Water System Asset Analyses

Treatment Plants

DIF SUPPORT PROJECT – WATER TREATMENT PLANTS
CITY OF SACRAMENTO DEPARTMENT OF UTILITIES

Basis of Estimate

Introduction

To support the City's efforts in determining the value of their drinking water system, Carollo Engineers prepared an estimate of probable cost to construct and remaining useful life for existing facilities at the Sacramento River Water Treatment Plant (WTP) and the E.A. Fairbairn WTP. Estimates were prepared based on historical and engineering data available along with parametric cost parameters and professional engineering judgement. The purpose of this document is to describe in sufficient detail the methodology and assumptions used to prepare the estimates.

This memorandum describes:

1. WTP Value Estimates
2. Methodology
3. Class of Estimates
4. Reference Documents
5. Evaluation Assumptions
6. Indirect and Soft Costs

Attachments:

- Value Estimate Table for each water treatment plant

WTP Value Estimates

The estimated current WTP values are:

- Sacramento River WTP - $750,300,000
- E.A. Fairbairn WTP - $482,000,000

Tables with major estimated facility values for each plant are attached.

Methodology

All known major facilities in use at the two water treatment plants were included in the effort. For each major facility the following information was developed to arrive at a current estimate of value:

- Facility Name
- Approximate Year of Construction
- Expected Useful Life
- Estimated Cost to Construct Facility in January of 2022

The estimated cost to construct is to re-construct the named facility (i.e. replace with a similar structure.) This cost does not include efforts to bring the facility up to current code requirements, performance criteria, or City planning and policy standards. With this information developed, as directed by the City, a straight line depreciation method was used to discount the cost to construct the facility if built in January 2022 by the ratio of remaining useful life to total expected useful life to arrive at each estimated current facility value.

Class of Estimate

This estimate was prepared in general accordance with the guidance established by the Association for the Advancement of Cost Engineering (AACE) and as such could be described as a Class 5 estimate. This level of estimate may have an accuracy range of -50% to +100%. For most costs parametric estimating was used, evaluating the facilities by their size multiplied by a unit cost. In some instances, recently developed cost estimates for the City's Water+ Program were used as the basis and modified accordingly to account for minor differences between the planned new Water+ facilities and the existing facilities. Any previous cost estimates used as a basis were escalated to January 2022 dollars using a standardized approach utilized by the Department of Utilities, based on national and local ENR cost indices, and do not include escalation to mid-point of future construction.

In early 2020 the construction community and vendor network that supports the water/wastewater industry experienced significant disruptions due to COVID-19 restrictions adding new and significant complexity to their operations, labor force management, and material supply chain. This has created a bidding environment that has been and remains very difficult to predict. Throughout the second half of 2020 and all of 2021 there have been extraordinary cost increases in key materials commonly required by plant and pipeline projects and increased pressures on attracting and retaining quality craft labor. Additionally, increasing fuel costs and massive congestion at the nation's ports and rail yards combined with near record low warehouse and trucking capacity have raised shipping prices to levels that far exceed historical norms. It is clear by reviewing bid results for projects procured during this period that prices have increased at a rate that far exceeds long-term escalation trends and the variability between bidders has increased making the pricing process more difficult to predict.

The construction outlook for 2022 retains many of the same concerns as the previous two years while also incorporating new ones. Even though the primary risks regarding the health and safety of the population due to the threat of COVID-19 and its variants appear to be diminishing and the corresponding restrictions on businesses are slowly being lifted, many of the challenges created by these past actions remain unresolved. Political events, economic policies, global trade disruptions, supply chain delays, fierce competition for labor, consumer inflation, rising fuel prices, and war have all created uncertainties that have impacted contractor pricing.

Consumers of construction cost estimate data should be advised that pricing accuracy is time sensitive and will degrade over relatively brief periods of time. Pricing updates should be made regularly to increase overall reliability.

Reference Documents

The following data comprise the design basis for the estimate:

- Sacramento River Water Treatment Plant Design Drawings from all major historical projects
- E.A. Fairbairn Water Treatment Plant Design Drawings from all major historical projects
- Water+ Program Planning Level Cost Estimates
- DOU Excel Spreadsheet titled, "SMF ENR Indices_Jan22"

Evaluation Assumptions

The evaluations were performed with the following assumptions:

1. Civil/site and electrical and I&C work were estimated as a percentage of the sum of the facility costs and discounted by a composite estimate of age of the major work.
2. Some parametric costs were developed by scaling from similar facilities. Scaling factors included size (footprint), volume (gallons), capacity (million gallons per day), and estimated complexity.
3. Facilities not in serviceable condition were not included in the evaluation.

Indirect and Soft Costs

Indirect costs have been included in the parametric cost estimate values for each major facility. Indirect costs are those costs added to the direct burdened labor, materials, subcontract, construction equipment, and other direct costs to better represent a general contractor's price. Indirect costs can include:

- Local Sales Tax
- State Sales Tax
- General Subcontractor General Conditions, Overhead and Profit
- Specialty Subcontractor General Conditions, Overhead and Profit
- Self-Perform Management
- Builder's Risk & General Liability Insurance Premiums
- General Contractor Overhead & Profit
- Payment and Performance Bond Premium

Consistent with typical Level 5 cost estimates, we have included a contingency of 35% to account for those items not specifically captured in such a high-level estimate. The contingency reflects an amount added to the cost estimate to accommodate costs that may result from design changes, items not fully itemized in the estimate, errors or omissions in the estimate, or unpredictable conditions or risks that experience shows are likely to occur during the design or bidding phase of the project. The contingency does not encompass increases in scope of the project, unforeseen market conditions, or changes during construction.

Soft costs, including engineering, legal, and admin have been estimated at 25% of the construction (direct and indirect) cost. This cost is calculated from each plant subtotal.

SACRAMENTO RIVER WTP

6/27/2022

Project # 11662A.10
Client: City of Sacramento
Date: 6/20/2022
Current \ 2022

Area No.	Facility	Size	Size Unit	Unit Construction Cost in 2022	Cost Unit	Construction Cost in 2022 Dollars	Installation Year	Age (yr)	Life Expectancy (yr)	Current Value in 2022 Dollars	Notes on Cost
15	Filter Waste Washwater Lagoons	48,000	sq.ft	$6,400,000	per sq.ft	$6,400,000	2004	18	50	$4,100,000	$60/ft^2 concrete + $3M equipment (escalated to Jan 2022 from 2021 cost estimate)
16	Sludge Lagoons	96,000	sq.ft	$65.17	per sq.ft	$6,300,000	2004	18	50	$4,000,000	$60/ft^2 (escalated from to Jan 2022 from 2021 cost estimate)
17	Sludge Drying Bed	105,349	sq.ft	$10.00	per sq.ft	$1,100,000	2015	7	20	$700,000	
18	Gravity Thickeners	-	-	$10,300,000	LS	$10,300,000	2015	7	50	$8,900,000	Based on Water+ Costs (escalated to Jan 2022 from 2021)
19	Dewatering Building	-	-	$30,400,000	LS	$30,400,000	2015	7	35	$24,300,000	Based on Water+ Costs (escalated to Jan 2022 from 2021)
20	Intake No. 1	-	-	$90,100,000	LS	$90,100,000	2002	20	50	$54,100,000	Based on Water+ Costs (escalated to Jan 2022 from 2021)
30	Grit Basins	861,696	gal	$8.00	per gal	$6,900,000	2004	18	50	$4,400,000	
	Floc-Sed Basin (No. 1-2)	-	-	$32,400,000	LS	$32,400,000	2004	18	75	$24,600,000	Cost based on 2013 SRWTP Rehab Estimate (escalated to Jan 2022 from 2015)
41	Floc-Sed Basin (No. 3-4)	-	-	$32,400,000	LS	$32,400,000	2015	7	75	$29,400,000	Cost based on 2013 SRWTP Rehab Estimate (escalated from 2015)
51	Filters (No. 1-8)	-	-	$39,100,000	LS	$39,100,000	2004	18	75	$29,700,000	Based on Water+ Costs (escalated to Jan 2022 from 2021)
	Filters (No. 9-16)	-	-	$39,100,000	LS	$39,100,000	2015	7	75	$35,500,000	Based on Water+ Costs (escalated to Jan 2022 from 2021)
61	Ct No. 1 / Clearwell	7,000,000	gal	$6.50	per gal	$45,500,000	2004	18	75	$34,600,000	
62	9.5 MG Reservoir	9,500,000	gal	$5.00	per gal	$47,500,000	1931	91	75	$0	
63	5 MG Reservoir	5,000,000	gal	$5.00	per gal	$25,000,000	1921	101	75	$0	
71	High Service Pump Station	-	-	$40,000,000	LS	$40,000,000	2015	7	50	$34,400,000	Cost based on 2013 SRWTP Rehab Estimate (escalated to Jan 2022 from 2015)
81	Coagulant Building	7,351	sq.ft	$500	per sq.ft	$3,700,000	1922	100	75	$0	
82	Chemical Bulk Storage & Feed North	10,127	sq.ft	$800	per sq.ft	$8,100,000	2004	18	50	$5,200,000	
92	Operations Building	22,136	sq.ft	$600	per sq.ft	$13,300,000	2004	18	75	$10,100,000	
94	Maintenance Building	5,654	sq.ft	$250	per sq.ft	$1,400,000	1962	40	40	$0	
96	Plant Elec Substation	-	-	$8,900,000	LS	$8,900,000	2015	7	50	$7,700,000	Cost based on 2013 SRWTP Rehab Estimate (escalated to Jan 2022 from 2015)
	Utilidoor	-	-	$10,000,000	LS	$10,000,000	2004	18	50	$6,400,000	
	Misc. Civil Costs	-	-	$100,000,000	LS	$100,000,000	2004	18	75	$76,000,000	
	Land Purchase	-	-	$0.00		$0				$0	
	Generator	-	-	$3,700,000	LS	$3,700,000	2015	7	20	$2,400,000	Cost based on 2013 SRWTP Rehab Estimate (escalated to Jan 2022 from 2015)
	SUBTOTAL					**$601,600,000**				**$396,600,000**	
				EI&C		$120,300,000	2004	18	30	$48,100,000	20% of Subtotal
				SUBTOTAL		**$721,900,000**				**$444,600,000**	
				Contingency		$252,700,000				$155,600,000	35% of Subtotal
				TOTAL CONSTRUCTION COST		**$974,600,000**				**$600,200,000**	
				Engineering, Legal, & Admin		$243,700,000				$150,100,000	25% of Total Construction Cost
				TOTAL PROJECT COST		**$1,218,300,000**				**$750,300,000**	

E.A. FAIRBAIRN WTP

6/27/2022

Project #: 11662A.10
Client: City of Sacramento
Date: 6/20/2022
Current Yea 2022

Area No.	Facility	Size	Size Unit	Unit Construction Cost in 2022	Cost Unit	Construction Cost in 2022 Dollars	Installation Year	Age (yr)	Life Expectancy (yr)	Current Value in 2022 Dollars	Notes on Cost
8	Fluoride Tanks	-	-	$2,000,000	LS	$2,000,000	2018	4	20	$1,600,000	
15	ilter Waste Washwater Lagoons (No. 1 & 2	46,600	sq.ft	$6,300,000	per sq.ft	$6,300,000	2004	18	50	$4,000,000	$60/ft^2 concrete + $3M equipment (escalated to Jan 2022 from 2021 cost estimate)
16	Sludge Lagoons (No. 1,2,&3)	100,877	sq.ft	$65.17	per sq.ft	$6,600,000	2004	18	50	$4,200,000	$60/ft^2 (escalated from to Jan 2022 from 2021 cost estimate)
18	Gravity Thickeners	-	-	$7,200,000	LS	$7,200,000	2015	7	50	$6,200,000	70% of SRWTP Gravity Thickeners cost
19	Dewatering Building	-	-	$22,800,000	LS	$22,800,000	2015	7	35	$18,200,000	75% of SRWTP Dewatering Building cost
20	Intake	-	-	$48,300,000	LS	$48,300,000		37.5	50	$12,100,000	54% of SRWTP Intake No. 1 cost
31	Grit Basins	286,708	gal	$16.00	per gal	$4,600,000	1964	58	50	$0	Cost factored for levy work
	Floc-Sed Basins (No. 1 & 2)	-	-	$29,100,000	LS	$29,100,000	1964	58	75	$6,600,000	90% of SRWTP Floc-Sed Basin (No. 1-2) cost
41	Floc-Sed Basins (No. 3 & 4)	-	-	$29,100,000	LS	$29,100,000	2005	17	75	$22,500,000	90% of SRWTP Floc-Sed Basin (No. 3-4) cost
	Filters (No. 1-8)	13,936	sq.ft	$4,000	per sq.ft	$55,700,000	1964	58	75	$12,600,000	
51	Filters (No. 9-16)	12,544	sq.ft	$5,000	per sq.ft	$62,700,000	2005	17	75	$48,500,000	
61	CT Basin / 6 MG Reservoir	6,000,000	gal	$6.50	per gal	$39,000,000	2005	17	75	$30,200,000	
62	20 MG Reservoir	20,000,000	gal	$3.00	per gal	$60,000,000	1964	58	75	$13,600,000	Cost factored for hopper bottom
63	High-Service Pump Station	-	-	$34,600,000	LS	$34,600,000	1964	58	50	$0	87% of SRWTP High Service Pump Station cost
64	Plant Electrical Substation	-	-	$8,900,000	LS	$8,900,000	1964	58	50	$0	100% of SRWTP Plant Elec Substation cost
82	Chemical Building	17,650	sq.ft	$800	per sq.ft	$14,100,000	2005	17	50	$9,300,000	
83	Lime Building	2,134	sq.ft	$1,000	per sq.ft	$2,100,000	2005	17	50	$1,400,000	
91	Laboratory	11,700	sq.ft	$1,500	per sq.ft	$17,600,000	1985	37	40	$1,300,000	
91	Operations Building (Headhouse)	14,963	sq.ft	$800	per sq.ft	$12,000,000	1964	58	50	$0	
92	Maintenance & Control Building	7,105	sq.ft	$800	per sq.ft	$5,700,000	2004	18	50	$3,600,000	
93	Maintenance & Storage Building	1,181	sq.ft	$250	per sq.ft	$300,000	2010	12	40	$200,000	
94	Maintenance Shop	2,475	sq.ft	$250	per sq.ft	$600,000	2010	12	40	$400,000	
95	Maintenance Warehouse	234	sq.ft	$250	per sq.ft	$100,000	2010	12	40	$100,000	
	Utilidoor	-	-	$1,500,000	LS	$1,500,000	1964	58	50	$0	
	Misc. Civil Costs	-	-	$60,000,000	LS	$60,000,000	2005	17	75	$46,400,000	
	Land Purchase	-	-	$0.00		$0				$0	
	Generator	-	-	$2,000,000	LS	$2,000,000		20	20	$0	
	SUBTOTAL					**$532,900,000**				**$243,000,000**	
				EI&C		$106,600,000	2004	18	30	$42,600,000	20% of Subtotal
				SUBTOTAL		**$639,500,000**				**$285,600,000**	
				Contingency		$223,800,000				$100,000,000	35% of Subtotal
				TOTAL CONSTRUCTION COST		**$863,300,000**				**$385,600,000**	
				Engineering, Legal, & Admin		$215,800,000				$96,400,000	25% of Total Construction Cost
				TOTAL PROJECT COST		**$1,079,100,000**				**$482,000,000**	

Reservoirs

DIF SUPPORT PROJECT – RESERVOIRS
CITY OF SACRAMENTO DEPARTMENT OF UTILITIES

Basis of Estimate

Introduction

To support the City's efforts in determining the value of their drinking water system, Carollo Engineers prepared an estimate of probable cost to construct and remaining useful life for the existing potable water distribution system reservoirs. Estimates were prepared based on historical and engineering data available along with parametric cost parameters and professional engineering judgement. The purpose of this document is to describe in sufficient detail the methodology and assumptions used to prepare the estimates.

This memorandum describes:

1. Reservoir Estimates
2. Methodology
3. Class of Estimates
4. Reference Documents
5. Evaluation Assumptions
6. Indirect and Soft Costs

Attachments:

- Reservoir Value Estimate Table

Reservoir Value Estimates

The estimated current value of the potable water distribution system reservoirs is estimated at $127,100,000. Additional cost estimate development information for each reservoir is provided in the attached table.

Methodology

For each distribution system reservoir the following information was developed to arrive at a current estimate of value:

- Facility Name
- Approximate Year of Construction
- Expected Useful Life
- Estimated Cost to Construct Facility in January of 2022

The estimated cost to construct is to re-construct the reservoir and pump station, if applicable (i.e. replace with a similar facility.) This cost does not include efforts to bring the facility up to current code requirements, performance criteria, or City planning and policy standards. With this information developed, as directed by the City, a straight line depreciation method was used to discount the cost to construct each reservoir if built in January 2022 by the ratio of remaining useful life to total expected useful life to arrive at each estimated current reservoir value.

Class of Estimate

This estimate was prepared in general accordance with the guidance established by the Association for the Advancement of Cost Engineering (AACE) and as such could be described as a Class 5 estimate. This level of estimate may have an accuracy range of -50% to +100%. For most costs parametric estimating was used, evaluating the facilities by their size multiplied by a unit cost. Any previous cost estimates used as a basis were escalated to January 2022 dollars using a standardized approach utilized by the Department of Utilities, based on national and local ENR cost indices, and do not include escalation to mid-point of future construction. The one exception is the Shasta Reservoir, which the City estimated its current construction cost in 2022 dollars through the ENR 20-City Cost Index.

In early 2020 the construction community and vendor network that supports the water/wastewater industry experienced significant disruptions due to COVID-19 restrictions adding new and significant complexity to their operations, labor force management, and material supply chain. This has created a bidding environment that has been and remains very difficult to predict. Throughout the second half of 2020 and all of 2021 there have been extraordinary cost increases in key materials commonly required by plant and pipeline projects and increased pressures on attracting and retaining quality craft labor. Additionally, increasing fuel costs and massive congestion at the nation's ports and rail yards combined with near record low warehouse and trucking capacity have raised shipping prices to levels that far exceed historical norms. It is clear by reviewing bid results for projects procured during this period that prices have increased at a rate that far exceeds long-term escalation trends and the variability between bidders has increased making the pricing process more difficult to predict.

The construction outlook for 2022 retains many of the same concerns as the previous two years while also incorporating new ones. Even though the primary risks regarding the health and safety of the population due to the threat of COVID-19 and its variants appear to be diminishing and the corresponding restrictions on businesses are slowly being lifted, many of the challenges created by these past actions remain unresolved. Political events, economic policies, global trade disruptions, supply chain delays, fierce competition for labor, consumer inflation, rising fuel prices, and war have all created uncertainties that have impacted contractor pricing.

Consumers of construction cost estimate data should be advised that pricing accuracy is time sensitive and will degrade over relatively brief periods of time. Pricing updates should be made regularly to increase overall reliability.

Reference Documents

Reservoir information was gathered from the following electronic files, provided by DOU:

- City of Sacramento, Water Master Plan, July 2013, Chapter 5, West Yost.
- Condition Assessment Water Storage Facilities, Condition Assessment Recommendations Report, July 9, 2018, Stantec.
- Excel Spreadsheet titled "Shasta Cost Analysis_2022-05-06 updates for DIF **.xlsx.
- Reservoirs.kmz Google Earth file indicating reservoir names and locations.

- DOU Excel Spreadsheet titled, "SMF ENR Indices_Jan22"

Evaluation Assumptions

The evaluations were performed with the following assumptions:

1. For ground storage reservoirs and buried reservoirs, associated pump stations were included in the reservoir cost as appropriate.
2. Some parametric costs were developed by scaling from similar facilities. Additional factors were applied in some cases to account for variation in project estimated complexity.
3. Life expectancy was estimated based on industry average. Actual condition and any maintenance programs were not accounted for.
4. EI&C costs have been included in the value of the reservoirs and is not shown separately as a percentage of the subtotal.

Indirect and Soft Costs

Indirect costs have been included in the parametric cost estimate values for each reservoir. Indirect costs are those costs added to the direct burdened labor, materials, subcontract, construction equipment, and other direct costs to better represent a general contractor's price. Indirect costs can include:

- Local Sales Tax
- State Sales Tax
- General Subcontractor General Conditions, Overhead and Profit
- Specialty Subcontractor General Conditions, Overhead and Profit
- Self-Perform Management
- Builder's Risk & General Liability Insurance Premiums
- General Contractor Overhead & Profit
- Payment and Performance Bond Premium

Consistent with typical Level 5 cost estimates, we have included a contingency of 35% to account for those items not specifically captured in such a high-level estimate. The contingency reflects an amount added to the cost estimate to accommodate costs that may result from design changes, items not fully itemized in the estimate, errors or omissions in the estimate, or unpredictable conditions or risks that experience shows are likely to occur during the design or bidding phase of the project. The contingency does not encompass increases in scope of the project, unforeseen market conditions, or changes during construction.

Soft costs, including engineering, legal, and admin have been estimated at 25% of the construction (direct and indirect) cost. This cost is calculated from the reservoir subtotal.

RESERVOIRS

6/27/2022

Job: 11662A.10
Client: City of Sacramento
Current Year: 2022

Reservoir Name	Storage Type	Diameter (ft)	Unit Sidewater Depth (gal/ft)	Low Water Elevation (ft)	Overflow Elevation (ft)	Storage Capacity (MG)	Unit Construction Cost in 2022 Dollars	Cost Unit	Construction Cost in 2022 Dollars	Year Installed	Age (yr)	Life Expectancy (yr)	Current Value in 2022 Dollars	Notes on Cost
Alhambra	Elevated Concrete	144	121,081	100	125	3	$6.00	per gal	$18,000,000	1962	60	75	$3,600,000	Cost for Cast-in-Place tank with added for elevated construction and steel liner
Capital Gateway	Ground Steel	143	120,133	15	40.5	3	$8,200,000	LS	$8,200,000	1991	31	50	$3,100,000	West Sacramento Bridge District Project- 2011 3MG Tank and PS for $5.8M
City College	Elevated Concrete	144	121,081	100	125	3	$6.00	per gal	$18,000,000	1962	60	75	$3,600,000	Cost for Cast-in-Place tank with added for elevated construction and steel liner
El Centro	Ground Steel	150	132,192	23	48	3	$8,200,000	LS	$8,200,000	2000	22	50	$4,600,000	West Sacramento Bridge District Project- 2011 3MG Tank and PS for $5.8M
Elkhorn	Ground Concrete	160	98,538	16	48	3	$3.00	per gal	$9,000,000	2008	14	75	$7,300,000	Shasta unit cost plus premium for volume reduction
Florin	Buried Concrete	Varies	Varies	9.5	32	15	$5.00	per gal	$75,000,000	1970	52	75	$23,000,000	Shasta Cost Plus Adjustment for Buried and Cast-in-Place
Freeport	Elevated Steel	Varies	Varies	90	125	3	$14,000,000	LS	$14,000,000	1960	62	50	$0	Cost from Marshall & Swift Cost Guide, extrapolated from 2MG Low-Stress Area Elevated Steel Tank in 2010 $; 40% premium added for current labor and safety requirements to construct
Riverside	Partially Buried	154	137,710	8.2	29	3	$4.00	per gal	$12,000,000	1962	60	75	$2,400,000	$10.7M from DOU Cost Estimate for Shasta plus adjustment for partially buried
Robla	Ground Steel	150	132,182	37	62	3	$8,200,000	LS	$8,200,000	1988	34	50	$2,600,000	West Sacramento Bridge District Project- 2011 3MG Tank and PS for $5.8M
San Juan	Buried Concrete	160	148,841	0	25	3	$5.00	per gal	$15,000,000	2004	18	75	$11,400,000	Shasta Cost Plus Adjustment for Buried and Cast-in-Place
UC Medical Center	Elevated Concrete	144	121,081	100	125	3	$6.00	per gal	$18,000,000	1962	60	75	$3,600,000	Cost for Cast-in-Place tank with added for elevated construction and steel liner
Shasta	Ground Concrete					4	$2.68	per gal	$10,700,000	2018	4	75	$10,100,000	$10.7M from DOU Cost Estimate
							Land Purchase		$0				$0	
							SUBTOTAL		**$214,300,000**				**$75,300,000**	
							Contingency		$75,000,000				$26,400,000	35% of Subtotal
							TOTAL CONSTRUCTION COST		**$289,300,000**				**$101,700,000**	
							Engineering, Legal, & Admin		$72,300,000				$25,400,000	25% of Subtotal
							TOTAL PROJECT COST		**$361,600,000**				**$127,100,000**	

Wells

WEST YOST
Water. Engineered.

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Bldg. 1, Suite 363
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TECHNICAL MEMORANDUM

DATE: June 17, 2022

Project No.: 038-80-21-60
SENT VIA: EMAIL

TO: Michelle Carrey, PE, City of Sacramento
Brett Ewart, PE, City of Sacramento

FROM: Roberto Vera, PE, RCE #83500
Angie Yan, EIT #172428

REVIEWED BY: Elizabeth Drayer, PE, RCE #46872

REGISTERED PROFESSIONAL ENGINEER
ROBERTO D. VERA
No. C83500
Exp. 3-31-23
CIVIL
STATE OF CALIFORNIA

SUBJECT: Groundwater Well Facilities Valuation for 2022 Development Impact Fee

This technical memorandum (TM) presents West Yost's findings and conclusions for the valuation of the City of Sacramento's (City) existing groundwater facility assets. This valuation will subsequently be used to support the City's ongoing Development Impact Fee (DIF) update. This TM is organized as follows:

- Background
- Valuation Methodology
- Valuation of Existing Groundwater Wells
- Findings and Conclusions

BACKGROUND

The City's Department of Utilities (DOU) has been requested to estimate the current value of the City's existing utility system assets for purposes of updating the City's DIF. For the City's 2022 DIF update, the City requested West Yost to develop an estimated valuation for the City's existing groundwater facility assets. These existing groundwater facility assets include the City's existing active municipal production wells and recently completed municipal production wells which are not yet active. Older inactive wells and non-potable irrigation wells are not included in the valuation.

The valuation considered current replacement costs, current condition/useful life of existing facilities, and recently completed facility improvements that have extended the useful life of the existing facilities. The subsequent sections of this TM describe the methodology used to establish the valuation of the City's groundwater facility assets.

The valuation of other water system facilities, including transmission/distribution system facilities, reservoirs and pump stations, and water treatment plants, are concurrently being developed by others.

VALUATION METHODOLOGY

The value of the City's groundwater facility assets was based on their remaining useful life, along with the typical replacement value (or actual value of the facility, if information was available), and recently completed facility improvements that have extended the useful life of some existing groundwater facilities.

In general, the overall useful life for a groundwater facility is 50 years[1]. A groundwater facility, however, is comprised of several components, each of which have a typical useful life which is different than the overall useful life for the overall facility. For example, site improvements at a groundwater facility are likely to have a much longer useful life than the chemical feed equipment. For the purpose of this valuation, groundwater facilities were subdivided into the following five (5) major components:

- Well Casing (Downhole)
- Pump and Motor
- Electrical Equipment
- Chemical Feed System
- Site/Building

The typical useful life of these major components are summarized in Table 1.

Table 1. Summary of Useful Life Assumptions by Asset Class

Asset Class	Typical Useful Life, years[(a)]	Straight-Line Depreciation Rate, % per year
Well Casing (Downhole)	50	2.0%
Pump and Motor	25	4.0%
Electrical Equipment	25	4.0%
Chemical Feed System	10	10.0%
Site/Building	50	2.0%
Well Facility (Overall)	50	2.0%

(a) Typical useful life estimates are based on recommendations by American Water Works Association and Water Environment Research Foundation.

To develop the value of a groundwater facility asset, the following methodology was used:

- If the groundwater facility's age exceeds the typical useful life of a well, then the value of the well was based on the value of the recent improvements, if any, performed on each of the five major well components (described above). The value of the improvements was first escalated to current dollars and subsequently depreciated based on the remaining useful life (by component). In addition, the value of the land that the groundwater facility is on was also included in the overall value (discussed in more detail in the subsequent sections below).

[1] Based on recommendations by the American Water Works Association and Water Environment Research Foundation.

- If a groundwater facility's age is less than the typical useful life of a well, then the value of the groundwater facility is based on the remaining value of a groundwater facility plus the value of recent improvements, if any, performed on each of the five major well components. If records from the recent construction of the facility were available, this information was used to establish the remaining value of the facility; if these records were not available, then a replacement cost for a new groundwater facility was used to estimate the remaining value of the facility. The value of the improvements was first escalated to current dollars and subsequently depreciated based on the remaining useful life (by component). In addition, the value of the land that the groundwater facility is on was also included in the overall value (discussed in more detail in the subsequent sections below).

Groundwater facility/well construction and rehabilitation records were provided by the City, compiled and reviewed to obtain the value of the recent improvements, and further categorized by major component. As described above, costs were first escalated to current dollars then depreciated, assuming a straight-line depreciation from the improvement year to the current year, based on the assumed depreciation rates shown in Table 1. This depreciated cost for each component was then used in the valuation of the wells described below. Costs were escalated to current (January 2022) dollars using the same methodology that the City typically applies to other projects, where an average of the ENR Construction Cost Index (CCI) for 20-Cities and San Francisco is used as the overall index. This average has been found by the City to be representative of costs in the Sacramento Region.

Groundwater Well Replacement Cost

The conceptual capital cost estimate for a new groundwater well is summarized in Table 2. Estimated construction costs are presented by the same five major well components discussed above and include an estimate of land acquisition costs. These costs are based on recent (2016 - 2022) well bid tabulation information and omit costs that are significantly impacted by market volatility and COVID supply chain constraints. In addition, the construction costs include allowances for general conditions, contractor overhead and profit, sales tax, and planning-level estimating contingencies. The construction costs presented in Table 2 are considered budget-level estimates with accuracies of -10 percent to +40 percent in accordance with the recommendations of the Association of Advancement of Cost Engineering (AACE). Other project costs are also included to estimate the value of other project elements including engineering, construction management and program implementation (e.g., administrative, CEQA, legal, etc.), which are consistent with other City planning efforts including the on-going Water Master Plan. Based on these assumptions, the total capital cost for a new groundwater well is estimated to be $5,060,500.

Land acquisition cost was estimated at $15 per square foot ($15/sq. ft.). This value is based on a review of average list prices and associated gross square footage of empty lots (zoned for commercial and industrial uses) within the North Sacramento and Del Paso Heights neighborhoods[2].

[2] Listings obtained by accessing Zillow.com on April 21, 2022 and are based on average $/sq ft prices.

Costs presented in Table 2 assume that water quality in the new wells/groundwater facilities meet all Title 22 drinking water standards. If water quality in a new well is found to not meet Title 22 drinking water standards, additional treatment facilities would be required for these facilities to be permitted as active wells, and the type of treatment would be dependent on the specific constituents that exceed maximum contaminant levels. Costs associated with these treatment facilities vary widely and would be in addition to the costs presented in Table 2.

Table 2. Conceptual Capital Cost Estimate for a New Groundwater Well

Cost Element	Basis	Estimated Cost
Construction Costs		
Downhole	Based on recent bid costs, not significantly impacted by market volatility and or supply chain constraints	$816,000
Pump and Motor		$150,000
Electrical Equipment		$700,000
Chemical Feed System		$150,000
Site/Building		$700,000
Land Acquisition	$15/sq. ft., with an assumed 6,500 sq. ft. lot	$97,500
	Subtotal	*$2,613,500*
Estimating Contingency	20% of Direct Costs	$523,000
	Subtotal Direct Construction Cost (with Contingency)	*$3,136,500*
General Conditions	10% of Direct Construction Costs (with Contingency)	$314,000
Overhead and Profit	10% of Direct Construction Costs (with Contingency)	$314,000
Sales Tax	8% of 1/2 of Direct Construction Costs (with Contingency)	$126,000
	Total Construction Cost	*$3,890,500*
Other Project Costs[a]		
Engineering	10% of Construction Cost	$390,000
Construction Management	10% of Construction Cost	$390,000
Program Implementation	10% of Construction Cost	$390,000
	Total Other Project Costs	$1,170,000
	Total Capital Costs	**$5,060,500**

(a) Other project cost multipliers are consistent with City's 2022 Water Master Plan assumptions.

VALUATION OF EXISTING GROUNDWATER WELLS

Table 3 summarizes the City's existing groundwater wells, associated pertinent well information (i.e., well name, pumping/firm capacity, active status, reliable status, years of remaining useful life, etc.) and presents the estimate of remaining value, by major asset component (five major well components) and land cost. The total value of the City's existing groundwater wells is estimated at $40.1 million (M).

Almost all the City's wells/groundwater facilities are beyond their useful life with the exception of Wells 153A, 164, 165, 166, and 167. Well 166 was recently completed at the City's E.A. Fairbairn Water Treatment Plant, and is not equipped with any above-grade pumping facilities, and is therefore inactive. Wells 165 and 167 are located at the recently completed Shasta Park reservoir and booster pumping facility and are currently not active and are undergoing startup activities. Wells 165 and 167 have elevated concentrations of methane and manganese, and a treatment system is provided for these wells. As of 2020, the combined production capacity for Wells 165 and 167 was approximately 5,000 gallons per minute (gpm). The treatment system, however, has a maximum capacity of 3,000 gpm, which limits the overall capacity of these wells. Only one well is intended to be operated and treated at a given time.

Well information was obtained during the course of the on-going City Water Master Plan effort. Active and reliable well status is based on City staff input and consistent with other planning activities. While the City has a stated total pumping capacity of 44.0 million gallons per day (mgd), it does not have the capacity to pump all of its groundwater well facilities at one time. Capacity is limited by age and performance of mechanical equipment, water quality of wells, and on-going maintenance activities, and operations at storage tanks and/or surface water treatment plants. The City has, however, identified wells/groundwater facilities that are reliable, meaning that they are more often than not producing water or are slated for upcoming improvements which would make them reliable. This reliable capacity is considered to be the City's firm groundwater supply capacity, and totals 19.6 mgd.

Table 3. Groundwater Well Valuation Summary [a]

Well	Address	Original Construction Date	Pumping Capacity (gpm)	Reliable Well	Firm Capacity (gpm) [b]	Status	Overall Age	Years of Remaining Useful Life	APN	Lot Size (sq. ft.)	Estimate of Remaining Value by Major Asset Component [c,d]: Downhole	Pump and Motor	Electrical	Chemical System	Site/Building	Land [e]	Total Asset Value	Notes
Active Wells (Permitted)																		
83	Wyndham Dr	1963	750	N	0	Active	59	(9)	11700610180000	1,735	$ 164,821	$ 65,741	$ 125,009	$ 8,588	$ 40,772	$ 26,021	$ 430,951	
91	Northview Dr	1956	320	N	0	Active	66	(16)	26202340110000	1,830	$ -	$ -	$ 32,209	$ 4,131	$ 1,787	$ 27,445	$ 65,572	
93	Tenaya Ave	1956	330	N	0	Active	66	(16)	26200530510000	2,422	$ -	$ 840	$ 62,645	$ 4,131	$ 2,286	$ 36,335	$ 106,236	
94	Rio Tierra Ave	1955	900	Y	900	Active	67	(17)	25005200060000	2,335	$ 291,892	$ 35,251	$ 86,958	$ 8,399	$ 46,093	$ 35,029	$ 503,620	
107	Grandstaff Dr	1964	1,000	N	0	Active	58	(8)	11700210230000	2,224	$ 324,324	$ 39,167	$ 95,741	$ 8,530	$ 51,214	$ 33,365	$ 552,342	
112	Calvados Ave	1944	750	N	0	Active	78	(28)	27701410010000	873	$ -	$ -	$ 78,374	$ 4,212	$ 12,889	$ 13,097	$ 108,583	This well has reached 50% of the maximum contaminant level for Title 22 standards and therefore the City will be taking it offline.
114	Arden Way	1945	687	N	0	Active	77	(27)	27702410030000	714	$ -	$ -	$ 106,031	$ 4,212	$ 1,787	$ 10,705	$ 122,735	This well has reached 50% of the maximum contaminant level for Title 22 standards and therefore the City will be taking it offline.
120	Branch St	1946	1,050	Y	1,050	Active	76	(26)	26501210240000	4,292	$ 340,540	$ 41,126	$ 100,133	$ 8,596	$ 53,775	$ 64,386	$ 608,556	
122	Juliesse Ave	1948	1,050	Y	1,050	Active	74	(24)	26501910020000	2,227	$ 340,540	$ 41,126	$ 100,133	$ 8,596	$ 53,775	$ 33,399	$ 577,569	
123	Western Ave	1960	940	N	0	Active	62	(12)	26303210010000	1,103	$ -	$ -	$ 94,789	$ 4,131	$ 5,237	$ 16,547	$ 120,703	
124	Danville Way	1954	525	N	0	Active	68	(18)	26303030090000	1,220	$ -	$ -	$ 35,851	$ -	$ -	$ 18,300	$ 54,151	
126	Rivera Dr	1950	930	Y	930	Active	72	(22)	25102600050000	6,776	$ 301,622	$ 36,426	$ 89,593	$ 8,438	$ 47,629	$ 101,640	$ 585,347	
127	Arcade Blvd	1965	530	N	0	Active	57	(7)	25103300100000	8,266	$ 40,813	$ -	$ 29,462	$ 3,884	$ 1,787	$ 123,983	$ 199,929	This well is planned for destruction.
129	Rio Linda Blvd	1957	850	N	0	Active	65	(15)	25100510020000	1,549	$ 275,676	$ 33,292	$ 82,566	$ 8,333	$ 43,532	$ 23,241	$ 466,640	
131	North Ave	1946	550	N	0	Active	76	(26)	25200120240000	4,995	$ 120,868	$ 48,210	$ 93,782	$ 8,235	$ 29,889	$ 74,929	$ 375,923	
133	Pell Dr	1962	1,350	Y	1,350	Active	60	(10)	23700220360000	6,010	$ 437,838	$ 52,876	$ 126,483	$ 8,991	$ 69,139	$ 90,156	$ 785,484	
134	Bell Ave	1961	750	N	0	Active	61	(11)	23702650360000	4,220	$ 144,355	$ -	$ 29,427	$ 4,160	$ -	$ 63,306	$ 241,247	
137	N/A	1965	750	N	0	Active	57	(7)	#N/A	4,900	$ 166,008	$ 65,741	$ 125,009	$ 8,588	$ 40,772	$ 73,500	$ 479,618	
138	Fell St	1965	950	Y	950	Active	57	(7)	23703110110000	5,089	$ 308,108	$ 37,209	$ 91,349	$ 1,474	$ 48,654	$ 76,332	$ 563,126	
139	Lathrop Way	1965	818	N	0	Active	57	(7)	27502540020000	2,160	$ -	$ 407	$ 79,658	$ 4,212	$ -	$ 32,394	$ 116,671	
143	Acacia Ave	1965	900	N	0	Active	57	(7)	26500710080000	10,485	$ 200,767	$ 77,206	$ 145,433	$ 8,091	$ 49,664	$ 157,269	$ 638,430	
144	Eldridge Ave	Unknown	488	N	0	Active	--	--	26503710120000	6,034	$ 115,340	$ 41,863	$ 82,476	$ 7,713	$ 26,929	$ 90,506	$ 364,826	This well is planned for destruction.
153A	Main Ave	1993	1,020	N	0	Active	29	21	23700400470000	6,567	$ 891,142	$ 209,487	$ 733,040	$ 130,187	$ 625,555	$ 98,500	$ 2,687,912	
154	Dry Creek Rd	1967	380	N	0	Active	55	(5)	21502300530000	2,659	$ 156,471	$ -	$ 36,007	$ 4,160	$ 13,656	$ 39,882	$ 250,176	This well is planned for destruction.
155	Roanoke Ave	1968	820	N	0	Active	54	(4)	25202020190000	3,973	$ 184,109	$ 70,344	$ 133,208	$ 8,017	$ 45,249	$ 59,588	$ 500,515	
156	Tribute Rd	1968	900	Y	900	Active	54	(4)	27702820020000	3,423	$ 146,482	$ -	$ 34,730	$ 4,160	$ 13,656	$ 51,350	$ 250,379	
158	Challenge Way	1968	900	Y	900	Active	54	(4)	27702710030000	2,207	$ -	$ 840	$ 68,931	$ 4,131	$ 1,787	$ 33,106	$ 108,794	
164	Kelton Way	1993	1,200	N	0	Active	29	21	22600500360000	5,958	$ 932,484	$ 224,928	$ 760,545	$ 130,352	$ 635,488	$ 89,366	$ 2,773,163	
165 [f,g]	Kastanis Way	2018	2,800	Y	2,800	Inactive	4	46	11701820230000	78,000	$ 5,513,726	$ 267,208	$ 2,129,283	$ 1,028,587	$ 1,635,022	$ -	$ 10,573,827	This well was recently completed and equipped with treatment and is undergoing the startup process.
166 [h]	College Town Dr	2016	2,800	Y	2,800	Inactive	6	44	00500100110000	76,600	$ 1,390,413	$ 255,591	$ 1,192,756	$ 255,591	$ 1,192,756	$ -	$ 4,287,106	Only downhole facility constructed. City will be working towards equipping this facility (design and construction activities ongoing).
167 [f,g]	Kastanis Way	2018	2,200	N	0	Inactive	4	46	11701820230000	78,000	$ 5,513,726	$ 267,208	$ 2,129,283	$ 1,028,587	$ 1,635,022	$ -	$ 10,573,827	This well was recently completed and equipped with treatment and is undergoing the startup process.
	Total Capacity (mgd)		**44.0**	**Firm Capacity (mgd)**	**19.6**					**Subtotal - Active Wells**	**$ 18,302,065**	**$ 1,912,085**	**$ 9,110,894**	**$ 2,729,418**	**$ 6,425,820**	**$ 1,593,677**	**$ 40,073,959**	
Inactive Wells																		
Not included in Valuation																		
Non-Potable Wells																		
Not included in Valuation																		

(a) Well information based on GIS files provided by City as well as the 2015 GWMP.
(b) While well facilities that are designated active status are available to pump and produce groundwater, they are not necessarily reliable due to many limiting factors (e.g. age, changing water quality conditions, etc.). Wells designated as reliable are wells that do not have limiting factors and/or wells which the City intends to invest in the future, making them more reliable. Wells designated as reliable are based on City staff input and consistent with other planning activities.
(c) Remaining value for major components of well was determined as follows:
For Wells where age exceeds the typical useful life of a well (i.e., 50 years) the value of downhole, pump and motor, electrical, chemical system, site and building is based on recent improvements, escalated to current dollars (i.e., January 2022), and depreciated (i.e., straight line) to current useful life.
For Wells where age is less than the typical useful life of a well (i.e., 50 years) the value of downhole, pump and motor, electrical, chemical system, site and buildings is based on recent improvements, escalated to current dollars (i.e., January 2022), and depreciated (i.e., straight line) to current useful life plus the remaining value of a new well (Refer to Table 2).
(d) Cost of recent improvements were (1) escalated to current dollars by using the average of the SF and 20-Cities construction cost index, escalated to January 2022 dollars, and then (2) depreciated by the associated depreciation rate (straight line) based on component type (Refer to Table 1).
(e) Value of land is based on a unit cost of $15/square foot, which is estimated based on the average listings of empty lots in the north Sacramento / Del Paso Heights neighborhoods from Zillow.com.
(f) As of 2020, the combined groundwater well capacity for Wells 165 and 167 was approximately 5,000 gpm. However, both wells have an elevated concentration of methane and manganese and therefore, a treatment system was equipped on these wells. The treatment system has a maximum capacity of 3,000 gpm, limiting the overall capacity of these wells (i.e. only one well is operated and treated at a time).
(g) Both Wells 165 and 167 are located at Shasta reservoir and pump station facility. Land costs are not accounted for these wells as they are assumed to already be accounted for the reservoir and pump station costs.
(h) Well 166 is located at the Fairbairn Water Treatment Plant. Land costs are not accounted for this well as the land costs are assumed to already be accounted for the Fairbairn Water Treatment Plant cost.

FINDINGS AND CONCLUSIONS

The following summarizes West Yost's findings and conclusions from the valuation of the City's groundwater facilities:

- Based on available recent improvement cost information, typical replacement costs or available costs for the construction of recent wells, the total value of the City's groundwater facilities/wells is estimated at $40.1M.
- Nearly all of the City's groundwater facilities/wells are beyond the recommended useful life of 50 years.
- The City will need to make major investments in its groundwater well program to increase the remaining useful life of its groundwater facilities/wells and maintain their firm capacity.
- The City's reliable/firm groundwater supply capacity is currently equal to 19.6 mgd. As the City proceeds with the DIF updates, this supply capacity should be used to define how much existing supply capacity future customers are buying into.

Transmission Mains

City of SACRAMENTO Department of Utilities

MEMO- DRAFT

TO: Michelle Carrey, Supervising Engineer

FROM: Kathy Sananikone, Assistant Engineer

CC: Brett Ewart, Supervising Engineer

DATE: May 24, 2022

SUBJECT: City Transmission Main Valuation

Summary

The total remaining value of the City of Sacramento's 158 miles of transmission main is estimated to be **$234,483,136** (Table 1). Age of City's transmission mains ranged from 2 to 131 years, with a median age of 47.5 years. Over 56% of the City's mains are older than 47 years; the largest inventory at 60 years. Pipe materials used for transmission mains within the City include cast iron, concrete cylinder, ductile and wrought iron, and riveted and welded steel, with concrete cylinder making up over 50%. Table 2 provides the percent, age range, and pipe diameters for the various pipe materials throughout the City.

Table 1. Remaining Value of Transmission Main

Pipe Diameter (in)	Total Length (%)	2022 Replacement Cost ($)	Depreciation Value ($)	Remaining Value ($)
14	2.1%	$5,879,459	$5,377,265	$502,194
16	2.2%	$7,007,300	$5,510,147	$1,497,153
18	11.9%	$41,502,637	$22,877,685	$18,624,952
20	0.4%	$1,552,273	$1,201,118	$351,155
24	28.2%	$129,218,820	$69,807,439	$59,411,381
30	23.7%	$135,316,484	$86,214,626	$49,101,858
36	18.9%	$129,631,959	$77,960,795	$51,671,164
38	0.3%	$1,992,257	$1,992,257	$0
42	5.2%	$41,713,450	$28,301,920	$13,411,530
48	2.8%	$26,264,881	$15,618,937	$10,645,944
54	3.1%	$32,780,402	$12,207,045	$20,573,357
60	0.6%	$7,427,207	$4,731,372	$2,695,835
66	0.3%	$4,015,372	$754,319	$3,261,054
72	0.3%	$3,894,198	$2,044,967	$1,849,230
84	0.1%	$963,402	$77,072	$886,330
Grand Total	**100.0%**	**$569,160,101**	**$334,676,964**	**$234,483,136**

Table 2. Percentage, Age Range, and Pipe Diameters by Pipe Material

Pipe Material	Percent of Inventory	Age Range	Pipe Diameters (inch)
Cast Iron	2.9%	23-121	14-20
Concrete Cylinder Pipe	51.5%	4-101	14-72
Iron (ductile, wrought)	13.4%	2-107	16-42
Steel (riveted, welded)	31.6%	2-107	10-84
Unknown	0.6%	9-131	14-72

Methodology

Original cost of pipe construction was not available, thus remaining value was based on replacement cost in 2022 dollars minus the depreciation value. Cost estimates per pipe diameter were taken as the average data found in the Sacramento Suburban Water District Water Transmission Main Asset Management Plan published in 2014 and 2020 data provided by consultant, West Yost and Associates. Costs were adjusted to 2022 dollars using ENR's Construction Cost Index (Table 3). Depreciation was calculated for individual pipe sections for varying age and pipe diameters.

Table 3. Estimated Replacement Cost Per Foot

Pipe Diameter (inches)	Estimated Cost in 2022 ($/ft)
14	$ 344.96
16	$ 351.16
18	$ 387.63
20	$ 428.41
24	$ 492.25
30	$ 676.08
36	$ 835.82
48	$ 1,153.09
54	$ 1,291.46
72	$ 1,729.63
78	$ 1,875.69

Assumptions

A straight-line depreciation was used based on a 75-year service life, irrespective of pipe material. For pipes older than 75 years, it was assumed complete depreciation with remaining value of $0. Construction method was assumed to be open trench construction.

Appendix A

Diameter (inches)	Age of Pipe (years)	Length (ft)	Sum of 2022 Replacement Cost	Sum of Depreciation Value ($/yr)	Sum of Remaining Value
14	2	86.67	$28,946	$772	$28,174
	6	51.98	$17,360	$1,389	$15,971
	10	50.17	$16,756	$2,234	$14,522
	13	157.92	$52,746	$9,143	$43,603
	15	96.63	$32,273	$6,455	$25,819
	16	3.00	$1,002	$214	$788
	17	47.47	$15,854	$3,593	$12,260
	34	79.00	$26,386	$11,962	$14,424
	46	282.63	$94,396	$57,896	$36,500
	47	347.11	$115,932	$72,651	$43,281
	56	409.18	$136,663	$102,042	$34,621
	57	2242.25	$748,902	$569,166	$179,737
	60	44.35	$14,814	$11,851	$2,963
	68	672.67	$224,668	$203,699	$20,969
	70	1282.74	$428,431	$399,869	$28,562
	75	836.12	$279,259	$279,259	$0
	76	20.00	$6,680	$6,680	$0
	84	165.19	$55,173	$55,173	$0
	97	3364.49	$1,123,724	$1,123,724	$0
	107	5925.79	$1,979,186	$1,979,186	$0
	121	1438.07	$480,309	$480,309	$0
14 Total		**17603.40**	**$5,879,459**	**$5,377,265**	**$502,194**
16	2	380.44	$143,188	$3,818	$139,369
	4	6.00	$2,258	$120	$2,138
	14	3.54	$1,332	$249	$1,084
	15	58.20	$21,905	$4,381	$17,524
	16	63.77	$24,000	$5,120	$18,880
	20	57.00	$21,452	$5,721	$15,731
	23	3.33	$1,254	$384	$869
	27	2299.21	$865,367	$311,532	$553,835
	29	589.89	$222,021	$85,848	$136,173
	31	1262.01	$474,989	$196,329	$278,660
	33	467.97	$176,131	$77,498	$98,633
	34	122.73	$46,194	$20,941	$25,253
	41	968.05	$364,351	$199,178	$165,172
	54	15.00	$5,645	$4,065	$1,581
	70	1683.80	$633,742	$591,493	$42,249
	85	52.12	$19,618	$19,618	$0
	87	132.55	$49,888	$49,888	$0
	92	9.35	$3,520	$3,520	$0
	107	10017.05	$3,770,173	$3,770,173	$0
	121	425.82	$160,270	$160,270	$0
16 Total		**18617.84**	**$7,007,300**	**$5,510,147**	**$1,497,153**
18	2	211.02	$88,454	$2,359	$86,096
	8	3130.22	$1,312,101	$139,957	$1,172,143
	10	168.16	$70,487	$9,398	$61,089
	12	1625.51	$681,370	$109,019	$572,350
	14	316.47	$132,655	$24,762	$107,893
	15	777.56	$325,931	$65,186	$260,745
	16	913.69	$382,995	$81,706	$301,289
	17	526.84	$220,836	$50,056	$170,780
	18	15.88	$6,655	$1,597	$5,058
	19	5785.66	$2,425,189	$614,381	$1,810,808
	20	3206.82	$1,344,212	$358,457	$985,756
	21	6602.55	$2,767,607	$774,930	$1,992,677

Appendix A

Diameter (inches)	Age of Pipe (years)	Length (ft)	Sum of 2022 Replacement Cost	Sum of Depreciation Value ($/yr)	Sum of Remaining Value
18	23	2316.96	$971,208	$297,837	$673,371
	24	9718.51	$4,073,732	$1,303,594	$2,770,138
	26	10.00	$4,192	$1,453	$2,739
	27	2993.20	$1,254,665	$451,679	$802,986
	34	9179.48	$3,847,785	$1,744,329	$2,103,456
	38	398.53	$167,053	$84,640	$82,413
	43	5172.50	$2,168,169	$1,243,084	$925,085
	45	154.56	$64,788	$38,873	$25,915
	50	2678.16	$1,122,612	$748,408	$374,204
	51	140.25	$58,787	$39,975	$18,812
	54	245.53	$102,918	$74,101	$28,817
	58	3846.45	$1,612,326	$1,246,865	$365,461
	59	13567.76	$5,687,229	$4,473,954	$1,213,276
	60	6320.47	$2,649,366	$2,119,493	$529,873
	61	5709.82	$2,393,398	$1,946,630	$446,768
	62	10005.15	$4,193,883	$3,466,943	$726,940
	67	170.97	$71,666	$64,022	$7,644
	71	16.66	$6,985	$6,612	$373
	84	3085.56	$1,293,383	$1,293,383	$0
18 Total		**99010.90**	**$41,502,637**	**$22,877,685**	**$18,624,952**
20	2	35.00	$16,185	$432	$15,753
	14	3.97	$1,835	$343	$1,493
	20	53.22	$24,610	$6,563	$18,047
	21	14.91	$6,892	$1,930	$4,962
	31	905.02	$418,467	$172,966	$245,500
	55	530.39	$245,247	$179,848	$65,399
	76	1155.59	$534,327	$534,327	$0
	84	556.47	$257,305	$257,305	$0
	95	5.84	$2,701	$2,701	$0
	107	96.68	$44,704	$44,704	$0
20 Total		**3357.09**	**$1,552,273**	**$1,201,118**	**$351,155**
24	2	1307.32	$719,111	$19,176	$699,934
	3	206.89	$113,802	$4,552	$109,250
	4	212.73	$117,013	$6,241	$110,773
	6	107.86	$59,330	$4,746	$54,583
	8	19086.34	$10,498,701	$1,119,861	$9,378,840
	10	3998.13	$2,199,227	$293,230	$1,905,996
	12	7024.74	$3,864,056	$618,249	$3,245,807
	13	216.65	$119,169	$20,656	$98,513
	14	5239.94	$2,882,299	$538,029	$2,344,270
	15	2976.60	$1,637,318	$327,464	$1,309,854
	16	5370.45	$2,954,088	$630,206	$2,323,883
	17	11.32	$6,224	$1,411	$4,813
	18	92.76	$51,023	$12,245	$38,777
	19	6208.26	$3,414,941	$865,118	$2,549,822
	20	10018.46	$5,510,791	$1,469,544	$4,041,247
	21	17.06	$9,386	$2,628	$6,758
	22	8173.73	$4,496,069	$1,318,847	$3,177,222
	23	7386.93	$4,063,283	$1,246,073	$2,817,209
	24	12623.93	$6,943,964	$2,222,069	$4,721,896
	26	564.58	$310,556	$107,659	$202,897
	27	4283.68	$2,356,297	$848,267	$1,508,030
	30	351.83	$193,528	$77,411	$116,117
	33	30.00	$16,502	$7,261	$9,241
	34	90.93	$50,018	$22,675	$27,343

Appendix A

Diameter (inches)	Age of Pipe (years)	Length (ft)	Sum of 2022 Replacement Cost	Sum of Depreciation Value ($/yr)	Sum of Remaining Value
24	35	2060.18	$1,133,228	$528,840	$604,388
	37	10393.22	$5,716,934	$2,820,354	$2,896,580
	38	10334.55	$5,684,660	$2,880,228	$2,804,432
	40	234.61	$129,053	$68,828	$60,225
	41	13799.57	$7,590,642	$4,149,551	$3,441,091
	43	21.56	$11,857	$6,798	$5,059
	48	5212.23	$2,867,055	$1,834,915	$1,032,140
	50	6.00	$3,300	$2,200	$1,100
	51	4470.64	$2,459,139	$1,672,214	$786,924
	52	22.63	$12,446	$8,629	$3,817
	53	9830.18	$5,407,224	$3,821,105	$1,586,119
	54	4642.45	$2,553,643	$1,838,623	$715,020
	55	8838.35	$4,861,654	$3,565,213	$1,296,441
	56	4531.39	$2,492,552	$1,861,105	$631,446
	57	5196.98	$2,858,668	$2,172,588	$686,080
	59	177.73	$97,763	$76,907	$20,856
	60	11359.07	$6,248,211	$4,998,569	$1,249,642
	61	2716.27	$1,494,122	$1,215,219	$278,903
	62	5277.11	$2,902,746	$2,399,604	$503,143
	65	5.00	$2,750	$2,384	$367
	67	60.35	$33,197	$29,656	$3,541
	71	23.32	$12,825	$12,141	$684
	73	20.89	$11,491	$11,185	$306
	76	28987.00	$15,944,693	$15,944,693	$0
	79	411.77	$226,500	$226,500	$0
	84	22.76	$12,517	$12,517	$0
	85	77.83	$42,810	$42,810	$0
	86	7.47	$4,110	$4,110	$0
	87	10347.36	$5,691,705	$5,691,705	$0
	95	64.84	$35,667	$35,667	$0
	96	16.38	$9,012	$9,012	$0
	97	64.90	$35,699	$35,699	$0
	101	80.45	$44,251	$44,251	$0
24 Total		**234916.14**	**$129,218,820**	**$69,807,439**	**$59,411,381**
30	2	141.92	$97,174	$2,591	$94,583
	6	6830.30	$4,676,746	$374,140	$4,302,607
	9	27.95	$19,139	$2,297	$16,842
	13	253.26	$173,410	$30,058	$143,353
	16	4945.33	$3,386,096	$722,367	$2,663,729
	17	90.70	$62,106	$14,077	$48,028
	20	1021.12	$699,164	$186,444	$512,721
	21	10643.88	$7,287,930	$2,040,620	$5,247,309
	22	76.29	$52,238	$15,323	$36,915
	23	2454.22	$1,680,422	$515,330	$1,165,093
	25	439.55	$300,962	$100,321	$200,641
	26	44.21	$30,273	$10,495	$19,778
	29	5052.13	$3,459,227	$1,337,568	$2,121,659
	30	8078.74	$5,531,558	$2,212,623	$3,318,935
	33	1727.46	$1,182,804	$520,434	$662,371
	35	12025.10	$8,233,658	$3,842,374	$4,391,284
	38	6713.12	$4,596,515	$2,328,901	$2,267,614
	42	3023.15	$2,069,967	$1,159,181	$910,785
	48	7675.02	$5,255,130	$3,363,283	$1,891,847
	49	226.11	$154,815	$101,146	$53,669
	50	3568.06	$2,443,074	$1,628,716	$814,358

Appendix A

Diameter (inches)	Age of Pipe (years)	Length (ft)	Sum of 2022 Replacement Cost	Sum of Depreciation Value ($/yr)	Sum of Remaining Value
30	51	9634.37	$6,596,709	$4,485,762	$2,110,947
	52	19643.61	$13,450,100	$9,325,402	$4,124,697
	53	2389.99	$1,636,437	$1,156,416	$480,022
	54	8714.01	$5,966,537	$4,295,907	$1,670,630
	55	3874.42	$2,652,841	$1,945,416	$707,424
	56	732.89	$501,814	$374,687	$127,126
	57	398.53	$272,876	$207,386	$65,490
	59	8389.53	$5,744,364	$4,518,900	$1,225,464
	60	36912.74	$25,274,372	$20,219,497	$5,054,874
	61	1912.53	$1,309,517	$1,065,074	$244,443
	62	19959.82	$13,666,608	$11,297,729	$2,368,879
	67	516.73	$353,808	$316,068	$37,739
	76	5.48	$3,752	$3,752	$0
	84	8055.68	$5,515,771	$5,515,771	$0
	101	1429.18	$978,569	$978,569	$0
30 Total		**197627.13**	**$135,316,484**	**$86,214,626**	**$49,101,858**
36	6	187.11	$154,010	$12,321	$141,689
	8	4.54	$3,737	$399	$3,338
	12	12315.85	$10,137,171	$1,621,947	$8,515,223
	15	4377.77	$3,603,341	$720,668	$2,882,673
	16	3249.90	$2,674,995	$570,666	$2,104,329
	18	1285.40	$1,058,016	$253,924	$804,092
	21	2486.07	$2,046,280	$572,958	$1,473,322
	22	6152.69	$5,064,274	$1,485,520	$3,578,753
	24	542.85	$446,819	$142,982	$303,837
	25	8387.23	$6,903,528	$2,301,176	$4,602,352
	26	11761.37	$9,680,777	$3,356,003	$6,324,775
	27	30.21	$24,862	$8,950	$15,912
	31	1150.49	$946,968	$391,413	$555,554
	33	7285.19	$5,996,434	$2,638,431	$3,358,003
	34	1319.91	$1,086,417	$492,509	$593,908
	35	4.09	$3,364	$1,570	$1,794
	38	533.53	$439,145	$222,500	$216,645
	41	1694.08	$1,394,400	$762,272	$632,128
	42	12.00	$9,877	$5,531	$4,346
	45	77.20	$63,541	$38,124	$25,416
	50	4.96	$4,086	$2,724	$1,362
	51	10098.79	$8,312,313	$5,652,373	$2,659,940
	53	8022.42	$6,603,254	$4,666,300	$1,936,955
	54	545.60	$449,083	$323,340	$125,743
	55	1442.87	$1,187,626	$870,926	$316,700
	57	5162.03	$4,248,867	$3,229,139	$1,019,728
	58	13381.69	$11,014,467	$8,517,854	$2,496,612
	59	9017.52	$7,422,320	$5,838,892	$1,583,428
	60	9796.95	$8,063,869	$6,451,095	$1,612,774
	61	19352.72	$15,929,214	$12,955,760	$2,973,453
	62	1680.65	$1,383,340	$1,143,561	$239,779
	68	2943.14	$2,422,497	$2,196,397	$226,100
	71	7756.49	$6,384,366	$6,043,867	$340,500
	76	2756.13	$2,268,569	$2,268,569	$0
	84	130.00	$107,004	$107,004	$0
	95	2542.98	$2,093,130	$2,093,130	$0
36 Total		**157492.43**	**$129,631,959**	**$77,960,795**	**$51,671,164**
38	95	2289.78	$1,992,257	$1,992,257	$0
38 Total		**2289.78**	**$1,992,257**	**$1,992,257**	**$0**

Appendix A

Diameter (inches)	Age of Pipe (years)	Length (ft)	Sum of 2022 Replacement Cost	Sum of Depreciation Value ($/yr)	Sum of Remaining Value
42	9	3901.96	$3,766,344	$451,961	$3,314,383
	18	1554.31	$1,500,294	$360,070	$1,140,223
	33	295.82	$285,538	$125,637	$159,902
	42	3096.37	$2,988,752	$1,673,701	$1,315,051
	43	1132.77	$1,093,396	$626,880	$466,515
	44	310.78	$299,977	$175,987	$123,991
	45	299.82	$289,404	$173,642	$115,761
	55	4007.50	$3,868,220	$2,836,695	$1,031,525
	56	9125.45	$8,808,291	$6,576,857	$2,231,434
	57	5885.16	$5,680,619	$4,317,270	$1,363,349
	59	3859.52	$3,725,381	$2,930,633	$794,748
	61	7518.35	$7,257,043	$5,902,395	$1,354,648
	76	1029.57	$993,791	$993,791	$0
	95	1198.04	$1,156,400	$1,156,400	$0
42 Total		**43215.43**	**$41,713,450**	**$28,301,920**	**$13,411,530**
48	19	6.63	$7,367	$1,866	$5,501
	22	8503.94	$9,449,067	$2,771,726	$6,677,341
	23	19.94	$22,159	$6,795	$15,363
	24	350.62	$389,583	$124,667	$264,917
	54	2559.17	$2,843,597	$2,047,390	$796,207
	57	3716.61	$4,129,676	$3,138,554	$991,122
	59	4605.16	$5,116,977	$4,025,355	$1,091,622
	61	3875.71	$4,306,455	$3,502,583	$803,872
48 Total		**23637.77**	**$26,264,881**	**$15,618,937**	**$10,645,944**
54	6	625.03	$788,033	$63,043	$724,990
	17	2819.49	$3,554,779	$805,750	$2,749,029
	18	358.71	$452,254	$108,541	$343,713
	19	7326.75	$9,237,474	$2,340,160	$6,897,314
	27	6265.23	$7,899,119	$2,843,683	$5,055,436
	28	620.48	$782,293	$292,056	$490,237
	30	4321.20	$5,448,120	$2,179,248	$3,268,872
	52	588.18	$741,565	$514,152	$227,413
	57	215.01	$271,080	$206,020	$65,059
	59	2326.89	$2,933,712	$2,307,853	$625,858
	61	532.98	$671,974	$546,539	$125,435
54 Total		**25999.94**	**$32,780,402**	**$12,207,045**	**$20,573,357**
60	6	147.70	$208,881	$16,710	$192,171
	17	157.87	$223,252	$50,604	$172,648
	18	1035.85	$1,464,890	$351,574	$1,113,316
	23	87.31	$123,472	$37,865	$85,608
	34	126.24	$178,530	$80,934	$97,596
	59	2847.73	$4,027,217	$3,168,077	$859,140
	61	664.27	$939,408	$764,052	$175,356
	109	21.63	$30,583	$30,583	$0
	115	17.41	$24,624	$24,624	$0
	116	59.54	$84,199	$84,199	$0
	128	23.89	$33,791	$33,791	$0
	131	62.48	$88,359	$88,359	$0
60 Total		**5251.93**	**$7,427,207**	**$4,731,372**	**$2,695,835**
66	6	1293.38	$2,032,340	$162,587	$1,869,753
	18	340.78	$535,486	$128,517	$406,969
	24	921.22	$1,447,546	$463,215	$984,331
66 Total		**2555.39**	**$4,015,372**	**$754,319**	**$3,261,054**
72	6	2.00	$3,464	$277	$3,187
	17	211.91	$367,071	$83,203	$283,868

Appendix A

Diameter (inches)	Age of Pipe (years)	Length (ft)	Sum of 2022 Replacement Cost	Sum of Depreciation Value ($/yr)	Sum of Remaining Value
72	18	910.66	$1,577,485	$378,596	$1,198,889
	61	1123.51	$1,946,178	$1,582,891	$363,287
72 Total		**2248.08**	**$3,894,198**	**$2,044,967**	**$1,849,230**
84	6	466.47	$963,402	$77,072	$886,330
84 Total		**466.47**	**$963,402**	**$77,072**	**$886,330**
Grand Total		**834289.73**	**$569,160,101**	**$334,676,964**	**$234,483,136**

Appendix B-3

CIP

Summary

Parent Program	Project Name	Cost Allocation Total	Existing	New Growth	New Growth %
BACKFLOW PREVENTION DEVICE3330	Backflow Prevention Device program development				
BACKFLOW PREVENTION DEVICE3330 Total		$75,000	$75,000	$0	0.0%
BASE CIP CONTINGENCY-WATER	BASE CIP CONTINGENCY-WATER				
BASE CIP CONTINGENCY-WATER Total		$17,000,000	$17,000,000	$0	0.0%
DISTRIB MAIN REHAB PROGRAM	Chlorine Analyzers - Distrib System				
	Franklin Blvd Distribution Main Improvements				
	Hydraulic model update				
	Main Replacement Program Development & Implementation				
	Meters and electrical at Interties				
	Water Distribution System Improvements				
DISTRIB MAIN REHAB PROGRAM Total		$160,772,400	$160,772,400	$0	0.0%
DOU FACILITIES IMPR/REHAB	1395 35th Ave Roof Replacement				
	DOU Facilities Project TBD				
	Electrical Projects by Facillities				
	General Admin Bldg CIP by Facilities				
	Roof repairs at water facilities				
DOU FACILITIES IMPR/REHAB Total		$4,377,102	$4,377,102	$0	0.0%
DOU IT PROGRAM	Asset gathering project				
	Asset management support				
	CCB Upgrade				
	DOU documents integrate to CCM				
	Photo Collections				
	Transform to Utility Network data model				
	Citywide Enterprise PM Program				
	GIS System Upgrade				
	CCB Customer Self Service Portal				
	WO management systems upgrade/consolidation				
DOU IT PROGRAM Total		$8,646,600	$6,761,641	$1,884,959	21.8%
DRINKING WATER QUALITY 3330	FWTP Lab Equipment Purchases				
	Ozone Pilot				
	UDF				
	WQ sampling station				
DRINKING WATER QUALITY 3330 Total		$4,937,000	$3,860,734	$1,076,266	21.8%

Sources: DOU and EPS

Parent Program	Project Name	Cost Allocation: Total	Existing	New Growth	New Growth %
FIRE HYDRANT & GATE VALVE REPL	FIRE HYDRANT & GATE VALVE REPL				
FIRE HYDRANT & GATE VALVE REPL Total		$4,850,000	$4,850,000	$0	0.0%
FWTP	Chlorine Pipes	$50,000	$39,100	$10,900	21.8%
	FTWP Grit Basin R&R Projects	$700,000	$547,400	$152,600	21.8%
	FWTP Caviblasting	$1,200,000	$1,200,000	$0	0.0%
	FWTP Chemical tanks	$600,000	$469,200	$130,800	21.8%
	FWTP Concrete Repair projects	$2,295,000	$1,794,690	$500,310	21.8%
	FWTP Filter Wash Water System R&R Projects	$450,000	$351,900	$98,100	21.8%
	FWTP Fire System	$250,000	$250,000	$0	0.0%
	FWTP gear boxes	$250,000	$195,500	$54,500	21.8%
	FWTP General Valve and Sluice Gate R&R Projects	$1,030,000	$805,460	$224,540	21.8%
	FWTP Gravity thickener system R&R Projects	$100,000	$78,200	$21,800	21.8%
	FWTP HVAC	$750,000	$750,000	$0	0.0%
	FWTP Instrumentation replacements	$1,650,000	$1,290,300	$359,700	21.8%
	FWTP Intake Structure R&R Projects	$1,000,000	$782,000	$218,000	21.8%
	FWTP Large flow meters	$550,000	$430,100	$119,900	21.8%
	FWTP Lime System Projects	$1,420,000	$1,110,440	$309,560	21.8%
	FWTP MOVS_ACTUATORS	$2,400,000	$1,876,800	$523,200	21.8%
	FWTP Paintings	$1,000,000	$1,000,000	$0	0.0%
	FWTP PLCs	$1,500,000	$1,173,000	$327,000	21.8%
	FWTP Project TBD	$9,350,000	$9,350,000	$0	0.0%
	FWTP pumps & motors repair &/or replace	$1,330,000	$1,040,060	$289,940	21.8%
	FWTP Roofs	$1,100,000	$1,100,000	$0	0.0%
	FWTP Sed Basin R&R Projects	$1,000,000	$782,000	$218,000	21.8%
	FWTP Substation Replacement Project	$500,000	$391,000	$109,000	21.8%
	FWTP supply feed meter	$300,000	$234,600	$65,400	21.8%
	FWTP Switchgear replacement	$1,000,000	$782,000	$218,000	21.8%
	FWTP VFDS	$1,600,000	$1,251,200	$348,800	21.8%
	Generators	$3,500,000	$2,737,000	$763,000	21.8%
	Generic Facilities projects at FWTP	$1,107,640	$1,107,640	$0	0.0%
	FWTP Network Hardware	$2,250,000	$1,759,500	$490,500	21.8%
FWTP Total					
INFORMATION TECHNOLOGY - SCADA	Communications Tower				
	FY22 SCADA Project from Master Plan				
	New pressure zone in NE study				
	PLCs				
	Review of SCADA				
	SCADA Fiber Optics				

Parent Program	Project Name	Total	Existing	New Growth	New Growth %
		Cost Allocation			
INFORMATION TECHNOLOGY - SCADA Total		$10,473,030	$8,189,909	$2,283,121	21.8%
RESERVOIR PROGRAM	Cathodic Protection Systems	$50,000	$39,100	$10,900	21.8%
	Elevated Reservoir Platforms	$1,638,000	$1,280,916	$357,084	21.8%
	Exterior concrete sealing	$3,700,000	$2,893,400	$806,600	21.8%
	Florin Reservoir Upgrades	$2,250,000	$1,759,500	$490,500	21.8%
	Freeport Res Improvement Project	$350,000	$273,700	$76,300	21.8%
	Hatch R&R at Reservoir	$225,000	$175,950	$49,050	21.8%
	Interior & exterior Coatings of reservoirs	$21,048,600	$16,460,005	$4,588,595	21.8%
	Ladder R&R Projects	$2,750,000	$2,150,500	$599,500	21.8%
	Reservoir Assessments and Improvements	$602,500	$471,155	$131,345	21.8%
	Reservoir Electrical Systems	$9,000,000	$7,038,000	$1,962,000	21.8%
	Reservoir Fencing	$250,000	$250,000	$0	0.0%
	Reservoir Fire System	$220,000	$220,000	$0	0.0%
	Reservoir HVAC	$1,300,000	$1,300,000	$0	0.0%
	Reservoir Instrumentation replacements	$1,000,000	$782,000	$218,000	21.8%
	Reservoir Interior ceiling	$3,511,000	$2,745,602	$765,398	21.8%
	Reservoir PLCs	$1,800,000	$1,407,600	$392,400	21.8%
	Reservoir Plumbing	$3,850,000	$3,850,000	$0	0.0%
	Reservoir Project TBD	$5,200,000	$5,200,000	$0	0.0%
	Reservoir Pump, motor, and VFD replacements	$5,300,000	$4,144,600	$1,155,400	21.8%
	Reservoir Roof Repairs	$1,825,000	$1,825,000	$0	0.0%
	Riser pipe interior	$700,000	$700,000	$0	0.0%
	Spare Pumps	$300,000	$234,600	$65,400	21.8%
listed in MP as recommended System Impro	Storage Res - NE	$11,781,000	$9,212,742	$2,568,258	21.8%
MP - 2030 Future Retail Improvmenet, W-S	Storage Res - SW	$13,229,000	$0	$13,229,000	100.0%
	WQ sampling station at Reservoirs	$300,000	$234,600	$65,400	21.8%
	Reservoir Valve Rehab/Replacements	$1,650,000	$1,290,300	$359,700	21.8%
RESERVOIR PROGRAM Total					
RESIDENTIAL WATER METERING PRO	AWMP Investigation				
	Development of a Meter/AMI replacement program				
RESIDENTIAL WATER METERING PRO Total		$44,600,000	$44,600,000	$0	0.0%
SECURITY & EMERG PREP PROG	Physical & Perimeter Sec				
	Security & Emergency Projects				
	Security Camera Maintenance & Improvements at Reservoirs				
	Security Camera Maintenance & Improvements at Well Site				
	Security Camera Maintenance & Improvements at WTPs				
	Video Surveillance				

Parent Program	Project Name	Total	Existing	New Growth	New Growth %
		Cost Allocation			
SECURITY & EMERG PREP PROG Total		$12,265,000	$9,591,230	$2,673,770	21.8%
SRWTP IMPROVEMENTS PROGRAM	Chlorine Pipes	$50,000	$39,100	$10,900	21.8%
	Generators	$2,000,000	$1,564,000	$436,000	21.8%
	Generic Facilities projects at SRWTP	$86,699	$86,699	$0	0.0%
	SRWTP Assessments & Improvements	$264,490	$206,831	$57,659	21.8%
	SRWTP CHEMICAL TANK	$1,300,000	$1,016,600	$283,400	21.8%
	SRWTP CHLORINATORS	$45,000	$35,190	$9,810	21.8%
	SRWTP Concrete Repairs	$3,502,500	$2,738,955	$763,545	21.8%
	SRWTP Filter Media Projects	$6,650,000	$5,200,300	$1,449,700	21.8%
	SRWTP Filter Wash Water System R&R Projects	$800,000	$625,600	$174,400	21.8%
	SRWTP Fire System	$350,000	$350,000	$0	0.0%
	SRWTP Flow Meters (Flash Mix)	$250,000	$195,500	$54,500	21.8%
	SRWTP gear boxes	$250,000	$195,500	$54,500	21.8%
	SRWTP General Valve and Sluice Gate R&R Project	$1,795,000	$1,403,690	$391,310	21.8%
	SRWTP Gravity thickener system R&R Projects	$200,000	$156,400	$43,600	21.8%
	SRWTP Grit Basin R&R Project	$1,925,000	$1,505,350	$419,650	21.8%
	SRWTP HVAC	$3,000,000	$3,000,000	$0	0.0%
	SRWTP Improvement Project TBD	$9,350,000	$9,350,000	$0	0.0%
	SRWTP Instrumentation replacements	$1,350,000	$1,055,700	$294,300	21.8%
	SRWTP Intake Project	$500,000	$391,000	$109,000	21.8%
	SRWTP Interior and Exterior Structural Sealing, Painting, Stucco, etc	$900,000	$703,800	$196,200	21.8%
	SRWTP Large flow meters	$1,350,000	$1,055,700	$294,300	21.8%
	SRWTP Lime System Project	$440,000	$344,080	$95,920	21.8%
	SRWTP MOVs and actuators	$2,900,000	$2,267,800	$632,200	21.8%
	SRWTP PLCs	$1,500,000	$1,173,000	$327,000	21.8%
	SRWTP pumps & motors repair &/or replace	$1,270,000	$993,140	$276,860	21.8%
	SRWTP RESERVOIR 2 Project	$262,500	$205,275	$57,225	21.8%
	SRWTP Roofs	$3,966,110	$3,966,110	$0	0.0%
	SRWTP Sed Basin R&R Project	$4,250,000	$3,323,500	$926,500	21.8%
	SRWTP storm drain	$400,000	$312,800	$87,200	21.8%
	SRWTP VFDs	$2,450,000	$1,915,900	$534,100	21.8%
	SRWTP Network Hardware	$2,250,000	$1,759,500	$490,500	21.8%
SRWTP IMPROVEMENTS PROGRAM Total					
TRANS MAIN PROGRAM		$0	$0	$0	
	Tmain along Ethan and El Camino	$8,543,000	$0	$8,543,000	100.0%
	Tmain Center Parkway	$4,651,000	$0	$4,651,000	100.0%
	Tmain Delta Shores	$4,444,000	$0	$4,444,000	100.0%
	Tmain Greenbriar area	$5,575,000	$0	$5,575,000	100.0%

Sources: DOU and EPS

Parent Program	Project Name	Cost Allocation Total	Existing	New Growth	New Growth %
	Tmain North B along 7th	$10,804,000	$0	$10,804,000	100.0%
	Tmain Panhandle area	$5,132,000	$0	$5,132,000	100.0%
	Tmain SRWTP along North B	$5,652,000	$0	$5,652,000	100.0%
	Tmain within Grandpark area - outside city but MP lists this project needed to support RA, see note on pdf of WSMP Ch. 8	$5,796,000	$5,796,000	$0	0.0%
	Tmain adjacent to Elkhorn Res	$350,000	$0	$350,000	100.0%
	Tmain along Cosumnes River	$3,618,000	$0	$3,618,000	100.0%
	Tmain along Mack	$4,016,000	$0	$4,016,000	100.0%
	Tmain along Q St	$9,331,000	$0	$9,331,000	100.0%
	Tmain parallel to Natomas/Truxel	$13,377,000	$0	$13,377,000	100.0%
	Tmain along Marysville Blvd - tmains included in the Water Supply RiverArc costs, inside City limits, supports RA	$14,221,000	$14,221,000	$0	0.0%
	Tmain within Grandpark area required to support RA-tmains included in the Water Supply RiverArc costs, (remove 2050 projects and 1/2 of the 12K LF from the 36" Tmain project within GP), see pdf for supporting notes	$13,829,000	$13,829,000	$0	0.0%
	Tmain along North B	$3,656,000	$2,858,992	$797,008	21.8%
	Tmain from Florin Res to southern area	$2,000,000	$1,564,000	$436,000	21.8%
	Tmain along El Camino - add to SRWTP exp. Project list	$1,224,000	$1,224,000	$0	0.0%
	Tmain along El Camino, Truxel, San Juan - add to SRWTP exp. Project list	$6,459,000	$6,459,000	$0	0.0%
	Tmain along San Juan - add to SRWTP exp. Project list	$5,383,000	$5,383,000	$0	0.0%
	Tmain along Silver Eagle - add to SRWTP exp. Project list	$3,432,000	$3,432,000	$0	0.0%
	Tmain along Truxel- add to SRWTP exp. Project list	$13,377,000	$13,377,000	$0	0.0%
	Tmain adjacent to City College - wholesale	$4,419,000	$4,419,000	$0	0.0%
	Tmain along 7th and 6th St - wholesale	$9,961,000	$9,961,000	$0	0.0%
	Tmain from EAFWTP to Florin Res- wholesale and existing system, adjusted for 20% for ex. System (see WY email from 8/23/23)	$4,966,600	$4,966,600	$0	0.0%
	Tmain along Florin Perkins -wholesale	$500,000	$500,000	$0	0.0%
	Tmain along Folsom - wholesale	$0	$0	$0	
	Tmain along Franklin - wholesale	$0	$0	$0	
		$0	$0	$0	
TRANS MAIN PROGRAM Total					
UNPLANNED CORRECTIVE MAINT.	UNPLANNED CORRECTIVE MAINT.				
UNPLANNED CORRECTIVE MAINT. Total		$8,400,000	$8,400,000	$0	0.0%
WATER+ PROGRAM	RiverArc - growth, 7 mgd	$50,048,103	$0	$50,048,103	100.0%
	RiverArc, resiliency, 8mgd	$57,197,832	$44,728,705	$12,469,127	21.8%

		Cost Allocation			
Parent Program	**Project Name**	**Total**	**Existing**	**New Growth**	**New Growth %**
	Tmain for RA included in both RA Water Supply project and WSMP Tmain - remove $14.7M from RA. Remove 22/30 from growth construction costs and 8/30 from the combined benefit construciton costs.	$0			
	SRWTP Water Expansion & New Transmission (Impact Fees, Fund 6001)	$8,900,000	$6,959,800	$1,940,200	21.8%
	Wastewater piping from WTP	$100,000	$78,200	$21,800	21.8%
	Water+ 75mgd expansion	$489,000,000	$489,000,000	$0	0.0%
	Water+ projects (fund 6005)	$9,322,500	$7,290,195	$2,032,305	21.8%
	Water+ resiliency	$526,000,000	$411,332,000	$114,668,000	21.8%
WATER+ PROGRAM Total					
WELL PROGRAM	Convert existing GW to NaOCl	$200,000	$156,400	$43,600	21.8%
	FWTP Well - other funding	$5,500,000	$4,301,000	$1,199,000	21.8%
	GW Well Monitoring Well Network	$325,000	$254,150	$70,850	21.8%
	Plug-in adapter and transfer switch	$1,248,000	$975,936	$272,064	21.8%
	Portable generators	$1,560,000	$1,219,920	$340,080	21.8%
	Ranney Collector Investigation & Assessment	$1,350,000	$1,055,700	$294,300	21.8%
	Shasta well filter media	$0	$0	$0	
	Well 159 Replacement	$2,000,000	$1,564,000	$436,000	21.8%
	Well 159 Replacement - other funding	$3,500,000	$2,737,000	$763,000	21.8%
	Well 168 Replacement	$3,584,800	$2,803,314	$781,486	21.8%
	Well 168 Replacement - other funding	$1,200,000	$938,400	$261,600	21.8%
	Well destruction	$800,000	$800,000	$0	0.0%
	Future Well Planned Projects	$62,631,000	$48,977,442	$13,653,558	21.8%
	Well Pump & Motor Replacement, Well Repair, & Specialty WQ Testing	$1,450,000	$1,133,900	$316,100	21.8%
	Well Vibration Monitors	$25,000	$19,550	$5,450	21.8%
	Well WQ chemical/mechanical cleaning	$3,050,000	$2,385,100	$664,900	21.8%
	Wells (R & R) - GW MP/Voluntary Agreement	$1,145,000	$895,390	$249,610	21.8%
	Wells Instrumentation replacements	$1,000,000	$782,000	$218,000	21.8%
	Well Electrical	$0	$0	$0	
	Well Treatment projects	$17,500,000	$13,685,000	$3,815,000	21.8%
WELL PROGRAM Total					N/A
	Total	**1,879,420,006**	**1,548,297,090**	**331,122,916**	**17.6%**
	Annual Miscellaneous	1,113,262	870,571	242,691	21.8%
	Grand Total	**1,880,533,268**	**1,549,167,661**	**331,365,607**	**17.6%**
	By System Function				
	Resiliency	882,352,352	689,999,539	192,352,813	21.8%

Parent Program	Project Name		Cost Allocation			
			Total	**Existing**	**New Growth**	**New Growth %**
		Growth	138,770,103	-	138,770,103	100.0%
		Distribution	858,297,551	858,297,551	-	0.0%
		Total	**1,879,420,006**	**1,548,297,090**	**331,122,916**	**17.62%**
		Annual Misc.	1,113,262	870,571	242,691	21.8%
		Total CIP	**1,880,533,268**	**1,549,167,661**	**331,365,607**	**17.62%**

Sources: DOU and EPS

Descriptions

Long Term CIP	Objective	Description
Backflow Prevention Device3330	To ensure compliance with the City's Cross-Connection Control Program, the Department of Utilities annually tests backflow devices to ensure that backflow prevention assemblies are working properly.	Annually test backflow devices for city departments requiring backflow testing and repairs and issue a permit, or "tag" to show compliance of the State requirement.
BASE CIP CONTINGENCY-WATER	Reserve for unforeseen capital program needs.	Facilitate the completion of capital projects by reserving appropriations for minor overruns and provide a source of funds for small projects that could not be anticipated before the start of the fiscal year.
Distrib Main Program	Improve water distribution system reliability including increased pressures and fire suppression capabilities.	Replace water distribution mains (pipes twelve-inch in diameter or smaller) and other work associated with the distribution system that have maintenance issues or have exceeded their useful life.
DOU Facilities Impr/Rehab	Improve the existing condition of Department of Utilities facilities through maintenance and/or replacement projects for continued occupancy of Department of Utilities sites.	This program provides funding for capital improvements to Department of Utilities facilities including space planning and rehabilitation projects.
DOU IT Program	Supports initiatives through technology advancements and enhancements by providing reliable systems that improves customer service and staff with tools to be more efficient and make decisions that promotes the Department's vision.	Planning and implementation of IT initiatives as well as coordination and management of IT resources and oversight on all identified IT programs, software, hardware upgrades, and consulting services.
Drinking Water Quality 3330	Comply with drinking water regulatory requirements of the California Surface Water Treatment Rule, and California Code of Regulations Title 22. New equipment is required to meet regulatory requirements.	Provide for drinking water regulatory efforts that encompass water production through the water treatment plants, wells, and reservoirs; and distribute this water to ratepayers.
Fire Hydrant & Gate Valve Repl	Replace valves and fire hydrants to facilitate positive system shutdowns and improve the system's reliability and safety.	Replace valves and fire hydrants in the water distribution system that have failed or are obsolete.
Florin Res Back Up Engine	Complete necessary improvements for reliability of pump station and redundancy needs for maintenance, including needed safety upgrades. (Parent CIP to close in FY24.) New growth makes the completion of this project a priority to maintain pressures throughout the system, especially during periods of high demand.	Design and construct various improvements at Florin Pump Station including air quality, improved communications, flow meter replacement, pump redundancy, programming improvements, and improved safety and reliability of station.
FWTP	Make available to the City a reliable 100-120 million gallons per day of water treatment capacity at the E.A. Fairbairn Water Treatment Plant.	Rehabilitate and enhance the E.A. Fairbairn Water Treatment Plant (FWTP) structures constructed in 1964.
Information Technology - SCADA	Provide improvements and maintenance of the SCADA system that have been deemed essential and critical and are used by Operations to remotely control and monitor the facilities and equipment for the Water, Wastewater, and Storm Drainage infrastructure per the SCADA master plan.	This program funds the maintenance and improvements of the Supervisory Control and Data Acquisition (SCADA) system as defined in the SCADA master plan.
Reservoir Program	Improve and enhance the water system reliability and extend useful lives of the City's reservoirs.	Rehabilitation work at water reservoirs, including booster pump stations, which may include patching interior and exterior coatings, improvements to cathodic protection systems, pump and motor improvements, electrical upgrades, structural repairs, etc. Also, the 2023 Water Supply Master Plan identifies two new water reservoir that will be needed prior to FY40 which is within the timeframe of the Development Impact Fee report. One is in the Southwest area of the City for growth and the other is recommended for existing system improvements in the northeast portion of the City.
Residential Water Metering Program	Comply with AB 2572, promote conservation, and bill customers for the amount of water they use. Once the City is fully metered, a replacement program will be developed to replace meters, gateways, endpoints and other associated infrastructure.	Install water meters at residential homes that do not currently have meters. Assembly Bill (AB) 2572 requires water meters be installed on existing water service connections by 2025. Once the City is fully metered, a replacement program will be developed and implemented.

Long Term CIP	Objective	Description
Security & Emerg Prep Prog	Implement the Department of Utilities' Security Master Plan recommendations, as accepted by City Council in September 2014.	Provide security improvements to key Water, Drainage, and Wastewater facilities as recommended in the DOU Security Master Plan.
Shasta Park 4Mg Res And Pmp St	Provide water to the southern portion of the City during peak hour demands, fire demands, and emergencies. (Parent CIP to close in FY24.) New growth makes the completion of this project a priority to help maintain pressures, especially during periods of high demand.	Design and construct a four million gallon (4MG) water storage reservoir, booster pump station, and two groundwater wells.
SRWTP Improvements Program	Make available to the City a reliable 160 million gallons per day of water treatment capacity at the Sacramento River Water Treatment Plant (SRWTP). Includes enhancements to the WTP such as automation of systems where appropriate, equipment upgrades, and other upgrades for further improvements to the existing plant.	Maintenance projects, upgrades due to regulatory changes, safety improvements, or updating antiquated electrical equipment are examples of projects to be designed and implemented.
SRWTP Intake Sed Rmvl	Parent CIP to close in FY24	
SRWTP Property Acquisition	Parent CIP to close in FY24. Property acquisition necessary for water treatment plant expansion of water supply and space for resiliency projects.	
Trans Main Program	Ensure and improve the reliability of the water distribution system and reduce potential damage from transmission main breaks.	Replace existing water transmission mains (pipes larger than twelve-inch diameter) that have significant maintenance issues with new reliable mains that meet City standards. The WMP identifies transmission main projects - both to replace and upsize existing mains and for growth. Projects included in the fee calculation focus on project within existing City limits (with the exception of the pipes needed to convey water from the proposed RiverArc water treatment plant into the City limits. All pipes included are needed prior to FY40 which is within the timeframe of the Development Impact Fee report.
Unplanned Corrective Maint.	Enable repairs needed to continue operating efficiently.	Correct and repair unexpected critical failures with the City's water infrastructure.
Water+ Program	Ensure the City has sufficient and resilient water treatment capacity for the future water demands of the City of Sacramento. Protect the City's drinking water against anticipated climate change impacts and other risks.	Design plans and specifications for the development of necessary water supply expansion improvements needed due to expected growth as well as resiliency projects for the City's water supply and facilities. Resiliency Projects are increasingly important because of changing regulations, continueding climate change, wildfires in the watershed, river pollution and algal toxins, among other risks impacting the City's ability to reliably deliver high-quality drinking water. Development and implementation of Resiliency Projects will help protect the City's water supply from these risks.
Well Program	Improve City's water supply reliability and groundwater extraction capability. A reliable groundwater supply will optimize conjunctive management of the City's water supply and will allow the City to participate in future drought banking programs and water transfers.	Rehabilitate and replace dilapidated infrastructure at the City potable groundwater facilities. Monitoring capabilities may be required and other work associated with the groundwater well program.

Sources: DOU andf EPS

Appendix_B.3b

Appendix B-4

Companion Charts to Tables 2-10 and 2-11

Table 2-10: Charts by Land Use and Meter Size

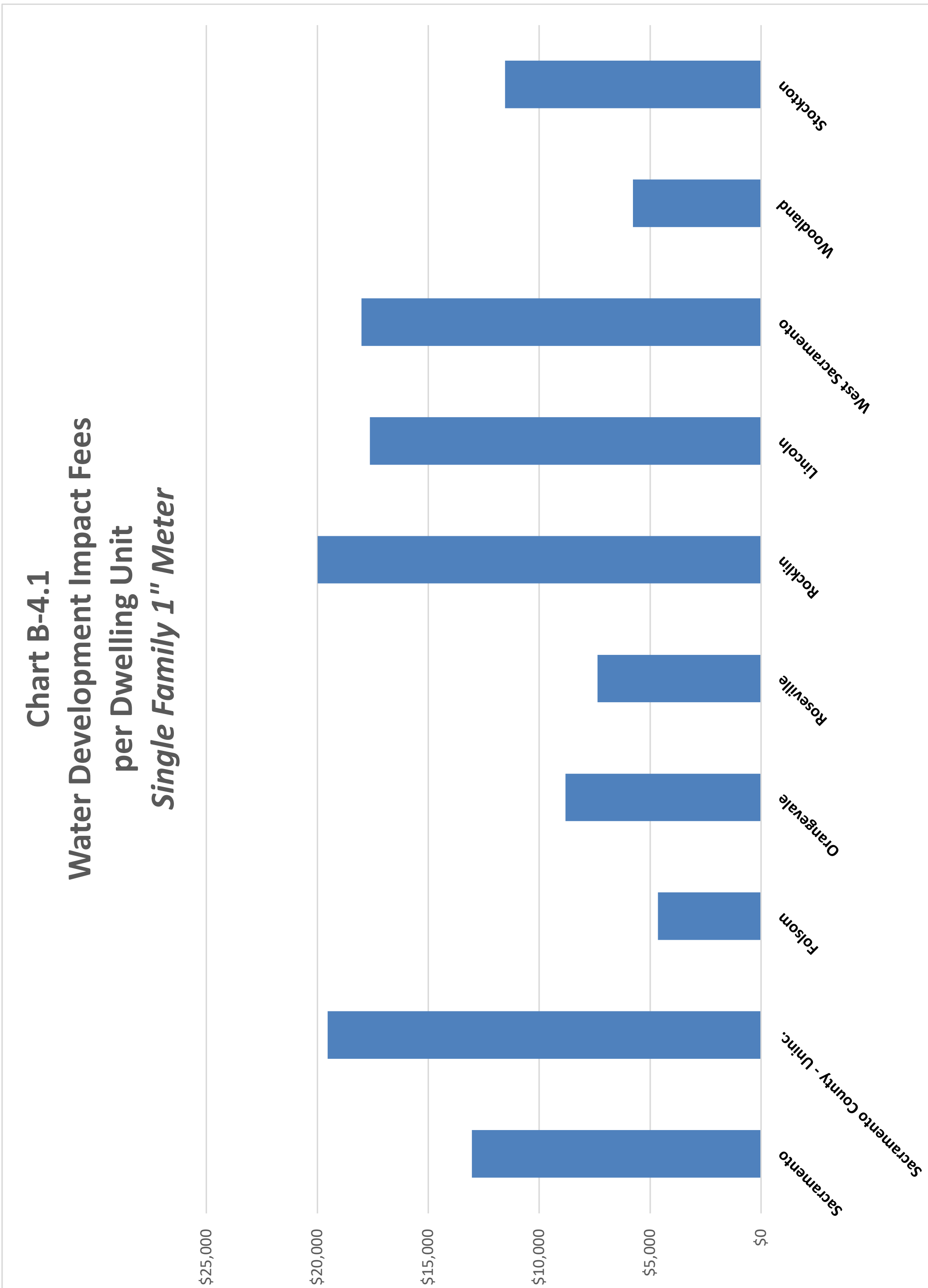


Chart B-4.2
Water Development Impact Fees
Retail - 2, 2" Meters

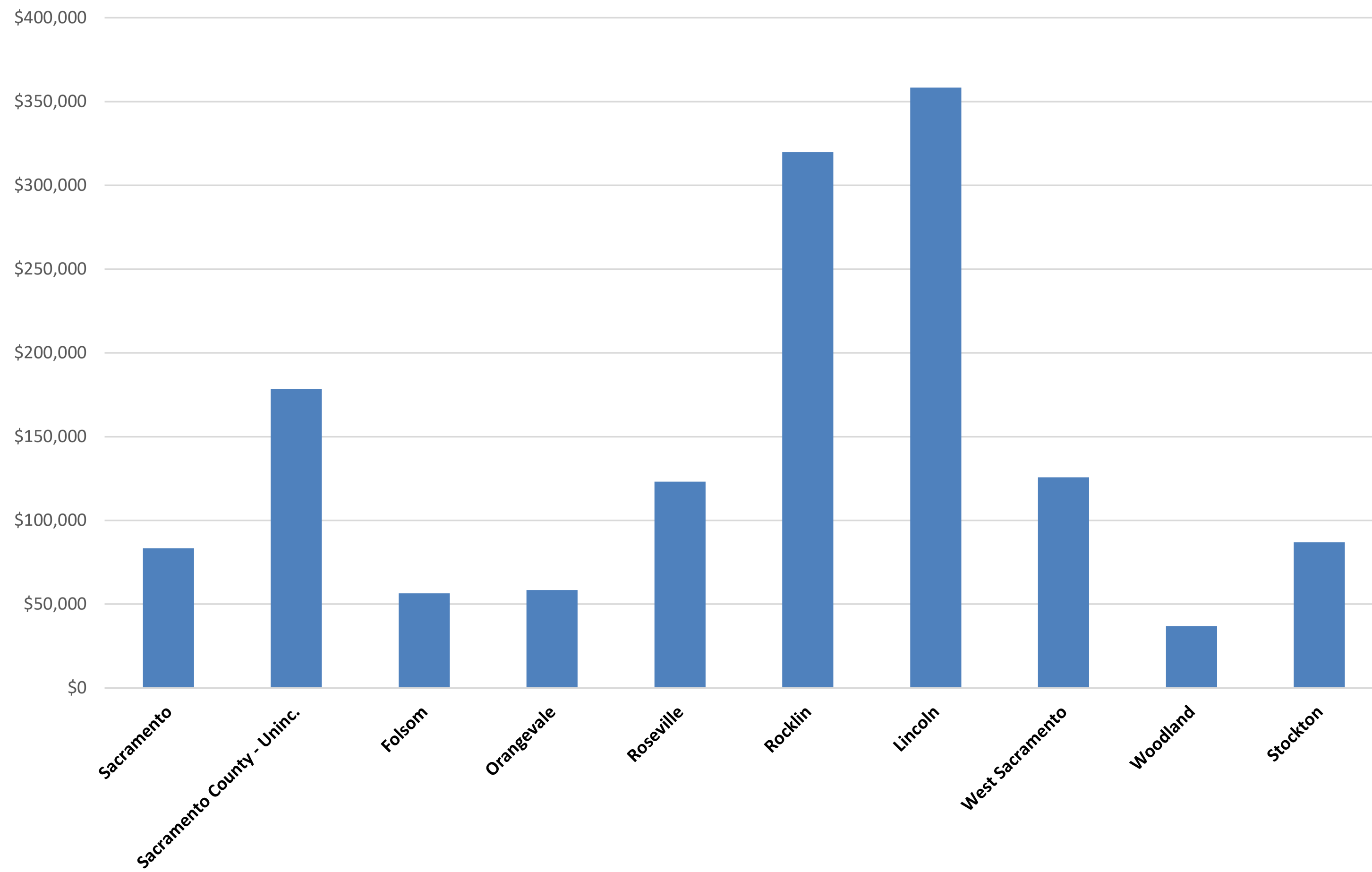


Chart B-4.3
Water Development Impact Fees
Office - 2, 2" Meters

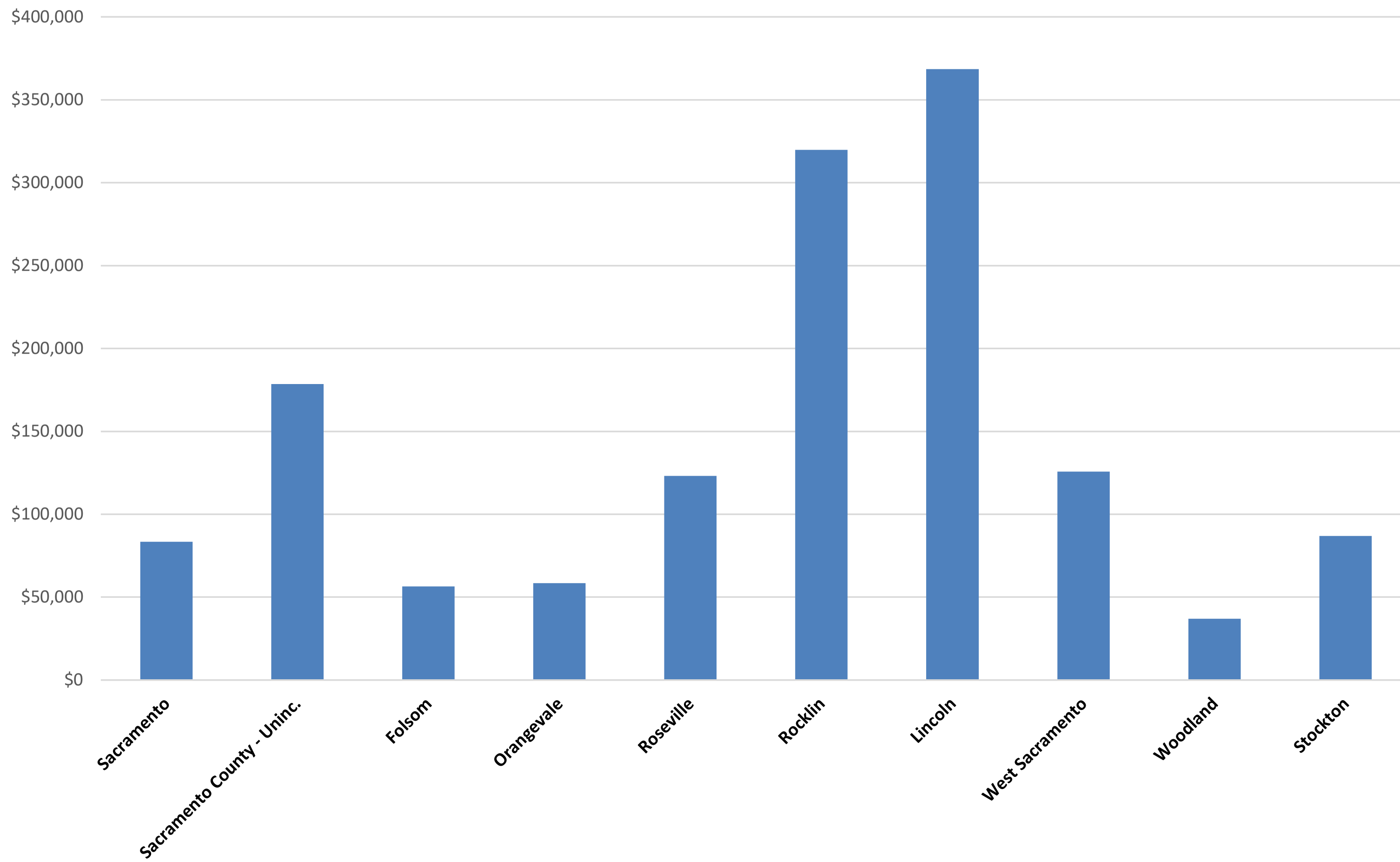


Table 2-11: Charts by Land Use and Area

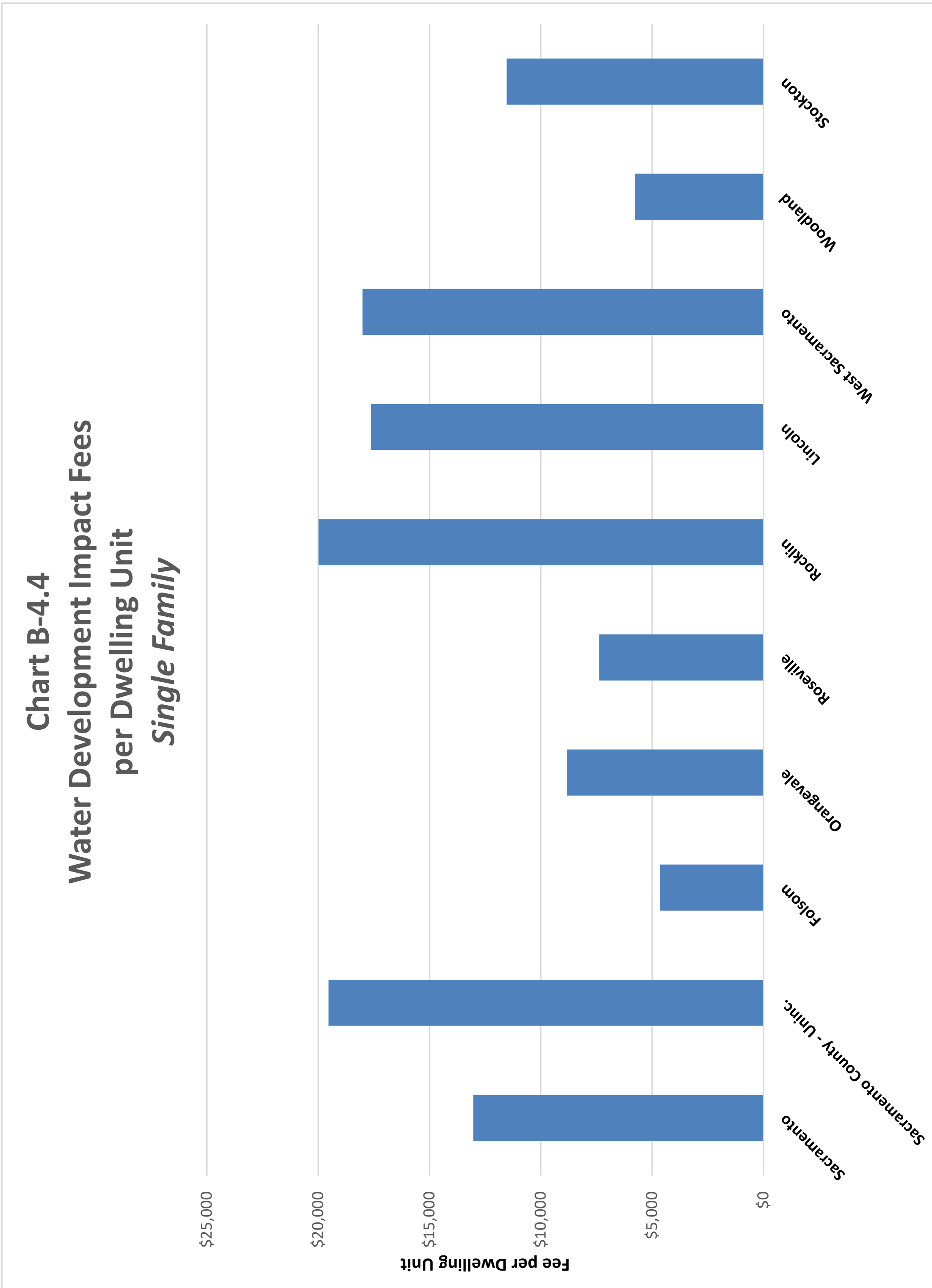


Chart B-4.5
Water Development Impact Fees per 1,000 Building Square Feet
Retail

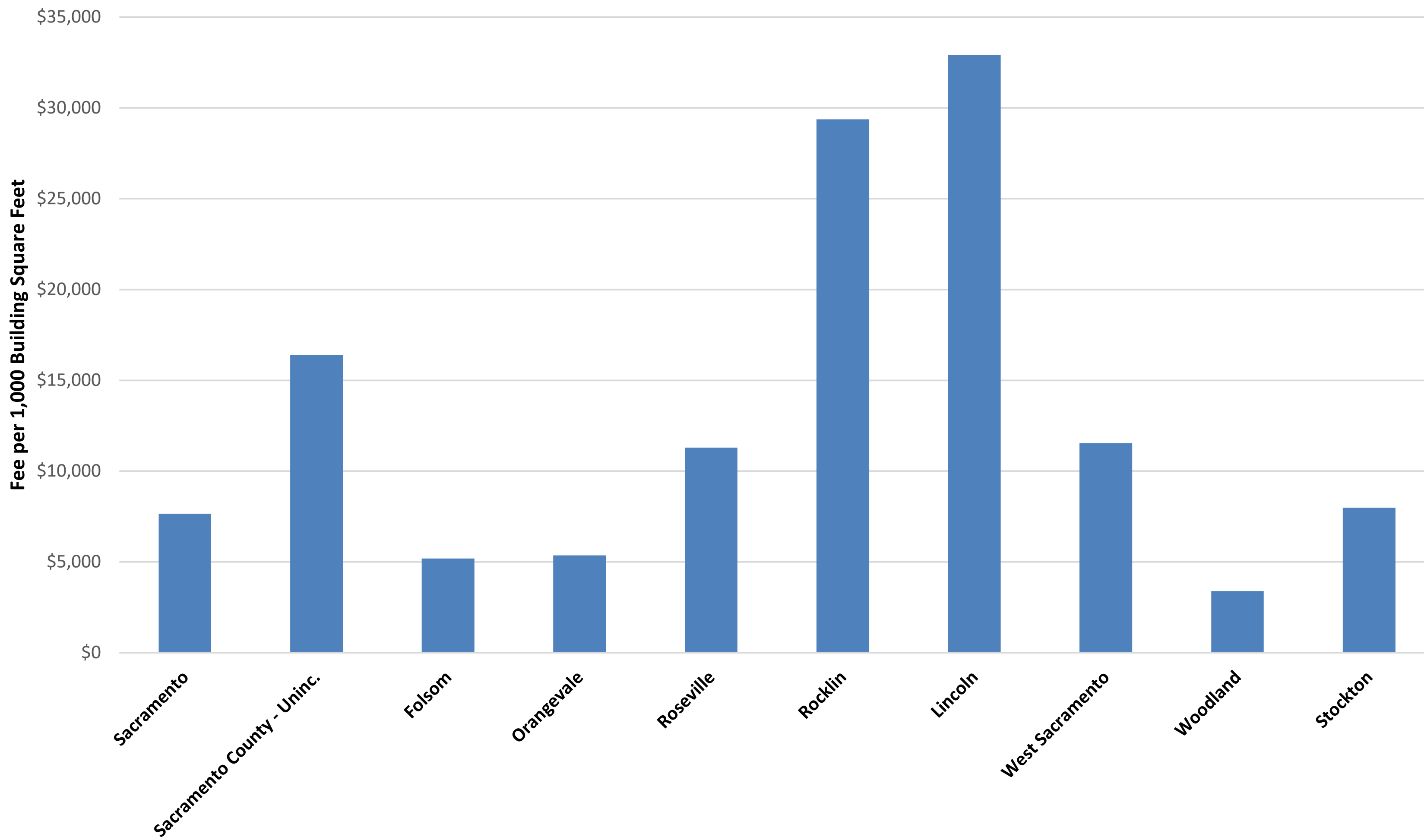
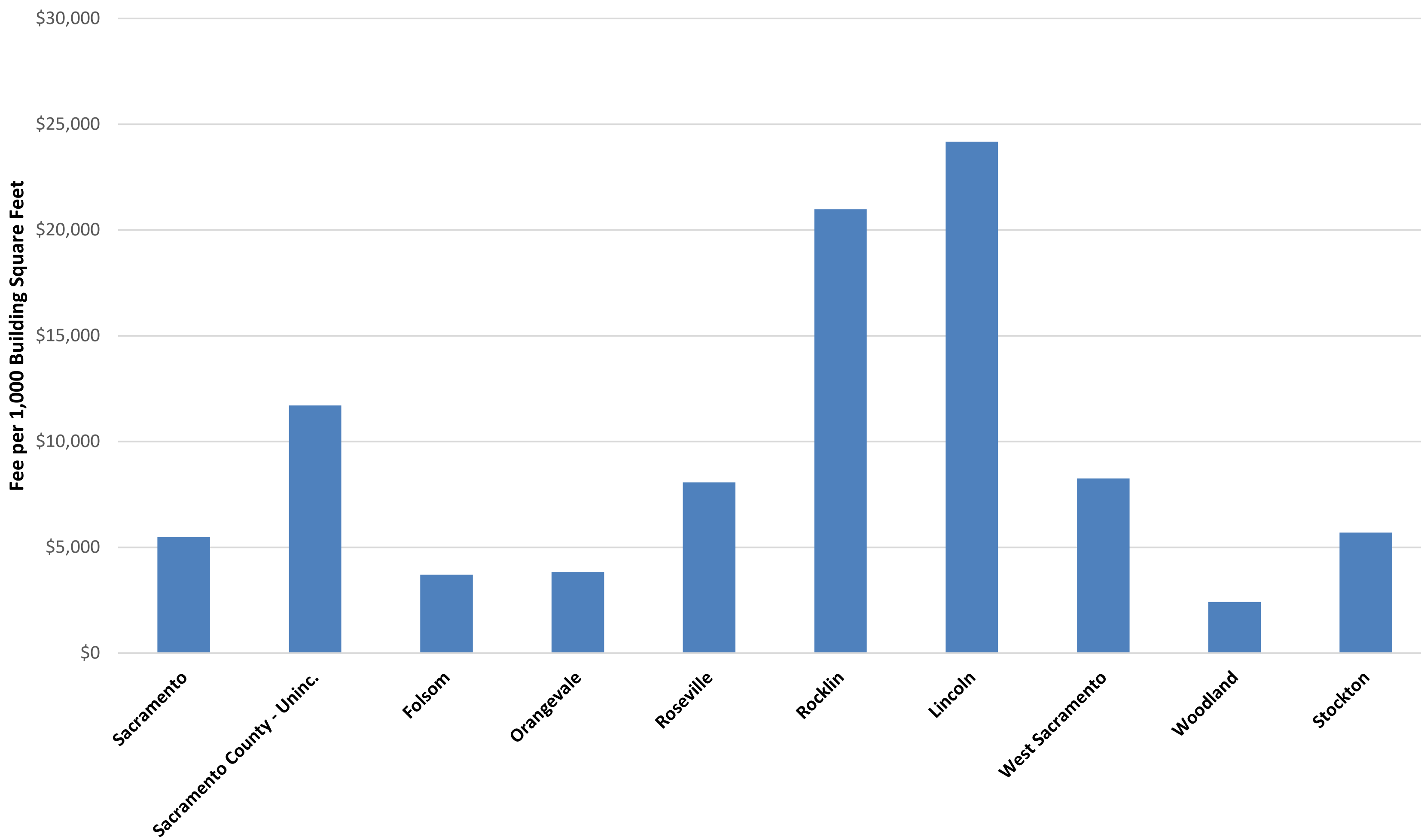


Chart B-4.6
Water Development Impact Fees
per 1,000 Building Square Feet
Office



Charts per Acre

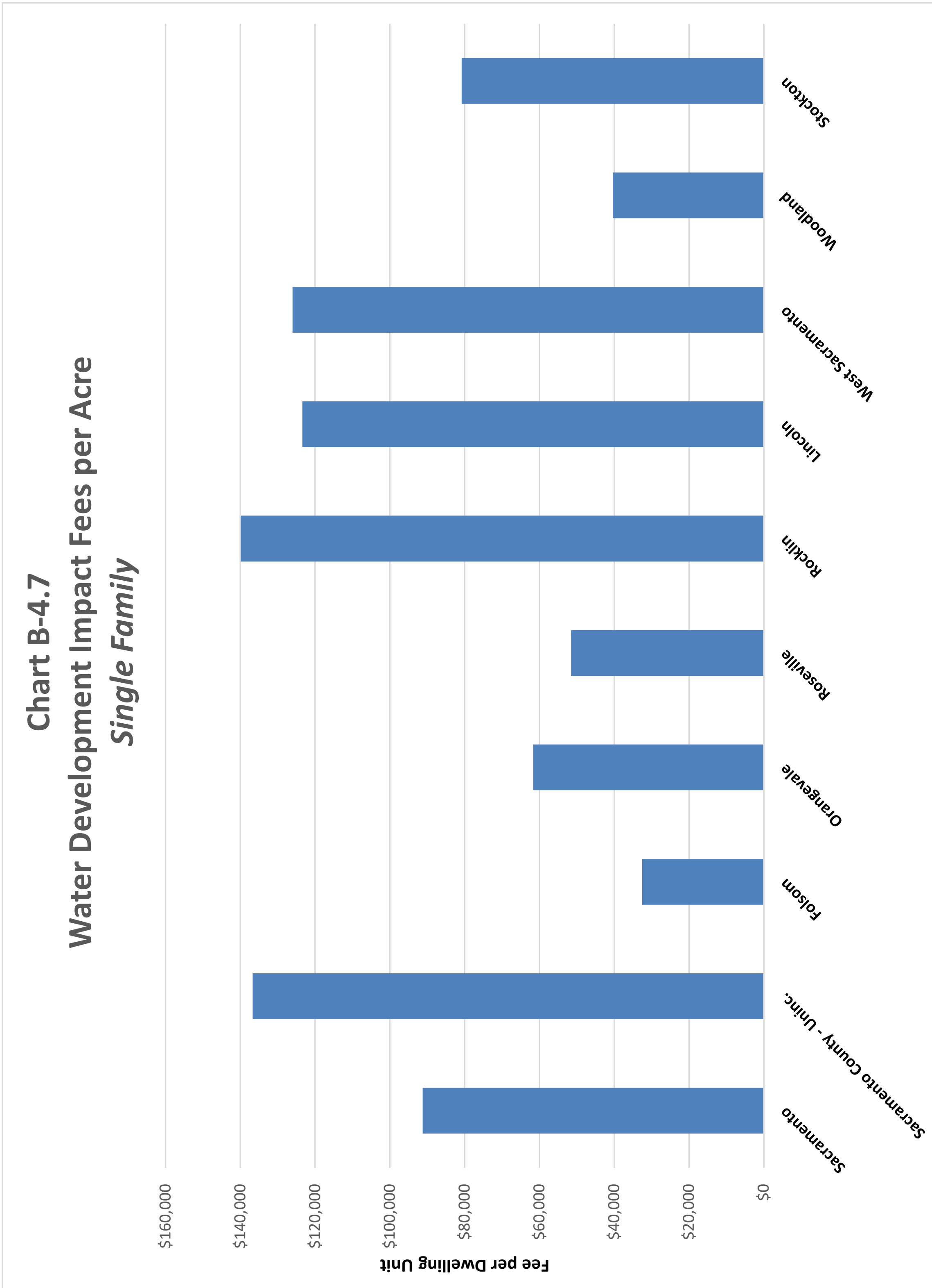
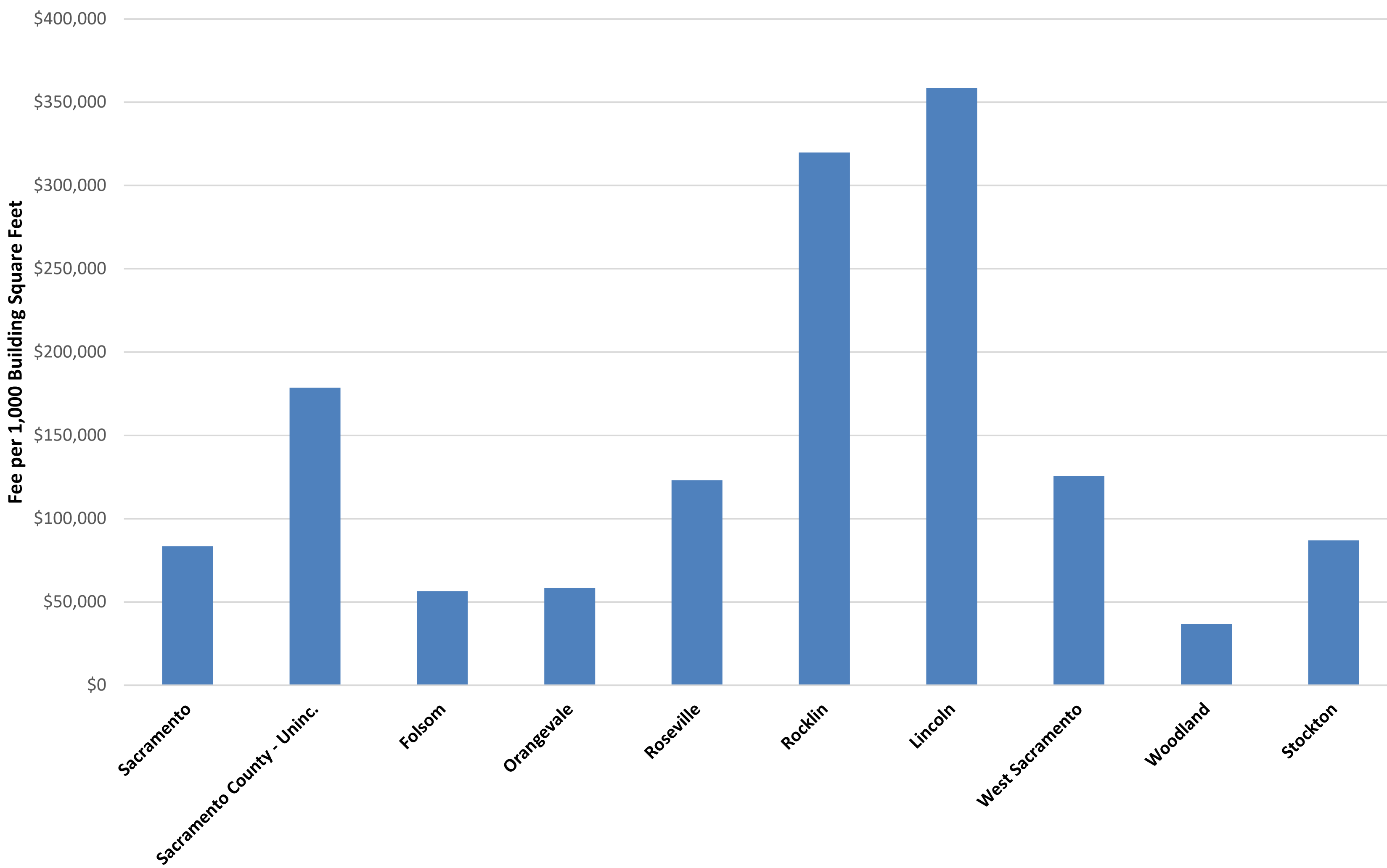


Chart B-4.8
Water Development Impact Fees per Acre
Retail



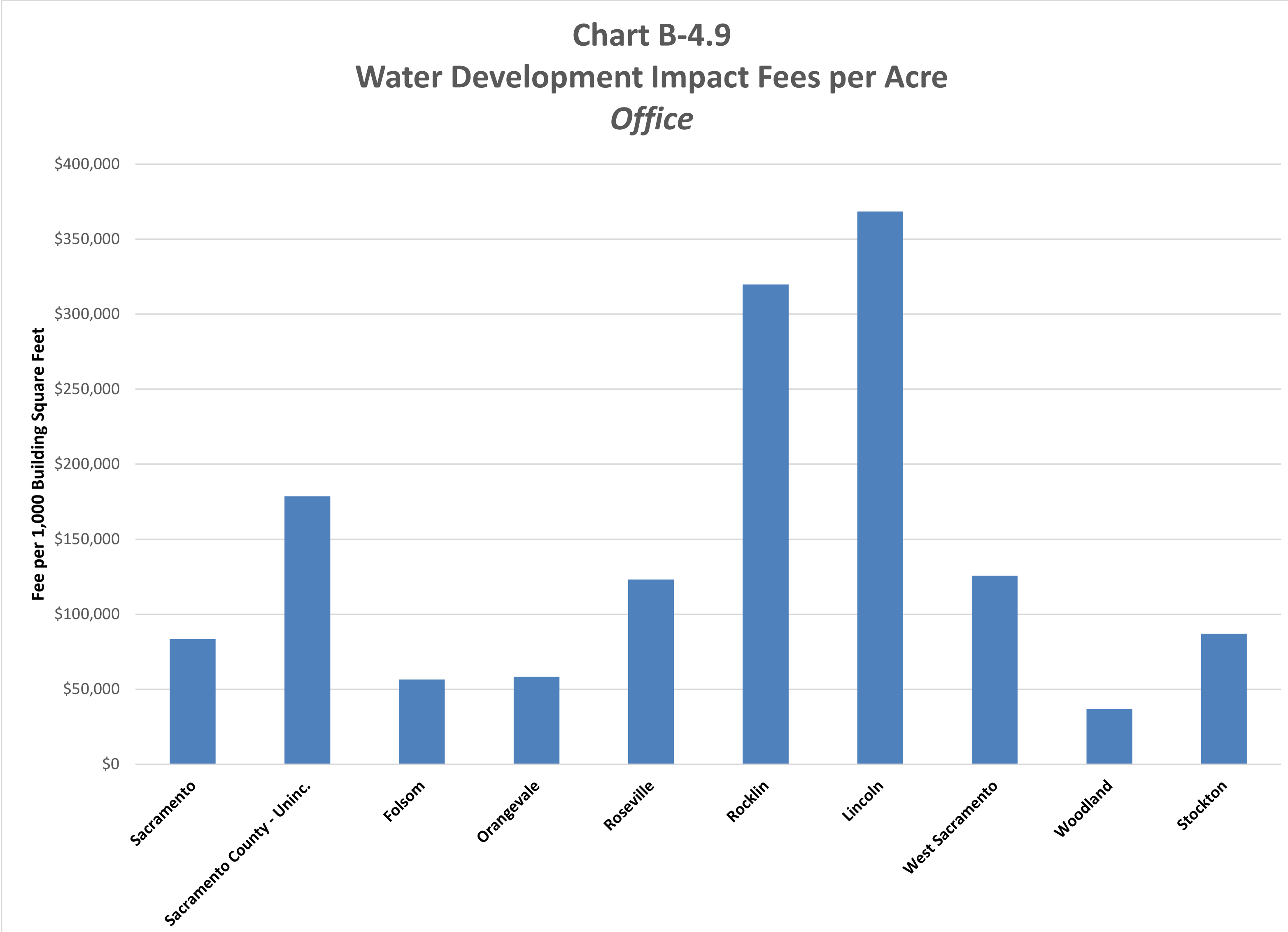


Chart B-4.9
Water Development Impact Fees per Acre
Office
Fee per 1,000 Building Square Feet
$400,000
$350,000
$300,000
$250,000
$200,000
$150,000
$100,000
$50,000
$0
Sacramento
Sacramento County - Uninc.
Folsom
Orangevale
Roseville
Rocklin
Lincoln
West Sacramento
Woodland
Stockton

APPENDIX C:

Separated Sewer System Utility

Appendix C-1: Technical Memorandum, Department of Utilities, November 18, 2009

Appendix C-2: Sample of Basin Improvements

Appendix C-3: Separated Sewer Detailed Fee Schedule

Appendix C-4: Companion Charts to Table 3-8

Appendix C-1

Technical Memorandum, Department of Utilities, November 18, 2009

DEPARTMENT
OF UTILITIES

ENGINEERING
SERVICES DIVISION

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November 18, 2009

TECHNICAL MEMORANDUM:

PRELIMINARY HYDRAULIC ANALYSIS SEPARATED SEWER BASINS

This technical memorandum (TM) summarizes our approach to evaluate the hydraulic capacity of sanitary sewer "backbone" facilities in each of the City of Sacramento (City) separated sewer basins. This evaluation is part of a broader effort to develop a reasonably accurate and realistic Sewer Development Fee by, in part, estimating the hydraulic capacity of the facilities utilizing a consistent method. Portions of the City have been evaluated via master plans over the past 15 years, but the methods were not consistent. Excluded from this study were combined sewer system facilities located in the older central City area and all small collection pipelines not identified as belonging to the "backbone" network of pipes.

The following sections present background information regarding the separated sewer system within the City, along with a discussion of the general wastewater components and methodology used in the hydraulic capacity evaluations. In addition, the approach used for estimating the 2009 capital costs to replace and improve, if warranted, the existing "backbone" sewer infrastructure within the basins is discussed. Reports are included in the appendices that provide information regarding the existing infrastructure, existing land uses, and projected future land uses within each basin, along with the specific wastewater components used in each hydraulic evaluation. Finally, the results of the hydraulic and capital costs evaluations for each basin are summarized.

This study involved static hydraulic evaluations based on various simplifying assumptions in order to satisfy limitations imposed on the project. Therefore, this study did not include flow monitoring, condition assessment of sewer facilities, or dynamic modeling of the collection systems and, thus, provides only a general overview of hydraulic considerations within the basins. The reports presented in the appendices can be used as a preliminary assessment of hydraulic capacity and as a screening tool to determine if a more detailed sanitary sewer study is required.

Background Information

Wastewater collection in the City of Sacramento is provided by both the City and the County of Sacramento. The Sacramento Area Sewer District (SASD) maintains approximately 35 percent of the public collection system within the City limits, primarily in the northwest and southeast sections of the City. The City Department of Utilities (DOU) maintains the remaining portion of the public collection system, which includes a combined sewer system in the older central City area with a total service area of approximately 7,545 acres and approximately 305 miles of 4 to 120 inch diameter pipes. The separated sewer system, which is described below in more detail, is located primarily in the northeast, east and southwest sections of the City with a total service area of about 20,750 acres.

Wastewater conveyed by the City's separated sewer system is routed by the collection system to the Sacramento Regional Wastewater Treatment Plant (SRWTP) for treatment and disposal via an interceptor system consisting of large diameter pipes and pump stations. The interceptor system and the SRWTP, located just south of the City limits, are owned and operated by the independent Sacramento Regional County Sanitation District (SRCSD). A detail showing the City of Sacramento and SASD service areas, as well as the location of SRCSD interceptor pipe within the City service area is presented in Figure 1.

Maintenance of the City's separated sewer system is provided by three Divisions within the DOU. The Field Services Division maintains the entire collection system infrastructure, including approximately 485 miles of 4 to 42 inch diameter gravity collection pipes, about 5.3 miles of force mains, and about 14,400 manholes. The Plant Services Division maintains the pump stations. The Engineering Services Division coordinates with the Field and Plant Services Divisions to design and manage all capital improvement projects related to sewer replacement and rehabilitation. Figure 1 and Tables 1 and 2 show the size and distribution of separated gravity and force main pipes in the City service area.

Table 1 – Gravity Collection Pipe

Pipe Diameter (inch)	Length (feet)	Length (miles)	Percentage of System (by length)
4	7,164	1.36	0.28
6	1,594,110	301.91	62.3
8	460,984	87.31	18.0
10	151,597	28.71	5.9
12	122,078	23.12	4.8
15	66,088	12.52	2.6
18	35,671	6.76	1.4
21	59,534	11.28	2.3
24	31,906	6.04	1.2
27	3,376	0.64	0.13
30	11,314	2.14	0.44
36	978	0.19	0.04
42	14,706	2.79	0.57
Total	2,559,507	484.8	100

Table 2 - Force Mains

Pipe Diameter (inch)	Length (feet)	Length (miles)	Percentage of System (by length)
4	4,679	0.89	16.66
6	1,752	0.33	6.2
8	5,859	1.11	20.9
12	4,976	0.94	17.7
18	4,379	0.83	15.6
21	5,138	0.97	18.3
24	497	0.09	1.8
30	42	0.01	0.15
36	772	0.15	2.75
Total	28,094	5.3	100

The separated sewer system is composed predominately of vitrified clay and reinforced concrete pipes. A majority of the pipes were installed between the 1940's and the 1970's. Pipes in the older sections of the City were constructed in the late 1800's and early 1900's. Since the 1970's, polyvinyl chloride (PVC) pipe gradually gained acceptance and now PVC pipe is used almost exclusively as replacement pipes and in new construction.

The City service area is divided into 49 separated sewer basins. Thirty-nine of the sewer basins are pumped through individual pump stations. The remaining ten sewer basins gravity flow directly or indirectly into the SRCSD interceptor pipes. Twenty-seven of the pump stations were constructed between the 1950's and the 1970's; most of these pumps have been rehabilitated and/or upsized during the past ten years. The remaining 13 pump stations were constructed between 1985 and 2004 with only one pump station (Sump 122) rehabilitated in 1999. Many of the pump stations discharge into downstream gravity sewers which, in turn, convey the wastewater to pump stations further downstream. Because of this interconnection, changes in one basin can affect the performance of the separated sewer system in downstream basins. Figure 2 shows the layout of separated sewer basins in the City.

Wastewater Components

Sewer or wastewater flows used to evaluate hydraulic capacity are composed of several components termed: (1) average dry weather flow (ADWF), (2) peak dry weather flow (PDWF), (3) peak wet weather flow (PWWF), (4) groundwater infiltration (GWI), and (5) rainfall-dependent infiltration/inflow (RDI/I). The latter two components are collectively referred to as infiltration/inflow (I/I). The following presents a brief discussion of each component and factors used in the hydraulic evaluations.

Average Dry Weather Flow

The ADWF is the average daily sanitary sewer flow contribution from residential, commercial, industrial and institutional users at any given point in the collection system during dry season conditions, excluding all flow from groundwater infiltration and

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Average Dry Weather Flow

The ADWF is the average daily sanitary sewer flow contribution from residential, commercial, industrial and institutional users at any given point in the collection system during dry season conditions, excluding all flow from groundwater infiltration and stormwater runoff infiltration/inflow.

Sewer system planning within the City is typically based on a unit flow rate representing the average sanitary sewer flow contribution from one single family residence, termed an Equivalent Single-Family Dwelling unit, or ESD. The flow contributions from other types of land uses are expressed in terms of either an equivalent number of ESDs, actual water usage, an appropriate density factor (e.g., dwelling units or ESDs per net acre), or some other parameter that reflects sewage generation. For example, the flow from one multi-family dwelling unit is equated to 0.75 ESD, whereas a density factor of 6 ESD/acre may be used to equate flows from commercial/retail users. The ADWF is determined by totaling the ESDs from land uses that contribute flow to a particular collection pipe and then multiplying the value by a unit flow rate expressed in units of gallons per day per ESD (gpd/ESD).

The current City Design and Procedures Manual requires that a unit flow rate of 400 gpd/ESD be used for planning purposes. A reduced unit flow rate of 310 gpd/ESD was selected for this evaluation based on flow monitoring performed by the DOU and the SASD in recent years[1]. This reduced unit flow rate will be included in future revisions to the City Design and Procedures Manual.

To support the impact fee evaluation and for use in future planning, the ADWF was evaluated for three land use scenarios: existing conditions; development and/or redevelopment conditions expected by the year 2030, coinciding with the City's 2030 General Plan; and ultimate build-out conditions. A discussion regarding how land use conditions were determined for each basin is presented in the subsection titled "Land Use Conditions" and in the Basin Reports included in the Appendices.

Once the existing land use data was compiled, land uses that could reasonably be expected to convert sewer flow to the collection system were converted to equivalent ESDs using the factors shown on Table 3. The existing ADWF was determined by multiplying the total ESDs within the basin or subbasin by the unit flow rate of 310 gpd/ESD.

Table 3

Land Use	ESD Flow Unit
Single-Family Residential	1
Multi-Family Residential	0.75
Commercial/Industrial	6 per net parcel acre.
Schools	0.13 per capita
Open Spaces/Parks, etc.	0

Once the acreage for all new or future 2030 and Build-out land use was compiled, the equivalent new or additional ESDs were calculated using the density factors presented in Table 4. The additional 2030 ESDs where then added to the Existing ESDs to establish the total 2030 ESDs for each basin or subbasin. Likewise, the additional Build-out ESDs were then added to the 2030 ESDs to establish the total Build-Out ESDs for each basin

1 Flow monitoring performed by the DOU and SASD has shown a significant reduction to the unit flow rate due to water conservation policies and measures. Measured unit flow rates typically range from less than 200 gpd/ESD to 300 gpd/ESD. A unit flow rate of 310 gpd/ESD is currently used by SASD for planning studies. The SASD unit flow rate appears reasonable with an adequate safety factor.

or subbasin. The total ESDs were then multiplied by the unit flow rate to determine the 2030 and Build-out ADWF.

Table 4

Land Use	*ESDs/Ac.*[2]
Suburban and Traditional Neighborhoods	
Low Density	6
Med. Density	11
High Density	20
Urban Neighborhoods	
Low Density	15
Med. Density	45
Commercial/Retail Centers and Corridors	
Suburban & Traditional Center	6
Regional Commercial Center	6
Urban Center Low	11
Urban Center High	25
Suburban Corridor	6
Urban Corridor	11
Other	
Employment Center Low Rise	6
Employment Center Mid-Rise	9
Industrial	11
Public/Quasi-Public	6
Open Space/Parks, etc.	0

Peak Dry Weather Flow (PDWF)

The diurnal flow pattern in Sacramento and most cities tends to vary throughout the day in a typical way, generally peaking early in the morning in the upstream sewers and later and less sharply in the larger downstream sewers with higher flows. The PDWF refers to the maximum dry weather flow rate that is likely to be seen at any given point in the collection system. The typical PDWF tends to be 1½ to 2½ times the ADWF.

In a static hydraulic analysis, the most common means of expressing the anticipated magnitude of the PDWF is by a "peaking factor" (PF), which relates the PDWF to the ADWF. The current City Design and Procedures manual provides a diagram relating the ADWF to the PF. As alluded to earlier, recent flow monitoring clearly shows that water conservation policies and measures have not only reduced the unit flow rate from 400 gpd/ESD to 310 gpd/ESD, but also reduced the measured PDWFs. These findings appear to be consistent with studies performed by other agencies and cities, such as SASD, Los Angeles and Portland among others. Using flow measurements recorded by the City and SASD, the DOU has developed a representative PF, which is more consistent with the PF used by cities such as Los Angeles and Portland. The new PF equation used in the evaluations is as follows:

$$PF = 1.9(ADWF)^{-0.1} \quad (\text{min. PF} = 1.5,\ \text{max. PF} = 3.0)$$

2 Numerous jurisdictional resources were reviewed to determine the density factors listed on Table No. 2. Density factors were averaged and then compared to available flow monitoring and water usage data within the City to obtain a reasonable and representative value for the various land uses.

$$PDWF = ADWF \times PF$$

This PF will be included in future revisions to the City Design and Procedures Manual.

Groundwater Infiltration (GWI)

GWI is groundwater that enters the sewer system through cracks or defective joints in pipes and manhole walls. The magnitude of GWI depends on the condition of the sewers as well as on the depth of the groundwater table with respect to the local sewer collection system. Therefore, GWI is highly dependent on location and topography. Sewers in low lying areas near the Sacramento and American Rivers and the many creeks traversing the Sacramento area tend to exhibit higher GWI rates.

GWI is typically expressed on a unit area basis (gpd/acres or gpad) by dividing GWI flow determined through flow monitoring by the sewered acreage of the monitored area. An evaluation of City and SASD flow monitoring data suggests that typical GWI rates range from about 100 to 500 gpad. SASD currently applies a GWI value of 200 gpad for design of all collection systems in their service area based on data collected at the Sacramento Regional Wastewater Treatment Plant. Unlike the Sacramento service area, however, much of the area served by the SASD is located away from rives and creeks and generally at a higher elevation. Thus, groundwater levels for a majority of their service area tend to be relatively deep in comparison to the collection system. Because of Sacramento's proximity to rivers and creeks, groundwater tends to be relatively shallow under much of the City. This factor, combined with the recent flow monitoring data and the old age of the City collection system, a GWI value of 300 gpad was considered more representative of conditions in the City provided groundwater is 15 feet or less in depth. If the groundwater table was found to be below a depth of 15 feet, no GWI was included in estimated sewer flows. The 15 foot depth was selected because most sewer facilities in the City are located near and/or above this depth.

For the purpose of our evaluation, groundwater elevations for the basin were determined using the data from geotechnical studies maintained on the DOU intranet and/or groundwater contour maps published by the California Department of Water Resources between Spring 1979 and Spring 2007[3]. Ground surface elevations were determined based on Lidar elevation maps also available on the DOU intranet.

The DOU recognizes that groundwater elevations can and will fluctuate due to variations in precipitation, temperature, localized pumping, and other factors. Therefore, it is possible that groundwater elevations may be higher or lower than the levels reported in past geotechnical studies and generalized groundwater contour maps.

Rainfall-Dependent Infiltration/Inflow (RDI/I)

RDI/I is infiltration and inflow that is directly related to rainfall events. RDI/I may enter the sewer collection system through manhole and pipe defects, as well as direct surface drainage connections such as illegally connected roof, pool and yard drains. The magnitude of RDI/I flows are related to the intensity and duration of the rainfall, the

3 Spring groundwater contour maps were selected because river and creek stages and, thus, groundwater elevations tend to be at or near their highest levels.

relative soil moisture at the time of the rainfall event, the condition of the collection system, and other factors. Peak sewer flows during rainfall events are typically the highest flow rates that occur in any sewer collection system.

Planning studies completed by outside consultants for Basins 21, 55, 85, 119, 127, 134, 135, 136, 137 and 145 have shown RDI/I flow rates ranging from less than 1,000 gpd/acre (gpad) to over 9,000 gpad for a 6-hr, 10-year frequency storm event (storm event used for design per the City Design and Procedures manual). SASD has reported RDI/I ranging from 1,000 to 6,000 gpad within their system for the same design storm event and subsequently elected in their planning studies to incorporate RDI/I rates of 1,600 gpad for older existing development and 1,400 gpad for newer (less than 5 years old) and future development. Based on flow data collected from the planning studies completed in the City, the RDI/I rate of 1,600 gpad appears appropriate for sewers less than 20 years old (coinciding with the predominate use of PVC pipe in Sacramento). For sewers greater than 20 years old, an RDI/I rate of 2,500 gpad appears generally representative. Therefore, unless specific flow monitoring and RDI/I data was available for a basin, these values were used in the flow evaluations.

The DOU recognizes that, aside from pipe age, many other factors can contribute to RDI/I. In the absence of flow monitoring data for each basin, however, these other factors cannot be accurately determined. Flow data presented in previous planning studies did suggest a general correlation between pipe age and RDI/I and, thus, it was felt that pipe age would be the best method of quantification for the stated purpose of the evaluations.

Peak Wet Weather Flow (PWWF)

The PWWF refers to the maximum flow rate observed or predicted at any given point in the collection system during extreme wet weather conditions and is the component typically used to evaluate sewer facilities. Because the peak RDI/I during a storm event can occur at any time of the day, it is conservatively assumed in this analysis that the peak RDI/I flow would coincide with the PDWF. Therefore, the PWWF is the sum of the PDWF, GWI, and RDI/I components plus any flows from extraneous discharges. Extraneous discharges are flows from pump stations that discharge into the basin or SASD pipes that discharge into the City's system. Flows from permitted "special dischargers," such as from industries that discharge high flows into the sewer for a limited time period, were not considered in this evaluation. These special dischargers, however, should be considered in any future project specific sewer studies or master plans.

$$PWWF = PDWF + GWI + RDI/I + \text{Extraneous Flow}$$

Hydraulic Capacity Evaluation

Land Use Conditions

The first step in the evaluation process was to compile the existing and future land use data for each basin. To support the impact fee evaluation and for use in future planning, three land use scenarios were evaluated: existing conditions; development and/or redevelopment conditions expected by the year 2030, coinciding with the City's 2030 General Plan; and ultimate build-out conditions. It is recognized that full build-out of every parcel in a basin is never likely to occur. This scenario, however, provides for a sufficient level of conservatism to allow the DOU to plan sewer facilities with useful lives of about 50 to 100 years, which is typical industry standard, without significant risk of shortfalls in future capacity.

For the purpose of the evaluations, the existing land use conditions in a basin were separated into the five general categories listed in Table 3 and compiled using the 2008 Master Address Database GIS files, the 2008 GIS Parcel files, the 2005 Existing Land Use GIS files, and school web sites available on the internet. Since detached single family residences and attached multi-family residences contribute a vast majority of flow to the City's sewer collection system, the Master Address Database was felt to be the best source for obtaining a reasonably accurate residential count within the basins. The Parcel and Existing Land Use files were used to identify commercial/retail, industrial and open space parcels and to determine the gross acreage of the parcels. State and local school district web sites were used to determine enrollment at the numerous public and some private schools in the basins.

2030 land uses were determined using a GIS map developed by the Long Range Planning Department (LRPD) that identifies vacant and potentially subdividable parcels within the City that they feel have a potential or likelihood of being developed or redeveloped by the year 2030. Subdividable parcels are large, currently occupied parcels that have a reasonable potential of being subdivided to a higher density land use. This map was then overlain by a GIS land use map also developed by the LRPD for the City's 2030 General Plan titled "Land Use & Urban Form Diagram" to determine the anticipated future land use and acreage for each of the identified vacant and subdividable parcels.

Build-Out land uses were determined in the same manner as the 2030 land uses except that the Master Address Database was overlain on a 2008 aerial photograph to visually identify the remaining vacant and potentially subdividable parcels within the basin. The aerial photograph was then overlain by the "Land Use & Urban Form Diagram" to determine the anticipated future land use and acreage for each of the parcels. An assumption was made that land uses for existing low to high density housing and existing retail/commercial/industrial developments would not change in the future.

Backbone Pipes

Once the existing and future land use information was compiled, the land uses were then plotted in GIS format on individual aerial photographs of the basins that included overlays showing parcel locations and the layout of the collection systems. Based on the distribution, type, and density of the land uses, by inspection "backbone" pipes were selected for evaluation and nodes were chosen at the downstream end of "backbone" pipes. Backbone pipes are pipes that serve relatively large tributary or shed areas and/or pipes that will serve future developments or redevelopments that could contribute significant flow. Nodes correspond to sewer manholes. The basins were then graphically separated, generally along parcel lines, into smaller subbasins that could be used to evaluate tributary sewer flow to the nodes.

Once the nodes and subbasins were selected within a basin, the acreage and land use data was separated according to the subbasins for estimating the ESDs in each subbasin and the ADWF, PDWF and PWWF at each node using an Excel spreadsheet and the assumptions and methods previously discussed. Using the same Excel spreadsheet, the selected backbone pipes upstream of a node were then analyzed using Manning's Equation to estimate if the pipes are able to convey the PWWF without surcharging[4]. If the hydraulic capacity of a pipe was found to be inadequate, the evaluation was concluded by estimating the minimum pipe diameter required to convey the flow.

Limited information is currently available regarding the line and grade (slope) of the existing collection system. In addition, the flow characteristics throughout most of the system have not been measured through flow monitoring. Accordingly, several assumptions had to be made in order to complete the evaluations. These included a pipe roughness or Manning's coefficient of 0.013 and a minimum flow velocity of 2 feet per second (fps) when the pipe is flowing full, both minimum criteria per the current City Design and Procedures Manual. In order to achieve the flow velocity of 2 fps, the minimum pipe slopes presented on Table 5 were assumed in the evaluations.

Table 5

Pipe Diameter (inch)	Min. Slope (ft/ft)
6	0.005
8	0.0035
10	0.0025
12	0.002
15	0.0015
18	0.0012
21	0.00092
24	0.00077
27	0.00066
30	0.00057
33	0.00051
36	0.00045
42	0.00037
48	0.00031
54	0.00026
60	0.00023
66	0.0002
72	0.00018
78	0.00016
84	0.00015
90	0.00013

Pump Station

The hydraulic capacity of pump stations were evaluated by comparing the current firm discharge capacity of the pump stations to the projected PWWF discharging into the pump stations. The "firm" discharge capacity is the capacity of a pump station with all pumps operating at the same time, except for one of the larger pumps. If the firm discharge capacity of a pump station exceeded the projected PWWF, the pump station was judged to have adequate hydraulic capacity with no required modifications. If the

4 A flow condition, i.e., pressure flow, resulting when the downstream hydraulic capacity is less than the upstream inflow causing sewer to accumulate and rise above the inside crown of a pipe or facility

firm discharge capacity of a pump station was less than the projected PWWF, it was assumed that the station would need either additional pumps installed or, if no room is available in the wet well, that some or all of the pumps would need to be removed and replaced with larger capacity pumps and associated electrical equipment. The potential need for complete reconstruction of a pump station for increased discharge capacity is beyond the scope of this study.

Quality Control

In an effort to "test out" or "ground proof" the methodology and conclusions of the preliminary hydraulic evaluations, the results for Basins 21, 55, 85 and 119 were compared to the findings reported in planning studies completed by outside consultants for these basins. In all cases, the studies identified the same pipes as having insufficient capacity. In a few instances, the conclusions varied as to the pipe diameter required to convey the estimated PWWF, but in no case did the pipe diameter vary by more than one pipe size, plus or minus. Since the results of the studies compared well, it was concluded that the methodology used in these preliminary evaluations produced reasonable results for the stated purpose of the evaluations.

Capital Costs Evaluation

A capital costs evaluation was performed to determined the average cost/ESD to: (1) replace the existing collection system and pump stations; (2) improve/upsize existing sewer backbone infrastructure that does not have adequate hydraulic capacity to convey the estimated existing and/or future PWWF without surcharging; and (3) both improve/upsize existing hydraulically inadequate sewer backbone infrastructure and replace the remaining sewer infrastructure, including pump stations. The evaluation was performed using the average unit costs obtained from the DOU Bid Book and the following assumptions:

1. All sewer pipes estimated to have inadequate flow capacity would be replaced with a new larger diameter pipe along the same line and grade as the existing pipe using conventional trench and fill construction.
2. In order to align the life cycle of the new pipe with the existing manholes along its alignment; all manholes greater than 20 years old would be replaced with a new manhole and all manholes 20 years or less in age would be rehabilitated in-place.
3. Unmarked utility crossing would be encountered at an interval of one per every 200 linear feet of new pipe alignment.
4. Due to wet soil, debris, etc., 0.3 tons of unsuitable soil (about 25% of the native backfill for a 10 foot deep trench excavation) will need to be excavated and replaced per foot of new pipe alignment.
5. If a existing pump station was found to have inadequate discharge capacity for the estimated existing or future PWWF, capital costs include the addition of pumps or the replacement of some or all the existing pumps to increase the capacity of the pump station. Costs assume that the existing building and wet well are structurally adequate and include costs to modify inlet and outlet control structures and switch gear.
6. A combined construction and estimating contingency of 25 percent would be

adequate to address potential unknowns, such as utility conflicts, and other miscellaneous construction issues, such as the need for dewatering, soil contamination, shoring and bracing, etc.

7. Existing sewer services, between the main and the point of service at the property line, would need to be realigned and/or replaced at an interval of one per every 100 linear feet of new pipe alignment.

Summary

The evaluation results indicate that about 121,848, 147,485 and 171,191 linear feet of sanitary sewer "backbone" pipe will need to be improved/upsized in 17 of the 49 sewer basins to adequately serve the estimated Existing, 2030, and Build-out land uses, respectively. The remaining 32 basins possess backbone pipelines that are adequately sized to convey flow generated by all the projected land uses. The improvements would also include the replacement or rehabilitation of about 450 to 600 manholes along the backbone pipe alignments and modifications to increase the capacity of between 5 and 7 pump stations. Overall, this would constitute improving between 5 and 7 percent of entire (backbone and non-backbone) separated sewer system. Approximately 73, 60 and 52 percent of the backbone improvements needed to serve the estimated Existing, 2030 and Build-out land use conditions, respectively, would be concentrated in four basins, Basins 55, 85, 119 and G354. In addition, the City would need to construct about 13,080 linear feet of new backbone sewer pipe in the northern portion of Basin G302, which is currently not served by the City system. A summary of the estimated linear footage of existing backbone pipe and manholes estimated to need improvement in each of the 17 sewer basins is presented on Table 6.

Table 6

Basin	Backbone Pipe Needing Capacity Improvement, linear ft.						Manholes	
	Existing Land Use	% of Improve.	2030 Land Use	% of Improve.	Build-Out Land Use	% of Improve.	Min.	Max.
32	2,310	1.9	2,310	1.6	2,755	1.6	13	14
45	1,697	1.4	2,062	1.4	3,945	2.3	8	20
48	5,052	4.1	8,072	5.5	9,292	5.4	20	35
55	33,565	27.5	33,565	22.8	33,565	19.6	117	117
80	0	0	3,365	2.3	3,365	2.0	12	17
85	17,565	14.4	17,565	11.9	17,565	10.3	49	49
87	7,505	6.2	7,505	5.1	7,505	4.4	24	24
106	1,505	1.2	4,765	3.2	6,100	3.6	7	24
119	16,970	13.9	16,970	11.5	16,970	9.9	62	62
121	1,925	1.6	1,925	1.3	1,925	1.1	7	7
137	1,850	1.5	1,850	1.3	1,850	1.1	4	4
G301	2,240	1.8	4,720	3.2	16,880	9.9	9	44
G302	0	0	2,609	1.8	5,272	3.1	5	11
G303	2,915	2.4	4,560	3.1	6,830	4.0	13	24
G304	3,385	2.8	4,745	3.2	4,745	2.8	13	16
G305	2,815	2.3	10,065	6.8	11,795	6.9	8	34
G354	20,549	16.9	20,832	14.1	20,832	12.2	88	88

Basins North of American River	37,930	31.1	59,899	40.6	80,057	46.8	140	243
Basins South of American River	83,918	68.9	87,586	59.4	91,134	53.2	319	347
Total	121,848		147,485		171,191		459	590

A summary of the capital costs to replace and/or improve the backbone pipe network in each separated sewer basin to meet the needs of the projected land uses is presented on Figure 3. The estimated cost to replace the existing separated sewer system (both backbone and non-backbone) is about $1.051 billion, or about $14,114 per existing ESD. The cost to upsize or improve the backbone network is estimated to be about $93.9 and $109.2 million, or about $7,412 and $4,422 per projected new/future ESD for the 2030 and Build-Out land use conditions, respectively. Lastly, the cost to upsize or improve backbone facilities to meet the needs of the Existing, 2030 and Build-Out land use conditions and to replace all the remaining backbone and non-backbone facilities size-on-size is estimated to be about $1.066, $1.069 and $1.071 billion, or about $14,326, $12,269 and $10,800 per estimated total ESD, respectively.

Approximately 62.5 percent of the total separated sewer pipe network is comprised of 4 to 6 inch diameter pipe that is by and large over 50 years old. Over the years, maintenance of these pipes have absorbed a majority of the Operations and Maintenance (O&M) budget since most are near or have exceeded their service life and are particularly susceptible to stoppages or plugging from root intrusion and the build-up of fats, oils and grease. The frequency of stoppages in larger diameter pipe has been found to be significantly less. To further complicate issues, about 150 miles of this pipe is located in residential backyard easements, making it additionally difficult and costly to maintain and replace the pipe. Often repairs need to be made using hand excavations or small, inefficient equipment. In addition, landscaping, hardscape, fences, etc. frequently need to be removed and replaced in order to complete the repair. As a result, City Standards over the past 20+ years have required all new sewer pipes to be at least 8 inches in diameter and located in streets or other City right-of-ways in an effort to reduce future maintenance costs.

By the year 2030, and certainly at Build-out, most of the existing 4 to 6 inch pipe will have reached and exceeded its service life and need to be replaced. At the same time, all pipes and manholes in residential backyard easements will need to be abandoned and relocated to the nearest street or accessible City right-of-way. Backyard services will also need to be replaced and redirected to the new pipe. Although replacement of these pipes is inevitable, the capital cost analysis presented herein did not consider this additional cost. If this cost had been included, it would have increased the potential replacement/improvement costs an additional $700 to $800 million[5], or an additional $9,400 to $10,750 per total existing ESD.

5 Because of numerous potential conflicts and other issues that likely will be encountered during replacement, the cost for this upgrade is difficult to estimate with any reasonable accuracy at this time.

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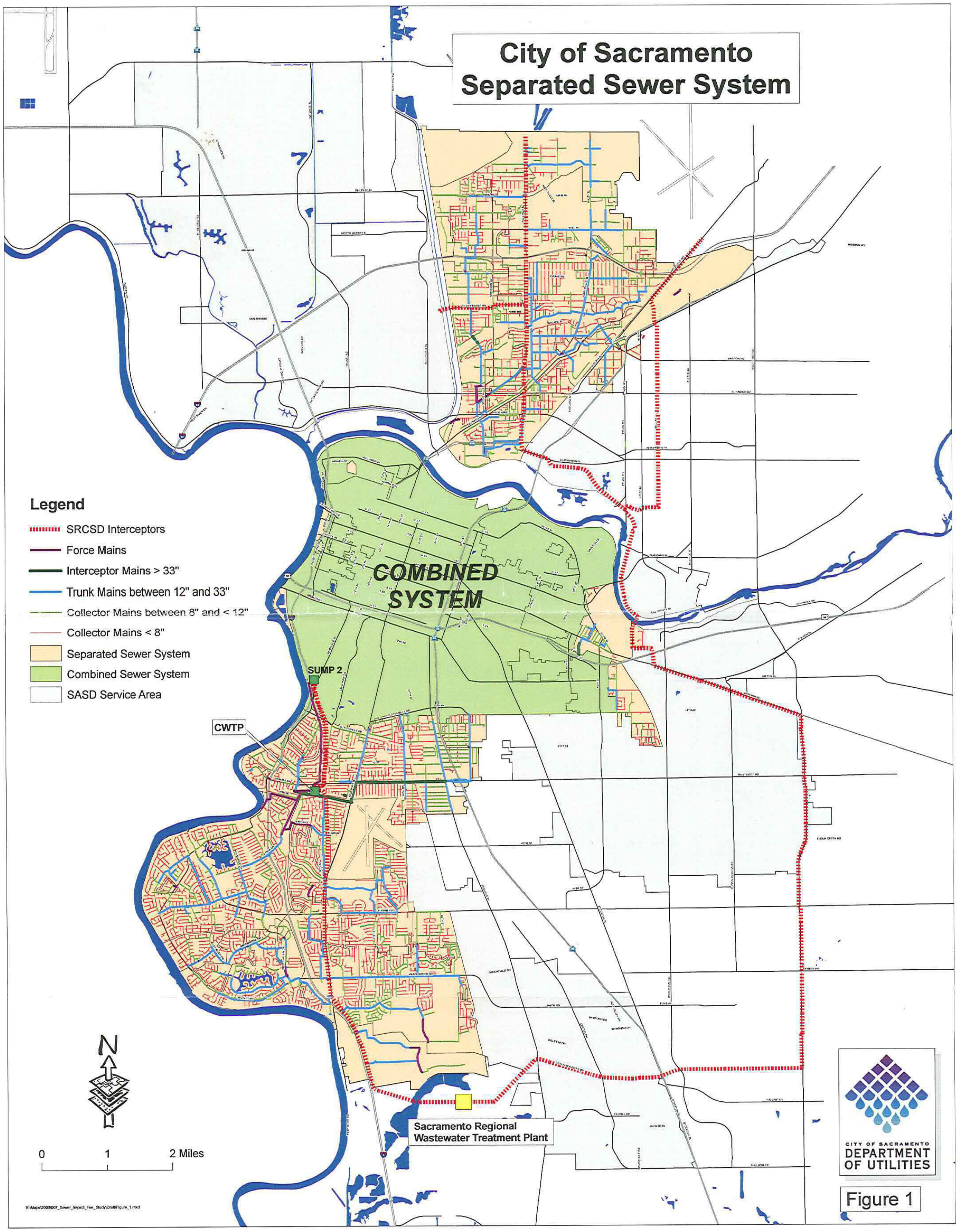


City of Sacramento
Separated Sewer System
COMBINED
SYSTEM
Legend
SRCSD Interceptors
Force Mains
Interceptor Mains > 33"
Trunk Mains between 12" and 33"
Collector Mains between 8" and < 12"
Collector Mains < 8"
Separated Sewer System
Combined Sewer System
SASD Service Area
SUMP 2
CWTP
Sacramento Regional
Wastewater Treatment Plant
N
0
1
2 Miles
CITY OF SACRAMENTO
DEPARTMENT
OF UTILITIES
Figure 1

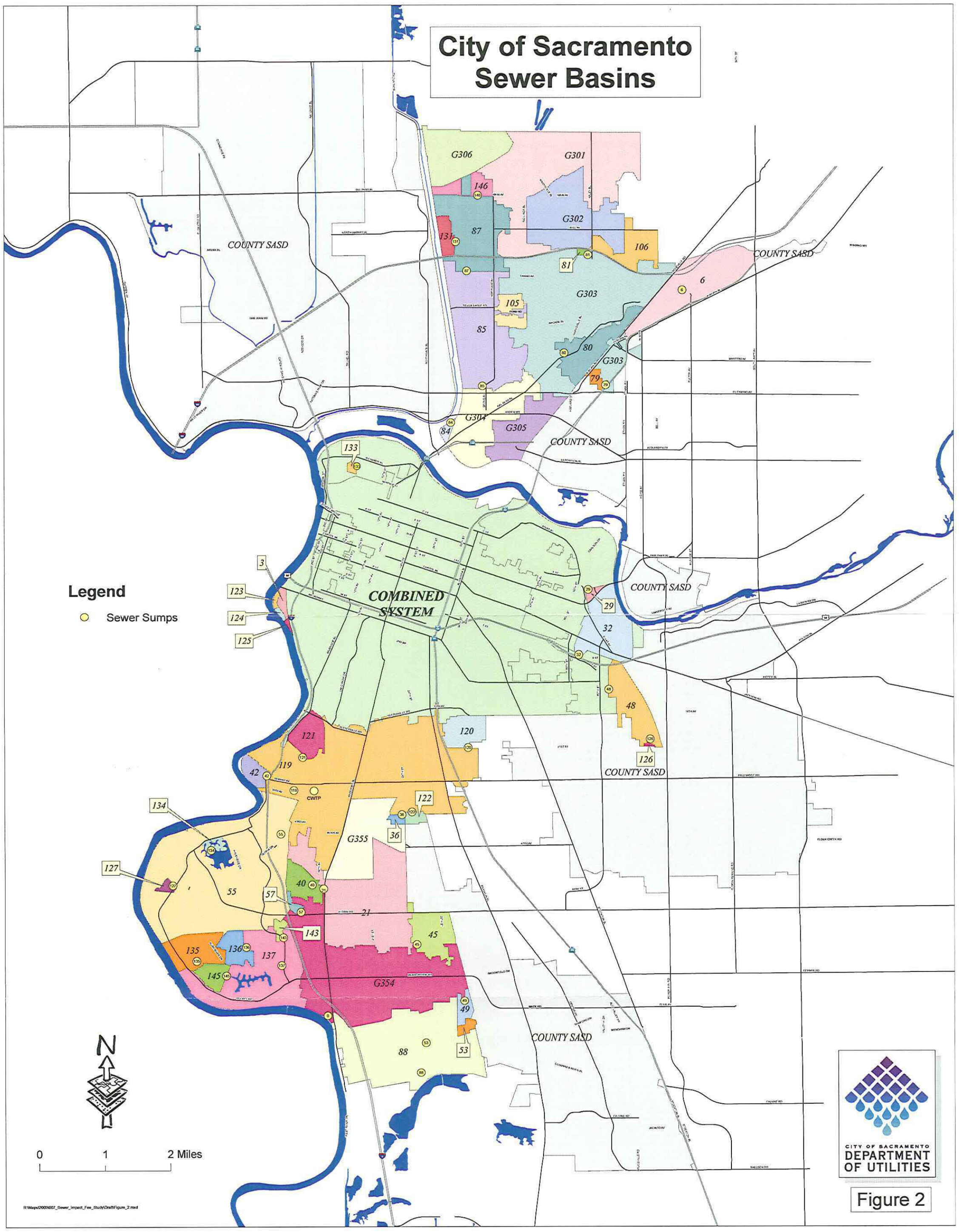

City of Sacramento
Sewer Basins
Legend
Sewer Sumps
COMBINED SYSTEM
COUNTY SASD
G306
G301
G302
G303
G304
G305
G354
G355
146
87
131
106
81
6
105
85
80
79
84
133
3
123
124
125
29
32
48
126
121
120
119
42
CWTP
122
36
134
127
55
40
57
21
143
45
135
136
137
145
49
53
88
N
0
1
2 Miles
CITY OF SACRAMENTO
DEPARTMENT
OF UTILITIES

Figure 2

SUMMARY OF REPLACEMENT AND IMPROVEMENT COSTS FOR SEPARATED SEWER SYSTEM

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Basin	Est. Total ESDs			Estimated Cost to Replace Existing Sewer System[1]	Cost per Existing ESD	Estimated Improvement Costs[2]			Est. Cost to Improve & Replace System[3]			Improvement Cost/Est. Total ESD[4]			Improvement Cost/New ESD[5]		Improvement & Replacement Costs/Total ESD[6]		
	Existing Land Use	2030 Land Use	Build-out Land Use			Existing Land Use	2030 Land Use	Build-out Land Use	Existing Land Use	2030 Land Use	Build-out Land Use	Existing Land Use	2030 Land Use	Build-out Land Use	2030 Land Use	Build-out Land Use	Existing Land Use	2030 Land Use	Build-out Land Use
3, 123, 124, 125	15	15	15	$3,134,521	$208,968				$3,134,521	$3,134,521	$3,134,521						$208,968	$208,968	$208,968
6	44	44	44	$1,913,847	$43,497				$1,913,847	$1,913,847	$1,913,847						$43,497	$43,497	$43,497
21	4,504	4,526	4,579	$75,869,182	$16,845				$75,869,182	$75,869,182	$75,869,182						$16,845	$16,763	$16,569
29	95	95	95	$1,432,891	$15,083				$1,432,891	$1,432,891	$1,432,891						$15,083	$15,083	$15,083
32	545	1,137	1,581	$9,238,855	$16,952	$1,599,997	$1,609,013	$1,791,037	$9,500,770	$9,500,770	$9,508,830	$2,936	$1,415	$1,133	$2,718	$1,729	$17,433	$8,356	$6,014
36	154	155	155	$1,869,531	$12,140				$1,869,531	$1,869,531	$1,869,531						$12,140	$12,061	$12,061
40	559	561	561	$10,274,287	$18,380				$10,274,287	$10,274,287	$10,274,287						$18,380	$18,314	$18,314
42	218	218	218	$5,561,750	$25,513				$5,561,750	$5,561,750	$5,561,750						$25,513	$25,513	$25,513
45	1,426	1,577	1,868	$14,857,020	$10,419	$726,901	$876,052	$1,810,927	$14,894,261	$14,894,261	$14,967,200	$510	$556	$969	$5,802	$4,097	$10,445	$9,445	$8,012
48	1,157	1,926	2,337	$14,123,623	$12,207	$2,264,913	$3,838,692	$4,305,757	$14,285,587	$14,366,821	$14,388,820	$1,958	$1,993	$1,842	$4,992	$3,649	$12,347	$7,459	$6,157
49	277	277	277	$4,084,356	$14,745				$4,084,356	$4,084,356	$4,084,356						$14,745	$14,745	$14,745
53	145	145	145	$4,755,436	$32,796				$4,755,436	$4,755,436	$4,755,436						$32,796	$32,796	$32,796
55	10,548	10,654	10,654	$140,047,352	$13,277	$22,721,068	$22,721,068	$22,721,068	$143,500,390	$143,500,390	$143,500,390	$2,154	$2,133	$2,133	$214,350	$214,350	$13,605	$13,469	$13,469
57	80	80	80	$1,834,044	$22,926				$1,834,044	$1,834,044	$1,834,044						$22,926	$22,926	$22,926
79	192	208	240	$2,256,314	$11,752				$2,256,314	$2,256,314	$2,256,314						$11,752	$10,848	$9,401
80	1,218	1,901	2,133	$14,269,524	$11,716	$0	$1,784,248	$2,739,007	$14,269,524	$14,448,798	$14,573,760	$0	$939	$1,284	$2,612	$2,993	$11,716	$7,601	$6,833
81	18	28	28	$741,641	$41,202				$741,641	$741,641	$741,641						$41,202	$26,487	$26,487
84	110	110	110	$1,619,389	$14,722				$1,619,389	$1,619,389	$1,619,389						$14,722	$14,722	$14,722
85	3,627	4,396	5,091	$54,139,577	$14,927	$10,968,171	$12,194,978	$13,203,373	$55,448,909	$55,822,803	$56,023,183	$3,024	$2,774	$2,593	$15,858	$9,019	$15,288	$12,699	$11,004
87	2,903	3,059	3,395	$31,051,640	$10,696	$4,221,593	$4,242,560	$4,242,560	$33,367,855	$33,388,822	$33,388,822	$1,454	$1,387	$1,250	$27,196	$8,623	$11,494	$10,915	$9,835
88	Undeveloped (Future Delta Shores Development)																		
105	275	555	712	$5,246,448	$19,078				$5,246,448	$5,246,448	$5,246,448						$19,078	$9,453	$7,369
106	736	1,139	1,182	$12,801,443	$17,393	$671,836	$2,216,070	$2,782,924	$12,842,340	$13,000,300	$13,036,409	$913	$1,946	$2,354	$5,499	$6,240	$17,449	$11,414	$11,029
119	12,170	12,939	13,158	$172,258,910	$14,154	$8,303,770	$8,303,770	$8,303,770	$173,175,105	$173,175,105	$173,175,105	$682	$642	$631	$10,798	$8,405	$14,230	$13,384	$13,161
120	875	947	956	$11,305,730	$12,921				$11,305,730	$11,305,730	$11,305,730						$12,921	$11,938	$11,826
121	674	680	680	$13,854,771	$20,556	$783,355	$783,355	$783,355	$13,889,482	$13,889,482	$13,889,482	$1,162	$1,152	$1,152	$130,559	$130,559	$20,608	$20,426	$20,426
122	171	171	171	$2,446,089	$14,305				$2,446,089	$2,446,089	$2,446,089						$14,305	$14,305	$14,305
126	42	42	42	$824,271	$19,626				$824,271	$824,271	$824,271						$19,626	$19,626	$19,626
127	99	99	99	$2,306,332	$23,296				$2,306,332	$2,306,332	$2,306,332						$23,296	$23,296	$23,296
131	390	398	398	$2,265,306	$5,808				$2,265,306	$2,265,306	$2,265,306						$5,808	$5,692	$5,692
133	41	41	224	$724,562	$17,672				$724,562	$724,562	$724,562						$17,672	$17,672	$3,235
134	110	118	118	$2,498,703	$22,715				$2,498,703	$2,498,703	$2,498,703						$22,715	$21,175	$21,175
135	1,183	1,196	1,196	$17,984,615	$15,203				$17,984,615	$17,984,615	$17,984,615						$15,203	$15,037	$15,037
136	701	701	701	$10,453,873	$14,913				$10,453,873	$10,453,873	$10,453,873						$14,913	$14,913	$14,913
137	4,344	4,547	4,547	$59,824,409	$13,772	$1,306,869	$1,406,947	$1,406,947	$59,941,330	$60,041,408	$60,041,408	$301	$309	$309	$6,931	$6,931	$13,799	$13,205	$13,205
143	299	299	299	$1,640,132	$5,485				$1,640,132	$1,640,132	$1,640,132						$5,485	$5,485	$5,485
145	666	666	666	$7,488,271	$11,244				$7,488,271	$7,488,271	$7,488,271						$11,244	$11,244	$11,244
146	531	534	548	$9,774,846	$18,408				$9,774,846	$9,774,846	$9,774,846						$18,408	$18,305	$17,837
G301	2,836	5,121	10,975	$37,340,463	$13,167	$1,223,904	$2,483,583	$8,952,491	$37,441,530	$37,606,338	$38,654,627	$432	$485	$816	$1,087	$1,100	$13,202	$7,344	$3,522
G302	1,372	2,655	3,930	$16,001,040	$11,663	$5,001,410	$7,045,407	$9,809,118	$20,999,094	$21,462,156	$21,682,721	$3,039	$2,654	$2,496	$5,491	$3,835	$15,305	$8,084	$5,517
G303	7,582	8,916	9,639	$116,291,356	$15,338	$1,321,592	$2,454,849	$3,526,076	$116,398,317	$116,556,873	$116,684,990	$174	$275	$366	$1,840	$1,714	$15,352	$13,073	$12,106
G304	2,807	3,879	4,124	$36,353,295	$12,951	$2,084,752	$2,655,933	$2,655,933	$36,506,117	$36,530,425	$36,530,425	$743	$685	$644	$2,478	$2,017	$13,005	$9,417	$8,858
G305	1,532	2,626	2,902	$16,697,213	$10,899	$2,018,078	$5,398,537	$6,294,692	$16,874,877	$17,343,982	$17,421,971	$1,317	$2,056	$2,169	$4,935	$4,595	$11,015	$6,605	$6,003
G306	Flood Plain (No Existing or Future Infrastructure)																		
G354	7,175	7,730	8,266	$101,293,397	$14,118	$13,644,380	$13,854,043	$13,854,043	$102,854,462	$102,936,102	$102,936,102	$1,902	$1,792	$1,676	$24,962	$12,698	$14,335	$13,316	$12,453
G355	Executive Airport (County Maintained)																		
Total	**74,446**	**87,111**	**99,139**	**$1,050,750,257**	**$913,445**	**$78,862,591**	**$93,869,105**	**$109,183,077**	**$1,066,496,319**	**$1,068,771,204**	**$1,070,710,613**								
Cost/ESD					**$14,114**							**$1,059**	**$1,078**	**$1,101**	**$7,412**	**$4,422**	**$14,326**	**$12,269**	**$10,800**

Notes:
1) Cost includes all existing sewer infrastructure, including all collector mains, trunk mains, interceptor mains, services, pump stations, etc.
2) Includes costs to meet the capacity requirements of the "backbone" system. Does not consider costs to upgrade system to current City standards, i.e., upsizing 6 inch diameter pipe to the minimum 8 inch diameter requirement.
3) Cost to improve "backbone" pipe that does not meet capacity standards plus the cost to replace all other existing sewer infrastructure.
4) Calculated by dividing the estimated improvement costs in columns 7, 8, and 9 by the estimated total ESDs in columns 2, 3 and 4, respectively.
5) Calculated by dividing the estimated improvement costs in columns 8 and 9 by the difference in ESDs between 2030 ESDs (column 3) and the existing ESDs (column 2) and the Build-Out ESDs (column 4) and the existing ESDs (column 2), respectively.
6) Calculated by dividing the estimated improvement and replacement costs in columns 10, 11 and 12 by the estimated total ESDs in columns 2, 3 and 4, respectively.
7) The combined sewer system, which comprises about 30 percent of the total City system, is excluded.

FIGURE 3

Appendix C-2

Sample Basin Improvements

Basin G303

Improvements are the net of Plate 9 minus Plate 8. ESD are current to 2022 (see **Table 3-2**) based on 2040 General Plan projections (**Table 3-1**). Costs are escalated to 2022 dollars (**Table 3-3**).

COST TO REPLACE INFRASTRUTURE WITH INADEQUATE HYDRAULIC CAPACITY
(2030 LAND USE CONDITION)

Basin G303 — PM GHG — Date 9/29/2009

Item no.	Description	Est. Quantity	Units	Est. Cost	Est.Total
1	Mobilization (8%)	1	LS	$242,451	$242,451
2	Traffic Control (4%)	1	LS	$121,225	$121,225
3	Preconstruction Photographs	1	LS	$2,000	$2,000
4	Ex. Pipe to Remove, 8" Pipe to Place		LF	$165	$0
5	Ex. Pipe to Remove,10" Pipe to Place	1,705	LF	$175	$298,375
6	Ex. Pipe to Remove, 12" Pipe to Place	420	LF	$190	$79,800
7	Ex. Pipe to Remove, 15" Pipe to Place	1,850	LF	$225	$416,250
8	Ex. Pipe to Remove, 18" Pipe to Place	3,920	LF	$250	$980,000
9	Ex. Pipe to Remove, 21" Pipe to Place	720	LF	$275	$198,000
10	Ex. Pipe to Remove, 24" Pipe to Place	1,645	LF	$310	$509,950
11	Ex. Pipe to Remove, 27" Pipe to Place		LF	$345	$0
12	Ex. Pipe to Remove, 30" Pipe to Place		LF	$375	$0
13	Ex. Pipe to Remove, 33" Pipe to Place		LF	$410	$0
14	Ex. Pipe to Remove, 36" Pipe to Place		LF	$440	$0
15	Ex. Pipe to Remove, 42" Pipe to Place		LF	$510	$0
16	Manhole Rehabilitation		EA	$4,500	$0
17	Manhole Type 3	36	EA	$6,500	$234,000
18	Manhole Type 3A		EA	$7,300	$0
19	Manhole Type 4	5	EA	$9,100	$45,500
20	Saddle Manhole		EA	$14,500	$0
21	Ex. Sewer Service to Relocate/Replace	103	EA	$1,400	$143,640
22	Unsuitable Soil to Remove	3,078	TON	$35	$107,730
23	Unmarked Utility Crossing	51	EA	$300	$15,390
24	Modify/Increase Pump Station Capacity		EA		$0
25					$0
26					$0
27					$0
28					$0
29					$0
30					$0
31					$0
32					$0
				SUBTOTAL	$3,394,311

Guide	Design and Mangement	Estimate %	Est.Total
4% - 10%	Construction Contingency	10	$339,431
0.5% - 5%	Environmental	1	$33,943
3% - 7%	Project Management	5	$169,716
20% - 30%	Design Engineering	20	$678,862
10% - 20%	Construction Management	10	$339,431
10% - 20%	Estimate Contingency for Undefined/Changed Scope	15	$509,147
		SUBTOTAL	$2,070,530
		TOTAL PROJECT ESTIMATE	$5,464,841

Notes:

PLATE NO. 9

COST TO REPLACE INFRASTRUCTURE WITH INADEQUATE HYDRAULIC CAPACITY (EXISTING LAND USE CONDITION)

Basin G303 PM GHG
Date 9/29/2009

Item no.		Description	Est. Quantity		Units	Est. Cost		Est.Total
1		Mobilization (8%)	1		LS	$105,451		$105,451
2		Traffic Control (4%)	1		LS	$52,725		$52,725
3		Preconstruction Photographs	1		LS	$2,000		$2,000
4		Ex. Pipe to Remove, 8" Pipe to Place			LF	$165		$0
5		Ex. Pipe to Remove,10" Pipe to Place	1,705		LF	$175		$298,375
6		Ex. Pipe to Remove, 12" Pipe to Place			LF	$190		$0
7		Ex. Pipe to Remove, 15" Pipe to Place	1,210		LF	$225		$272,250
8		Ex. Pipe to Remove, 18" Pipe to Place			LF	$250		$0
9		Ex. Pipe to Remove, 21" Pipe to Place			LF	$275		$0
10		Ex. Pipe to Remove, 24" Pipe to Place	1,645		LF	$310		$509,950
11		Ex. Pipe to Remove, 27" Pipe to Place			LF	$345		$0
12		Ex. Pipe to Remove, 30" Pipe to Place			LF	$375		$0
13		Ex. Pipe to Remove, 33" Pipe to Place			LF	$410		$0
14		Ex. Pipe to Remove, 36" Pipe to Place			LF	$440		$0
15		Ex. Pipe to Remove, 42" Pipe to Place			LF	$510		$0
16		Manhole Rehabilitation			EA	$4,500		$0
17		Manhole Type 3	18		EA	$6,500		$117,000
18		Manhole Type 3A			EA	$7,300		$0
19		Manhole Type 4			EA	$9,100		$0
20		Saddle Manhole			EA	$14,500		$0
21		Ex. Sewer Service to Relocate/Replace	46		EA	$1,400		$63,840
22		Unsuitable Soil to Remove	1,368		TON	$35		$47,880
23		Unmarked Utility Crossing	23		EA	$300		$6,840
24		Modify/Increase Pump Station Capacity			EA			$0
25								$0
26								$0
27								$0
28								$0
29								$0
30								$0
31								$0
32								$0
						SUBTOTAL		**$1,476,311**

Guide	Design and Mangement		Estimate %			Est.Total
4% - 10%	Construction Contingency		10			$147,631
0.5% - 5%	Environmental		1			$14,763
3% - 7%	Project Management		5			$73,816
20% - 30%	Design Engineering		20			$295,262
10% - 20%	Construction Management		10			$147,631
10% - 20%	Estimate Contingency for Undefined/Changed Scope		15			$221,447
				SUBTOTAL		**$900,550**
				TOTAL PROJECT ESTIMATE		**$2,376,861**

Notes:

PLATE NO. 8

Appendix C-3

Separated Sewer Detailed Fee Schedule

Land Use	ESDs per Unit	Factor	Cost Per ESD	Fee per Unit
Residential				
Single Family Residential	1.00	Per residence	$3,461	$3,565
Apartments	0.66	Per residence	$3,461	$2,362
Duplex	0.83	Per residence	$3,461	$2,946
Triplex	0.60	Per residence	$3,461	$2,150
Fourplex	0.60	Per residence	$3,461	$2,155
Mobile Home	0.67	Per residence	$3,461	$2,395
Hotel and Motel	0.43	Per room	$3,461	$1,530
College Dorm / Boarding House	0.40	Per bed or resident	$3,461	$1,410
Residential Care/Skilled Nursing Facility	0.49	Per residence	$3,461	$1,740
Retail				
Single Retail	0.53	per 1,000 sq. ft.	$3,461	$1,889
Community Shopping Center	0.85	per 1,000 sq. ft.	$3,461	$3,040
Market	0.59	per 1,000 sq. ft.	$3,461	$2,106
Dine-In Restaurant	1.77	per 1,000 sq. ft.	$3,461	$6,322
Drive-In or Fast Food Restaurant	2.48	per 1,000 sq. ft.	$3,461	$8,848
Cocktail Lounge/Bar	1.58	per 1,000 sq. ft.	$3,461	$5,643
Coffee Shop	0.93	per 1,000 sq. ft.	$3,461	$3,331
Service Station	1.25	per 1,000 sq. ft.	$3,461	$4,460
Theatre	0.43	per 1,000 sq. ft.	$3,461	$1,538
Commercial				
Car Wash	3.64	per 0.1 acre of property	$3,461	$12,976
Clinic: Medical, Dental, Veterinarian	0.32	per 1,000 sq. ft.	$3,461	$1,127
Food Processing	3.02	per 1,000 sq. ft.	$3,461	$10,750
Store/Office Combo	0.43	per 1,000 sq. ft.	$3,461	$1,523
Auto Repair	0.18	per 1,000 sq. ft.	$3,461	$658
Auto Sales	0.70	per 1,000 sq. ft.	$3,461	$2,481
Unclassified Commercial	0.33	per 1,000 sq. ft.	$3,461	$1,170
Industrial and Warehouse				
Light Industrial	0.27	per 1,000 sq. ft.	$3,461	$951
Heavy Industrial	0.30	per 1,000 sq. ft.	$3,461	$1,058
Office Warehouse (>30% Office)	0.67	per 1,000 sq. ft.	$3,461	$2,397
Distribution Warehouse (15%-30% Office)	0.13	per 1,000 sq. ft.	$3,461	$454
Storage Warehouse (3%-14% Office)	0.08	per 1,000 sq. ft.	$3,461	$286
Mini-Storage	0.05	per 1,000 sq. ft.	$3,461	$166
Unclassified Warehouse	0.15	per 1,000 sq. ft.	$3,461	$542
Office				
Single Story	0.33	per 1,000 sq. ft.	$3,461	$1,167
Two Story	0.18	per 1,000 sq. ft.	$3,461	$648
Multi-Story	0.11	per 1,000 sq. ft.	$3,461	$398
Schools and Hospitals				
Hospital	1.62	per bed	$3,461	$5,772
Public Elementary , Middle, or Highschool	3.96	per 100 students	$3,461	$14,127
Public or Private Colleges	3.84	per acre of property	$3,461	$13,689
Private School	3.48	per acre of property	$3,461	$12,406
Church	0.22	per 1,000 sq. ft.	$3,461	$800

Sources: DOU and EPS *Appendix_C.3*

Appendix C-4

Companion Charts to Table 3-8

Per Unit

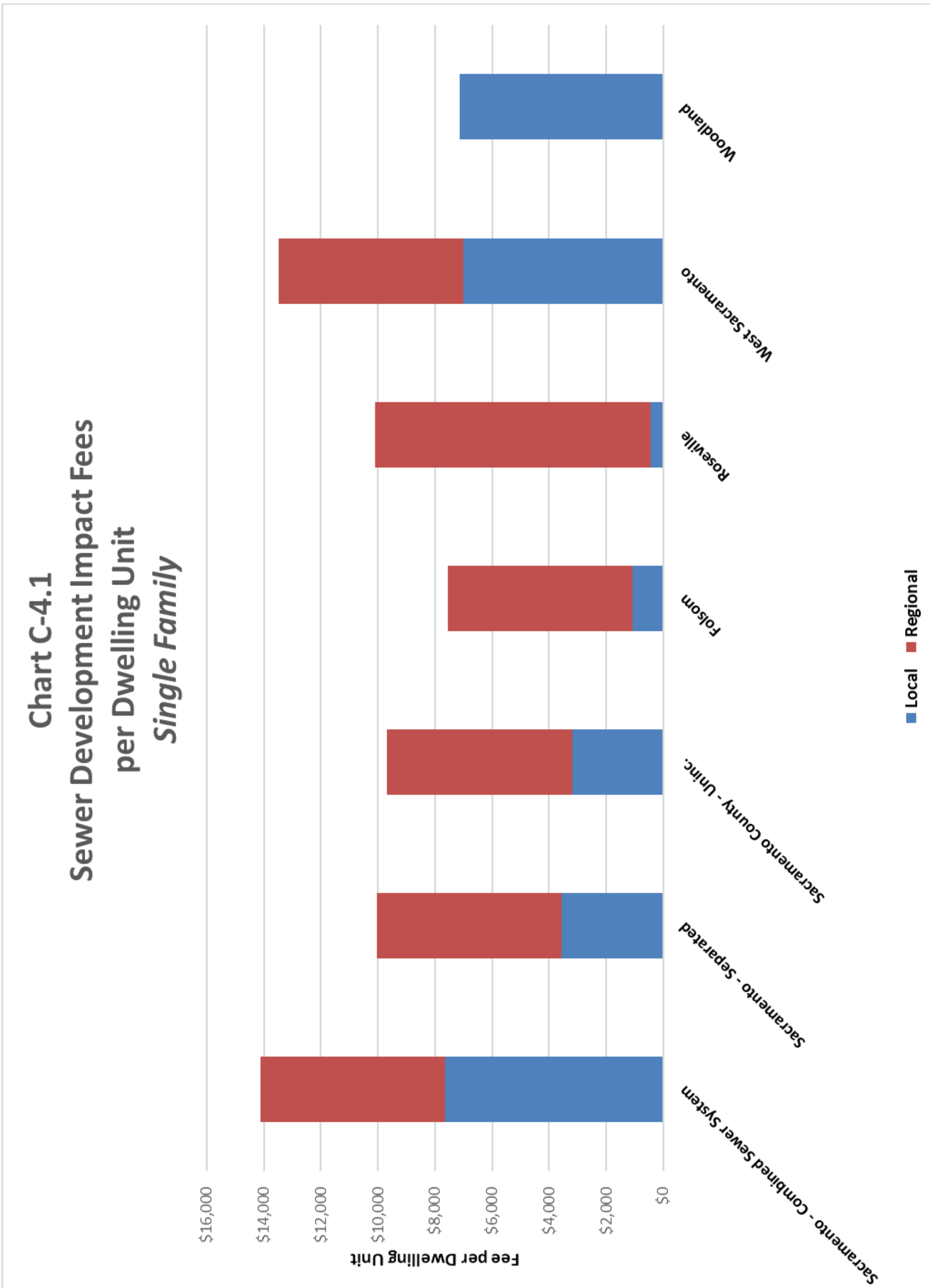


Chart C-4.2
Sewer Development Impact Fees
per 1,000 Building Square Feet
Retail

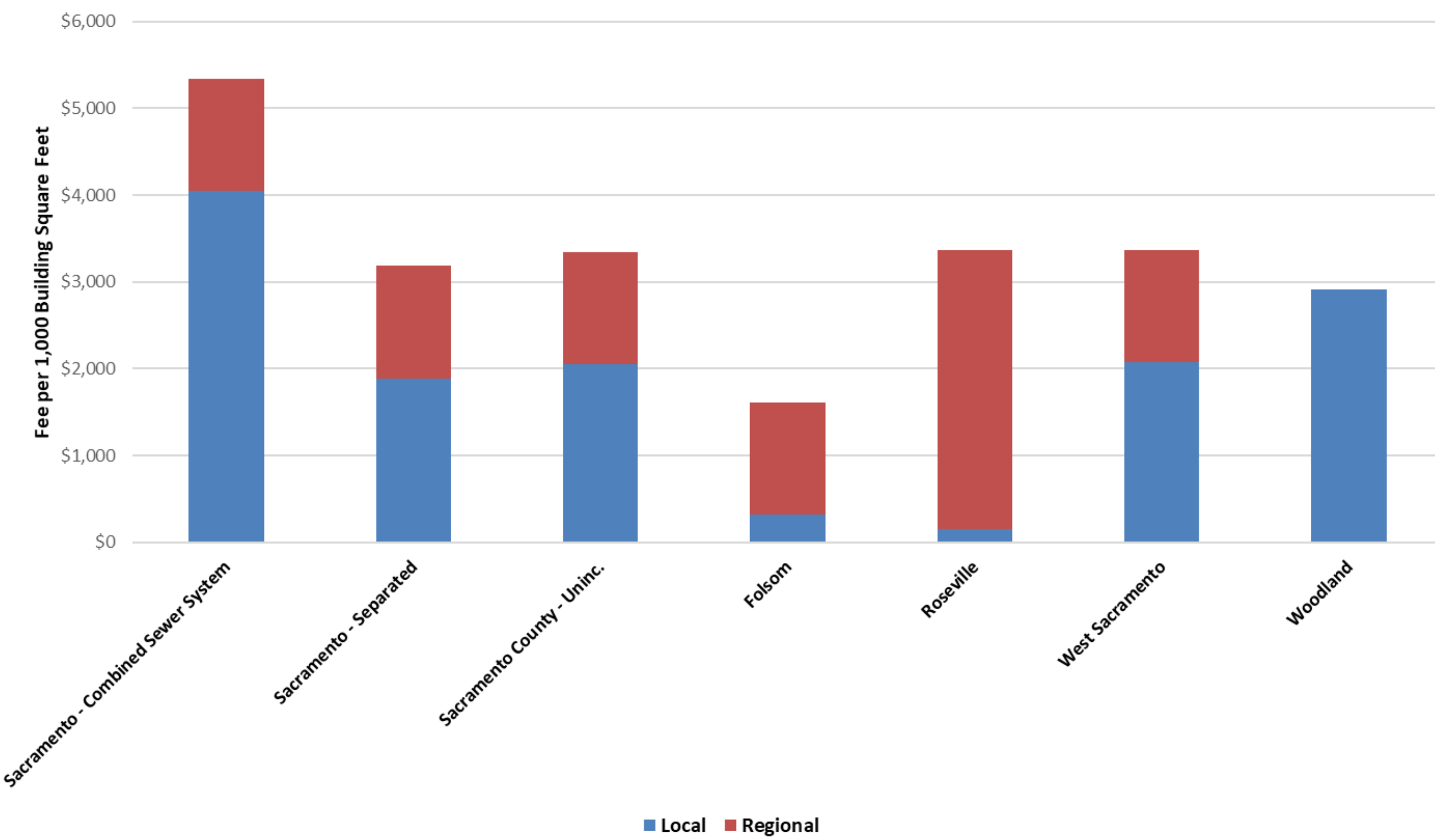
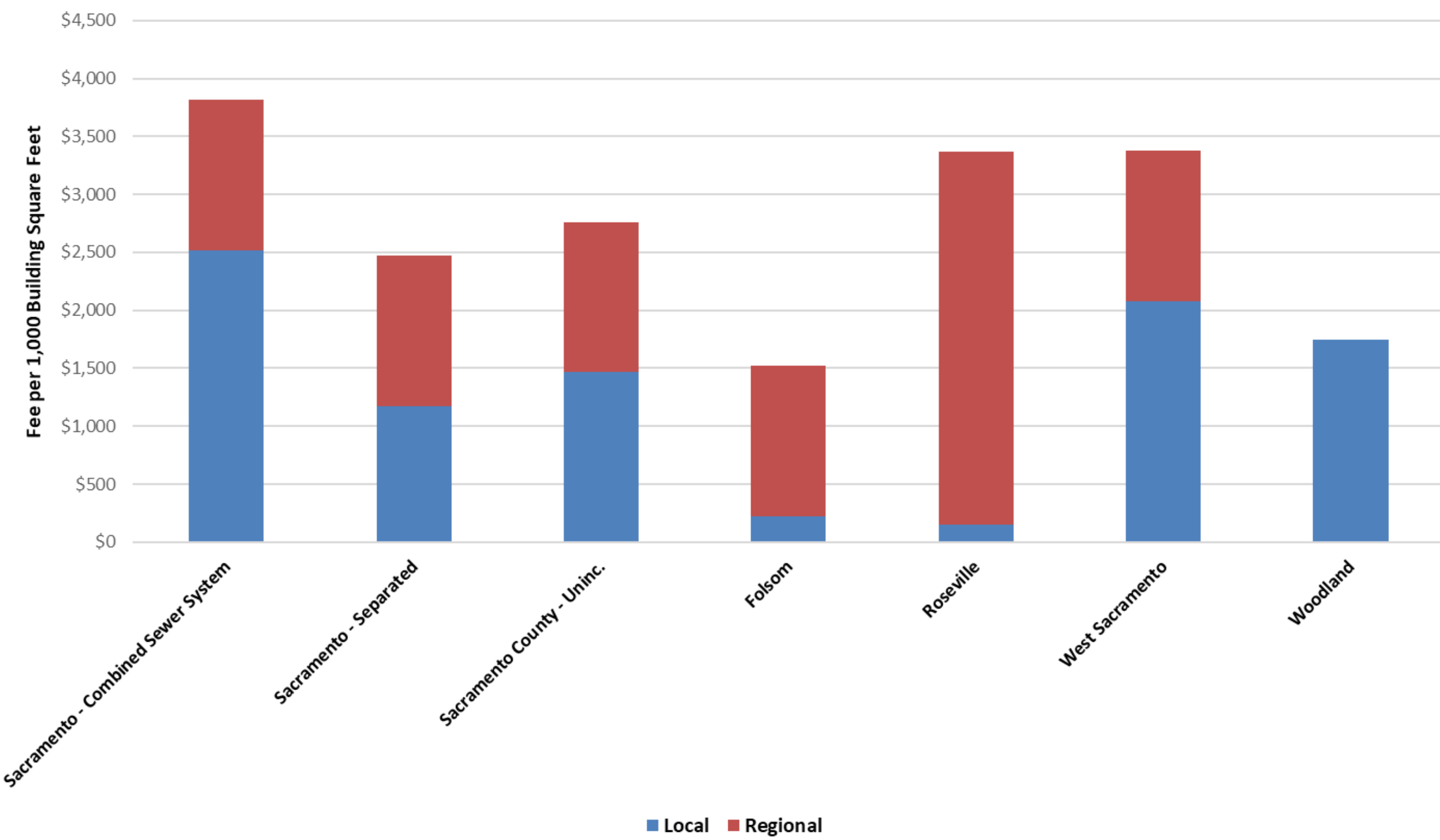


Chart C-4.3
Sewer Development Impact Fees per 1,000 Building Square Feet
Office



Per Acre

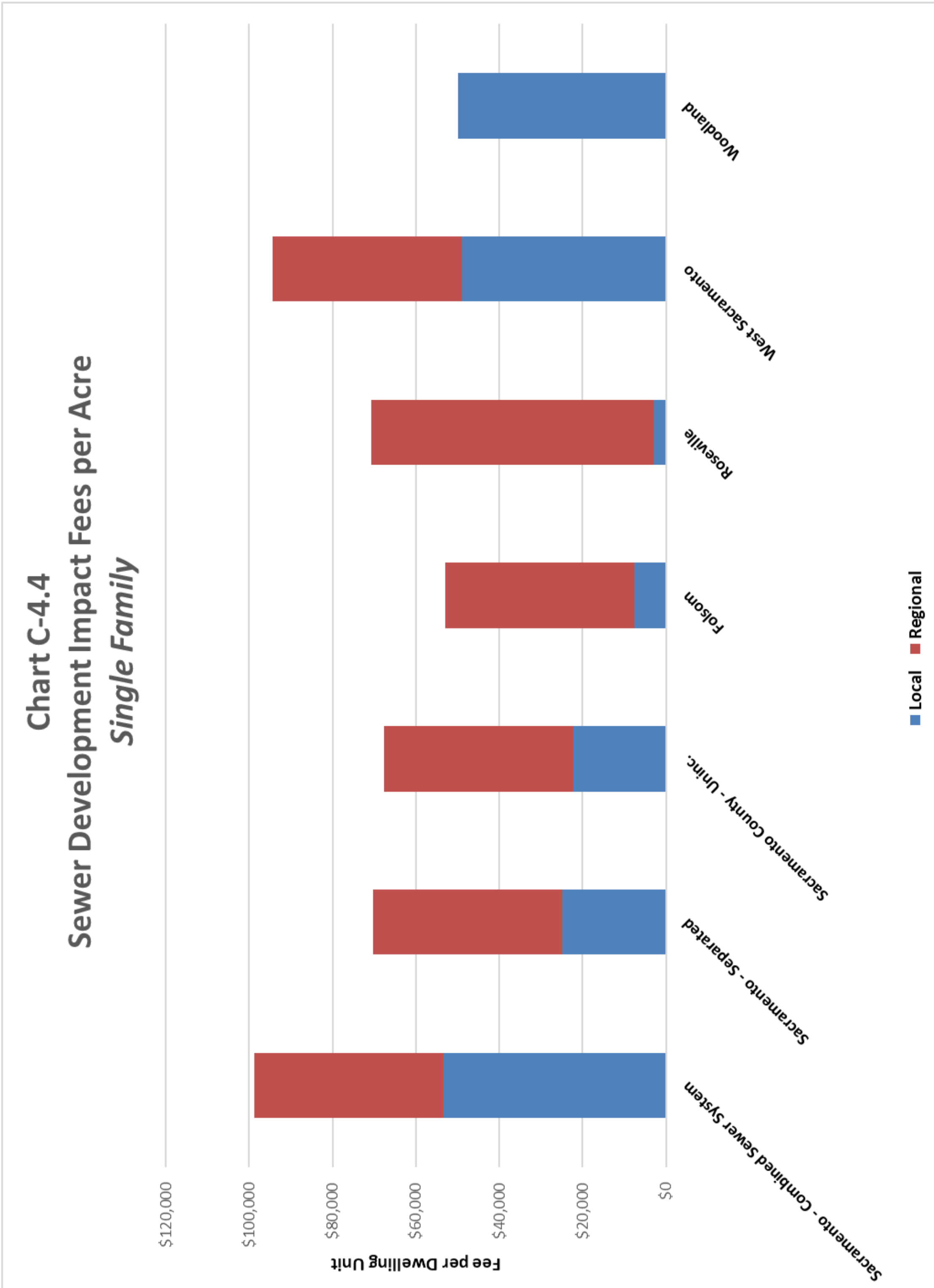


Chart C-4.4
Sewer Development Impact Fees per Acre
Single Family
Fee per Dwelling Unit
$120,000
$100,000
$80,000
$60,000
$40,000
$20,000
$0
Sacramento - Combined Sewer System
Sacramento - Separated
Sacramento County - Uninc.
Folsom
Roseville
West Sacramento
Woodland
Local
Regional

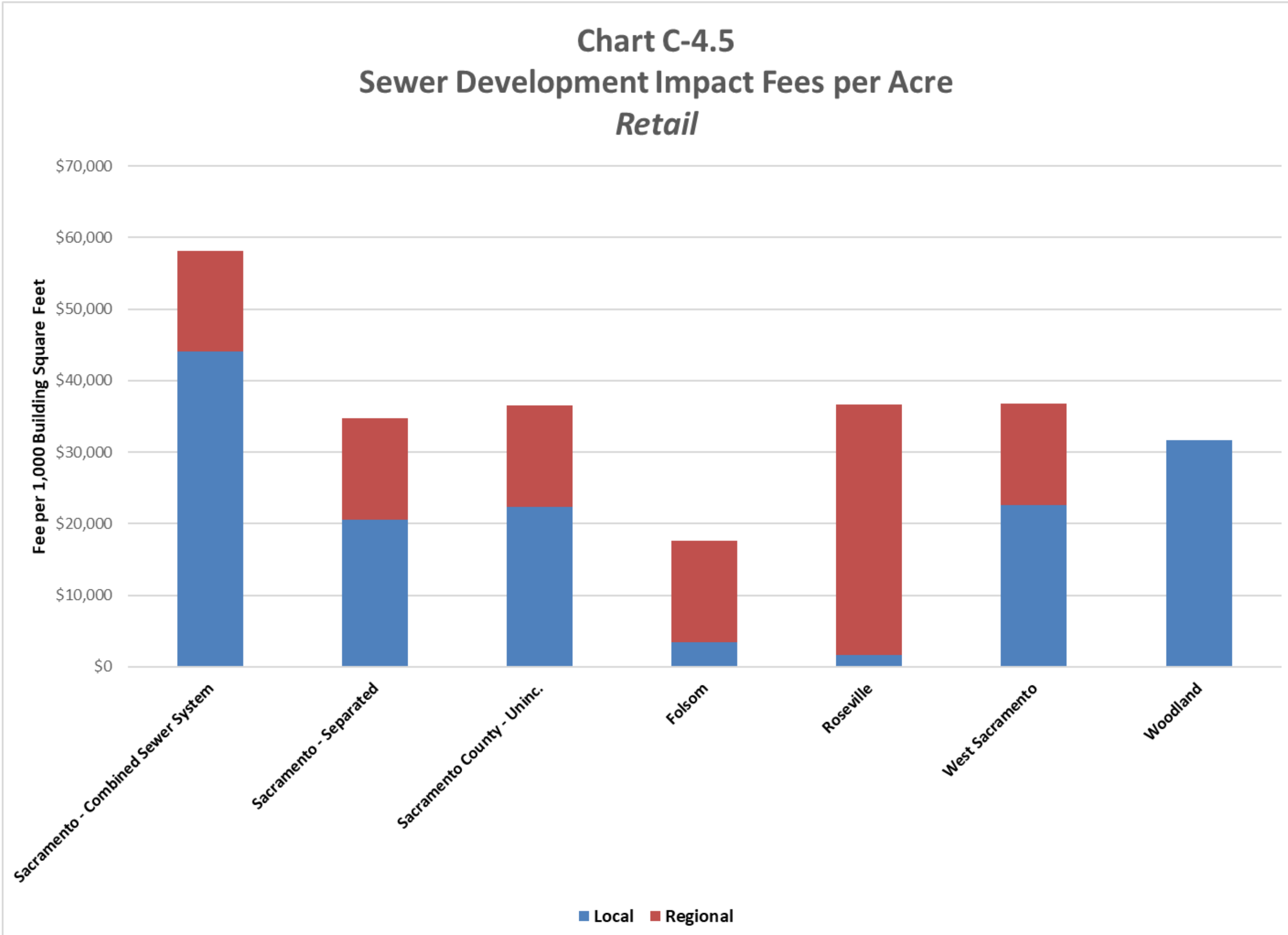
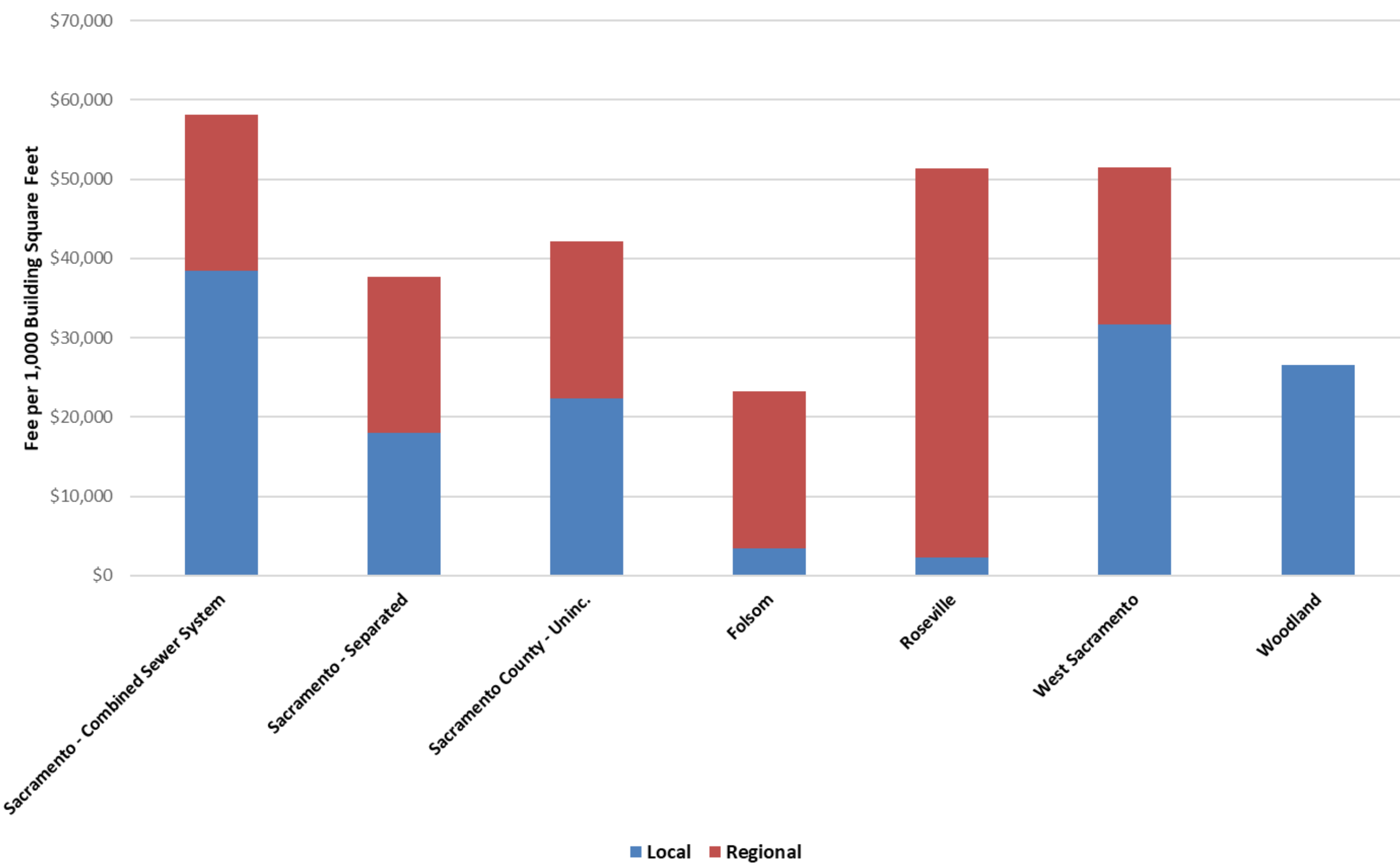


Chart C-4.5
Sewer Development Impact Fees per Acre
Retail
Fee per 1,000 Building Square Feet
$70,000
$60,000
$50,000
$40,000
$30,000
$20,000
$10,000
$0
Sacramento - Combined Sewer System
Sacramento - Separated
Sacramento County - Uninc.
Folsom
Roseville
West Sacramento
Woodland
Local
Regional

Chart C-4.6
Sewer Development Impact Fees per Acre
Office



APPENDIX D:

Combined Sewer System Utility

Appendix D-1

Combined Sewer System Detailed Fee Schedule

All Land Uses	
New Impervious Surface Cost per Square Foot	**$5.38**

Land Use	ESDs per Unit	Factor	Cost Per ESD	Fee per Unit
Residential				
Single Family Residential	1.00	Per residence	$7,413	**$7,635**
Apartments	0.66	Per residence	$7,413	**$5,060**
Duplex	0.83	Per residence	$7,413	**$6,309**
Triplex	0.60	Per residence	$7,413	**$4,605**
Fourplex	0.60	Per residence	$7,413	**$4,615**
Mobile Home	0.67	Per residence	$7,413	**$5,130**
Hotel and Motel	0.43	Per room	$7,413	**$3,276**
College Dorm / Boarding House	0.40	Per bed or resident	$7,413	**$3,019**
Residential Care/Skilled Nursing Facility	0.49	Per residence	$7,413	**$3,727**
Retail				
Single Retail	0.53	per 1,000 sq. ft.	$7,413	**$4,047**
Community Shopping Center	0.85	per 1,000 sq. ft.	$7,413	**$6,510**
Market	0.59	per 1,000 sq. ft.	$7,413	**$4,511**
Dine-In Restaurant	1.77	per 1,000 sq. ft.	$7,413	**$13,541**
Drive-In or Fast Food Restaurant	2.48	per 1,000 sq. ft.	$7,413	**$18,950**
Cocktail Lounge/Bar	1.58	per 1,000 sq. ft.	$7,413	**$12,087**
Coffee Shop	0.93	per 1,000 sq. ft.	$7,413	**$7,136**
Service Station	1.25	per 1,000 sq. ft.	$7,413	**$9,553**
Theatre	0.43	per 1,000 sq. ft.	$7,413	**$3,294**
Commercial				
Car Wash	3.64	per 0.1 acre of property	$7,413	**$27,793**
Clinic: Medical, Dental, Veterinarian	0.32	per 1,000 sq. ft.	$7,413	**$2,413**
Food Processing	3.02	per 1,000 sq. ft.	$7,413	**$23,026**
Store/Office Combo	0.43	per 1,000 sq. ft.	$7,413	**$3,261**
Auto Repair	0.18	per 1,000 sq. ft.	$7,413	**$1,410**
Auto Sales	0.70	per 1,000 sq. ft.	$7,413	**$5,313**
Unclassified Commercial	0.33	per 1,000 sq. ft.	$7,413	**$2,507**
Industrial and Warehouse				
Light Industrial	0.27	per 1,000 sq. ft.	$7,413	**$2,038**
Heavy Industrial	0.30	per 1,000 sq. ft.	$7,413	**$2,265**
Office Warehouse (>30% Office)	0.67	per 1,000 sq. ft.	$7,413	**$5,135**
Distribution Warehouse (15%-30% Office)	0.13	per 1,000 sq. ft.	$7,413	**$972**
Storage Warehouse (3%-14% Office)	0.08	per 1,000 sq. ft.	$7,413	**$613**
Mini-Storage	0.05	per 1,000 sq. ft.	$7,413	**$357**
Unclassified Warehouse	0.15	per 1,000 sq. ft.	$7,413	**$1,160**
Office				
Single Story	0.33	per 1,000 sq. ft.	$7,413	**$2,499**
Two Story	0.18	per 1,000 sq. ft.	$7,413	**$1,388**
Multi-Story	0.11	per 1,000 sq. ft.	$7,413	**$852**
Schools and Hospitals				
Hospital	1.62	per bed	$7,413	**$12,363**
Public Elementary , Middle, or Highschool	3.96	per 100 students	$7,413	**$30,257**
Public or Private Colleges	3.84	per acre of property	$7,413	**$29,320**
Private School	3.48	per acre of property	$7,413	**$26,571**
Church	0.22	per 1,000 sq. ft.	$7,413	**$1,713**

Sources: DOU and EPS *Appendix_D.1*

Appendix D-2

Companion Charts to Table 4-9

Per Unit

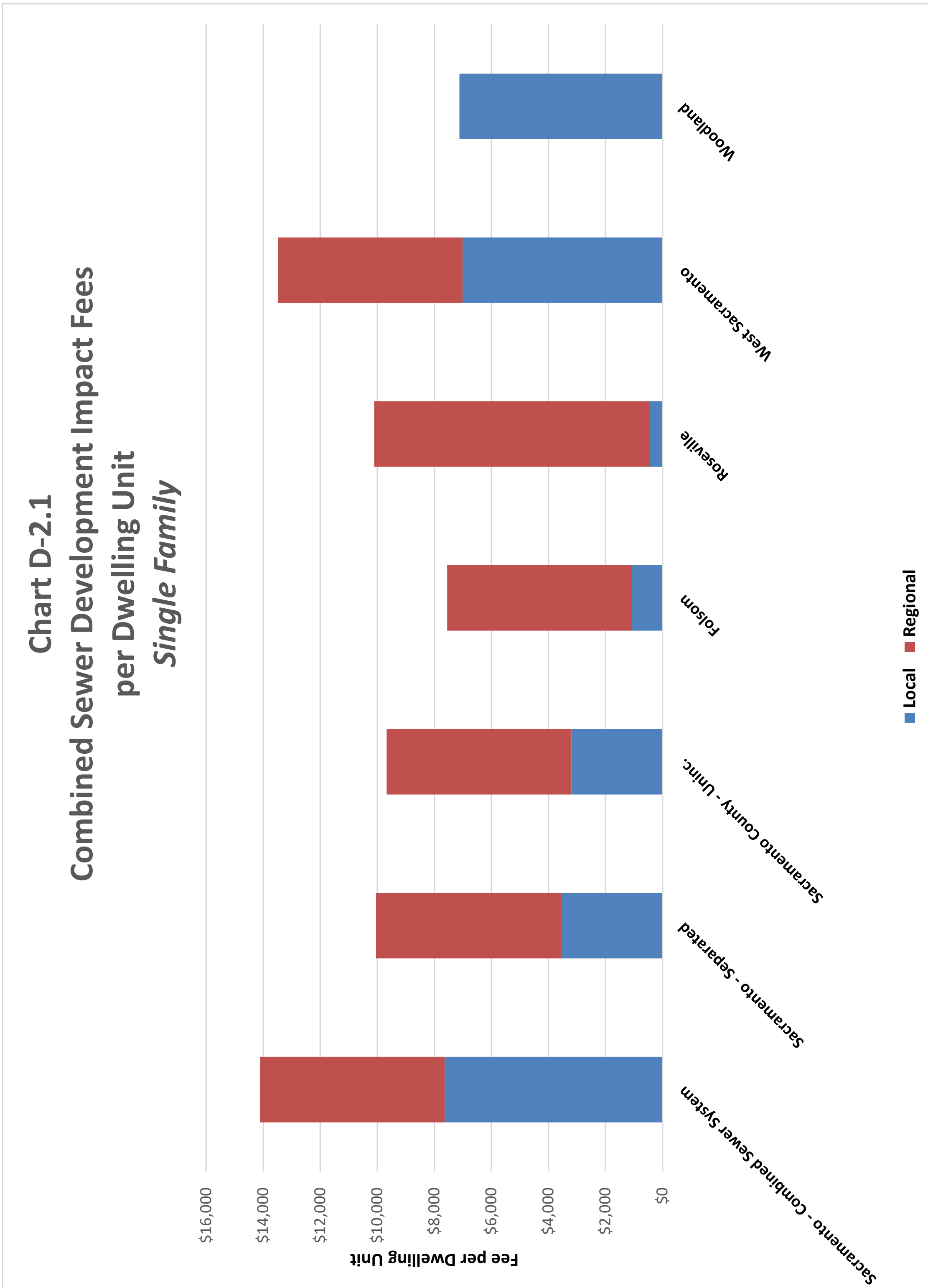


Chart D-2.2
Combined Sewer Development Impact Fees
per 1,000 Building Square Feet
Retail

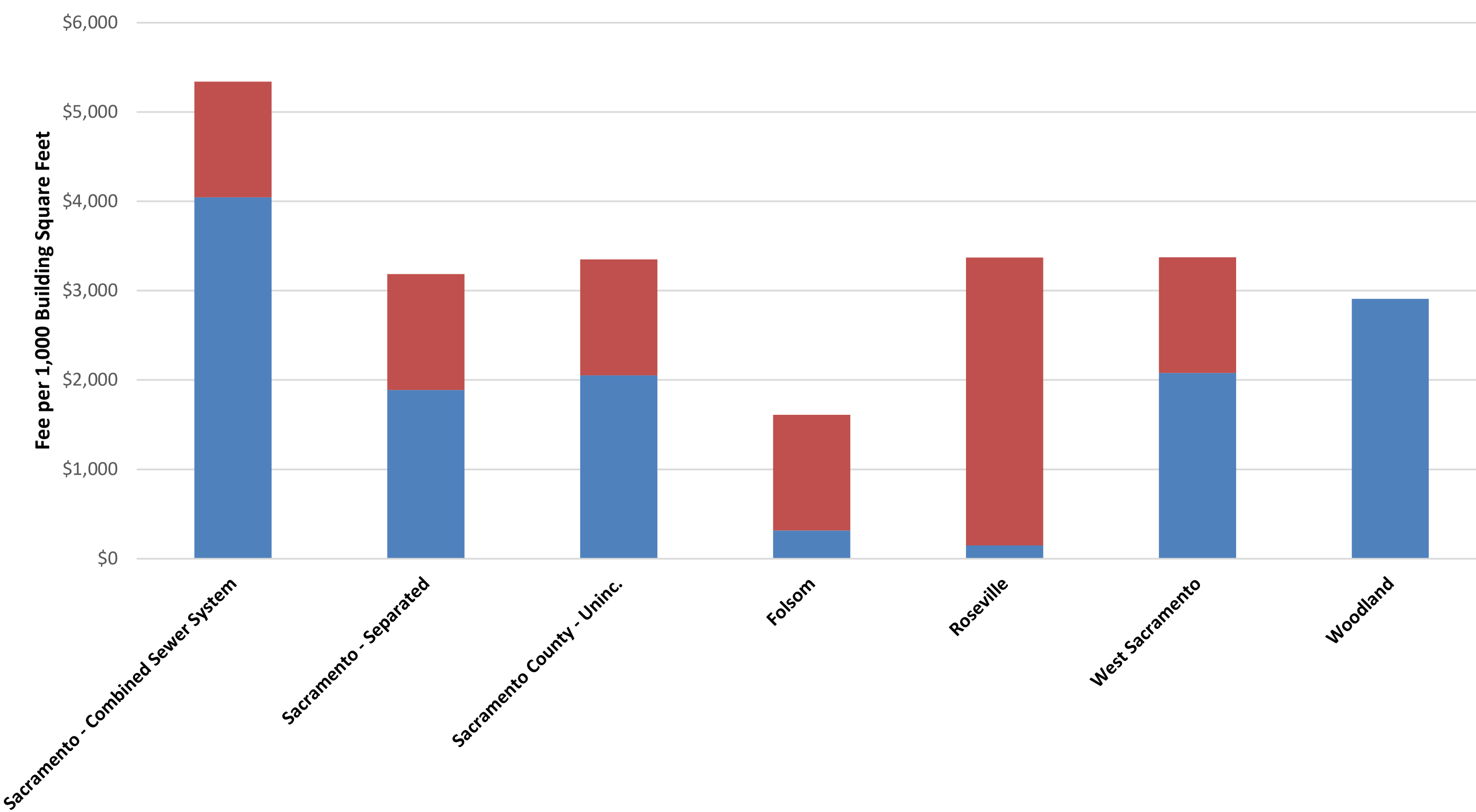
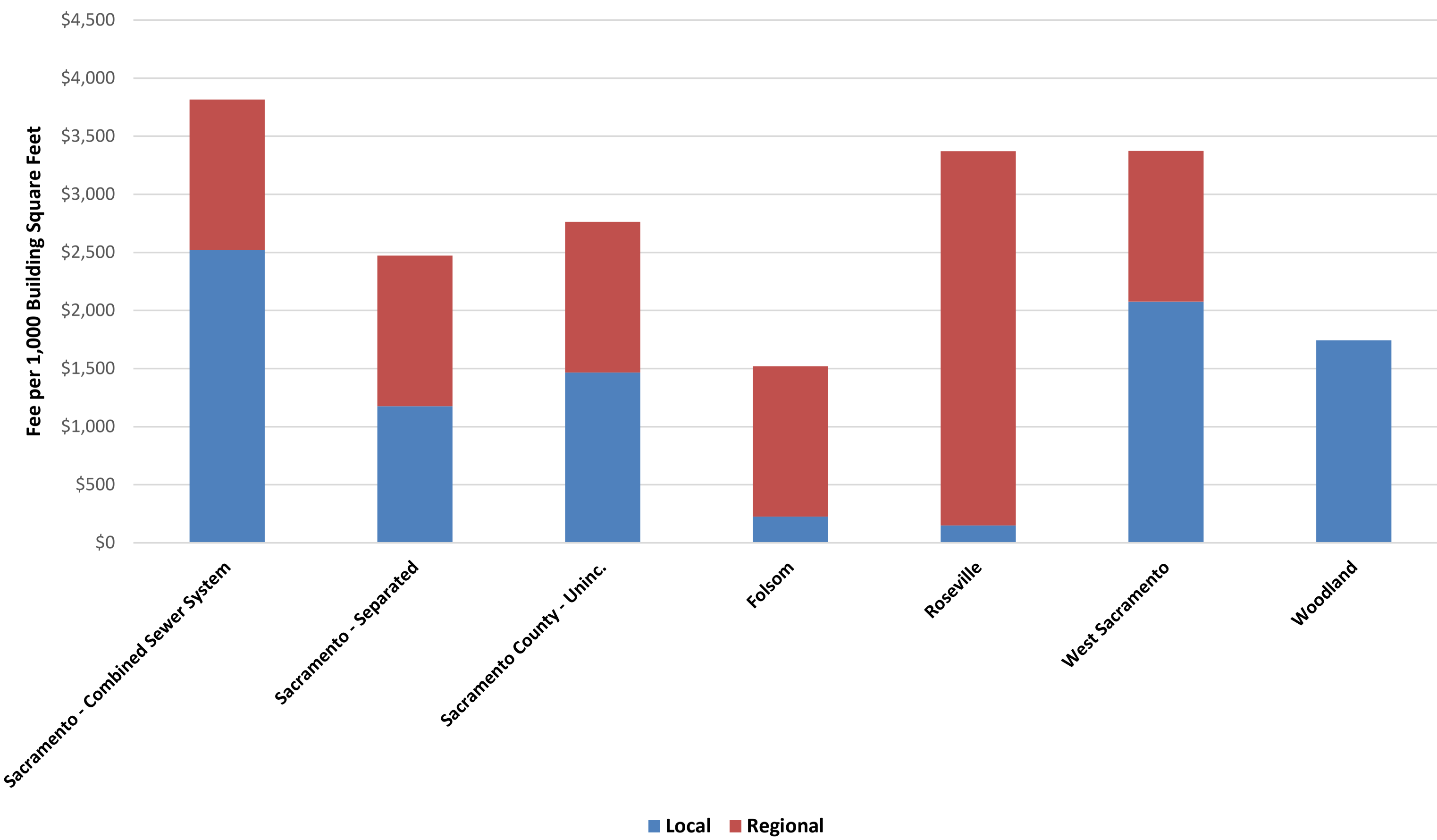


Chart D-2.3
Combined Sewer Development Impact Fees per 1,000 Building Square Feet
Office



Per Acre

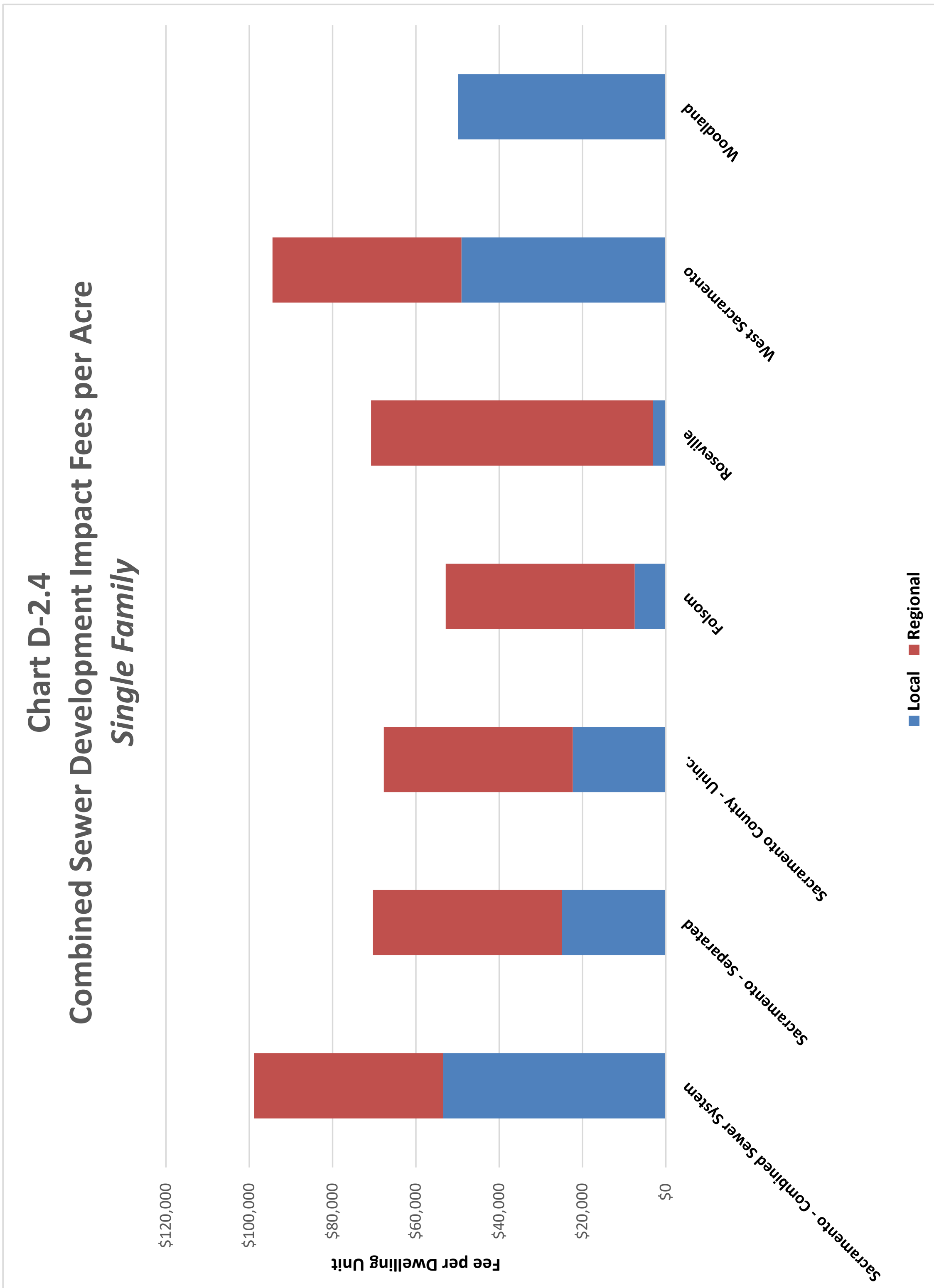


Chart D-2.4
Combined Sewer Development Impact Fees per Acre
Single Family
$0
$20,000
$40,000
$60,000
$80,000
$100,000
$120,000
Fee per Dwelling Unit
Sacramento - Combined Sewer System
Sacramento - Separated
Sacramento County - Uninc.
Folsom
Roseville
West Sacramento
Woodland
Local
Regional

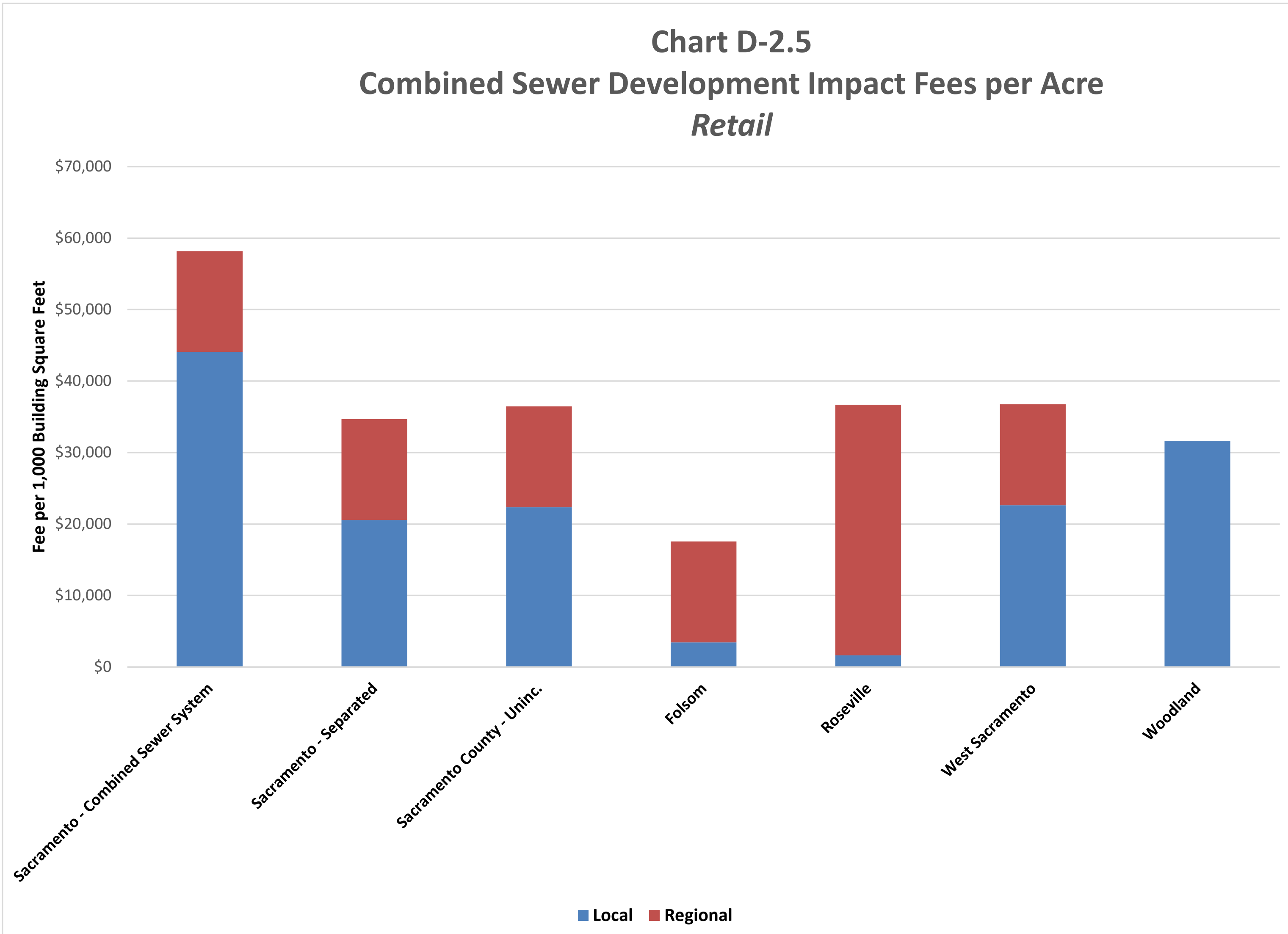


Chart D-2.5
Combined Sewer Development Impact Fees per Acre
Retail
Fee per 1,000 Building Square Feet
$70,000
$60,000
$50,000
$40,000
$30,000
$20,000
$10,000
$0
Sacramento - Combined Sewer System
Sacramento - Separated
Sacramento County - Uninc.
Folsom
Roseville
West Sacramento
Woodland
Local
Regional

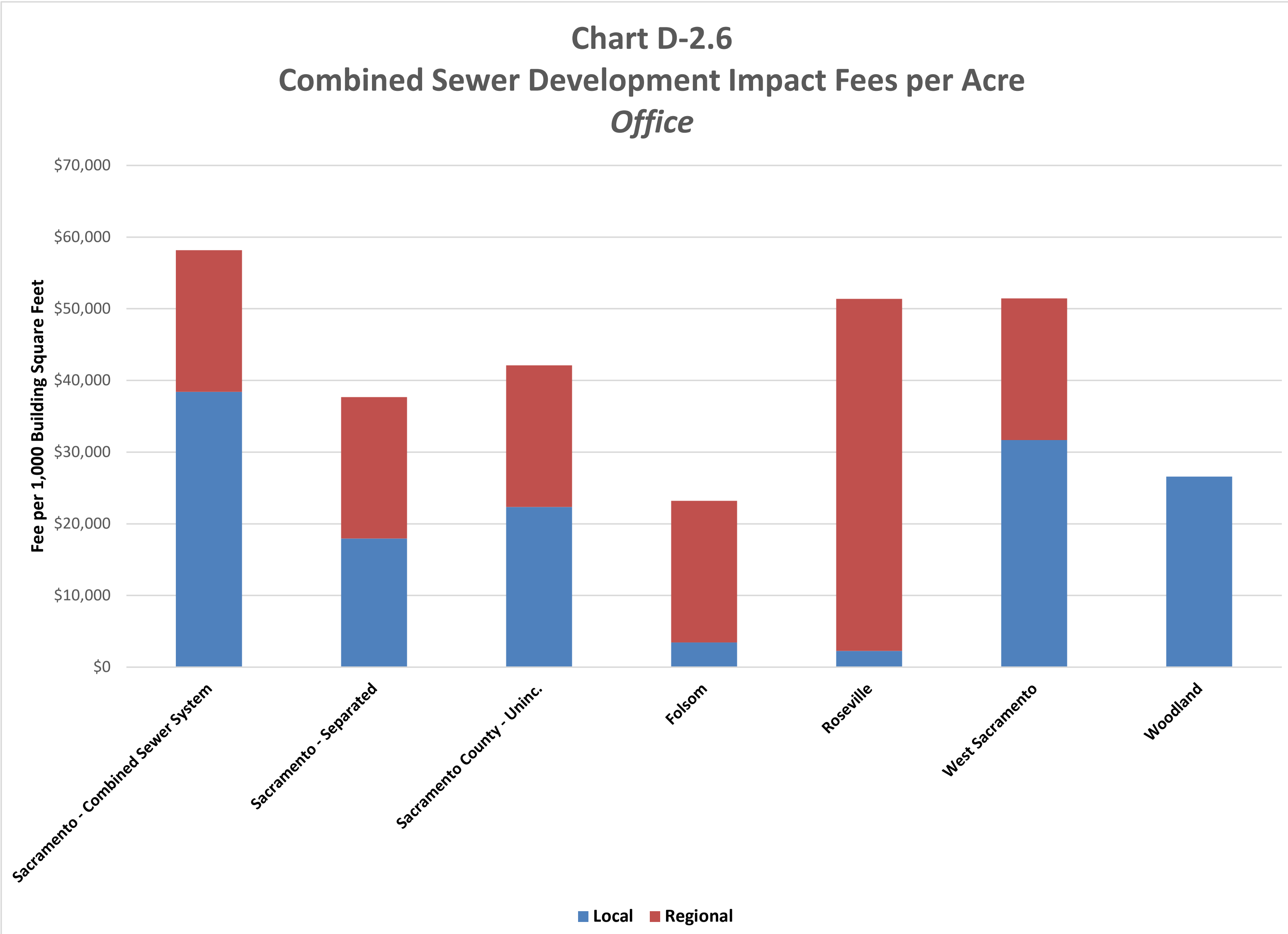


Chart D-2.6
Combined Sewer Development Impact Fees per Acre
Office
Fee per 1,000 Building Square Feet
$70,000
$60,000
$50,000
$40,000
$30,000
$20,000
$10,000
$0
Sacramento - Combined Sewer System
Sacramento - Separated
Sacramento County - Uninc.
Folsom
Roseville
West Sacramento
Woodland
Local
Regional

APPENDIX E:

Storm Drainage System Utility

Appendix E-1

Assets by Basins and Basin Type

Pumped Basins

Basin	Total Pipe Replacement Cost	Pipe Depreciated Asset Value	Acerage	Undeveloped Acres	Developed Acres	Total Pipe Length	Pump Station Capacity (CFS)	Pump Station Replacement Value	Pump Station 100 year life cycle value, Depreciated	Pump Station Depreciated Value	Total Basin Replacement Value	Total Basin Depreciated Value	Basin Value Per Acre	Pipe Length per Acre	Nominal Capacity (cfs/ac)	Capacity x Acerage (cfs)
8	$ 2,821,632	$ 1,100,436	215	0.00	214.69	4716	48.79	$ 2,367,663	$ 1,671,334	$ 424,759	$ 5,189,295	$ 1,525,195	$ 7,104.17	21.97	0.2	42.94
10	$ 7,292,711	$ 2,844,157	701	0.47	701.00	12035	102.49	$ 2,937,521	$ 2,073,596	$ 526,991	$ 10,230,232	$ 3,371,149	$ 4,805.83	17.16	0.15	105.22
19	$ 33,818	$ 13,189	88	9.85	77.72	74	22.28	$ 2,150,166	$ 1,517,802	$ 385,740	$ 2,183,984	$ 398,929	$ 4,555.54	0.85	0.2	17.51
22	$ 2,067,667	$ 806,390	381	0.15	381.04	3907	83.33	$ 2,714,334	$ 1,916,048	$ 486,952	$ 4,782,001	$ 1,293,342	$ 3,392.91	10.25	0.11	41.93
24	$ 3,175,061	$ 1,238,274	396	0.24	395.69	5645	66.84	$ 2,539,894	$ 1,792,911	$ 455,657	$ 5,714,955	$ 1,693,931	$ 4,278.36	14.26	0.08	31.67
25	$ 438,012	$ 170,825	65	0.00	64.89	828	66.84	$ 2,539,894	$ 1,792,911	$ 455,657	$ 2,977,906	$ 626,482	$ 9,654.52	12.76	0.12	7.79
26	$ 6,548,542	$ 2,553,931	945	1.82	943.47	11566	111.4	$ 3,048,817	$ 2,152,160	$ 546,958	$ 9,597,359	$ 3,100,889	$ 3,280.36	12.24	0.11	103.98
31	$ 9,101,759	$ 3,549,686	860	6.35	854.03	15083	80.56	$ 2,683,891	$ 1,894,558	$ 481,490	$ 11,785,650	$ 4,031,176	$ 4,685.34	17.53	0.16	137.66
33	$ 4,841,858	$ 1,888,325	718	16.92	700.66	9182	116.41	$ 3,113,490	$ 2,197,813	$ 558,560	$ 7,955,348	$ 2,446,885	$ 3,409.91	12.80	0.1	71.76
34	$ 7,671,052	$ 2,991,710	696	5.44	690.74	13468	268.25	$ 5,788,421	$ 4,086,046	$ 1,038,443	$ 13,459,473	$ 4,030,153	$ 5,788.95	19.35	0.12	83.54
35	$ 329,954	$ 128,682	52	0.00	52.25	722	45	$ 2,333,984	$ 1,647,560	$ 418,717	$ 2,663,938	$ 547,399	$ 10,476.53	13.82	0.8	41.80
37	$ 1,334,096	$ 520,297	150	0.00	150.28	2480	53.47	$ 2,410,441	$ 1,701,530	$ 432,433	$ 3,744,537	$ 952,731	$ 6,339.70	16.50	0.24	36.07
43	$ 4,950,829	$ 1,930,823	511	0.00	511.24	8077	81.63	$ 2,695,596	$ 1,902,821	$ 483,590	$ 7,646,425	$ 2,414,413	$ 4,722.66	15.80	0.1	51.12
46	$ 217,344	$ 84,764	78	4.50	73.72	408	38.1	$ 2,274,883	$ 1,605,840	$ 408,114	$ 2,492,227	$ 492,878	$ 6,301.18	5.22	0.22	17.21
50	$ 328,583	$ 128,147	83	0.00	82.90	719	25.62	$ 2,175,246	$ 1,535,506	$ 390,239	$ 2,503,829	$ 518,386	$ 6,253.15	8.67	0.15	12.44
51	$ 18,280	$ 7,129	91	0.12	90.74	40	27.16	$ 2,187,035	$ 1,543,828	$ 392,354	$ 2,205,315	$ 399,483	$ 4,396.69	0.44	0.15	13.63
52	$ 1,622,856	$ 632,914	271	1.35	269.38	3192	106.94	$ 2,992,511	$ 2,112,413	$ 536,856	$ 4,615,367	$ 1,169,770	$ 4,320.80	11.79	0.22	59.56
54	$ 564,154	$ 220,020	240	18.67	221.24	982	48.79	$ 2,367,663	$ 1,671,334	$ 424,759	$ 2,931,817	$ 644,779	$ 2,687.59	4.09	0.14	33.59
63	$ 2,116,709	$ 825,517	470	0.19	469.31	3821	71.3	$ 2,585,464	$ 1,825,079	$ 463,832	$ 4,702,173	$ 1,289,349	$ 2,746.22	8.14	0.07	32.87
65	$ 3,526,111	$ 1,375,183	296	0.00	295.99	5047	60.16	$ 2,473,874	$ 1,746,308	$ 443,813	$ 5,999,985	$ 1,818,996	$ 6,145.47	17.05	0.07	20.72
66	$ 2,405,068	$ 937,977	492	0.53	490.99	4660	202.53	$ 4,460,767	$ 3,148,856	$ 800,262	$ 6,865,835	$ 1,738,238	$ 3,536.45	9.48	0.27	132.71
67	$ 5,432,847	$ 2,118,810	881	7.14	874.13	10251	167.77	$ 3,863,391	$ 2,727,167	$ 693,092	$ 9,296,238	$ 2,811,903	$ 3,190.74	11.63	0.12	105.75
68	$ 1,003,361	$ 391,311	303	0.00	303.42	1865	83.55	$ 2,716,772	$ 1,917,769	$ 487,389	$ 3,720,133	$ 878,700	$ 2,895.98	6.15	0.15	45.51
69	$ 6,979,511	$ 2,722,009	1052	0.00	1051.50	13175	184.48	$ 4,141,512	$ 2,923,493	$ 742,987	$ 11,121,023	$ 3,464,996	$ 3,295.29	12.53	0.11	115.67
70	$ 918,344	$ 358,154	213	0.69	212.64	1736	43.67	$ 2,322,370	$ 1,639,361	$ 416,633	$ 3,240,714	$ 774,787	$ 3,631.87	8.14	0.1	21.33
71	$ 48,899	$ 19,071	228	0.25	227.58	107	6.88	$ 2,043,191	$ 1,442,288	$ 366,548	$ 2,092,090	$ 385,619	$ 1,692.57	0.47	0.12	27.34
91	$ 2,798,914	$ 1,091,576	482	0.00	481.71	5194	125.66	$ 3,236,857	$ 2,284,897	$ 580,692	$ 6,035,771	$ 1,672,269	$ 3,471.53	10.78	0.17	81.89
92	$ 7,565,110	$ 2,950,393	1138	2.39	1135.88	13138	171.56	$ 3,925,002	$ 2,770,659	$ 704,145	$ 11,490,112	$ 3,654,538	$ 3,210.61	11.54	#N/A	#N/A
95	$ 3,993,436	$ 1,557,440	489	0.31	488.58	6892	213.22	$ 4,659,066	$ 3,288,835	$ 835,836	$ 8,652,502	$ 2,393,277	$ 4,895.33	14.10	0.29	141.78
96	$ 14,246,044	$ 5,555,957	1071	33.31	1037.48	24520	325.29	$ 7,150,895	$ 5,047,817	$ 1,282,871	$ 21,396,939	$ 6,838,828	$ 6,386.71	22.90	0.2	214.16
97	$ 3,070,912	$ 1,197,656	375	16.33	359.01	5980	125.21	$ 3,230,736	$ 2,280,577	$ 579,594	$ 6,301,648	$ 1,777,250	$ 4,735.04	15.93	0.2	75.07
98	$ 4,154,912	$ 1,620,416	632	4.88	626.63	7376	187.15	$ 4,187,504	$ 2,955,959	$ 751,238	$ 8,342,416	$ 2,371,654	$ 3,755.53	11.68	0.19	119.99
99	$ 7,531,530	$ 2,937,297	386	0.60	385.02	12522	198.07	$ 4,380,063	$ 3,091,886	$ 785,783	$ 11,911,593	$ 3,723,080	$ 9,654.79	32.47	0.3	115.69
101	$ 9,601,580	$ 3,744,616	544	4.75	538.80	15668	183.94	$ 4,132,262	$ 2,916,964	$ 741,328	$ 13,733,842	$ 4,485,944	$ 8,253.05	28.83	0.19	103.27
102	$ 3,298,696	$ 1,286,491	406	13.62	392.27	6136	95.8	$ 2,857,088	$ 2,016,818	$ 512,562	$ 6,155,784	$ 1,799,053	$ 4,432.37	15.12	0.18	73.06
103	$ 1,891,204	$ 737,570	269	9.73	259.69	3592	84.33	$ 2,725,437	$ 1,923,886	$ 488,943	$ 4,616,641	$ 1,226,513	$ 4,552.42	13.33	0.15	40.41
104	$ 12,956,492	$ 5,053,032	871	2.42	868.89	17276	558.86	$ 14,767,371	$ 10,424,287	$ 2,649,266	$ 27,723,863	$ 7,702,298	$ 8,839.91	19.83	0.3	261.39
109	$ 219,006	$ 85,412	110	0.00	110.22	414	45.9	$ 2,341,904	$ 1,653,150	$ 420,138	$ 2,560,910	$ 505,550	$ 4,586.73	3.76	0.18	19.84
110	$ 105,395	$ 41,104	236	2.10	234.37	107	0	$ 2,000,000	$ 1,411,800	$ 358,800	$ 2,105,395	$ 399,904	$ 1,691.14	0.45	0.07	16.55
111	$ 4,518,115	$ 1,762,065	452	10.81	441.49	7723	207.65	$ 4,554,887	$ 3,215,295	$ 817,147	$ 9,073,002	$ 2,579,212	$ 5,702.44	17.07	0.3	135.69
115	$ 526,710	$ 205,417	150	0.00	150.03	1038	69.07	$ 2,562,529	$ 1,808,889	$ 459,718	$ 3,089,239	$ 665,135	$ 4,433.34	6.92	0.24	36.01
116	$ 543,339	$ 211,902	225	0.00	225.18	1179	68.18	$ 2,553,460	$ 1,802,487	$ 458,091	$ 3,096,799	$ 669,993	$ 2,975.37	5.24	0.2	45.04
117	$ 1,888,556	$ 736,537	206	11.84	193.83	3512	36.34	$ 2,260,265	$ 1,595,521	$ 405,492	$ 4,148,821	$ 1,142,028	$ 5,552.72	17.08	0.2	41.13
128	$ 6,388,545	$ 2,491,533	648	0.90	647.07	10557	159.08	$ 3,725,379	$ 2,629,745	$ 668,333	$ 10,113,924	$ 3,159,866	$ 4,876.56	16.29	0.18	116.63
129	$ 14,055,244	$ 5,481,545	1434	0.00	1433.78	20752	572.37	$ 15,308,109	$ 10,805,994	$ 2,746,275	$ 29,363,353	$ 8,227,820	$ 5,738.55	14.47	0.3	430.13
130	$ 3,701,015	$ 1,443,396	503	10.35	492.92	7151	217.23	$ 4,735,221	$ 3,342,592	$ 849,499	$ 8,436,236	$ 2,292,894	$ 4,555.99	14.21	0.28	140.92
132	$ 10,838,214	$ 4,226,903	2057	5.17	2052.32	20166	1256.59	$ 57,023,247	$ 40,252,710	$ 10,229,971	$ 67,861,461	$ 14,456,874	$ 7,026.46	9.80	0.3	617.25
138	$ 1,509,859	$ 588,845	196	0.54	195.60	2875	51.24	$ 2,389,894	$ 1,687,026	$ 428,747	$ 3,899,753	$ 1,017,592	$ 5,188.09	14.66	0.14	27.46
139	$ 1,172,549	$ 457,294	216	0.00	215.64	2285	66.17	$ 2,533,151	$ 1,788,151	$ 454,447	$ 3,705,700	$ 911,741	$ 4,228.07	10.60	0.17	36.66

140	$ 2,958,418	$ 1,153,783	462	34.55	427.66	**5710**	178.24	$ 4,035,692	$ 2,848,795	$ 724,003	$ 6,994,110	$ 1,877,786	$ 4,062.63	12.35	0.21	97.06
141	$ 3,437,029	$ 1,340,441	407	25.52	381.07	**6997**	196.04	$ 4,343,725	$ 3,066,235	$ 779,264	$ 7,780,754	$ 2,119,706	$ 5,213.37	17.21	0.3	121.98
142	$ 1,260,343	$ 491,534	107	0.88	105.82	**2551**	49.02	$ 2,369,735	$ 1,672,796	$ 425,130	$ 3,630,078	$ 916,664	$ 8,591.04	23.91	0.25	26.68
144	$ 6,986,162	$ 2,724,603	525	26.88	497.92	**11606**	259.78	$ 5,602,758	$ 3,954,987	$ 1,005,135	$ 12,588,920	$ 3,729,738	$ 7,106.97	22.12	0.31	162.69
147	$ 985,749	$ 384,442	40	2.23	37.94	**2157**	13.59	$ 2,088,051	$ 1,473,955	$ 374,596	$ 3,073,800	$ 759,038	$ 18,895.66	53.70	0.1	4.02
148	$ 1,717,966	$ 670,007	162	0.00	162.44	**3190**	92.46	$ 2,817,937	$ 1,989,182	$ 505,538	$ 4,535,903	$ 1,175,545	$ 7,236.79	19.64	0.37	60.10
151	$ 15,362,753	$ 5,991,474	998	20.17	977.88	**27149**	348.46	$ 7,760,123	$ 5,477,871	$ 1,392,166	$ 23,122,876	$ 7,383,640	$ 7,398.07	27.20	0.26	259.49
152	$ 13,136,994	$ 5,123,428	1596	2.71	1593.09	**16746**	548.53	$ 14,361,303	$ 10,137,644	$ 2,576,418	$ 27,498,297	$ 7,699,845	$ 4,825.07	10.49	0.23	367.03
153	$ 440,409	$ 171,760	243	3.46	239.48	**849**	75.31	$ 2,627,455	$ 1,854,721	$ 471,365	$ 3,067,864	$ 643,125	$ 2,647.26	3.49	0.14	34.01
154	$ 5,069,631	$ 1,977,156	653	14.94	637.87	**9543**	119.2	$ 3,150,159	$ 2,223,697	$ 565,139	$ 8,219,790	$ 2,542,295	$ 3,894.39	14.62	0.13	84.87
155	$ 1,849,207	$ 721,191	127	1.75	125.50	**3055**	143.17	$ 3,484,451	$ 2,459,674	$ 625,110	$ 5,333,658	$ 1,346,301	$ 10,579.97	24.01	0.26	33.09
157	$ 11,074,353	$ 4,318,998	2273	72.30	2200.49	**21993**	777.13	$ 24,845,102	$ 17,538,157	$ 4,457,211	$ 35,919,455	$ 8,776,209	$ 3,861.43	9.68	0.2	454.56
158	$ 5,905,668	$ 2,303,211	465	48.55	416.04	**10992**	99.15	$ 2,897,029	$ 2,045,012	$ 519,727	$ 8,802,697	$ 2,822,937	$ 6,076.19	23.66	0.1	46.46
159	$ 1,345,529	$ 524,756	615	19.63	595.81	**2609**	94.36	$ 2,840,126	$ 2,004,845	$ 509,519	$ 4,185,655	$ 1,034,275	$ 1,680.55	4.24	0.05	30.77
160	$ 9,025,750	$ 3,520,043	544	0.00	544.38	**15214**	382.99	$ 8,727,849	$ 6,160,989	$ 1,565,776	$ 17,753,599	$ 5,085,819	$ 9,342.41	27.95	0.46	250.41
Totals	**$ 272,920,396**	**$ 106,438,954**	**32789**	**478.30**	**32311**	**470200**	**10611**	**$ 323,120,611**	**$ 228,090,839**	**$ 57,967,838**	**$ 596,041,007**	**$ 164,406,792**	**$ 5,014.03**	**14.34**		**6334.55**
															Weighted Average (cfs/ac)=	0.19

Gravity Basins

Basin	Total Pipe Replacement Cost	Pipe Depreciated Asset Value	Basin Acres	Undeveloped Acres	Developed Acres	Total Pipe Length	Basin Replacement Value per Acre	Depreciated Basin Value Per Acre	Pipe /Acre	Comments	Nominal Capacity (cfs/ac)	Capacity x Acerage (cfs)
G200	$ 3,308,651	$ 1,290,374	541.00	0.00	541.00	6,287	$ 6,115.81	$ 2,385.16	11.62		0.2	108.20
G201	$ 7,712,003	$ 3,007,681	1,596.97	21.81	1,575.16	14,651	$ 4,829.15	$ 1,883.37	9.17		0.2	319.39
G206	$ -	$ -	347.13	0.00	347.13	14,181	$ -	$ -	40.85	CFD	NN	#VALUE!
G207	$ -	$ -	456.36	0.21	456.15	22,267	$ -	$ -	48.79	CFD	NN	#VALUE!
G208	$ -	$ -	409.12	0.00	409.12	13,802	$ -	$ -	33.74	CFD	NN	#VALUE!
G209	$ 4,156,868	$ 1,621,179	910.98	0.00	910.98	5,204	$ 4,563.07	$ 1,779.60	5.71		0.1	91.10
G248	$ 722,714	$ 281,858	321.25	31.64	289.61	1,514	$ 2,249.69	$ 877.38	4.71		0	0.00
G252	$ 17,627,343	$ 6,874,664	1,221.39	35.46	1,185.93	30,471	$ 14,432.20	$ 5,628.56	24.95		0.08	97.71
G254	$ 840,846	$ 327,930	684.79	0.00	684.79	1,434	$ 1,227.89	$ 478.88	2.09		0.12	82.17
G258	$ 3,641,029	$ 1,420,001	551.48	43.21	508.27	6,829	$ 6,602.29	$ 2,574.89	12.38		0.2	110.30
G259	$ 8,978,574	$ 3,501,644	753.94	0.00	753.94	16,470	$ 11,908.87	$ 4,644.46	21.85		0.2	150.79
G260	$ 1,193,830	$ 465,594	145.96	0.00	145.96	2,170	$ 8,179.16	$ 3,189.87	14.87		0.2	29.19
G269	$ 3,894,637	$ 1,518,908	194.30	19.27	175.03	6,229	$ 20,044.45	$ 7,817.34	32.06		0.48	93.26
G270	$ 3,629,641	$ 1,415,560	729.31	10.85	718.46	6,601	$ 4,976.82	$ 1,940.96	9.05		0.17	123.98
G273	$ 7,034,482	$ 2,743,448	371.16	20.66	350.50	13,186	$ 18,952.69	$ 7,391.55	35.53		0.5	185.58
Totals	$ 62,740,618	$ 24,468,841	8,134.67	151.60	7,983.07	161,296	**$ 7,712.74**	**$ 3,007.97**	**Weighted Average (cfs/ac) =**			0.17

Appendix E-2

Companion Charts to Table 5-10

Charts per Unit

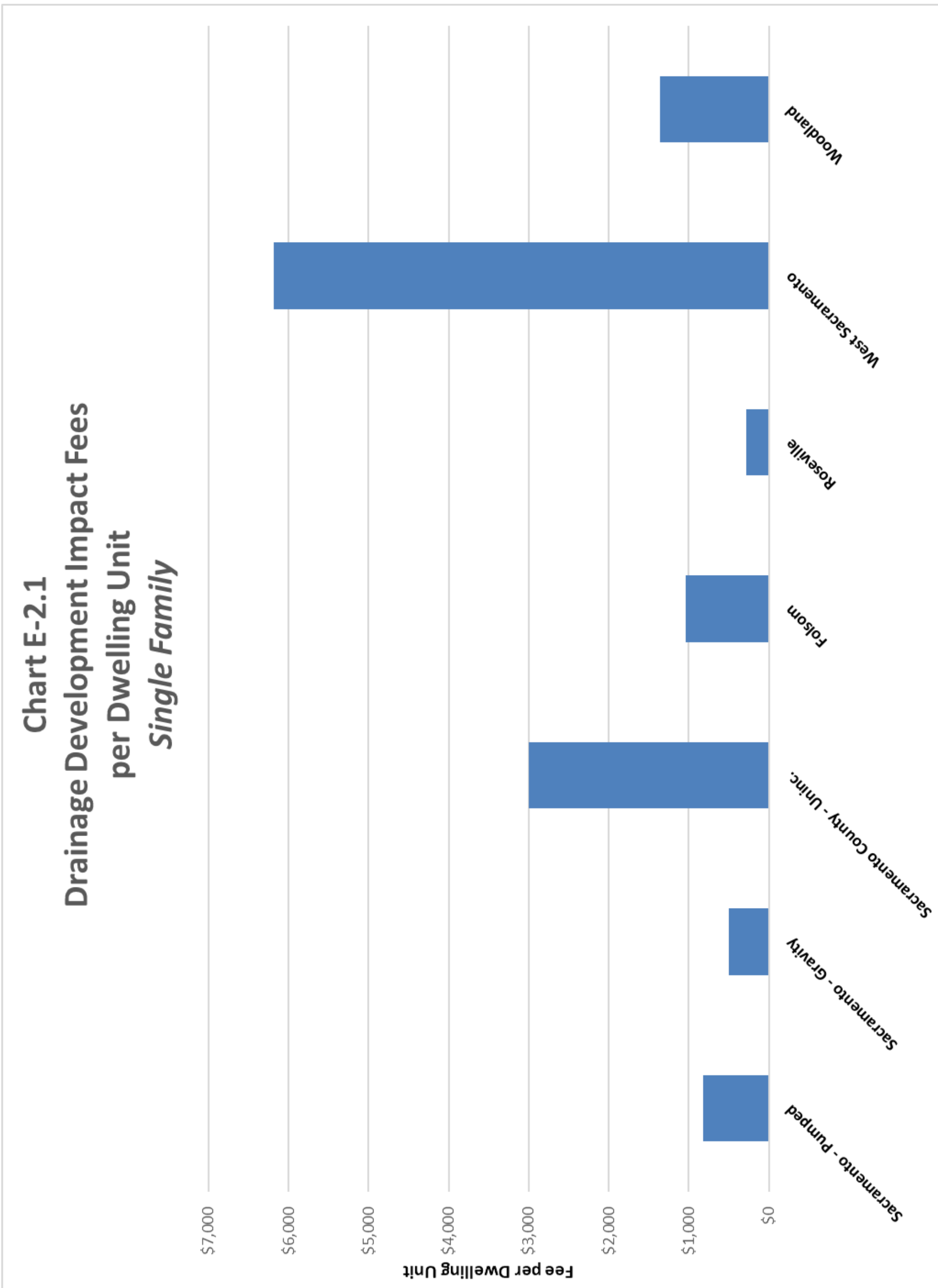


Chart E-2.2
Drainage Development Impact Fees
per 1,000 Building Square Feet
Retail

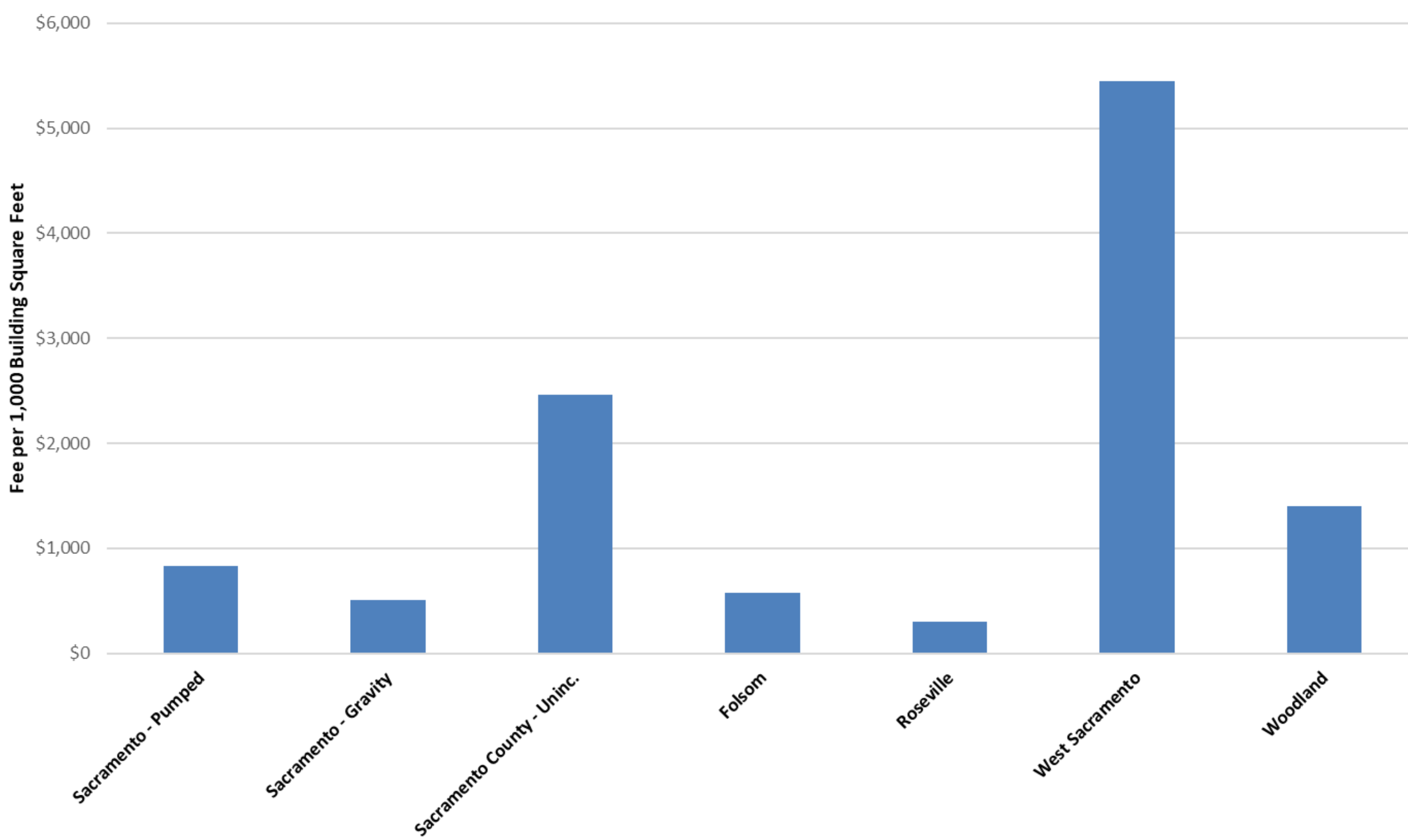
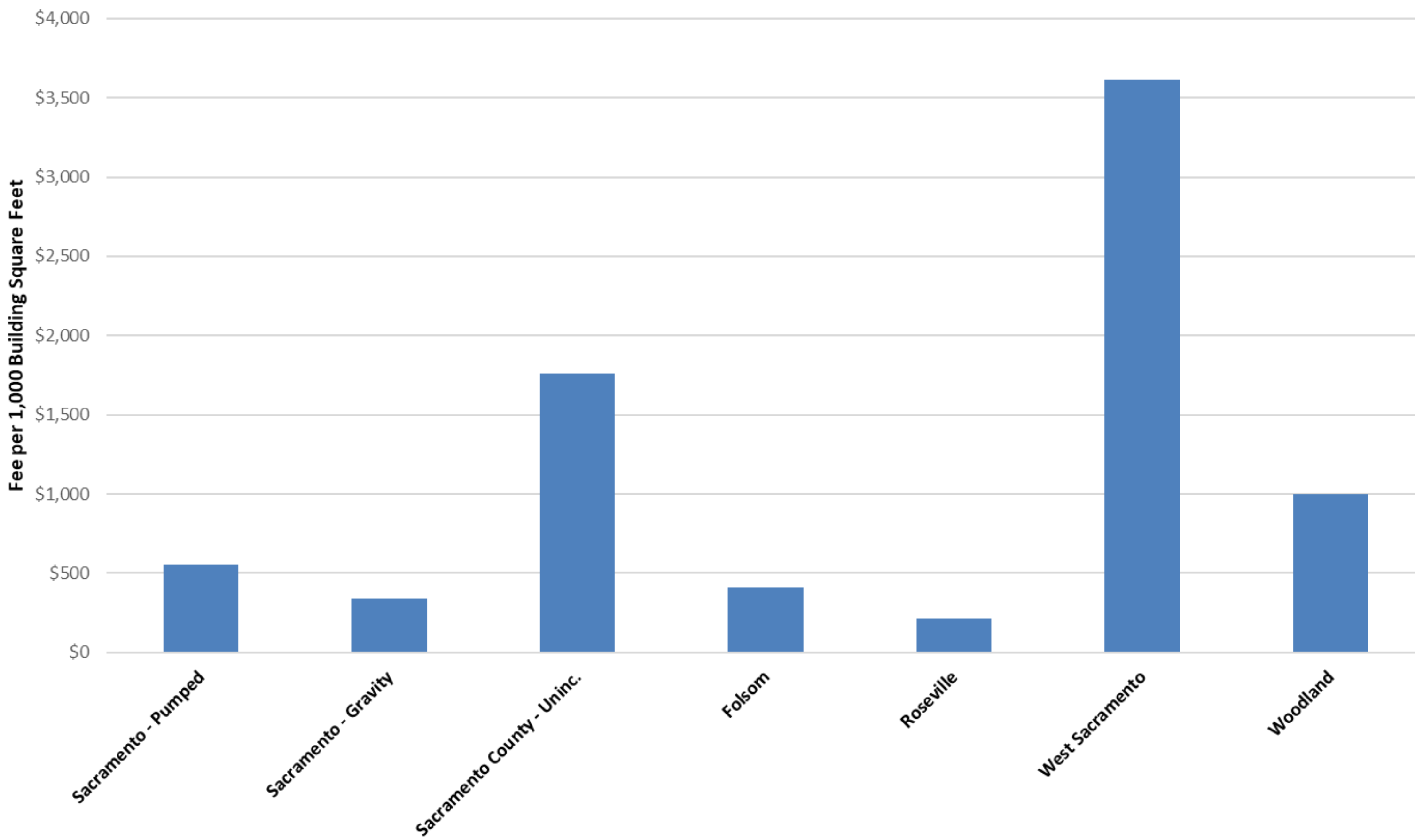


Chart E-2.3
Drainage Development Impact Fees per 1,000 Building Square Feet
Office



Per Acre Charts

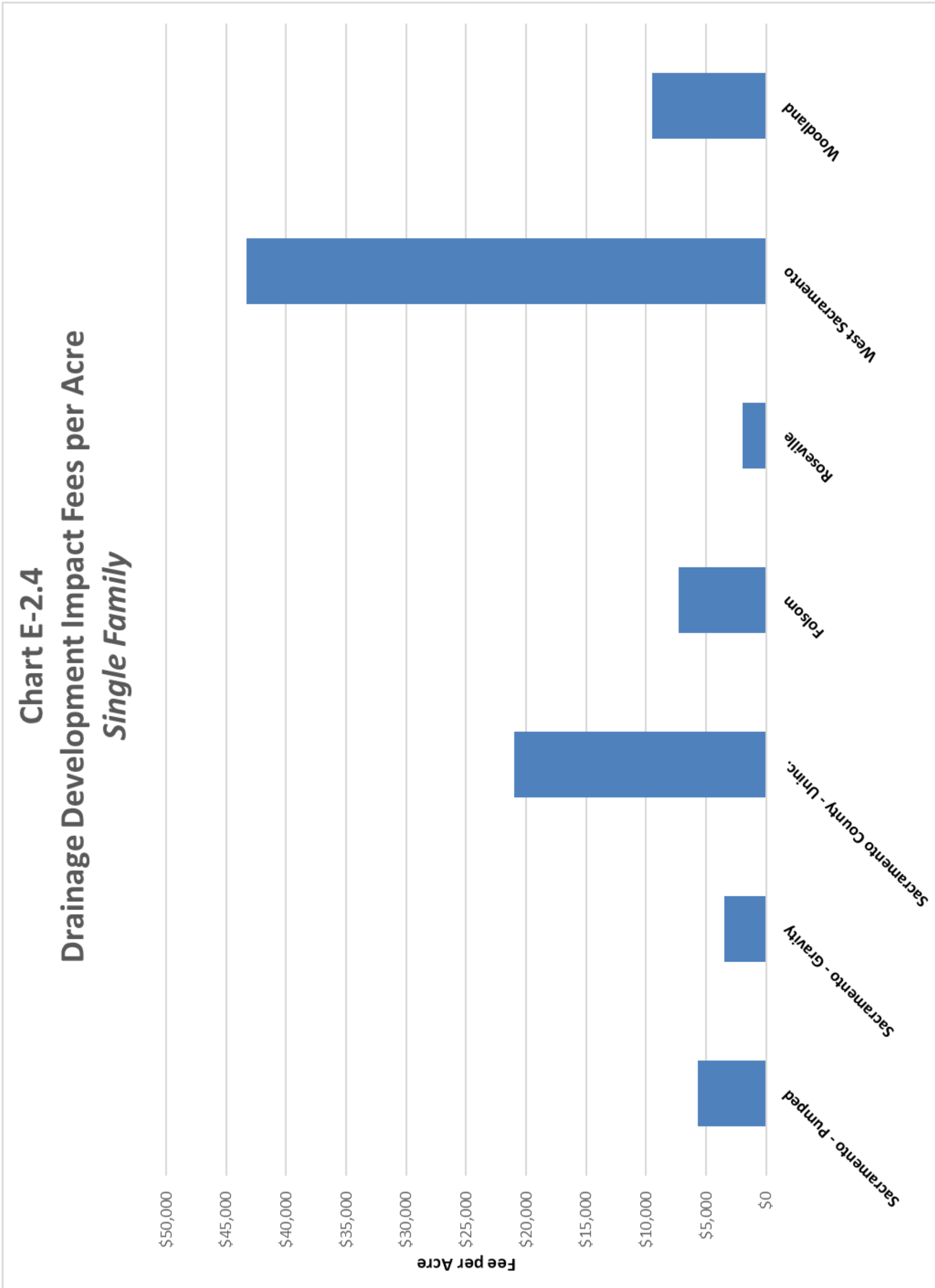


Chart E-2.5
Drainage Development Impact Fees per Acre
Retail

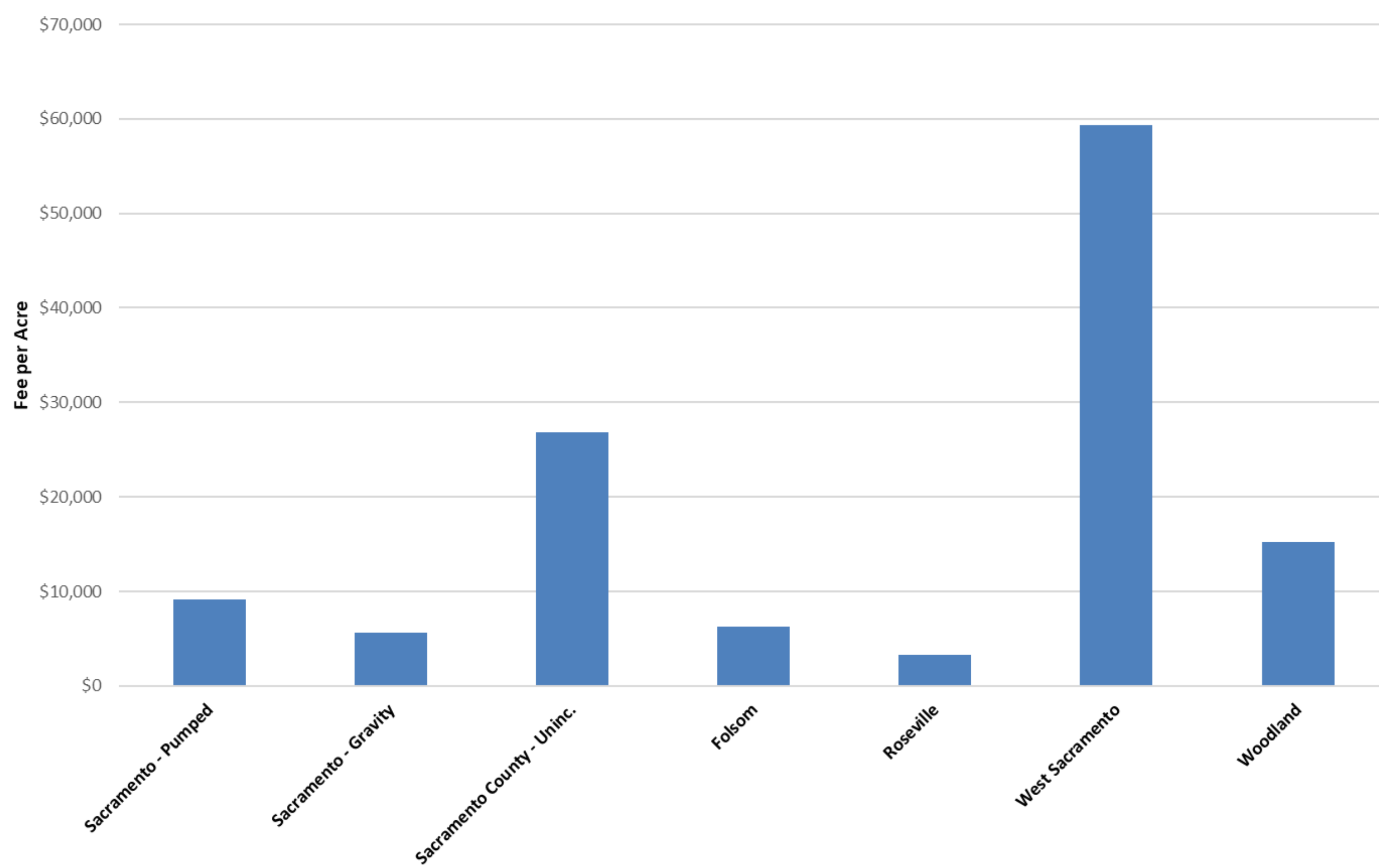


Chart E-2.6
Drainage Development Impact Fees per Acre
Office