Infrastructure Financing Plan *for the* City of Phoenix, Arizona

Fire Protection
Library
Parks
Police
Roadway Facilities
Storm Drainage
Wastewater
Water

City Council Adoption, November 30, 2011

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Acknowledgments

This Infrastructure Financing Plan is derived from five documents previously adopted by the Council of the City of Phoenix, which are the following:

- The *Specific Infrastructure Financing Plan for the the City of Phoenix, Arizona*, dated 4-6-2011;
- The *Infrastructure Financing Plan for the Development Impact Fee Areas of Phoenix* (including *Appendices*), dated 11-15-2006;
- The *Offsets Report for the Development Impact Fee Areas of Phoenix,* dated 8-27-2007.
- The *Impact Fee Update: Phoenix, Arizona, Roadway Facilities, Parks, and Open Space,* adopted 3-4-2009; and
- The *Specific Infrastructure Financing Plan for the City of Phoenix, Arizona: Fire Protection, Police, Library, and Drainage Fee Categories*, adopted 4-21-2010.

This Infrastructure Financing Plan replaces and supersedes all of the aforementioned documents. The last two documents in the list, adopted in 2009 and 2010 respectively, were prepared by Duncan Associates of Austin, Texas. The base data used remains intact; however some of the inputs have been removed and methodologies altered to ensure compliance with Senate Bill 1525, passed by the Arizona State Legislature and signed by the Governor on April 26, 2011.

The former fee categories of Open Space, Solid Waste Facilities, and Equipment Repair Facilities were repealed in accordance with SB 1525 and are not included or referenced in this Plan.

The Wastewater and Water fees have not been altered from the previously adopted *Infrastructure Financing Plan* and *Offsets Report*; however the text has been reformatted, and all data and fee calculations included within this single document for greater ease of use.

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Section I: Administration

Infrastructure Financing Plan for the
City of Phoenix, Arizona

ADMINISTRATION

This document is the Infrastructure Financing Plan (IFP) for the City of Phoenix, Arizona, which is an integral piece of the Development Impact Fee Program. The authority for creation and approval of this document can be found in Chapter 29 of the City of Phoenix Code of Ordinances, known as the *Development Impact Fee Ordinance*.

This *Administration* section of the Infrastructure Financing Plan applies to all necessary public services for which Development Impact Fees are assessed in the City of Phoenix, specifically:

- Fire Protection
- Libraries
- Parks
- Police
- Roadway Facilities
- Storm Drainage
- Wastewater
- Water

"Recommended Fees" vs. fees adopted in the Development Impact Fee Ordinance

The Infrastructure Financing Plan generally consists of sections addressing the calculation of proposed impact fees, and explanations of the methodology behind the calculations. However, the actual fees which are assessed to customers at the time building permits are issued are the fees stated in the Development Impact Fee Ordinance (Chapter 29 of the City of Phoenix Code of Ordinances), which may vary from "recommended" or "proposed" fees calculated in the Infrastructure Financing Plan. The reason for any inconsistency between the two documents is that the City Council has the authority to change fees at the time of adoption, and any such changes would only appear in the final adopted version of the Development Impact Fee Ordinance--not the Infrastructure Financing Plan.

Amendments to the Infrastructure Financing Plan

The Infrastructure Financing Plan is governed by the Development Impact Fee Ordinance (Chapter 29 of the City of Phoenix Code of Ordinances), and Arizona Revised Statutes § 9-463.05. All amendments shall be completed in accordance with both sets of regulations.

Funding of Capital Facilities through the Development Impact Fee Program

Capital facilities are funded through the Development Impact Fee Program in one of two ways: through disbursement of funds collected by the City as impact fees, or as impact fee credits.

Disbursement of Funds

Capital facilities can be funded from monies collected as impact fees in one of two ways: by release to a City department for construction/provision of a qualifying capital facility; or to a private developer through a City Council-approved reimbursement agreement. Any monies disbursed from impact fee accounts for construction of an eligible capital facility must be utilized in accordance with standard procedures for the use of City funds in construction or acquisition of capital facilities; in particular, the restrictions of A.R.S. Title 34-201 apply.

Impact Fee Credits

Capital facilities are often funded by private developers. However, when a qualifying capital facility is provided by a private developer within an impact fee area, generally the developer may apply to have the impact fee reduced by the costs of providing the capital facility (subject to the requirements and limitations regarding impact fee credits stated in Chapter 29 of the City Code). In short, this is system by which a developer may provide an actual capital facility in lieu of paying part (or the full amount) of an impact fee.

Qualifying Capital Facilities

Any capital facility which is to be funded by the Development Impact Fee Program listed as a "planned improvement" in this IFP shall be considered to be authorized for funding by the Development Impact Fee Program. No capital facility shall be funded, either through disbursement of impact fee funds or impact fee credits, prior to inclusion in this IFP through an authorized amendment or adoption process.

Section II: Impact Fee Study

Infrastructure Financing Plan for the City of Phoenix, Arizona

IMPACT FEE STUDY

This section of the Infrastructure Financing Plan serves as one of the two documents required by A.R.S. § 9-463.05, and is known as the *Impact Fee Study*. The second document required by A.R.S. § 9-463.05 is the *Infrastructure Improvements Plan*, and is provided in Section III of this IFP. Additional data supporting both documents is included in the Section IV: *Appendices*.

The purpose of the impact fee study is to summarize the potential impact fees the City of Phoenix should charge in the growth areas based on planned improvements, land use assumptions, and adopted levels of service for Fire Protection, Library, Parks, Police, Roadway Facilities, Storm Drainage, Wastewater, and Water improvements.

This Impact Fee Study as revised primarily to comply with Senate Bill 1525, passed by the Arizona State Legislature and signed by the Governor on April 26, 2011.

Summary of Recommended Impact Fee Schedules

Senate Bill 1525 placed some restrictions on what types of capital facilities could be funded by Development Impact Fees; Open Space, Solid Waste Facilities and Equipment Repair Facilities were eliminated as categories as a result of the legislation. The other categories of Necessary Public Service were either not affected, or were slightly restricted by the legislation.

Offsets caused a unique issue for Phoenix—for some fee categories, the prohibition of funding for certain types of capital facilities also prohibited offsets for the same types of facilities, resulting in potential fee increases. However, no fee increases are recommended in this Impact Fee Study. Where fees would increase, the recommendation is to maintain the current fee; where fees would decrease, the decreased fee is recommended. Details are provided in the recommended impact fee schedules:

Fire Protection

Development Impact Fees for Fire Protection are recommended to decrease for the Estrella/Laveen service area, and remain the same for the Northern Growth Area and the Ahwatukee service area. Certain vehicles and equipment previously funded were excluded from the impact fee calculations to ensure compliance with Senate Bill 1525. The Adjustment Factor reflects the percentage of the full Plan-Based Fee which could be charged in accordance with Senate Bill 1525.

Table 1. Fire Protection Impact Fee Summary

	Northern Growth Area	Estrella/ Laveen	Ahwatukee
Adopted Net Fee per EDU	$328	$310	$372
Potential Net Fee per EDU	$328	$293	$594
Recommended Net Fee per EDU	**$328**	**$293**	**$372**
Adjustment Factor	100.00%	100.00%	62.63%

Source: Adopted net fees per EDU from City of Phoenix Code of Ordinances, Chapter 29, adopted May, 2011; potential net fee per EDU from Table 25.

Libraries

Development Impact Fees for Libraries are recommended to remain the same for residential uses in the Estrella/Laveen service area, and decrease for residential uses all other service areas. However, as of January 1, 2012, fees will be additionally charged to non-residential development, in accordance with Senate Bill 1525.

Library facilities larger than 10,000 square feet, and all books and equipment previously funded were excluded from the impact fee calculations to ensure compliance with Senate Bill 1525. The Adjustment Factor reflects the percentage of the full Plan-Based Fee which could be charged in accordance with Senate Bill 1525.

Table 2. Libraries Impact Fee Summary

Cost Element	N. Gateway/ DV 1-4	Desert View/ DV 5	Estrella/ Laveen	Ahwatukee
Adopted Net Fee / EDU	$143	$166	$46	$237
Potential Net Fee / EDU	$0	$53	$59	$183
Recommended Net Fee/EDU	**$0**	**$53**	**$46**	**$183**
Adjustment Factor	100.00%	100.00%	77.97%	100.00%

Source: Adopted net fees per EDU from City of Phoenix Code of Ordinances, Chapter 29, adopted May, 2011; potential net fee per EDU from Table 38.

Parks

Development Impact Fees for Parks are recommended as per Table 3 below. In short, the recommended net fee per unit reflects the following:

1) Fees have been revised to be charged to non-residential development in accordance with Senate Bill 1525;
2) Demand factors for Parks were revised so as not to increase the number of facilities required along with the addition of non-residential EDUs to the calculations (i.e. charging more types of EDUs for Parks does not result in an increased demand for parks facilities).
3) Fees have been adjusted to not exceed the fees proposed in 2007, which were based on the last comprehensive study undertaked to evaluate proportionate share amongst different land-use types.

For greater detail, please see the section of this document entitlted Infrastructure Improvements Plans: Parks.

Table 3. Parks Impact Fee Summary

	Unit	EDU Factor	Potential Net Fee/ Unit	Option 2 Net Fee/ Unit	Prior Net Fee/ Unit	Recommended Net Fee/ Unit	Adjustment Factor
North Gateway							
Single-Family, Detached	Dwelling	1.00	$2,968	$2,968	$4,072	**$2,968**	100.00%
Multi-Family	Dwelling	0.76	$2,256	$1,068	$1,482	**$1,068**	47.37%
Mobile Home/RV Park	Space	0.85	$2,523	$1,158	$1,606	**$1,158**	45.88%
Retail	1,000 sq. ft.	0.55	$1,632	$416	$389	**$389**	23.83%
Office	1,000 sq. ft.	0.63	$1,870	$564	$629	**$564**	30.16%
Public/Institutional	1,000 sq. ft.	0.61	$1,810	$326	$236	**$236**	13.04%
Industrial	1,000 sq. ft.	0.49	$1,454	$237	$286	**$237**	16.33%
Desert View							
Single-Family, Detached	Dwelling	1.00	$1,613	$1,613	$2,910	**$1,613**	100.00%
Multi-Family	Dwelling	0.76	$1,226	$581	$1,064	**$581**	47.37%
Mobile Home/RV Park	Space	0.85	$1,371	$629	$1,153	**$629**	45.88%
Retail	1,000 sq. ft.	0.55	$1,363	$1,549	$227	**$227**	16.66%
Office	1,000 sq. ft.	0.63	$1,326	$1,527	$408	**$408**	30.76%
Public/Institutional	1,000 sq. ft.	0.61	$1,335	$1,563	$109	**$109**	8.16%
Industrial	1,000 sq. ft.	0.49	$1,390	$1,577	$193	**$193**	13.88%
Estrella/Laveen							
Single-Family, Detached	Dwelling	1.00	$2,011	$2,011	$2,035	**$2,011**	100.00%
Multi-Family	Dwelling	0.76	$1,529	$724	$749	**$724**	47.37%
Mobile Home/RV Park	Space	0.85	$1,710	$784	$812	**$784**	45.88%
Retail	1,000 sq. ft.	0.55	$1,106	$282	$104	**$104**	9.40%
Office	1,000 sq. ft.	0.63	$1,267	$382	$241	**$241**	19.02%
Public/Institutional	1,000 sq. ft.	0.61	$1,227	$221	$12	**$12**	0.98%
Industrial	1,000 sq. ft.	0.49	$986	$161	$123	**$123**	12.48%
Ahwatukee							
Single-Family, Detached	Dwelling	1.00	$977	$977	$2,003	**$977**	100.00%
Multi-Family	Dwelling	0.76	$743	$352	$662	**$352**	47.37%
Mobile Home/RV Park	Space	0.85	$830	$381	$796	**$381**	45.88%
Retail	1,000 sq. ft.	0.55	$537	$137	$171	**$137**	25.45%
Office	1,000 sq. ft.	0.63	$616	$186	$332	**$186**	30.16%
Public/Institutional	1,000 sq. ft.	0.61	$596	$107	$65	**$65**	10.91%
Industrial	1,000 sq. ft.	0.49	$479	$78	$161	**$78**	16.33%

Source: EDU factors from Table 43; potential fees from Table 63; "Option 2" fees from Table 64; adjustment factors derived from dividing the recommended fee by the potential fee.

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Police

Development Impact Fees for Police are recommended to decrease for all service areas, since certain vehicles and equipment previously funded were excluded from the impact fee calculations to ensure compliance with Senate Bill 1525.

Table 4. Police Impact Fee Summary

	Northern Growth Area	Estrella/ Laveen	Ahwatukee
Adopted Net Fee per EDU	$209	$209	$209
Potential Net Fee per EDU	$177	$170	$149
Recommended Net Fee per EDU	**$177**	**$170**	**$149**

Source: Adopted fees per EDU from City of Phoenix Code of Ordinances, Chapter 29, adopted May, 2011; potential net fee per EDU from Table 88.

Roadway Facilities

Development Impact Fees for Roadway Facilities are recommended to decrease for the NorthGateway/North Black Canyon Corridor service area, and remain the same for the other service areas. The differences between the Existing Net Fee and the Potential Net Fee result from the slight methodology changes required by SB 1525. The Adjustment Factor reflects the percentage of the full Plan-Based Fee which could be charged in accordance with Senate Bill 1525.

Table 5. Roadway Facilities Impact Fees Summary

	Northern Growth Area		Southern Growth Area	
	North Gateway/ NBCC	Desert View	Estrella/ Laveen	Ahwatukee West
Existing Net Fee per EDU	$3,417	$1,273	$1,591	$1,834
Potential Net Fee per EDU	$3,403	$1,302	$1,736	$3,482
Recommended Net Fee per EDU	**$3,403**	**$1,273**	**$1,591**	**$1,834**
Adjustment Factor	100.00%	97.77%	91.65%	52.67%

Source: Existing net fees per EDU from City of Phoenix Code of Ordinances, Chapter 29, adopted May, 2011; potential net fee per EDU from Table 113.

Storm Drainage

Development Impact Fees for Storm Drainage are charged only in the Estrella and Laveen service areas, are recommended to remain the same for both. The differences between the Adopted Net Fee and the Potential Net Fee result from the slight methodology changes required by SB 1525. The Adjustment Factor reflects the percentage of the full Plan-Based Fee which could be charged in accordance with Senate Bill 1525.

Table 6. Storm Drainage Impact Fee Summary

	Estrella	Laveen
Adopted Net Fee per EDU	$842	$352
Potential Net Fee per EDU	$842	$763
Recommended Net Fee per EDU	**$842**	**$352**
Adjustment Factor	100.00%	46.13%

Source: Adopted net fees per EDU from City of Phoenix Code of Ordinances, Chapter 29, adopted May, 2011; potential net fee per EDU from Table 133.

Wastewater

Development Impact Fees for Wastewater are not recommended for revision at this time, since the data and calculations were not affected by Senate Bill 1525. A full schedule of net impact fees is not possible to provide, however, since the offset for Development Occupational Fees varies by type of use and may be revised independently of this IFP. Examples of the net fees for a single-family unit are provided in the following tables:

Table 7. Wastewater Impact Fee Summary, Northern Growth Area

	North Gateway	Deer Valley I	Deer Valley II	Deer Valley III	Deer Valley IV	Deer Valley V	Desert View
Gross Cost per EDU	$6,637	$2,880	$2,265	$2,265	$2,620	$7,310	$4,376
– Development Occupational Fee Offset	-$600	-$600	-$600	-$600	-$600	-$600	-$600
– Wastewater Rate Debt Service Offset	-$598	-$598	-$598	-$598	-$598	-$598	-$598
Potential Net Fee, Single-Family Detached Dwelling Unit	**$5,439**	**$1,682**	**$1,067**	**$1,067**	**$1,422**	**$6,112**	**$3,178**

Source: Gross cost per EDU from Table 142; DOF fees per City of Phoenix Ordinances G-2664 through 2667, secondary property tax offset from Table 144.

Table 8. Wastewater Impact Fee Summary,Southern Growth Area

	Estrella North	Estrella South	Laveen East	Laveen West	Ahwatukee
Gross Cost per EDU	$2,265	$4,555	$2,265	$3,555	$2,927
– Development Occupational Fee Offset	-$600	-$600	-$600	-$600	-$600
– Wastewater Rate Debt Service Offset	-$598	-$598	-$598	-$598	-$598
Potential Net Fee, Single-Family Detached Dwelling Unit	**$1,067**	**$3,357**	**$1,067**	**$2,357**	**$1,729**

Source: Gross cost per EDU from Table 143; DOF fees per City of Phoenix Ordinances G-2664 through 2667, secondary property tax offset from Table 144.

Water

Development Impact Fees for Water are not recommended for revision at this time, since the data and calculations were not affected by Senate Bill 1525. A full schedule of net impact fees is not possible to provide, however, since the offset for Development Occupational Fees varies by type of use and may be revised independently of this IFP. Example of the net fees for a single-family unit are provided in the following table:

Table 9. Water Impact Fee Summary

	Northern Area	Southern Area
Gross Cost per EDU	$5,921	$3,537
– Development Occupational Fee Offset	-$600	-$600
– Water Rate Debt Service Offset	-$211	-$211
Potential Net Fee, Single-Family Detached Dwelling Unit	**$5,110**	**$2,726**

Source: Gross cost per EDU from Table 151; DOF fees per City of Phoenix Ordinances G-2664 through 2667, secondary property tax offset from Table 152.

Impact Fee Study Background

The purpose of this study is to calculate potential impact fees that the City of Phoenix can charge based on planned improvements, land use assumptions, and adopted levels of service for Fire Protection, Library, Parks, Police, Roadway Facilities, Storm Drainage, Wastewater, and Water improvements in the growth areas of the City of Phoenix.

This section of the impact fee study includes the information required by the Arizona impact fee enabling act, Section 9-463.05, Arizona Revised Statutes (A.R.S.), as revised by Senate Bill 1525, which requires that:

> *A municipality…shall release to the public a written report of the land use assumptions and infrastructure improvements plan adopted pursuant to subsection D of this section.* (A.R.S. 9-463.05, as amended)

In addition to the requirements of the impact fee enabling act, this section provides an overview of the City's current impact fee system, and the legal framework that governs impact fees nationally and within Arizona.

The Development Impact Fee program for the City of Phoenix, Arizona does not apply city-wide; impact fees are assessed only on new development located within the Northern and Southern Growth Areas. The growth areas are illustrated in Figure 1 and Figure 2; it should be noted that these maps are illustrated in this report for informational purposes and that these areas are more completely delineated by electronic maps retained on file by the City of Phoenix Planning and Development Department in a Geographic Information Systems (GIS) format. The growth areas are further divided into additional service areas for certain categories of Necessary Public Service. Impact fees are charged at the time of building permit issuance and are based on the land use and service area in which the development is located. The water and wastewater impact fees are charged when the permit is issued for the water meter if the meters or fixture units cannot be identified when the building permit is issued.

Figure 1. Northern Phoenix Growth Area Map

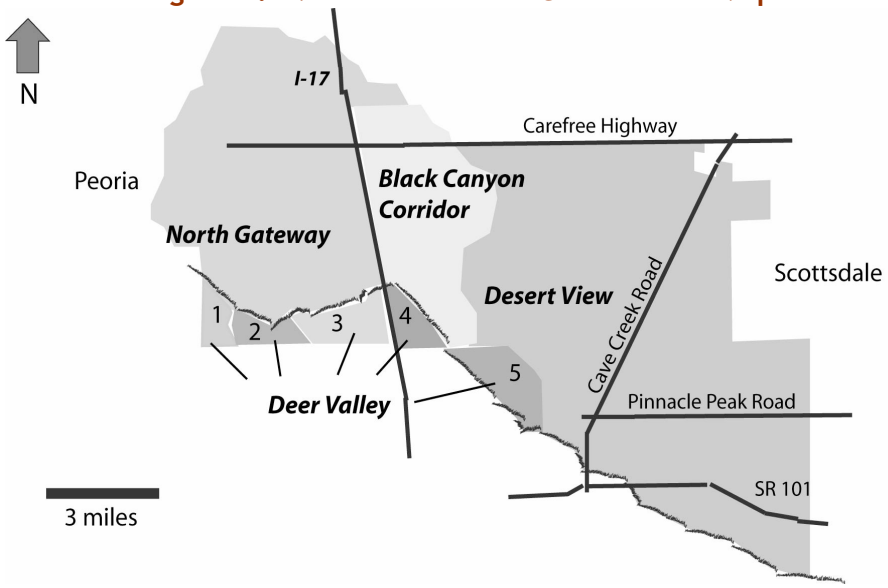
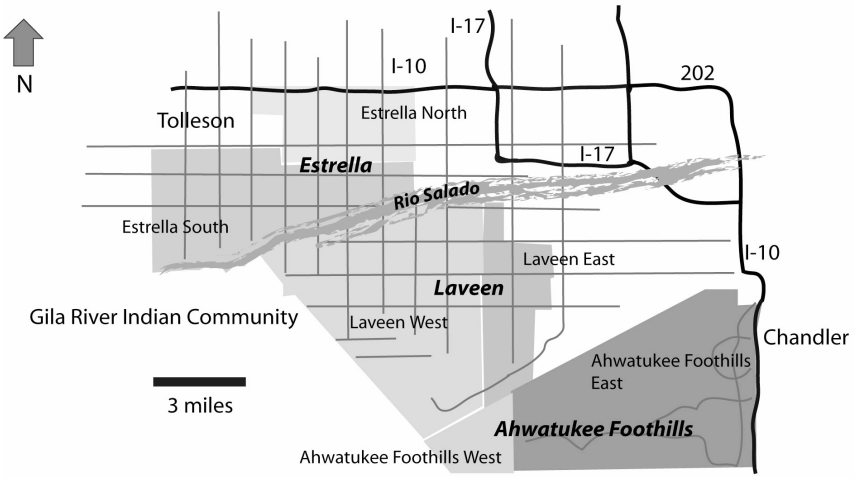


Figure 2. Southern Phoenix Growth Area Map



Phoenix has attracted a steady inflow of residents since the mid-20th century. Since 1950, when the population was approximately 100,000 residents, the city has maintained one of the fastest growth rates for a large municipality in the country, growing to approximately 1.6 million residents in 2008. The city's rapid growth creates demands for new infrastructure and facilities in order to maintain acceptable levels of service. The City's impact fees are charged in the areas of the city that account for much of the current and recent residential growth.

Relationship between Impact Fees and Infrastructure Improvements Plan

The Infrastructure Improvements Plan includes all data and calculations resulting in the recommended impact fees for each capital facility category. However, the City Council has the ultimate authority over the final fee amounts and may choose to alter or phase-in implementation of any or all impact fees from those recommended in the Infrastructure Improvements Plan.

The impact fees that are assessed at the time building permits (or water/sewer service connections) are purchased are the amounts stated in or calculated from the tables contained in the Development Impact Fee Ordinance (Section 29 of the City Code). These amounts reflect the final fee amounts adopted by City Council at the time of the Council hearing, and may differ in all or in part from the fees recommended in the Infrastructure Financing Plan presented in the following section of this report.

Legal Framework

Impact fees are charges that are assessed on new development to help pay for the capital facility costs they impose on the community. Impact fees require that each new residential or commercial project pay its proportionate share of the cost of new facilities required to serve that development. This section discusses the legal framework that governs impact fees in Arizona and within the City of Phoenix.

State Law

Arizona is one of more than two dozen states that have adopted specific enabling legislation authorizing the use of impact fees, also called "development fees," as a method of financing improvements to public facilities necessitated by the increased demands resulting from new development. The Arizona impact fee enabling act for cities, Section 9-463.05, Arizona Revised Statutes (A.R.S.), provides that:

> *A municipality may assess development fees to offset costs to the municipality associated with providing necessary public services to a development, including the costs of infrastructure, improvements, real property, engineering and architectural services, financing and professional services required for the preparation or revision of a development fee pursuant to this section, including the relevant portion of the infrastructure improvements plan.* (A.R.S. 9-463.05.A, as amended)

While this is a broad grant of authority, the Arizona Supreme Court has ruled that facilities that are not directly provided by a municipality, such as schools, do not represent "costs to the municipality" and therefore are not eligible for impact fees.[1]

Senate Bill 1525 thoroughly revised the enabling legislation for development impact fees, and this IFP has been revised to comply with all changes required prior to January 1, 2012.

Case Law

The adoption of impact fee legislation in Arizona and its interpretation by the Arizona courts has taken place in the larger context of the evolution of development financing methods nationally. Since impact fees were pioneered in states like Florida that lacked specific enabling legislation, such fees have generally been legally defended as an exercise of local government's broad "police power" to protect the health, safety and welfare of the community. The courts have gradually developed guidelines for constitutionally-valid impact fees, based on a "rational nexus" that must exist between the regulatory fee or exaction and the development activity that is being regulated. The standards set by court cases generally require that an impact fee meet a two-part test:

1) The amount of the fee must be proportional to the need for new facilities created by the new development; and

2) The expenditure of impact fee revenues must provide benefit to the fee-paying development.

Of key importance in calculating legally-valid development impact fees in Arizona is the proper interpretation of the phrase that the fee "must bear a reasonable relationship to the burden imposed upon the municipality to provide additional necessary public services." The following four principles developed from case law provide guidance for interpreting this issue:

1) Fees should not exceed the cost of needed facilities;

2) Fees should be proportional to the demand generated by the development;

3) Fees should not charge new development for a higher level of service; and

[1] Homebuilders of Central Arizona, et. al. v. City of Apache Junction, 2000.

4) New development should not be charged twice for the same level of service.

The first principle was often linked to the second principle in early impact fee cases. For example, the Florida Supreme Court in the 1976 Dunedin case held that water and sewer connection fees charged for the purpose of funding system capacity expansion were permissible if they "do not exceed a pro rata share of reasonable anticipated costs of expansion."

The second principle sets a somewhat different standard; not only is it necessary not to overcharge new development generally, each particular development must pay no more than its proportionate share of the costs. Impact fees for various types of developments should be proportional to the impact of each development on the need to construct additional or expanded facilities. The fees do not have to recover the full cost, but if the fees are reduced by a percentage from the full cost, the percentage reduction should apply evenly to all types of developments.

The third principle is that impact fees should not charge new development for a higher level of service than is provided to existing development. While the impact fees could be based on a higher level of service than the one existing at the time of the adoption of the fees, two things are required if this is done. First, another source of funding other than impact fees must be identified and committed to fund the capacity deficiency created by the higher level of service. Second, the impact fees must generally be reduced to ensure that new development does not pay twice for the same level of service, once through impact fees and again through general taxes that are used to remedy the capacity deficiency for existing development.

Finally, under the fourth principle, new development should not have to pay twice for the same level of service. As noted above, if impact fees are based on a higher-than-existing level of service, the fees should be reduced by an offset that accounts for the contribution of new development toward remedying the existing deficiencies. A similar situation arises when the existing level of service has not been fully paid for. Outstanding debt on existing facilities that are counted in the existing level of service will be retired, in part, by revenues generated from new development. To avoid requiring new development to pay more than its proportional share, impact fees should be reduced to account for future tax payments that will retire outstanding debt on existing facilities.

In general, offsets against impact fees are not required for other types of funding that may be used for growth-related, capacity-expanding improvements. While new development may contribute toward such funding, so does existing development, and both existing and new development benefit from the higher level of service that the additional funding makes possible. As long as the fees are based on new development paying to maintain existing levels of service that have been paid for in full by existing development, and additional funding can reasonably be used to raise the level of service for existing and new development alike, no additional revenue offsets are warranted.

City Ordinance

The Development Impact Fee Ordinance (Chapter 29 of the City's Code of Ordinances) contains the standards and procedures relating to the development impact fee program, as well as schedules of the current fees adopted by the City Council. Key provisions of the ordinance include the circumstances under which impact fees will be imposed, infrastructure financing plans, administration of development impact fees, method for computation of fees and rules for the issuance of development credits and development agreements.

As previously mentioned, the impact fees do not apply city-wide, but are assessed only on new development located within growth areas. Impact fees are calculated for two general geographic areas, the Northern Growth Area and Southern Growth Area, which are both divided further into additional service areas for certain facility types. The fees are charged at building permit and are based on the land use and the impact fee service area in which the development is located. These practices conform to standard impact fee principles and State law.

Study Methodology

This section provides an overview of the methodology used in developing this impact fee update and the legal and policy rationale for changes to the impact fee methodology used in prior studies. Facility-specific methodology changes are discussed in more detail for each facility in Section III of this study.

The State enabling act and national case law guide the appropriate approach to calculating and analyzing impact fees. There are several alternative methodologies that can be used in impact fee analysis. The plan-based methodology, also called an "improvements-based" approach, essentially divides the cost of growth-related improvements required over a fixed planning horizon by the number of new service units projected to be generated by growth over the same planning horizon in order to determine a cost per service unit.

In the past, the City of Phoenix nominally utilized the plan-based methodology in developing the impact fees. The calculation of the cost was based on a list of planned major improvements in each service area. The cost of the improvements was then divided by projected EDUs for each service area.

The City's 2006 update differed from the traditional plan-based approach in that the City utilized total service units expected to be in the service area in 2030 as the basis for the impact fee calculation, rather than the expected new growth in service units added through 2030, which is the planning horizon on which the improvements are based. If a service area has no existing development, the two approaches would yield the same result; but as the service area builds out, the fees based on this approach become much smaller than the actual cost to accommodate growth. While some of the growth areas may have had very little existing development when the fees were first established; most areas have experienced growth over the past two decades and are, on average, at about one-third of residential build-out. Since the planned improvements are designed to serve new growth rather than existing development, the cost of growth's portion of the improvements should be divided by new EDUs over the planning horizon, not existing plus new EDUs as was done previously.

Service Units

To make a level of service standard, it is necessary to define a common unit of expression for service demand, known as a "service unit." This study maintains the use of Equivalent Demand Units (EDUs) to standardize the demand generated by each land use type for the calculation and assessment of the impact fees. The EDUs associated with each land use represent the demand that it places on each category of necessary public service compared to the demand created by a detached single-family housing unit.

Functional Population. The functional population approach presumes that the demand for necessary public services is strongly related to the presence of people at the site of a land use. This update utilizes the functional population approach for all categories of Necessary Public Service except Wastewater and Water. More detail on the Functional Population approach is provided in Appendix B.

Wastewater and Water service units. Wastewater and water utilize a similar approach to the Functional Population approach, but with a planning horizon of 2030 (instead of build-out), and slightly different assumptions. More detail is provided in Appendix B.

Parks Adjustments. As discussed in more detail in the Infrastructure Improvments Plan: Parks, the Functional Population method was used in initial fee calculations, but adjustments made in response to concerns raised by the Impact Fee Ad Hoc Committee.

Planning Horizon

Generally, a plan-based approach must be based on a facility master plan that ensures that the listed improvements are going to be needed over the planning horizon on which the fees are based. However, a time-specific plan is not required if the planning horizon is build-out and the community has determined the ultimate facilities needed to accommodate build-out conditions. All of the categories of necessary public services, with the exception of Wastewater and Water, utilize the build-out time horizon. Existing and build-out housing units and nonresidential development are based on population and employment projections provided by Maricopa Association of Governments (MAG). Wastewater and water use a 2030 horizon since both of those categories have approved facility master plans.

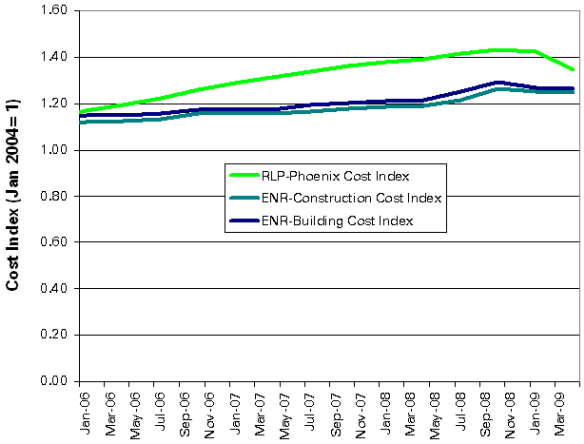
Planned Improvements

A minimum standard in any plan-based impact fee calculation is that the improvements used in calculating the fee must expand the capacity of the system to serve additional development. The current methodology includes the cost of improvements that are deemed to be "capacity-expanding." Capacity-expanding improvements can be identified based on the nature of the improvement (e.g., renovating an existing fire station or replacing existing equipment such as a patrol car would not be eligible, but building a new fire station or adding patrol cars to the fleet would be capacity-expanding). For all facility types, the City has identified planned capacity-expanding improvements to serve anticipated build-out development. In addition to future improvements, future principal payments on outstanding debt for existing facilities are also future costs. Total future costs are reduced by impact fee account balances to determine net future costs needed to serve build-out development, when appropriate.

Improvement Costs

Many of the Fire Protection and drainage costs contained in this update are based on construction cost estimates developed for the 2006 update. These 2006 costs were updated using the *Engineering News-Record* national construction cost and building cost indices. These national cost indices are based on materials and labor costs, but do not include overhead and profit. A different index of building construction costs that does include overhead and profit is provided by the *RLB Construction Cost Quarterly*, both for Phoenix and the nation. This index is more volatile, since contractors will tend to increase their profit margins when business is booming and reduce them in slack times as they try to keep their workers busy.

Figure 3. Construction Cost Indices



Level of Service

One of the principles of impact fees is that new development should not be charged for a higher level of service than is provided to existing development. To determine if impact fees are equitable, it is necessary to determine what level of service is currently being provided by the City for existing residents and businesses. As long as the fees are not based on a higher level of service than is currently provided to existing development, the fees are consistent with rational nexus principles.

The City has not needed to measure the existing level of service in previous updates, since its methodology (dividing cost of improvements needed over a planning period by total EDUs at the end of the planning period) was so conservative. However, the methodology used in this study raises the possibility that the final increment of development could be required to pay for more than its share of the cost (e.g., the last 10 percent of growth paying for 50 percent of the cost of facilities). To ensure that this does not happen, this study includes a level of service analysis for the total EDUs at the end of the planning period which uses the total costs of existing and future capital facility needs.

While various indicators can be used to measure level of service, such as patrol officers per 1,000 residents, it is possible to address these issues without specifying a level of service standard in terms of an explicit ratio. In reality, the level of service is a set of capital facilities, including land, buildings and equipment that provide service to a given amount of development. The use of explicit level of service standards generally over-simplifies this complex relationship by emphasizing one element of the capital facilities, such as patrol officers for police. An alternative approach is to measure the combined level of service in terms of measuring the replacement cost of existing facilities, plus the costs of planned future facilities, for each service area. The combined level of service calculation may or may not include the existing impact fee account balance, since such balances may be reserved for spending on facilities for which impact fees may no longer be collected (per Senate Bill 1525). On the other hand, outstanding debt on existing facilities is subtracted from the total replacement cost, because this portion of the value of existing facilities has not been paid for by existing development.

If the combined level of service cost per EDU at build-out is lower than the planned cost per EDU required by growth, the combined level of service cost becomes the recommended fee (since that result means that all EDUs within the service area will be charged the same). If the combined level of service cost per EDU at build-out is higher than the planned cost per EDU required by growth, the planned cost per EDU becomes the recommended fee.

Section III: Infrastructure Improvements Plan

Infrastructure Financing Plan for the
City of Phoenix, Arizona

INFRASTRUCTURE IMPROVEMENTS PLAN: INTRODUCTION

In 2007, the Arizona State Legislature passed Senate Bill 1423, which amended State law relating to municipal development impact fees. Among the provisions included in the bill, the revised statute requires municipalities to adopt an infrastructure improvements plan, which provides a list and schedule of planned infrastructure that will be funded with the development fee. The revised statute requires that "before the adoption or amendment of a development fee, the governing body of the municipality shall adopt or update the land use assumptions and infrastructure improvements plan for the designated service area." The Infrastructure Improvements Plan (IIP) must include an estimate of future facilities that will be required as a result of new development and a forecast of the infrastructure costs, at a minimum

The requirements for the infrastructure improvements plan were further modified by the Arizona State Legislature in 2011 through Senate Bill 1525. The amendment to the State Act requires the following for each facility that is the subject of an impact fee:

1. *A description of the existing necessary public services in the service area and the costs to upgrade, update, improve, expand, correct or replace those necessary public services to meet existing needs and usage and stricter safety, efficiency, environmental or regulatory standards, which shall be prepared by qualified professionals licensed in this state, as applicable.*
2. *An analysis of the total capacity, the level of current usage and commitments for usage of capacity of the existing necessary public services, which shall be prepared by qualified professionals licensed in this state, as applicable.*
3. *A description of all or the parts of the necessary public services or facility expansions and their costs necessitated by and attributable to development in the service area based on the approved land use assumptions, including a forecast of the costs of infrastructure, improvements, real property, financing, engineering and architectural services, which shall be prepared by qualified professionals licensed in this state, as applicable.*
4. *A table establishing the specific level or quantity of use, consumption, generation or discharge of a service unit for each category of necessary public services or facility expansions and an equivalency or conversion table establishing the ratio of a service unit to various types of land uses, including residential, commercial and industrial.*
5. *The total number of projected service units necessitated by and attributable to new development in the service area based on the approved land use assumptions and calculated pursuant to generally accepted engineering and planning criteria.*
6. *The projected demand for necessary public services or facility expansions required by new service units for a period not to exceed ten years.*
7. *A forecast of revenues generated by new service units other than development fees, which shall include estimated state-shared revenue, highway users revenue, federal revenue, ad valorem property taxes, construction contracting or similar excise taxes and the capital recovery portion of utility fees attributable to development based on the approved land use assumptions, and a plan to include these contributions in determining the extent of the burden imposed by the development as required in subsection B, paragraph 12 of this section.*

This section of the report provides the Infrastructure Improvements Plan required by State law for each of the necessary public services for which development impact fees are charged; however only

the revisions required prior to January 1, 2012 have been incorporated in this IIP. Full compliance with items 1-7 above is required prior to August 1, 2014.

Facility Needs

The planned improvements used in calculating the future facility needs in this update are based on the build-out facility needs for all necessary public services except Wastewater and Water, which use a 2030 planning horizon. The planned improvement costs in this update are divided by new service units expected in each service area through build-out. The plan-based costs per EDU are derived by dividing future capacity-expanding expenditures by future growth in EDUs for the service area.

Senate Bill 1525 requires the planning horizon to be shortened to 10 years for all facilities other than Wastewater and Water, which may have a 15-year planning horizon. However, these horizons will not be enforced prior to August 1, 2014, and were not implemented in the creation of this IFP.

Facility Costs

The cost components for each fee were updated to reflect costs at the time of each prior update. In particular, land cost components were updated to reflect 2009 costs paid by the City of Phoenix for Fire Protection, police, library and storm drainage sites. Other costs were current at the time of the original studies. For Roadway Facilities, Parks, and Open Space, the costs were estimated in 2009; for Fire Protection, Libraries, Police, and Storm Drainage, the costs were estimated in 2010; and for Wastewater and Water the costs were estimated in 2006.

Senate Bill 1525 requires a complete update to the IFP prior to August 1, 2014, and all facility costs will be revised and updated in the course of that process.

Revenue Sources

The net cost per EDU represents new development's fair share of future capacity-expanding improvements, and is the maximum impact fee that may be charged by the City based on the study. In all cases, the net cost per EDU is less than the plan-based cost per EDU. This is because (1) the net cost per EDU is based on the plan-based cost per EDU or the combined level of service, whichever is less, and (2) if the fee is based on plan-based costs, it has been reduced to account for future property tax payments that will retire outstanding debt. The ratio of the net cost per EDU to the plan-based cost per EDU gives the percentage of the future planned expenditures that can be attributed to new development in the service area and that could be funded by the impact fee revenue if the potential fee is fully adopted by the City.

The mix of funding sources available to fund necessary public services beyond the portion covered by the impact fee calculated in this report will be determined by the actions of future City Councils in prioritizing projects, allocating funding in future Capital Improvement Programs and the availability of impact fee revenue in each service area. As such, this study does not include a specific plan for financing the portion of necessary public services that will not be covered by the recommended impact fee calculated in this document.

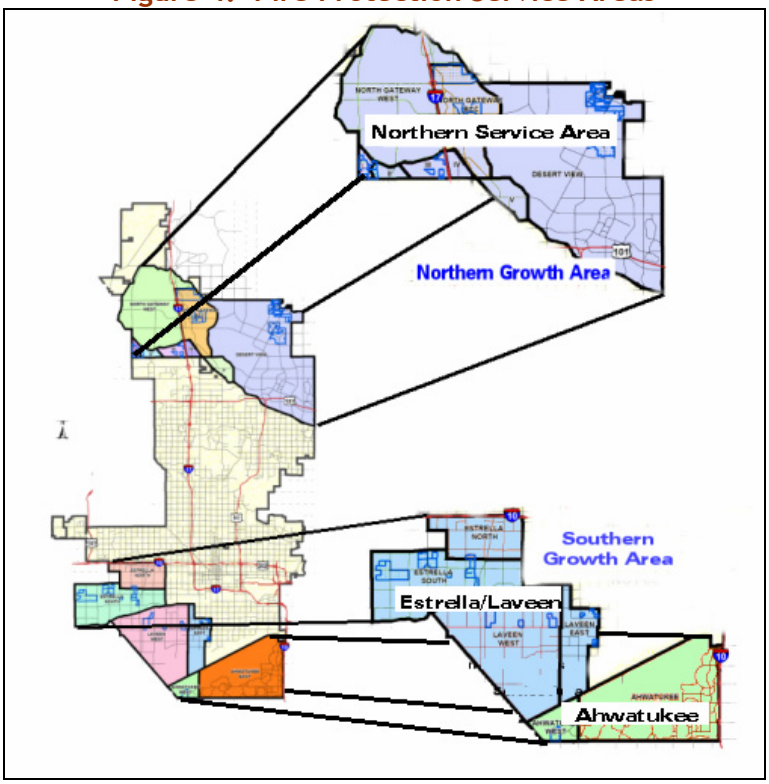
INFRASTRUCTURE IMPROVEMENTS PLAN: FIRE PROTECTION

The Phoenix Fire Department provides fire protection and emergency medical services (EMS) city-wide. In 2008, the Fire Department responded to more than 146,000 calls for service, including 14,500 fire calls and 124,500 EMS calls. The fire and EMS apparatus are dispatched to responses from 57 fire stations located throughout the city. The City's Fire Protection impact fee funds the construction of fire stations and the acquisition of related capital equipment in the Northern and Southern Growth Areas.

Service Areas

In an impact fee system, it is important to clearly define the geographic areas within which impact fees will be collected and within which the fees collected will be spent. There are really two types of geographic areas that serve different functions in an impact fee system: service areas and benefit districts. The service areas define the area within which a set of common capital facilities provides service, and for which a fee schedule based on average costs within that district is calculated. Benefit districts, on the other hand, represent an area within which the fees collected must be spent. The City has established three fire protection service areas; one service area for the entire Northern Growth Area that includes all of the villages in that area, and two separate service areas in the Southern Growth Area (Estrella/Laveen and Ahwatukee). The Fire Protection service areas are shown in Figure 4.

Figure 4. Fire Protection Service Areas



Methodology

The City's fire station facility planning is based upon a service standard of a four-minute emergency response time, which roughly equates to a five square-mile grid with 10,000 to 25,000 people. The response time planning standard conforms to the National Fire Protection Association deployment standard for first responder service delivery. In planning future stations and general locations, the Fire Department analyzes the existing and future street network to determine ideal locations and facility needs.

Regardless of the level of service established for planning purposes, this update examines the existing provision of Fire Protection facilities within each service area based on the ratio of the replacement value of existing facilities to existing development in order to ensure that the impact fees are not based on a higher level of service than currently provided to development in the service area. The service area level of service is appropriate for fire facilities, since they tend to serve a limited geographical area, and new stations are generally added as warranted by growth.

The total cost per service unit for Fire Protection facilities consists of three components: the cost of land for the fire stations, the fire stations and the vehicles. The updated component costs for land and improvements will be applied to the existing fire facilities to determine the existing fire facility level of service in each service area.

The cost per service unit for fire facilities is based on the total (combined) or planned level of service within the service area, whichever is less. The impact fee per service unit is determined by subtracting the property tax offset per service unit from the cost per service unit. The impact fee per unit of development is calculated by multiplying the net cost per service unit for the service area by the EDUs per development unit.

Service Units

In impact fee analysis, disparate types of development must be translated into a common unit of measurement that reflects the impact of new development on the demand for new facilities. This unit of measurement is called a "service unit." This study maintains the City's current practice of utilizing the Equivalent Demand Unit, or EDU, as the basis for measuring the demand for each land use relative to the impact of a typical single-family detached dwelling unit.

The two most common methodologies used in calculating Fire Protection impact fees are the "calls-for-service" approach and the "functional population" approach. The calls-for-service approach uses historical data on calls by land use type to make the connection between land use type and demand for Fire Department services. The functional population approach is a more generalized approach than calls-for-service, and it presumes that the demand for fire services is strongly related to the presence of people at the site of a land use. In developing prior (2006) fire EDU factors, the City utilized a random sample of emergency medical service and structural fire call data, and allocated the call data among single-family, multi-family (including mobile homes) and nonresidential land uses. The allocation of the call data included a factor for both the number of calls and time spent on the call by the fire department. The call data were then weighted to reflect the proportion

of calls related to fires and emergency service. The service unit factor for each land use was based on the relative total minutes per unit for each land use compared to the single-family call minutes per unit.

This update instead utilizes the functional population approach. While the Fire Department has some call data available for very generalized land uses, the availability of police call data by land use is even more limited. In order to be able to use more refined land use categories and maintain consistency between the two impact fee calculations, the functional population approach is used as the basis for the service unit calculation in both Fire Protection and Police impact fee categories.

The functional population approach is based on the premise that the demand for fire services is strongly related to the presence of people at the site of a land use. This is reasonable, since 85 percent of Fire Department calls are related to emergency medical response, rather than structure fires. Functional population is analogous to the concept of "full-time equivalent" employees. It represents the number of "full-time equivalent" people present at the site of a land use, and it is used for the purpose of determining the impact of a particular development on the need for Fire Protection facilities. For residential development, functional population is simply average household size times the percent of time people are assumed to spend at home. For nonresidential development, functional population is based on a formula that factors trip generation rates, average vehicle occupancy and average number of hours spent by employees and visitors at a land use. The functional population multipliers for various land use types are then converted to Equivalent Demand Units (EDUs), based on the functional population of the average single-family detached unit. The calculations of functional population and EDUs are presented in Section IV, Appendix B.

The EDU factors used for developing the impact fee calculations are shown in Table 10.

Table 10. Fire Protection Service Unit Multipliers

Land Use	Unit	EDUs/Unit
Single-Family, Detached	Dwelling	**1.00**
Multi-Family	Dwelling	**0.76**
Mobile Home/RV Park	Space	**0.85**
Retail	1,000 sq. ft.	**0.55**
Office	1,000 sq. ft.	**0.63**
Public/Institutional	1,000 sq. ft.	**0.61**
Industrial	1,000 sq. ft.	**0.49**

Source: Residential functional population EDUs per unit from Table 157; nonresidential functional population EDUs per unit from Table 158.

To determine the cost per service unit using the plan-based methodology, the planned improvement costs are divided by the projected growth in service units over the planning horizon. As discussed in the previous section, the planning horizon used in this update is build-out. The growth through build-out in each of the Fire Protection impact fee service areas and city-wide is shown in Table 11.

Table 11. Existing and Build-Out Fire Protection Service Units

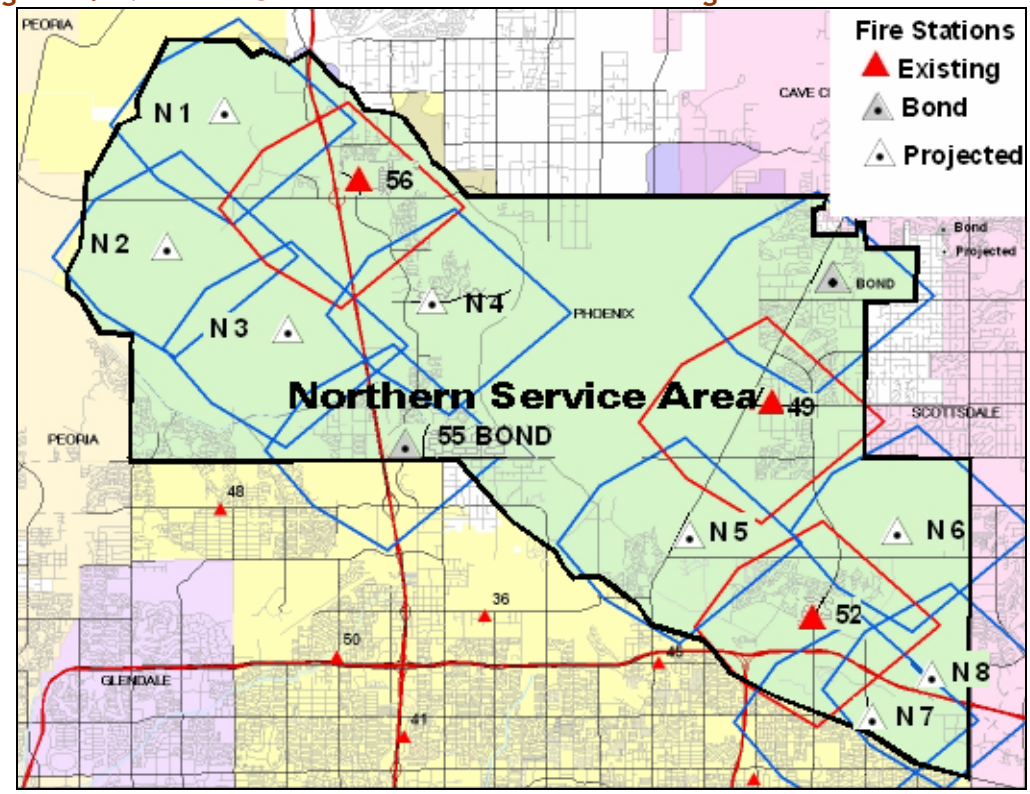
	Build-Out	Existing	New
Northern Growth Area	192,691	29,343	163,348
Estrella/Laveen	119,457	40,687	78,770
Ahwatukee	40,496	37,389	3,107
Subtotal, Growth Areas	352,644	107,419	245,225
+ Non-Growth Area	910,262	631,355	278,907
City-Wide Total	**1,262,906**	**738,774**	**524,132**

Source: Build-out service units from Table 160, Appendix B; existing service units from Table 159.

Planned Improvements

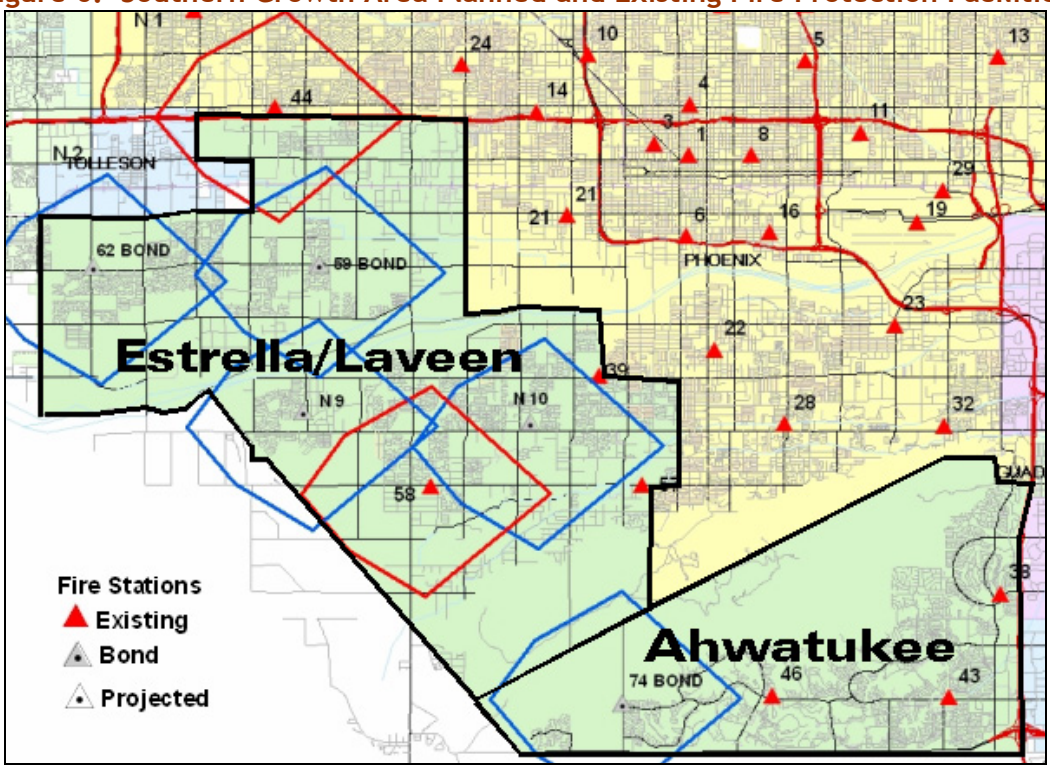
The existing and planned fire stations are shown in Figure 5 for the Northern Growth Area, and in Figure 6 for the Southern Growth Area. The stations are shown surrounded by response polygons that indicate the generalized first-response area for each station. Stations that are identified as bond-funded will be partially funded with general obligation debt issues funded through the secondary property tax. Based on the Fire Department analysis, the Northern Growth Area will need a total of 13 fire stations; there are three existing stations in the area and the City has purchased land for two of the planned stations (Station #55 and Station #72).

Figure 5. Northern Growth Area Planned and Existing Fire Protection Facilities



The Southern Growth Area includes the Estrella/Laveen and Ahwatukee service areas. In Estrella/Laveen, the Fire Department has identified the need for four additional stations in addition to the three existing stations that will be required at build-out. The existing stations within the Estrella/Laveen service area boundary include Stations #44, #57 and #58; the City has also purchased land for a fourth station (Station #59). In Ahwatukee, the Fire Department has planned one additional station (Station #74) in addition to the existing three stations, and has purchased land for the planned station.

Figure 6. Southern Growth Area Planned and Existing Fire Protection Facilities



The existing and planned fire stations for each service area are summarized below in Table 12. Every fifth station in Phoenix is designed as a battalion headquarters facility, which houses additional staff and battalion vehicles.

Table 12. Fire Station Planning Summary

	Total Planned Stations		Existing Stations		New Stations	
Service Area	Station	Battalion HQ	Station	Battalion HQ	Station	Battalion HQ
Northern Growth Area	11	2	2	1	9	1
Estrella/Laveen	6	1	3	0	3	1
Ahwatukee	3	1	2	1	1	0

Source: Planned and existing fire stations based on planning maps in Figure 5 and Figure 6 provided by the City of Phoenix Fire Department, Office of Strategic Planning, March 12, 2009; battalion headquarters demand based on Fire Department planning standard.

Fire Protection Facility Cost

The cost associated with each fire station includes land acquisition, facility construction and furnishings and the purchase of necessary equipment and fire protection vehicles. Standard equipment for fire stations includes an advanced life support (ALS) ambulance/rescue vehicle, an engine and a brush truck; battalion headquarters also include a battalion vehicle. The Fire Department has developed standardized fire station designs that include 14,000 square feet and are typically located on two and one-half acre sites. The facilities include four truck bays, overnight rooms, offices, restrooms and a kitchen. Every fifth planned fire station serves as a battalion office, which requires an additional 5,000 square feet of space and an additional half acre of site area to accommodate additional staff and vehicles.

The land cost estimates used in this study are based on recent City land purchases with the service areas and analysis by a professional real estate appraiser. The land cost data and analysis is presented in Section IV, Appendix C.

The total cost of the fire stations used in the impact fee calculation is based on prototype fire station facilities. The facilities utilized in the impact fee include a typical fire station with 14,000 square feet and a battalion headquarters fire station with an additional 5,000 square feet. The fire facility impact fee cost components were last updated in 2006 as part of the most recent *Infrastructure Financing Plan* and were based on a cost analysis conducted by an engineering firm of the costs associated with Station #32. The total costs include direct construction costs as well as the costs associated with fees, taxes, bond/insurance and general conditions. The fire station costs exclude the costs of fire-fighting apparatus and related equipment.

Since the City updated the costs in 2006 as part of the *Infrastructure Financing Plan*, this update retains the basis for the cost estimates and updates the costs based on the change in the *Engineering News-Record* (ENR), Building Cost Index (BCI) from January 2007 to January 2009. According to Fire Department staff, the estimated cost for the fire stations derived in Table 13 of $371 per square foot is similar to recent fire station construction costs for fire stations constructed since 2006.

Table 13. Fire Station Construction Cost

Total Assembly Cost		$3,597,113
Construction Fee	6.30%	$226,618
Tax	5.27%	$189,568
Bond/Insurance	3.00%	$107,913
A/E (Design)	8.00%	$287,769
CoP Eng. And Arch.	14.00%	$503,596
Const. Management	8.00%	$287,769
Total Construction Cost		**$5,200,346**
÷ Square Feet		14,000
Cost per Square Foot		**$371**

Source: Construction cost derived from 3 D/I, *Construction Cost Analyses and Recommendations for the City of Phoenix*, April 20, 2006 and updated to January 2009 value using *Engineering News- Record*, Building Cost Index (BCI).

The total planned Fire Protection facility cost is based on fire station land and construction costs, standardized facility and site characteristics and planned new stations in each service area. The cost associated with land that has already been purchased for future fire stations is excluded from the planned costs. As mentioned, the City has purchased sites for two of the planned stations in the Northern Growth Area (Stations #55 and #72), for Station #59 in Estrella/Laveen and for Station #74 in Ahwatukee. The planned facility and site costs for each service area are summarized in Table 14.

Table 14. Planned Fire Station Costs

	Planned	Unit Cost	Total Cost
Fire Stations	9.0	$5,200,346	$46,803,114
Fire Station Land (Acres)	17.5	$197,833	$3,462,069
Fire Station w/ Battalion HQ	1.0	$7,049,000	$7,049,000
Fire/Battalion Land (Acres)	3.0	$197,833	$593,498
Total, Northern Growth Area			**$57,907,680**
Fire Stations	3.0	$5,200,346	$15,601,038
Fire Station Land (Acres)	5.0	$134,526	$672,630
Fire Station w/ Battalion HQ	1.0	$7,049,000	$7,049,000
Fire/Battalion Land (Acres)	3.0	$134,526	$403,578
Total, Estrella/Laveen			**$23,726,246**
Fire Stations	1.0	$5,200,346	$5,200,346
Fire Station Land (Acres)	0.0	$182,006	$0
Fire Station w/ Battalion HQ	0.0	$7,049,000	$0
Fire/Battalion Land (Acres)	0.0	$182,006	$0
Total, Ahwatukee			**$5,200,346**

Source: Planned fire stations and battalion headquarters from Table 12; fire station land based on City of Phoenix Fire Department planning standards of 2.5 acres for stations and 3 acres for battalion headquarters; land requirement excludes existing sites purchased for future fire stations; fire station cost from Table 13; battalion headquarters cost derived from cost per square foot in Table 13 and standard facility size of 19,000 square feet; land cost per acre from Table 163.

Fire Protection Equipment Costs

The cost of fire-fighting apparatus is based on current pricing for fully-equipped vehicles. The standard vehicle pricing by equipment type is shown in Table 15.

Table 15. Fire Protection Equipment Unit Costs

Apparatus Type	Vehicle	Equipment	Total
Engine	$400,000	$157,368	$557,368
Ladder	$754,887	$135,610	$890,497
Ladder Tender	$211,856	$135,610	$347,466
Utility	$450,500	$20,000	$470,500
Ambulance/Rescue	$121,500	$67,512	$189,012
Brush	$85,500	$18,556	$104,056
Tanker	$160,000	$29,156	$189,156
Battalion Command	$30,000	$80,000	$110,000

Source: City of Phoenix Fire Department, February 17, 2009.

For planning purposes, each fire station will be equipped with an ALS rescue vehicle, fire engine and brush truck. The battalion headquarters also includes a battalion vehicle. The total planned vehicle costs for each service area are shown in Table 16.

Table 16. Planned Fire Protection Equipment Cost

Vehicle Type	Demand	Unit Cost	Total Cost
ALS Rescue	10	$189,012	$1,890,120
Engine	10	$557,368	$5,573,680
Brush Truck	10	$104,056	$1,040,560
Battalion Vehicle	1	$110,000	$110,000
Total, Northern Growth Area			**$8,614,360**
ALS Rescue	4	$189,012	$756,048
Engine	4	$557,368	$2,229,472
Brush Truck	4	$104,056	$416,224
Battalion Vehicle	1	$110,000	$110,000
Total, Estrella/Laveen			**$3,511,744**
ALS Rescue	1	$189,012	$189,012
Engine	1	$557,368	$557,368
Brush Truck	1	$104,056	$104,056
Battalion Vehicle	0	$110,000	$0
Total, Ahwatukee			**$850,436**

Source: Planned vehicles based on planned new fire stations and battalion headquarters from Table 12 and fire equipment costs from Table 15.

Planned Cost per Service Unit

The cost per service unit is developed by dividing the planned improvement costs by the projected growth in service units through build-out. In addition to future improvement costs, principal payments from impact fee accounts on outstanding debt used to build existing fire stations within each service area are also a future cost. The growth-related improvement costs for fire facilities must be adjusted to account for the net cash balance available in the fire facility impact fee funds. The available cash balance is subtracted from the total costs since the fund balance will be used to pay for a portion of the future infrastructure and decrease the amount needed to be collected from future impact fees. There are currently no outstanding developer credits related to the fire facility impact fee in any of the service areas. The plan-based cost per service unit is determined by dividing the total plan-based cost by the number of service units that will be added through build-out, as shown in Table 17.

Table 17. Plan-Based Fire Protection Cost per Service Unit

	Northern Growth Area	Estrella/ Laveen	Ahwatukee
Facility Cost	$57,907,680	$23,726,246	$5,200,346
+ Vehicle/Equipment Cost	$8,614,360	$3,511,744	$850,436
Total Planned Facility and Vehicle Cost	$66,522,040	$27,237,990	$6,050,782
+ Outstanding Debt	$1,826,949	$4,882,799	$4,532,929
– Existing Balance	-$696,244	-$2,255,526	-$185,326
Total Planned Costs	$67,652,745	$29,865,263	$10,398,385
÷ New Service Units (EDUs)	163,348	78,770	3,107
Plan-Based Cost per EDU	**$414**	**$379**	**$3,347**

Source: Facility costs from Table 14; vehicle/equipment cost from Table 16; existing balance from City of Phoenix Planning Department and based on January 2009 balance; outstanding debt on existing fire stations in the service areas from City of Phoenix Budget and Research Department, June 11, 2009; new EDUs from Table 11.

Level of Service Analysis

One of the fundamental principles of impact fees, central to the "rational nexus" standard enunciated by the courts and echoed in Arizona's "reasonable relationship" language, is that new development cannot be asked to pay for a higher level of service than existing development. The methodology used in this plan raises the possibility that the final increment of development could be required to pay for more than its share of the cost (e.g., the last 10 percent of growth paying for 50 percent of the cost). To ensure that this does not happen, this study provides an analysis of the total (combined existing plus future planned) level of service.

The total (combined) level of service for Fire Protection facilities in this study is calculated by starting with the replacement cost of existing facilities and major fire-fighting capital equipment located within each service area. The value of existing facilities is based on the cost estimates used in developing the fee and the square feet and land associated with existing facilities. Also included in the value of the existing facilities is the value of land that has been acquired for future stations (recall that those parcels were excluded from the plan-based costs). The estimated value of the existing facilities in each of the service areas are shown in Table 18.

Table 18. Existing Fire Protection Facilities

Fire Station	Building (Sq. Ft.)	Land (Acres)
Station 49	7,300	1.75
Station 52 w/ Battalion HQ	13,300	1.16
Station 56	15,000	2.00
Station 55 (Planned)	NA	3.00
Station 72 (Planned)	NA	3.23
Subtotal, Northern Growth Area	35,600	11.14
x Unit Cost	$371	$197,833
Total Cost, Northern Growth Area	**$13,207,600**	**$2,203,854**
Station 44	7,300	1.46
Station 57	15,000	2.29
Station 58	6,300	1.28
Station 59 (Planned)	NA	3.00
Subtotal, Estrella/Laveen	28,600	8.03
x Unit Cost	$371	$134,526
Total Cost, Estrella/Laveen	**$10,610,600**	**$1,080,244**
Station 38	7,600	1.40
Station 43 w/ Battalion HQ	17,200	2.00
Station 46	6,600	1.00
Station 74 (Planned)	NA	3.00
Subtotal, Ahwatukee	31,400	7.40
x Unit Cost	$371	$182,006
Total Cost, Ahwatukee	**$11,649,400**	**$1,346,844**

Source: Existing facilities inventory from City of Phoenix Fire Department, April 21, 2009; facility replacement cost per square foot from Table 13; land costs per acre from Table 163.

As shown in Table 19, the replacement cost of fire-fighting apparatus is based on the unit cost and the inventory of existing equipment located at stations within each service area. The existing equipment inventory includes both the standard equipment, such as engines and brush trucks, as well as equipment types that are specific to a certain location, such as ladder trucks. Such equipment is necessary based on the type of development within the area served by the fire station.

Table 19. Existing Fire Protection Vehicle Inventory

Paramedic/Engine 49	$557,368
Brush 49	$104,056
Paramedic/Engine 52	$557,368
Brush 52	$104,056
Battalion 6 (Station 52)	$110,000
Paramedic/Engine 56	$557,368
Tanker 56	$189,156
Total, Northern Growth Area	**$2,179,372**
Paramedic/Engine 44	$557,368
Squad/Rescue 44	$189,012
Paramedic/Engine 57	$557,368
Rescue 57	$189,012
Paramedic/Engine 58	$557,368
Brush 58	$104,056
Total, Estrella/Laveen	**$2,154,184**
Paramedic/Engine 38	$557,368
Rescue 38	$189,012
Hazmat 38	$350,000
Brush 38	$104,056
Engine 43	$557,368
Rescue 43	$189,012
Ladder 43	$890,497
Ladder Tender 43	$347,466
Battalion 7 (Station 43)	$110,000
Paramedic/Engine 46	$557,368
Brush 46	$104,056
Total, Ahwatukee	**$3,956,203**

Source: Existing vehicle inventory from City of Phoenix Fire Department, "Fire Station Locations and Apparatus Report," June 23, 2008; unit replacement costs from Table 15.

Total fire facility costs for each service area are added together to find the total existing investment value for each service area. The existing impact fee account balances are added to the value of facilities because these cash funds have been paid by existing development. As shown in Table 20, the replacement value of the existing fire facilities is highest in the Northern Growth Area and lowest in Estrella/Laveen.

Table 20. Existing Fire Protection Investment in Impact Fee Service Areas

	Northern Growth Area	Southern Growth Area	
		Estrella/Laveen	Ahwatukee
Building Replacement Value	$13,207,600	$10,610,600	$11,649,400
Land Value	$2,203,854	$1,080,244	$1,346,844
Vehicle Replacement Costs	$2,179,372	$2,154,184	$3,956,203
Total Land and Development Value	$17,590,826	$13,845,028	$16,952,447
Existing Impact Fee Balance	$696,244	$2,255,526	$185,326
Total Existing Replacement Value:	**$18,287,070**	**$16,100,554**	**$17,137,773**

Source: Building and land replacement value from Table 18; vehicle replacement cost from Table 19; existing balances from Table 17; existing EDUs from Table 159.

The total investment based on the existing provision of fire facilities, and impact fees already paid, is then added to the cost of future planned improvements to find the total fire expenditures for each service area. The total fire expenditures are then divided by the total service area EDUs (both existing and future) to determine the total fire expenditure per EDU in each of the service areas, as shown in Table 21.

Table 21. Total (Combined) Fire Protection Expenditures per EDU

	Northern Growth Area	Southern Growth Area	
		Estrella/Laveen	Ahwatukee
Total Existing Replacement Value:	$18,287,070	$16,100,554	$17,137,773
Planned Expenditures	$67,652,745	$29,865,263	$10,398,385
Combined Existing and Planned Expenditures	$85,939,815	$45,965,817	$27,536,158
÷ Total Service Area EDUs	192,691	119,457	40,496
Total (Combined) Cost per EDU	**$446**	**$385**	**$680**

Source: Total existing replacement value from Table 20; planned expenditures from Table 17, total service area EDUs from Table 11.

Gross Cost per EDU

In order to determine the potential gross fee per EDU for each service area, the total (combined existing investment plus future planned expenditures) cost per EDU is compared to the plan-based cost per EDU for each service area. To make sure that new development is not paying for a higher level of service than existing development, the lower of the two amounts is selected to determine the gross impact fee for each service area. As shown in Table 22, in all service areas except Ahwatukee, the selected amount is the plan-based cost per EDU.

Table 22. Comparison of Total (Combined) Costs and Plan-Based Costs per Service Area

	Northern Growth Area	Southern Growth Area	
		Estrella/Laveen	Ahwatukee
Total (Combined) Cost / EDU	$446	$385	$680
Plan-Based Cost / EDU	$414	$379	$3,347
Gross Cost / EDU	**$414**	**$379**	**$680**

Source: Total (combined) level of service costs from Table 21, plan-based costs from Table 17.

Offsets

Before determining an actual impact fee schedule, offsets must be taken into consideration. An offset is applied for any other type of revenue dedicated to paying for a portion of the same improvements funded by impact fees. In order to avoid requiring new development to pay more than its proportionate share of facility costs, impact fee calculations should account for future tax payments that will retire outstanding debt used to fund existing fire facilities This section calculates the offset for outstanding debt funded through the secondary property tax.

Secondary Property Tax Offset

The major funding sources for Fire Protection facilities in Phoenix have generally consisted primarily of debt funded through the secondary property tax along with impact fee funds in the growth areas. The secondary property tax in Arizona can only be used to repay debt used for capital improvements. The City issues general obligation debt funded with the secondary property tax to fund street, bridge and storm drain improvements. In this update, the debt offset recognizes the expenditure of property tax proceeds from new development that will be used to repay outstanding fire facility debt from prior bond-funded improvements. Under the City's current offset schedule, the offset varies for each land use category. The approach used in this study allows for a uniform debt offset per EDU.

In past updates, the City used a forward-looking offset methodology to account for secondary property tax debt by analyzing the future facilities that may be funded with debt. However, the legal principle involved applies much more clearly to the existing debt than to future debt. In other words, new development should not have to pay for the Fire Protection facilities it will require in the growth areas, while also having to help repay debt on existing fire-related facilities and equipment serving existing development. Consequently, the impact fee should be reduced to account for the amount that new development will pay to retire the debt on existing facilities in order to avoid double-payment issues.

In this update, the secondary property tax offset is based on the outstanding city-wide debt for Fire Protection facilities and the existing city-wide fire service units. This approach avoids double-payment issues and creates a uniform offset per EDU for all land uses. Outstanding fire-related debt issues are summarized in Table 23.

Table 23. Outstanding Fire Protection-Related Bond Issues

Series	Original Principal	Bonds Outstanding
Fire 1995A	$610,000	$170,000
Fire 2002B	$3,000,000	$2,390,000
Fire 2004	$23,000,000	$14,165,000
Fire 2005B	$17,000,000	$11,170,000
Fire 2007B	$300,000	$300,000
Fire 2007A	$12,500,000	$12,500,000
Fire 2007A	$8,700,000	$8,700,000
Subtotal, Fire Debt	$65,110,000	$49,395,000
2002B	$51,500,000	$14,515,000
2004	$33,000,000	$25,125,000
2004R	$7,300,000	$1,960,000
2005B	$30,000,000	$20,000,000
2007A	$4,300,000	$4,300,000
2007B	$21,110,000	$21,110,000
Subtotal, Fire/Police/Tech Debt	$147,210,000	$87,010,000
Total Fire-Related Debt	**$212,320,000**	**$136,405,000**

Source: Outstanding secondary property tax funded debt series, original principal and outstanding balance provided by City of Phoenix Finance Administration, February 20, 2009.

A portion of the outstanding debt issues shown in Table 23 were used to fund police facilities and technology upgrades and projects for non-fire facilities. Since the exact allocation of the joint debt issues cannot be determined, this study includes an analysis of all existing Fire Protection facilities that were funded in whole or in part with secondary property tax in the CIP over the past 25 years (see Table 164, Appendix D: Fire Protection Facilities). Based on this analysis, the City of Phoenix has utilized $99.2 million in secondary property tax bonds for fire-related projects.

The secondary property tax offset is based on the fire facility share of outstanding secondary property tax bonds that have been utilized for Fire Protection facilities. As shown in Table 24, approximately 47 percent of the fire-related debt was utilized for Fire Protection facilities. Based on the outstanding fire-related bond issue principal, the Fire Protection facility share of fire-related debt and existing city-wide EDUs, the secondary property tax offset is per EDU. As with all secondary property tax offset calculations in this study, city-wide service units are utilized in the calculation, since the debt will be repaid by city-wide property tax payers and not just those residing in the impact fee service areas.

Table 24. Fire Protection Debt per Service Unit

Total Orig. Cost of Existing Debt-Funded Fire Facilities	$99,215,377
÷ Total of Original Principal Fire-Related Debt	$212,320,000
Fire Facility Share of Fire-Related Debt	46.7%
x Fire-Related Bonds Outstanding	$136,405,000
Outstanding Fire Facility Debt	$63,701,135
÷ Existing City-Wide EDUs	738,774
Outstanding Fire Debt per EDU	**$86**

Source: Existing debt-funded facilities from Table 164, Appendix C; total of original Fire Protection-related debt principal and fire-related bonds outstanding from Table 23; existing city-wide EDUs from Table 159.

Potential Net Fee per EDU

The potential net Fire Protection impact fee schedule for each service area is calculated by subtracting the offset per EDU from the gross cost per EDU. That figure is then multiplied by the EDU factor to determine the potential net fee per type of use. These calculations are shown in Table 25.

Table 25. Potential Net Fee per EDU, Fire Protection

	Northern Growth Area	Estrella/ Laveen	Ahwatukee
Gross Cost per EDU	$414	$379	$680
– Secondary Property Tax Offset per EDU	-$86	-$86	-$86
Potential Net Fee per EDU	**$328**	**$293**	**$594**

Source: Gross cost per EDU from Table 22 secondary property tax offset per EDU from Table 24.

Recommended Fire Protection Impact Fee Schedule

The recommended Fire Protection impact fee schedule would normally be calculated using the potential net fees as calculated in Table 25. However, recently imposed State regulations currently prohibit an increase in existing impact fees. Therefore, the existing net impact fees per EDU are compared with the potential net fees per EDU in Table 26 Since the potential net fee is more than the adopted fee for the Ahwatukee service area, an adjustment factor is required.

Table 26. Recommended Net Impact Fee / EDU, Fire Protection

	Northern Growth Area	Estrella/ Laveen	Ahwatukee
Adopted Net Fee per EDU	$328	$310	$372
Potential Net Fee per EDU	$328	$293	$594
Recommended Net Fee per EDU	**$328**	**$293**	**$372**
Adjustment Factor	100.00%	100.00%	62.63%

Source: Adopted net fees per EDU from City of Phoenix Code of Ordinances, Chapter 29, adopted May, 2011; potential net fee per EDU from Table 25.

It should be noted that, upon the end of the State-imposed moratorium on increases to adopted impact fees, the City Council may choose to adopt a revised impact fee schedule based on the Potential Impact Fee Schedules without any further revision to this document.

Fire Protection Improvements Plan

The portion of the cost of future fire protection capital improvements in each service area attributable to new development and the potential revenue from Fire Protection impact fees if adopted at the full net cost should be the identical amount, because the fees are calculated to cover the growth-related cost. Any additional cost not covered by potential impact fee revenue is not attributable to existing development in the service area – this would only be the case if the fees were based on a higher level of service than currently exists, in which case the deficit would be attributable to an existing capacity deficiency. The fees calculated in this report have been based on the total (combine) level of service or the cost to construct remaining improvements, whichever is less. For this reason, any cost not covered by potential impact fee revenue is for improvements that will raise the level of service for, and benefit, both existing and new development in the service area. Consequently, no additional offset against the impact fees is warranted for any additional non-impact fee funding used to pay for needed fire capital improvements in the impact fee service areas.

The growth share of future costs, which is the same as potential impact fee revenue, is the product of the net cost per service unit and the number of future service units from now to build-out. Potential impact fee revenue for each of the three service areas is shown in Table 27.

Table 27. Potential Fire Protection Impact Fee Revenue

	Northern Growth Area	Estrella/ Laveen	Ahwatukee
Net Cost per EDU	$328	$293	$372
x New EDUs, 2009-Buildout	163,348	78,770	3,107
Potential Impact Fee Revenue	**$53,578,144**	**$23,079,610**	**$1,155,804**

Source: Net cost per EDU from Table 26; new EDUs from Table 11.

The fire improvements plan for all three service areas is shown in Table 28. The improvements plan provides a list of planned capital improvements and other expenditures that are eligible to be funded by the impact fees. Eligible expenditures include capacity-expanding Fire Protection facility improvements and equipment funded in the 2009-2013 Capital Improvement Program (CIP) and beyond 2013 through build-out. In addition to the planned facility and equipment costs, eligible expenditures include debt repayment for newly constructed facilities that have the capacity to serve future growth. In addition, the planned expenditures are adjusted to reflect the impact fee account balance for each service area.

Projects not currently in the five-year CIP will be programmed by the City Council in future CIPs based on need and will depend on availability of funding. If the Fire Protection impact fee is adopted at the full potential impact fee schedule calculated in this report, a portion of the planned improvements in each service area will still need to be funded by other revenue sources. The mix of funding sources available to fund necessary public services beyond the portion covered by the impact fees calculated in this report will be determined by the actions of future City Councils in prioritizing projects, allocating funding in future Capital Improvement Programs and the availability of impact fee revenue in each service area. This study does not include a specific estimate of the time required to finance and provide the necessary public services between 2013 and build-out for each service area, since the build-out of each impact fee service area will vary depending on market conditions and availability of land for new development.

Table 28. Fire Protection Improvements Plan

Fire Facility	FY 2009-2013	Beyond 2013	Total
Unnamed Future Fire Stations	$0	$48,302,700	$48,302,700
Fire Equipment/Apparatus	$0	$6,829,360	$6,829,360
Fire Station 72--Equipment	$855,000	$0	$855,000
Fire Station 72--Facility	$2,508,660	$0	$2,508,660
Fire Station 55--Equipment	$930,000	$0	$930,000
Fire Station 55--Facility	$7,096,320	$0	$7,096,320
Outstanding Debt on Station 52	$0	$1,826,949	$1,826,949
Total Planned Expenditures, Northern Growth Area	$11,389,980	$56,959,009	$68,348,989
– Impact Fee Fund Balance			-$696,244
Total Future Costs			$67,652,745
– Growth Costs & Potential Impact Fee Revenue			-$53,578,144
Additional Funding Requirement, Northern Growth Area			**$14,074,601**
Unnamed Future Fire Stations	$0	$14,685,235	$14,685,235
Fire Equipment/Apparatus	$0	$1,957,744	$1,957,744
Fire Station 59--Equipment	$1,404,000	$0	$1,404,000
Fire Station 59--Facility	$6,914,240	$0	$6,914,240
Fire Station 62--Equipment	$150,000	$0	$150,000
Fire Station 62--Facility	$2,126,771	$0	$2,126,771
Outstanding Debt on Station 57	$0	$4,882,799	$4,882,799
Total Planned Expenditures, Estrella/Laveen	$10,595,011	$21,525,778	$32,120,789
– Impact Fee Fund Balance			-$2,255,526
Total Future Costs			$29,865,263
– Growth Costs & Potential Impact Fee Revenue			-$23,079,610
Additional Funding Requirement, Estrella/Laveen			**$6,785,653**
Fire Equipment/Apparatus	$0	$156,436	$156,436
Fire Station 74--Equipment	$694,000	$0	$694,000
Fire Station 74--Facility	$5,200,346	$0	$5,200,346
Outstanding Debt on Station 43	$0	$4,532,929	$4,532,929
Total Planned Expenditures, Ahwahtukee			$10,583,711
– Impact Fee Fund Balance			-$185,326
Total Future Costs			$10,398,385
– Growth Costs & Potential Impact Fee Revenue			-$1,155,804
Additional Funding Requirement, Ahwatukee			**$9,242,581**

Source: 2009-2013 project cost based on total programmed project expenditure in the City of Phoenix *2009-2013 Capital Improvement Program*; total project costs, outstanding debt and impact fee fund balances from Table 17; growth cost/potential impact fee revenue from Table 27.

INFRASTRUCTURE IMPROVEMENTS PLAN: LIBRARIES

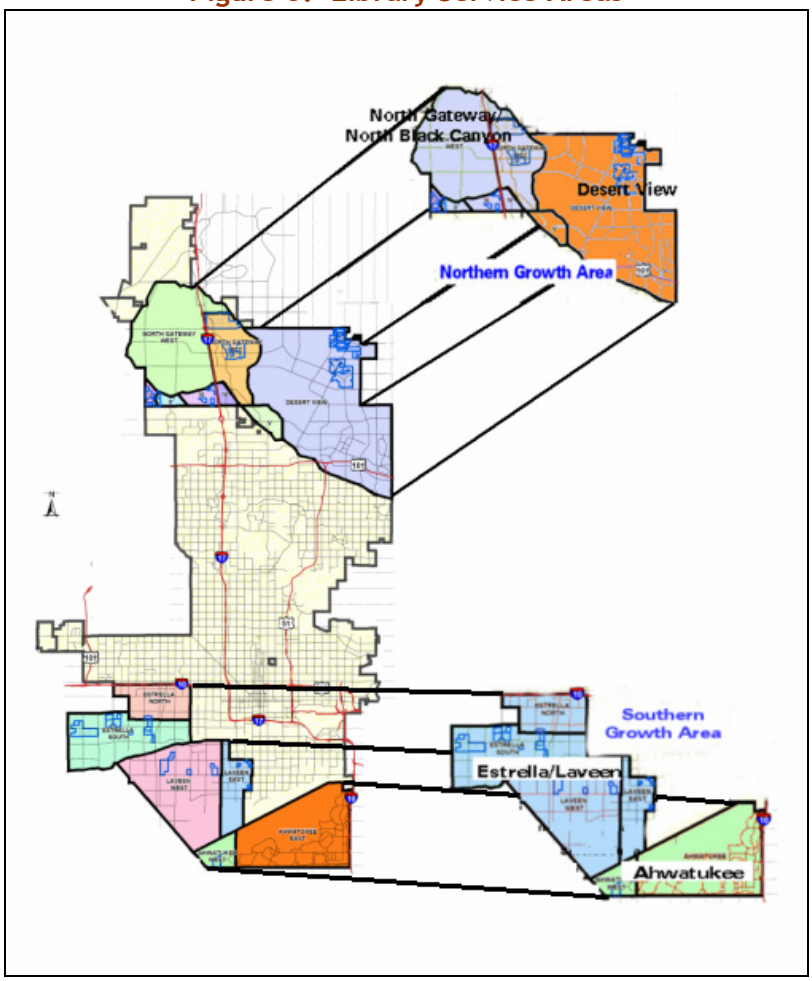
The City of Phoenix has a comprehensive library system with a central library and 15 neighborhood branch libraries. Library facilities offer residents of the City free access to collection materials, public-use computers and periodicals, along with providing space for meetings and civic events. The City's Libraries impact fee funds the construction of branch libraries and, in the past, has funded collection materials in the City's northern and southern growth areas. The existing library facilities are shown in Figure 7, and a detailed inventory of existing branch library facilities is provided in Table 33.

Figure 7. Existing Library Facilities

Service Areas

The Libraries impact fee is charged in all areas of the Northern and Southern Growth Areas, with both of these growth areas currently divided into two service areas. The Northern Growth Area service areas include North Gateway and Desert View; the Southern Growth Area service areas include Estrella/Laveen and Ahwatukee. Given that the Libraries impact fee is used to fund branch libraries, which serve relatively small geographic areas, the existing service areas assure that impact fee funds are spent in reasonable proximity to the development that pays the fee. The Libraries impact fee service areas are shown in Figure 8.

Figure 8. Library Service Areas



Methodology

As in the past, the methodology used to calculate the Libraries impact fee is based on the facilities that will be needed to serve new development in the growth area. As with the other fees in this report, the new facilities that will be needed are based on the build-out conditions rather than a specific planning horizon. To ensure that the final increment of development in each service area does not bear more than its share of the planned improvements, this study includes a level of service analysis for each service area.

Service Units

As with the other impact fee calculations, the demand for library facilities is calculated using an EDU factor that relates facility demand for each land use to the demand of a single-family detached residence. The EDU factors used in the determining past impact fees for libraries were derived from data on library usage, vacancy rates, persons per household and employees per 1,000 square

feet. The library usage data were developed by an outside consultant based on user surveys conducted in 1998 and were used to estimate the relative per-capita likelihood of library usage for each land use.[2] This plan utilizes a service unit that avoids the need to update the out-of-date usage survey or make assumptions about library usage and vacancy rates among different types of units.

Service Unit Multipliers

For this update, the City utilizes both residential and nonresidential service units in developing the total service units from which the fees are derived. The Functional Population provides a more consistent and simpler approach to allocating Libraries costs across all land uses based on the number of "full-time equivalent" people present at the site of a land use. The Libraries service units are therefore based on the functional population analysis presented in Appendix B.

The EDU factors used for developing the impact fee calculation are shown in Table 29. The Libraries impact fee is assessed for both residential and nonresidential land uses.

Table 29. Libraries Service Unit Multipliers

Land Use	Unit	EDUs/Unit
Single-Family, Detached	Dwelling	**1.00**
Multi-Family	Dwelling	**0.76**
Mobile Home/RV Park	Space	**0.85**
Retail	1,000 sq. ft.	**0.55**
Office	1,000 sq. ft.	**0.63**
Public/Institutional	1,000 sq. ft.	**0.61**
Industrial	1,000 sq. ft.	**0.49**

Source: Residential functional population EDUs per unit from Table 157; nonresidential functional population EDUs per unit from Table 158.

Existing and Future Service Units

To determine the cost per service unit using the plan-based methodology, the planned improvement costs are divided by the projected growth in service units over the planning horizon. As shown in Table 30, development in the growth areas is expected to add almost 245,224 EDUs through build-out, while city-wide growth is expected to add 524,132 EDUs.

Table 30. Existing and Build-Out Libraries Service Units

	Build-Out	Existing	New
North Gateway / Deer Valley I - IV	87,555	8,891	78,664
Desert View / Deer Valley V	105,135	20,452	84,683
Estrella/Laveen	119,457	40,687	78,770
Ahwatukee	40,496	37,389	3,107
Subtotal, Growth Areas	352,643	107,419	245,224
+ Non-Growth Area	910,263	631,355	278,908
City-Wide Total	**1,262,906**	**738,774**	**524,132**

Source: Build-out service units from Table 160; existing service units from Table 159.

[2] Hausrath Economics Group, *Phoenix Park and Library EDU Factors*, September 1998.

Planned Improvements

The City plans to build four more branch libraries in the growth areas – one in each of the four Libraries impact fee service areas. All four library sites have been acquired. The new Agave branch in the North Gateway service area is a 25,000 square foot building on a 3.84-acre site. The planned new branch libraries in Desert View and Ahwatukee will also be 25,000 square feet, while the new Estrella/Laveen branch will be 15,000 square feet. All three of these planned libraries will be on three-acre sites already owned by the City.

The construction and related design and permit costs for the Agave Branch Library in North Gateway are used to develop the cost per square foot for libraries in this study. As shown in Table 31, the library construction cost is $321 per square foot. However, construction costs have been falling in the Phoenix area. According to the construction cost index for Phoenix prepared by the international real estate and construction firm Rider Levett Bucknall (RLB), total building costs in Phoenix, including materials, labor, profit and taxes and fees, fell by 6.3 percent from October 1, 2008 to April 1, 2009. While the Agave Branch costs represent current actual costs for that facility, a new construction contract entered into today may cost less. To acknowledge this possibility, the cost per square foot is adjusted downward.

Table 31. Library Construction Cost per Square Foot

Design/Engineering/Permits	$1,197,637
Construction	$7,374,081
Total Construction Cost	$8,571,718
÷ Square Feet	25,000
Original Cost per Square Foot	$343
x Phoenix Cost Index (Apr 2009/Oct 2008)	0.937
Adjusted Cost per Square Foot	**$321**

Source: City of Phoenix Library Department, Agave Library budget status report, December 15, 2008; adjustment factor is ratio of April 1, 2009 to October 1, 2008 construction cost index for Phoenix from *RLB Quarterly Construction Cost Report*.

As noted above, all of the future library sites have already been purchased, so there are no planned expenditures for land acquisition. No collection materials, equipment, or appurtenances are included in the costs in accordance with State statutes.

Planned Cost per Service Unit

The plan-based cost per service unit is developed by dividing the planned improvement costs by the projected growth in service units through build-out. In addition to future improvement costs, principal payments on outstanding debt used to build existing libraries within each service area are also a future cost. These future expenditures are NOT reduced to account for cash balance available in the Libraries impact fee funds, since the funds may be used to complete different capital facilities included in a prior version of this plan. The results are shown in Table 32.

Table 32. Plan-Based Library Cost per Service Unit

Cost Element	N. Gateway/ DV 1-4	Desert View/ DV 5	Estrella/ Laveen	Ahwatukee
Planned New Building Sq. Ft.	25,000	25,000	15,000	25,000
Maximum Permitted SF	10,000	10,000	10,000	10,000
x Cost per Sq. Foot	$321	$321	$321	$321
Planned Building Cost	$3,210,000	$3,210,000	$3,210,000	$3,210,000
Outstanding Debt	$0	$5,443,459	$5,292,165	$0
Total Planned Expenditures	$3,210,000	$8,653,459	$8,502,165	$3,210,000
÷ New EDUs	78,664	84,683	78,770	3,107
Plan-Based Cost per EDU	**$41**	**$102**	**$108**	**$1,033**

Source: Planned building sq. ft. from City of Phoenix Library Department, June 9, 2009; construction cost per square foot from Table 31; outstanding debt on existing libraries in each service area from City of Phoenix Budget and Research Department, June 10, 2009; new EDUs from Table 30.

Level of Service Analysis

This study examines the existing provision of library facilities relative to existing development in order to ensure that the impact fees for libraries are not based on a higher level of service than currently provided to residents of the service areas. To start this process, we must analyze the inventory of existing library facilities within the City. The existing city-wide inventory of branch library facilities and site acreages is presented in Table 33.

Table 33. Existing City-Wide Branch Libraries

Library	Building (Sq. Ft.)	Land (Ac.)
Burton Barr Central Library*	56,000	1.59
Acacia Library	6,600	1.42
Century Library	6,500	1.52
Cholla Library	30,000	0.69
Desert Sage Library	13,400	2.30
Harmon Library	12,300	1.40
Ironwood Library (Ahwatukee)	15,000	2.10
Juniper Library	14,435	1.43
Mesquite Library	19,875	1.90
Ocotillo Library	6,600	1.35
Palo Verde Library	16,000	1.40
Saguaro Library	10,500	2.00
Yucca Library	10,000	1.00
Desert Broom Library (Desert View)	15,000	3.00
Cesar Chavez Library (Estrella/Laveen)	25,000	3.63
Agave Library (N Gateway-under const.)	0	3.84
Future Desert View Branch	0	3.00
Future Estrella Laveen Branch	0	3.00
Future Ahwatukee Branch	0	3.00
Total	257,210	39.57

*Branch portion of central library facility only.
Source: City of Phoenix Library Department, December 15, 2008.

As with the Fire Protection and Police impact fee calculations, the land costs used in this update are based on recent City land purchases and an analysis by professional real estate appraiser.

The inventory of existing library facilities in each service area and the unit costs used in developing the plan-based fee are used to determine the building and land replacement costs. Total facility and land cost for each service area, not including collection materials, equipment, or appurtenances, is calculated for each service area, and the existing impact fee account balances are added to the value of facilities because these cash funds have been paid by existing development. There is no existing branch library building in North Gateway, but the land has been purchased and there is a significant balance in the Libraries impact fee account. As shown in Table 34, the level of existing library investment is highest in Estrella/Laveen and lowest in North Gateway.

Table 34. Existing Library Investment in Impact Fee Service Areas

	N. Gateway/ DV 1-4	Desert View/ DV 5	Estrella/ Laveen	Ahwatukee
Existing Building	0	15,000	25,000	15,000
x Cost/Sq. Ft.	$321.00	$321.00	$321.00	$321.00
Building Replacement Cost	$0	$4,815,000	$8,025,000	$4,815,000
Existing Land	3.84	6.00	6.63	5.10
x Cost/Acre	$158,266	$237,399	$134,526	$182,006
Land Replacement Cost	$607,741	$1,424,394	$891,907	$928,231
Total Replacement Cost	$607,741	$6,239,394	$8,916,907	$5,743,231
+ Existing Impact Fee Balance	$1,913,005	$1,369,400	$4,046,676	$440,658
Total Existing Investment Value	**$2,520,746**	**$7,608,794**	**$12,963,583**	**$6,183,889**

Source: Existing branch library square feet and acres from Table 33; building cost per sq. ft. from Table 31; land cost per acre from Table 163; existing fee balance from City of Phoenix Planning Department and based on January 2009 balance; new EDUs from Table 30.

The total investment based on the existing provision of branch libraries, and impact fees already paid, is then added to the cost of future planned improvements to find the total library expenditures for each service area. The total library expenditures are then divided by the total service area EDUs (both existing and future) to determine the total library expenditure per EDU in each of the growth areas, as shown in Table 35.

Table 35. Total (Combined) Library Expenditures per EDU

	N. Gateway/ DV 1-4	Desert View/ DV 5	Estrella/ Laveen	Ahwatukee
Total Existing Investment Value	2,520,746	7,608,794	12,963,583	6,183,889
Planned Expenditures	$3,210,000	$8,653,459	$8,502,165	$3,210,000
Total Library Expenditures	$5,730,746	$16,262,253	$21,465,748	$9,393,889
÷ Total Service Area EDUs	87,555	105,135	119,457	40,496
Total (Combined) Cost per EDU	**$65**	**$155**	**$180**	**$232**

Source: Total existing investment value from Table 34; planned expenditures from Table 32; total service area EDUs from Table 30.

Gross Cost per EDU

In order to determine the potential gross fee per EDU for each service area, the total (combined existing investment plus future planned expenditures) cost per EDU is compared to the plan-based cost per EDU for each service area. To make sure that new development is not paying for a higher level of service than existing development, the lower of the two amounts is selected to determine the

gross impact fee for each service area. As shown in Table 36, in all service areas except Ahwatukee, the selected amount is the plan-based cost per EDU.

Table 36. Comparison of Total (Combined) Costs and Plan-Based Costs per Service Area

	N. Gateway/ DV 1-4	Desert View/ DV 5	Estrella/ Laveen	Ahwatukee
Total (Combined) Cost / EDU	$65	$155	$180	$232
Plan-Based Cost per EDU	$41	$102	$108	$1,033
Gross Cost/EDU	**$41**	**$102**	**$108**	**$232**

Source: Combined level of service cost from Table 35; plan-based cost per EDU from Table 32.

Offsets

Before determining an actual impact fee schedule, offsets must be taken into consideration. An offset is applied for any other type of revenue dedicated to paying for a portion of the same improvements funded by impact fees, which includes future tax payments that will retire outstanding debt used to develop the existing libraries.

Secondary Property Tax Offset

The Libraries impact fee calculations include an offset to reflect the share of growth-related libraries that have been funded though bonds that will be repaid through the secondary property tax. In this update, the secondary property tax offset is based on the outstanding city-wide debt for library facilities and the existing City-wide library service units. This approach avoids double payment issues and creates a uniform offset per EDU for all land uses.

The debt offset per EDU represents the expenditure of property tax proceeds that will be used to repay outstanding library facility debt from prior bond-funded land and and building improvements, but subtracts out debt service to be paid from impact fee funds, as shown in Table 32. The secondary property tax offset for existing library debt is $49 per EDU, as calculated in Table 37.

Table 37. Library Debt per Service Unit

Series	Original Principal	Bonds Outstanding
1993A	$13,180,000	$1,225,000
1993C	$855,000	$40,000
1998	$33,595,000	$16,965,000
1999	$6,165,000	$3,135,000
2002A	$2,470,000	$2,470,000
2002B	$3,200,000	$3,200,000
2002B	$700,000	$700,000
2003	$3,215,000	$3,150,000
2004	$7,000,000	$7,000,000
2005B	$12,000,000	$12,000,000
2007A	$7,800,000	$7,800,000
2007A	$5,700,000	$5,700,000
2007B	$17,730,000	$17,730,000
Total Outstanding Bonds		$81,115,000
- Impact Fee Area Debt		$10,735,624
Total Outsdanding Library Debt		$70,379,376
÷ Existing City-wide EDUs		738,774
Total Library Debt Offset/EDU		$95
x % devoted to buildings and land		52%
Debt Offset per EDU		**$49**

Source: City of Phoenix Finance Administration, February 20, 2009 based on outstanding balance as of June 30, 2008; outstanding debt on libraries in the service areas (Desert Broom and Caesar Chavez) from City of Phoenix Budget and Research Department, June 10, 2009; % devoted to buildings and land derived from data provided by the City of Phoenix Library Department, December 15, 2008; city-wide EDUs from Table 30.

Potential Net Fee per EDU

The potential net cost per EDU for each service area is calculated by subtracting the offset per EDU from the gross cost per EDU, as shown in Table 38.

Table 38. Potential Net Fee per EDU, Libraries

	N. Gateway/ DV 1-4	Desert View/ DV 5	Estrella/ Laveen	Ahwatukee
Gross Cost/EDU	$41	$102	$108	$232
– Debt Offset / EDU	-$49	-$49	-$49	-$49
Potential Net Fee / EDU	**$0**	**$53**	**$59**	**$183**

Source: Gross costs from Table 35; debt offset from Table 37.

Recommended Libraries Impact Fee Schedule

Because the potenial net Libraries impact fees are all less than the current adopted net impact fee per EDU for each service area, the recommended net Libraries impact fees are the same as the potential net fees The current adopted impact fees are compared with the selected cost per EDU in Table 39. area.

Table 39. Recommended Net Impact Fee / EDU, Libraries

Cost Element	N. Gateway/ DV 1-4	Desert View/ DV 5	Estrella/ Laveen	Ahwatukee
Adopted Net Fee / EDU	$143	$166	$46	$237
Potential Net Fee / EDU	$0	$53	$59	$183
Recommended Net Fee/EDU	**$0**	**$53**	**$46**	**$183**
Adjustment Factor	100.00%	100.00%	77.97%	100.00%

Source: Adopted net fees per EDU from City of Phoenix Code of Ordinances, Chapter 29, adopted May, 2011; potential net fee per EDU from Table 38.

It should be noted that the primary cause for the large reduction in the fees are the the inclusion of the non-residential EDU's in the calculations for this update. Prior to the approval of Senate Bill 1525, which requires that all impact fees be charged to all types of development, the Libraries impact fees were charged only to residential development.

Libraries Improvements Plan

The portion of the cost of future library capital improvements in each service area attributable to new development and the potential revenue from Libraries impact fees if adopted at the recommended cost per EDU for each service area should be the identical amount, because the fees are calculated to cover the growth-related cost. Any additional cost not covered by potential impact fee revenue is either attributable to existing development in the service area or, in this case, to limitations imposed by State statute on impact fee funding of capital facilities for libraries.

The growth share of future costs, which is the same as potential impact fee revenue, is the product of the net cost per service unit and the number of future service units from now to build-out. Potential impact fee revenue for each of the four service areas is shown in Table 40.

Table 40. Potential Libraries Impact Fee Revenue

	N. Gateway/ DV 1-4	Desert View/ DV 5	Estrella/ Laveen	Ahwatukee
Net Cost per EDU	$0	$53	$46	$183
New EDUs, 2009-Buildout	78,664	84,683	78,770	3,107
Potential Impact Fee Revenue	**$0**	**$4,488,199**	**$3,623,420**	**$568,490**

Source: Net cost per EDU from Table 39; new EDUs from Table 30.

The library improvements plan for all four service areas is shown in Table 41. The improvements plan provides a list of planned capital improvements and other expenditures that are eligible to be funded by the impact fees. The plan for each service area reflects capacity-expanding improvements included in the City's 2009-2013 CIP. However, the improvements plan does not include the funding programmed in the CIP to acquire library sites in Ahwatukee and North Gateway and completion of the Cesar Chavez library in Laveen, since these facilities were have been largely completed and are reflected in the existing level of service. The future costs are adjusted to reflect outstanding debt, but not to include existing impact fee fund balances, since those funds may be used to fund items approved in previous versions of this Infrastructure Financing Plan, and may not be used for capital facilites included within this IFP.

Projects not currently in the five-year CIP will be programmed by the City Council in future CIPs based on need and will depend on availability of funding. If the Libraries impact fees are adopted at the full potential impact fee schedules calculated in this report, a portion of the planned improvements in each service area will still need to be funded by other revenue sources. The mix of funding sources available to fund necessary public services beyond the portion covered by the impact fee calculated in this report will be determined by the actions of future City Councils in prioritizing projects, allocating funding in future CIPs and the availability of impact fee revenue in each service area. This study does not include a specific estimate of the time required to finance and provide the necessary public services between 2013 and build-out for each service area, as the build-out for each impact fee service area is likely to vary depending on market conditions and availability of land for new development.

Table 41. Library Improvements Plan

Library Facility	Amount
Future Library Facility	$3,210,000
Total Planned Expenditures, N. Gateway/DV 1-4	$3,210,000
+ Outstanding Debt	$0
Total Future Costs	$3,210,000
– Growth Costs & Potential Impact Fee Revenue	$0
Additional Funding Requirement, N Gateway/DV 1-4	**$3,210,000**
Future Library Facility	$3,210,000
Total Planned Expenditures, Desert View/DV 5	$3,210,000
+ Outstanding Debt	$5,443,459
Total Future Costs	$8,653,459
– Growth Costs & Potential Impact Fee Revenue	-$4,488,199
Additional Funding Requirement, Desert View/DV 5	**$4,165,260**
Future Library Facility	$3,210,000
Total Planned Expenditures, Estrella/Laveen	$3,210,000
+ Outstanding Debt	$5,292,165
Total Future Costs	$8,502,165
– Growth Costs & Potential Impact Fee Revenue	-$3,623,420
Additional Funding Requirement, Estrella/Laveen	**$4,878,745**
Future Library Facility	$3,210,000
Total Planned Expenditures, Ahwatukee	$3,210,000
+ Outstanding Debt	$0
Total Future Costs	$3,210,000
– Growth Costs & Potential Impact Fee Revenue	-$568,490
Additional Funding Requirement, Ahwatukee	**$2,641,510**

Source: 2009-2013 project cost based on total programmed project expenditure in the City of Phoenix *2009-2013 Capital Improvement Program*; total project costs, outstanding debt from Table 32; growth costs/potential impact fee revenues from Table 40.

INFRASTRUCTURE IMPROVEMENTS PLAN: PARKS

The City has charged a Parks impact fee since 1988 to cover the cost of land acquisition, park development and associated improvements. The Parks impact fee is charged in all parts of the Northern and Southern Growth Areas, which are each divided into two parks service areas. As with the other impact fee categories, the City has a separate fee schedule for each service area.

The City of Phoenix Parks impact fee is based on the cost of recreational parkland and amenities, which include neighborhood parks, community parks, and community centers (up to 3000 sf).

The existing parks and the service area boundaries are illustrated for each growth area in Figure 9 and Figure 10. The Northern Growth Area map also shows the location of the Sonoran Preserve properties and future state and private land acquisition areas for the open space.

Figure 9. Northern Growth Area Parks and Service Area Boundaries

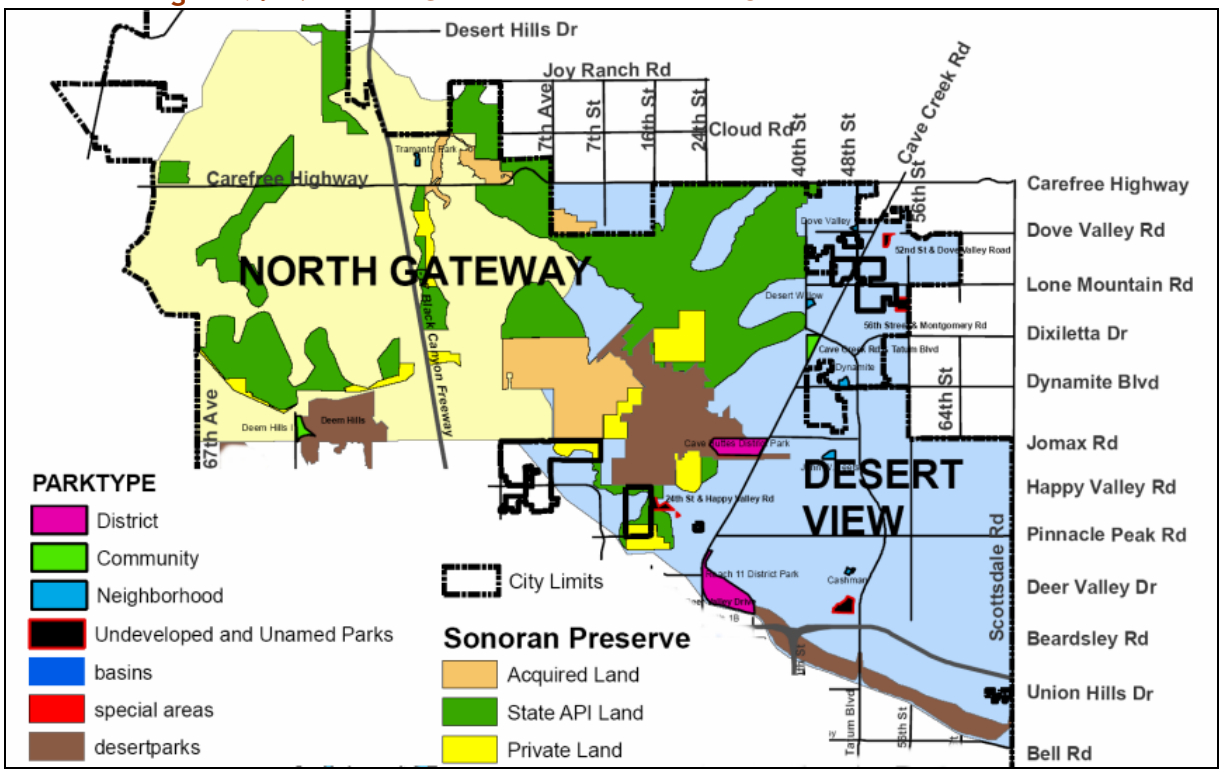
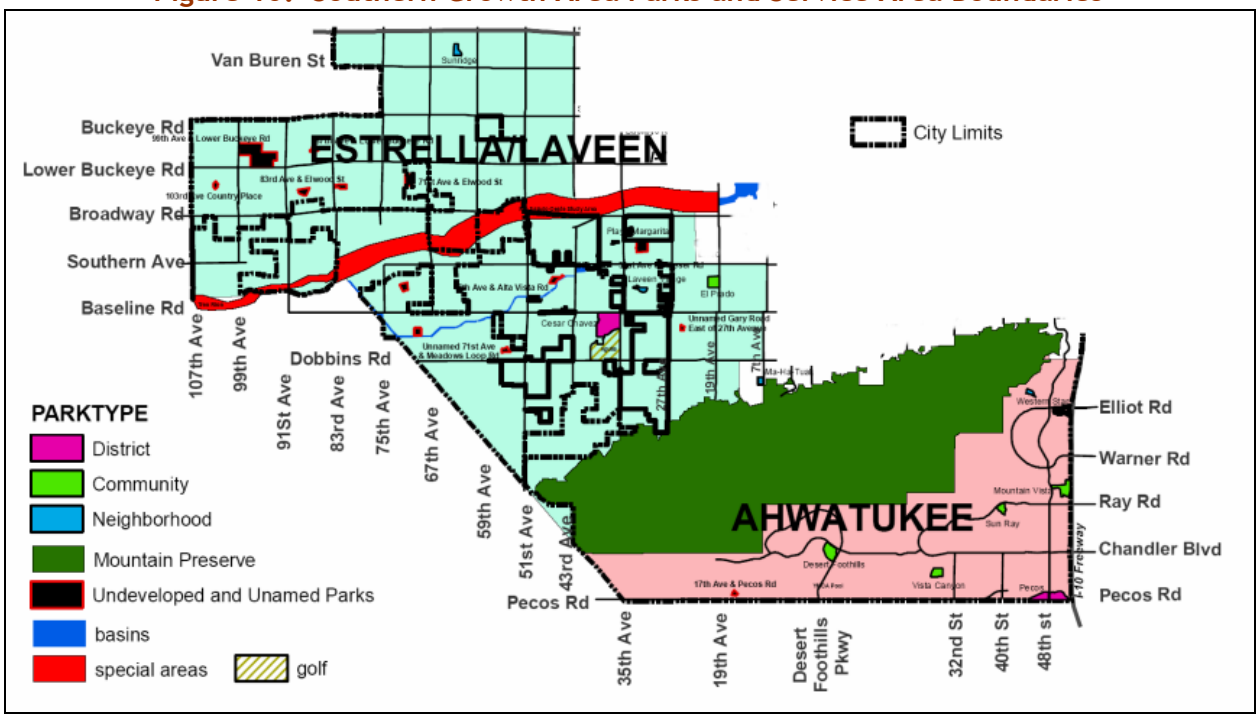


Figure 10. Southern Growth Area Parks and Service Area Boundaries



Service Area

The City of Phoenix charges impact fees for new residential, commercial, and industrial development that occurs in one of two general geographic areas, which are referred to as the Northern Growth Area and the Southern Growth Area. The parks components are charged throughout the Northern and Southern Growth Areas, each of which is currently divided into two service areas for the Parks impact fee—North Gateway and Desert View in the Northern Growth Area and Estrella/Laveen and Ahwatukee in the Southern Growth Area.

The City's four parks service areas roughly divide each of the Northern and Southern Growth Areas in half. Given that the City's parks fee includes neighborhood and community parks, the smaller service area and corresponding benefit districts assure that impact fee funds are spent in reasonable proximity to the development that pays the fees.

In addition, the differences in the land costs between the service areas support maintaining the current service area boundaries. Since additional park land will be purchased in each of the existing service areas, the difference in land costs between such areas is a relevant consideration. In order to determine the differences in land costs, the City retained a land appraiser to determine acquisition costs per acre for the three categories of parks and for trails. As shown in Table 42, the park land cost estimates for the Northern Growth Area differ by approximately 14 percent between the two service areas, while the Southern Growth Area land costs differ by approximately 23 percent.

Table 42. Park Land Costs

Park Type	Northern Growth Area			Southern Growth Area		
	N. Gateway	Desert View	Difference	Estrella/Laveen	Ahwatukee	Difference
District Park	$264,047	$226,807	14%	$166,197	$204,657	23%
Community Park	$293,386	$252,008	14%	$184,663	$227,397	23%
Neighborhood Park	$293,386	$252,008	14%	$184,663	$227,397	23%

Source: Brekan – Nava Group, *Land Cost Analysis for the Northern Development Impact Area* and *Land Cost Analysis for the Southern Development Impact Area,* December 1, 2007 and addendum from July 1, 2008.

Methodology

The City's 2006 calculations for the Parks impact fee were based on constructing facilities necessary to serve development in 2030, based on the planned level of service and land and facility development costs. However, the Parks impact fee is not based on a completely defined list of projects. Instead, the fees are based on the future demand for parks and the park planning service standards established for each facility type. The actual location of most future parks cannot be determined at this time because they will be located in growth areas as they develop and their actual location will depend on the availability of land and development patterns. The facility development costs are based on prototype facility costs and recent land acquisition cost estimates.

The City's approach to developing the impact fee in 2006 utilized total future service units expected to be in the service area in 2030, rather than the expected new growth in service units that will be added through 2030 due to new development. The City's approach allocated the cost of developing the remaining park facility needs to the total future service units. However, since the planned parks acquisitions and improvements are designed to serve new growth rather than existing development, the fee should be based on the cost to serve new growth. In addition, the planned improvements should be based on the projected growth through build-out in order to be consistent with the calculations for other fee categories.

The demand for future park facilities creates the basis upon which the proposed park impact fee is calculated. The facility demand is based on park planning service standards and population projections for each service area, which is then adjusted to reflect the existing parks within each service area. In the 2006 update, the City utilized park planning service standards for determining the future park demand in each service areas. The park planning service standards were based on the total number of residential EDUs per park acre, and used the following residential EDUs per acre: 150 EDUs per acre for neighborhood parks, 300 EDUs per acre for community parks, and 26,000 EDUs per community center.

This update incorporates revised planning standards created to reflect the addition of non-residential EDUs to the calculations. The consensus of City staff and the Ad Hoc committee was that the assessment the Parks impact fee to non-residential EDUs would not actually increase the need for additional park facilities, as previously determined by the 2006 park planning service standards. However, when including non-residential EDUs in the calculations, the total number of EDUs increases from 248,760 (residential only) to 451,419 (all types) at buildout—an almost two-fold increase. Therefore, in order to end up with the same demand for park facilities, the parks planning service standards were revised for this update, as follows:

- 300 EDUs per acre for neighborhood parks
- 600 EDUs per acre for community parks
- 50,000 EDUs per community center (limited to 3,000 sf).

It also should be noted that district parks (± 100 acres in size) have been excluded from this update due to changes in Arizona statutes regarding impact fee funding of park facilities larger than 30 acres.

Regardless of the planning service standard used in developing parks, an impact fee may not charge new development for a higher level-of-service than is provided to existing residents. The degree to which the City has been able to achieve the planning service standard for each service area is measured against the actual level-of-service as part of the impact fee level of service analysis in this study. The level of service analysis in this study examines the provision of existing parks in the impact fee service areas, and in turn evaluates the total level of service for each service area (existing facilities + planned facilities provided to both existing and future development) in order to ensure that the impact fees are not based on a higher level of service than currently provided to residents in the service areas. The total cost per service unit for parks consists of two components: the cost of land and the cost of improvements. The updated component costs for land and improvements used in calculating the impact fee will be applied to the existing park land to determine the total replacement value of the existing park system.

Service Units

As with the other impact fee calculations, the demand for parks are calculated using an EDU factor that relates facility demand for each land use to the demand of a single-family detached residence. The EDU factors used in prior fee calcuations for parks were derived from data on park usage, vacancy rates, persons per household and employees per 1,000 square feet. The park usage data were developed by an outside consultant based on user surveys conducted in 1998 and were used to estimate the relative per-capita likelihood of park usage for each land use.[3] This plan utilizes a service unit that avoids the need to update the 1998 park usage survey or make assumptions about park usage and vacancy rates among different types of units.

Service Unit Multipliers

For this update, the City utilizes both residential and nonresidential service units in developing the total service units from which the fees are derived. The Functional Population provides a more consistent and simpler approach to allocating Parks costs across all land uses based on the number of "full-time equivalent" people present at the site of a land use. However, the Ad Hoc committee did express some concern that this method did not work as well to determine proportionate share for parks facilities as it does other necessary public services, so the eventual calculations have been adjusted to address the Ad Hoc committee's concerns. However, to start with, the Parks service units are based on the functional population analysis presented in Appendix B.

[3] Hausrath Economics Group, *Phoenix Park and Library EDU Factors*, September 1998.

The EDU factors used for developing the impact fee calculation are shown in Table 43. The Parks impact fee is assessed for both residential and nonresidential land uses.

Table 43. Parks Service Unit Multipliers

Land Use	Unit	EDUs/Unit
Single-Family, Detached	Dwelling	**1.00**
Multi-Family	Dwelling	**0.76**
Mobile Home/RV Park	Space	**0.85**
Retail	1,000 sq. ft.	**0.55**
Office	1,000 sq. ft.	**0.63**
Public/Institutional	1,000 sq. ft.	**0.61**
Industrial	1,000 sq. ft.	**0.49**

Source: Residential functional population EDUs per unit from Table 157; nonresidential functional population EDUs per unit from Table 158.

Existing and Future Service Units

To determine the cost per service unit using the plan-based methodology, the planned improvement costs are divided by the projected growth in service units over the planning horizon. As shown in Table 44, development in the growth areas is expected to add almost 0.25 million EDUs through build-out, while city-wide growth is expected to add 0.52 million EDUs.

Table 44. Existing and Build-Out Parks Service Units

	Build-Out	Existing	New
North Gateway / Deer Valley I - IV	87,555	8,891	78,664
Desert View / Deer Valley V	105,135	20,452	84,683
Estrella/Laveen	119,457	40,687	78,770
Ahwatukee	40,496	37,389	3,107
Subtotal, Growth Areas	352,643	107,419	245,224
+ Non-Growth Area	910,263	631,355	278,908
City-Wide Total	**1,262,906**	**738,774**	**524,132**

Source: Build-out service units from Table 160; existing service units from Table 159.

Planned Improvements

The Parks impact fee includes community centers, community parks, and neighborhood parks. As noted earlier, the plan-based fee is based on the park planning service standards developed by the City for planning new parks in the growth areas and prototype park facility costs and land values rather than a specific list of planned park improvements. The future park demand in this study is updated to reflect the current inventory of park facilities for each service area and updated land-use projections for each growth area. The inventory of existing park facilities for each service area is presented in Appendix E, and the land use data are provided in Appendix A.

Community Centers

Community centers may be located in any type of City park facility. The planning standard for each community center facility is one for each 50,000 EDUs. Community centers offer social programs and recreational facilities. As shown in Table 45, based on the level of service standards the City will need to construct community centers in each of the service areas. However, impact fee funding of community centers is limited by State statute; currently only up to 3000 sf may be funded by impact fees. This restriction will be taken into account when calculating the costs.

Table 45. Community Center Demand

Growth Area	Build-Out EDUs	EDUs per Facility	Demand	Existing	Future Need
North Gateway	87,555	50,000	2	0	2
Desert View	105,135	50,000	2	0	2
Estrella/Laveen	119,457	50,000	2	0	2
Ahwatukee	40,496	50,000	1	0	1
Total, Community Centers			**7**	**0**	**7**

Source: Build-out EDUs from Table 44; demand based on City of Phoenix Park and Recreation Department planning standards for community centers and revised per the Impact Fee Ad Hoc Committee recommendations; existing community centers from City of Phoenix Parks and Recreation Department *A Guide to Facilities, Parks and Preserves—People Places*, 2006.

Community Parks

Community parks serve multiple neighborhoods within an area of a one and one-half mile radius. Community parks in Phoenix are typically up to 40 acres in size, and the City utilizes the planning standard of one acre for every 600 EDUs when planning community parks, when including both residential and non-residential EDUs. However, impact fee funding of parks and park facilities is limited by State statute to 30 acres in size, or larger if shown to provide a "direct benefit" to a development. For the purposes of impact fee funding, it will be assumed that the land and improvement area of any given community park will be limited to 30 acres in size.

As shown in Table 46, the City will need to acquire and develop additional community park land in both of the Northern service areas and Estrella/Laveen in order to maintain the planned service standards. The existing and developed community park land in Ahwatukee is sufficient to serve the future population of this service area.

Table 46. Community Park Demand

Growth Area	Build-Out EDUs	EDUs/Acre	Demand (Acres)	Existing Parks (Acres)		Future Need (Acres)	
				Land	Developed	Land	Dev't
North Gateway	87,555	600	146	64	28	82	118
Desert View	105,135	600	175	111	71	64	104
Estrella/Laveen	119,457	600	199	96	28	103	171
Ahwatukee	40,496	600	67	133	133	0	0

Source: Build-out EDUs from Table 44; demand based on City of Phoenix Park and Recreation Department planning standards and revised per the Impact Fee Ad Hoc Committee recommendations; existing park acres from Table 165 and Table 166.

Neighborhood Parks

Neighborhood parks serve areas within a one-half mile radius with up to 7,000 people, and they typically include passive and active recreational amenities and are generally 10 to 20 acres in size. The City utilizes a planning standard 300 EDUs per acre for neighborhood parks, when including both residential and non-residential EDUs As shown in Table 47, the City will need to acquire and develop additional neighborhood park land in each of the four service areas in order to achieve the City's neighborhood park planning standard.

Table 47. Neighborhood Park Demand

Growth Area	Build-Out EDUs	EDUs/Acre	Demand (Acres)	Existing Parks (Acres)		Future Need (Acres)	
				Land	Developed	Land	Dev't
North Gateway	87,555	300	411	12	12	399	399
Desert View	105,135	300	350	135	71	215	279
Estrella/Laveen	119,457	300	398	148	22	250	376
Ahwatukee**	40,496	300	20	17	10	3	10

**The demand for neighborhood parks in Ahwatukee was reduced to acknowledge the existing provision of park amenities in South Mountain Park, which is a unique benefit for the Ahwatukee service area.

Source: Build-out EDUs from Table 44 demand based on City of Phoenix Park and Recreation Department planning standards and revised per the Impact Fee Ad Hoc Committee recommendations; existing park acres from Table 165 and Table 166.

Planned Improvement Costs

The planned improvement costs are based on the demand for new facilities, park development costs and recent land acquisition cost estimates developed by a professional appraiser for each impact fee service area.

Land Cost

The City retained a professional appraiser to develop land cost estimates for each service area and capital facility category. The land cost estimates are based on the cost to purchase residentially zoned and platted land in each service area. As shown in Table 48, the changes in land costs vary among the service areas with land costs falling in Desert View/Deer Valley V and Ahwatukee, and increasing in North Gateway/Deer Valley I-IV and Estrella/Laveen.

Table 48. Park Land Value per Acre, 2006 to 2008

Service Area	Park Type	2006 Study	Current Value
North Gateway - Deer Valley I-IV	Neighborhood	$53,153	$293,386
	Community	$190,766	$293,386
Desert View - Deer Valley V	Neighborhood	$370,424	$252,008
	Community	$370,424	$252,008
Estrella/Laveen	Neighborhood	$113,874	$184,663
	Community	$113,874	$184,663
Ahwatukee	Neighborhood	$230,979	$227,397
	Community	$230,979	$227,397

Source: 2006 land value from City of Phoenix, *Infrastructure Financing Plan Appendices,* Appendix E, November 15, 2006; current value from Brekan - Nava Group, *Land Cost Analysis for the Northern Development Impact Area* and *Land Cost Analysis for the Southern Development Impact Area,* December 1, 2007 and July 1, 2008 addendum.

The park land acquisition costs through build-out are based on the amount of land that will need to be acquired to achieve the park planning standard for each park type and the updated land cost per acre in each service area.

This update includes a further reduction to the total land acquisition cost of 28 percent for each service area to reflect the current real estate market. The 28 percent reduction is based on a comparison by City staff of appraisals related to the acquisition South Mountain Parcel 620 from the State Land Department. As shown in Table 49, the adjusted land acquisition costs range from $0.5 million in Ahwatukee to $50.6 million in Desert View.

Table 49. Total Planned Park Land Acquisition Cost

	Northern Growth Area		Southern Growth Area	
	N. Gateway	Desert View	Estrella/Laveen	Ahwatukee
Land Cost/Acre	$293,386	$252,008	$184,663	$227,397
Future Need (Acres)	82	64	103	0
Subtotal, Community Park	$24,057,652	$16,128,512	$19,020,289	$0
Land Cost/Acre	$293,386	$252,008	$184,663	$227,397
Future Need (Acres)	399	215	250	3
Subtotal, Neighborhood Park	$117,061,014	$54,181,720	$46,165,750	$682,191
Total Land Cost	$141,118,666	$70,310,232	$65,186,039	$682,191
Land Value Adjustment (28%)	-$39,513,226	-$19,686,865	-$18,252,091	-$191,013
Adjusted Land Cost	**$101,605,440**	**$50,623,367**	**$46,933,948**	**$491,178**

Source: Land cost per acre from Table 48; future land acquisition need from Table 46 and Table 47; land adjustment based on reduction of 28% of total land value.

Facility Costs

The park land development costs are based on the cost to develop prototype park facilities. As part of the 2006 update, 3 D/I developed park development cost estimates for district, community and neighborhood parks based on a list of standard amenities. The standard amenities and other cost components used in developing the cost estimate are shown in Table 50.

Table 50. Prototype Park Amenities

Community Park	Neighborhood Park
2 Basketball Court (Lighted)	1 Basketball Court (Lighted)
2 Volleyball Court (Lighted)	1 Volleyball Court (Lighted)
1 Playground w/ Shade Canopy	1 Playground w/ Shade Canopy
2 Tennis Courts (Lighted)	2 Picnic Ramadas
Multi-Use Athletic Field (Lighted)	1 Restroom
5 Picnic Ramadas	Parking (20 Spaces)
1 Restroom	Landscape/Irrigate (20 Acres)
Parking (150 Spaces)	1/2 Street Improvements
Dog Park (2 Acres)	
Landscape/Irrigate (30 Acres)	
1/2 Street Improvements	

Source: Prototype amenities from 3 D/I, *Construction Cost Analyses and Recommendations for the City of Phoenix*, April 20, 2006.

For this update, the prototype development costs were adjusted to reflect construction cost inflation between January 2007 and January 2008. In addition to the assembly cost, the construction cost includes adjustments for fees, taxes, bond/insurance and construction management. The total cost also includes typical capital equipment necessary to maintain parks. As shown in Table 51, the cost per acre is $332,615 for a community park and $316,531 for a neighborhood park.

Table 51. Park Development Cost Per Acre

Cost Component	Community Park	Neighborhood Park
Assembly Cost	$8,677,669	$4,129,021
Construction Fee (6.30%)	$546,693	$260,128
Tax (5.27%)	$457,313	$217,599
Bond/Insurance (3.00%)	$260,330	$123,871
General Conditions (8.75%)	$759,296	$361,289
Design (8.00%)	$694,214	$330,322
Engineering (14.00%)	$1,214,874	$578,063
Construction Management (8.00%)	$694,214	$330,322
Total Cost	$13,304,603	$6,330,615
Acres	40	20
Cost per Acre	**$332,615**	**$316,531**

Source: Construction cost derived from 3 D/I, *Construction Cost Analyses and Recommendations for the City of Phoenix*, April 20, 2006 and updated to January 2008 value using ENR CCI.

As with the park land acquisition costs, park development costs through build-out are based on the amount of park land that will need to be developed to achieve the park planning standard for each park type and the development cost per acre in each service area. The total development costs in the Northern Growth Area are $165.5 million in North Gateway and $122.9 million in Desert View, while the total costs in the Southern Growth Area are $175.9 million in Estrella/Laveen and $3.2 million in Ahwatukee, as shown in Table 52.

Table 52. Total Planned Park Development Cost

	Northern Growth Area		Southern Growth Area	
	N. Gateway	Desert View	Estrella/Laveen	Ahwatukee
Development Cost/Acre	$332,615	$332,615	$332,615	$332,615
Future Need (Acres)	118	104	171	0
Subtotal, Community Park	$39,248,570	$34,591,960	$56,877,165	$0
Development Cost/Acre	$316,531	$316,531	$316,531	$316,531
Future Need (Acres)	399	279	376	10
Subtotal, Neighborhood Park	$126,295,869	$88,312,149	$119,015,656	$3,165,310
Total Development Cost	**$165,544,439**	**$122,904,109**	**$175,892,821**	**$3,165,310**

Source: Development cost per acre from Table 51; future need from Table 46 and Table 47.

Community Center Costs

In addition to standard amenities included in all typical parks, some parks have community center facilities. As with the other construction costs, these special amenity costs are based on prototype facility construction costs developed by 3D/I and updated with the construction cost index from

Engineering News-Record. As shown in Table 53, the community center construction cost of is based on the cost to develop the Paseo Highland Community Center, which includes a gymnasium, athletic equipment and locker rooms; however the costs have been adjusted to reflect the funding limitation of 3000 sf. The community center cost also excludes the cost to develop the neighborhood police substation located in the same building as the Paseo Highland Community Center.

Table 53. Community Center Construction Cost

Cost Component	Community Center (49,000 sf prototype)	Community Center (adjusted to 3000 sf maximum)
Assembly Cost	$8,447,788	$517,200
Construction Fee (6.30%)	$532,211	$32,580
Tax (5.27%)	$445,198	$27,270
Bond/Insurance (3.00%)	$253,434	$15,510
General Conditions (8.75%)	$739,181	$45,270
Design (8.00%)	$675,823	$41,370
Engineering (14.00%)	$1,182,690	$72,420
Construction Management (8.00%)	$675,823	$41,370
Total	**$12,952,148**	**$792,990**

Source: Construction cost derived from 3 D/I, *Construction Cost Analyses and Recommendations for the City of Phoenix*, April 20, 2006 and updated to January 2008 value using ENR CCI. Adjusted costs are based upon the proportionate share of a 3000 sf community center vs. the 49,000 sf prototype.

The total community center costs for planned parks are shown in Table 54. In the Northern Growth Area, the costs total $1.6 million in North Gateway and $1.6 million in Desert View. In the Southern Growth Area, the total cost to develop community centers is $1.6 million in Estrella/Laveen and $792,990 in Ahwatukee.

Table 54. Total Planned Community Center Costs

	Northern Growth Area		Southern Growth Area	
	N. Gateway	Desert View	Estrella/Laveen	Ahwatukee
Community Center Cost	$792,990	$792,990	$792,990	$792,990
Future Need	2	2	2	1
Subtotal, Community Centers	$1,585,980	$1,585,980	$1,585,980	$792,990
Total Community Center Cost	**$1,585,980**	**$1,585,980**	**$1,585,980**	**$792,990**

Source: Community Center costs from Table 53; future need from Table 45.

Planned Cost per Service Unit

The cost per service unit for parks is based on the cost of planned improvements divided by the number of new service units that will be added in each service area through build-out. The total planned park costs are adjusted to include the value of outstanding developer credits, because impact fee funds collected by future development in areas in which the City has entered into a developer agreement will be utilized to credit developers for past park facility contributions. The cost per EDU for each service area is compared with the value of the total (combined) level of

service per EDU at buildout in the following section to ensure that the impact fee is not based on a higher level of service than provided to existing residents of each service area.

Table 55. Parks Plan-Based Cost per Service Unit

	Northern Growth Area		Southern Growth Area	
	N. Gateway	Desert View	Estrella/Laveen	Ahwatukee
Adjusted Land Cost	$101,605,440	$50,623,367	$46,933,948	$491,178
Development Cost	$165,544,439	$122,904,109	$175,892,821	$3,165,310
Community Center Cost	$1,585,980	$1,585,980	$1,585,980	$792,990
Total Planned Park Costs	$268,735,859	$175,113,456	$224,412,749	$4,449,478
Outstanding Developer Credits	$566,706	$0	$661,540	$0
Adjusted Planned Improvement Costs	$269,302,565	$175,113,456	$225,074,289	$4,449,478
New Service Units (EDUs)	78,664	84,683	78,770	3,107
Plan-Based Cost per EDU	**$3,423**	**$2,068**	**$2,857**	**$1,432**

Source: Land cost from Table 49; development cost from Table 52; community center cost from Table 54; value of outstanding developer credits from City of Phoenix, Planning Department, January 22, 2008; new EDUs from Table 44.

Level of Service Analysis

As noted earlier, impact fees should not be based on a higher level of service than is provided to existing residents. The level of service analysis in this update is necessary, since the impact fee calculation will be based on the net increase in service units over the planning horizon as opposed to the total future service units used as the basis for the City's prior impact fee calculations. In order to determine the existing and planned level of service, this study considers both the existing and planned park facilities along with their replacement value. The inventory of existing parks for each service area is provided in Appendix E: Parks Facilities.

Traditional park planning defines level of service as the per capita provision of park land or geographic service area standards, such as a neighborhood park service area of one-half mile. An alternative to measuring the level of service with the provision of land is to measure it using the replacement cost of the land and capital facilities provided per unit of development served. In fact, this is what impact fee calculations generally do. The choice of an explicit level of service standard to represent this relationship is generally unnecessary, and can create undesirable policy outcomes. For example, it may unintentionally put undue emphasis on the acquisition of park land, at the expense of the provision of recreational amenities and improvements. The expansion of a park system may involve periods of extensive land acquisition, followed by periods that focus on the development of land with park improvements. Adoption of a level of service standard expressed in acres implies that only additional land acquisition can enhance the level of service. In reality, the level of service provided by a park system can be enhanced by improvements to existing land as well as by acquisition of additional land.

As a result, this study examines the existing provision of parks based on the ratio of replacement value of existing land and facilities to existing development in order to ensure that the impact fees for parks are not based on a higher level of service than currently provided to residents of the service areas. The replacement cost is based on the value of existing park land, developed acres, and amenities.

The existing park land value is based on existing park land and current land acquisition costs for each service area. The land value per acre is based on the land cost analysis utilized in developing the cost per service unit. As was done with the planned cost per service unit, the total existing land value is adjusted by 28 percent to reflect recent declines in the value of land. As shown in Table 56, the value of existing park land is an estimated $16.1 million in North Gateway, $44.6 million in Desert View, $32.4 million in Estrella/Laveen and $24.6 million in Ahwatukee.

Table 56. Park Land Replacement Value

	Northern Growth Area		Southern Growth Area	
	N. Gateway	Desert View	Estrella/Laveen	Ahwatukee
Community Park Land (Acres)	64	111	96	133
Value per Acre	$293,386	$252,008	$184,663	$227,397
Community Park Land Value	$18,776,704	$27,972,888	$17,727,648	$30,243,801
Neighborhood Park Land (Acres)	12	135	148	17
Value per Acre	$293,386	$252,008	$184,663	$227,397
Neighborhood Park Land Value	$3,520,632	$34,021,080	$27,330,124	$3,865,749
Total Land Value	$22,297,336	$61,993,968	$45,057,772	$34,109,550
Land Value Adjustment (28%)	$6,243,254	$17,358,311	$12,616,176	$9,550,674
Adjusted Total Land Value	**$16,054,082**	**$44,635,657**	**$32,441,596**	**$24,558,876**

Source: Existing park land from Table 165 and Table 166; value per acre from Table 48; land adjustment based on reduction of 28% of total land value.

The value of developed parks is based on the inventory of developed acres and the cost to develop each park type. The inventory of developed parkland illustrates how park development lags behind the acquisition of new land for parks. Typically, park development follows residential development. As shown in Table 57, the value of developed parks ranges from $13.1 million in the North Gateway service area to $47.4 million in Ahwatukee.

Table 57. Park Land Development Value

	Northern Growth Area		Southern Growth Area	
	N. Gateway	Desert View	Estrella/Laveen	Ahwatukee
Community (Developed Acres)	28	71	28	133
Cost per Acre	$332,615	$332,615	$332,615	$332,615
Subtotal, Community Park	$9,313,220	$23,615,665	$9,313,220	$44,237,795
Neighborhood (Developed Acres)	12	71	22	10
Cost per Acre	$316,531	$316,531	$316,531	$316,531
Subtotal, Neighborhood Park	$3,798,372	$22,473,701	$6,963,682	$3,165,310
Total Park Development Value	**$13,111,592**	**$46,089,366**	**$16,276,902**	**$47,403,105**

Source: Existing developed park land from Table 165, and Table 166; development cost per acre from Table 51.

Total park land and development costs for each service area are added together to find the total land and development value for each service area. The existing impact fee account balances are added to the value of facilities because these cash funds have been paid by existing development, while the

total value of outstanding developer credits are subtraced since this money is being held for refund and has already been accounted for through the valuation of existing land and/or park improvements. The total park land and development costs for each service area are as shown in Table 58.

Table 58. Existing Parks Investment in Impact Fee Service Areas

	Northern Growth Area		Southern Growth Area	
	N. Gateway	Desert View	Estrella/Laveen	Ahwatukee
Adjusted Total Park Land	$16,054,082	$44,635,657	$32,441,596	$24,558,876
Developed Parks	$13,111,592	$46,089,366	$16,276,902	$47,403,105
Total Land and Development Value	$29,165,674	$90,725,023	$48,718,498	$71,961,981
Existing Impact Fee Balance	$9,173,779	$4,737,624	$21,488,396	$1,984,206
Less: Outstanding Developer Credits	$566,706	$0	$661,540	$0
Total Existing Replacement Value:	**$37,772,747**	**$95,462,647**	**$69,545,354**	**$73,946,187**

Source: Park land replacement value from Table 56; developed park value from Table 57; existing impact fee account balances from City of Phoenix Planning Department, April 7, 2008; value of outstanding developer agreements from City of Phoenix, Planning Department, January 22, 2008.

The total investment based on the existing provision of park facilities, and impact fees already paid, is then added to the cost of future planned improvements to find the total parks expenditures for each service area. The total parks expenditures are then divided by the total service area EDUs (both existing and future) to determine the total parks expenditure per EDU in each of the service areas, as shown in Table 59.

Table 59. Total (Combined) Parks Expenditures per EDU

	Northern Growth Area		Southern Growth Area	
	N. Gateway	Desert View	Estrella/Laveen	Ahwatukee
Total Existing Replacement Value:	$37,772,747	$95,462,647	$69,545,354	$73,946,187
Planned Expenditures	$269,302,565	$175,113,456	$225,074,289	$4,449,478
Combined Existing and Planned Expenditures	$307,075,312	$270,576,103	$294,619,643	$78,395,665
÷ Total Service Area EDUs	87,555	105,135	119,457	40,496
Total (Combined) Cost per EDU	**$3,507**	**$2,574**	**$2,466**	**$1,936**

Source: Total existing replacement value from Table 58; planned expenditures from Table 55, total service area EDUs from Table 44.

Gross Cost per EDU

In order to determine the potential gross fee per EDU for each service area, the total (combined existing investment plus future planned expenditures) cost per EDU is compared to the plan-based cost per EDU for each service area. To make sure that new development is not paying for a higher level of service than existing development, the lower of the two amounts is selected to determine the gross impact fee for each service area. As shown in Table 60, in all service areas except Desert View, the selected amount is the total (combined) cost per EDU.

Table 60. Comparison of Total (Combined) Costs and Plan-Based Costs per Service Area

	Northern Growth Area		Southern Growth Area	
	N. Gateway	Desert View	Estrella/Laveen	Ahwatukee
Total (Combined) Cost / EDU	$3,507	$2,574	$2,466	$1,936
Plan-Based Cost / EDU	$3,423	$2,068	$2,857	$1,432
Gross Cost / EDU	**$3,423**	**$2,068**	**$2,466**	**$1,432**

Source: Total (combined) level of service costs from Table 59, plan-based costs from Table 55.

Offsets

Before determining an actual impact fee schedule, offsets must be taken into consideration. An offset is applied for any other type of revenue dedicated to paying for a portion of the same improvements funded by impact fees. For example, the City also funds recreational facilities such as parks and mountain preserves through bonds, parks and preserves initiative sales tax, and other restricted funds. In the 2008-2013 Capital Improvement Program, the City's capital improvements for parks are funded through bond funds, impact fees, sales tax, grants and proceeds from the sale of other park land.

In order to avoid requiring new development to pay more than its proportionate share of facility costs, impact fee calculations should account for future tax payments that will retire outstanding debt used to develop the existing parks, together with other taxes that are dedicated for park development. Additional offsets are not necessary for grants, since grant funds are limited to available Federal or State funding, such as Community Development Block Grants, and the grant funding is not dedicated for growth-related improvements. This section calculates the offset for sales tax and outstanding debt funded through the secondary property tax.

Sales Tax Offset

In 1999, City voters approved a 0.10 percent sales tax for parks and preserves; revenues from the sales tax are allocated for park improvements and the acquisition of desert preserves. Sixty percent of the revenues are to be used for open space preservation, 30 percent for regional parks and 10 percent for neighborhood and community parks.

The parks sales tax accounts for 7.7 percent of the City's 1.30 cent total sales tax and will generate approximately $21.6 million for parks and preserves in 2009-10. As shown in Table 61, the offset calculation is based on total city-wide tax revenues in 2009-10 and the total number of city-wide park EDUs added by new construction in 2007. The offset calculation allocates 40 percent of the park tax, since that is the proportion of the sales tax earmarked for parks, and assumes that all of the proceeds will be used for growth-related park facilities.

The park sales tax, which was set to expire in November 2009, was extended to 2039 by a voter approved referendum in May 2008. This update assumes that the level of sales tax revenue and residential construction will remain relatively constant. As shown in Table 61, the parks sales tax offset is $164 per EDU.

Table 61. Parks Sales Tax Offset

Total City-Wide Parks and Preserves Sales Tax Revenue, 2007-08	$34,364,000
Percent of Parks and Preserves Sales Tax for New Parks	10%
Growth-Related Parks Sales Tax Revenue	$3,436,400
Annual New City-Wide Park EDUs, 2009-buildout	20,965
Park Sales Tax Revenue per EDU	**$164**

Source: Parks and preserves sales tax revenue estimate from City of Phoenix, *Summary Budget 2007-08*, 2007, p. 66; annual new city-wide park EDUs derived from Table 44, with an assumption of a 25-year buildout.

Secondary Property Tax Offset

The Parks impact fees calculations include an offset to reflect the share of growth-related parks that have been funded through bonds that will be repaid through the secondary property tax. In this update, the secondary property tax offset is based on the outstanding city-wide debt for parks and the existing city-wide parks service units. This approach avoids double payment issues and creates a uniform offset per EDU for all land uses.

The summary of outstanding park-related debt issues are shown in Table 62. However, a portion of the outstanding debt is related to Sonoran Preserve and other open space acquisition and improvements funded with the 1988 and 2001 voter approved parks and recreation bonds, and as such, have been excluded from the debt offset calculations.

Table 62. General Obligation Debt Offset, Parks

Program	Series	Outstanding Balance
Parks-1988	1989B	$572,571
Parks-Refund	1993A	$9,570,000
Parks-Refund	1993C	$220,000
Parks-1988	1999	$3,990,000
Parks-Refund	1999A	$1,285,000
Parks-Refund	1999B	$2,710,000
Parks-1988	2000	$80,000
Parks-2001	2002A	$1,000,000
Parks-Refund	2002A	$28,535,000
Parks-2001	2002B	$4,385,000
Parks-Refund	2002B	$335,000
Parks-Refund	2003	$10,125,000
Parks-2001	2004	$25,000,000
Parks-Refund	2004R	$6,120,000
Parks-2001	2005B	$32,000,000
Parks-2001	2007	$3,400,000
Parks-2006	2007	$2,000,000
Parks-2001	2007A	$6,675,000
Parks-2006	2007A	$20,125,000
Parks-Refund	2007B	$27,965,000
Parks-ASU	2007	$25,000,000
Parks-ASU	2007A	$4,000,000
Total Outstanding Parks Debt		$215,092,571
Existing City-Wide EDUs		738,774
Outstanding Parks Debt per EDU		**$291**

Source: Parks related debt and outstanding balance based on data from the City of Phoenix Budget and Research Department, February 7, 2008; existing city-wide EDUs based on city-wide EDUs calculated in Table 44.

Potential Net Fee Schedules

The potential net Parks impact fee schedule for each service area is calculated by subtracting the offset per EDU from the gross cost per EDU. That figure is then multiplied by the EDU factor to determine the potential net fee per type of use. These calculations are shown in Table 63.

Table 63. Potential Net Impact Fee Schedule, Parks

	Unit	EDU Factor	Offset/ Unit	Gross Fee/ Unit	Net Fee/ Unit
North Gateway					
Single-Family, Detached	Dwelling	1.00	$455	$3,423	**$2,968**
Multi-Family	Dwelling	0.76	$346	$2,601	**$2,256**
Mobile Home/RV Park	Space	0.85	$387	$2,910	**$2,523**
Retail	1,000 sq. ft.	0.55	$250	$1,883	**$1,632**
Office	1,000 sq. ft.	0.63	$287	$2,156	**$1,870**
Public/Institutional	1,000 sq. ft.	0.61	$278	$2,088	**$1,810**
Industrial	1,000 sq. ft.	0.49	$223	$1,677	**$1,454**
Desert View					
Single-Family, Detached	Dwelling	1.00	$455	$2,068	**$1,613**
Multi-Family	Dwelling	0.76	$346	$1,572	**$1,226**
Mobile Home/RV Park	Space	0.85	$387	$1,758	**$1,371**
Retail	1,000 sq. ft.	0.55	$250	$1,613	**$1,363**
Office	1,000 sq. ft.	0.63	$287	$1,613	**$1,326**
Public/Institutional	1,000 sq. ft.	0.61	$278	$1,613	**$1,335**
Industrial	1,000 sq. ft.	0.49	$223	$1,613	**$1,390**
Estrella/Laveen					
Single-Family, Detached	Dwelling	1.00	$455	$2,466	**$2,011**
Multi-Family	Dwelling	0.76	$346	$1,874	**$1,529**
Mobile Home/RV Park	Space	0.85	$387	$2,096	**$1,710**
Retail	1,000 sq. ft.	0.55	$250	$1,356	**$1,106**
Office	1,000 sq. ft.	0.63	$287	$1,554	**$1,267**
Public/Institutional	1,000 sq. ft.	0.61	$278	$1,504	**$1,227**
Industrial	1,000 sq. ft.	0.49	$223	$1,208	**$986**
Ahwatukee					
Single-Family, Detached	Dwelling	1.00	$455	$1,432	**$977**
Multi-Family	Dwelling	0.76	$346	$1,088	**$743**
Mobile Home/RV Park	Space	0.85	$387	$1,217	**$830**
Retail	1,000 sq. ft.	0.55	$250	$788	**$537**
Office	1,000 sq. ft.	0.63	$287	$902	**$616**
Public/Institutional	1,000 sq. ft.	0.61	$278	$874	**$596**
Industrial	1,000 sq. ft.	0.49	$223	$702	**$479**

Source: EDUs per unit from Table 43; offsets from Table 61 and Table 62, gross cost per EDU from Table 60.

Recommended Parks Impact Fee Schedule

The recommended Parks impact fee schedule would normally be calculated as shown in the Potential Fee Schedules. However, the Impact Fee Ad Hoc committee expressed concerns that: 1) the use of the Functional Population method to determine the EDU factors for Parks (as outlined in Appendix B) was perhaps not the most accurate method for determining demand for Parks amongst

different land use types, and 2) this methodology would not be consistent with the methodology used to calculate fees for the other categories of Necessary Public Service, which recommend the lower of currently calculated or previously adopted (or in the case of non-residential uses, previously recommended) fees. Therefore, the Ad Hoc committee considered several options, one of which applied the use of the 2007 EDU factors to the gross fees and offsets considered in this section. These calculations are shown in Table 64.

Table 64. Ad Hoc Option 2-- Parks Impact Fee Schedule

	Unit	2007 EDU Factor	Offset/ Unit	Gross Fee/ Unit	Net Fee/ Unit
North Gateway					
Single-Family, Detached	Dwelling	1.00	$455	$3,423	**$2,968**
Multi-Family	Dwelling	0.36	$164	$1,232	**$1,068**
Mobile Home/RV Park	Space	0.39	$177	$1,335	**$1,158**
Retail	1,000 sq. ft.	0.14	$64	$479	**$416**
Office	1,000 sq. ft.	0.19	$86	$650	**$564**
Public/Institutional	1,000 sq. ft.	0.11	$50	$377	**$326**
Industrial	1,000 sq. ft.	0.08	$36	$274	**$237**
Desert View					
Single-Family, Detached	Dwelling	1.00	$455	$2,068	**$1,613**
Multi-Family	Dwelling	0.36	$164	$744	**$581**
Mobile Home/RV Park	Space	0.39	$177	$807	**$629**
Retail	1,000 sq. ft.	0.14	$64	$1,613	**$1,549**
Office	1,000 sq. ft.	0.19	$86	$1,613	**$1,527**
Public/Institutional	1,000 sq. ft.	0.11	$50	$1,613	**$1,563**
Industrial	1,000 sq. ft.	0.08	$36	$1,613	**$1,577**
Estrella/Laveen					
Single-Family, Detached	Dwelling	1.00	$455	$2,466	**$2,011**
Multi-Family	Dwelling	0.36	$164	$888	**$724**
Mobile Home/RV Park	Space	0.39	$177	$962	**$784**
Retail	1,000 sq. ft.	0.14	$64	$345	**$282**
Office	1,000 sq. ft.	0.19	$86	$469	**$382**
Public/Institutional	1,000 sq. ft.	0.11	$50	$271	**$221**
Industrial	1,000 sq. ft.	0.08	$36	$197	**$161**
Ahwatukee					
Single-Family, Detached	Dwelling	1.00	$455	$1,432	**$977**
Multi-Family	Dwelling	0.36	$164	$516	**$352**
Mobile Home/RV Park	Space	0.39	$177	$558	**$381**
Retail	1,000 sq. ft.	0.14	$64	$200	**$137**
Office	1,000 sq. ft.	0.19	$86	$272	**$186**
Public/Institutional	1,000 sq. ft.	0.11	$50	$158	**$107**
Industrial	1,000 sq. ft.	0.08	$36	$115	**$78**

Source: EDU factors from the *Infrastructure Financing Plan for the Development Impact Fee areas of the City of Phoenix, November 15, 2006*; offsets from Table 61 and Table 62; gross fees from Table 60.

While this was a step in the right direction, there was still concern that some of the resulting net fees were higher than the net fees recommended in the prior adopted *Infrastructure Financing Plan for the Development Impact Fee Areas of the City of Phoenix, November 15, 2006*. Since all of the recommended impact fee schedules for the other fee categories adjust for the lower of the calculated or the prior fee, the Ad Hoc committee agreed that the same should be done for the Parks fees. Therefore, the prior net impact fee per unit, by type of use, is compared with both the potential fees from Table 63, and the "Option 2" fees shown in Table 64. The recommended net Parks impact fee for each

service area is shown in the second last column, and is the lower of the three compared figures for each land use type. The last column shows adjustment factors to be used in calculating the recommended net impact fee when starting with the gross cost/EDU (shown in Table 60) and the offsets (shown in Table 61 and Table 62).

Table 65. Recommended Parks Impact Fee Schedule

	Unit	EDU Factor	Potential Net Fee/ Unit	Option 2 Net Fee/ Unit	Prior Net Fee/ Unit	Recommended Net Fee/ Unit	Adjustment Factor
North Gateway							
Single-Family, Detached	Dwelling	1.00	$2,968	$2,968	$4,072	**$2,968**	100.00%
Multi-Family	Dwelling	0.76	$2,256	$1,068	$1,482	**$1,068**	47.37%
Mobile Home/RV Park	Space	0.85	$2,523	$1,158	$1,606	**$1,158**	45.88%
Retail	1,000 sq. ft.	0.55	$1,632	$416	$389	**$389**	23.83%
Office	1,000 sq. ft.	0.63	$1,870	$564	$629	**$564**	30.16%
Public/Institutional	1,000 sq. ft.	0.61	$1,810	$326	$236	**$236**	13.04%
Industrial	1,000 sq. ft.	0.49	$1,454	$237	$286	**$237**	16.33%
Desert View							
Single-Family, Detached	Dwelling	1.00	$1,613	$1,613	$2,910	**$1,613**	100.00%
Multi-Family	Dwelling	0.76	$1,226	$581	$1,064	**$581**	47.37%
Mobile Home/RV Park	Space	0.85	$1,371	$629	$1,153	**$629**	45.88%
Retail	1,000 sq. ft.	0.55	$1,363	$1,549	$227	**$227**	16.66%
Office	1,000 sq. ft.	0.63	$1,326	$1,527	$408	**$408**	30.76%
Public/Institutional	1,000 sq. ft.	0.61	$1,335	$1,563	$109	**$109**	8.16%
Industrial	1,000 sq. ft.	0.49	$1,390	$1,577	$193	**$193**	13.88%
Estrella/Laveen							
Single-Family, Detached	Dwelling	1.00	$2,011	$2,011	$2,035	**$2,011**	100.00%
Multi-Family	Dwelling	0.76	$1,529	$724	$749	**$724**	47.37%
Mobile Home/RV Park	Space	0.85	$1,710	$784	$812	**$784**	45.88%
Retail	1,000 sq. ft.	0.55	$1,106	$282	$104	**$104**	9.40%
Office	1,000 sq. ft.	0.63	$1,267	$382	$241	**$241**	19.02%
Public/Institutional	1,000 sq. ft.	0.61	$1,227	$221	$12	**$12**	0.98%
Industrial	1,000 sq. ft.	0.49	$986	$161	$123	**$123**	12.48%
Ahwatukee							
Single-Family, Detached	Dwelling	1.00	$977	$977	$2,003	**$977**	100.00%
Multi-Family	Dwelling	0.76	$743	$352	$662	**$352**	47.37%
Mobile Home/RV Park	Space	0.85	$830	$381	$796	**$381**	45.88%
Retail	1,000 sq. ft.	0.55	$537	$137	$171	**$137**	25.45%
Office	1,000 sq. ft.	0.63	$616	$186	$332	**$186**	30.16%
Public/Institutional	1,000 sq. ft.	0.61	$596	$107	$65	**$65**	10.91%
Industrial	1,000 sq. ft.	0.49	$479	$78	$161	**$78**	16.33%

Source: EDU factors from Table 43; potential fees from Table 63; "Option 2" fees from Table 64; adjustment factors derived from dividing the recommended fee by the potential fee.

It should be noted that, upon the end of the State-imposed moratorium on increases to adopted impact fees, the City Council may choose to adopt a revised impact fee schedule based on the Potential Impact Fee Schedules without any further revision to this document.

Parks Improvements Plan

Due to offsets for dedicated sales tax and debt service payments that will be made by new residential development, in addition to the fee adjustments recommended by the Impact Fee Ad Hoc Committee, the net cost per service unit for each service area is lower than the gross plan-based cost. As shown in Table 66, the net cost per service unit upon which the Parks impact fee is based varies for each service area, as well as for each land use type.

Table 66. New Growth Percentage of Parks Costs

	Growth EDUs	Gross Fee	Gross Total	Net Fee	Net Total	Percentage
Single-Family, Detached	25,900	$2,968	$76,871,200	$2,968	$76,871,200	100.00%
Multi-Family	15,808	$2,256	$35,657,789	$1,068	$16,890,532	47.37%
Retail	10,603	$1,632	$17,308,337	$389	$4,124,567	23.83%
Office	22,558	$1,870	$42,179,851	$564	$12,720,907	30.16%
Public/Institutional	1,125	$1,810	$2,036,790	$236	$265,500	13.04%
Industrial	2,670	$1,454	$3,883,034	$237	$633,965	16.33%
Total, North Gateway / Deer Valley V			**$177,937,002**		**$111,506,671**	**62.67%**
Single-Family, Detached	40,900	$1,613	$65,971,700	$1,613	$65,971,700	100.00%
Multi-Family	23,028	$1,226	$28,229,565	$581	$13,371,899	47.37%
Retail	9,117	$1,363	$12,424,192	$227	$2,069,559	16.66%
Office	4,898	$1,326	$6,496,462	$408	$1,998,384	30.76%
Public/Institutional	2,792	$1,335	$3,728,576	$109	$304,328	8.16%
Industrial	$3,949	$1,390	$5,489,307	$193	$762,157	13.88%
Total, Desert View and Deer Valley I - IV			**$122,339,803**		**$84,478,027**	**69.05%**
Single-Family, Detached	47,000	$2,011	$94,532,219	$2,011	$94,532,219	100.00%
Multi-Family	8,208	$1,529	$12,546,799	$724	$5,943,220	47.37%
Retail	5,302	$1,106	$5,865,221	$104	$551,408	9.40%
Office	4,857	$1,267	$6,154,470	$241	$1,170,537	19.02%
Public/Institutional	1,830	$1,227	$2,245,241	$12	$21,960	0.98%
Industrial	$11,573	$986	$11,405,755	$123	$1,423,479	12.48%
Total, Estrella/Laveen			**$132,749,704**		**$103,642,823**	**78.07%**
Single-Family, Detached	1,100	$977	$1,074,700	$977	$1,074,700	100.00%
Multi-Family	456	$743	$338,589	$352	$160,384	47.37%
Retail	694	$537	$372,921	$137	$94,925	25.45%
Office	590	$616	$363,151	$186	$109,522	30.16%
Public/Institutional	141	$596	$84,032	$65	$9,165	10.91%
Industrial	128	$479	$61,277	$78	$10,004	16.33%
Total, Ahwatukee			**$2,294,670**		**$1,458,701**	**63.57%**

Source: Growth EDUs from Table 44, gross fees from Table 59, net fees from Table 64.

The Parks improvements plan for each of the fee areas are shown in Table 67 through Table 70, respectively. The improvements plans for parks provide a list of planned capital improvements and other expenditures that are eligible to be funded by the impact fees along with the growth share of the total planned expenditures. Eligible expenditures include capacity-expanding park

improvements funded in the 2009-2013 Capital Improvement Program (CIP) and beyond 2013; capacity improvements include both the acquisition of new park land and the development of new park facilities. The planned expenditures are NOT adjusted to reflect outstanding credits or the impact fee account balance for each service area, since those funds will be kept aside for refund, or use on capital facilities approved in a prior version of this Infrastructure Improvements Plan, respectively.

Table 67. Parks Infrastructure Improvements Plan, North Gateway

Name of Park	Acres to acquire	Acres to be developed	Cost of Land to Acquire (per acre)	Cost of Land to Develop (per Acre)	Total Project Costs
Deem Hills 1	0	30	$211,238	$339,134	$10,174,020
Community Park NG-2	30	30	$211,238	$339,134	$16,511,160
Community Park NG-3	30	30	$211,238	$339,134	$16,511,160
Community Park NG-4	22	28	$211,238	$339,134	$14,142,988
Total, Community Parks	**82**	**118**	**n/a**	**n/a**	**$57,339,328**
Neighborhood Park NG-1	12	12	$211,238	$323,050	$6,411,456
Neighborhood Park NG-2	10	10	$211,238	$323,050	$5,342,880
Neighborhood Park NG-3	20	20	$211,238	$323,050	$10,685,760
Neighborhood Park NG-4	20	20	$211,238	$323,050	$10,685,760
Neighborhood Park NG-5	20	20	$211,238	$323,050	$10,685,760
Neighborhood Park NG-6	20	20	$211,238	$323,050	$10,685,760
Neighborhood Park NG-7	20	20	$211,238	$323,050	$10,685,760
Neighborhood Park NG-8	20	20	$211,238	$323,050	$10,685,760
Neighborhood Park NG-9	20	20	$211,238	$323,050	$10,685,760
Neighborhood Park NG-10	20	20	$211,238	$323,050	$10,685,760
Neighborhood Park NG-11	20	20	$211,238	$323,050	$10,685,760
Neighborhood Park NG-12	20	20	$211,238	$323,050	$10,685,760
Neighborhood Park NG-13	20	20	$211,238	$323,050	$10,685,760
Neighborhood Park NG-14	20	20	$211,238	$323,050	$10,685,760
Neighborhood Park NG-15	20	20	$211,238	$323,050	$10,685,760
Neighborhood Park NG-16	20	20	$211,238	$323,050	$10,685,760
Neighborhood Park NG-17	20	20	$211,238	$323,050	$10,685,760
Neighborhood Park NG-18	20	20	$211,238	$323,050	$10,685,760
Neighborhood Park NG-19	20	20	$211,238	$323,050	$10,685,760
Neighborhood Park NG-20	20	20	$211,238	$323,050	$10,685,760
Neighborhood Park NG-21	17	17	$211,238	$323,050	$9,082,896
Total, Neighborhood Parks	**399**	**399**	**n/a**	**n/a**	**$213,180,912**
Community Center NG-1	n/a	n/a	n/a	n/a	$792,990
Community Center NG-2	n/a	n/a	n/a	n/a	$792,990
Total, Amenities					**$1,585,980**
PARKS TOTAL, NORTH GATEWAY / DEER VALLEY 1-IV FEE AREA					**$272,106,220**
Anticipated Net Impact Fee Revenue					$111,506,671
Additional Funding Required					**$160,599,549**

Source: Land acquisition costs from Table 48 and adjusted to show the 28% decline per acre; park development costs per Table 51, amenity costs from Table 53;anticipated net impact fee revenue from Table 66.

Table 68. Parks Infrastructure Improvements Plan, Desert View

Name of Park	Acres to acquire	Acres to be developed	Cost of Land to Acquire (per acre)	Cost of Land to Develop (per Acre)	Total Project Costs
56th St/Montgomery	0	30	$181,446	$339,134	$10,174,020
Community Park DV-2	30	30	$181,446	$339,134	$15,617,400
Community Park DV-3	30	30	$181,446	$339,134	$15,617,400
Community Park DV-4	4	14	$181,446	$339,134	$5,473,660
Total, Community Parks	**64**	**104**	**n/a**	**n/a**	**$46,882,480**
24th St/Happy Valley	0	30	$181,446	$323,050	$9,691,500
52nd St/Dove Valley	0	29	$181,446	$323,050	$9,368,450
Neighborhood Park DV-3	20	20	$181,446	$323,050	$10,089,920
Neighborhood Park DV-4	20	20	$181,446	$323,050	$10,089,920
Neighborhood Park DV-5	20	20	$181,446	$323,050	$10,089,920
Neighborhood Park DV-6	20	20	$181,446	$323,050	$10,089,920
Neighborhood Park DV-7	20	20	$181,446	$323,050	$10,089,920
Neighborhood Park DV-8	20	20	$181,446	$323,050	$10,089,920
Neighborhood Park DV-9	20	20	$181,446	$323,050	$10,089,920
Neighborhood Park DV-10	20	20	$181,446	$323,050	$10,089,920
Neighborhood Park DV-11	20	20	$181,446	$323,050	$10,089,920
Neighborhood Park DV-12	20	20	$181,446	$323,050	$10,089,920
Neighborhood Park DV-13	15	20	$181,446	$323,050	$9,182,690
Total, Neighborhood Parks	**215**	**279**	**n/a**	**n/a**	**$129,141,840**
Community Center DV-1	n/a	n/a	n/a	n/a	$792,990
Community Center DV-2	n/a	n/a	n/a	n/a	$792,990
Total, Amenities					**$1,585,980**
PARKS TOTAL, DESERT VIEW / DEER VALLEY V FEE AREA					**$177,610,300**
Anticipated Net Impact Fee Revenue					$84,478,027
Additional Funding Required					**$93,132,273**

Source: Land acquisition costs from Table 48 and adjusted to show the 28% decline per acre; park development costs per Table 51, amenity costs from Table 53; anticipated net impact fee revenue from Table 66.

Table 69. Parks Infrastructure Improvements Plan, Estrella/Laveen

Name of Park	Acres to acquire	Acres to be developed	Cost of Land to Acquire (per acre)	Cost of Land to Develop (per Acre)	Total Project Costs
71st Ave/Elwood	0	28	$132,957	$339,134	$9,495,752
31st Ave/Roeser	0	30	$132,957	$339,134	$10,174,020
Community Park EL-3	30	30	$132,957	$339,134	$14,162,730
Community Park EL-4	30	30	$132,957	$339,134	$14,162,730
Community Park EL-5	30	30	$132,957	$339,134	$14,162,730
Community Park EL-6	13	23	$132,957	$339,134	$9,528,523
Total, Community Parks	**103**	**171**	**n/a**	**n/a**	**$71,686,485**
87th Ave/Lower Buckeye	0	16	$132,957	$323,050	$5,168,800
103rd Ave/Country Place	0	10	$132,957	$323,050	$3,230,500
83rd Ave/Elwood	0	13	$132,957	$323,050	$4,199,650
71st Ave/Meadow Loop Road	0	15	$132,957	$323,050	$4,845,750
47th Ave/Alta Vista	0	16	$132,957	$323,050	$5,168,800
31st Ave/Vineyard	0	21	$132,957	$323,050	$6,784,050
23rd Ave/Gary Way	0	7	$132,957	$323,050	$2,261,350
Neighborhood Park EL-8	0	28	$132,957	$323,050	$9,045,400
Neighborhood Park EL-9	20	20	$132,957	$323,050	$9,120,140
Neighborhood Park EL-10	20	20	$132,957	$323,050	$9,120,140
Neighborhood Park EL-11	20	20	$132,957	$323,050	$9,120,140
Neighborhood Park EL-12	20	20	$132,957	$323,050	$9,120,140
Neighborhood Park EL-13	20	20	$132,957	$323,050	$9,120,140
Neighborhood Park EL-14	20	20	$132,957	$323,050	$9,120,140
Neighborhood Park EL-15	20	20	$132,957	$323,050	$9,120,140
Neighborhood Park EL-16	20	20	$132,957	$323,050	$9,120,140
Neighborhood Park EL-17	20	20	$132,957	$323,050	$9,120,140
Neighborhood Park EL-18	20	20	$132,957	$323,050	$9,120,140
Neighborhood Park EL-19	20	20	$132,957	$323,050	$9,120,140
Neighborhood Park EL-20	15	15	$132,957	$323,050	$6,840,105
Neighborhood Park EL-21	15	15	$132,957	$323,050	$6,840,105
Total, Neighborhood Parks	**250**	**376**	**n/a**	**n/a**	**$154,706,050**
Name of Park	**Acres to acquire**	**Acres to be developed**	**Cost of Land to Acquire (per acre)**	**Cost of Land to Develop (per Acre)**	**Total Project Costs**
Community Center EL-1	n/a	n/a	n/a	n/a	$792,990
Community Center EL-2	n/a	n/a	n/a	n/a	$792,990
Total, Amenities					**$1,585,980**
PARKS TOTAL, ESTRELLA/LAVEEN FEE AREA					**$227,978,515**
Anticipated Net Impact Fee Revenue					$103,642,823
Additional Funding Required					**$124,335,692**

Source: Land acquisition costs from Table 48 and adjusted to show the 28% decline per acre; park development costs per Table 51, amenity costs from Table 53; anticipated net impact fee revenue from Table 66.

Table 70. Parks Infrastructure Improvements Plan, Ahwatukee

Name of Park	Acres to acquire	Acres to be developed	Cost of Land to Acquire (per acre)	Cost of Land to Develop (per Acre)	Total Project Costs
Total, Community Parks	**0**	**0**	**n/a**	**n/a**	**$0**
17th Ave/Pecos	0	7	$163,726	$323,050	$2,261,350
Neighborhood Park AH-2	3	3	$163,726	$323,050	$1,460,328
Total, Neighborhood Parks	**3**	**10**	**n/a**	**n/a**	**$3,721,678**
Community Center AH-1	n/a	n/a	n/a	n/a	$792,990
Total, Amenities					**$792,990**
PARKS TOTAL, AHWATUKEE FEE AREA					**$4,514,668**
Anticipated Net Impact Fee Revenue					$1,458,701
Additional Funding Required					**$3,055,967**

Source: Land acquisition costs from Table 48 and adjusted to show the 28% decline per acre; park development costs per Table 51, amenity costs from Table 53; anticipated net impact fee revenue from Table 66.

INFRASTRUCTURE IMPROVEMENTS PLAN: POLICE

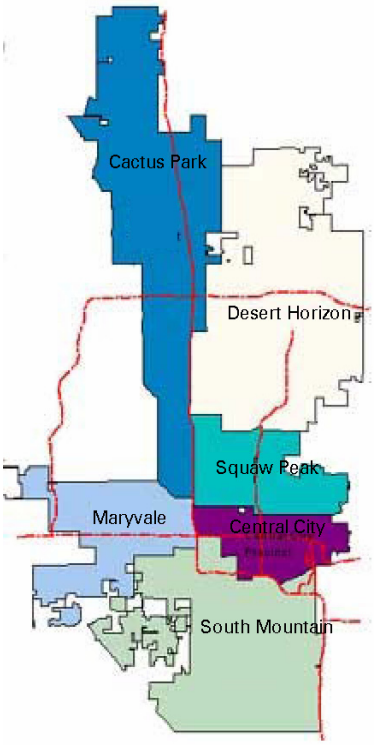
City of Phoenix Police Department services are provided out of both precinct and neighborhood stations. The capital facility needs for police services required by new development in the growth areas are based on the same standard of service provided in the other areas of the City.

Service Areas

The City's Police impact fee service areas are the same as those used for the Fire Protection impact fee, with one unified service area in the Northern Growth Area and two separate service areas in the Southern Growth Area (Estrella/Laveen and Ahwatukee).

The precinct stations are the primary geographic unit for the allocation of police services for impact fees, and the three service areas are divided into three future precinct areas: north, southwest and southeast. However, the existing service area boundaries do not correspond with the existing six precinct boundaries, which are illustrated in Figure 11. The Northern Growth Area is split between the Cactus Park and Desert Horizon precincts, the Estrella/Laveen service area is split between the Maryvale and South Mountain precincts, and the Ahwatukee service area is only a small part of the South Mountain precinct. As a result, the existing developments in the growth areas share facilities with developments outside of the growth areas. The mismatch between impact fee service areas and existing precinct areas will require a city-wide level of service analysis, rather than a service-area specific level of service analysis used for other facilities.

Figure 11. Phoenix Police Precinct Map



Methodology

The demand for future police facilities creates the basis upon which the Police impact fee is calculated. Each precinct is planned to serve approximately 80,000 to 120,000 EDUs. The precinct size varies based on the geography or service needs of a specific area.

Regardless of the level of service established for planning purposes, the update will examine the existing city-wide provision of police facilities based on the ratio of the replacement value of existing facilities to existing development in order to ensure that the impact fees are not based on a higher level of service than currently provided to residents throughout the city. The updated component costs for land and improvements will be applied to the existing police facilities to determine the existing Police level of service.

The cost per service unit for police facilities is based on the existing or planned level of service, whichever is less. The net cost per service unit is determined by subtracting the property tax offset per service unit from the cost per service unit. The net cost per unit of development is calculated by multiplying the net cost per service unit for the service area by the EDUs per development unit. The net cost represents the maximum impact fee that may be charged based on this study.

Service Units

As with fire protection, the two most common methodologies used in calculating the demand for law enforcement services are the "calls-for-service" approach and the "functional population" approach. The calls-for-service approach uses calls by land use type to make the connection between land use type and demand for facilities and equipment. The functional population approach is a more generalized approach than calls-for-service, and it presumes that the demand for Fire Protection and police services is strongly related to the presence of people at the site of a land use.

The 2006 Police impact fee service unit calculation was based on calls for service and time spent at calls, with the average time spent per call for one single-family unit equal to one EDU. This study uses functional population in order to be consistent with the Fire Protection impact fees, and because detailed call data by land use are not available. Police calls are often not directly related to existing land uses; they often occur on streets or in parking lots, where they are related to movement between land uses. While non-attributed incidents can be indirectly attributed to specific land uses, the functional population provides a more consistent and simpler approach to allocating police costs across all land uses based on the number of "full-time equivalent" people present at the site of a land use. The police service units are based on the functional population analysis presented in Appendix B.

The EDU factors used for developing the impact fee calculation are shown in Table 71. The Police impact fee is assessed for both residential and nonresidential land uses.

Table 71. Police Service Unit Multipliers

Land Use	Unit	EDUs/Unit
Single-Family, Detached	Dwelling	**1.00**
Multi-Family	Dwelling	**0.76**
Mobile Home/RV Park	Space	**0.85**
Retail	1,000 sq. ft.	**0.55**
Office	1,000 sq. ft.	**0.63**
Public/Institutional	1,000 sq. ft.	**0.61**
Industrial	1,000 sq. ft.	**0.49**

Source: Residential functional population EDUs per unit from Table 157; nonresidential functional population EDUs per unit from Table 158.

To determine the cost per service unit using the plan-based methodology, the planned improvement costs are divided by the projected growth in service units over the planning horizon. As shown in Table 72, development in the growth areas is expected to add almost 0.25 million EDUs through build-out, while city-wide growth is expected to add 0.52 million EDUs.

Table 72. Existing and Build-Out Police Service Units

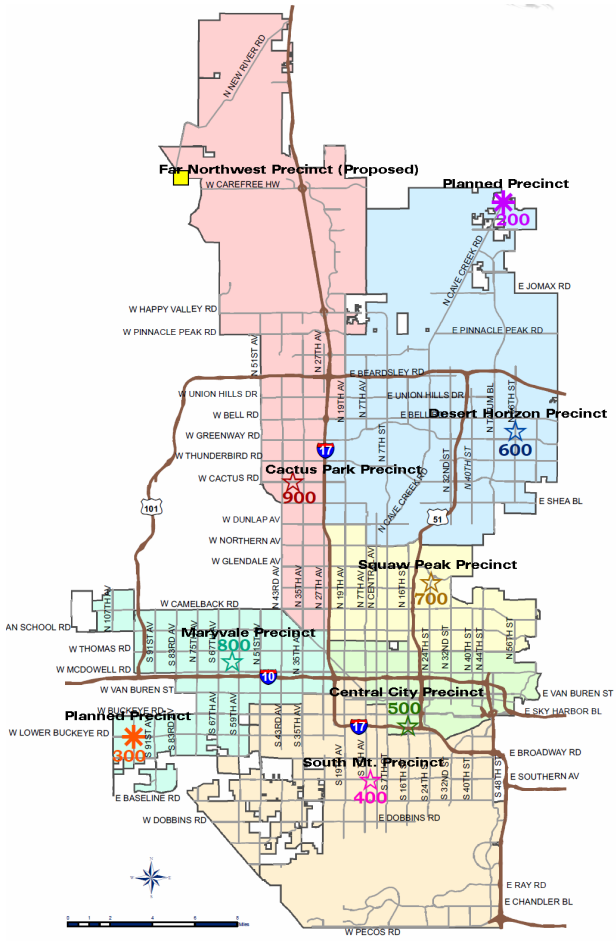
	Build-Out	Existing	New
Northern Growth Area	192,691	29,343	163,348
Estrella/Laveen	119,457	40,687	78,770
Ahwatukee	40,496	37,389	3,107
Subtotal, Growth Areas	352,644	107,419	245,225
+ Non-Growth Area	910,262	631,355	278,907
City-Wide Total	**1,262,906**	**738,774**	**524,132**

Source: Build-out service units from Table 160; existing service units from Table 159.

Planned Improvements

The City's Police Department services are provided from both centralized facilities and precinct stations. Precinct stations are the primary geographic unit for the allocation of police services, and the standard precinct includes facilities for sworn officers and patrol functions. The City's precinct stations typically include a briefing room, lobby, holding cells and administrative offices, and house the vehicle fleet related to the patrol functions. The City has developed neighborhood stations in certain areas to support a portion of the personnel for the overall precinct area and supplement the level of service in areas with unique geographic constraints and service demands. The City of Phoenix Police Department houses other essential components of law enforcement in centralized facilities; such facilities include communications, command centers and centralized command and support. This impact fee update includes the allocation of planned precinct costs related to new growth along with growth-related expansion of the City's police communications facility, in accordance with State statutes. No neighborhood stations are currently planned for either growth area, so this plan focuses on precinct facilities and other capital needs.

Figure 12. Current and Proposed Precinct Facilities



The City of Phoenix Police Department precinct planning is designed to maintain a safe and equivalent level of service across the city, as well as to maintain adequate response times to calls for service. The level of service provided by the City's existing six precinct stations, expressed in terms of EDUs per station, is shown in Table 73. Based on that existing level of service, the City will need a total of ten precinct stations at build-out. This is consistent with the Police Department's current plans. Since the last plan update, the Police Department has acquired land for and started construction on two new precinct stations, one located in the Northern Growth Area and one located in Estrella/Laveen. The City will have eight precincts upon completion of these precinct stations. In addition, the Department still anticipates needing to add at least two additional precinct stations prior to build-out, one of which is proposed in the far northwest part of the city. The existing six precincts and three of the planned precinct stations are illustrated in Figure 12.

Table 73. Existing Precinct Station Level of Service

Existing City-Wide EDUs	738,774
÷Existing Precinct Stations	6
Current EDUs/Station	**123,129**
Build-Out City-Wide EDUs	1,262,906
÷Current EDUs/Station	123,129
Total Future City-Wide Precinct Demand	**10**

Source: Existing city-wide EDUs from Table 159; existing precinct stations from Table 167; build-out city-wide EDUs from Table 160.

The planned precinct improvement costs are based on prototype facility costs and recent land acquisition costs. The land costs for the Police impact fee are the same as those used for the Fire Protection impact fee, since the site requirements are similar to fire stations.

The prototypical precinct station is based on the design for the 99th Avenue and Lower Buckeye Road precinct station. As with this new station, the prototypical precinct station has 24,500 square feet and includes a briefing room, lobby, holding cells, secretarial and supervisory offices, workstations, rest rooms, space for support staff and locker space. The cost to construct precinct stations is based on the current bid and cost data for the 99th Avenue facility. As shown in Table 74, a prototypical 24,500 square foot precinct station costs approximately $9.0 million based on the current construction costs. Despite the fact that construction costs have been falling in the Phoenix area, no downward adjustment was deemed necessary, since over $2 million in on-site and off-site costs have been excluded.

Table 74. Precinct Station Construction Cost

Design/Build Process - Design and Construction Cos	$5,997,312
FF&E and Telecommunications	$1,199,462
Engineering and Architectural Services (incl Permits,	$1,799,194
Total Construction Cost	$8,995,968
÷ Square Feet	24,500
Adjusted Cost per Square Foot	**$367**

Source: City of Phoenix Police Department 99th Ave. and Lower Buckeye Precinct Station project cost breakdown and square feet, January 7, 2010.

The vehicle fleet necessary for the initial operation of each precinct station is also included in the impact fee costs. The average precinct station currently has more than 160 vehicles with 145 marked vehicles. In planning the vehicles necessary for future precinct stations, the Police Department includes 125 officer cars, 26 sergeant cars and 7 lieutenant cars. The cost of patrol vehicles is based on current pricing for fully equipped vehicles. The costs of these vehicles vary from $50,265 for officer vehicles to $63,121 for lieutenant vehicles due to additional equipment needs. While current precinct stations include a mix of patrol cars and patrol SUVs, the impact fee analysis assumes that all precinct vehicles will be cars.

The Police impact fee includes an allocation of the cost of a planned communications facility that will serve all precincts, but will be necessary to accommodate new growth. The existing communications facility takes all 9-1-1 calls and transfers them to the appropriate response unit. The addition of a new communications center will increase the ability to respond and manage police resources, increase the security of the communication abilities of the Police Department and improve officer safety. This new central facility will be required based on projected growth, to provide equivalent levels of service throughout the city. The Police Department has also begun planning for an expansion of the centralized training facility and a new specialty vehicle facility; however, these projects are not included in this update.

Planned Cost per Service Unit

Planned Police improvements needed to serve build-out development of the entire city are summarized in Table 75. The need for these improvements cannot be entirely attributed to new development in the growth areas, because the growth areas are part of larger precinct areas and because the new communications facility will serve the entire city. For these reasons, it is appropriate to divide the cost of the improvements by all new service units anticipated from development throughout the city in order to determine the planned improvement cost per service unit. There are currently no outstanding developer credits related to the Police impact fee in any of the service areas.

Table 75. Planned City-Wide Police Improvements and Cost /EDU

	Number	Unit Cost	Total Cost
New Precinct Stations	4	$8,995,968	$35,983,870
New Precinct Land Sites (acres)	20	$178,049	$3,560,986
New Officer Vehicles (at 125/station)	500	$50,265	$25,132,500
New Sergeant Vehicles (at 26/station)	104	$58,133	$6,045,832
New Lieutenant Vehicles (at 7/station)	28	$63,121	$1,767,388
New Communications Facility	1	$50,600,000	$50,600,000
Total Planned Improvements			**$123,090,576**
÷ New City-Wide EDUs			524,132
Planned Precinct Station Cost/EDU			$69
Planned Precinct Land Cost/EDU			$7
Planned Officer Vehicle Cost/EDU			$48
Planned Sergeant Vehicle Cost/EDU			$12
Planned Lieutenant Vehicle Cost/EDU			$3
Planned Communications Facility Cost/EDU			$97
Total Planned Cost per EDU			**$236**

Source: New station need is build-out need at existing LOS from Table 73; precinct station unit cost from Table 74; land site need based on two 10-acre sites (the City has already acquired the other two sites); cost per acre from Table 163; vehicles per station and unit cost from City of Phoenix Police Department, April 2, 2009; communications facility cost estimate from City of Phoenix Police Department, April 2, 2009; city-wide new service units from Table 72.

Level of Service Analysis

It is not possible to determine an existing police level of service for each service area, since the service areas are currently part of one or even two larger police precincts and essential centralized facilities, which serve the entire city, are not located within specific service areas. As a result, the existing level of service for police facilities is based on the city-wide provision of service. The existing inventory of police facilities is presented in Table 167, Appendix F: Police Facilities. The existing facilities that are included in the level of service analysis include precinct stations, neighborhood stations, command stations and communication facilities. Other facilities, such as City-wide training facilities, have not been included, in accordance with State statutes regarding restrictions of impact fee funding. The examination of the existing provision of police facilities and equipment to existing development will ensure that the Police impact fees in each service area are not based on a level of service that is higher than currently provided city-wide.

The existing level of service for Police facilities in this study is based on the replacement cost of existing precincts, neighborhood police stations and command facilities. The value of the existing facilities is based on the cost estimates used in developing the fee and the square feet and land associated with existing facilities. The analysis excludes temporary and leased facilities along with ancillary structures, such as storage sheds and metal/pre-fabricated warehouse and repair facilities. Based on precinct station construction costs per square foot and existing permanent facility square feet, the replacement value of existing police facilities is $80.1 million, as shown in Table 76.

Table 76. Existing Police Facilities

Precinct Stations (sq. ft.)	68,588
+ Neighborhood Stations (sq. ft.)	18,056
Total Precinct/Neighborhood Facilities (sq. ft.)	86,644
x Precinct Facility Cost/Sq. Ft.	$367
Precinct/Neighborhood Facility Cost	$31,798,348
Command Facilities/Communications (sq. ft.)	131,645
x Command Facility/Communicaitons Cost/Sq. Ft.	$367
Command Facilities/Communications Replacement Cost	$48,313,715
Total Facility Replacement Cost	**$80,112,063**

Source: Facility square foot from Table 167; police facility construction cost per square foot derived from Table 74; command facility/communications replacement cost assumed to be same as precinct cost.

The land replacement costs are based on the facility site sizes and the cost per acre for the area in which the facility is located, which is illustrated in Figure 18, Appendix F: Police Facilities. As shown in Table 77, the land replacement cost is approximately $12.9 million.

Table 77. Police Facility Land Replacement Cost

Facility	Land (Acres)	Cost/ Acre	Total Value
Cactus Park Precinct	4.00	$197,833	$791,330
Central City Precinct	5.00	$197,833	$989,163
Desert Horizon Precinct	5.00	$197,833	$989,163
Maryvale Precinct	5.00	$134,526	$672,630
South Mountain Precinct	5.80	$182,006	$1,055,635
Squaw Peak Precinct	4.00	$197,833	$791,330
Future Precinct #300 (99th Ave & Lower Buckeye Rd.)	12.00	$134,526	$1,614,312
Future Precinct #200 (Cave Creek & Smokehouse Tr.)	15.00	$197,833	$2,967,488
Subtotal, Precinct Stations			$9,871,051
North Command Station	6.00	$197,833	$1,186,995
Southern Command Station	5.00	$134,526	$672,630
Communications Facility	9.00	$134,526	$1,210,734
Subtotal, Command Facilities			$3,070,359
Total Land Replacement Value			**$12,941,410**

Source: Facility land from Table 167; cost per acre based on facility location and land costs from Table 163.

The existing precinct patrol vehicles include both patrol cars and patrol SUVs, as shown in Table 78. The level of service analysis excludes specialized vehicles and support vehicles.

Table 78. Existing Precinct Vehicle Inventory

	Vehicle Type	
Precinct	Patrol Car	Patrol SUV
South Mountain	128	45
Central City	100	43
Desert Horizon	100	42
Squaw Peak	91	41
Maryvale	103	44
Cactus Park	92	42
Total	**614**	**257**

Source: City of Phoenix Police Department, April 2, 2009.

The vehicle replacement costs are based on the weighted cost of officer, sergeant and lieutenant cars and their share of the precinct fleets. As shown in Table 79, the replacement cost of patrol cars is $52,038 and the cost of patrol SUVs is $61,038.

Table 79. Patrol Vehicle Unit Cost

Vehicle Type	Vehicle Distribution	Cost	Weighted Cost
Officer Car	80%	$50,265	$40,212
Sergeant Car	16%	$58,133	$9,301
Lieutenant Car	4%	$63,121	$2,525
Avg. Patrol Car Cost			**$52,038**
Officer SUV	80%	$59,265	$47,412
Sergeant SUV	16%	$67,133	$10,741
Lieutentant SUV	4%	$72,121	$2,885
Avg. Patrol SUV Cost			**$61,038**

Source: Vehicle distribution and cost per vehicle from City of Phoenix Police Department, April 2, 2009.

The total precinct patrol vehicle replacement cost is based on the weighted average cost per vehicle and the inventory of existing vehicles. As shown in Table 80, the replacement cost is $47.6 million.

Table 80. Police Precinct Vehicle Replacement Cost

Vehicle Type	Units	Cost/Vehilce	Total Value
Patrol Cars	614	$52,038	$31,951,332
Patrol SUV	257	$61,038	$15,686,766
Total Police Vehicle Replacement Cost			**$47,638,098**

Source: Vehicle units from Table 78; cost per unit from Table 79.

The City's existing communications equipment is located in the communications facility and police headquarters. The radio and 9-1-1 communications equipment replacement cost is based on the cost for the console positions. As shown in Table 81, the replacement cost of the existing communications equipment is approximately $1.2 million for each type of equipment.

Table 81. Police Communications Equipment Replacement Cost

	Communications Type	
Location	Radio	911
Communications	26	30
+ Police Headquarters	21	22
Total Consoles	47	52
x Cost per Console	$24,879	$22,147
Total Console Cost	**$1,169,313**	**$1,151,644**

Source: Inventory and replacement cost from City of Phoenix Police Department, April 2, 2009.

Total facility, land, vehicle and equipment cost used in the city-wide provision of the Police Department's public protection activities is divided by the existing city-wide service units to determine the per service unit capital investment necessary to maintain the existing Police Department level of service. The total existing impact fee account balances for all three service areas are added to the value of the facilities, because these cash funds have been paid by existing development. The amount of police-related debt per EDU is subtracted to account for existing facilities that are not yet paid for. As shown in Table 82, the existing level of service, measured as the net cost per EDU, is $199 per EDU.

Table 82. Existing Police Facility Cost per EDU

Facility Replacement Cost	$80,112,063
Facility Land Replacement Cost	$12,941,410
Precinct Vehicle Replacement Cost	$47,638,098
Radio Equipment Cost	$1,169,313
911 Equipment Cost	$1,151,644
Subtotal, Facility and Equipment Value	$143,012,528
+ Existing City-wide Police Impact Fee Balance	$4,021,740
Total Replacement Value	$147,034,268
÷ Existing City-Wide EDUs	738,774
Existing Police Facility Cost/EDU	**$199**

Source: Facility replacement cost from Table 76; land replacement cost from Table 77; vehicle replacement cost from Table 80; radio and 911 equipment cost from Table 81; existing city-wide Police impact fee balance from City of Phoenix Police Department, April 2, 2009; existing city-wide EDUs from Table 72.

To calculate the existing police expenditures for each service area, the existing police facility cost per EDU is multiplied by the number of existing service units in each service area, as shown in Table 83. The result is the existing police investment in each service area.

Table 83. Existing Police Investment in Impact Fee Service Areas

	Northern Growth Area	Estrella/ Laveen	Ahwatukee
Existing Police Facility Cost/EDU	$199	$199	$199
x Existing EDUs	29,343	40,687	37,389
Total Existing Police Investment	**$5,839,257**	**$8,096,713**	**$7,440,411**

Source: Existing police facility cost/EDU from Table 82; existing EDUs from Table 72.

The total existing police investment is then added to the cost of the future planned police expenditures for each service area to find the total (combined) investment for each service area. The total (combined) investment is then divided by the the total EDUs (both existing and future) to determine the total (combined) cost per EDU in each service area, as shown in Table 84.

Table 84. Total (Combined) Police Expenditures per EDU

	Northern Growth Area	Estrella/ Laveen	Ahwatukee
Total Existing Police Investment	$5,839,257	$8,096,713	$7,440,411
Planned Police Expenditures	$38,550,128	$18,589,720	$733,252
Total (Combined) Investment, Existing and Planned	$44,389,385	$26,686,433	$8,173,663
÷ Total Service Area EDUs	192,691	119,457	40,496
Total (Combined) Cost per EDU	**$230**	**$223**	**$202**

Source: Total existing police investment from Table 83; planned police expenditures from Table 75; total service area EDUs from Table 72.

Gross Cost per EDU

In order to determine the potential gross fee per EDU for each service area, the total (combined) existing investment plus future planned expenditures) cost per EDU is compared to the plan-based cost per EDU for each service area. To make sure that new development is not paying for a higher level of service than existing development, the lower of the two amounts is selected to determine the gross impact fee for each service area. As shown in Table 85, the selected amount is the total (combined) cost per EDU for all three service areas.

Table 85. Comparison of Total (Combined) Costs and Plan-Based Costs per Service Area

	Northern Growth Area	Estrella/ Laveen	Ahwatukee
Total (Combined) Cost per EDU	$230	$223	$202
Plan-Based Cost per EDU	$236	$236	$236
Gross Cost per EDU	**$230**	**$223**	**$202**

Source: Total (combined) costs per EDU from Table 84; plan-based costs from Table 83.

Offsets

Before determining an actual impact fee schedule, offsets must be taken into consideration. An offset is applied for any other type of revenue dedicated to paying for a portion of the same improvements funded by impact fees, which includes future tax payments that will retire outstanding debt used to develop the existing police facilities.

Secondary Property Tax Offset

The major funding sources for police facilities in Phoenix consist primarily of debt funded through the secondary property tax along with impact fee funds in the growth areas. However, there is a considerable amount of outstanding debt on existing police facilities. Not all of the existing police facilities and equipment have been paid for by existing development. The summary of outstanding police-related debt issues are shown in Table 86.

Table 86. Outstanding Police-Related Bond Issues

Series	Original Principal	Bonds Outstanding
1995A	$3,530,000	$975,000
2002B	$4,555,000	$3,365,000
2004	$10,000,000	$5,845,000
2005B	$35,680,000	$30,530,000
2007	$12,675,000	$10,060,000
2007A	$25,905,000	$26,050,000
Subtotal, Police Debt	$92,345,000	$76,825,000
2002B	$51,500,000	$14,515,000
2004	$33,000,000	$25,125,000
2004R	$7,300,000	$1,960,000
2005B	$30,000,000	$20,000,000
2007A	$4,300,000	$4,300,000
2007B	$21,110,000	$21,110,000
Subtotal, Fire/Police/Tech Debt	$147,210,000	$87,010,000
Total Police-Related Debt	**$239,555,000**	**$163,835,000**

Source: Outstanding property tax funded debt series, original principal and outstanding balance provided by City of Phoenix Finance Administration, February 20, 2009.

A portion of the outstanding debt issues shown in the preceding table was used to fund other non-police facilities. Since the exact allocation of the joint debt issues cannot be determined, this study includes an analysis of all existing police facilities that were funded in whole or in part with debt

issues in the City's CIP over the past 25 years. The debt funded facilities are listed in Table 168, Appendix F: Police Facilities. Based on this analysis, the City of Phoenix has utilized $122.8 million in secondary property tax bonds for police-related projects.

The secondary property tax offset is based on the police facility share of outstanding secondary property tax bonds that have been partially utilized for Fire Protection facilities. Based on this analysis, approximately 24 percent of the police-related debt issues were utilized for police facilities. Based on the outstanding police-related bond issues principal, the police facility share of police-related debt is approximately $39 million, as shown in Table 87.

Table 87. Outstanding Police Debt

Total Debt-Funded Police Facilities	$57,063,844
÷ Total of Original Principal Police-Related Debt	$239,555,000
Police Facility Share of Debt Issues	23.8%
x Police-Related Bonds Outstanding	$163,835,000
Outstanding Police Facility Debt	**$38,992,730**
÷ Existing City-Wide EDUs	738,774
Outstanding Police Debt per EDU	**$53**

Source: Existing debt-funded facilities from Table 168; total of original police-related debt principal from Table 86; existing city-wide EDUs from Table 72.

Potential Net Fee per EDU

The potential net cost per EDU for each service area is calculated by subtracting the offset per EDU from the gross cost per EDU, as shown in Table 88.

Table 88. Potential Net Fee per EDU, Police

	Northern Growth Area	Estrella/ Laveen	Ahwatukee
Gross Cost per EDU	$230	$223	$202
– Outstanding Police Debt per EDU	-$53	-$53	-$53
Potential Net Fee per EDU	**$177**	**$170**	**$149**

Source: Gross cost per EDU from Table 85; outstanding police debt from Table 87.

Recommended Police Impact Fee Schedule

The recommended Police impact fee schedule would normally be calculated using the potential net fees as shown in Table 88. However, recently imposed State regulations currently prohibit an increase in existing impact fees. Therefore, the adopted net impact fees per EDU are compared with the potential net fees per EDU in Table 89. Since the potential net fee is less than the current fee for each service area, no adjustments are required.

Table 89. Recommended Net Impact Fee / EDU, Police

	Northern Growth Area	Estrella/ Laveen	Ahwatukee
Adopted Net Fee per EDU	$209	$209	$209
Potential Net Fee per EDU	$177	$170	$149
Recommended Net Fee per EDU	**$177**	**$170**	**$149**

Source: Adopted fees per EDU from City of Phoenix Code of Ordinances, Chapter 29, adopted May, 2011; potential net fee per EDU from Table 88.

Police Improvements Plan

The portion of the cost of future police protection capital improvements in each service area attributable to new development and the potential revenue from Police impact fees if adopted at the full net cost should be the identical amount, because the fees are calculated to cover the growth-related cost. Any additional cost not covered by potential impact fee revenue is not attributable to existing development in the service area – this would only be the case if the fees were based on a higher level of service than currently exists, in which case the deficit would be attributable to an existing capacity deficiency. Consequently, no additional offset against the impact fees is warranted for any additional non-impact fee funding used to pay for needed police capital improvements in the impact fee service areas.

The growth share of future costs, which is the same as potential impact fee revenue, is the product of the net cost per service unit and the number of future service units from now to build-out. Potential impact fee revenue for each of the three service areas is shown in Table 90.

Table 90. Potential Police Impact Fee Revenue

	Northern Growth Area	Estrella/ Laveen	Ahwatukee
Net Cost per EDU	$177	$170	$149
x New EDUs, 2009-Buildout	163,348	78,770	3,107
Potential Impact Fee Revenue	**$28,972,322**	**$13,422,236**	**$462,442**

Source: Net cost per EDU from Table 89; new EDUs from Table 72.

The police improvements plan for all three service areas is shown in Table 91. The improvements plan provides a list of planned capital improvements and other expenditures that are eligible to be funded by the impact fees. Since precinct boundaries do not match existing service area boundaries, a portion of impact fee revenues from each area may be programmed for precinct stations that will serve the impact fee service areas and the growth-related share of centralized facilities. Currently, the 2009-2013 CIP includes expenditures for two planned precinct stations that will serve the northern growth area, the Northwest and Northeast precincts. It should be kept in mind, however, that these planned expenditures may change with subsequent CIPs as the City revisits the city-wide precinct plans. The planned expenditures are NOT adjusted to reflect the impact fee account balance in each service area, as these funds may be reserved for capital facilities approved in a prior version of this Infrastructure Improvements Plan.

Projects not currently in the five-year CIP will be programmed by the City Council in future CIPs based on need and will depend on availability of funding. If the Police impact fee is adopted at the full potential impact fee schedule calculated in this report, a portion of the planned improvements in each service area will still need to be funded by other revenue sources. The mix of funding sources available to fund necessary public services beyond the portion covered by the impact fee calculated in this report will be determined by the actions of future City Councils in prioritizing projects, allocating funding in future CIPs and the availability of impact fee revenue in each service area. This study does not include a specific estimate of the time required to finance and provide the necessary public services between 2013 and build-out for each service area, as the build-out for each impact

fee service area is likely to vary depending on market conditions and availability of land for new development.

Table 91. Police Improvements Plan

Police Facility	FY 2009-2013	Beyond 2013	Total
NE/Cave Creek Precinct	$19,336,000	$0	$19,336,000
NW Precinct Land	$2,600,000	$0	$2,600,000
NW Precinct Construction	$0	$8,995,968	$8,995,968
Future Planned Improvements	$0	$7,974,349	$7,974,349
Total Planned Expenditures, Northern Growth Area	$21,936,000	$16,970,317	$38,906,317
– Growth Costs & Potential Impact Fee Revenue			-$28,972,322
Additional Funding Requirement, Northern Growth Area			**$9,933,995**
SW Precinct	$14,260,000	$0	$14,260,000
Future Planned Improvements	$0	$4,409,424	$4,409,424
Total Planned Expenditures, Estrella/Laveen	$14,260,000	$4,409,424	$18,669,424
– Growth Costs & Potential Impact Fee Revenue			-$13,422,236
Additional Funding Requirement, Estrella/Laveen			**$5,247,188**
South Mountain Precinct Addition	$732,188	$0	$732,188
Future Planned Improvements	$0	$0	$0
Total Planned Expenditures, Ahwahtukee	$732,188	$0	$732,188
– Growth Costs & Potential Impact Fee Revenue			-$462,442
Additional Funding Requirement, Ahwatukee			**$269,746**

Source: 2009-2013 project cost based on total programmed project expenditure in the City of Phoenix, *2009-2013 Capital Improvement Program* (except that only a portion of the South Mountain Precinct addition is attributed to growth, since the total cost exceeds the build-out plan-based costs attributable to Ahwatukee); beyond 2013 costs are differences between 2009-2013 and total planned expenditures; growth costs/potential revenue from Table 90.

INFRASTRUCTURE IMPROVEMENTS PLAN: ROADWAY FACILITIES

Prior to this impact fee update, the City utilized the Major Streets and Bridges impact fee to fund growth-related improvements to the arterial street system in the growth areas. The arterial street network provides the backbone of the Phoenix street system and is primarily designed to provide long distance travel, with access to abutting land uses a secondary function. The arterial roads are generally four- or six-lane roadways with a median or center turn lane. The Major Streets and Bridges impact fee also included bridges, culverts and drainage facilities and traffic interchanges that are part of the arterial street system.

Per the recommendation of the City's Impact Fee Ad Hoc committee established after the public review draft of the updated impact fee study was published in August 2008, the Major Streets and Bridges impact fee was renamed the "Roadway Facilities Impact Fee". This section presents the Roadway Facilities impact fee calculations based on recommendations by the Ad Hoc Committee. The Ad Hoc Committee alternative is based on the cost to complete major transportation facilities, including bridges, drainage facilities and regional transportation facilities. The Ad Hoc Committee's alternative excludes the costs related to right-of-way acquisition, most arterial street construction and Sonoran Parkway (Boulevard). The recommended impact fee schedule is also based on the Ad Hoc Committee alternative.

Arterial Street System and Service Area

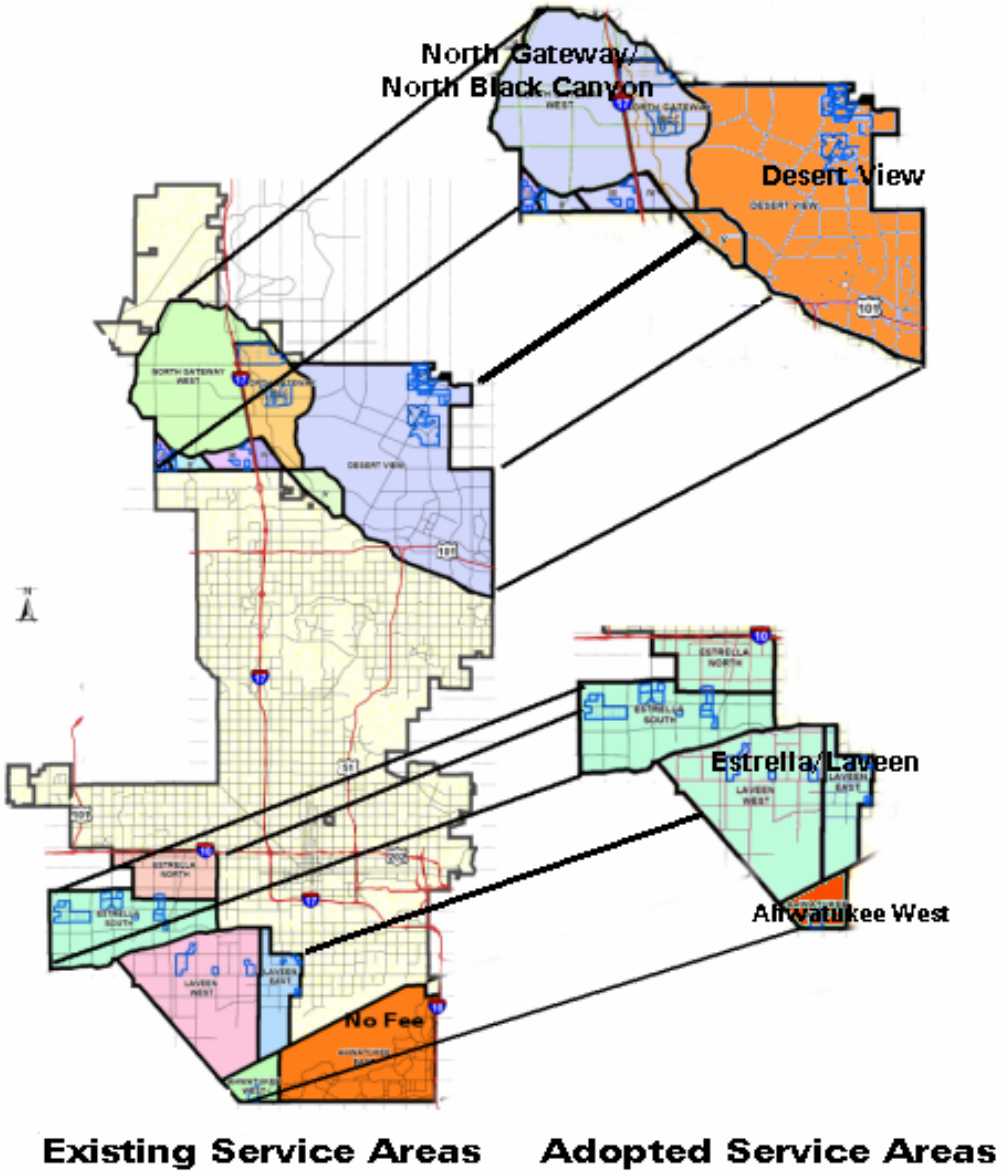
In an impact fee system, it is important to clearly define the geographic areas within which impact fees will be collected and within which the fees collected will be spent. There are really two types of geographic areas that serve different functions in an impact fee system: service areas and benefit districts. Service areas define the area within which a set of common capital facilities provides service, and for which a fee schedule based on average costs within that district is calculated. Benefit districts, on the other hand, represent an area within which the fees collected must be spent. The City currently has seven separate roadway facilities service areas, which also serve as benefit districts.

Generally, arterial street impact fees tend to have a single service area and a uniform fee schedule. That is because the arterial system is designed to move traffic from one part of a community to another, and improvements to this system are generally of community-wide benefit. The original policy recommendation was to simplify the current fee schedule and recognize the integrated nature of the planned arterial street system by combining the three northern service areas into one unified service area and benefit district and combining Estrella North, Estrella South, Laveen and Ahwatukee West into one service area and benefit district. As in the past, Ahwatukee East would remain exempt from the Roadway Facilities impact fee, since the arterial street network in that area is largely complete.

The Ad Hoc Committee recommended, and the City Council adopted, two service areas in each growth area. In the Northern Growth Area, the adopted service area boundaries combine the North Gateway West and North Gateway Black Canyon Corridor (NBCC) service areas and maintain a separate service area in Desert View. In the Southern Growth Area, the Estrella and

Laveen service areas are combined, while Ahwatukee West remains a separate service area. The existing and adopted service area boundaries are illustrated in Figure 13.

Figure 13. Adopted Roadway Facilities Service Area Boundaries



Methodology

There are two main alternative methodologies used in impact fee analysis: "plan-based" and "standards-based." One variant of the standards-based methodology, known as the "incremental expansion" approach, assumes that existing infrastructure is adequate to serve existing development, and will need to be expanded in proportion to growth. Such an approach does not require a list of planned improvements, but requires only the cost to provide the existing level of service.

The plan-based methodology, also called an "improvements-based" approach, essentially divides the cost of growth-related improvements required over a fixed planning horizon by the number of new service units projected to be generated by growth over the same planning horizon in order to determine a cost per service unit.

In the past, the City of Phoenix utilized the plan-based approach in developing the impact fees. However, the City's approach differed from the traditional plan-based approach in that the City utilized total future EDUs expected to be in the service area in 2030 as the basis for the impact fee calculation, rather than the expected new growth in service units added through 2030. Since the planned improvements are designed to serve new growth rather than existing development, the fee calculated in this report is developed by dividing growth's share of the cost of the improvements by new EDUs added over the planning horizon, not existing plus new EDUs as was done previously.

Generally, a plan-based approach must be based on a facility master plan that ensures that the listed improvements are going to be needed over the planning horizon on which the fees are based. However, a time-specific plan is not required if the planning horizon is build-out and the community has determined the ultimate facilities needed to accommodate build-out conditions. Since the planned street improvements reflect build-out conditions rather than a specific planning horizon, the updated impact fees will be based on build-out land use projections provided by Maricopa Association of Governments (MAG), rather than the 2030 development projection.

One of the principles of impact fees is that new development should not be charged for a higher level of service than is provided to existing development. The City has not needed to measure the existing level of service in previous updates, since its methodology (dividing cost of improvements needed over a planning period by total EDUs at the end of the planning period) was so conservative. However, the revised methodology used in this update requires an analysis of the existing level of service, because it raises the possibility that the final increment of development could be required to pay for more than its share of the cost (e.g., the last 10 percent of growth paying for 50 percent of the cost of facilities). To ensure that this does not happen, this study includes an existing level of service analysis of the overall arterial roadway system. If the level of service at build-out is lower than the existing level of service, the cost per service unit will be calculated by dividing remaining project costs by new service units. If the level of service at build-out is higher than the existing level of service, the cost per service unit will be based on the existing level of service. The level of service analysis for roadway facilities is based on the system-wide ratio of capacity to demand (see Table 109).

Service Units

This study maintains the City's prior practice of utilizing the EDU as the basis for measuring the demand on the arterial street system for each land use relative to the impact of a typical single-family detached dwelling unit. The City's 2006 EDU factors for each land use were identified in the City's impact fee ordinance and are based on the average weekday vehicle trips adjusted by primary trip rate and trip length associated with each land use. The denominator used in calculating the EDU factors is the daily travel generated by the standard density single-family housing unit. While plan-based road impact fees can use only vehicle trips as the basis of the service unit, EDU factors that take into account trip length and new trips are generally preferred, since this approach takes into consideration that land uses that generate more trips also generally generate shorter trips and attract more pass-by trips. This update maintains the City's approach in calculating the EDU factors; however, elements of the EDU calculation are updated to reflect the most current and applicable data available and the number of land use categories are reduced in order to simplify impact fee administration.

Travel Demand

Travel demand is expressed in terms of vehicle-miles of travel (VMT), which is the product of trip generation, new trip factors and average trip lengths. Trip generation rates represent trip ends, or driveway crossings at the site of a land use. The trip generation data used in the City's 2006 calculation for major land use EDU factors were based on the average weekday trip rates from the Institute of Transportation Engineers (ITE), *Trip Generation, 6th Edition*, which was published in 1997, or the San Diego Association of Governments (SANDAG), *Traffic Generators*, which was published in 1990.[4] In this update, the City's EDU factors are updated to reflect the most recent average daily trip rates from ITE's *Trip Generation, 7th Edition,* which was published 2003.

Adjustments to the trip rates are made to reflect the proportion of trips that are primary trips, and to exclude pass-by and diverted-link trips. These adjustments are intended to reduce the possibility of over-counting additional travel induced by a new development. Pass-by trips are those trips that are already on a particular route for a different purpose and simply stop at a development on that route. For example, a stop at a convenience store on the way home from the office is a pass-by trip for the convenience store. A pass-by trip does not create an additional burden on the street system and therefore should not be counted in the assessment of impact fees. A diverted-link trip is similar to a pass-by trip, but a diversion is made from the regular route to make an interim stop. The City's 2006 primary trip factors were drawn from SANDAG's *Traffic Generators,* published in 1990. This update utilizes more recent primary trip factors available for retail land uses from the ITE *Trip Generation Handbook*, published in 2004 and more recent SANDAG data for non-retail categories published in 2002. The *Trip Generation Handbook* contains data on primary trip, pass-by trip and diverted-link trip percentages based on national studies for almost twenty different retail categories.

Finally, the transportation demand factor is adjusted to reflect the average length of a trip for each land use. The 2006 trip length data were derived from local household travel surveys conducted

[4] San Diego Association of Governments, *Traffic Generators*, January 1990, cited in City of Phoenix Planning Department, *Derivation of Equivalent Dwelling Unit Factors for Development Impact Fees*, February 27, 2002..

almost 20 years ago.[5] More current national data are available from the U.S. Department of Transportation, *National Household Travel Survey,* published in 2001. This update utilizes the more recent national trip length data for different land uses. Since the trip length data are used to estimate relative trip lengths, the national data are reasonable to use for Phoenix. The recommended roadway facilities EDUs based on VMT for Phoenix are shown in Table 92.

Table 92. Roadway Facilities Service Unit Multipliers

Land Use	Unit	Trip Rate (ITE7)	Primary Trip %	Trip Length (Mi.)	VMT	EDU Ratio
Single-Family Detached	Dwelling	9.57	86%	10.31	42.43	1.00
Multi-Family	Dwelling	6.59	86%	10.31	29.22	0.69
Mobile Home/RV Park	Space	4.99	86%	10.31	22.12	0.52
Shopping Center/General Retail	1000 sq. ft.	42.94	43%	7.02	64.81	1.53
Lodging, Hotel/Motel, Resort	Room	6.90	58%	7.22	14.45	0.34
Office	1000 sq. ft.	11.01	82%	9.87	44.55	1.05
Religious Facility	1000 sq. ft.	9.11	64%	7.53	21.95	0.52
Day Care Center	1000 sq. ft.	79.26	24%	3.77	35.86	0.85
Elementary School, Private	1000 sq. ft.	14.49	57%	7.53	31.10	0.73
High School, Private	1000 sq. ft.	12.89	75%	7.53	36.40	0.86
Hospital	1000 sq. ft.	17.57	73%	9.88	63.36	1.49
Nursing Home	1000 sq. ft.	6.10	73%	9.88	22.00	0.52
Industrial and Manufacturing	1000 sq. ft.	6.96	79%	9.87	27.13	0.64
Warehouse	1000 sq. ft.	4.96	92%	9.87	22.52	0.53
Mini Warehouse	1000 sq. ft.	2.50	92%	7.22	8.30	0.20

Source: Trip rate is daily trips during weekday from Institute of Transportation Engineers (ITE), *Trip Generation, 7th ed.*, 2003; primary trip percentage for retail from ITE, *Trip Generation Handbook*, June 2004, day care center from Preston Hitchens, "Trip Generation of Day Care Centers," 1990 *ITE Compendium*, and all other primary trip rates from San Diego Association of Governments, "Brief Guide of Vehicular Traffic Generation Rates for the San Diego Region," April 2002; trip length from the Online Analysis Tool for the 2001 National Household Travel Survey on http://nhts.ornl.gov, table created on August 7, 2007 (residential trip length is weighted 20% work trip length and 80% average trip length); VMT is product of ½ trip rate, primary trip percentage and trip length; EDU ratio is ratio of VMT to VMT for single-family detached units.

Existing and Future Service Units

In order to determine the existing level of service and calculate the Roadway Facilities impact fee, it is necessary to determine the existing and future service units in the service area. The EDU factors used in estimating the future service units used in the *Specific Infrastructure Financing Plan* are based on generalized major land use categories for which land use data are available. The proposed EDU factors for developing the impact fee calculation are shown in Table 93.

[5] Maricopa Association of Governments Transportation Planning Office, *1988/1989 Household Travel Survey*, 1989.

Table 93. Roadway Facilities Generalized EDU Factors

Land Use	Unit	EDU Factor
Single-Family, Detached	Dwelling	**1.00**
Multi-Family	Dwelling	**0.69**
Retail	1000 Sq. Ft.	**1.53**
Office	1000 Sq. Ft.	**1.05**
Industrial	1000 Sq. Ft.	**0.64**
Public/Other	1000 Sq. Ft.	**0.52**

Source: EDU factors from Table 92.

In order to determine the existing level of service and calculate the Roadway Facilities impact fee, it is necessary to determine the existing and future service units for each of the growth areas as well as city-wide. The existing service unit calculation is based on the EDU shown in Table 93 factors and an analysis of existing residential and nonresidential development prepared by Maricopa Association of Governments (MAGs). The existing service units in each service area are shown in Table 94, the existing level of development range from EDUs in Ahwatukee West to EDUs in Estrella/Laveen; city-wide, there are approximately 0.9 million EDUs.

Table 94. Existing Roadway Facilities Service Units

Land Use	Unit	Units	EDU/Unit	EDUs
Single-Family Detached	Dwelling	7,900	1.00	7,900
Multi-Family	Dwelling	700	0.69	483
Retail	1000 Sq. Ft.	541	1.53	828
Office	1000 Sq. Ft.	32	1.05	34
Industrial	1000 Sq. Ft.	0	0.64	0
Public/Other	1000 Sq. Ft.	231	0.52	120
Subtotal, North Gateway/NBCC				**9,365**
Single-Family Detached	Dwelling	13,500	1.00	13,500
Multi-Family	Dwelling	2,800	0.69	1,932
Retail	1000 Sq. Ft.	4,595	1.53	7,030
Office	1000 Sq. Ft.	968	1.05	1,016
Industrial	1000 Sq. Ft.	522	0.64	334
Public/Other	1000 Sq. Ft.	2,346	0.52	1,220
Subtotal, Desert View				**25,032**
Total, Northern Growth Area				34,397
Single-Family Detached	Dwelling	29,900	1.00	29,900
Multi-Family	Dwelling	2,100	0.69	1,449
Retail	1000 Sq. Ft.	5,765	1.53	8,820
Office	1000 Sq. Ft.	65	1.05	68
Industrial	1000 Sq. Ft.	10,001	0.64	6,401
Public/Other	1000 Sq. Ft.	1,769	0.52	920
Subtotal, Estrella/Laveen				**47,558**
Single-Family Detached	Dwelling	500	1.00	500
Multi-Family	Dwelling	0	0.69	0
Retail	1000 Sq. Ft.	0	1.53	0
Office	1000 Sq. Ft.	0	1.05	0
Industrial	1000 Sq. Ft.	0	0.64	0
Public/Other	1000 Sq. Ft.	38	0.52	20
Subtotal, Ahwatukee West				**520**
Total, Southern Growth Area				48,078
Single-Family Detached	Dwelling	379,800	1.00	379,800
Multi-Family	Dwelling	186,000	0.69	128,340
Retail	1000 Sq. Ft.	160,631	1.53	245,765
Office	1000 Sq. Ft.	80,742	1.05	84,779
Industrial	1000 Sq. Ft.	66,679	0.64	42,675
Public/Other	1000 Sq. Ft.	74,962	0.52	38,980
City-Wide				**920,339**

Source: Existing units from Table 154 (Southern Growth Area total excludes Ahwatukee East); EDU/unit from Table 93.

Future service units are estimated based on residential and nonresidential development growth forecasts prepared for Phoenix by MAG. As shown in Table 95, the total number of EDUs will grow to an estimated 54,400 EDUs in the Northern Gateway/NBCC, 249,058 EDUs in Desert View, 1,100 EDUs in Estrella/Laveen and 143,419 EDUs in Ahwatukee West. City-wide, Phoenix will grow to an estimated 1.6 million EDUs.

Table 95. Build-Out Roadway Facilities Service Units

Land Use	Unit	Units	EDU/Unit	EDUs
Single-Family Detached	Dwelling	33,800	1.00	33,800
Multi-Family	Dwelling	21,500	0.69	14,835
Retail	1000 Sq. Ft.	19,819	1.53	30,323
Office	1000 Sq. Ft.	35,839	1.05	37,631
Industrial	1000 Sq. Ft.	5,448	0.64	3,487
Public/Other	1000 Sq. Ft.	2,076	0.52	1,080
Subtotal, North Gateway/NBCC				**121,156**
Single-Family Detached	Dwelling	54,400	1.00	54,400
Multi-Family	Dwelling	33,100	0.69	22,839
Retail	1000 Sq. Ft.	21,171	1.53	32,392
Office	1000 Sq. Ft.	8,742	1.05	9,179
Industrial	1000 Sq. Ft.	8,582	0.64	5,492
Public/Other	1000 Sq. Ft.	6,923	0.52	3,600
Subtotal, Desert View				**127,902**
Total, Northern Growth Area				249,058
Single-Family Detached	Dwelling	76,900	1.00	76,900
Multi-Family	Dwelling	12,900	0.69	8,901
Retail	1000 Sq. Ft.	15,405	1.53	23,570
Office	1000 Sq. Ft.	7,774	1.05	8,163
Industrial	1000 Sq. Ft.	33,619	0.64	21,516
Public/Other	1000 Sq. Ft.	4,769	0.52	2,480
Subtotal, Estrella/Laveen				**141,530**
Single-Family Detached	Dwelling	1,100	1.00	1,100
Multi-Family	Dwelling	200	0.69	138
Retail	1000 Sq. Ft.	360	1.53	551
Office	1000 Sq. Ft.	0	1.05	0
Industrial	1000 Sq. Ft.	0	0.64	0
Public/Other	1000 Sq. Ft.	192	0.52	100
Subtotal, Ahwatukee West				**1,889**
Total, Southern Growth Area				143,419
Single-Family Detached	Dwelling	515,900	1.00	515,900
Multi-Family	Dwelling	409,800	0.69	282,762
Retail	1000 Sq. Ft.	256,486	1.53	392,424
Office	1000 Sq. Ft.	250,903	1.05	263,448
Industrial	1000 Sq. Ft.	146,119	0.64	93,516
Public/Other	1000 Sq. Ft.	106,269	0.52	55,260
City-Wide				**1,603,310**

Source: Build-out units from Table 155 (Southern Growth Area total excludes Ahwatukee East); EDU/unit from Table 93.

To determine the cost per service unit using the plan-based methodology, the planned improvement costs are divided by the projected growth through build-out. As shown in Table 96, development in North Gateway/NBCC is expected to add an estimated 111,791 EDUs, new development will add 102,870 EDUs in Desert View, Estrella/Laveen is expected to grow by 93,972 EDUs and Ahwatukee will grow by 1,369 EDUs. City-wide growth is expected to add approximately 0.7 million EDUs.

Table 96. New Roadway Facilities Service Units

	Build-Out	Existing	New EDUs
North Gateway/NBCC	121,156	9,365	111,791
Desert View	127,902	25,032	102,870
Subtotal, Northern Growth Area	249,058	34,397	214,661
Estrella/Laveen	141,530	47,558	93,972
Ahwatukee West	1,889	520	1,369
Subtotal, Southern Growth Area	143,419	48,078	95,341
All Service Areas	535,896	130,553	405,343
Other Areas	1,067,414	789,786	277,628
Total City-Wide	1,603,310	920,339	682,971

Source: Build-out service units from Table 95; existing service units from Table 94.

Planned Improvements

The planned improvements utilized in this update are based on the planned street drainage and bridge facilities associated with the City's approved Street Classification Map, which defines the future arterial street network and the street cross-section. The classification map is not based on a fixed planning horizon, and, instead, represents the future arterial network that will be in place at build-out in the City's growth areas and has been developed to maintain Level of Service "D" (LOS D) for the evening peak-hour period.

As part of this update, the list of planned improvements has been reviewed and updated to reflect the facilities that remain to be constructed. Since 2006, the City has completed road projects on 35th Avenue, 51st Avenue, Southern Avenue, 75th Avenue, 67th Avenue, Van Buren Street and Jomax Road. The road construction projects on those streets also include related culvert, tiling and storm drain construction. In addition, the City has completed the 35th Avenue bridge over the Salt River and a large box culvert installation on 67th Avenue and Harrison Street. The planned culvert, drain and tiling improvements are summarized in Table 119, Table 120, and Table 121.

Planned Improvement Costs

Upon completion and presentation of the public draft of the prior impact fee update in August 2008, the Mayor appointed a 20-member Impact Fee Ad Hoc Committee to review the proposed impact fee and bring forth recommendations on adoption of the updated impact fee through consensus. The committee members included representatives of the home building community, commercial and multi-family developers and community members from the impact fee growth

areas. The committee held five meetings and achieved consensus on the Roadway Facilities impact fee components. In reviewing the Roadway Facilities impact fee, the Committee recommended changes to the service area boundaries, reducing the proposed fee by eliminating certain cost components and phasing the recommended fee schedule in over three years. The Committee's recommendations were presented to the City Council Transportation and Infrastructure Subcommittee on November 19, 2008; on December 2, 2008, the Council Subcommittee approved and forwarded the Ad Hoc Committee recommendations for consideration by the full City Council on March 4, 2009.

The recommended Roadway Facilities impact fee reflects full growth-related infrastructure costs for the regional facility, bridge, storm drain, culvert and irrigation tiling cost components only. The recommended fee is based on the Ad Hoc Committee's fee recommendation to exclude the costs related to right-of-way acquisition, arterial street construction and the Sonoran Parkway regional facility costs. As in prior studies, limited access highways and frontage roads are excluded from the impact fee, since they are typically funded by Federal and State governments and serve a wider regional area than arterial streets. As a result of the exclusion of arterial street costs, developers will be responsible for arterial street improvements and right-of-way dedication. The following sections illustrate the computation of the recommended Roadway Facilities impact fee along with the recommended phasing schedule for each service area.

The Roadway Facilities impact fee cost components were last updated in 2006 as part of the previous *Infrastructure Financing Plan* and were based on a cost analysis conducted by an engineering firm. Since the City updated the costs in 2006 as part of the *Infrastructure Financing Plan*, this update will retain the basis for the cost estimates and update the costs based on an analysis of recent bid tabulation data from similar projects and the inflation rate based on the change in the *Engineering News-Record* (ENR) Construction Cost Index (CCI). This approach to updating the component costs is similar to the methodology used by the City to update the bridge and drainage construction costs as part of the 2006 update, which was based on January 2007 costs. All construction and land costs in this update are based on January 2008 cost estimates.

Pass-Through Factor

In prior impact fee calculations, the streets and bridges costs were adjusted by 78 percent in the Northern Growth Area and 67 percent in the Southern Growth Area to account for the 22 percent and 33 percent, respectively, pass-through traffic in each area. The higher pass-through factor in the Southern Growth Area reflects the absence of freeways traversing through these areas; as a result, the arterial street network is expected to carry a larger proportion of the regional pass-through traffic. The pass-through traffic rate represents trips that do not have an origin or destination within the fee area and are based on the City's traffic model used in developing the planned improvements for the growth areas. In continuing to use the pass-through factor, the impact fee calculation pre-supposes that other funding will be used to pay for the portion of road costs related to the pass-through traffic that originates or terminates in areas without an impact fee or outside of the City's jurisdiction. In the absence of funding programmed for a portion of the roads from other funding sources, the City will not be able to fund the planned road system through impact fees.

Storm Drain, Culvert and Irrigation Tiling Construction Costs

The storm drainage, culvert and irrigation tiling costs associated with planned street construction in the service areas are based on a detailed analysis of drainage needs and projects that was prepared as

part of the 2006 update by J E Fuller Hydrology and Geo-Morphology, Inc. (The 2003 *Infrastructure Financing Plan* calculation, on which the 2006 fees were based, did not include a detailed list of necessary drainage improvements.) Drainage structures within arterial streets are provided to remove water from the pavement and consist of lateral or main line pipes as well as structures such as catch basins, manholes, connector pipes and fittings. Culverts, minor bridges and irrigation tiling allow arterial streets to cross over minor washes and irrigation ditches.

To determine the anticipated drainage facilities necessary within the Northern Growth Area, the City of Phoenix had J E Fuller Hydrology and Geomorphology develop a drainage plan and provide cost estimates for the future drainage facilities. The drainage plans identify drainage facility costs for culverts, storm drains and irrigation tiling needed in the growth areas. Irrigation tiling is necessary in the Southern Growth Area where roads encroach upon irrigation delivery laterals and tail-water ditches maintained by the Salt River Valley Water Users Association. The list of planned storm drainage, culvert and irrigation tiling facilities are summarized in Table 119, Table 120, and Table 121.

As with the other construction components, City staff identified facilities that remain to be constructed, and the January 2007 cost estimates were updated based on the ENR CCI data for January 2008. The culvert and irrigation tiling costs used in updating the impact fees are based on the original J E Fuller cost estimates, which were updated in 2006 as part of the 2006 *Infrastructure Financing Plan*. The culvert cost per unit is based on the size of the planned culvert and the cost per square foot; the irrigation tiling costs are based on the total length of tiling necessary and the cost per linear foot. The culvert and irrigation tiling costs used in this update were adjusted to January 2008 values based on the ENR CCI, as shown in Table 97.

Table 97. Culverts and Irrigation Tiling Unit Costs

		Cost per Unit		
Item	Unit	2003	2007	2008
Culverts	Sq. Ft.	$10.00	$28.74	$29.52
Irrigation Tiling	Lin. Ft.	$100.00	$250.00	$256.80

Source: 2003 construction cost derived from J E Fuller Hydrology and Geomorphology *Desert View Arterial Street Drainage Structure Analysis*, 2002, *Desert View Drainage Impact Fee Analysis Storm Drain Technical Memorandum*, 2002; 2007 cost derived from 2002 J E Fuller Desert View analysis and *North Gateway Drainage Structure Cost Analysis*, 2005; unit costs updated to January 2008 value using ENR CCI.

As shown in Table 98, the storm sewer unit costs have been updated from the J E Fuller costs and those used in the 2006 *Infrastructure Financing Plan*. As with the other cost estimates, the ENR CCI data was used to update the storm sewer costs used in this update. The storm sewer costs are based on the pipe diameter and the cost per linear foot.

Table 98. Storm Sewer Unit Costs

Sewer Type	Cost per Unit		
	2003	2007	2008
18-inch	$101.74	$110.50	$113.50
24-inch	$116.74	$136.00	$139.70
30-inch	$121.74	$144.50	$148.40
36-inch	$141.74	$178.50	$183.30
42-inch	$151.74	$195.50	$200.80
48-inch	$181.74	$246.50	$253.20
54-inch	$211.74	$297.50	$305.50
60-inch	$216.74	$306.00	$314.30
66-inch	$251.74	$365.50	$375.40
72-inch	$256.74	$374.00	$384.10
78-inch	$286.74	$425.00	$436.50
84-inch	$406.74	$629.00	$646.00
90-inch	$416.74	$646.00	$663.40
96-inch	$436.74	$680.00	$698.40
102-inch	$446.74	$697.00	$715.80
108-inch	$486.74	$765.00	$785.70

Source: 2003 construction cost derived from J E Fuller Hydrology and Geomorphology *Desert View Arterial Street Drainage Structure Analysis*, 2002, *Desert View Drainage Impact Fee Analysis Storm Drain Technical Memorandum*, 2002; 2007 cost derived from 2002 J E Fuller Desert View analysis and *North Gateway Drainage Structure Cost Analysis*, 2005; unit costs updated to January 2008 value using ENR CCI.

The net total adjusted drainage costs for each service area are summarized below in Table 99. Details of the planned storm drain, culvert and irrigation tiling improvements for each service area are shown in Table 119, Table 120, and Table 121. In addition to the direct construction cost, administrative costs related to construction, engineering and design account for 20 percent of the total construction cost. The drainage construction costs used in this update exclude culverts and storm drain costs associated with the Sonoran Parkway. As with the other cost components, the drainage costs are adjusted to reflect the pass-through traffic associated with each proposed service area.

Table 99. Drainage Construction Cost Summary

Cost Component	Northern Growth Area		Southern Growth Area	
	North Gateway/ NBCC	Desert View	Estrella/Laveen	Ahwatukee West
Storm Drains/Culverts	$108,591,424	$105,959,515	$75,821,128	$5,446,631
Irrigation Tiling	$0	$0	$39,875,904	$0
Total Drainage Construction	$108,591,424	$105,959,515	$115,697,032	$5,446,631
Construction Administration	$21,718,285	$21,191,903	$23,139,406	$1,089,326
Total Drainage Construction Cost	$130,309,709	$127,151,418	$138,836,438	$6,535,957
Pass-Through Adjustment	78%	78%	67%	67%
Total Adjusted Drainage Cost	$101,641,573	$99,178,106	$93,020,413	$4,379,091

Source: Northern Growth Area culvert and storm drain costs from Table 119; Southern Growth Area storm drain and culvert costs from Table 120; planned irrigation tiling cost from Table 121; administrative cost based on 20% of drainage construction; pass-through factor from City of Phoenix.

Major Bridges

The arterial street planning in both the northern and southern impact fee areas includes bridges for river and wash crossings and growth-related costs for major transportation facilities. The major transportation facilities include parkways that primarily serve the growth areas (these include Avenida Rio Salado and portions of Sonoran Parkway/Boulevard), as well as frontage roads and ramps that connect to regional freeways and expressways.

Major bridge facilities in the growth areas include planned bridge crossings for washes, creeks and the Central Arizona Project (CAP) canals. The major bridge facilities exclude culverts, which are included in the drainage costs. The bridge plans and cost estimates were developed by J E Fuller with cost estimates updated to reflect current prices. As shown in Table 100, the bridge cost estimates are based on the cost per square foot of bridge decking. The J E Fuller cost estimates have been updated to January 2008 values using the ENR CCI data.

Table 100. Bridge Cost Factors

Cost Component	Unit	Cost per Unit		
		2003	2007	2008
Bridge	Sq. Ft.	$66.00	$201.25	**$206.68**
CAP Bridge w/no Dike	Sq. Ft.	NA	$250.00	**$256.75**
CAP Bridge w/ Dike	Sq. Ft.	NA	$300.00	**$308.10**

Source: 2003 cost from J E Fuller, *Desert View Arterial Street Drainage Structure Analysis*, September 2002; 2007 costs based on J E Fuller, *Estrella, Laveen and Ahwatukee Foothills Drainage Structure Cost Analysis*, September 2003, and *North Gateway Drainage Structure Cost Analysis*, May 2005; January 2007 costs updated to January 2008 value using ENR CCI.

The planned bridge costs were developed using the cost per square foot and the design of planned bridge facilities. The total construction cost for bridges is reduced to reflect pass-through traffic; the allocation of the pass-through share for the bridges in the growth areas was developed by the Planning Department using computer models to estimate specific percentages of pass-through traffic for each facility. As a result, the pass-through adjustment rate for each bridge varies based on the road location and planned road characteristics.

The total cost for major bridges for all of the service areas are summarized in Table 101. As with construction administrative costs, the administrative costs for bridges are 20 percent.

Table 101. Major Bridge Cost Summary

	Northern Growth Area		Southern Growth Area	
	North Gateway/ NBCC	Desert View	Estrella/ Laveen	Ahwatukee West
Total Bridge Construction	$270,355,555	$63,633,828	$33,885,186	$0
Bridge Construction Administration	$54,071,111	$12,726,766	$6,777,037	$0
Total Bridge Costs	**$324,426,666**	**$76,360,594**	**$40,662,223**	**$0**

Source: Northern Growth Area bridge construction cost from Table 117; Southern Growth Area bridge construction costs from Table 118; bridge construction administration based on 20% of bridge costs.

Regional Transportation Facilities

The major transportation facility allocated to growth in the Northern Growth Area are the ramps for where Black Mountain Parkway (Boulevard) will connect with State Route 51. The major facility in the Southern Growth Area is the Avenida Rio Salado in Laveen, which will connect 51st Avenue to 67th Avenue along the Salt River, south of the Broadway Road alignment. The major facility project costs exclude Federal and State funding and are adjusted to reflect the pass-by factor for each growth area. As shown in Table 102, the total adjusted construction cost of major facilities in the Northern Growth Area is $49.2 million. The adjusted total cost of the Avenida Rio Salado project in the Southern Growth Area includes $80.6 million for construction. Right-of-way acquisition costs for regional transportation facilities have been excluded.

Table 102. Regional Transportation Facilities

Project	Design	Construction	Total Assembly
Black Mt. Parkway Ramps	$1,956,178	$38,443,178	$40,399,356
Subtotal, Northern Growth Area			$40,399,356
Pass-Through Adjustment			78%
Total Adjusted Cost, Northern Growth Area			**$31,511,498**
Avenida Rio Salado	$4,942,181	$115,291,534	$120,233,715
Pass-Through Adjustment			67%
Total Adjusted Cost, Southern Growth Area			**$80,556,589**

Source: 2007 project costs provided by City of Phoenix, Street Transportation Department, February 22, 2008; 2008 cost updated to January 2008 value using ENR CCI; pass-through adjustment from City of Phoenix.

Total Planned Cost

The potential impact fee is based on the adjusted planned improvement costs in the impact fee service areas. In this update, the total planned costs for the drainage and bridge components are considered separately from the regional facility components. Since the regional facilities serve a larger area than the service areas used for the other cost components, the related costs are spread evenly among the new EDUs projected in the overall growth area in which they are located rather than allocated to an individual service area. The total costs summarized in Table 103 represent the updated non-pass-through cost of implementing all of the remaining drainage and bridge projects included in the impact fee calculation that will be needed in the service areas through build-out except the regional transportation cost components.

Table 103. Planned Roadway Facilities Improvements Summary

	Northern Growth Area		Southern Growth Area	
Cost Component	North Gateway/ NBCC	Desert View	Estrella/Laveen	Ahwatukee West
Storm Drain, Culvert and Irrigation Tiling	$101,641,573	$99,178,106	$93,020,413	$4,379,091
Bridges	$324,426,666	$76,360,594	$40,662,223	$0
Total Future Non-Pass-Through Costs	**$426,068,239**	**$175,538,700**	**$133,682,636**	**$4,379,091**

Source: Drainage cost from Table 99; bridge construction costs from Table 101.

Planned Cost per Service Unit

The plan-based cost per service unit is developed by dividing the planned improvement costs by the projected growth in service units through build-out. The non-pass-through improvement costs for roadway facilities must be adjusted to account for the value of outstanding developer credits related to prior developer-funded improvements and the net cash balance available in the Roadway Facilities impact fee funds.

Phoenix provides impact fee credits or reimbursement to developers for the dedication or construction of capital facilities that are listed in the *Specific Infrastructure Financing Plan* upon which the impact fee was calculated. The outstanding credit value used in this update reflects the value of drainage and bridge facilities that have been provided by developers and accepted by the City but have not yet been used by developers to reduce the impact fees for their projects. Under the recommended impact fee, outstanding developer credits based on components which were included in the former Major Streets and Bridges impact fee which are no longer included in the Roadway Facilities impact fee will have no value after the effective date of the ordinance amendment. Developers with existing credit agreements and with unissued credits for drainage or bridge components will have the opportunity to apply the credits to the Roadway Facilities impact fee provided that they can supply substantiating documentation indicating that have not been provided sufficient credits in the past to compensate for their actual infrastructure costs. In addition to the developer credits, Table 104 shows existing cash balances in the impact fee accounts for each service area.

Table 104. Roadway Facilities Impact Fee Fund Credit and Cash Balances

Impact Fee Area	Cash Balance	Developer Credits
North Gateway/NBCC	$7,627,393	$949,070
Desert View	$11,419,630	$1,291,352
Subtotal, Northern Growth Area	$19,047,023	$2,240,422
Estrella/Laveen	$13,668,650	$3,058,948
Ahwatukee West	$65,847	$3,738
Subtotal, Southern Growth Area	$13,734,497	$3,062,686
Total	$32,781,520	$5,303,108

Source: Cash balance from City of Phoenix Budget and Research Department, April 7, 2008; outstanding developer credits provided by City of Phoenix Planning Department, January 26, 2009.

The total growth-related improvement costs are adjusted by both the outstanding impact fee account balance and the outstanding developer credits in order to determine the plan-based cost. The adjustments are made to the total cost of the non-regional facilities, since they account for the largest portion of the gross plan-based cost. The value of the outstanding credit agreements are added to the total costs in order to recognize the portion of the existing developer-provided infrastructure that will be funded with future impact fee revenue. The available cash balance is subtracted from the total costs since the fund balance will be used to pay for a portion of the future infrastructure and decrease the amount needed to be collected from future impact fees. The plan-

based cost per service unit is determined by dividing the total plan-based cost by the number of service units that will be added through build-out. As shown in Table 105, the cost for the planned non-regional facility improvements and costs attributable to new development ranges from per EDU in Estrella/Laveen to per EDU in North Gateway.

Table 105. Roadway Facilities Cost per EDU, Non-Regional Facilities

	Northern Growth Area		Southern Growth Area	
Cost Component	North Gateway/ NBCC	Desert View	Estrella/Laveen	Ahwatukee West
Total Future Non-Pass-Through Costs	$426,068,239	$175,538,700	$133,682,636	$4,379,091
Outstanding Developer Credits	$949,070	$1,291,352	$3,058,948	$3,738
Adjusted Planned Improvement Cost	$427,017,309	$176,830,052	$136,741,584	$4,382,829
New EDUs	111,791	102,870	93,972	1,369
Planned Cost per EDU--Drainage/Bridges	**$3,820**	**$1,719**	**$1,455**	**$3,201**

* only one-half of costs and developer credits shown, reflecting level-of-service adjustment discussed on page 112.
Source: Total non-pass-through improvement costs from Table 99; developer credit agreement balance and impact fee cash balance from Table 104; new EDUs from Table 96.

As mentioned in the previous section, the regional facility costs are considered separately from the non-regional facility costs, since such facilities will serve the entire growth area rather than one specific service area within a growth area. As shown in Table 106, the regional facility costs are divided by new EDUs through build-out for each growth area, which results in a uniform regional cost per EDU for the two northern service areas and two southern service areas.

Table 106. Roadway Facilities Regional Facility Cost per EDU

	Northern	Southern
Regional Transportation Facilities	$31,511,498	$80,556,589
Regional Transportation Facilities ROW	NA	NA
Total Regional Transportation Facilities	$31,511,498	$80,556,589
New EDUs	214,661	95,341
Planned Cost per EDU--Regional Facilities	**$147**	**$845**

Source: Regional facility costs from Table 102; new EDUs from Table 96.

The total planned cost per service unit is determined by adding the cost per service unit for non-regional facilities and the cost per service unit for the regional facilities. As shown in Table 107, the Northern Growth Area plan-based cost per EDU for roadway facilities included in the impact fee is per service unit in North Gateway/NBCC and per EDU in Desert View. The Southern Growth Area cost per service unit range from per EDU in Estrella/Laveen to per EDU in Ahwatukee West.

Table 107. Gross Cost per EDU, Roadway Facilities

	Northern Growth Area		Southern Growth Area	
	North Gateway/ NBCC	Desert View	Estrella/Laveen	Ahwatukee West
Planned Cost per EDU--Non-Regional	$3,820	$1,719	$1,455	$3,201
Planned Cost per EDU--Regional Facilities	$147	$147	$845	$845
Gross Cost per EDU	**$3,967**	**$1,866**	**$2,300**	**$4,046**

Source: Non-regional facility cost per EDU from Table 105; regional facility cost per EDU from Table 106.

Level of Service Analysis

One of the fundamental principles of impact fees, central to the "rational nexus" standard enunciated by the courts and echoed in the Arizona statute's "reasonable relationship" language, is that new development cannot be asked to pay for a higher level of service than existing development. Prior infrastructure financing plans did not measure the existing level of service for roadway facilities in each of the impact fee service areas. Normally, this might make it difficult to determine whether new development in these areas was being charged for a higher level of service; however, under the City's past methodology the total cost of remaining planned improvements was divided by total service units (including both new and existing development), which ensured that new growth did not pay more than its share of the costs. As a result, a detailed level of service analysis was not necessary under the City's past approach, since there was no danger that new development would be charged for a higher level of service.

Dividing the planned costs by the new service units rather than dividing by the ultimate (existing and new) service units, as done by Phoenix in prior fee updates, requires an analysis of the current level of service provided to existing development in each service area. The methodology used in this report raises the possibility that the final increment of development could be required to pay for more than its share of the cost (e.g., the last 10 percent of growth paying for 50 percent of the cost). To ensure that this does not happen, this study provides an analysis of the existing level of service. If the level of service at build-out is lower than the existing level of service, the cost per service unit used in the fee schedule will be based on the planned improvement cost per EDU. If the level of service at build-out is higher than the existing level of service, the cost per service unit will be based on the existing level of service.

Traditional road impact fees define level of service in terms of operational characteristics of individual roadway segments or intersections; the Level of Service (LOS) is measured on a scale of A through F, with LOS A being the best measure of operation and LOS F representing disrupted flow. The City's Street Transportation Department developed the street classification map, which specifies the major road improvements necessary in the Northern and Southern Growth Areas to maintain LOS D. The list of improvements in the City's *Infrastructure Financing Plan* for each growth area is based on the City's approved Street Classification Map that defines the future arterial street network and the street cross-section. The classification map is not based on a fixed planning horizon, and, instead, represents the future arterial street network that will be in place at build-out.

Rather than examining the level of service of individual bridges and drainage facilities, the level of service analysis is based on the system-wide ratio of the arterial road capacity (vehicle-miles of capacity or VMC) to EDUs for each Roadway Facilities impact fee service area. The existing and planned vehicle-miles of capacity for the major roads are presented in Table 169 and Table 170, Appendix G: Roadway Facilities. The vehicle-miles of capacity for existing roads is determined by multiplying the miles of each road segment by the percentage of the final planned cross-section that has been completed and the generalized daily capacity for the planned cross-section. Similarly, vehicle-miles of capacity for planned improvements is determined by multiplying miles of arterial roadway by the generalized daily capacity of the cross-section type; the generalized capacities are shown in Table 108. This approach provides a comparison between the amount of roadway

capacity per new service unit that will be added by planned projects and the capacity per service unit provided by the existing arterial road system in each service area.

Table 108. Arterial Street Capacities

Cross Section Type	Road Capacity
A	50,000
B	50,000
C	35,000
CM	35,000
D	35,000

Source: Arterial street road capacities at LOS D from City of Phoenix Street Transportation Department, October 19, 2007.

The ratio of VMC per EDU for existing arterials is compared to the ratio of planned new VMC per anticipated new EDUs to ensure that new development is not charged for a higher level of service. As shown in Table 109, the existing VMC/EDU ratio for each service area exceeds the ratio derived from the capacity of planned improvements and new EDUs added through build-out. The City may adopt the plan-based fee calculated in this report for each service area, since the existing VMC/EDU ratio exceeds the ratio associated with the planned arterial street improvements in both service areas. However, it should be noted that the added VMC/EDU for Ahwatukee West is more than twice that of the other three service areas, and even exceeds the existing level of service in nearby Estrella/Laveen.

Table 109. Existing and Planned Arterial Network Level of Service

	Northern Growth Area		Southern Growth Area	
	North Gateway/ NBCC	Desert View	Estrella/ Laveen	Ahwatukee West
Future Road Capacity (VMC)	2,809,950	4,746,750	4,099,900	147,950
Existing Road Capacity (VMC)	535,450	1,598,550	1,664,250	61,900
Added Capacity	2,274,500	3,148,200	2,435,650	86,050
New EDUs	111,791	102,870	93,972	1,369
Added VMC/EDU	**20.35**	**30.60**	**25.92**	**62.86**
Existing Road Capacity (VMC)	535,450	1,598,550	1,664,250	61,900
Existing EDUs	9,365	25,032	47,558	520
Existing VMC/EDU	**57.18**	**63.86**	**34.99**	**119.04**

Source: Future and existing VMC from Table 169 and Table 170; existing EDUs from Table 94; new EDUs from Table 96.

Offsets

This section updates the offsets to the Roadway Facilities impact fee in order to recognize other revenues that will be generated by new development and used to offset the planned improvement costs in order to determine the net cost per service unit.

The major funding sources for the City's transportation projects include capital construction funding, Arizona Highway User Revenues (AHUR), bond funds, impact fees, capital reserves and Federal and State transit grants. Offsets for the capital construction funding and Federal and State transit grant funding are not necessary, since the capital construction funding is used for maintenance projects, and the Federal and State transit grant funding is utilized for mass transit operating and capital expenses.

As in prior studies, this update includes an offset based on the amount of AHUR funding for growth-related improvements included in the impact fee calculation and debt funded from the secondary property tax. Taxes on fuel and vehicle sales generate the AHUR revenue, which is distributed by the State of Arizona on a per-capita basis. A portion of the AHUR funds has traditionally been programmed by the City for growth-related major roadway facility improvements. An additional offset is provided to account for the secondary property tax used to secure bonds for growth-related major bridge and drainage improvements in the growth areas.

State and Federal Funding

The City of Phoenix receives AHUR from the State that can be programmed for new roadway facilities in the Capital Improvement Plan (CIP). The proposed approach measures the amount of growth-related AHUR funding that will be returned to the City for each additional EDU added through 2013, which is the time period used for developing the CIP. In prior updates, the City utilized a more complicated approach that calculated an AHUR offset based on AHUR funding per capita and total future street EDUs along with the share of AHUR funding utilized for growth-related projects on major streets.

The AHUR funding offset in this update is based on the AHUR funding programmed for capacity-expanding arterial streets and bridges projects in the 2008-2013 CIP and forecast growth in city-wide EDUs. This approach yields the AHUR funding per new EDU, which is the basis upon which the Roadway Facilities impact fee is calculated and charged to new development. The offset calculations for the recommended impact fees reflect an adjustment to exclude funding associated with ROW acquisition and construction. Growth-related bridge and major transportation facility and drainage costs account for $28.9 million of the total AHUR funding programmed in the 2008-13 CIP, as shown in Table 110, which amounts to $302 per service unit.

Table 110. Arizona Highway User Revenues (AHUR) Offset—No ROW/Construction

Existing City-Wide EDUs	920,339
EDUs, 2013 (Based on 2% annual population growth)	1,016,129
New EDUs, 2008-2013	95,790
AHUR Funded Capacity-Expanding Projects, 2008-2013	$28,895,131
AHUR Offset per New EDU (Drainage/Major Facilities)	**$302**

Source: Existing city-wide EDUs from Table 94; 2013 EDUs based on annual population growth rate from 2000 through 2007 when the City's population grew from 1,350,500 to an estimated 1,538,806; capacity-expanding AHUR funding (drainage and major facility cost only) from Table 171.

Secondary Property Tax

The secondary property tax in Arizona can only be used to repay debt used for capital improvements. The City issues general obligation debt funded with the secondary property tax to fund street, bridge and storm drain improvements. In this update, the debt offset recognizes the expenditure of property tax proceeds from new development that will be used to repay outstanding street and drainage debt from prior bond-funded improvements. The approach used in this study allows for a uniform debt offset per EDU that recognizes the amount of secondary property tax funding that will be generated from new development and used to retire outstanding debt.

In past updates, the City used a forward-looking offset methodology to account for secondary property tax debt by analyzing the future facilities that may be funded with debt. However, the legal principle involved applies much more clearly to the existing debt than to future debt. In other words, new development should not have to pay for the roadway facilities it will require in the growth areas, while also having to help repay debt on existing roadway facilities serving existing development. Consequently, the impact fee should be reduced to account for the amount that new development will pay to retire the debt on existing transportation facilities to avoid double payment issues.

Based on an analysis of the current 2008-2013 CIP, approximately two-thirds of secondary property tax bond proceeds programmed for streets, bridges and related sewer and drainage projects in the CIP is used for capacity-enhancing projects. However, the offset calculation will assume that all of the outstanding road-related debt was issued for capacity-enhancing projects. An analysis of past bond issues indicates that the City's outstanding debt attributed to storm sewer projects is $241.4 million, as shown in Table 111. The outstanding debt related to street construction projects is not included in the offset, since such projects have been excluded from the cost per service unit in the update adopted by the City Council.

Table 111. Outstanding Secondary Property Tax Debt for Drainage Facilities

Program	Series	Maturity	Outstanding Balance
Storm Sewers-Refund	1993A	2009	$12,195,000
Storm Sewers-Refund	1993C	2009	$510,000
Storm Sewers-Refund	1993C	2009	$640,000
Storm Sewers-1988	1998	2022	$5,905,000
Storm Sewers-1988	1999	2023	$3,050,000
Storm Sewers-Refund	1999A	2016	$14,385,000
Storm Sewers-Refund	1999B	2020	$1,850,000
Storm Sewers-1988	2000	2010	$185,000
Storm Sewers-2001	2002B	2027	$4,530,000
Storm Sewers-Refund	2002R	2018	$30,290,000
Storm Sewers-Refund	2002S	2015	$4,990,000
Storm Sewers-Refund	2003R	2016	$28,380,000
Storm Sewers-2001	2004	2028	$18,000,000
Storm Sewers-Refund	2004R	2015	$12,110,000
Storm Sewers-1988	2005B	2025	$1,985,000
Storm Sewers-2001	2005B	2025	$28,000,000
Storm Sewers-2001	2007A	2027	$8,100,000
Storm Sewers-2006	2007A	2027	$16,200,000
Storm Sewers-Refund	2007B	2025	$50,110,000
Total Drainage Bonds			$241,415,000

Source: Street and storm sewer related debt and outstanding balance based on data from the City of Phoenix Budget and Research Department, February 7, 2008.

A simple method that ensures that new development is not required to pay for existing facilities, through the secondary property tax, as well as new facilities through impact fees, is to divide the outstanding debt by the existing city-wide service units. Essentially, this methodology ensures that new development will be allowed to fund the same portion of its streets and bridges costs through secondary property tax-funded debt that existing development does. As shown in Table 112, the secondary property tax debt offset is $262 per EDU based on the city-wide service units and outstanding debt.

Table 112. Roadway Facilities Debt Offset per Service Unit

Total Outstanding Drainage Debt	$241,415,000
Outstanding Existing City-Wide EDUs	920,339
Outstanding Drainage Debt Offset per EDU	$262

Source: Street and storm sewer related debt and outstanding balance from Table 111; existing city-wide EDUs from Table 94.

Potential Net Fee per EDU

The net costs per service unit for the recommended impact fees based on drainage and major bridge and transportation facilities are derived by reducing the costs per service unit by the AHUR and debt offsets and adding the costs per EDU related to the supplemental street funding included in the Ad Hoc Committee's recommendation. The additional two percent will cover such costs as over-sizing facilities, extensions of roadways beyond parcel boundaries and other costs associated with arterial road construction not included in the recommended impact fee. As shown in Table 113, the net

costs per service unit with the two percent funding for arterial streets are $3,403 in North Gateway/NBCC,$1,302 in Desert View, $1,736 in Estrella/Laveen and $3,482 in Ahwatukee West.

Table 113. Potential Net Fee per EDU, Roadway Facilities

	Northern Growth Area		Southern Growth Area	
	North Gateway/ NBCC	Desert View	Estrella/ Laveen	Ahwatukee West
Plan-Based (Gross) Cost per EDU	$3,967	$1,866	$2,300	$4,046
Less: AHUR Offset per EDU	-$302	-$302	-$302	-$302
Less: Street and Drainage Debt Offset per EDU	-$262	-$262	-$262	-$262
Potential Net Fee per EDU	**$3,403**	**$1,302**	**$1,736**	**$3,482**

Source: Plan-based cost per EDU from Table 107; AHUR offset from Table 110; drainage debt offset from Table 112.

Recommended Roadway Facilities Impact Fee Schedule

The recommended Roadway Facility impact fee schedule would normally be calculated using the potential net fees as shown in Table 114. However, recently imposed State regulations currently prohibit an increase in existing impact fees. Therefore, the existing net impact fees per EDU are compared with the potential net fee per EDU in Table 113. Since the current net fee is less than the potential fee for all service areas except North Gateway, adjustment factors are required when calculating the net fee .

Table 114. Recommended Net Impact Fee / EDU, Roadway Facilities

	Northern Growth Area		Southern Growth Area	
	North Gateway/ NBCC	Desert View	Estrella/ Laveen	Ahwatukee West
Existing Net Fee per EDU	$3,417	$1,273	$1,591	$1,834
Potential Net Fee per EDU	$3,403	$1,302	$1,736	$3,482
Recommended Net Fee per EDU	**$3,403**	**$1,273**	**$1,591**	**$1,834**
Adjustment Factor	100.00%	97.77%	91.65%	52.67%

Source: Existing net fees per EDU from City of Phoenix Code of Ordinances, Chapter 29, adopted May, 2011; potential net fee per EDU from Table 113.

Roadway Facilities Improvements Plan

The City's Roadway Facilities impact fee is based on the plan-based cost per service unit. The plan-based cost per service unit excludes costs related to pass-through traffic. In order to calculate the growth-related share of planned improvement costs, the plan-based cost per service unit is adjusted to account for external funding that is expected to be provided for capacity-expanding roadway projects used in developing the fee. As shown in Table 115, the net costs per service unit range from 68 percent of the future non-pass-through costs in Desert View to 86 percent in North Gateway/NBCC. The share of planned expenditures in the infrastructure improvements plan that cannot be directly funded with impact fees may be funded through a combination of funds, including external funding sources.

Table 115. New Growth Share of Roadway Facilities Costs

	Total
North Gateway/NBCC	
Plan-Based Cost/EDU (Bridge, Drainage and Major Facilities)	$3,967
Net Cost/EDU	$3,403
Growth Share of Future Non-Pass-Through Expenditures	**85.78%**
Desert View	
Plan-Based Cost/EDU (Bridge, Drainage and Major Facilities)	$1,866
Net Cost/EDU	$1,273
Growth Share of Future Non-Pass-Through Expenditures	**68.22%**
Estrella/Laveen	
Plan-Based Cost/EDU (Bridge, Drainage and Major Facilities)	$2,300
Net Cost/EDU	$1,591
Growth Share of Future Non-Pass-Through Expenditures	**69.17%**
Ahwatukee West	
Plan-Based Cost/EDU (Bridge, Drainage and Major Facilities)	$4,046
Net Cost/EDU	$1,834
Growth Share of Future Non-Pass-Through Expenditures	**45.33%**

Source: Plan-based cost/EDU per Table 107; net cost/EDU per Table 114.

The improvements plan in Table 116 provides a summary of planned capital improvements and other expenditures that are eligible to be funded by the Roadway Facilities impact fee along with the total growth share of the planned expenditures. Detailed lists of the fee-eligible projects for each component are provided in *Appendix H: Roadway Facilities—Planned Improvements* of this document. Eligible expenditures include planned capacity-expanding drainage, bridge and major regional infrastructure improvements in the growth areas in the draft 2009-2013 Capital Improvement Program and planned improvements beyond 2013. All project costs are adjusted to exclude the pass-by share of project expenditures. Some of the project costs differ from those used in calculating the impact fee, since the 2009-2013 CIP costs include an inflation adjustment. The improvements plan costs exclude right-of-way expenditures and costs related to Sonoran Parkway (Boulevard).

Table 116. Roadway Facilities Growth Related Costs

Facility	Total
North Gateway/NBCC	
Storm Drains and Culverts	$698,384
Bridges	$270,355,555
Regional Facilities	$16,385,979
Total Planned Expenditures	$287,439,918
Outstanding Developer Credits	$949,070
Total Planned Expenditures	$288,388,988
Growth Share of Future Non-Pass-Through Expenditures	85.78%
Total Fee Eligible Expenditures, NBCC/North Gateway	**$247,380,074**
Desert View	
Storm Drains and Culverts	$0
Bridges	$63,633,828
Regional Facilities	$15,125,519
Total Planned Expenditures	$78,759,347
Outstanding Developer Credits	$1,291,352
Net Total Planned Expenditures	$80,050,699
Growth Share of Future Non-Pass-Through Expenditures	68.22%
Total Fee Eligible Expenditures, Desert View	**$54,610,587**
Total Fee Eligible Expenditures, Northern Growth Area	**$301,990,661**
Estrella/Laveen	
Storm Drains and Culverts	$76
Irrigation Tiling	$40
Bridges	$33,885,186
Regional Facilities	$79,751,023
Total Planned Expenditures	$113,636,325
Outstanding Developer Credits	$3,058,948
Total Planned Expenditures	$116,695,273
Growth Share of Future Non-Pass-Through Expenditures	69.17%
Total Fee Eligible Expenditures, Estrella/Laveen	**$80,718,120**
Ahwatukee West	
Storm Drains and Culverts	$5
Bridges	$0
Regional Facilities	$805,566
Total Planned Expenditures	$805,571
Outstanding Developer Credits	$3,738
Net Total Planned Expenditures	$809,309
Growth Share of Future Non-Pass-Through Expenditures	45.33%
Total Fee Eligible Expenditures, Ahwatukee West	**$366,860**
Total Fee Eligible Expenditures, Southern Growth Area	**$81,084,980**

Source: Storm drain and culvert costs from Table 120; bridge costs from Table 118; irrigation tiling costs from Table 121; regional transportation facility costs from Table 102; developer credits from Table 104; growth share of future costs from Table 115.

More detailed information regarding the specific improvements planned for each of the impact fee service areas is provided in Table 117 through Table 121.

As shown in Table 117, the total adjusted Northern Growth Area bridge costs are an estimated $21,329,376 million in North Gateway/NBCC and $0 million in the Desert View. While allocating most of a bridge cost to the impact fee service area in which the bridge is located, the traffic model used in bridge planning allocates a portion of a bridge costs for some of the bridge facilities to adjacent service areas to reflect the bridge traffic attributable to these areas. As with the drainage facilities, the planned bridge costs exclude the bridge facilities associated with the Sonoran Parkway (Boulevard).

Table 117. Planned Major Bridges, Northern Growth Area

Bridge	Total Cost	Pass-Through Adjustment	North Gateway/ NBCC	Desert View
64th St over CAP	$9,820,688	$589,241	$392,828	$8,838,619
Cave Creek Road over CAP	$4,390,425	$1,009,798	$131,713	$3,248,914
Tatum Blvd over CAP	$1,540,500	$92,430	$61,620	$1,386,450
51 Ave over CAP	$4,775,550	$47,756	$4,727,794	$0
19 Ave over CAP	$4,775,550	$286,533	$4,345,751	$143,267
Happy Valley Rd. over CAP	$4,390,425	$526,851	$2,853,776	$1,009,798
7th St. over CAP	$4,390,425	$570,755	$2,546,447	$1,273,223
67 Ave. over CAP	$4,390,425	$614,660	$3,731,861	$43,904
Mayo Blvd Overpass of 101	$6,324,408	$379,464	$252,976	$5,691,968
North Valley Pkwy over Skunk Creek	$17,361,120	$2,777,779	$12,847,229	$1,736,112
Lone Mountain over Skunk Creek	$19,593,264	$1,175,596	$17,046,140	$1,371,528
Dove Valley Rd over Skunk Creek	$15,625,008	$1,875,001	$11,718,756	$2,031,251
Carefree Hwy over Skunk Creek	$4,133,600	$1,612,104	$1,984,128	$537,368
North Valley Pkwy over Sonoran Wash	$7,440,480	$818,453	$6,398,813	$223,214
Pyramid Peak Pky over Dead Man Wash	$25,917,672	$1,555,060	$23,844,259	$518,353
39th Ave over Dead Man Wash	$13,392,864	$803,572	$12,321,435	$267,857
Carefree Hwy over New River East Split	$7,853,840	$3,062,998	$3,769,843	$1,020,999
Carefree Hwy over New River Middle Split	$3,616,900	$1,410,591	$1,736,112	$470,197
Carefree Hwy over Dead Man Wash	$54,563,520	$21,279,773	$26,190,489	$7,093,258
Dove Valley Rd over Dead Man Wash (1)	$28,645,848	$3,437,502	$21,484,385	$3,723,961
Dove Valley Rd over Dead Man Wash (2)	$32,459,094	$3,895,092	$24,344,320	$4,219,682
Dove Valley Rd over New River (1)	$11,160,720	$1,339,286	$8,370,540	$1,450,894
Dove Valley Rd over New River (2)	$11,160,720	$1,339,286	$8,370,540	$1,450,894
Jomax Rd (E. of Cave Creek Rd.)	$2,273,480	$136,409	$90,939	$2,046,132
Deer Valley Rd (E. of Cave Creek Rd.)	$2,686,840	$752,315	$53,738	$1,880,787
Deer Valley Rd at 64th St.	$2,893,520	$810,186	$57,870	$2,025,464
Deer Valley Rd (E. of 64th St.)	$2,893,520	$810,186	$57,870	$2,025,464
Mayo Blvd (E. of 64th St.)	$2,893,520	$173,611	$115,741	$2,604,168
64th St north of CAP	$2,893,520	$173,611	$115,741	$2,604,168
Dixileta Dr. over Skunk Creek	$22,817,472	$1,369,048	$19,851,201	$1,597,223
Pioneer Rd over Dead Man Wash	$32,986,128	$1,979,168	$30,347,237	$659,723
Jenny Lin Rd / 51st Ave - Dead Man Wash	$21,949,416	$1,316,965	$20,193,463	$438,988
Northern Growth Area Bridge Construction	**$392,010,462**	**$8,860,785**	**$270,355,555**	**$63,633,828**

Source: 2007 costs originally based on J E Fuller, *North Gateway Drainage Structure Cost Analysis*, May 2005; 2007 cost updated to January 2008 value using ENR CCI; planned facilities have been adjusted to accurately reflect field conditions in January 2008.

As shown in Table 118, the total adjusted bridge costs are an estimated $33.9 million in Estrella/Laveen. There are no planned major bridges in Ahwatukee West, and no pass-through costs attributable to this area for the bridges in Estrella/Laveen.

Table 118. Planned Major Bridges, Southern Growth Area

Bridge	Total Cost	Pass-Through Adjustment	Estrella/ Laveen	Ahwatukee West
67th Avenue over Salt River	$ 24,801,600	$3,472,224	$21,329,376	$0
91st Avenue over Salt River	$ 27,901,800	$15,345,990	$12,555,810	$0
Total, Southern Growth Area	**$52,703,400**	**$18,818,214**	**$33,885,186**	**$0**

Source: Planned improvements derived from 2003 cost from J E Fuller, *Desert View Arterial Street Drainage Structure Analysis*, September 2002; 2007 costs originally based on J E Fuller, *Estrella, Laveen and Ahwatukee Foothills Drainage Structure Cost Analysis*, September 2003; planned facilities have been adjusted to accurately reflect field conditions in January 2008.

As shown in Table 119, the total adjusted culvert and storm drain costs are an estimated $108.6 million in the NBCC/North Gateway service area, and $106.0 million in Desert View, for a total of $214.6 million in the Northern Growth Area. These costs include an additional 5.5% for storm drains which are not specifically identified in the JE Fuller study. The included storm drains are assumed to be larger than 36" in diameter and needed in conjunction with an arterial street project.

Table 119. Planned Culverts and Storm Drains—Northern Growth Area

Location	Facility	Count	Cost
19th Avenue	Culvert	2	$743,904
39th Ave	Culvert	4	$1,459,475
43rd Ave	Culvert	6	$7,230,810
51st Ave	Culvert	13	$10,829,949
67Ave/Pyramid Peak	Culvert	18	$17,284,224
Carefree Hwy	Culvert	7	$10,629,383
Desert Hills Dr	Culvert	5	$3,667,188
Dixileta	Culvert	9	$7,290,641
Dove Valley	Culvert	26	$27,334,822
Jenny Lin/51 Ave	Culvert	2	$2,724,496
Lone Mountain	Culvert	8	$6,247,644
North Valley Pkwy	Culvert	12	$3,701,084
Pioneer Rd	Culvert	4	$3,786,640
Subtotal, NBCC/North Gateway Culverts			$102,930,260
Misc. Storm Drain Pipe Cost (5.5%)			$5,661,164
Subtotal, NBCC/North Gateway			**$108,591,424**
7th Street	Culvert	2	$716,554
56th St	Culvert	26	$10,977,189
56th St	Culvert Ext.	2	$680,141
64th St	Culvert	10	$5,368,625
Black Mountain Pkwy	Culvert	21	$9,207,406
Black Mountain Pkwy	Culvert Ext.	5	$698,384
Cave Creek Rd	Culvert	2	$497,353
Deer Valley Dr	Culvert	11	$7,434,789
Deer Valley Dr	Culvert Ext.	7	$1,630,611
Desert Willow Pkwy	Culvert	2	$4,093,597
Dixileta Dr	Culvert	1	$269,931
Dynamite Blvd	Culvert	4	$2,945,860
Happy Valley Rd	Culvert	34	$11,514,677
Jomax Rd	Culvert	11	$3,659,063
Lone Mountain Rd	Culvert	5	$4,144,608
Mayo Blvd	Culvert	21	$14,388,048
Mayo Blvd	Culvert Ext.	1	$57,387
Pinnacle Peak Rd	Culvert	37	$14,098,044
Tatum Blvd	Culvert	12	$7,575,068
Tatum Blvd	Culvert Ext.	2	$478,224
Subtotal, Desert View Culverts			$100,435,559
Misc. Storm Drain Pipe Cost (5.5%)			$5,523,956
Subtotal, Desert View			**$105,959,515**
Total Northern Growth Area - Culverts/Storm Drains			**$214,550,939**

Source: Planned culverts and costs summarized from Table 172 and Table 173; miscellaneous storm drain pipe cost based on 5.5% of culvert cost totals.

As shown in Table 120, the total adjusted culvert and storm drain costs are an estimated million in the Estrella/Laveen service area, and million in Ahwatukee West, for a total of million in the Southern Growth Area.

Table 120. Planned Culverts and Storm Drains—Southern Growth Area

Location	Facility	Count	Cost
19th Avenue	Storm Drain	1	$1,084,114
27th Avenue	Storm Drain	1	$418,136
35th Avenue	Storm Drain	3	$2,197,766
35th Avenue	Culvert	1	$425,088
43rd Avenue	Storm Drain	1	$985,578
51st Avenue	Storm Drain	2	$2,176,538
59th Avenue	Storm Drain	8	$7,293,952
59th Avenue	Culvert	1	$188,928
75th Avenue	Storm Drain	7	$6,718,756
75th Avenue	Culvert	1	$283,392
83rd Avenue	Storm Drain	4	$5,210,903
91st Avenue	Storm Drain	4	$4,278,329
99th Avenue	Storm Drain	5	$5,023,780
107th Avenue	Storm Drain	3	$3,980,549
Baseline Road	Storm Drain	4	$3,181,674
Broadway Road	Storm Drain	6	$6,587,728
Buckeye Road	Storm Drain	3	$3,024,984
Dobbins Road	Storm Drain	5	$6,277,675
Dobbins Road	Culvert	1	$850,176
Lower Buckeye Road	Storm Drain	8	$7,034,588
Southern Avenue	Storm Drain	8	$7,590,166
Van Buren Street	Storm Drain	1	$1,008,328
Subtotal, Estrella/Laveen			**$75,821,128**
Pecos Rd	Culvert	7	$3,003,955
Chandler Blvd	Culvert	1	$1,983,744
Chandler Boulevard	Storm Drain	1	$458,932
Subtotal, Ahwatukee West			**$5,446,631**
Total, Southern Growth Area Culverts and Storm Drains			**$81,267,759**

Source: Planned culverts and costs summarized from Table 174; planned storm drains and costs summarized from Table 175.

In the Southern Growth Area only, the planned improvements also include irrigation tiling adjacent to arterial streets. As shown in Table 121, the total adjusted culvert and storm drain costs are an estimated million in the Estrella/Laveen service area. No irrigation tiling is necessary in the Ahwatukee West service area.

Table 121. Planned Irrigation Tiling—Southern Growth Area

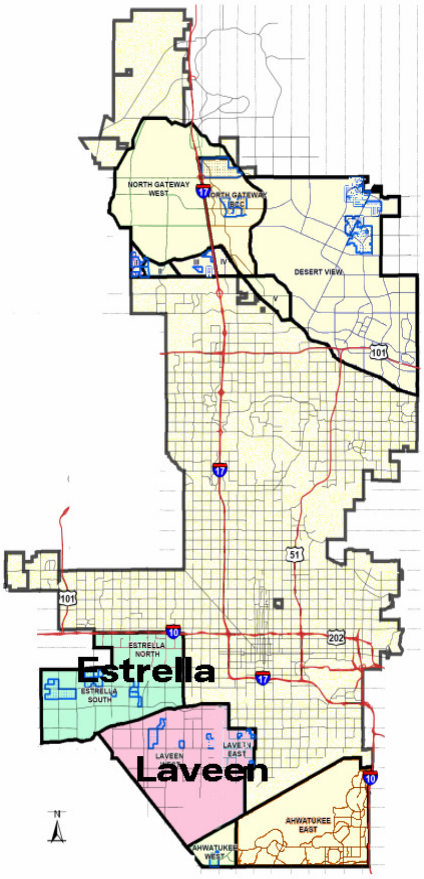
Road Segment	Length (Ft.)	Cost
19th Ave. - South Mtn Ave. to Baseline	2,600	$667,680
27th Ave. - Dobbins to Baseline	5,300	$1,361,040
35th Ave. - Baseline to Southern	4,000	$1,027,200
43rd Ave. - Buckeye to Lower Buckeye	1,300	$333,840
43rd Ave. - I-10 to Buckeye	2,900	$744,720
59th Ave. - Dobbins to Baseline	2,600	$667,680
59th Ave. - Dobbins to Elliot	2,600	$667,680
59th Ave. - I-10 to Broadway	1,900	$487,920
67th Ave. - I-10 to S. of Broadway	5,800	$1,489,440
75th Ave. - Broadway to Southern	4,500	$1,155,600
75th Ave. - Buckeye to Lower Buckeye	30	$7,704
75th Ave. - Van Buren to Buckeye	4,200	$1,078,560
83rd Ave. - Broadway to Southern	7,900	$2,028,720
91st Ave. - Buckeye to Lower Buckeye	4,500	$1,155,600
107th Ave. - Buckeye to Southern	4,500	$1,155,600
Baseline - 27th Ave. to 35th Ave.	850	$218,280
Broadway - 107th Ave. to 99th Ave.	5,200	$1,335,360
Broadway - 67th Ave. to 75th Ave.	5,300	$1,361,040
Broadway - 83rd Ave. to 75th Ave.	4,700	$1,206,960
Broadway - 91st Ave. to 83rd Ave.	1,000	$256,800
Broadway - 99th Ave. to 91st Ave.	2,700	$693,360
Buckeye - 67th Ave. to 75th Ave.	1,000	$256,800
Buckeye - 91st Ave. to 83rd Ave.	4,800	$1,232,640
Buckeye - 99th Ave. to 91st Ave.	3,000	$770,400
Dobbins Road - 19th Ave. to 27th Ave.	6,500	$1,669,200
Dobbins Road - 27th Ave. to 35th Ave.	2,700	$693,360
Dobbins Road - 35th Ave. to 43rd Ave.	2,500	$642,000
Dobbins Road - 43rd Ave. to 51st Ave.	3,600	$924,480
Dobbins Road - 51st Ave. to 59th Ave.	3,900	$1,001,520
Dobbins Road - 59th Ave. to W. of 67th Ave.	6,400	$1,643,520
Elliot Road - 47th Ave. to 63rd Ave.	10,600	$2,722,080
Estrella Drive - 43rd Ave. to 55th Ave.	5,300	$1,361,040
Lower Buckeye - 43rd Ave. to 75th Ave.	8,600	$2,208,480
Lower Buckeye - 83rd Ave. to 75th Ave.	4,000	$1,027,200
Lower Buckeye - 91st Ave. to 83rd Ave.	4,000	$1,027,200
Lower Buckeye - 99th Ave. to 91st Ave.	5,300	$1,361,040
Southern - 11th Ave. to 17th Ave.	2,600	$667,680
Southern - 91st Ave. to 83rd Ave.	2,600	$667,680
Southern - 99th Ave. to 91st Ave.	3,500	$898,800
Subtotal, Estrella/Laveen		$39,875,904
Total Southern Growth Area		**$39,875,904**

Source: Planned irrigation tiling structures derived from J E Fuller, *Estrella, Laveen and Ahwatukee Foothills Drainage Structure Cost Analysis*, September 24, 2003; project list updated to reflect completed road sections by City of Phoenix Street Transportation Management Services, February 29, 2008; unit costs based on tiling drainage costs from Table 97.

INFRASTRUCTURE IMPROVEMENTS PLAN: STORM DRAINAGE

The City of Phoenix assesses a Storm Drainage impact fee in the Estrella and Laveen areas because these areas are prone to severe flooding events. The storm drainage fees fund a network of channels, basins and large storm drains designed to address 100-year flood events. The regional facilities needed to serve new development are based on Flood Control District of Maricopa County (FCDMC) drainage master plans that are developed through topographical and hydrological modeling. Localized protection from limited duration storm events for all growth areas are provided by drainage facilities in streets (the street drainage facilities are included in the major streets and bridges impact fee) and onsite retention requirements.

Figure 14. Storm Drainage Service Areas



Service Areas

The Storm Drainage impact fee is currently charged only in the Estrella and Laveen service areas, because these areas are prone to severe flooding events and will receive a direct benefit from the drainage infrastructure planned to address 100-year flood events. The Storm Drainage impact fee areas are illustrated in Figure 14. The Salt River serves as the boundary between the two service areas.

Methodology

The methodology used to calculate the drainage impact fee is based on the regional drainage facilities necessary in Estrella and Laveen that will be needed to protect the area from 100-year flood events. As with the other fees in this report, the new facilities that will be needed are based on build-out conditions rather than a specific planning horizon. To ensure that the final increment of development in each service area does not bear more than its share of the planned improvements, this study includes an existing level of service analysis. If the level of service at build-out is lower than the existing level of service, the cost per service unit will be based on planned improvement costs.

Service Units

The service unit calculation for storm drainage is based on the number of acres benefiting from regional storm drainage improvements. One EDU is based on the standard single-family density of four dwellings per acre. The fee is assessed based on lot size with one EDU equal to one quarter acre of lot area.

In order to develop the level of service analysis, it is necessary to determine the existing and future service units for each service area as well as city-wide. The service units are based on total developed acres, which are derived from the land use data in Section IV, Appendix A of this study. The existing and build-out acres and EDUs are shown in Table 122. The total EDUs are developed by multiplying total acres by four, since the single-family EDU is based on the standard single-family density of four dwellings per acre.

Table 122. Existing and Build-Out Storm Drainage Service Units

	Existing	Build-Out	New
Estrella Service Area			
Total Developed Acres	6,528	20,179	13,651
– Right-of-Way Acres	-979	-3,027	-2,048
Net Developed Acres	5,549	17,152	11,603
x EDUs per Net Acre	4	4	4
EDUs, Estrella	**22,196**	**68,608**	**46,412**
Laveen Service Area			
Total Developed Acres	8,378	25,142	16,764
– Right-of-Way Acres	-1,257	-3,771	-2,514
Net Developed Acres	7,121	21,371	14,250
x EDUs per Net Acre	4	4	4
EDUs, Laveen	**28,484**	**85,484**	**57,000**
City-Wide			
Total Developed Acres	171,096	303,936	132,840
– Right-of-Way Acres	-25,664	-45,590	-19,926
Net Developed Acres	145,432	258,346	112,914
x EDUs per Net Acre	4	4	4
EDUs, City-Wide	**581,728**	**1,033,384**	**451,656**

Source: Total build-out acres for Estrella and Laveen from City Planning based on MAG data, March 24, 2009; total city-wide build-out acres from U.S. Census, *County and City Data Book*, 2007; total existing acres estimated based on build-out acres and percent developed (ratio of existing to build-out sum of dwelling units and 1,000s of square feet from Table 154 and Table 155); right-of-way acres estimated based on assumed 15% of total acres; total EDUs is derived by multiplying developed acres by four.

Planned Improvements

The list of planned drainage improvements in Laveen and Estrella are based on Area Drainage Master Plans (ADMP) developed by the Flood Control District of Maricopa County (FCDMC). The master plans were developed based on extensive topographical and hydrological modeling to

identify improvements necessary to minimize widespread flooding during severe 100-year flood events. Typically, drainage facilities include a combination of channels, storm drains and basins that capture and convey floodwaters to a regional watercourse such as the Salt River.

In the Laveen and Estrella service areas, there are three primary drainage master plans: the *Durango ADMP* (2002) for the Estrella area, and the *South Phoenix/Laveen ADMP* (1997) and the *Laveen ADMP* (2001) for the Laveen service area. The Laveen Area Conveyance Channel (FCDMC, 2003) is also the result of drainage master planning and design, but it is considered a separate project from the other ADMPs. The planned projects associated with the drainage master plans for Laveen and Estrella are shown in Table 123. As with the 2006 impact fee study, the planned improvements related to the Durango Regional Conveyance Channel reflect the reduced project scope recommended in the 2006 amendment to the *Durango ADMP*.

Table 123. Planned Storm Drainage Projects

Fee Area	Master Plan	Project Details
Laveen	South Phoenix/Laveen	27th Ave Basin
Laveen	South Phoenix/Laveen	43rd Ave/Baseline Basin
Laveen	South Phoenix/Laveen	27th Ave Storm Drain (Southern to SR) & 23rd Ave Basin
Laveen	South Phoenix/Laveen	27th Ave Storm Drain (Dobbins-Baseline) and Dobbins Basin
Laveen	South Phoenix/Laveen	7th Ave Storm Drain (Baseline to South Moutain)
Laveen	South Phoenix/Laveen	43rd Ave Storm Drain
Laveen	Laveen ADMP	51st Ave & Baseline Detention Basin
Laveen	Laveen ADMP	51st Ave & Dobbins Detention Basin
Laveen	Laveen ADMP	51st Ave & Elliot Detention Basin
Laveen	Laveen ADMP	51st Ave Storm Drain (Baseline to Elliot)
Laveen	Laveen ADMP	67th Ave Channel (Southern to South Mountain Ave)
Laveen	Laveen ADMP	44th Ave & Carver Detention Basin
Laveen	Laveen ADMP	Carver Hills Storm Drain
Laveen	Laveen ADMP	Dobbins Rd. Storm Drain (43rd to 51st)
Laveen	Laveen ADMP	43rd Ave & Dobbins Detention Basin
Laveen	Laveen ADMP	Reservation Channel (Dobbins to LACC)
Laveen	Laveen ADMP	Western Canal Channel
Laveen	LACC FCDMC	Laveen Area Conveyance Channel
Estrella	Durango ADMP	Durango Regional Conveyance Channel (75th to 107th)
Estrella	Durango ADMP	75th Ave. Drain System (DRCC Phase 1)
Estrella	Durango ADMP	Sunland Ave. Channel
Estrella	Durango ADMP	47th Ave. Channel System

Source: City of Phoenix Street Transportation Department.

The design and construction of drainage facilities often involve intergovernmental cooperation between the City of Phoenix, the FCDMC and in some cases adjacent jurisdictions. The total costs used in this study are based on cost estimates developed by the Street Transportation Department and FCDMC. The intergovernmental cooperation often involves cost-sharing agreements with other agencies; however, the impact fee calculation only includes Phoenix's share of project costs. In some cases, such as the land acquisition and construction costs associated with the Laveen Area Conveyance Channel (LACC), the actual costs and breakdown of the cost-sharing are known. In other cases, the facility and land costs are estimated, and the cost-sharing arrangements are assumed based on historic cost-sharing arrangements.

Land acquisition costs for stormwater channels and basins are based on land acquisition needs for each project and land costs estimates. The LACC project has existing agreements in place for the land acquisition necessary for the project at a cost of $42,500 per acre. For other projects, the land cost is based on recent drainage land acquisitions. As shown in Table 124, the City has purchased two large parcels for drainage improvements over the past two years at an average cost of $84,356 per acre.

Table 124. Storm Drainage Land Costs

Project	Land Cost	Acres	Cost/Acre
Durango Regional Conveyance Channel (April, 2009)	$2,800,000	37.52	$74,627
Loop 303 Drainage Improvements (June, 2008)	$3,155,532	33.08	$95,391
Total (Average Cost per Acre)	$5,955,532	70.60	**$84,356**

Source: City of Phoenix Street Transportation Department and Flood Control District of Maricopa County, March 26, 2009.

Planned drainage project costs, amount expended to-date, remaining costs, anticipated external funding and City of Phoenix share of remaining costs are shown in Table 125. Total planned costs include both land and improvement costs. The land cost for each project is estimated based on land acquisition needs and the average land cost calculated above, with the exception noted above. There are no separate land cost estimates available for the Durango Regional Conveyance Channel project and the 75th Avenue drain system, since the land costs for those projects are included in the total improvement cost estimate. The improvement costs are based on estimates by the Street Transportation Department developed for the 2006 impact fee. The January 2007 cost estimates were adjusted by the Engineering News-Record (ENR) Construction Cost Index (CCI) to January 2009 costs. Individual cost components for some of the multi-phase projects are presented in Table 176, Appendix I: Storm Drainage Facilities.

Many of the planned projects involve cost-sharing agreements. Although cost-shares have varied in the past, it is anticipated that the FCDMC will generally be responsible for half of the costs projected for land and facilities specified in the Estrella and Laveen ADMPs, and that the remainder will be covered by the City of Phoenix. As a result, the costs used in the impact fee calculations are less than the actual construction cost of the channels and basins. In this update, the cost-share ratio has been applied to the remaining costs. In Estrella, the City will be responsible for the full cost of the Durango Regional Conveyance Channel project from 75th Avenue to 107th Avenue, but anticipates cost-sharing for the other three major drainage projects. The cost-share agreement for the 75th Avenue Drain System will require the City to fund 35 percent of the project cost, while the Sunland Avenue and 47th Avenue channel systems are expected to be half funded by the City. The cost-share assumption for South Phoenix/Laveen and the Laveen ADMP projects is 50 percent, while the City's share of the Laveen Area Conveyance Channel is an estimated 59 percent.

Table 125. Planned Storm Drainage Project Costs

Project	Acres	Total Planned Cost	Total Expended	Remaining Cost	External Funding	Phoenix Costs
DRCC (75th to 107th)	NA	$21,734,817	$0	$21,734,817	$0	$21,734,817
75th Ave. Drain Sys (Ph 1)	NA	$37,971,500	$24,533,660	$13,437,840	$8,677,005	$4,760,835
Sunland Ave. Channel	43.0	$11,558,094	$0	$11,558,094	$5,779,047	$5,779,047
47th Ave. Channel System	88.0	$27,912,102	$0	$27,912,102	$13,956,051	$13,956,051
Total Project Costs, Estrella		$99,176,513	$24,533,660	$74,642,853	$28,412,103	**$46,230,750**
South Phoenix/Laveen	30.0	$27,222,733	$1,083,544	$26,139,189	$12,527,822	$13,611,367
Laveen	92.0	$45,257,610	$0	$45,257,610	$22,628,805	$22,628,805
Laveen Conveyance Channel	125.0	$25,925,600	$8,967,652	$16,957,948	$6,974,274	$9,983,674
Total Project Costs, Laveen		$98,405,943	$10,051,196	$88,354,747	$42,130,901	**$46,223,846**

Source: Acres from City of Phoenix; total planned cost is sum of land and improvement costs; land cost is product of acres times average land cost from Table 124, with exception that Laveen Conveyance Channel land cost based on existing land acquisition agreement cost of $42,500 per acre; South Phoenix/Laveen and Laveen improvement cost from Table 176; other improvement costs based on City of Phoenix Street Transportation Department costs from *Infrastructure Financing Plan*, November 15, 2006, updated with ENR CCI to January 2009 dollars; external funding based on City of Phoenix funding estimate, March 20, 2009.

Planned Cost per Service Unit

The cost per service unit is developed by dividing the City's share of the planned improvement costs by the projected growth in service units through build-out. The planned costs in Laveen are adjusted to reflect the value of outstanding developer credits. The value of the outstanding credit agreement is added to the total costs in order to recognize the portion of the existing developer-provided infrastructure that will be funded with future impact fee revenue. The impact fee cash balance is subtracted from the total cost, since the fund balance will be used to pay for a portion of planned drainage facilities and decrease the amount needed to be collected from future impact fees. The plan-based cost per service unit is determined by dividing the total plan-based cost by the number of service units that will be added through build-out. The planned service units for drainage represent one-quarter acre single-family equivalent lot sizes. As shown in Table 126, the planned drainage impact fee cost ranges from $864 per EDU in Laveen to $821 in Estrella.

Table 126. Plan-Based Storm Drainage Cost per Service Unit

	Estrella	Laveen
Total Planned Drainage Costs	$46,230,750	$46,223,846
+ Outstanding Developer Credits	$0	$2,582,000
– Existing Fund Balance	$6,136,470	$2,004,216
Adjusted Planned Improvement Costs	$40,094,280	$46,801,630
÷ New EDUs	46,412	57,000
Plan-Based Cost per EDU	**$864**	**$821**

Source: Total planned drainage costs from Table 125; outstanding developer credits from City of Phoenix Planning Department, February 27, 2009; existing fund balance from City of Phoenix Planning Department and based on January 2009 balance; new EDUs from Table 122.

Level of Service Analysis

The Storm Drainage impact fee is only charged in Estrella and Laveen because this area has a flat topography, does not have much natural drainage and is prone to flooding, and each development with the service area will receive a direct benefit from the planned improvements. Given that natural drainage does not exist in the area, the impact fee level of service analysis for drainage is based on the existing drainage facilities that have been constructed in the each service area and current development. Similar to the level of service analysis for the other facilities in this report, the combined existing level of service plus plan-based costs is compared with the plan-based costs alone to ensure that future growth does not pay a disproportionate share of the necessary drainage facilities remaining to be built in each service area.

Existing development in Estrella and Laveen is currently being served by a number of completed or partially completed drainage projects, which were funded by the City and FCDMC. As shown in Table 127, the value of the completed projects, which reflects the amount expended for the project, is $24.5 million for the DRCC project in Estrella. In Laveen, the City has constructed a portion of the LACC project and the FCDMC has completed drainage projects on 43rd Avenue and Baseline Road. The completed costs do not reflect funds appropriated for the 75th Avenue detention channel and the DRCC detention basin, since these projects are scheduled in the CIP for fiscal year 2009 and 2010 and have not yet been completed.

Table 127. Completed Storm Drainage Projects

Project	Completed Cost
67th Ave/Harrison St. Box Culvert	$534,780
75th Ave Detention Channel	$0
75th Ave: Buckeye Rd to Van Buren St	$8,960,057
75th Ave: Salt River to Papago Freeway	$14,239,294
DRCC Detention Basin	$0
Santa Maria Basin 71st Ave & Elwood	$799,530
Total, Estrella Service Area	**$24,533,660**
Laveen Area Conveyance Crossing	$8,967,652
43rd Ave. Storm Drain	$6,446,792
Baseline Road Storm Drain	$5,490,472
Total, Laveen Service Area	**$20,904,916**

Source: City of Phoenix Street Transportation Department analysis of completed and partially completed drainage projects, March 24, 2009 and April 7, 2009.

The existing drainage infrastructure investment in each service area required to maintain the existing storm drainage level of service is shown in Table 128. The existing impact fee account balances are added to the value of facilities, because these cash funds have been paid by existing development and will fund future drainage facilities. The outstanding developer credits are subtracted from the total value, because the cost of the facilities funded by the developers has not been fully recovered..

Table 128. Existing Storm Drainage Investment in Service Areas

	Estrella	Laveen
Completed Project Value	$24,533,660	$20,904,916
+ Existing Fund Balance	$6,136,470	$2,004,216
– Outstanding Developer Credits	$0	-$2,582,000
Total Existing Replacement Value	**$30,670,130**	**$20,327,132**

Source: Completed project value from Table 127; existing fund balance and developer credits from Table 126; existing drainage EDUs from Table 122.

The total investment based on the existing provision of storm drainage facilities is then added to the cost of future planned improvements to find the total (combined) storm drain expenditures for each service area. The total expenditures are then divided by the total service area EDUs (both existing and future) to determine the total storm drainage expenditure per EDU in each of the service areas, as shown in Table 129.

Table 129. Total (Combined) Storm Drainage Expenditures per EDU

	Estrella	Laveen
Total Existing Replacement Value	$30,670,130	$20,327,132
Planned Expenditures	$40,094,280	$46,801,630
Combined Existing and Planned Expenditures	$70,764,410	$67,128,762
÷ Total Service Area EDUs	68,608	85,484
Total (Combined) Cost per EDU	**$1,031**	**$785**

Source: Total existing replacement value from Table 128; planned expenditures from Table 126, total service area EDUs from Table 122.

Gross Cost per EDU

In order to determine the potential gross fee per EDU for each service area, the total (combined existing investment plus future planned expenditures) cost per EDU is compared to the plan-based cost per EDU for each service area. To make sure that new development is not paying for a higher level of service than existing development, the lower of the two amounts is selected to determine the gross impact fee for each service area. As shown in Table 130, the selected amount is the plan-based cost per EDU for Estrella, and the total (combined) cost per EDU for Laveen.

Table 130. Comparison of Total (Combined) Costs and Plan-Based Costs per Service Area

	Estrella	Laveen
Total (Combined) Cost per EDU	$1,031	$785
Plan-Based Cost per EDU	$864	$821
Gross Cost per EDU	**$864**	**$785**

Source: Total (combined) level of service costs from Table 129, plan-based costs from Table 126.

Offsets

This section updates the offsets to the Storm Drainage impact fee in order to recognize other revenues that will be generated by new development and used to offset the planned improvement costs in order to determine the net cost per service unit.

Secondary Property Tax Offset

As in prior studies, this update includes an offset to account for the secondary property tax used to secure bonds for growth-related major storm drainage improvements in the growth areas. A separate offset for external funding is not necessary, since the fee calculation is based on the City's share of the planned project costs. In past updates, the City used a forward-looking offset methodology to account for secondary property tax debt by analyzing the future facilities that may be funded with debt. However, the legal principal involved applies much more clearly to the existing debt than to future debt. In other words, new development should not have to pay for the storm drainage improvements required in the growth areas, while also having to help repay debt on existing storm drainage improvements serving existing development. Consequently, the impact fee should be reduced to account for the amount that new development will pay to retire the debt on existing transportation facilities to avoid double payment issues.

The City has issued general obligation debt funded with the secondary property tax to fund storm drainage improvements. An offset for the City's outstanding debt for storm drainage improvements was included in the Roadway Facilities impact fee update. The Roadway Facilities impact fee update provided an offset to account for the storm sewer and drainage debt under the assumption that all of the debt was related to storm drainage in streets. Rather than duplicating the roadway facilities offset, the offset used in the update is based on an analysis of existing storm drainage facilities and their funding source. As shown in Table 131, the analysis shows that outstanding debt related to storm drainage is approximately $12.2 million.

Table 131. Outstanding Storm Drainage Debt

Project	Bond Authorization	Outstanding Debt
75th Ave: Buckeye Rd to Van Buren St	2001	$6,077,804
75th Ave: Buckeye Rd to Van Buren St	2006	$33,713
75th Ave: Salt River to Papago Freeway	2001	$6,077,804
Santa Maria Basin 71st Ave & Elwood	2006	$7,434
Total Outstanding Debt		**$12,196,755**

Source: City of Phoenix Street Transportation Department analysis of completed and partially complete drainage projects, March 24, 2009.

The calculation of the offset for outstanding storm drainage debt is similar than the secondary offset used in the other fee calculations in this study. Dividing the outstanding debt by the existing city-wide service units ensures that new development will be allowed to fund the same portion of its storm drainage costs through secondary property tax-funded debt that existing development does. As shown in Table 132, the secondary property tax debt offset is $22 per EDU based on the city-wide service units and outstanding storm drainage debt.

Table 132. Storm Drainage Debt per EDU

Outstanding Storm Drainage Debt	$12,196,755
÷ Existing EDUs (City-Wide)	549,172
Debt Offset per EDU	**$22**

Source: Outstanding storm drainage debt from Table 131; existing city-wide EDUs from Table 122.

Potential Net Fee per EDU

The potential net Storm Drainage impact fee schedule for each service area is calculated by subtracting the offset per EDU from the gross cost per EDU. That figure is then multiplied by the EDU factor to determine the potential net fee per type of use. These calculations are shown in Table 133.

Table 133. Potential Net Fee per EDU, Storm Drainage

	Estrella	Laveen
Gross Cost/EDU	$864	$785
– Debt Offset/EDU	-$22	-$22
Net Cost/EDU	**$842**	**$763**

Source: Gross cost per EDU from Table 130 secondary property tax offset per EDU from Table 132.

Recommended Storm Drainage Impact Fee Schedule

The recommended Storm Drainage impact fee schedule would normally be calculated using the potential net fees as calculated in Table 133. However, recently imposed State regulations currently prohibit an increase in existing impact fees. Therefore, the adopted net impact fees per EDU are compared with the potential net fees per EDU in Table 134 Since the potential net fee is more than the current fee for the Laveen service area, an adjustment factor is required.

Table 134. Recommended Net Impact Fee / EDU, Storm Drainage

	Estrella	Laveen
Adopted Net Fee per EDU	$842	$352
Potential Net Fee per EDU	$842	$763
Recommended Net Fee per EDU	**$842**	**$352**
Adjustment Factor	100.00%	46.13%

Source: Adopted net fees per EDU from City of Phoenix Code of Ordinances, Chapter 29, adopted May, 2011; potential net fee per EDU from Table 133.

It should be noted that, upon the end of the State-imposed moratorium on increases to adopted impact fees, the City Council may choose to adopt a revised impact fee schedule based on the Potential Impact Fee Schedules without any further revision to this document.

Storm Drainage Improvements Plan

The portion of the cost of future drainage capital improvements in Estrella and Laveen attributable to new development and the potential revenue from Storm Drainage impact fees if adopted at the full net cost should be the identical amount, because the fees are calculated to cover the growth-related cost. Any additional cost not covered by potential impact fee revenue is not attributable to existing development in the service area – this would only be the case if the fees were based on a higher level of service than currently exists, in which case the deficit would be attributable to an existing capacity deficiency. The fees calculated in this report have been based on the total (combined) level of service or the cost to construct remaining improvements, whichever is less. For this reason, any cost not covered by potential impact fee revenue is for improvements that will raise the level of service for, and benefit, both existing and new development in the service areas. Consequently, no additional offset against the impact fees is warranted for any additional non-impact fee funding used to pay for needed drainage capital improvements in the impact fee service areas.

The growth share of future costs, which is the same as potential impact fee revenue, is the product of the net cost per service unit and the number of future service units from now to build-out. Potential drainage impact fee revenue for each of the two service areas is shown in Table 135.

Table 135. Potential Storm Drainage Impact Fee Revenue

	Estrella	Laveen
Net Cost per EDU	$842	$352
New EDUs, 2009-Buildout	46,412	57,000
Potential Impact Fee Revenue	**$39,078,904**	**$20,064,000**

Source: Net cost per EDU from Table 133; new EDUs from Table 122.

The drainage improvements plan for both service areas is shown in Table 136. The improvements plan provides a list of planned capital improvements and other expenditures that are eligible to be funded by the impact fees. Eligible expenditures include capacity-expanding drainage facility improvements funded in the 2009-2013 Capital Improvement Program (CIP) and beyond 2013 through build-out. The net cost per EDU accounts for most of the plan-based cost in Estrella, but only 42.9 percent in Laveen. The lower share of growth costs in Laveen reflects that the net cost in that service area is based on existing level of service and is adjusted to reflect anticipated outside funding.

Projects not currently in the five-year CIP will be programmed by the City Council in future CIPs based on need and will depend on availability of funding. If the drainage impact fees are adopted at the full potential impact fee schedules calculated in this report, a portion of the planned improvements in each service area will still need to be funded by other revenue sources. The mix of funding sources available to fund necessary public services beyond the portion covered by the impact fee calculated in this report will be determined by the actions of future City Councils in prioritizing projects, allocating funding in future CIPs and the availability of impact fee revenue in each service area. This study does not include a specific estimate of the time required to finance and provide the necessary public services between 2013 and build-out for each service area, as the

build-out for each impact fee service area is likely to vary depending on market conditions and availability of land for new development.

Table 136. Storm Drainage Improvements Plan

Drainage Project	FY 2009-2013	Beyond 2013	Total
Durango Regional Conveyance Channel (75th to 107th)	$0	$21,734,817	$21,734,817
75th Ave. Drain System (DRCC Phase 1)	$4,572,000	$188,835	$4,760,835
Sunland Ave. Channel	$0	$5,779,047	$5,779,047
47th Ave. Channel System	$0	$13,956,051	$13,956,051
Total Planned Expenditures (City Share), Estrella	$4,572,000	$41,658,750	$46,230,750
+ Outstanding Developer Credits			$0
– Impact Fee Fund Balance			$6,136,470
Total Future Costs			$40,094,280
– Growth Costs & Potential Impact Fee Revenue			-$39,078,904
Additional Funding Requirement, Estrella			**$1,015,376**
27th Ave Basin	$0	$1,978,124	$1,978,124
43rd Ave/Baseline Basin	$0	$1,978,124	$1,978,124
27th Ave Storm Drain (Southern to SR) & 23rd Ave Basin	$0	$3,956,248	$3,956,248
27th Ave Storm Drain (Dobbins-Baseline) and Dobbins Basin	$0	$2,256,920	$2,256,920
7th Ave Storm Drain (Baseline to South Moutain)	$0	$2,124,160	$2,124,160
43rd Ave Storm Drain	$0	$564,230	$564,230
Misc. Land Acquisition and Other Costs	$0	$753,562	$753,562
51st Ave & Baseline Detention Basin	$0	$1,566,325	$1,566,325
51st Ave & Dobbing Detention Basin	$0	$1,347,989	$1,347,989
51st Ave & Elliot Detention Basin	$0	$1,471,396	$1,471,396
51st Ave Storm Drain (Baseline to Elliot)	$0	$2,211,840	$2,211,840
67th Ave Channel (Southern to South Mountain Ave)	$0	$2,563,077	$2,563,077
44th Ave & Carver Detention Basin	$0	$3,417,435	$3,417,435
Carver Hills Storm Drain	$0	$598,051	$598,051
Dobbins Rd. Storm Drain (43rd to 51st)	$0	$740,445	$740,445
43rd Ave & Dobbins Detention Basin	$0	$1,196,103	$1,196,103
Reservation Channel (Dobbins to LACC)	$0	$1,063,202	$1,063,202
Western Canal Channel	$0	$2,572,569	$2,572,569
Misc. Land Acquisition and Other Costs	$0	$3,880,376	$3,880,376
Laveen Area Conveyance Channel	$0	$9,983,674	$9,983,674
Subtotal, Planned Expenditures (City Share), Laveen	$0	$46,223,846	$46,223,846
Unidentified Impact Fee-Funded Storm Drainage Projects	$2,303,140	-$2,303,140	$0
Total Planned Expenditures, Laveen	$2,303,140	$43,920,706	$46,223,846
+ Outstanding Developer Credits			$2,582,000
– Impact Fee Fund Balance			$2,004,216
Total Future Costs			$46,801,630
– Growth Costs & Potential Impact Fee Revenue			-$20,064,000
Additional Funding Requirement, Laveen			**$26,737,630**

Source: 2009-2013 planned expenditures from City of Phoenix *2009-2013 Capital Improvement Program*; total project costs, outstanding developer credits and impact fee fund balances from Table 176, Appendix G; growth share of future costs from Table 135.

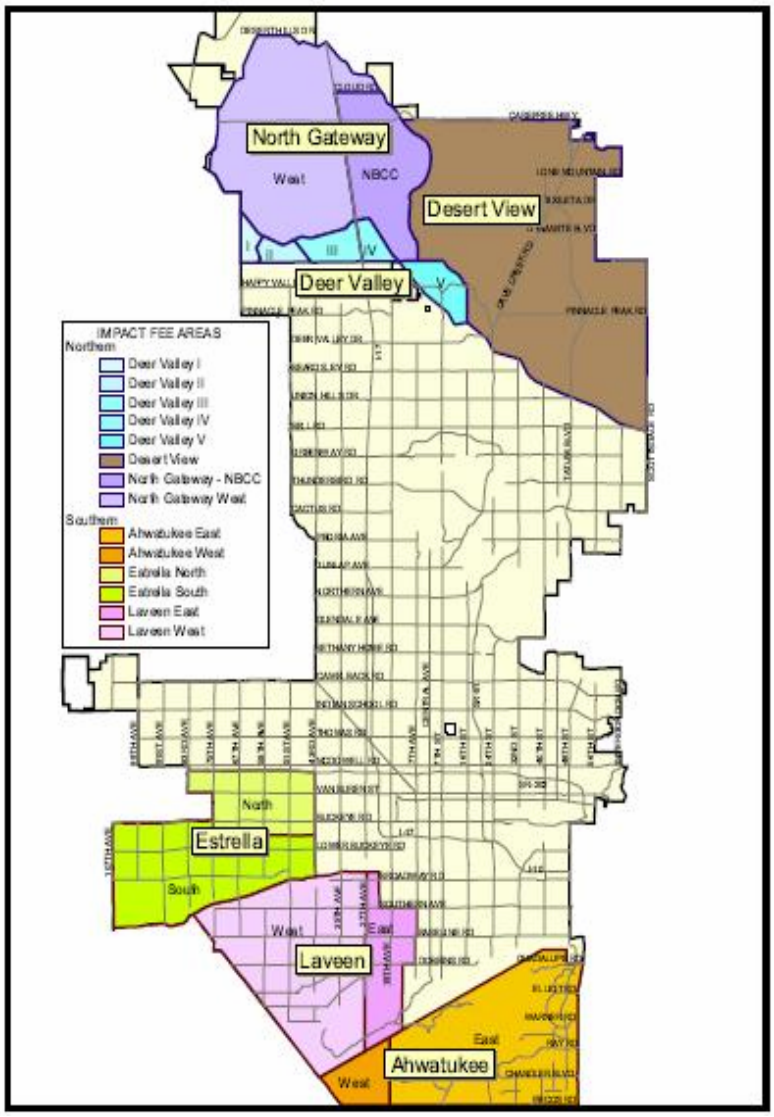
INFRASTRUCTURE IMPROVEMENTS PLAN: WASTEWATER

The City of Phoenix is responsible for the reliable collection and treatment of wastewater. The infrastructure built to implement this service for which impact fees are charged include sewer lines (gravity sewers and dual force mains), wastewater lift stations (submersible and wet and dry wells), wastewater treatment facilities, and water reclamation facilities. Reclaimed water distribution systems are not included in the Wastewater Development Impact Fee.

Service Areas

As Shown in Figure 15, there are seven independent Service Areas within the Northern Growth Area: North Gateway, Desert View, Deer Valley I, Deer Valley II, Deer Valley III, Deer Valley IV, and Deer Valley V. In the Southern Growth Area, there are five independent Service Areas: Estrella North, Estrella South, Laveen East, Laveen West, and Ahwatukee.

Figure 15. Wastewater Service Areas



Methodology

The demand for future wastewater facilities within each Service Area creates the basis upon which the Wastewater impact fee is calculated. The infrastructure requirements for each Service Area varies depending on a variety of factors including topography, existing infrastructure, existing flows, and projected growth demands. At the very minimum, the infrastructure built to provide wastewater services must have adequate capacity to collect all sewage discharged each Service Area, transport it to treatment facilities, and to discharge plant effluent in accordance with County, State, and Federal rules and regulations. The system must be reliable, secure, and efficiently operated.

The construction and expansion of centralized facilities such as wastewater treatment plants and reclamation plants make up a large portion of the infrastructure required to serve new development within each Service Area. The City apportions the cost of those facilities by determining the proportion of those facilities necessary to serve the EDUs attributable to growth in each specific Service Area.

Service Units

The Service Units for Wastewater and Water were not calculated using the same planning horizon as the other Impact Fee categories. Instead, Wastewater and Water impact fee calculations utilized the number of service units projected for the year 2030. More information on how the number of Service Units was calculated can be found in Appendix B: Service Units. The projected Wastewater EDUs for the year 2030 are shown in Table 137.

Table 137. Wastewater Service Units, 2030.

Impact Fee Service Area	Wastewater EDUs
North Gateway	73,760
Deer Valley I	1,306
Deer Valley II	1,520
Deer Valley III	1,339
Deer Valley IV	2,137
Deer Valley V	943
Desert View	94,444
Total, Northern Growth Area	**175,449**
Estrella North	14,074
Estrella South	40,102
Laveen East	9,284
Laveen West	42,176
Ahwatukee	39,002
Total, Southern Growth Area	**144,638**

Source: EDUs per Service Area from Table 161.

Water and Wastewater Impact Fee Structure Study

This study analyzed the methods the City of Phoenix uses to allocate the cost of providing water and wastewater systems infrastructure for new development. The analysis included a review of the existing system, a comparison of methods used in other communities, and an analysis of water consumption and land use data from selected nonresidential land uses within particular areas of Phoenix. The report provided recommendations for planning EDU factors for water and wastewater for office and retail land uses, as well as suggestions about methods for the assessment of fees. The study was prepared by MuniFinancial in 2004 and is available to the public by contacting the City of Phoenix Water Services Department.

EDU Factors

The EDU factors used for developing the impact fee calculations are shown in Table 138. The Wastewater impact fee is assessed for both residential and nonresidential land uses.

Table 138. Wastewater Service Unit Multipliers

Land Use	EDU Factor
Single-Family, Detached	**1.00 per Dwelling Unit**
All Other Uses	**EDUs = Total Number of Drainage Fixture Units ÷ 23**

Source: Single-family detached dwelling unit set as one Equivalent Demand Unit; relative demand of other uses based on the assumption that one single-family detached dwelling unit has, on average, 23 drainage fixture units.

Planned Improvements

Wastewater Master Plan

The City of Phoenix hired Wilson & Associates in 2006 to prepare a study that modeled the City's wastewater system to identify future facility attributes such as capacities, sizes, locations and costs. The study utilized projections of possible land use changes under different scenarios to develop future wastewater flows in various drainage basins across the City and then to translate these flows into infrastructure requirements that must be provided through the capital improvement program over the next fifty years. All large system facilities, from large sewers, lift stations and force mains to the wastewater treatment and water reclamation plants, were modeled to develop a master plan that meets the city's operational and financial requirements. A copy of this study is available to the public by contacting the City of Phoenix Water Services Department.

Wastewater Treatment Plant Costs

The Wastewater Treatment Plant costs include the costs of treating wastewater at regional, City-wide facilities. While it may seem that an equivalent cost per EDU might be calculated for regional facilities, that is not the case. Each Service Area utilizes different, and in some cases, separate regional facilities. In addition, each Service Area utilizes facilities differently. The differences in cost per EDU for each Service Area are outlined in Table 139.

Table 139. Wastewater Treatment Plant Costs / EDU, by Service Area

	Treatment Cost per EDU							
	North Gateway	Deer Valley I	Deer Valley II	Deer Valley III	Deer Valley IV	Deer Valley V	Desert View	Southern Growth Area
91st Ave WWTP, Solids Only	$370	$0	$0	$0	$0	$370	$370	$0
91st Ave WWTP, Full Treatment	$0	$2,265	$2,265	$2,265	$2,265	$0	$0	$2,265
North Gateway Reclamation Plant	$4,149	$0	$0	$0	$0	$0	$0	$0
Cave Creek Reclamation Plant	$0	$0	$0	$0	$0	$3,353	$3,353	$0
Total Plant Costs per EDU	**$4,519**	**$2,265**	**$2,265**	**$2,265**	**$2,265**	**$3,723**	**$3,723**	**$2,265**

Source: Wastewater treatment costs from Table 178.

Network Costs

Network costs include the costs of providing wastewater collection facilities throughout each Service Area. The collection facilities transport wastewater to the treatment facilities. Each Service Area has different requirements for the collection of wastewater, resulting in different network costs. Existing impact fee balances are subtracted from the costs incurred by each Service Area, since these funds will be used to pay for future required network facilities. The cost per EDU for wastewater network facilities in the Northern Growth Area is shown in Table 140, and in the Southern Growth Area in Table 141. The Adjusted Network Costs per EDU reflect minor changes in the costs adopted with the previous Infrastructure Financing Plan which are not enumerated in Appendix J: Wastewater Facilities.

Table 140. Wastewater Network Costs by Service Area, Northern Growth Area

	North Gateway	Deer Valley I	Deer Valley II	Deer Valley III	Deer Valley IV	Deer Valley V	Desert View
Gravity Sewers	$33,295,389	$1,667,006	$0	$0	$1,517,605	$0	$27,590,445
Force Mains	$13,791,553	$0	$0	$0	$0	$1,297,018	$11,185,849
Lift Stations	$85,031,000	$0	$0	$0	$0	$2,336,205	$24,577,275
Other Facilities	$27,892,800	$0	$0	$0	$0	$0	$480,248
- Existing Impact Fee Balance	-$3,615,091	-$858,598	N/A	N/A	-$5,991	-$250,345	-$2,088,965
Total Network Costs	$156,395,651	$808,408	$0	$0	$1,511,614	$3,382,878	$61,744,852
÷ Number of EDUs	73,760	1,306	1,520	1,339	2,137	943	94,444
Network Cost / EDU	$2,120	$619	$0	$0	$707	$3,587	$654
Adjusted Network Cost / EDU	**$2,118**	**$615**	**$0**	**$0**	**$355**	**$3,587**	**$653**

Source: Network costs from Table 179, adjusted network costs from the adopted *Infrastructure Financing Plan for the Development Impact Fee Areas of the City of Phoenix*, November 15, 2006; Table 180, and Table 181; EDUs from Table 137; existing impact fee balances at time of original adoption, November 15, 2006.

Table 141. Wastewater Network Costs by Service Area, Southern Growth Area.

	Estrella North	Estrella South	Laveen East	Laveen West	Ahwatukee
Gravity Sewers	$0	$65,016,934	$0	$26,263,257	$0
Force Mains	$0	$11,942,311	$0	$0	$0
Lift Stations	$0	$20,527,541	$0	$33,935,000	$0
Other Facilities	$0	$0	$0	$0	$26,199,643
- Existing Impact Fee Balance	N/A	-$5,384,879	N/A	-$5,803,479	-$391,722
Total Network Costs	$0	$92,101,907	$0	$54,394,778	$25,807,921
÷ Number of EDUs	14,074	40,102	9,284	42,176	39,002
Network Cost / EDU	$0	$2,297	$0	$1,290	$662
Adjusted Network Cost / EDU	**$0**	**$2,290**	**$0**	**$1,290**	**$662**

Source: Network costs from Table 182 and Table 183, adjusted network costs from the adopted *Infrastructure Financing Plan for the Development Impact Fee Areas of the City of Phoenix*, November 15, 2006; Ahwatukee financing costs from Table 184; EDUs from Table 137; existing impact fee balances at time of original adoption, November 15, 2006.

Planned Cost per Service Unit

The Planned Cost per Service Unit is calculated by adding the Wastewater Treatment Plant costs per EDU to the Adjusted Wastewater Network cost per EDU for each Service Area. The Planned Costs per EDU for the Northern Growth Area are shown in Table 142, while the Planned Costs per EDU for the Southern Growth Area are shown in Table 143.

Table 142. Planned Wastewater Improvement Cost / EDU, Northern Growth Area

	North Gateway	Deer Valley I	Deer Valley II	Deer Valley III	Deer Valley IV	Deer Valley V	Desert View
Treatment Cost / EDU	$4,519	$2,265	$2,265	$2,265	$2,265	$3,723	$3,723
Adjusted Network Cost / EDU	$2,118	$615	$0	$0	$355	$3,587	$653
Total Planned Cost / EDU	**$6,637**	**$2,880**	**$2,265**	**$2,265**	**$2,620**	**$7,310**	**$4,376**

Source: Treatment costs from Table 139, network costs from Table 140.

Table 143. Planned Wastewater Improvement Cost / EDU, Southern Growth Area

	Estrella North	Estrella South	Laveen East	Laveen West	Ahwatukee
Treatment Cost / EDU	$2,265	$2,265	$2,265	$2,265	$2,265
Adjusted Network Cost / EDU	$0	$2,290	$0	$1,290	$662
Total Planned Cost / EDU	**$2,265**	**$4,555**	**$2,265**	**$3,555**	**$2,927**

Source: Treatment costs from Table 139, network costs from Table 141.

Level of Service Analysis

For the Wastewater impact fee calculations, a level of service analysis similar to those done for the other impact fee categories (with the exception of Water) is neither required nor possible, since the methodology used (dividing cost of improvements needed over a planning period ending in 2030 by total EDUs at the end of the planning period) is very conservative. With this methodology, there is no possibility that the final increment of development could be required to pay for more than its share of the cost (e.g., the last 10 percent of growth paying for 50 percent of the cost of facilities).

Gross Cost per EDU

Since no level of service analysis is required using this methodology, the Planned Cost per EDU becomes the Gross Cost per EDU. The Gross Costs per EDU for the Northern Service Area is therefore shown in Table 142, and the Gross Costs per EDU for the Southern Growth Area are shown in Table 143.

Offsets

Before determining an actual impact fee schedule, offsets must be taken into consideration. An offset is applied for any other type of revenue dedicated to paying for a portion of the same improvements funded by impact fees, which includes future tax payments that will retire outstanding debt used to develop the existing wastewater facilities.

Development Occupational Fees

The City charges a Development Occupational Fee (DOF) at the time wastewater or water connections are purchased. Since these fees fund some of the same types of infrastructure as development impact fees, an offset in the amount of the DOF should be applied when assessing the Wastewater impact fee. Since the DOF varies per type of development, and may be revised independently of this Infrastructure Financing Plan, the amount of the DOF offset is not provided herein.

Wastewater Rate Debt Service Offset

The major funding sources for wastewater facilities in Phoenix consist primarily of debt funded through the collection of wastewater rates along with impact fee funds in the growth areas. However, there is a considerable amount of outstanding debt on existing wastewater facilities. Not all of the existing wastewater facilities and equipment have been paid for by existing development. Citywide, approximately $45 million in wastewater debt service is being paid through wastewater, of which approximately $32 million is associated with growth-related development.

The calculation of the Wastewater Rate Debt Service Offset is shown in Table 144 The formula used is a fairly standard accounting method for approximating the total amount to be paid over time, but in current dollars, by each EDU.

Table 144. Wastewater Rate Debt Service Offset, per EDU

Sewer Rate Revenue	$120,463,740
Debt Service	$45,163,775
Growth-Related Debt Service	$31,740,000
Growth-Related Debt Service as % of Rate Revenues	**26.35%**
Annual Sewer Rate Revenue per 5/8" Account	$206
Annual per EDU Sewer Revenues Available for Growth Related Debt Service	$54.28
Bond Proceeds Factor for Wastewater	11.019
Offset per EDU	**$598**

Source: Derived from the *Offsets Report for the Development Impact Fee Areas of the City of Phoenix*, revised August 27, 2007.

Potential Net Fee per Service Unit

Since the amount of the Development Occupational Fee offset varies by type of development, it is not possible to provide a Potential Net Fee per EDU which would apply to all developments. However, it is possible to provide an example of a Potential Net Fee for a single-family detached dwelling unit based upon the $600 DOF imposed at the time of this writing. The potential fees are shown for the Northern Growth Area in Table 145, and for the Southern Growth Area in Table 146.

Table 145. Potential Wastewater Net Fee per Single-Family Detached Dwelling Unit, Northern Growth Area

	North Gateway	Deer Valley I	Deer Valley II	Deer Valley III	Deer Valley IV	Deer Valley V	Desert View
Gross Cost per EDU	$6,637	$2,880	$2,265	$2,265	$2,620	$7,310	$4,376
– Development Occupational Fee Offset	-$600	-$600	-$600	-$600	-$600	-$600	-$600
– Wastewater Rate Debt Service Offset	-$598	-$598	-$598	-$598	-$598	-$598	-$598
Potential Net Fee, Single-Family Detached Dwelling Unit	**$5,439**	**$1,682**	**$1,067**	**$1,067**	**$1,422**	**$6,112**	**$3,178**

Source: Gross cost per EDU from Table 142; DOF fees per City of Phoenix Ordinances G-2664 through 2667, wastewater rate debt service offset from Table 144.

Table 146. Potential Wastewater Net Fee per Single-Family Detached Dwelling Unit, Southern Growth Area

	Estrella North	Estrella South	Laveen East	Laveen West	Ahwatukee
Gross Cost per EDU	$2,265	$4,555	$2,265	$3,555	$2,927
– Development Occupational Fee Offset	-$600	-$600	-$600	-$600	-$600
– Wastewater Rate Debt Service Offset	-$598	-$598	-$598	-$598	-$598
Potential Net Fee, Single-Family Detached Dwelling Unit	**$1,067**	**$3,357**	**$1,067**	**$2,357**	**$1,729**

Source: Gross cost per EDU from Table 143; DOF fees per City of Phoenix Ordinances G-2664 through 2667, wastewater rate debt service offset from Table 144.

Recommended Wastewater Impact Fee Schedule

The recommended Wastewater impact fee schedules should be calculated in the same manner as the potential net fees per EDU as shown in Table 145 and Table 146. Although recently imposed State regulations currently prohibit an increase in existing impact fees, all of the components used to calculate the Potential Net Fee per EDU in this chapter are identical to the ones in effect and assessed by the City at the time of this writing, so no adjustments are required.

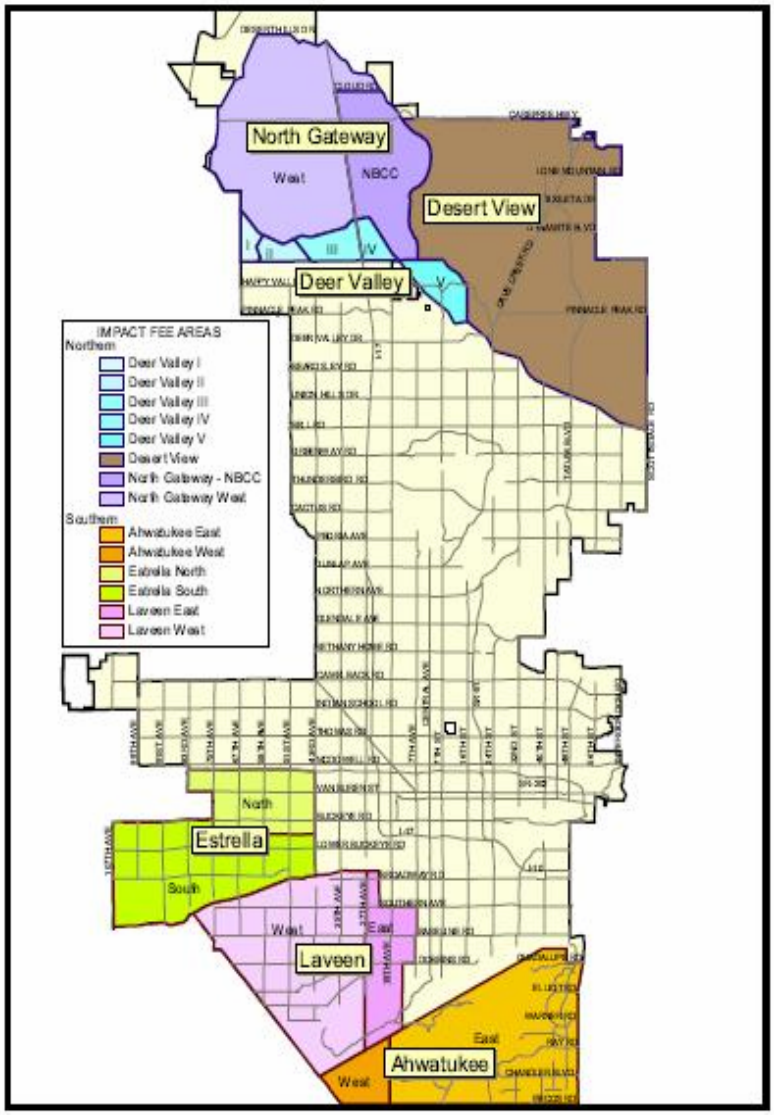
INFRASTRUCTURE IMPROVEMENTS PLAN: WATER

The ability to provide a reliable source of cost effective, high quality water to new developments is the key to ensuring growth. The City of Phoenix works with the development community to plan for the water needs of projects Northern and Southern Growth areas.. The types of facilities being planned include transmission pipelines, pressure-reducing or flow-control valve stations, well facilities, booster-pump stations, storage reservoirs, and water treatment facilities. The system must be reliable, secure, and efficiently operated.

Service Areas

As Shown in Figure 16, there are seven independent Service Areas within the Northern Growth Area: North Gateway, Desert View, Deer Valley I, Deer Valley II, Deer Valley III, Deer Valley IV, and Deer Valley V. In the Southern Growth Area, there are five independent Service Areas: Estrella North, Estrella South, Laveen East, Laveen West, and Ahwatukee.

Figure 16. Water Service Areas



Methodology

The demand for future water facilities within each Service Area creates the basis upon which the Water impact fee is calculated. The infrastructure requirements for each Service Area varies depending on a variety of factors including topography, existing infrastructure, existing supply, and projected growth demands. At the very minimum, the infrastructure built to provide water services must have adequate sufficient capacity to meet projected demand, in accordance with State and Federal water-quality standards. System pressure must be maintained between 50 and 100 pounds per square inch at all times in each pressure zone. Infrastructure for water systems are generally designed to accommodate the pressure zones they serve. However, imposing a pressure zone

structure over a land use structure often results in water facilities needed to serve a specific area being located in a different pressure zone and at some distance away. For example, a storage reservoir may be located several miles from the area it serves, which requires additional transmission mains to connect the reservoir with the service area.

The construction and expansion of centralized facilities such as water treatment plants make up a large portion of the infrastructure required to serve new development within each Service Area. The City apportions the cost of those facilities by determining the proportion of those facilities necessary to serve the EDUs attributable to growth in each specific Service Area.

Service Units

The Service Units for Wastewater and Water were not calculated using the same planning horizon as the other Impact Fee categories. Instead, Wastewater and Water impact fee calculations utilized the number of service units projected for the year 2030. More information on how the number of Service Units was calculated can be found in Appendix B: Service Units. The projected Water EDUs for the Northern Growth Area and the Southern Growth Area for the year 2030 are shown in Table 147.

Table 147. Water Service Units, 2030.

Impact Fee Service Area	Water EDUs
Total, Northern Growth Area	157,249
Total, Southern Growth Area	131,428

Source: EDUs per Service Area from Table 161.

Water and Wastewater Impact Fee Structure Study

This study analyzed the methods the City of Phoenix uses to allocate the cost of providing water and wastewater systems infrastructure for new development. The analysis included a review of the existing system, a comparison of methods used in other communities, and an analysis of water consumption and land use data from selected nonresidential land uses within particular areas of Phoenix. The report provided recommendations for planning EDU factors for water and wastewater for office and retail land uses, as well as suggestions about methods for the assessment of fees. The study was prepared by MuniFinancial in 2004 and is available to the public by contacting the City of Phoenix Water Services Department.

EDU Factors

The EDU factors used for developing the impact fee calculations are shown in Table 148. The Wastewater impact fee is assessed for both residential and nonresidential land uses.

Table 148. Water Service Unit Multipliers

Land Use		EDU Factor		Unit
Multi-Family (sharing common meters, any size)		0.49	per	Dwelling Unit
Multi-Family (individually metered)		1.00	per	Dwelling Unit
Single-Family (up to 1" meter size)		1.00	per	Dwelling Unit
All Other Land Uses and/or Additional Meters	Meter Size			
	5/8" x 3/4"	1.00	per	Meter
	3/4" x 3/4"	1.50	per	Meter
	1"	2.50	per	Meter
	1-1/2"	5.00	per	Meter
	2" Displacement or Turbine	8.00	per	Meter
	3" Displacement	15.00	per	Meter
	3" Compound	16.00	per	Meter
	3" Turbine	17.50	per	Meter
	4" Displacement or Compound	25.00	per	Meter
	4" Turbine	30.00	per	Meter
	6" Displacement or Compound	50.00	per	Meter
	6" Turbine	62.50	per	Meter
	8" Compound	80.00	per	Meter
	8" Turbine	90.00	per	Meter

Source: Single-family detached dwelling unit set and individually-metered multi-family dwelling unit both considered one Equivalent Demand Unit. EDUs are assigned to other uses based upon the meter size.

Planned Improvements

Water Master Plan

A study was prepared of the City of Phoenix's water system to identify future facility attributes such as capacities, sizes, locations and costs. The study utilized projections of possible land use changes under various scenarios to develop future demands for potable water in the numerous water zones found in Phoenix and then translated them into infrastructure requirements that must be provided through the capital improvement program over the next fifty years. All large system facilities, from water treatment plants down to reservoirs, pressure reducing valves, booster stations and large water mains, were modeled using a series of programs to ensure that the final master plan met future demands, while taking into account the city's operational and financial requirements. This study was prepared by Malcolm Pirnie, with assistance from subcontractors CH2MHILL and Optimatics and is available to the public by contacting the City of Phoenix Water Services Department.

Wastewater Treatment Plant Costs

The Water Treatment Plant costs include the costs of treating water at regional, City-wide facilities. While it may seem that an equivalent cost per EDU might be calculated for regional facilities, that is not the case. The Northern and Southern Growth Areas utilize different regional facilities. The differences in cost per EDU for each Service Area are outlined in Table 149.

Table 149. Water Treatment Plant Costs / EDU, by Service Area

Impact Fee Service Area	Cost per EDU
Northern Growth Area	**$2,145**
Southern Growth Area	**$2,278**

Source: Wastewater treatment costs from Table 186.

Network Costs

Network costs include the costs of providing water distribution facilities throughout each Service Area. The distribution facilities transport treated water to water subscribers. Each Service Area has different requirements for the distribution of water, resulting in different network costs. Existing impact fee balances are subtracted from the costs incurred by each Service Area, since these funds will be used to pay for future required network facilities. The costs per EDU for water network facilities in the Northern and Southern Growth Areas are both shown in Table 150.

Table 150. Water Network Costs by Service Area

	Costs	
Type of Facility	Northern	Southern
Water Mains	$273,035,487	$92,244,322
Water Storage Facilities (Reservoirs)	$128,056,000	$21,688,560
Booster Stations	$81,630,586	$6,481,006
Pressure Reducing Valve (PRV) Stations	$12,294,630	$1,915,455
Existing Facilities (Remaining Interest + Principal)	$114,879,730	$61,480,437
Total Network	$609,896,433	$183,809,780
Less: Existing Account Balances	-$16,068,893	-$18,348,714
Network Costs After Balances	$593,827,540	$165,461,066
÷ Number of EDUs	157,249	131,428
Cost per EDU - Network	**$3,776**	**$1,259**

Source: Northern Area water main costs from Table 190; Northern Area booster station costs from Table 187; Northern Area PRV costs from Table 188; Northern Area water storage costs from Table 189; Southern Area water main costs from Table 194; Southern Area booster station costs from Table 191; Southern Area PRV costs from Table 192; Southern Area water storage costs from Table 193; EDUs from Table 137; existing impact fee balances and remaining interest and principal at time of original IFP adoption, November 15, 2006.

Planned Cost per Service Unit

The Planned Cost per Service Unit is calculated by adding the Water Treatment Plant costs per EDU to the Water Network cost per EDU for each Service Area, as shown in Table 151.

Table 151. Planned Water Improvement Costs / EDU

	Costs	
Type of Facility	Northern	Southern
Treatment Cost / EDU	$2,145	$2,278
Network Costs / EDU	$3,776	$1,259
Total Planned Cost / EDU	**$5,921**	**$3,537**

Source: Treatment costs from Table 149, network costs from Table 150.

Level of Service Analysis

For the Water impact fee calculations, a level of service analysis similar to those done for the other impact fee categories (with the exception of Wastewater) is neither required nor possible, since the methodology used (dividing cost of improvements needed over a planning period ending in 2030 by total EDUs at the end of the planning period) is very conservative. With this methodology, there is no possibility that the final increment of development could be required to pay for more than its share of the cost (e.g., the last 10 percent of growth paying for 50 percent of the cost of facilities).

Gross Cost per EDU

Since no level of service analysis is required using this methodology, the Planned Cost per EDU becomes the Gross Cost per EDU for each Service Area, as shown in Table 151.

Offsets

Before determining an actual impact fee schedule, offsets must be taken into consideration. An offset is applied for any other type of revenue dedicated to paying for a portion of the same improvements funded by impact fees, which includes future tax payments that will retire outstanding debt used to develop the existing wastewater facilities.

Development Occupational Fees

The City charges a Development Occupational Fee (DOF) at the time wastewater or water connections are purchased. Since these fees fund some of the same types of infrastructure as development impact fees, an offset in the amount of the DOF should be applied when assessing the Water impact fee. Since the DOF varies per type of development, and may be revised independently of this Infrastructure Financing Plan, the amount of the DOF offset is not provided herein.

Water Rate Debt Service Offset

The major funding sources for water facilities in Phoenix consist primarily of debt funded through the water rate collection along with impact fee funds in the growth areas. However, there is a considerable amount of outstanding debt on existing water facilities. Not all of the existing water facilities and equipment have been paid for by existing development. Citywide, approximately $53 million in water debt service is being paid through secondary property taxes, of which approximately $14.5 million is associated with growth-related development.

The calculation of the Water Rate Debt Service Offset is shown in Table 152. The formula used is a fairly standard accounting method for approximating the total amount to be paid over time, but in current dollars, by each EDU.

Table 152. Water Rate Debt Service Offset, per EDU

Water Rate Revenue	$211,310,896
Debt Service	$53,095,584
Growth-Related Debt Service	$14,575,469
Growth-Related Debt Service as % of Rate Revenues	**6.90%**
Annual Water Rate Revenue per 5/8" Account	$278
Annual per EDU Water Revenues Available for Growth Related Debt Service	$19.18
Bond Proceeds Factor for Water	11.019
Offset per EDU	**$211**

Source: Derived from the *Offsets Report for the Development Impact Fee Areas of the City of Phoenix*, revised August 27, 2007.

Potential Net Fee per Service Unit

Since the amount of the Development Occupational Fee offset varies by type of development, it is not possible to provide a Potential Net Fee per EDU which would apply to all developments. However, it is possible to provide an example of a Potential Net Fee for a single-family detached dwelling unit based upon the $600 DOF imposed at the time of this writing. The potential fees are shown for both the Northern and Southern areas inTable 153.

Table 153. Potential Water Net Fees per Single-Family Detached Dwelling Unit

	Northern Area	Southern Area
Gross Cost per EDU	$5,921	$3,537
– Development Occupational Fee Offset	-$600	-$600
– Water Rate Debt Service Offset	-$211	-$211
Potential Net Fee, Single-Family Detached Dwelling Unit	**$5,110**	**$2,726**

Source: Gross cost per EDU from Table 151; DOF fees per City of Phoenix Ordinances G-2664 through 2667, water rate debt service offset from Table 152.

Recommended Water Impact Fee Schedule

The recommended Water impact fee schedules should be calculated in the same manner as the potential net fees per EDU as shown in Table 153. Although recently imposed State regulations currently prohibit an increase in existing impact fees, all of the components used to calculate the Potential Net Fee per EDU in this chapter are identical to the ones in effect and assessed by the City at the time of this writing, so no adjustments are required.

Section IV: Appendices

Infrastructure Financing Plan for the City of Phoenix, Arizona

APPENDIX A: LAND USE DATA

In order to determine the existing level of service for the various facilities, it is necessary to estimate the existing and future city-wide housing units and nonresidential development. This study utilizes socio-economic data provided for Phoenix and each service area by the Maricopa Association of Governments (MAG). The MAG data are used for both the existing land use estimates and future land use projections in order to provide a consistent basis for measuring existing and future service units. The nonresidential square feet projections are based on employment projections, which are converted to square feet utilizing employee per square foot assumptions used by the City in long range land use planning. As shown in Table 154, the existing impact fee service areas include 89,600 single-family and multi-family residential units and 38.4 million square feet of nonresidential development.

Table 154. Existing Residential and Nonresidential Development

Impact Fee Area	Single-Family (Dwelling Units)	Multi-Family (Dwelling Units)	Retail (1,000 Sq. Ft.)	Office (1,000 Sq. Ft.)	Public/Other (1,000 Sq. Ft.)	Industrial (1,000 Sq. Ft.)
Estrella North	2,800	1,000	1,892	65	231	7,836
Estrella South	10,400	100	1,441	0	538	1,642
Laveen East	4,500	500	360	0	269	75
Laveen West	12,200	500	2,072	0	731	448
Ahwatukee East	24,300	7,900	7,477	1,677	1,923	448
Ahwatukee West	500	0	0	0	38	0
Deer Valley 1	700	0	0	0	0	0
Deer Valley 2	700	0	0	0	0	0
Deer Valley 3	900	0	0	0	0	0
Deer Valley 4	1,200	0	0	0	0	0
Deer Valley 5	100	0	0	0	38	112
Desert View	13,400	2,800	4,595	968	2,308	410
North Gateway West	1,100	0	541	0	154	0
North Gateway NBCC	3,300	700	0	32	77	0
Service Area Total	**76,100**	**13,500**	**18,378**	**2,742**	**6,307**	**10,971**
Outside Fee Areas	303,700	172,500	142,253	78,000	68,655	55,708
City-Wide Total	**379,800**	**186,000**	**160,631**	**80,742**	**74,962**	**66,679**

Source: Existing residential units based on 2007 socio-economic analysis provided by Maricopa Association of Governments, July 29, 2008; nonresidential square feet based on MAG employment estimates and City of Phoenix Planning Department employee density assumptions per 1,000 square feet (1.11 for retail, 3.10 for office, 2.68 for industrial and 2.60 for public/other).

The future residential and nonresidential projections were developed for a build-out scenario for each service area and city-wide based on new development proposals and the land-use plan in the City's adopted General Plan, which includes bulk and zoning density targets. As shown in Table 155, total residential development in the service areas will grow to 267,000 units while nonresidential development will grow to 184.4 million square feet.

Table 155. Build-Out Residential and Nonresidential Development

Impact Fee Area	Single-Family (Dwelling Units)	Multi-Family (Dwelling Units)	Retail (1,000 Sq. Ft.)	Office (1,000 Sq. Ft.)	Public/Other (1,000 Sq. Ft.)	Industrial (1,000 Sq. Ft.)
Estrella North	3,900	4,200	2,703	871	885	21,194
Estrella South	26,400	3,500	5,495	4,419	1,692	11,119
Laveen East	8,300	800	1,171	65	423	75
Laveen West	38,300	4,400	6,036	2,419	1,769	1,231
Ahwatukee East	24,800	8,300	8,378	2,613	2,000	709
Ahwatukee West	1,100	200	360	0	192	0
Deer Valley 1	1,300	0	0	0	192	0
Deer Valley 2	1,700	0	0	0	77	0
Deer Valley 3	1,600	0	0	0	0	0
Deer Valley 4	2,600	400	90	97	38	75
Deer Valley 5	500	0	811	1,161	346	2,015
Desert View	53,900	33,100	20,360	7,581	6,577	6,567
North Gateway West	15,300	17,400	15,405	35,484	1,346	5,373
North Gateway NBCC	11,300	3,700	4,324	258	423	0
Service Area Total	**191,000**	**76,000**	**65,133**	**54,968**	**15,960**	**48,358**
Outside Fee Areas	324,900	333,800	191,353	195,935	90,309	97,761
City-Wide Total	**515,900**	**409,800**	**256,486**	**250,903**	**106,269**	**146,119**

Source: Build-out land use analysis based on 2007 socio-economic projections provided by Maricopa Association of Governments, July 29, 2008 nonresidential square feet based on MAG employment estimates and City of Phoenix Planning Department employee density assumptions per 1,000 square feet (1.11 for retail, 3.10 for office, 2.68 for industrial and 2.60 for public/other).

APPENDIX B: SERVICE UNITS

Functional Population

For all impact fee calculations other than those for Wastewater and Water, it is appropriate to apply a concept referred to as "functional population" in the impact fee literature. This is a generally-accepted methodology for these facility types and is based on the observation that demand for certain facilities is generally proportional to the presence of people.

To a large extent, the demand for public safety functions, including Fire Protection and police, is proportional to the presence of people. The functional population concept is analogous to the concept of "full-time equivalent" employees. It represents the number of "full-time equivalent" people present at the site of a land use. Functional population is the equivalent number of people occupying a building or land use site on a 24-hour-per-day basis.

Determining residential functional population multipliers is considerably simpler than the nonresidential component. The demand for facilities is proportional to the number of people in a dwelling unit. Consequently, data on average household size for various types of units is a critical component of calculating the residential EDUs. Table 156 presents the city-wide 2000 U.S. Census data on the total number of housing units, household population and average number of residents per occupied housing unit for the residential land use categories utilized in this update.

Table 156. Average Household Size, 2000

Land Use	Total Units	Vacant Units	Occupied Units	Household Population	Avg. HH Size
Single Family, Detached	285,575	8,184	277,391	852,681	3.07
Multi-Family	188,422	19,007	169,415	396,165	2.34
Mobile Home/RV Park	21,796	2,738	19,058	49,832	2.61

Source: U.S. Census Bureau, 2000 Census SF-3 (1-in-6 weighted sample data) for City of Phoenix.

It is assumed that people spend 12 hours per day at home during week days and 20 hours per day during weekends. In total, people are assumed to spend 100 hours per week, or 60 percent of their time, at home. The other 40 percent of their time spent away from home accounts for working, shopping and other away-from-home activities. For residential uses, then, Equivalent Demand Units are calculated by first multiplying average household size by 60 percent to determine functional population per unit, then dividing by the functional population per single-family unit to determine Equivalent Demand Units. The Equivalent Demand Units for single-family, multi-family and mobile home/RV units are shown in Table 157.

Table 157. Residential Functional Population and EDU Multipliers

Housing Type	Avg. HH Size	Occupancy	Func. Pop./Unit	EDUs/ Unit
Single-Family	3.07	0.60	1.842	1.00
Multi-Family	2.34	0.60	1.404	0.76
Mobile Home/RV Park	2.61	0.60	1.566	0.85

Source: Average household size from Table 156.

The functional population methodology for nonresidential uses is based on national trip generation data compiled by the Institute of Transportation Engineers (ITE). Functional population per 1,000 square feet is derived by dividing the total number of hours spent by employees and visitors during a day by 24 hours. Employees are assumed to spend eight hours per day at their place of employment, and visitors are assumed to spend one hour per visit depending on land use. The formula used to derive the nonresidential function population estimates is summarized in Figure 17.

Figure 17. Nonresidential Functional Population Formula

Functional population/1000 sf = (employee hours/1000 sf + visitor hours/1000 sf) ÷ 24 hours/day

Where:

Employee hours/1000 sf = employees/1000 sf x 8 hours/day

Visitor hours/1000 sf (retail, office and public/institutional) = visitors/1000 sf x 1 hour/visit

Visitor hours/1000 sf (industrial/warehouse) = visitors/1000 sf x ½ hour/visit

Visitors/1000 sf = weekday ADT/1000 sf x avg. vehicle occupancy - employees/1000 sf

Weekday ADT/1000 sf = one way average daily trips (total trip ends ÷ 2)

Using this formula and information on trip generation rates from the ITE manual, nonresidential functional population estimates per 1,000 square feet of gross floor area were calculated. These functional population estimates were then converted into Equivalent Demand Units by dividing them by the functional population per single-family unit calculated in the preceding table. Table 158 presents the results of these calculations for a number of nonresidential land use categories.

Table 158. Nonresidential Functional Population and EDU Multipliers

Land Use	Unit	Trip Rate	Persons/ Trip	Employee/ Unit	Visitors/ Unit	Functional Pop./Unit	EDUs/ Unit
Retail/Commercial	1000 sq. ft.	9.232	1.77	1.11	15.23	1.005	0.55
Office	1000 sq. ft.	5.505	1.14	3.10	3.18	1.166	0.63
Public/Institutional	1000 sq. ft.	5.505	1.63	2.60	6.37	1.132	0.61
Industrial/Warehouse	1000 sq. ft.	1.780	1.14	2.68	0.69	0.908	0.49

Source: Trip rate is one-half average daily trip ends on a weekday from Institute of Transportation Engineers (ITE), *Trip Generation*, 8th Ed., 2008 (retail based on shopping center, reduced by 57% to reflect only primary trips per ITE, Trip Generation Handbook, 2004; office and public/institutional based on general office; industrial/warehouse based on light industrial); persons per trip are average vehicle occupancies from U.S. Department of Transportation, *National Household Travel Survey*, 2001 for following trip purposes: "shopping" for retail, "to work" for office, industrial and warehouse and "all personal vehicle trips" for public/institutional; employees per unit based on City of Phoenix Planning Department employee density per 1,000 square feet assumptions used in the build-out analysis; visitors/unit and functional population /unit calculated based on formula in Figure 17.

In order to determine the existing levels of service for fire and police facilities, it is necessary to estimate the existing total functional population-based service units for the city. These are shown in Table 159 for all four major service areas, and for the City as a whole.

Table 159. Existing Total Functional Population-Based Service Units

Land Use	Unit	Number	EDU/Unit	EDUs
Single-Family, Detached	Dwelling	7,900	1.00	7,900
Multi-Family	Dwelling	700	0.76	532
Retail/Commercial	1,000 sq. ft.	541	0.55	298
Office	1,000 sq. ft.	32	0.63	20
Public/Institutional	1,000 sq. ft.	231	0.61	141
Industrial/Warehouse	1,000 sq. ft.	0	0.49	0
North Gateway/ DV 1-4				**8,891**
Single-Family, Detached	Dwelling	13,500	1.00	13,500
Multi-Family	Dwelling	2,800	0.76	2,128
Retail/Commercial	1,000 sq. ft.	4,595	0.55	2,527
Office	1,000 sq. ft.	968	0.63	610
Public/Institutional	1,000 sq. ft.	2,346	0.61	1,431
Industrial/Warehouse	1,000 sq. ft.	522	0.49	256
Desert View/DV 5				**20,452**
Single-Family, Detached	Dwelling	29,900	1.00	29,900
Multi-Family	Dwelling	2,100	0.76	1,596
Retail/Commercial	1,000 sq. ft.	5,765	0.55	3,171
Office	1,000 sq. ft.	65	0.63	41
Public/Institutional	1,000 sq. ft.	1,769	0.61	1,079
Industrial/Warehouse	1,000 sq. ft.	10,001	0.49	4,900
Estrella/Laveen				**40,687**
Single-Family, Detached	Dwelling	24,800	1.00	24,800
Multi-Family	Dwelling	7,900	0.76	6,004
Retail/Commercial	1,000 sq. ft.	7,477	0.55	4,112
Office	1,000 sq. ft.	1,677	0.63	1,057
Public/Institutional	1,000 sq. ft.	1,961	0.61	1,196
Industrial/Warehouse	1,000 sq. ft.	448	0.49	220
Ahwatukee				**37,389**
Single-Family, Detached	Dwelling	379,800	1.00	379,800
Multi-Family	Dwelling	186,000	0.76	141,360
Retail/Commercial	1,000 sq. ft.	160,631	0.55	88,347
Office	1,000 sq. ft.	80,742	0.63	50,867
Public/Institutional	1,000 sq. ft.	74,962	0.61	45,727
Industrial/Warehouse	1,000 sq. ft.	66,679	0.49	32,673
City-Wide Total		**948,814**		**738,774**

Source: Number of residential and nonresidential units from Table 154; residential EDUs per unit from Table 157; nonresidential EDUs per unit from Table 158; EDUs is product of units and EDUs per unit.

Build-out service units based on the functional population approach, both city-wide and for the three fire/police service areas, are shown in Table 160.

Table 160. Build-Out Functional Population-Based Service Units

Land Use	Unit	Number	EDU/Unit	EDUs
Single-Family, Detached	Dwelling	33,800	1.00	33,800
Multi-Family	Dwelling	21,500	0.76	16,340
Retail/Commercial	1,000 sq. ft.	19,819	0.55	10,900
Office	1,000 sq. ft.	35,839	0.63	22,579
Public/Institutional	1,000 sq. ft.	2,076	0.61	1,266
Industrial/Warehouse	1,000 sq. ft.	5,448	0.49	2,670
North Gateway/ DV 1-4				**87,555**
Single-Family, Detached	Dwelling	54,400	1.00	54,400
Multi-Family	Dwelling	33,100	0.76	25,156
Retail/Commercial	1,000 sq. ft.	21,171	0.55	11,644
Office	1,000 sq. ft.	8,742	0.63	5,507
Public/Institutional	1,000 sq. ft.	6,923	0.61	4,223
Industrial/Warehouse	1,000 sq. ft.	8,582	0.49	4,205
Desert View/DV 5				**105,135**
Single-Family, Detached	Dwelling	76,900	1.00	76,900
Multi-Family	Dwelling	12,900	0.76	9,804
Retail/Commercial	1,000 sq. ft.	15,405	0.55	8,473
Office	1,000 sq. ft.	7,774	0.63	4,898
Public/Institutional	1,000 sq. ft.	4,769	0.61	2,909
Industrial/Warehouse	1,000 sq. ft.	33,619	0.49	16,473
Estrella/Laveen				**119,457**
Single-Family, Detached	Dwelling	25,900	1.00	25,900
Multi-Family	Dwelling	8,500	0.76	6,460
Retail/Commercial	1,000 sq. ft.	8,738	0.55	4,806
Office	1,000 sq. ft.	2,613	0.63	1,646
Public/Institutional	1,000 sq. ft.	2,192	0.61	1,337
Industrial/Warehouse	1,000 sq. ft.	709	0.49	347
Ahwatukee				**40,496**
Single-Family, Detached	Dwelling	515,900	1.00	515,900
Multi-Family	Dwelling	409,800	0.76	311,448
Retail/Commercial	1,000 sq. ft.	256,486	0.55	141,067
Office	1,000 sq. ft.	250,903	0.63	158,069
Public/Institutional	1,000 sq. ft.	106,269	0.61	64,824
Industrial/Warehouse	1,000 sq. ft.	146,119	0.49	71,598
City-Wide Total				**1,262,906**

Source: Number of build-out residential and nonresidential units from Table 155; residential EDUs per unit from Table 157; nonresidential EDUs per unit from Table 158; EDUs is product of units and EDUs per unit.

Wastewater and Water Service Units

The calculations for the Wastewater and Water Impact Fees were not based upon "build out" and the "functional population" method to determine the demand for future service units. Rather, the number of Service Units was projected for the year 2030, and the demand factors are explained further within the Wastewater and Water Infrastructure Improvements Plans. This Appendix provides the background and data for the 2030 service unit assumptions.

Because of the large size of Phoenix, several Service Areas were created to more fairly allocate future Capital Facility costs for Wastewater and Water. As a result, there are two areas in which impact fees are assessed for infrastructure development: the Northern and Southern Growth Areas. The Northern Growth Area, containing approximately 79,130 acres, includes the Deer Valley, Desert View and North Gateway Service Areas. Some of these areas have been subdivided to smaller Service Areas better allocate specific types of Capital Facility costs. By assessing the fees on the basis of a specific Service Area, the City can better ensure that new development is only paying for capital facilities that it needs and from which it will benefit.

Deer Valley

Deer Valley contains approximately 6,050 acres. About 2,000 acres of land in Deer Valley is made up of washes and other non-developable land, leaving approximately 4,050 acres of potentially developable land (including land needed for streets and open space areas). By and large, the Service Area is comprised mostly of State Trust Lands that have been sold to private parties or are pending future sales. Existing development in the area includes the Dynamite Mountain Ranch and Stetson Hills master-planned communities and some smaller developments. It is anticipated that there will be 6,990 dwelling units and 150 acres of commercial and industrial development occurring in Deer Valley through 2030. Impact Fees are assessed for infrastructure development in five different sub-areas named Deer Valley I through V.

Desert View

Approximately 15,800 acres of the 43,100 acres of land in the Desert View Service Area is made up of washes and other non-developable land, leaving approximately 27,300 acres of potentially developable land (including land needed for streets and open space areas). By and large, the area is comprised mostly of State Trust Lands that have been sold to private parties or are pending future sales. Existing development in the area includes the master planned communities of Tatum Ranch, Dove Valley Ranch, Desert Ridge, and Paradise Ridge. Also included are some commercial and industrial developments such as the Marriott Resort, Sumitomo Sitix chip manufacturing plant, the Mayo Clinic, and the American Express corporate campus. It is anticipated that there will be 94,456 dwelling units and 5,400 acres of commercial and industrial development occurring in Desert View through 2030.

North Gateway

The North Gateway area is is comprised mostly of State Trust Lands that have been sold to private parties or are pending future sales. Existing development in the area includes the master planned communities of Tramonto, Dynamite Mountain Ranch and Sonoran Foothills. Additional residential, commercial and industrial development is expected to grow dramatically in the near future, particularly east of Interstate 17. It is anticipated that there will be 58,392 dwelling units and 11,390 acres of commercial and industrial development occurring in North Gateway through 2030. Impact Fees are assessed for infrastructure development in two Service Areas located within North Gateway: North Gateway West, and North Gateway – Black Canyon Corridor.

Ahwatukee

Ahwatukee is generally dominated by residential development with established commercial uses at major arterial intersections. However, the only significant areas remaining for new development are in what has been referred to as the Foothills Reserve and the South Mountain 620, which are located in the Ahwatukee West sub-area. It is anticipated that there will be 35,410 dwelling units and 3,437 acres of commercial and industrial development occurring in Ahwatukee Foothills through 2030.

Estrella

The 20,160 acres that comprise Estrella are generally bounded by the Salt River on the south, Interstate 10 on the north, 43rd Avenue on the east and 83rd, 75th and 107th Avenues on the west (depending on latitude). Land uses in Estrella were historically dominated by agricultural uses and limited commercial and industrial development. In recent years, a number of residential units have been built, with some additional industrial and commercial construction. It is anticipated that there will be 45,952 dwelling units and 6,723 acres of commercial and industrial development occurring in Estrella through 2030. Impact fees are assessed for infrastructure development in two sub-areas located within Estrella: Estrella North and Estrella South.

Laveen

The Laveen area is generally bounded by the Salt River to the north, the Gila River Indian Community to the southwest, Phoenix South Mountain Park to the southeast, and 23rd Avenue, 7th Avenue or 15th Avenue to the east (depending on latitude). Laveen has historically supported agricultural uses and, more recently, new single family residential development. Residential and commercial development is expected to grow dramatically in the near future. It is anticipated that there will be 49,175 dwelling units and 2,883 acres of commercial and industrial development occurring in Laveen through 2030. Impact fees are assessed and credit is available for infrastructure development in two sub-areas located within Laveen: Laveen East and Laveen West.

2030 Wastewater and Water Service Units

The 2030 Service Unit projections, shown in Table 161, are based on the assumptions for each Service Area provided above. The data was calculated using information provided by the Maricopa

Association of Goverments, as well as other development data and trend information provided by the Development Services, Planning, and Water Services Departments of the City of Phoenix. The different EDU figures calculated for the Wastewater and Water categories reflect different demands on each Necessary Public Service, as well as existing EDUs which have not yet connected to the City's public sewer system, but are expected to in the future.

Table 161. Wastewater and Water Service Units, 2030.

Impact Fee Service Area	Wastewater EDUs	Water EDUs
North Gateway	73,760	--
Deer Valley I	1,306	--
Deer Valley II	1,520	--
Deer Valley III	1,339	--
Deer Valley IV	2,137	--
Deer Valley V	943	--
Desert View	94,444	--
Total, Northern Growth Area	**175,449**	**157,249**
Estrella North	14,074	--
Estrella South	40,102	--
Laveen East	9,284	--
Laveen West	42,176	--
Ahwatukee	39,002	--
Total, Southern Growth Area	**144,638**	**131,428**

Source: 2030 EDUs derived from the *Infrastructure Financing Plan for Development Impact Fee Areas of the City of Phoenix, November 15, 2006*, which was based on socio-economic projections provided by Maricopa Association of Governments, and City of Phoenix Planning Department and Water Services Department data and assumptions.

APPENDIX C: LAND COSTS

This section addresses average land costs per acre to be used in the impact fee calculations for Fire Protection, police and library facilities. All three of these facility types typically require commercial tracts with good roadway access.

One approach to estimating current and future land costs is to look at recent historical purchases. Since 2003, the City has purchased seven sites for future facilities in the impact fee service areas. The recent City purchases are a mixture of small and large tracts, some with off-site improvements such as road access and utilities, and others with few are not off-site improvements. No clear pattern emerges as to average land costs by service area. As summarized in Table 162, these recent purchases average $178,049 per acre.

Table 162. City Land Purchases in the Growth Areas

Impact Fee Area	Year	Facility	Cost	Acres	Cost/Acre
Desert View/DV 5	2004	Police	$890,682	15.00	$59,379
North Gateway/DV 1-4	2009	Library, Other	$1,436,850	18.00	$79,825
North Gateway/DV 1-4	2009	Unknown	$1,635,700	15.00	$109,047
North Gateway/DV 1-4	2008	Fire	$1,895,000	3.19	$594,044
Estrella/Laveen	2003	Police	$316,000	12.00	$26,333
Estrella/Laveen	2009	Unknown	$1,070,000	3.51	$304,843
Ahwatukee	2009	Fire/Library/Preserve	$18,000,000	247.00	$72,874
Unweighted Average Cost per Acre					**$178,049**

Source: City of Phoenix, 2009.

As part of this project, the City retained the Phoenix-based professional real estate appraisal firm Brekan-Nava Group to assist in determining appropriate average land costs for Fire Protection, police and library sites. The firm reviewed sales of comparable sites over the last few years; the comparables were relatively small, improved sites ready for vertical development. Recent downward trends in land prices were taken into consideration. Based on this review, Brekan-Nava Group determined average costs for the four service areas, which ranged from $370,260 per acre in Estrella/Laveen to $653,400 per acre in Desert View. These costs per acre are significantly higher than most of the City's recent purchases. This may be due to a couple of factors, including the fact that several of the City's purchases were of large tracts that will be used for multiple purposes, as well as the fact that several of these sites are relatively unimproved and will require significant expenditures on off-site improvements such as road and utility access.

For the purposes of this study, the average cost per acre of recent sites acquired by the City will be used. The Brekan-Nava analysis will be relied upon as a reasonable measure of the differences in relative land costs between the service areas. The overall average cost per acre of recent City land purchases in the service areas is adjusted by the relative Brekan-Nava land costs to estimate average land costs by service area for Fire Protection, police and library sites, as shown in Table 163.

Table 163. Land Costs per Acre by Service Area

Impact Fee Area	Brekan-Nava Cost/Acre	Perent of Average	Avg. City Cost/Acre	Assumed Cost/Ac.
Desert View/DV 5	$653,400	133%	$178,049	**$237,399**
North Gateway/DV 1-4	$435,600	89%	$178,049	**$158,266**
Estrella/Laveen	$370,260	76%	$178,049	**$134,526**
Ahwatukee	$500,940	102%	$178,049	**$182,006**
Average, All Service Areas	$490,050			
Average, North Growth Area				**$197,833**

Source: Brekan-Nava costs per acre from Brekan-Nava Group, *Land Cost Analysis for the Northern Development Impact Area* and *Land Cost Analysis for the Southern Development Impact Area*, February 1, 2009 (costs projected to December 2009); average City cost per acre from Table 162.

APPENDIX D: FIRE PROTECTION FACILITIES

Table 164. Bond-Funded Fire Protection Facilities

Project	Bond Issue	Debt Funding
Operations Center	1984 Res Yld Fire Bonds	$4,497,582
FS #49 Artwork	1988 Fire Protection Bonds	$77,872
Preservation Of Artwork	1988 Fire Protection Bonds	$8,221
FS #12 Artwork	1988 Fire Protection Bonds	$37,928
FS #44 Artwork	1988 Fire Protection Bonds	$65,125
Fire Station #30 - A	1988 Fire Protection Bonds	$80,542
Fire Station #44	1988 Fire Protection Bonds	$1,330,898
Fire Station # 30	1988 Fire Protection Bonds	$2,190,926
Fire Station #26 Land	1988 Fire Protection Bonds	$319,485
Fire Station #28 Land	1988 Fire Protection Bonds	$75,565
Operations Center	1988 Fire Protection Bonds	$9,237,244
CAD II	1988 Fire Protection Bonds	$5,059,545
CAD Equipment	1988 Fire Protection Bonds	$1,155,851
Fs #28 Remodeling	1988 Fire Protection Bonds	$173,597
Relocate Fs #12	1988 Fire Protection Bonds	$2,857,933
New Station 60 at 19th Ave & Dunlap-Infill	2001 Fire Protection Technology	$129,466
New Station 61 - 16th St/Indian School Infill	2001 Fire Protection Technology	$120,944
Firefighter Training	2001 Fire Protection Technology	$553,770
Firefighter Safety	2001 Fire Protection Technology	$2,492,381
Additional Allocation for Traffic Preemption	2001 Fire Protection Technology	$1,217,100
Fire Station #43	2001 Fire Protection	$4,532,929
Fire Station #52	2001 Fire Protection	$1,826,949
Temp Battalion 6 Office	2001 Fire Protection	$186,500
New Station 50 at 35 Avenue & Beardsley Rd	2001 Fire Protection	$5,649,698
New Station 54 at 107th Ave & Camelback	2001 Fire Protection	$5,143,079
New Station 32 at 40th St and Baseline Rd	2001 Fire Protection	$5,637,027
FS62 @ 99th Ave and Lower Buckeye	2001 Fire Protection	$447,641
New Station 60 at 19 Ave & Bunlap-Infill	2001 Fire Protection	$5,580,863
New Station 57 at 15 Ave & Dobbins Rd	2001 Fire Protection	$4,882,799
New Station 61 - 16th St/ Indian School Infill	2001 Fire Protection	$6,707,773
Fire Station 55 at I-17 & Jomax Rd Land	2001 Fire Protection	$1,330,741
Fire Station 63 - 7th St/Thunderbird Land	2001 Fire Protection	$2,416
New Station 56 at I-17 & Carefree Hwy	2001 Fire Protection	$4,840,119
Public Safety Driver Education Facility	2001 Fire Protection	$6,968,377
Logistic Building Roof Repair	2001 Fire Protection	$283,037
Support Service Warehouse	2001 Fire Protection	$3,563,224
Land for Command Training Center	2001 Fire Protection	$307,761
Fire Station 16 - 1216 s 18th St Replace	2001 Fire Protection	$400,000
New Station 72-N. Desert View Village	2006 GO Fire Protection (Emergency Mgmt)	$1,401,220
New Station 55-Deer Valley/N Gateway	2006 GO Fire Protection (Emergency Mgmt)	$2,387
New Station 59-Estrella Village	2006 GO Fire Protection (Emergency Mgmt)	$17,246
New Fire Train./Comm	2006 GO Fire Protection (Emergency Mgmt)	$5,792,793
Fire Communications	2006 GO Fire Protection (Emergency Mgmt)	$2,028,824
Total Existing Debt-Funded Facilities		**$99,215,377**

Source: Fire CIP projects that have utilized General Obligation Bond funding provided by City of Phoenix Budget and Research Department, March 14, 2009; debt funding based on life-to-date actual debt expenditure for each project.

APPENDIX E: PARKS FACILITIES

Table 165. Inventory of Existing Parks—Northern Growth Area

Park	Dev Acres	Undeveloped	Total
North Gateway			
Deem Hills 1 (Community Park)	28	36	64
Tramonto Park (Neighborhood Park)	12	0	12
Total, North Gateway	**40**	**36**	**76**
Desert View			
Dove Valley	30	0	30
Desert Broom	41	0	41
56th St./Montgomery	0	40	40
Subtotal, Community Parks	71	40	111
Desert Willow	15	0	15
Dynamite	20	0	20
Cashman	10	0	10
24th St/Happy Valley Rd.	0	44	44
John W. Teets	21	0	21
52nd St./Dove Valley Rd.	0	20	20
Dove Valley	5	0	5
Subtotal, Neighborhood Parks	71	64	135
Total, Desert View	**142**	**104**	**246**

Source: City of Phoenix of Phoenix "Park Acreage Summary," October 25, 2007 and additional data from City of Phoenix Parks Development Department, January 22 and February 28, 2008.

Table 166. Inventory of Existing Parks—Southern Growth Area

Park	Dev Acres	Undeveloped	Total
Estrella/Laveen			
71st Ave/Elwood	28	28	56
31st Ave/Roeser Rd.	0	40	40
Subtotal, Community Park	28	68	96
Sunridge	16	0	16
87th Ave/Lower Buckeye	0	16	16
103rd Ave/Country Place	0	10	10
83rd Ave/Elwood	0	13	13
71st Ave/Meadow Loop Rd.	0	15	15
71st Ave/Elwood	0	28	28
47th Ave/Alta Vista Rd.	0	16	16
Playa Margarita	6	0	6
31st Ave/Vineyard	0	21	21
23rd Ave/Gary Way	0	7	7
Subtotal, Neighborhood Parks	22	126	148
Total, Estrella/Laveen	**50**	**194**	**244**
Ahwatukee			
Mountain Vista	44	0	44
Sun Ray	18	0	18
Vista Canyon	26	0	26
Desert Foothills	45	0	45
Subtotal, Community Parks	133	0	133
Western Star	10	0	10
17th Ave/Pecos Rd.	0	7	7
Subtotal, Neighborhood Parks	10	7	17
Total, Ahwatukee	**143**	**7**	**150**

Source: City of Phoenix of Phoenix "Park Acreage Summary," October 25, 2007 and additional data from City of Phoenix Parks Development Department, January 22 and February 28, 2008.

APPENDIX F: POLICE FACILITIES

Table 167. Existing City-Wide Police Facility Inventory

Facility	Building (Sq. Ft.)	Land (Acres)
Cactus Park Precinct	13,434	4.00
Central City Precinct	11,007	5.00
Desert Horizon Precinct	11,007	5.00
Maryvale Precinct	11,077	5.00
South Mountain Precinct	11,077	5.80
Squaw Peak Precinct	10,986	4.00
Future Precinct #300 (99th Ave & Lower Buckeye Rd.)	NA	12.00
Future Precinct #200 (Cave Creek & Smokehouse Tr.)	NA	15.00
Total, Precinct Stations	**68,588**	**55.80**
Ahwatukee Foothills Neighborhood Station	7,474	Shared
Four Corners Neighborhood Station	4,950	Shared
Paseo Highlands Neighborhood Station	5,632	Shared
Sunnyslope (Under Construction)	NA	3.00
Total, Neighborhood Stations	**18,056**	**3.00**
North Command Station	10,128	6.00
Southern Command Station	25,000	5.00
Communications Facility	96,517	9.00
Total, Command Stations/Communications	**131,645**	**20.00**

Source: City of Phoenix Police Department, April 2, 2009.

Figure 18. Existing and Planned Police Facility Map

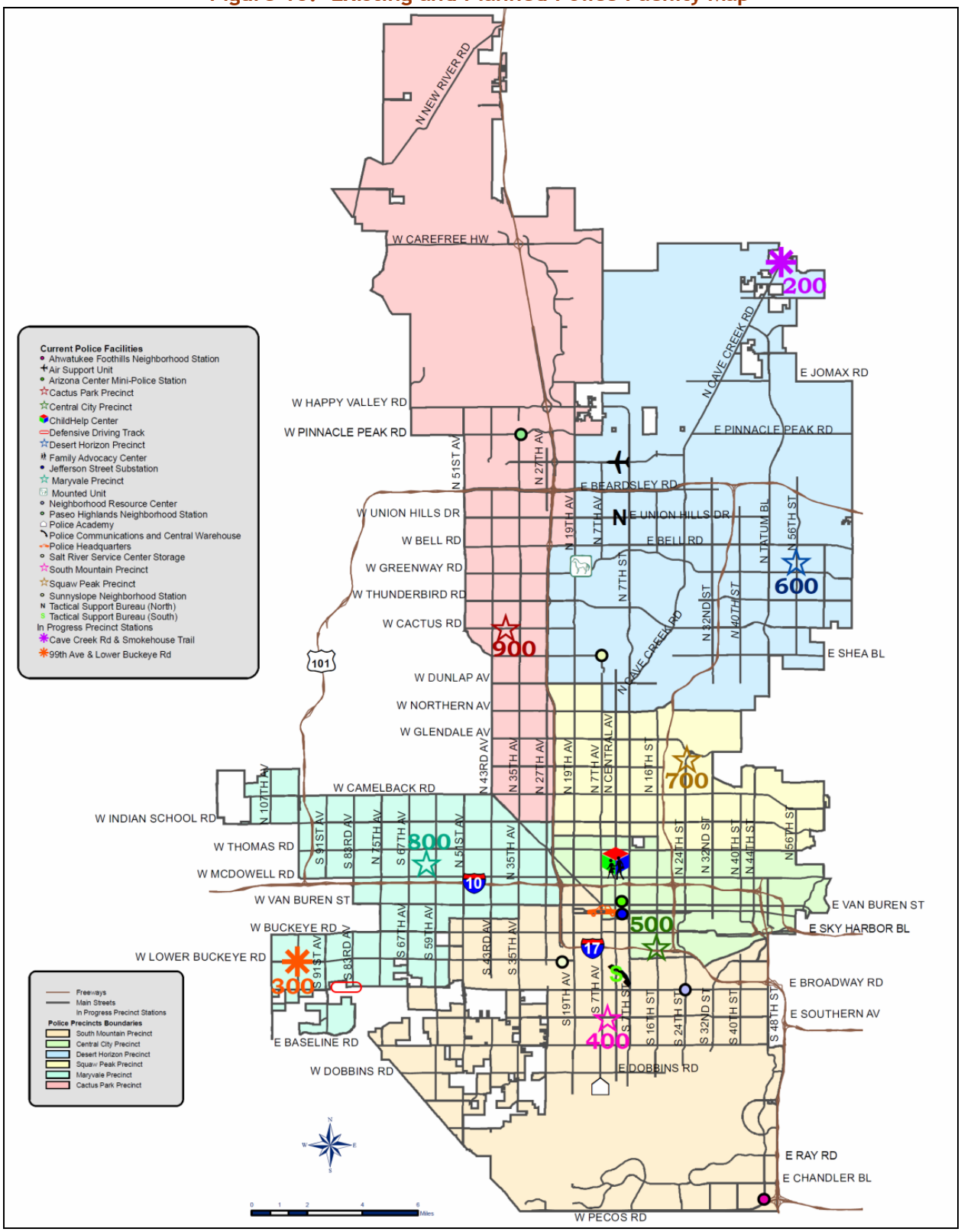


Table 168. Bond-Funded Police Facilities

Project	Bond Issue	Debt Funding
2 New Precincts (Land Only)	1988 Police Protection Bonds	$232,745
2 New Precincts (Land Only)	2001 Police Protection	$1,000,640
Mobile Activity Command Vehicle	2001 Police Protection	$469,497
Neighbrhd Police Stn.24th St/Broadway	2001 Police Protection	$1,800,517
Paseo Highlands Neighborhood Police St	2001 Police Protection	$1,069,885
Sunnyslope Neighbd Police Station	2001 Police Protection	$1,387,014
Northwest/I-17 & Happy Valley Precinct	2001 Police Protection	$1,707,684
Crime Lab	2001 Police Protection	$43,862,589
Police NW Precinct (Daisy Trail)-Land	2006 GO Police Protection	$2,097
Northeast/Cave Crk Precinct & Smoke	2006 GO Police Protection	$34,152
Crime Lab	2006 GO Police Protection	$2,970,000
Northwest/I-17 & Happy Valley Precinct	2006 GO Police Protection	$2,527,024
Total Debt-Funded Facilities		**$57,063,844**

Source: Police CIP projects that have utilized General Obligation Bond funding provided by City of Phoenix Budget and Research Department, March 14, 2009; debt funding based on life-to-date actual debt expenditure for each project; includes only debt-funded capital facilities qualifying for impact fee funding in accordance with State statutes.

APPENDIX G: ROADWAY FACILITIES—INVENTORY AND REVENUES

Table 169. Arterial Street Inventory—Northern Growth Area

Street	Segment	Type	Length (mi.)	% Complete	Exist VMC	Future VMC
40th St	Mayo Blvd to Deer Valley Rd	CM	0.68	100.0%	23,800	23,800
40th St	Deer Valley Rd to 150' N/O Hamblin Dr	CM	0.74	100.0%	25,900	25,900
40th St	150' N/O Hamblin Dr to Pinnacle Peak Rd	CM	0.29	85.7%	8,750	10,150
40th St	Pinnacle Peak Pky to Tatum Blvd	CM	0.96	0.0%	0	33,600
56th St	CAP to 1225' S/O Mayo Blvd	CM	0.69	85.7%	20,650	24,150
56th St	1225' S/O Mayo Blvd to Mayo Blvd	CM	0.23	85.7%	7,000	8,050
56th St	Mayo Blvd to 490' N/O Sr101	A	0.39	77.8%	15,000	19,500
56th St	490' N/O Sr101 to 1020' S/O Deer Valley Rd	A	0.29	0.0%	0	14,500
56th St	1020' S/O Deer Valley to Deer Valley	A	0.19	0.0%	0	9,500
56th St	Deer Valley Rd to 725' N/O Deer Valley Rd	A	0.14	0.0%	0	7,000
56th St	725' N/O Deer Valley to 1830' N/O Deer Valley	CM	0.48	0.0%	0	16,800
56th St	1830' N/O Deer Valley to 3500' S/O Pinnacle Peak	CM	1.38	0.0%	0	48,300
56th St	3500' S/O Pinnacle Peak to Pinnacle Peak	CM	0.66	0.0%	0	23,100
56th St	Pinnacle Peak Rd to Happy Valley Rd	CM	0.97	0.0%	0	33,950
56th St	Happy Valley Rd to Jomax Rd	CM	1.02	0.0%	0	35,700
56th St	Jomax Rd to Pinnacle Vista Dr	CM	0.51	0.0%	0	17,850
56th St	Pinnacle Vista Dr to 355' S/O Dynamite Blvd	CM	0.43	42.9%	6,300	15,050
56th St	355' S/O Dynamite Blvd to Dynamite Blvd	CM	0.07	0.0%	0	2,450
56th St	Dynamite Blvd to Dixileta Dr	CM	1.00	0.0%	0	35,000
56th St	Dixileta Dr to Lone Mountain Rd	CM	1.00	0.0%	0	35,000
56th St	Lone Mtn Rd to Rancho Paloma Dr	CM	0.25	0.0%	0	8,750
64th St	CAP to Mayo Blvd	D	1.03	0.0%	0	36,050
64th St	Mayo Blvd to Deer Valley Rd	A	0.90	0.0%	0	45,000
64th St	Deer Valley Rd to Pinnacle Peak Rd	CM	2.00	0.0%	0	70,000
64th St	Pinnacle Peak Rd to Happy Valley Rd	CM	1.04	0.0%	0	36,400
64th St	Happy Valley Rd to Jomax Rd	CM	0.89	0.0%	0	31,150
7th St	CAP to Happy Valley Rd	CM	0.71	0.0%	0	24,850
Black Mt. Pky	SR 101 to Mayo Blvd	A	0.23	0.0%	0	11,500
Black Mt. Pky	Mayo Blvd to Deer Valley Rd	A	0.24	100.0%	12,000	12,000
Black Mt. Pky	Deer Valley Rd to Rough Rider Rd	A	0.50	33.3%	8,500	25,000
Black Mt. Pky	Rough Rider Rd to Pinnacle Peak Rd	A	0.50	0.0%	0	25,000
Black Mt. Pky	Pinnacle Peak Rd to Happy Valley Rd	A	1.08	0.0%	0	54,000
Black Mt. Pky	Happy Valley Rd to 885' S/O Briles Rd	A	0.67	0.0%	0	33,500
Black Mt. Pky	885' S/O Briles Rd to Jomax Rd	A	0.42	22.2%	4,500	21,000
Black Mt. Pky	Jomax Rd to Cave Creek Rd	A	0.68	0.0%	0	34,000
Black Mt. Pky	Cave Creek Rd to Sonoran Pky	B	1.94	0.0%	0	97,000
Black Mt. Pky	Tatum Blvd to Lone Mtn Rd	CM	0.84	42.9%	12,600	29,400
Black Mt. Pky	Lone Mtn Rd to 460' S/O Desert Forest	CM	0.75	0.0%	0	26,250
Black Mt. Pky	460' S/O Desert Forest to 615' N/O Desert Forest	CM	0.20	42.9%	3,150	7,000
Black Mt. Pky	615' N/O Desert Forest Trl to Rancho Paloma	CM	0.53	100.0%	18,550	18,550
Black Mt. Pky	Rancho Paloma to Carefree Hwy	CM	1.05	100.0%	36,750	36,750
Carefree Hwy	West Boundary of Fee Area to 645' W/O 7th St	A	1.60	55.6%	44,500	80,000
Carefree Hwy	645' W/O 7th St to 7th St	A	0.12	33.3%	2,000	6,000
Carefree Hwy	7th St to 42nd St	A	4.26	55.6%	118,500	213,000
Carefree Hwy	42nd St to Black Mtn Pky	A	0.76	33.3%	12,500	38,000
Carefree Hwy	Black Mtn Pky to East Boundary of Fee Area	A	0.25	88.9%	11,000	12,500

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Table 169 Continued

Street	Segment	Type	Length (mi.)	% Complete	Exist VMC	Future VMC
Cave Creek Rd	CAP to Deer Valley Rd	B	0.48	55.6%	13,500	24,000
Cave Creek Rd	Deer Valley Rd to Cielo Grande Ave	B	0.89	88.9%	39,500	44,500
Cave Creek Rd	Cielo Grande Ave to 835' N/O Cielo Grande Ave	B	0.16	100.0%	8,000	8,000
Cave Creek Rd	835' N/O Cielo Grande to 405' S/O Pinnacle Peak	B	0.14	88.9%	6,000	7,000
Cave Creek Rd	405' S/O Pinnacle Peak to Pinnacle Peak Rd	B	0.08	77.8%	3,000	4,000
Cave Creek Rd	Pinnacle Peak Rd to Happy Valley Rd	B	0.90	88.9%	40,000	45,000
Cave Creek Rd	Happy Valley Rd to Jomax Rd	B	1.38	77.8%	53,500	69,000
Cave Creek Rd	Jomax Rd to Black Mtn Pky	B	0.40	77.8%	15,500	20,000
Cave Creek Rd	Black Mtn Pky to Dynamite Blvd	B	0.75	77.8%	29,000	37,500
Cave Creek Rd	Dynamite Blvd to 290' N/O Peak View Rd	B	0.43	77.8%	16,500	21,500
Cave Creek Rd	290' N/O Peak View Rd to Tatum Blvd	B	0.53	88.9%	23,500	26,500
Cave Creek Rd	Tatum Blvd to Desert Willow Pky	B	0.85	88.9%	38,000	42,500
Cave Creek Rd	Desert Willow Pky to Lone Mtn Rd	B	0.25	88.9%	11,000	12,500
Cave Creek Rd	Lone Mtn Rd to 925' N/O Lone Mtn Rd	B	0.18	100.0%	9,000	9,000
Cave Creek Rd	925' N/O Lone Mtn Rd to Ashler Hills Dr	B	0.39	55.6%	11,000	19,500
Cave Creek Rd	Ashler Hills Dr to Ocupado Dr	B	0.26	100.0%	13,000	13,000
Cave Creek Rd	Ocupado Dr to Rancho Paloma	B	0.18	88.9%	8,000	9,000
Cave Creek Rd	Rancho Paloma to 300' S/O Smokehouse Trl	B	0.40	33.3%	6,500	20,000
Cave Creek Rd	300' S/O Smokehouse Trl to City Limits	B	0.21	55.6%	6,000	10,500
Deer Valley Rd	CAP to Cave Creek Rd	B	0.37	100.0%	18,500	18,500
Deer Valley Rd	Cave Creek Rd to 28th St	B	0.58	33.3%	9,500	29,000
Deer Valley Rd	28th St to Black Mtn Pky	B	1.55	0.0%	0	77,500
Deer Valley Rd	Black Mtn Pky to 40th St	A	1.00	100.0%	50,000	50,000
Deer Valley Rd	40th St to Tatum Blvd	A	0.74	88.9%	33,000	37,000
Deer Valley Rd	Tatum Blvd to Marriott Dr	A	0.49	88.9%	22,000	24,500
Deer Valley Rd	Marriott Dr to 56th St	A	0.54	77.8%	21,000	27,000
Deer Valley Rd	56th St to 64th St	A	1.17	100.0%	58,500	58,500
Deer Valley Rd	64th St to Scottsdale Rd	A	1.09	0.0%	0	54,500
Desert Peak Pky	Happy Valley Rd to Cave Creek Rd	A	0.68	100.0%	34,000	34,000
Dixileta Dr	Tatum Blvd to 300' E/O 51st Pl	CM	0.73	100.0%	25,550	25,550
Dixileta Dr	300' E/O 51st Pl to 56th St	CM	0.50	0.0%	0	17,500
Dove Valley Rd	East Limit of Fee Area to Sonoran Pky	CM	1.68	0.0%	0	58,800
Dynamite Blvd	Black Mtn Pky to Cave Creek Rd	A	0.62	0.0%	0	31,000
Dynamite Blvd	Cave Creek to 855' W/O Tatum Blvd	A	1.06	0.0%	0	53,000
Dynamite Blvd	855' W/O Tatum Blvd to Tatum Blvd	A	0.16	100.0%	8,000	8,000
Dynamite Blvd	Tatum Blvd to 665' E/O Tatum Blvd	A	0.13	0.0%	0	6,500
Dynamite Blvd	665' E/O Tatum Blvd to 52nd St	A	0.88	33.3%	14,500	44,000
Dynamite Blvd	52nd St to 56th St	A	0.50	0.0%	0	25,000
Happy Valley Rd	West Limit of Fee Area to Desert Peak Pky	A	1.29	0.0%	0	64,500
Happy Valley Rd	Cave Creek Rd to Black Mountain Pky	CM	1.26	0.0%	0	44,100
Happy Valley Rd	Black Mountain Pky to Tatum Blvd	CM	1.31	0.0%	0	45,850
Happy Valley Rd	Tatum Blvd to 56th St	CM	1.15	0.0%	0	40,250
Happy Valley Rd	56th St to 64th St	CM	0.65	0.0%	0	22,750
Happy Valley Rd	64th St to Scottsdale Rd	CM	1.01	0.0%	0	35,350
Jomax Rd	Cave Creek Rd to Black Mtn Pky	CM	0.64	0.0%	0	22,400
Jomax Rd	Black Mtn Pky to Tatum Blvd	CM	1.10	100.0%	38,500	38,500
Jomax Rd	Tatum Blvd to 56th St	CM	1.03	0.0%	0	36,050
Jomax Rd	56th St to 64th St	CM	0.96	0.0%	0	33,600
Jomax Rd	64th St to Scottsdale Rd	CM	0.99	0.0%	0	34,650
Lone Mt. Rd	Sonoran Pky to Black Mtn Pky	CM	1.47	0.0%	0	51,450
Lone Mt. Rd	Black Mtn Pky to 705' W/O Cave Creek Rd	CM	0.66	42.9%	9,800	23,100

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Table 169 Continued

Street	Segment	Type	Length (mi.)	% Complete	Exist VMC	Future VMC
Lone Mt. Rd	705' W/O Cave Creek Rd to Cave Creek Rd	CM	0.13	100.0%	4,550	4,550
Lone Mt. Rd	Cave Creek Rd to 865' E/O Cave Creek Rd	B	0.16	100.0%	8,000	8,000
Lone Mt. Rd	865' E/O Cave Creek Rd to 52nd St	B	0.54	0.0%	0	27,000
Lone Mt. Rd	52nd St to 210' E/O 52nd St	B	0.31	33.3%	5,000	15,500
Lone Mt. Rd	210' E/O 52nd St to 56th St	B	0.19	0.0%	0	9,500
Lone Mt. Rd	56th St to 64th St	B	1.00	0.0%	0	50,000
Mayo Blvd	Black Mountain Pky to 40th St	CM	0.60	100.0%	21,000	21,000
Mayo Blvd	40th St to 44th St	CM	0.80	0.0%	0	28,000
Mayo Blvd	44th St to Tatum Blvd	A	0.67	0.0%	0	33,500
Mayo Blvd	Tatum Blvd to 1850' E/O Tatum Blvd	A	0.35	33.3%	6,000	17,500
Mayo Blvd	1850' E/O Tatum Blvd to 875' W/O 56th	A	0.59	0.0%	0	29,500
Mayo Blvd	875' W/O 56th St to 56th St	A	0.17	88.9%	7,500	8,500
Mayo Blvd	56th St to 1320 E/O 56th St	A	0.25	88.9%	11,000	12,500
Mayo Blvd	1320 E/O 56th St to 64th St	A	0.89	0.0%	0	44,500
Mayo Blvd	64th St to 68th St	A	0.51	0.0%	0	25,500
Mayo Blvd	68th St to Scottsdale Rd	A	0.50	88.9%	22,000	25,000
Pinnacle Pk. Rd	Cave Creek Rd to Black Mtn Pky	A	1.18	0.0%	0	59,000
Pinnacle Pk. Rd	Black Mtn Pky to 1140' W/O Cashman Dr	A	0.52	0.0%	0	26,000
Pinnacle Pk. Rd	1140' W/O Cashman Dr to 40th St	A	0.80	33.3%	13,500	40,000
Pinnacle Pk. Rd	40th St to Tatum Blvd	A	0.81	0.0%	0	40,500
Pinnacle Pk. Rd	Tatum Blvd to 56th St	A	1.00	0.0%	0	50,000
Pinnacle Pk. Rd	56th St to 64th St	A	0.50	0.0%	0	25,000
Pinnacle Pk. Rd	64th St to Scottsdale Rd	A	1.00	0.0%	0	50,000
Rancho Paloma	Black Mtn Pky to Cave Creek Rd	D	0.98	100.0%	34,300	34,300
Rancho Paloma	Cave Creek Rd to 52nd Pl	CM	0.36	100.0%	12,600	12,600
Rancho Paloma	52nd Pl to 56th St	CM	0.80	57.1%	16,100	28,000
Scottsdale Rd	Bell Rd to 450' N/O Princess Dr	A	1.17	44.4%	26,000	58,500
Scottsdale Rd	450' N/O Princess Dr to Chauncy Ln	A	0.25	44.4%	5,500	12,500
Scottsdale Rd	Chauncy Ln to Mayo Blvd	A	0.25	44.4%	5,500	12,500
Scottsdale Rd	Mayo Blvd to 450' S/O SR101	A	0.12	88.9%	5,500	6,000
Scottsdale Rd	450' S/O SR101 to 410' N/O SR101	A	0.16	100.0%	8,000	8,000
Scottsdale Rd	410' N/O SR101 to Thompson Peak Pky	A	0.71	44.4%	16,000	35,500
Scottsdale Rd	Thompson Peak Pky to Grayhawk Dr	A	0.50	44.4%	11,000	25,000
Scottsdale Rd	Grayhawk Dr to Deer Valley Rd	A	0.50	44.4%	11,000	25,000
Scottsdale Rd	Deer Valley Rd to Pinnacle Peak Rd	A	1.00	44.4%	22,000	50,000
Scottsdale Rd	Pinnacle Peak Rd to Happy Valley Rd	A	1.04	44.4%	23,000	52,000
Scottsdale Rd	Happy Valley Rd to Jomax Rd	A	0.89	44.4%	20,000	44,500
Sonoran Pky	West Limit of Fee Area to Dove Valley Rd	A	1.72	0.0%	0	86,000
Sonoran Pky	Dove Valley Rd to Black Mtn Pky	A	2.06	0.0%	0	103,000
Tatum Blvd	CAP to 1105' S/O Mayo Blvd	A	0.63	0.0%	0	31,500
Tatum Blvd	1105' S/O Mayo Blvd to Mayo Blvd	A	0.21	0.0%	0	10,500
Tatum Blvd	Mayo Blvd to 420' S/O SR10	A	0.22	88.9%	10,000	11,000
Tatum Blvd	420' S/O SR101 to 360' N/O SR101	A	0.15	100.0%	7,500	7,500
Tatum Blvd	360' N/O SR101 to Deer Valley Rd	A	0.45	100.0%	22,500	22,500
Tatum Blvd	Deer Valley Rd to 510' N/O Ranger Dr	A	1.18	100.0%	59,000	59,000
Tatum Blvd	510' N/O Ranger Dr to Pinnacle Peak Rd	A	0.18	0.0%	0	9,000
Tatum Blvd	Pinnacle Peak Rd to 40th St	A	0.55	0.0%	0	27,500
Tatum Blvd	40th St to Happy Valley Rd	A	0.35	0.0%	0	17,500
Tatum Blvd	Happy Valley Rd to 280' S/O Prickly Pear Trl	A	0.71	0.0%	0	35,500

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Table 169 Continued

Street	Segment	Type	Length (mi.)	% Complete	Exist VMC	Future VMC
Tatum Blvd	280' S/O Prickly Pear Trl to Jomax Rd	A	0.42	88.9%	18,500	21,000
Tatum Blvd	Jomax Rd to Dynamite Blvd	A	1.00	0.0%	0	50,000
Tatum Blvd	Dynamite Blvd to Dixileta Dr	A	0.63	100.0%	31,500	31,500
Tatum Blvd	Dixileta Dr to Cave Creek Rd	A	0.76	100.0%	38,000	38,000
Tatum Blvd	Cave Creek Rd to Black Mtn Pky	CM	0.32	100.0%	11,200	11,200
Tatum Blvd	Black Mtn Pky to Lone Mtn Rd	CM	0.92	0.0%	0	32,200
Subtotal, Desert View			107.07		1,598,550	4,746,750
19th Ave	Jomax Rd to CAP	A	0.25	0.0%	0	12,500
27th Ave	North Valley Pky to Cave Creek Rd	C	0.80	100.0%	28,000	28,000
Carefree Hwy	I-17 to North Valley Pky	A	0.36	0.0%	0	18,000
Carefree Hwy	North Valley Pky to Paloma Pky	A	1.11	66.7%	37,000	55,500
Carefree Hwy	Paloma Pky to East Boundary of Fee Area	A	0.93	55.6%	26,000	46,500
Dove Valley Rd	I-17 to North Valley Pky	A	0.86	0.0%	0	43,000
Dove Valley Rd	North Valley Pky to 200' E/O 23rd Ave	C	0.56	100.0%	19,600	19,600
Dove Valley Rd	200' E/O 23rd Ave to 550' E/O 22nd Ave	C	0.19	14.3%	1,050	6,650
Dove Valley Rd	550' E/O 22nd Ave to Paloma Pky	C	0.25	0.0%	0	8,750
Dove Valley Rd	Paloma Pky to 610' E/O 16th Ave	C	0.48	14.3%	2,450	16,800
Dove Valley Rd	610' E/O 16th Ave to East Limit of Fee Area	C	1.16	0.0%	0	40,600
Jomax Rd	I-17 to Norterra Pky	A	0.35	100.0%	17,500	17,500
Jomax Rd	Norterra Pky to 19th Ave	CM	0.78	0.0%	0	27,300
Lone Mt. Rd	I-17 to North Valley Pky	A	0.93	0.0%	0	46,500
North Valley Pky	CAP to Quail Track Dr	A	0.12	0.0%	0	6,000
North Valley Pky	Quail Track Dr to Norterra Pky	A	0.82	100.0%	41,000	41,000
North Valley Pky	Norterra Pky to Casino Ave	A	0.23	55.6%	6,500	11,500
North Valley Pky	Casino Ave to 315' N/O Morning Vista Ln	A	0.62	100.0%	31,000	31,000
North Valley Pky	315' N/O Morning Vista Ln to Lone Mtn Rd	A	1.24	100.0%	62,000	62,000
North Valley Pky	Lone Mtn Rd to Dove Valley Rd	A	1.12	100.0%	56,000	56,000
North Valley Pky	Dove Valley Rd to 3540' N/O Dove Valley Rd	A	0.67	100.0%	33,500	33,500
North Valley Pky	3540' N/O Dove Valley Rd to Carefree Hwy	A	1.38	0.0%	0	69,000
North Valley Pky	Carefree Hwy to 800' W/O 33rd Ln	CM	0.55	100.0%	19,250	19,250
North Valley Pky	800' W/O 33rd Ln to Cloud Rd	CM	0.66	0.0%	0	23,100
Paloma Pky	Sonoran Pky to Bronco Butte	CM	0.46	100.0%	16,100	16,100
Paloma Pky	Bronco Butte to Dove Valley Rd	CM	0.51	42.9%	7,700	17,850
Paloma Pky	Dove Valley Rd to 360' S/O Saddle Blanket Rd	CM	1.10	0.0%	0	38,500
Paloma Pky	360' S/O Saddle Blanket Rd to Carefree Hwy	CM	0.18	100.0%	6,300	6,300
Sonoran Pky	North Valley Pky to Paloma Pky	A	0.69	33.3%	11,500	34,500
Sonoran Pky	Paloma Pky to 3050' E/O Paloma Pky	A	0.58	33.3%	9,500	29,000
Sonoran Pky	3050' E/O Paloma Pky to East Limit of Fee Area	A	0.87	0.0%	0	43,500
Subtotal, NBCC			20.81		431,950	925,300
39th Ave	Pioneer to North Limits of Fee Area	C	1.35	0.0%	0	47,250
43rd Ave	Dixileta Dr to Dove Valley Rd	B	1.89	0.0%	0	94,500
43rd Ave	Dove Valley Rd to Carefree Hwy	B	1.00	0.0%	0	50,000
51st Ave	Jomax Rd to CAP	A	0.83	100.0%	41,500	41,500
51st Ave	CAP to Dixileta Dr	A	1.57	0.0%	0	78,500
51st Ave	Dixileta Dr to Dove Valley Rd	A	1.76	0.0%	0	88,000
51st Ave	Dove Valley Rd to Carefree Hwy	A	1.01	0.0%	0	50,500
51st Ave	Carefree Hwy to Desert Hills Dr	A	3.02	0.0%	0	151,000

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Table 169 Continued

Street	Segment	Type	Length (mi.)	% Complete	Exist VMC	Future VMC
63rd Ave	Cavedale Dr to 400' N/O Maya Way	B	0.20	100.0%	10,000	10,000
63rd Ave	400' N/O Maya Way to 190' S/O Bent Tree Dr	B	0.29	55.6%	8,000	14,500
63rd Ave	190' S/O Bent Tree Dr to Dynamite Blvd	B	0.50	100.0%	25,000	25,000
67th Ave	CAP to Dixileta Dr	B	0.77	0.0%	0	38,500
67th Ave	Dixileta Dr to Dove Valley Rd	B	1.44	0.0%	0	72,000
67th Ave	Dove Valley Rd to Carefree Hwy	B	0.98	0.0%	0	49,000
67th Ave	Carefree Hwy to Desert Hills	B	3.24	0.0%	0	162,000
Carefree Hwy	City Limits to 67th Ave	A	0.83	0.0%	0	41,500
Carefree Hwy	67th Ave to 51st Ave	A	2.08	0.0%	0	104,000
Carefree Hwy	51st Ave to 43rd Ave	A	0.87	0.0%	0	43,500
Carefree Hwy	43rd Ave to I-17	A	1.00	0.0%	0	50,000
Desert Hill Dr	67th Ave to 51st Ave	C	1.17	0.0%	0	40,950
Dixileta Dr	CAP to 67th Ave	A	0.72	0.0%	0	36,000
Dixileta Dr	67th Ave to 51st Ave	A	2.05	0.0%	0	102,500
Dixileta Dr	51st Ave to I-17	A	2.50	0.0%	0	125,000
Dove Valley Rd	City Limits to 67th Ave	D	1.00	0.0%	0	35,000
Dove Valley Rd	67th Ave to 51st Ave	A	2.07	0.0%	0	103,500
Dove Valley Rd	51st Ave to I-17	A	2.06	0.0%	0	103,000
North Valley Pky	Cloud Rd to North Limits of Fee Area	CM	1.44	0.0%	0	50,400
Pioneer Rd	39th Ave to North Valley Pky	C	0.43	0.0%	0	15,050
Pyramid Pk. Pky	South Limit of Fee Area to 64th Ave	B	0.18	100.0%	9,000	9,000
Pyramid Pk. Pky	64th Ave to Cavedale Dr	B	0.13	88.9%	6,000	6,500
Pyramid Pk. Pky	Dynamite Blvd to Brookhart Way	B	0.23	33.3%	4,000	11,500
Pyramid Pk. Pky	Brookhart Way to CAP	B	0.70	0.0%	0	35,000
Subtotal, North Gateway			39.31		103,500	1,884,650
Total, Northern Growth Area					**2,134,000**	**7,556,700**

Source: Road segments, road types and length based on planned street network from City of Phoenix Street Classification Map, March 7, 2007; percent complete based on an analysis of each segment with percentage determined by analyzing the fully improved lanes, sidewalks and median sections; existing and future VMC based on street type and daily capacity at LOS D from Table 108; capacity for partially completed roads based on final planned capacity and percent complete.

Table 170. Arterial Street Inventory—Southern Growth Area

Street	Segment	Type	Length (Mi.)	% Complete	Exist VMC	Future VMC
27th Ave	Pecos Rd to Chandler Blvd	D	0.32	42.86%	4,900	11,200
Chandler Blvd	27th Ave to 19th Ave	CM	1.15	0.00%	0	40,250
Pecos Rd	City Limits to 2620' W/O 27th Ave	A	0.46	0.00%	0	23,000
Pecos Rd	2620' W/O 27th Ave to 27th Ave	A	0.50	33.33%	8,500	25,000
Pecos Rd	27th Ave to 19th Ave	A	0.97	100.00%	48,500	48,500
Subtotal, Ahwatukee West					61,900	147,950
43rd Ave	Durango St to 115' N/O Durango St	D	0.04	0.00%	0	1,400
43rd Ave	115' N/O Durango St to Mohave St	D	0.09	100.00%	3,150	3,150
43rd Ave	Mohave St to 790' S/O Buckeye Rd	D	0.24	0.00%	0	8,400
43rd Ave	790' S/O Buckeye Rd to Buckeye Rd	D	0.15	42.86%	2,100	5,250
43rd Ave	Buckeye Rd to Van Buren St	D	1.00	100.00%	35,000	35,000
43rd Ave	Van Buren to I-10	D	0.74	100.00%	25,900	25,900
51st Ave	S. Limit of Fee Area to Buckeye	CM	0.44	100.00%	15,400	15,400
51st Ave	Buckeye Rd to Van Buren St	CM	1.00	100.00%	35,000	35,000
51st Ave	Van Buren St to I-10	CM	0.79	100.00%	27,650	27,650
59th Ave	Durango St to Buckeye Rd	CM	0.50	0.00%	0	17,500
59th Ave	Buckeye Rd to Van Buren St	D	1.00	100.00%	35,000	35,000
59th Ave	Van Buren to I-10	D	0.81	100.00%	28,350	28,350
67th Ave	Durango St to 380' N/O Yuma St	CM	0.50	42.86%	7,350	17,500
67th Ave	380' N/O Yuma St to Buckeye Rd	CM	0.12	0.00%	0	4,200
67th Ave	Buckeye Rd to 265' N/O Buckeye	D	0.05	100.00%	1,750	1,750
67th Ave	265' N/O Buckeye to 215' S/O Grant	D	0.22	100.00%	7,700	7,700
67th Ave	215' S/O Grant St to 915' N/O Grant	D	0.21	100.00%	7,350	7,350
67th Ave	915' N/O Grant to 900' S/O Van Buren	D	0.33	100.00%	11,550	11,550
67th Ave	900' S/O Van Buren to 570' S/O Van Buren	D	0.06	100.00%	2,100	2,100
67th Ave	570' S/O Van Buren St to Van Buren St	D	0.11	100.00%	3,850	3,850
67th Ave	Van Buren St to I-10	D	0.77	100.00%	26,950	26,950
75th Ave	South Limits of Fee Area to Buckeye Rd	CM	0.48	0.00%	0	16,800
75th Ave	Buckeye Rd to Van Buren St	D	1.01	100.00%	35,350	35,350
75th Ave	Van Buren St to Roosevelt St	D	0.48	100.00%	16,800	16,800
75th Ave	Roosevelt St to I-10	D	0.21	100.00%	7,350	7,350
83rd Ave	Van Buren St to I-10	CM	0.68	100.00%	23,800	23,800
Buckeye Rd	75th Ave to 69th Ave	CM	0.75	42.86%	11,200	26,250
Buckeye Rd	69th Ave to 300' W/O 67th Ave	CM	0.19	0.00%	0	6,650
Buckeye Rd	300' W/O 67th Ave to 67th Ave	CM	0.06	100.00%	2,100	2,100
Buckeye Rd	67th Ave to 530' E/O 67th Ave	CM	0.10	42.86%	1,400	3,500
Buckeye Rd	530' E/O 67th Ave to 340' W/O 65th Ave	CM	0.15	0.00%	0	5,250
Buckeye Rd	340' W/O 65th Ave to 63rd Ave	CM	0.24	28.57%	2,450	8,400
Buckeye Rd	63rd Ave to 1325' W/O 59th Ave	CM	0.25	42.86%	3,850	8,750
Buckeye Rd	1325' W/O 59th Ave to 59th Ave	CM	0.25	0.00%	0	8,750
Buckeye Rd*	59th Ave to 55th Ave	D	0.50	100.00%	17,500	17,500
Buckeye Rd*	55th Ave to 51st Ave	D	0.50	100.00%	17,500	17,500
Buckeye Rd*	51st Ave to 43rd Ave	D	1.00	100.00%	35,000	35,000
Van Buren St	83rd Ave to 79th Ave	D	0.50	0.00%	0	17,500
Van Buren St	79th Ave to 1280' E/O 79th Ave	D	0.24	57.14%	4,900	8,400
Van Buren St	1280' E/O 79th Ave to 75th Ave	D	0.25	0.00%	0	8,750
Van Buren St	75th Ave to 440' E/O 71st Ave	D	0.59	57.14%	11,900	20,650
Van Buren St	440' E/O 71st Ave to 175' E/O 69th Ave	D	0.17	100.00%	5,950	5,950
Van Buren St	175' E/O 69th Ave to 420' W/O 67th Ave	D	0.18	0.00%	0	6,300

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Table 170 Continued

Street	Segment	Type	Length (Mi.)	% Complete	Exist VMC	Future VMC
Van Buren St	420' W/O 67th Ave to 67th Ave	D	0.08	100.00%	2,800	2,800
Van Buren St	67th Ave to 420' E/O 67th Ave	D	0.08	100.00%	2,800	2,800
Van Buren St	420' W/O 67th Ave to 1290' W/O 59th Ave	D	0.65	100.00%	22,750	22,750
Van Buren St	1290' W/O 59th Ave to 59th Ave	D	0.24	100.00%	8,400	8,400
Van Buren St	59th Ave to 55th Ave	D	0.50	100.00%	17,500	17,500
Van Buren St**	55th Ave to 51st Ave	CM	0.50	100.00%	17,500	17,500
Van Buren St	51st Ave to 43rd Ave	D	1.00	100.00%	35,000	35,000
Subtotal, Estrella North					579,950	735,000
107th Ave	Southern Ave to Broadway Rd	CM	0.99	0.00%	0	34,650
107th Ave	Broadway Rd to Lower Buckeye Rd	CM	1.01	0.00%	0	35,350
107th Ave	Lower Buckeye Rd to 825' S/O Buckeye Rd	CM	0.84	100.00%	29,400	29,400
107th Ave	825' S/O Buckeye Rd to Buckeye Rd	CM	0.16	42.86%	2,450	5,600
43rd Ave	Lower Buckeye-1310' N/O Lower Buckeye	D	0.25	0.00%	0	8,750
43rd Ave	1310' N/O Lower Buckeye to Durango St	D	0.23	42.86%	3,500	8,050
51st Ave	Salt River Bridge to Broadway Rd	CM	0.33	100.00%	11,550	11,550
51st Ave	Broadway Rd to Lower Buckeye Rd	CM	0.74	100.00%	25,900	25,900
51st Ave	Lower Buckeye Rd to N. Limit of Fee Area	CM	0.50	100.00%	17,500	17,500
59th Ave	Broadway Rd to Warner St	CM	0.40	42.86%	5,950	14,000
59th Ave	Warner St to Lower Buckeye Rd	CM	0.60	0.00%	0	21,000
59th Ave	Lower Buckeye Rd to Durango St	CM	0.50	0.00%	0	17,500
63rd Ave	Broadway Rd to Elwood St	CM	0.00	42.86%	0	0
67th Ave	Salt River to Broadway Rd	D	0.78	0.00%	0	27,300
67th Ave	Broadway Rd to 150' S/O Elwood Rd	CM	0.50	0.00%	0	17,500
67th Ave	150' S/O Elwood Rd to Lower Buckeye Rd	CM	0.50	42.86%	7,350	17,500
67th Ave	Lower Buckeye-650' N/O Lower Buckeye	CM	0.12	0.00%	0	4,200
67th Ave	650' N/O Lower Buckeye to Durango St	CM	0.37	42.86%	5,600	12,950
75th Ave	Salt River to Broadway Rd	D	0.93	0.00%	0	32,550
75th Ave	Broadway Rd to 1325' N/O Broadway Rd	CM	0.25	100.00%	8,750	8,750
75th Ave	1325' N/O Broadway-1300' S/O Lower Buck	CM	0.50	42.86%	7,350	17,500
75th Ave	1300' S/O Lower Buckeye-1060' S/O Lower Buckeye	CM	0.05	0.00%	0	1,750
75th Ave	1060' S/O Lower Buckeye Rd to Lower Buckeye Rd	CM	0.20	42.86%	3,150	7,000
75th Ave	Lower Buckeye Rd to 900' N/O Lower Buckeye Rd	CM	0.17	0.00%	0	5,950
75th Ave	900' N/O Lower Buckeye-2370' N/O Lower Buckeye	CM	0.28	42.86%	4,200	9,800
75th Ave	2370' N/O L. Buckeye to North Limits of Fee Area	CM	0.05	0.00%	0	1,750
83rd Ave	Southern Ave to Broadway Rd	CM	1.15	0.00%	0	40,250
83rd Ave	Broadway Rd to 150' S/O Elwood Rd	CM	1.00	0.00%	0	35,000
83rd Ave	150' S/O Elwood Rd to 825' S/O Lower Buckeye Rd	CM	0.35	100.00%	12,250	12,250
83rd Ave	825' S/O Lower Buckeye Rd to Lower Buckeye Rd	CM	0.16	42.86%	2,450	5,600
83rd Ave	Lower Buckeye Rd to Durango St	CM	0.50	100.00%	17,500	17,500
83rd Ave	Durango St to 815' S/O Buckeye Rd	CM	0.33	100.00%	11,550	11,550
83rd Ave	815' S/O Buckeye Rd to Buckeye Rd	CM	0.15	0.00%	0	5,250
91st Ave	Salt River to Southern Ave	CM	0.57	0.00%	0	19,950
91st Ave	Southern Ave to Roeser Rd	CM	0.49	0.00%	0	17,150
91st Ave	Roeser Rd to Broadway Rd	CM	0.51	0.00%	0	17,850
91st Ave	Broadway Rd to Illini St	CM	0.36	0.00%	0	12,600
91st Ave	Illini St to Lower Buckeye Rd	CM	0.65	100.00%	22,750	22,750
91st Ave	Lower Buckeye Rd to Durango St	CM	0.50	42.86%	7,350	17,500
91st Ave	Durango St to Buckeye Rd	CM	0.50	0.00%	0	17,500
99th Ave	Salt River to Southern Ave	CM	0.56	0.00%	0	19,600

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Table 170 Continued

Street	Segment	Type	Length (Mi.)	% Complete	Exist VMC	Future VMC
99th Ave	Southern Ave to Gaby Rd	CM	0.76	0.00%	0	26,600
99th Ave	Gaby Rd to Broadway Rd	CM	0.21	42.86%	3,150	7,350
99th Ave	Broadway Rd to 2660' N/O Broadway Rd	CM	0.43	42.86%	6,300	15,050
99th Ave	2660' N/O Broadway Rd to Lower Buckeye Rd	CM	0.51	100.00%	17,850	17,850
99th Ave	Lower Buckeye to 1330' N/O Lower Buckeye	CM	0.25	100.00%	8,750	8,750
99th Ave	1330' N/O Lower Buckeye to Durango St	CM	0.25	42.86%	3,850	8,750
99th Ave	Durango St to Buckeye Rd	CM	0.50	42.86%	7,350	17,500
Broadway Rd	107th Ave to 104th Ln	CM	0.27	0.00%	0	9,450
Broadway Rd	104th Ln to 99th Ave	CM	0.71	42.86%	10,500	24,850
Broadway Rd	99th Ave to 91st Ave	CM	0.99	0.00%	0	34,650
Broadway Rd	91st Ave to 83rd Ave	CM	1.00	0.00%	0	35,000
Broadway Rd	83rd Ave to 79th Ave	CM	0.51	0.00%	0	17,850
Broadway Rd	79th Ave to 75th Ave	CM	0.45	42.86%	6,650	15,750
Broadway Rd	75th Ave to 71st Ave	CM	0.50	42.86%	7,350	17,500
Broadway Rd	71st Ave to 345' E/O 69th Ln	CM	0.25	42.86%	3,850	8,750
Broadway Rd	345' E/O 69th Ln to 67th Ave	CM	0.25	0.00%	0	8,750
Broadway Rd	67th Ave to 63rd Ave	CM	0.50	0.00%	0	17,500
Broadway Rd	63rd Ave to 450' E/O 62nd Dr	CM	0.17	42.86%	2,450	5,950
Broadway Rd	450' E/O 62nd Dr to 350' W/O 60th Dr	CM	0.09	0.00%	0	3,150
Broadway Rd	350' W/O 60th Dr to 59th Ave	CM	0.25	42.86%	3,850	8,750
Broadway Rd	59th Ave to 53rd Ave	D	0.81	0.00%	0	28,350
Broadway Rd	53rd Ave to 500' W/O 51st Ave	D	0.16	42.86%	2,450	5,600
Broadway Rd	500' W/O 51st Ave to 51st Ave	D	0.09	0.00%	0	3,150
Buckeye Rd	107th Ave to 99th Ave	CM	1.00	0.00%	0	35,000
Buckeye Rd	99th Ave to 91st Ave	CM	1.00	0.00%	0	35,000
Buckeye Rd	91st Ave to 83rd Ave	CM	0.98	0.00%	0	34,300
Buckeye Rd	83rd Ave to 1300' E/O 83rd Ave	CM	0.25	0.00%	0	8,750
Buckeye Rd	1300' E/O 83rd Ave to 79th Ave	CM	0.25	42.86%	3,850	8,750
Buckeye Rd	79th Ave to 75th Ave	CM	1.00	0.00%	0	35,000
Lower Buckeye	107th Ave to 103rd Ave	CM	0.50	42.86%	7,350	17,500
Lower Buckeye	103rd Ave to 99th Ave	CM	0.48	100.00%	16,800	16,800
Lower Buckeye	99th Ave to 97th Ave	CM	0.24	100.00%	8,400	8,400
Lower Buckeye	97th Ave to 91st Ave	CM	0.74	42.86%	11,200	25,900
Lower Buckeye	91st Ave to 87th Ave	CM	0.50	100.00%	17,500	17,500
Lower Buckeye	87th Ave to 83rd Ave	CM	0.49	100.00%	17,150	17,150
Lower Buckeye	83rd Ave to 1350' E/O 83rd Ave	CM	0.26	42.86%	3,850	9,100
Lower Buckeye	1350' E/O 83rd Ave to 79th Ave	CM	0.25	100.00%	8,750	8,750
Lower Buckeye	79th Ave to 730' E/O 79th Ave	CM	0.14	42.86%	2,100	4,900
Lower Buckeye	730' E/O 79th Ave to 75th Ave	CM	0.36	42.86%	5,250	12,600
Lower Buckeye	75th Ave to 325' W/O 73rd Dr	CM	0.13	0.00%	0	4,550
Lower Buckeye	325' W/O 73rd Dr to 360' E/O 73rd Dr	CM	0.13	42.86%	2,100	4,550
Lower Buckeye	360' E/O 73rd Dr to 71st Ave	CM	0.24	100.00%	8,400	8,400
Lower Buckeye	71st Ave to 67th Ave	CM	0.50	0.00%	0	17,500
Lower Buckeye	67th Ave to 450' E/O 67th Ave	CM	0.09	0.00%	0	3,150
Lower Buckeye	450' E/O 67th Ave to 650' E/O 67th Ave	CM	0.04	42.86%	700	1,400
Lower Buckeye	650' E/O 67th Ave to 63rd Ave	CM	0.37	100.00%	12,950	12,950
Lower Buckeye	63rd Ave to 59th Ave	CM	0.51	0.00%	0	17,850
Lower Buckeye	59th Ave to 875' E/O 59th Ave	D	0.17	0.00%	0	5,950
Lower Buckeye	875' E/O 59th Ave to 1300' W/O 51st Ave	D	0.58	57.14%	11,550	20,300

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Table 170 Continued

Street	Segment	Type	Length (Mi.)	% Complete	Exist VMC	Future VMC
Lower Buckeye	1300' W/O 51st Ave to 51st Ave	D	0.25	42.86%	3,850	8,750
Lower Buckeye	51st Ave to 2665' E/O 51st Ave	D	0.50	100.00%	17,500	17,500
Lower Buckeye	2665' E/O 51st Ave to 43rd Ave	D	0.50	0.00%	0	17,500
Southern Ave	107th Ave to 99th Ave	CM	0.97	0.00%	0	33,950
Southern Ave	99th Ave to 93rd Ave	CM	0.76	0.00%	0	26,600
Southern Ave	93rd Ave to 91st Ave	CM	0.27	0.00%	0	9,450
Subtotal, Estrella South					450,100	1,518,650
19th Ave	Dobbins Rd to South Mountain Ave	D	0.50	0.00%	0	17,500
19th Ave	South Mountain Ave to Latona Ln	D	0.09	42.86%	1,400	3,150
19th Ave	Latona Ln to Baseline Rd	D	0.43	0.00%	0	15,050
19th Ave	Baseline Rd Fremont Rd	D	0.25	0.00%	0	8,750
19th Ave	Fremont Rd Vineyard Rd	D	0.25	0.00%	0	8,750
19th Ave	Vineyard Rd to Alta Vista	D	0.25	42.86%	3,850	8,750
19th Ave	Alta Vista Rd to 170' S/O Lynne	D	0.14	100.00%	4,900	4,900
19th Ave	170' S/O Lynne Ln to Lynne Ln	D	0.03	85.71%	1,050	1,050
19th Ave	Lynne Ln to Southern Ave	D	0.08	100.00%	2,800	2,800
27th Ave	Dobbins Rd to Baseline Rd	D	1.02	0.00%	0	35,700
27th Ave	Baseline Rd to Minton St	D	0.21	42.86%	3,150	7,350
27th Ave	Minton St to 135' S/O Carson Rd	D	0.08	0.00%	0	2,800
27th Ave	135' S/O Carson Rd to Vineyard Rd	D	0.21	42.86%	3,150	7,350
27th Ave	Vineyard Rd to 340' N/O Vineyard Rd	D	0.06	0.00%	0	2,100
27th Ave	340' N/O Vineyard Rd to Southern Ave	D	0.43	42.86%	6,300	15,050
27th Ave	Southern Ave to Roeser Rd	D	0.50	0.00%	0	17,500
27th Ave	Roeser Rd to 135' N/O Spencer Run	D	0.25	42.86%	3,850	8,750
27th Ave	135' N/O Spencer Run to Broadway Rd	D	0.25	0.00%	0	8,750
35th Ave	Centon Dr to Estes Way	CM	0.77	0.00%	0	26,950
35th Ave	Estes Way to Dobbins Rd	CM	0.21	42.86%	3,150	7,350
35th Ave	Dobbins Rd to South Mountain Ave	CM	0.50	0.00%	0	17,500
35th Ave	South Mountain Ave to Ian Dr	CM	0.16	42.86%	2,450	5,600
35th Ave	Ian to Baseline Rd	CM	0.36	85.71%	10,850	12,600
35th Ave	Baseline Rd to 300' S/O Maldonado Rd	CM	0.33	0.00%	0	11,550
35th Ave	300' S/O Maldonado Rd to 260' N/O Maldonado Rd	CM	0.11	42.86%	1,750	3,850
35th Ave	260' N/O Maldonado Rd to 515' N/O Vineyard Rd	CM	0.15	100.00%	5,250	5,250
35th Ave	515' N/O Vineyard Rd to 450' N/O Lydia Ln	CM	0.16	42.86%	2,450	5,600
35th Ave	450' N/O Lydia Ln to Southern Ave	CM	0.25	0.00%	0	8,750
35th Ave	Southern Ave to 490' N/O Southern Ave	CM	0.09	100.00%	3,150	3,150
35th Ave	490' N/O Southern Ave to Roeser Rd	CM	0.41	100.00%	14,350	14,350
35th Ave	Roeser Rd to Broadway Rd	CM	0.50	100.00%	17,500	17,500
35th Ave	Broadway Rd to Salt River	D	0.28	100.00%	9,800	9,800
43rd Ave	Dobbins Rd to South Mountain Ave	D	0.50	0.00%	0	17,500
43rd Ave	South Mountain Ave to Baseline Rd	D	0.52	42.86%	7,700	18,200
43rd Ave	Baseline Rd to 200' N/O Vineyard Rd	D	0.54	100.00%	18,900	18,900
43rd Ave	200' N/O Vineyard Rd to 140' S/O Alta Vista Rd	D	0.15	42.86%	2,100	5,250
43rd Ave	140' S/O Alta Vista Rd to 115' N/O Nancy Ln	D	0.14	100.00%	4,900	4,900
43rd Ave	115' N/O Nancy Ln to Southern Ave	D	0.16	42.86%	2,450	5,600
51st Ave	City Limits to Estrella Dr	CM	0.60	0.00%	0	21,000
51st Ave	Estrella Dr to Elliot Rd	CM	1.00	0.00%	0	35,000
51st Ave	Elliot Rd to Dobbins Rd	CM	1.00	0.00%	0	35,000

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Table 170 Continued

Street	Segment	Type	Length (Mi.)	% Complete	Exist VMC	Future VMC
51st Ave	Dobbins Rd to 410' N/O Dobbins Rd	CM	0.08	42.86%	1,050	2,800
51st Ave	410' N/O Dobbins Rd to South Mountain Ave	CM	0.42	42.86%	6,300	14,700
51st Ave	South Mountain Ave to 130' S/O Beverly Rd	CM	0.24	100.00%	8,400	8,400
51st Ave	130' S/O Beverly Rd to Baseline Rd	CM	0.27	100.00%	9,450	9,450
51st Ave	Baseline Rd to 905' N/O Baseline Rd	CM	0.17	100.00%	5,950	5,950
51st Ave	905' N/O Baseline Rd to 230' S/O Maldonado Rd	CM	0.14	0.00%	0	4,900
51st Ave	230' S/O Maldonado Rd to 200' S/O Lydia Ln	CM	0.31	100.00%	10,850	10,850
51st Ave	200' S/O Lydia Ln to 400' S/O Burgess Ln	CM	0.12	42.86%	1,750	4,200
51st Ave	400' S/O Burgess Ln to Southern Ave	CM	0.25	0.00%	0	8,750
51st Ave	Southern Ave to Roeser Rd	CM	0.50	0.00%	0	17,500
51st Ave	Roeser Rd to Salt River Bridge	CM	0.35	0.00%	0	12,250
51st Ave	Salt River Bridge to Broadway Rd	CM	0.17	100.00%	5,950	5,950
59th Ave	City Limits to Elliot Rd	CM	0.34	0.00%	0	11,900
59th Ave	Elliot Rd to Dobbins Rd	CM	1.00	0.00%	0	35,000
59th Ave	Dobbins Rd to 2325' S/O Baseline Rd	CM	0.57	0.00%	0	19,950
59th Ave	2325' S/O Baseline Rd to Baseline Rd	CM	0.44	42.86%	6,650	15,400
59th Ave	Baseline Rd to Southern Ave	D	1.00	42.86%	15,050	35,000
67th Ave	Baseline Rd to 490' S/O Vineyard Rd	D	0.41	0.00%	0	14,350
67th Ave	490' S/O Vineyard Rd to Southern Ave	D	0.59	42.86%	8,750	20,650
67th Ave	Southern Ave to Salt River	D	0.36	0.00%	0	12,600
75th Ave	Baseline Rd to 1300' N/O Baseline Rd	D	0.25	42.86%	3,850	8,750
75th Ave	1300' N/O Baseline Rd to Southern Ave	D	0.75	0.00%	0	26,250
7th Ave	Baseline Rd to Vineyard Rd	D	0.50	100.00%	17,500	17,500
7th Ave	Vineyard Rd to Alta Vista Rd	D	0.25	100.00%	8,750	8,750
7th Ave	Alta Vista Rd to Southern Ave	D	0.25	100.00%	8,750	8,750
Baseline Rd	75th Ave to 71st Ave	CM	0.50	100.00%	17,500	17,500
Baseline Rd	71st Ave to 67th Ave	CM	0.50	42.86%	7,350	17,500
Baseline Rd	67th Ave to 63rd Ave	CM	0.44	42.86%	6,650	15,400
Baseline Rd	63rd Ave to 59th Ave	CM	0.56	0.00%	0	19,600
Baseline Rd	59th Ave to 55th Ave	CM	0.49	28.57%	4,900	17,150
Baseline Rd	55th Ave to 890' W/O 51st Ave	CM	0.33	42.86%	4,900	11,550
Baseline Rd	890' W/O 51st Ave to 51st Ave	CM	0.17	100.00%	5,950	5,950
Baseline Rd	51st Ave to 47th Ave	CM	0.49	100.00%	17,150	17,150
Baseline Rd	47th Ave to 43rd Ave	CM	0.49	100.00%	17,150	17,150
Baseline Rd	43rd Ave to 1330' W/O 35th Ave	CM	0.75	100.00%	26,250	26,250
Baseline Rd	1330' W/O 35th Ave to 35th Ave	CM	0.25	85.71%	7,350	8,750
Baseline Rd	35th Ave to 660' W/O 31st Ave	CM	0.38	85.71%	11,550	13,300
Baseline Rd	660' W/O 31st Ave to 125' E/O 29th Dr	CM	0.38	100.00%	13,300	13,300
Baseline Rd	125' E/O 29th Dr to 27th Ave	CM	0.25	100.00%	8,750	8,750
Baseline Rd	27th Ave to 19th Ave	CM	1.00	100.00%	35,000	35,000
Baseline Rd	19th Ave 7th Ave	CM	1.00	100.00%	35,000	35,000
Broadway Rd	43rd Ave to 310' W/O 35th Ave	D	1.04	0.00%	0	36,400
Broadway Rd	310' W/O 35th Ave to 35th Ave	D	0.06	100.00%	2,100	2,100
Broadway Rd	35th Ave to 27th Ave	D	1.00	0.00%	0	35,000
Broadway Rd	27th Ave to 23rd Ave	D	0.49	0.00%	0	17,150
Dobbins Rd	City Limits to 59th Ave	CM	1.26	0.00%	0	44,100
Dobbins Rd	59th Ave to 55th Ave	D	0.50	0.00%	0	17,500
Dobbins Rd	55th Ave to 51st Ave	D	0.49	42.86%	7,350	17,150
Dobbins Rd	51st Ave to 640' E/O 51st Ave	D	0.12	0.00%	0	4,200

--table continued on next page--

Table 170 Continued

Street	Segment	Type	Length (Mi.)	% Complete	Exist VMC	Future VMC
Dobbins Rd	640' E/O 51st Ave to 150' E/O 48th Dr	D	0.25	28.57%	2,450	8,750
Dobbins Rd	150' E/O 48th Dr to 47th Ave	D	0.12	0.00%	0	4,200
Dobbins Rd	47th Ave to 705' W/O 43rd Ave	D	0.36	42.86%	5,250	12,600
Dobbins Rd	705' W/O 43rd Ave to 43rd Ave	D	0.13	0.00%	0	4,550
Dobbins Rd	43rd Ave to 35th Ave	D	0.99	0.00%	0	34,650
Dobbins Rd	35th Ave to 27th Ave	D	0.99	0.00%	0	34,650
Dobbins Rd	27th Ave to 19th Ave	D	0.99	0.00%	0	34,650
Dobbins Rd	19th Ave to 675' W/O 15th Ave	D	0.37	0.00%	0	12,950
Dobbins Rd	675' W/O 15th Ave to 15th Ave	D	0.13	42.86%	2,100	4,550
Dobbins Rd	15th Ave to 770' W/O 7th Ave	D	0.35	0.00%	0	12,250
Dobbins Rd	770' W/O 7th Ave to 7th Ave	D	0.15	42.86%	2,100	5,250
Elliot Rd	City Limits to 59th Ave	CM	0.41	0.00%	0	14,350
Elliot Rd	59th Ave to 51st Ave	CM	0.99	0.00%	0	34,650
Elliot Rd	51st Ave to 47th Ave	CM	0.30	0.00%	0	10,500
Estrella Dr	City Limits to 51st Ave	D	0.53	0.00%	0	18,550
Estrella Dr	51st Ave to 47th Ave	D	0.50	0.00%	0	17,500
Estrella Dr	47th Ave to 43rd Ave	D	0.50	0.00%	0	17,500
Southern Ave	75th Ave to 750' W/O 69th Ave	CM	0.58	0.00%	0	20,300
Southern Ave	750' W/O 69th Ave to 67th Ave	CM	0.41	42.86%	6,300	14,350
Southern Ave	67th Ave to 59th Ave	CM	1.00	0.00%	0	35,000
Southern Ave	59th Ave to Cottonfields Ln	CM	0.50	42.86%	7,350	17,500
Southern Ave	Cottonfields Ln to 950' W/O 51st Ave	CM	0.42	100.00%	14,700	14,700
Southern Ave	950' W/O 51st Ave to 51st Ave	CM	0.18	0.00%	0	6,300
Southern Ave	51st Ave to 455' E/O 51st Ave	CM	0.09	0.00%	0	3,150
Southern Ave	455' E/O 51st Ave to 390' E/O 50th Ave	D	0.12	42.86%	1,750	4,200
Southern Ave	390' E/O 50th Ave to 47th Ave	D	0.30	0.00%	0	10,500
Southern Ave	47th Ave to 43rd Ave	D	0.50	42.86%	7,350	17,500
Southern Ave	43rd Ave to 650' E/O 39th Ave	D	0.63	100.00%	22,050	22,050
Southern Ave	650' E/O 39th Ave to 540' E/O 37th Ln	D	0.13	100.00%	4,550	4,550
Southern Ave	540' E/O 37th Ln to 35th Ave	D	0.25	100.00%	8,750	8,750
Southern Ave	35th Ave to 555 W/O 33rd Ave	D	0.14	0.00%	0	4,900
Southern Ave	555 W/O 33rd Ave to 33rd Ave	D	0.11	42.86%	1,750	3,850
Southern Ave	33rd Ave to 650' E/O 32nd Ave	D	0.25	100.00%	8,750	8,750
Southern Ave	650' E/O 32nd Ave to 27th Ave	D	0.50	42.86%	7,350	17,500
Southern Ave	27th Ave to 530' E/O 27th Ave	D	0.10	0.00%	0	3,500
Southern Ave	530' E/O 27th Ave 450' E/O 25th Ln	D	0.15	42.86%	2,100	5,250
Southern Ave	450' E/O 25th Ln to 23rd Ave	D	0.25	0.00%	0	8,750
Southern Ave	23rd Ave to 22nd Ave	D	0.12	100.00%	4,200	4,200
Southern Ave	22nd Ave to 20th Ave	D	0.23	42.86%	3,500	8,050
Southern Ave	20th Ave to 405' E/O 19th Ave	D	0.07	0.00%	0	2,450
Southern Ave	405' E/O 19th Ave to 19th Ave	D	0.08	100.00%	2,800	2,800
Southern Ave	19th Ave to 7th Ave	D	0.99	100.00%	34,650	34,650
Subtotal, Laveen					634,200	1,846,250
Total, Southern Growth Area					**1,726,150**	**4,247,850**

*Buckeye Road, 43rd Ave to 59th Ave, constructed as a type "X" cross-section, which has the same capacity as a "D" cross-section.
**Van Buren Street, 51st Ave to 55th Ave, constructed as a type "Z" cross-section, which has the same capacity as a "CM" cross-section.
Source: Road segments, road types and length based on planned street network from City of Phoenix Street Classification Map, March 7, 2007; percent complete based on an analysis of each segment with percentage determined by analyzing the fully improved lanes, sidewalks and median sections; existing and future VMC based on street type and daily capacity at LOS D from Table 108; capacity for partially completed roads based on final planned capacity and percent complete.

Table 171. Planned Arizona Highway User Revenue, 2008-2013

Project Description	Total AHUR Revenue	Capacity-Expanding Projects			
		Total	No ROW	Major	Major/Drain
Construct Lincoln St E/O 5 St - RR Crossing	$203,000	$0	$0	$0	$0
ACDC at 7th Ave Bike Underpass	$1,494,300	$0	$0	$0	$0
ADA Compliance Improvements	$1,200,000	$0	$0	$0	$0
Advance Real Estate Support	$5,000	$0	$0	$0	$0
Arcadia Crossing/AZ Canal Bridge	$174,225	$0	$0	$0	$0
Arcadia Portal Multi-Use Trail	$22,152	$0	$0	$0	$0
Citywide Wireless Comm Expansion	$13,300	$0	$0	$0	$0
Construct 19th Ave Bridge at CAP	$8,300,000	$8,300,000	$8,300,000	$0	$8,300,000
Construct 25th St. Ped. Bridge at Camelback Rd	$704,914	$704,914	$704,914	$0	$0
Construct 27TH Ave. S/O Jackson St RR Crossing	$121,500	$0	$0	$0	$0
Construct 2nd Av St.scape:Fillmore to Roosevelt	$149,173	$149,173	$149,173	$0	$0
Construct 32nd ST S/O Jackson ST RR Crossing	$121,500	$0	$0	$0	$0
Construct 35 Av: Widen Bridge at Salt River	$50,000	$50,000	$50,000	$50,000	$50,000
Construct 40Th ST S/0 Madison ST RR Crossing	$100,000	$0	$0	$0	$0
Construct 43AV: Baseline Rd to Southern Av	$1,460,000	$1,460,000	$1,460,000	$0	$0
Construct 51st Ave: Dobbins Rd. to Laveen C.C.	$2,177,500	$2,177,500	$2,177,500	$0	$0
Construct 67 Av: Buckeye to Van Buren	$3,312,500	$3,312,500	$3,312,500	$0	$0
Construct 75AV: Buckeye to Van Buren	$1,900,750	$1,900,750	$1,900,750	$0	$0
Construct 7th Street Bridge @ NBI #9186	$358,075	$358,075	$358,075	$0	$358,075
Construct Bike Lane	$176,525	$0	$0	$0	$0
Construct Bridge Inspection Program	$1,180,000	$0	$0	$0	$0
Construct Guardrail Repair - Cave Creek @ CAP	$55,000	$0	$0	$0	$0
Construct Guardrail Repair II - Various Locat.	$6,740	$0	$0	$0	$0
Construct HES-McDowell Rd & 35th Ave Upgrades	$180,000	$180,000	$180,000	$0	$0
Construct Lower Buckeye & 99th Ave	$100,000	$100,000	$100,000	$0	$0
Construct Lower Buckeye Rd E/O 27th Ave RR-xing	$350,000	$0	$0	$0	$0
Construct McDowell Rd: 83AV to 75AV	$6,221,718	$6,221,718	$6,221,718	$0	$0
Construct NB Cave Creek - Mtn Gate Pass Lane Ext	$238,830	$238,830	$238,830	$0	$0
Construct Ped Bridge	$458,100	$0	$0	$0	$0
Construct Sidewalk	$10,000	$0	$0	$0	$0
Construct Thomas Rd: 91 Av to 83 Av	$19,140	$19,140	$19,140	$0	$0
Construct Van Buren St & 3rd LT Lane Mods	$55,000	$55,000	$55,000	$0	$0
Construct Van Buren: 67AV to 59AV	$493,188	$493,188	$493,188	$0	$0
Crosswalk Painting (Thermoplastic)	$450,000	$0	$0	$0	$0
Design 20th St: Highland - Camelback (69KV)	$55,000	$0	$0	$0	$0
Design 27th Ave:Pima Fwy to Deer Valley Rd	$514,500	$514,500	$514,500	$0	$0
Design 32nd St: Washington - McDowell Impr	$29,013	$0	$0	$0	$0
Design 35th Ave:Dobbins-Baseline Rd	$650,000	$650,000	$650,000	$0	$0
Design 35th Ave:Olney Dr-Dobbins Rd	$585,000	$585,000	$585,000	$0	$0
Design 40th St-Mayo Blvd Brdg at Pima Fwy 101	$1,000,000	$1,000,000	$1,000,000	$0	$1,000,000
Design 44th St:Vermont Ave-Solano Dr	$193,000	$193,000	$193,000	$0	$0
Design 56th St: Deer Valley-Pinnacle Pk	$1,000,000	$1,000,000	$1,000,000	$0	$0
Design 75th Ave:Broadway-Lower Buckeye	$550,000	$550,000	$550,000	$0	$0
Design 83rd Ave:Lower Buckeye-Buckeye	$550,000	$550,000	$550,000	$0	$0
Design Bridge Inspection Cycle A 2007-08	$207,243	$0	$0	$0	$0
Design Dove Valley: I-17 to North Valley Pwy	$1,000,000	$1,000,000	$1,000,000	$0	$0

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Table 171 Continued

Project Description	Total AHUR Revenue	Capacity-Expanding Projects			
		Total	No ROW	Major	Major/Drain
Design Indian School Rd & 7th SBRT Lane Mods	$10,000	$10,000	$10,000	$0	$0
Design Lone Mtn: I17-North Valley Pkwy	$1,000,000	$1,000,000	$1,000,000	$0	$0
Design Ped Bridge Bikeway Study	$15,000	$0	$0	$0	$0
Design Reversible Lane Study	$40,000	$40,000	$40,000	$0	$0
Design Rio Salado Beyond the Banks	$25,000	$25,000	$25,000	$0	$0
Design Rio Salado Pathway	$700,000	$0	$0	$0	$0
Design RR Xing Analysis 35AV&Ind Sch/27Av&Tho	$20,000	$0	$0	$0	$0
Design Sonoran Desert Blvd Location Study	$121,907	$121,907	$121,907	$0	$0
Design/Construct 16th St Bridge Rehab	$1,200,000	$0	$0	$0	$0
Design/Construct 3 Historical Neighborhood Ltg	$87,200	$0	$0	$0	$0
Design/Construct 67th Ave & Tether Trail, Median Mods	$58,750	$0	$0	$0	$0
Design/Construct Greenway@Cave Creek Wash Bridge	$6,780,000	$6,780,000	$6,780,000	$6,780,000	$6,780,000
Design/Construct Pecos Post Office/S. Desert Hills PKWY	$55,000	$0	$0	$0	$0
Design/Construct Ped Bridge	$130,000	$0	$0	$0	$0
Design/Construct Ped Bridge	$169,849	$0	$0	$0	$0
Design/Construct RR Crossing Improvements - Various	$325,000	$0	$0	$0	$0
Design/Construct Thunderbird Rd:10th Pl	$402,000	$402,000	$402,000	$0	$0
Design/ROW 19th Avenue: Grand Canal Roadway	$220,000	$0	$0	$0	$0
Design/ROW Baseline Rd:59th Ave-51st Ave	$1,614,500	$1,614,500	$0	$0	$0
Design/ROW Buckeye Rd: 67th Ave to 59th Ave	$690,000	$690,000	$0	$0	$0
Design/ROW Dove Valley Rd Bridge @ Skunk Creek	$1,362,200	$1,362,200	$0	$0	$1,362,200
Design/ROW North Valley Pkwy Brdg at Sonoran Wash	$1,531,356	$1,531,356	$0	$0	$1,531,356
Design/ROW Pinnacle Peak:Cave Creek to Blk Mtn.	$2,514,500	$2,514,500	$0	$0	$0
Design/ROW/Construct 19th Ave @ Grand Canal	$925,000	$0	$0	$0	$0
Design/ROW/Construct 32nd St: Southern to Broadway	$5,862,500	$5,862,500	$4,400,000	$0	$0
Design/ROW/Construct 35th Ave: Baseline to Southern	$8,485,500	$8,485,500	$7,320,000	$0	$0
Design/ROW/Construct 43rd Ave: Lwr Buckeye to Buckeye	$4,926,000	$4,926,000	$4,750,000	$0	$0
Design/ROW/Construct 59th Ave: Lwr Buckeye Intersect	$1,673,000	$1,673,000	$1,000,000	$0	$0
Design/ROW/Construct 75th Ave: Lwr Buckeye to Buckeye	$6,292,700	$6,292,700	$5,500,000	$0	$0
Design/ROW/Construct 91st Ave:Ind. Schl to Camelback	$7,513,500	$7,513,500	$6,000,000	$0	$0
Design/ROW/Construct Happy Valley Rd: 67th Av-55th Av	$6,070,000	$6,070,000	$5,000,000	$0	$0
Design/ROW/Construct Happy Valley: 43rd-35th Ave	$7,363,300	$7,363,300	$5,700,000	$0	$0
Design/ROW/Construct Happy Valley: 55th Av.-43rd Av.	$5,180,000	$5,180,000	$4,300,000	$0	$0
Design/ROW/Construct Lower Buckeye Rd: 51st-43rd Ave	$5,912,300	$5,912,300	$5,200,000	$0	$0
Design/ROW/Construct N. Valley Pwy Bridge @ Skunk Crk	$9,513,500	$9,513,500	$8,000,000	$9,513,500	$9,513,500
Design/ROW/Construct Ped Bridge	$2,378,100	$0	$0	$0	$0
Design/ROW/Construct Sonoran East 26th St-Cave Creek	$15,621,504	$15,621,504	$10,400,000	$0	$0
Design/ROW/Construct Sonoran West 15th Ave-10th St	$18,920,383	$18,920,383	$10,400,000	$0	$0
Design/ROW/Construct Southern Ave: 31st Ave - 19th Ave	$8,216,000	$8,216,000	$7,771,000	$0	$0
Fiber Backbone Extension	$480,000	$0	$0	$0	$0
FOB - Replace ITS/ATMS Phone Connect.	$55,000	$0	$0	$0	$0
Landscape Retrofit	$124,000	$0	$0	$0	$0
Landscape Retrofit	$156,261	$0	$0	$0	$0
Landscape Retrofit	$463,770	$0	$0	$0	$0
Landscape Retrofit	$450,000	$0	$0	$0	$0
Landscape Retrofit	$246,000	$0	$0	$0	$0
Landscape Retrofit	$667,645	$0	$0	$0	$0
Landscape Retrofit	$3,000	$0	$0	$0	$0
Landscape Retrofit	$20,000	$0	$0	$0	$0

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Table 171 Continued

Project Description	Total AHUR Revenue	Capacity-Expanding Projects			
		Total	No ROW	Major	Major/Drain
Landscape Retrofit	$5,000	$0	$0	$0	$0
Landscape Retrofit	$1,020	$0	$0	$0	$0
Landscape Retrofit	$180	$0	$0	$0	$0
Landscape Retrofit	$2,000	$0	$0	$0	$0
Left Turn Arrows	$40,000	$0	$0	$0	$0
Left Turn Arrows	$42,764	$0	$0	$0	$0
Left Turn Arrows	$25,518	$0	$0	$0	$0
Left Turn Arrows	$17,088	$0	$0	$0	$0
Left Turn Arrows	$22,412	$0	$0	$0	$0
Left Turn Arrows	$60,000	$0	$0	$0	$0
Left Turn Arrows	$23,552	$0	$0	$0	$0
Left Turn Arrows	$25,000	$0	$0	$0	$0
Left Turn Arrows	$39,000	$0	$0	$0	$0
Left Turn Arrows	$24,020	$0	$0	$0	$0
Left Turn Arrows	$37,275	$0	$0	$0	$0
Left Turn Arrows	$43,601	$0	$0	$0	$0
Left Turn Arrows	$22,713	$0	$0	$0	$0
Left Turn Arrows	$71	$0	$0	$0	$0
Left Turn Arrows	$28,007	$0	$0	$0	$0
Left Turn Arrows	$19,478	$0	$0	$0	$0
Left Turn Arrows	$21,036	$0	$0	$0	$0
Left Turn Arrows	$19,944	$0	$0	$0	$0
Left Turn Arrows	$15,000	$0	$0	$0	$0
Left Turn Arrows	$75,000	$0	$0	$0	$0
Left Turn Arrows	$33,000	$0	$0	$0	$0
Left Turn Arrows	$35,000	$0	$0	$0	$0
Left Turn Arrows	$25,000	$0	$0	$0	$0
Left Turn Arrows	$25,000	$0	$0	$0	$0
Left Turn Arrows	$35,000	$0	$0	$0	$0
Left Turn Arrows	$25,000	$0	$0	$0	$0
Left Turn Arrows	$35,000	$0	$0	$0	$0
Left Turn Arrows	$35,000	$0	$0	$0	$0
Left Turn Arrows	$35,000	$0	$0	$0	$0
Left Turn Arrows	$34,000	$0	$0	$0	$0
Loop Detection	$252,000	$0	$0	$0	$0
Maryland Ave/I-17 Bicycle Bridge	$44,475	$0	$0	$0	$0
Mid Block Streetlights	$1,600,000	$0	$0	$0	$0
Miscellaneous AHUR Transactions	$300,000	$0	$0	$0	$0
Multijurisdictional Signals	$267,500	$0	$0	$0	$0
Multijurisdictional Signals	$481	$0	$0	$0	$0
Multijurisdictional Signals	$100,000	$0	$0	$0	$0
Multijurisdictional Signals	$15,520	$0	$0	$0	$0
Multijurisdictional Signals	$100,000	$0	$0	$0	$0
Multijurisdictional Signals	$125,000	$0	$0	$0	$0
Multijurisdictional Signals	$125,000	$0	$0	$0	$0
Multijurisdictional Signals	$100,000	$0	$0	$0	$0
Multijurisdictional Signals	$147,727	$0	$0	$0	$0

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Table 171 Continued

Project Description	Total AHUR Revenue	Capacity-Expanding Projects			
		Total	No ROW	Major	Major/Drain
Multijurisdictional Signals	$118,738	$0	$0	$0	$0
Multijurisdictional Signals	$134,183	$0	$0	$0	$0
Multijurisdictional Signals	$100,000	$0	$0	$0	$0
Multijurisdictional Signals	$25,000	$0	$0	$0	$0
Painting Traffic Poles 99/00	$749,500	$0	$0	$0	$0
Phx Regional Its Fob Phase II	$550,000	$0	$0	$0	$0
Preemption work for Railroad	$28,000	$0	$0	$0	$0
Purchase of Streetsweepers	$12,000	$0	$0	$0	$0
Railroad Pre-Signal Evaluation	$50,000	$0	$0	$0	$0
Removal of Pavement Markings	$900,000	$0	$0	$0	$0
ROW 43rd Avenue & Rid Canal	$25,000	$0	$0	$0	$0
ROW Baseline Rd: 32 St to 40 St	$193	$193	$0	$0	$0
ROW Baseline Road and 35th Ave.Offset	$30,000	$30,000	$0	$0	$0
ROW Baseline: 16 St to 24 St	$30,228	$30,228	$0	$0	$0
ROW N.Valley Pkwy:Dixileta to Lone Mtn.	$16,000	$16,000	$0	$0	$0
ROW Pinnacle Pk Rd - Tatum Intersection	$1,060,000	$1,060,000	$0	$0	$0
ROW Southern: 19 Av to 7 Av	$320	$320	$0	$0	$0
ROW Washington St Land-Light Rail	$10,830	$0	$0	$0	$0
ROW/Construct 16th Street and Glendale Avenue	$1,538,500	$1,538,500	$0	$0	$0
ROW/Construct 19 Av: Baseline to Southern	$4,775,000	$4,775,000	$4,725,000	$0	$0
ROW/Construct 19th Avenue and Thunderbird Road	$714,000	$714,000	$0	$0	$0
ROW/Construct 44th Street and Indian School Road	$560,000	$560,000	$0	$0	$0
ROW/Construct 51 Av: Broadway to Lwr Buckeye	$110,000	$110,000	$82,000	$0	$0
ROW/Construct 51st Ave: Laveen Con. Channel to S.R.	$5,802,264	$5,802,264	$0	$0	$0
ROW/Construct 52 St: McDowell Rd to Thomas Rd	$5,389,433	$5,389,433	$5,344,433	$0	$0
ROW/Construct 7th Ave: Southern Ave to Salt River	$3,426,700	$3,426,700	$0	$0	$0
ROW/Construct 7th Street and McDowell	$2,975,300	$2,975,300	$0	$0	$0
ROW/Construct 83AV: Van Buren to Papago Freeway	$1,000	$1,000	$0	$0	$0
ROW/Construct Baseline Rd: 24 St to 32 St	$18,190	$18,190	$0	$0	$0
ROW/Construct Bridge Rehabilitation	$1,801,825	$0	$0	$0	$0
ROW/Construct Cave Creek Rd: Beardsley - Rose Garden	$4,750,000	$4,750,000	$0	$0	$0
ROW/Construct Deer Valley: 7 St to Cv Crk (887133)	$2,151,000	$2,151,000	$2,031,000	$0	$0
ROW/Construct Lower Buckeye Rd: 43rd Ave/35th Ave	$7,650,000	$7,650,000	$7,200,000	$0	$0
ROW/Construct Pinnacle Peak Rd: 43AV to 35AV	$4,020,000	$4,020,000	$4,000,000	$0	$0
ROW/Construct Pinnacle Peak Rd: I-17 to 19AV	$15,000	$15,000	$0	$0	$0
ROW/Construct Pinnacle Peak: 55AV to 43AV	$5,911,100	$5,911,100	$5,500,000	$0	$0
ROW/Construct Scottsdale Rd:Loop 101-Bell Rd IGA	$10,600,000	$10,600,000	$0	$0	$0
ROW/Construct Sonoran Central 10th St-26th St	$12,444,414	$12,444,414	$10,400,000	$0	$0
Signal System Enhancements	$161,988	$0	$0	$0	$0
Signal System Upgrade	$54,000	$0	$0	$0	$0
Street Modernization	$83,000	$0	$0	$0	$0
Street Modernization	$476,146	$0	$0	$0	$0
Street Modernization	$204,739	$0	$0	$0	$0
Street Modernization	$366,999	$0	$0	$0	$0
Street Modernization	$15,000	$0	$0	$0	$0
Street Modernization	$7,214	$0	$0	$0	$0
Street Modernization	$20,000	$0	$0	$0	$0
Street Modernization	$382,020	$0	$0	$0	$0
Street Modernization	$239,676	$0	$0	$0	$0

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Table 171 Continued

Project Description	Total AHUR Revenue	Capacity-Expanding Projects			
		Total	No ROW	Major	Major/Drain
Street Modernization	$930,000	$0	$0	$0	$0
Street Modernization	$157,653	$0	$0	$0	$0
Street Rehabilitation	$2,500,000	$0	$0	$0	$0
Street Rehabilitation	$2,502,000	$0	$0	$0	$0
Street Rehabilitation	$31,000,000	$0	$0	$0	$0
Street Rehabilitation	$15,255,822	$0	$0	$0	$0
Street Rehabilitation	$4,900,000	$0	$0	$0	$0
Street Rehabilitation	$5,500,000	$0	$0	$0	$0
Street Rehabilitation	$7,000,000	$0	$0	$0	$0
Street Rehabilitation	$1,254,000	$0	$0	$0	$0
Street Rehabilitation	$1,256	$0	$0	$0	$0
Street Rehabilitation	$270,498	$0	$0	$0	$0
Street Rehabilitation	$861	$0	$0	$0	$0
Street Rehabilitation	$597,000	$0	$0	$0	$0
Street Rehabilitation	$5,908,382	$0	$0	$0	$0
Street Rehabilitation	$250,000	$0	$0	$0	$0
Street Rehabilitation	$979,139	$0	$0	$0	$0
Street Rehabilitation	$1,046,000	$0	$0	$0	$0
Street Rehabilitation	$1,378,744	$0	$0	$0	$0
Street Rehabilitation	$90,333	$0	$0	$0	$0
Street Rehabilitation	$303,000	$0	$0	$0	$0
Street Rehabilitation	$10,000	$0	$0	$0	$0
Street Rehabilitation	$75,000	$0	$0	$0	$0
Traffic Count Stations	$558,069	$0	$0	$0	$0
Total	$341,863,750	$233,393,580	$165,165,628	$16,343,500	$28,895,131
Percent Capacity-Expanding		68.3%	48.3%	4.8%	12.4%

Source: AHUR projects from City of Phoenix *2008-2013 Draft Capital Improvement Program* and based on analysis of AHUR-funded projects; "Construction" excludes right-of-way related costs and "Bridge/Major" includes major bridges and major transportation facilities; construction portion of projects with both ROW and construction components assumed to be one-half of total programmed cost.

APPENDIX H: ROADWAY FACILITIES—PLANNED IMPROVEMENTS

Table 172. Planned Culverts, NBCC/North Gateway

Street Name	Culvert ID	Length (feet)	Width (feet)	Height (feet)	Barrels	Total Length (feet)	Cost	Fee Area
19th Avenue	302	140	10	6	1	8,400	$247,968	NBCC
19th Avenue	303	140	10	6	2	16,800	$495,936	NBCC
Subtotal, 19th Ave							**$743,904**	2
39th Ave	39	112	6	6	4	16,128	$476,099	NG
39th Ave	40	110	8	6	2	10,560	$311,731	NG
39th Ave	176	112	6	6	3	12,096	$357,074	NG
39th Ave	309	110	4	6	1	2,640	$77,933	NG
39th Ave	misc.						$236,638	NG
Subtotal, 39th Ave							**$1,459,475**	4
43rd Ave	69	149	8	6	2	14,304	$422,254	NG
43rd Ave	70	218	10	6	3	39,240	$1,158,365	NG
43rd Ave**	71	162	8	6	6	46,656	$1,369,554	NG
43rd Ave	157	218	6	6	4	31,392	$926,692	NG
43rd Ave	293	162	8	6	3	23,328	$688,643	NG
43rd Ave	294	171	8	6	11	90,288	$2,665,302	NG
Subtotal, 43rd Ave							**$7,230,810**	6
51st Ave	54	183	8	6	1	8,784	$259,304	NG
51st Ave	55	142	10	6	1	8,520	$251,510	NG
51st Ave	56	162	6	6	2	11,664	$344,321	NG
51st Ave	57	149	8	6	1	7,152	$211,127	NG
51st Ave	58	145	6	6	4	20,880	$616,378	NG
51st Ave	60	162	6	6	2	11,664	$344,321	NG
51st Ave	61	149	8	6	2	14,304	$422,254	NG
51st Ave**	62	198	10	6	11	130,680	$3,852,485	NG
51st Ave	63	162	8	6	4	31,104	$918,190	NG
51st Ave	64	198	6	6	13	92,664	$2,735,441	NG
51st Ave	80	145	6	6	1	5,220	$154,094	NG
51st Ave	81	141	6	6	2	10,152	$299,687	NG
51st Ave	291	198	6	6	2	14,256	$420,837	NG
Subtotal, 51st Ave							**$10,829,949**	13

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Table 172 continued

Street Name	Culvert ID	Length (feet)	Width (feet)	Height (feet)	Barrels	Total Length (feet)	Cost	Fee Area
67Ave/Pyramid Peak	15	132	4	6	1	3,168	$93,519	NBCC
67Ave/Pyramid Peak	15	132	4	6	1	3,168	$93,519	DV I
67Ave/Pyramid Peak	17	130	6	6	2	9,360	$276,307	NG
67Ave/Pyramid Peak	18	184	8	6	3	26,496	$782,162	NG
67Ave/Pyramid Peak	19	130	8	6	6	37,440	$1,105,229	NG
67Ave/Pyramid Peak	20	132	8	6	1	6,336	$187,039	NG
67Ave/Pyramid Peak	21	132	6	6	11	52,272	$1,543,069	NG
67Ave/Pyramid Peak	24	170	6	6	14	85,680	$2,529,274	NG
67Ave/Pyramid Peak	25	150	8	6	9	64,800	$1,912,896	NG
67Ave/Pyramid Peak	26	159	8	6	2	15,264	$450,593	NG
67Ave/Pyramid Peak	27	202	8	6	6	58,176	$1,717,356	NG
67Ave/Pyramid Peak	82	170	8	6	6	48,960	$1,445,299	NG
67Ave/Pyramid Peak	109	138	10	6	3	24,840	$733,277	NG
67Ave/Pyramid Peak	110	150	6	6	3	16,200	$478,224	NG
67Ave/Pyramid Peak	167	159	8	6	6	45,792	$1,351,780	NG
67Ave/Pyramid Peak	168	184	10	6	7	77,280	$2,281,306	NG
67Ave/Pyramid Peak	311	130	4	6	1	3,120	$92,102	DV I
67Ave/Pyramid Peak	312	130	6	6	1	4,680	$138,154	DV I
67Ave/Pyramid Peak**	misc.						$73,119	
Subtotal, 67 Ave/Pyramid Peak							**$17,284,224**	18
Carefree Hwy	314	183	8	6	7	61,488	$1,815,126	NG
Carefree Hwy	315	171	10	6	1	10,260	$302,875	NG
Carefree Hwy	316	149	8	6	8	57,216	$1,689,016	NG
Carefree Hwy**	317	149	6	6	13	69,732	$2,043,315	NG
Carefree Hwy	318	145	8	6	6	41,760	$1,232,755	NG
Carefree Hwy	321	141	10	6	7	59,220	$1,748,174	NG
Carefree Hwy	322	141	8	6	9	60,912	$1,798,122	NG
Subtotal, Carefree Highway							**$10,629,383**	7
Desert Hills Dr	32	156	6	6	4	22,464	$663,137	NG
Desert Hills Dr	90	154	8	6	6	44,352	$1,309,271	NG
Desert Hills Dr	91	117	8	6	1	5,616	$165,784	NG
Desert Hills Dr	111	117	10	6	1	7,020	$207,230	NG
Desert Hills Dr**	112	149	10	6	5	44,700	$1,321,766	NG
Subtotal, Desert Hills Dr							**$3,667,188**	5

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Table 172 continued

Street Name	Culvert ID	Length (feet)	Width (feet)	Height (feet)	Barrels	Total Length (feet)	Cost	Fee Area
Dixileta	65	141	10	6	3	25,380	$749,218	NG
Dixileta	66	142	8	6	9	61,344	$1,810,875	NG
Dixileta	67	154	6	6	2	11,088	$327,318	NG
Dixileta	68	145	10	6	3	26,100	$770,472	NG
Dixileta	156	141	6	6	4	20,304	$599,374	NG
Dixileta	158	142	8	6	4	27,264	$804,833	NG
Dixileta	159	149	10	6	7	62,580	$1,845,971	NG
Dixileta	160	162	6	6	1	5,832	$172,161	NG
Dixileta	161	198	6	6	1	7,128	$210,419	NG
Subtotal, Dixileta							**$7,290,641**	9
Dove Valley	103	117	6	6	1	4,212	$124,338	NBCC
Dove Valley	104	112	8	6	2	10,752	$317,399	NBCC
Dove Valley	105	127	10	6	3	22,860	$674,827	NBCC
Dove Valley	106	110	10	6	1	6,600	$194,832	NBCC
Dove Valley	271	144	8	6	2	13,824	$408,084	NBCC
Dove Valley	272	127	8	6	2	12,192	$359,908	NBCC
Dove Valley	273	127	8	6	2	12,192	$359,908	NBCC
Dove Valley	275	114	10	6	1	6,840	$201,917	NBCC
Dove Valley	304	110	6	6	1	3,960	$116,899	NBCC
Dove Valley	305	112	4	6	1	2,688	$79,350	NBCC
Dove Valley	22	156	6	6	11	61,776	$1,823,628	NG
Dove Valley	23	127	6	6	14	64,008	$1,889,516	NG
Dove Valley	29	141	6	6	13	65,988	$1,947,966	NG
Dove Valley	30	100	8	6	8	38,400	$1,133,568	NG
Dove Valley	31	102	6	6	4	14,688	$433,590	NG
Dove Valley	83	112	8	6	6	32,256	$952,197	NG
Dove Valley	84	112	10	6	4	26,880	$793,498	NG
Dove Valley**	85	156	10	6	11	102,960	$3,015,184	NG
Dove Valley	86	117	10	6	11	77,220	$2,279,534	NG
Dove Valley	149	115	6	6	3	12,420	$366,638	NG
Dove Valley	150	102	10	6	6	36,720	$1,083,974	NG
Dove Valley	151	141	8	6	9	60,912	$1,798,122	NG
Dove Valley	152	114	8	6	11	60,192	$1,776,868	NG
Dove Valley	153	144	8	6	8	55,296	$1,632,338	NG
Dove Valley	155	144	10	6	11	95,040	$2,805,581	NG
Dove Valley	292	144	10	6	3	25,920	$765,158	NG
Subtotal, Dove Valley							**$27,334,822**	26

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Table 172 continued

Street Name	Culvert ID	Length (feet)	Width (feet)	Height (feet)	Barrels	Total Length (feet)	Cost	Fee Area
Jenny Lin/51st Ave	170	183	10	6	3	32,940	$972,389	NG
Jenny Lin/51st Ave**	319	198	10	6	5	59,400	$1,752,107	NG
Subtotal, Jenny Lin/51st Ave							**$2,724,496**	2
Lone Mountain	74	142	10	6	6	51,120	$1,509,062	NG
Lone Mountain	75	142	6	6	3	15,336	$452,719	NG
Lone Mountain	76	142	10	6	2	17,040	$503,021	NG
Lone Mountain	77	171	10	6	5	51,300	$1,514,376	NG
Lone Mountain	78	149	10	6	5	44,700	$1,319,544	NG
Lone Mountain	79	145	8	6	3	20,880	$616,378	NG
Lone Mountain**	162	141	6	6	1	5,076	$150,819	NG
Lone Mountain	310	171	6	6	1	6,156	$181,725	NG
Subtotal, Lone Mountain							**$6,247,644**	8
North Valley Pkwy	1	97	4	4	5	7,760	$229,075	NBCC
North Valley Pkwy	2	74	12	10	1	8,880	$262,138	NBCC
North Valley Pkwy	3	120	8	4	3	11,520	$340,070	NBCC
North Valley Pkwy	283	121	6	6	2	8,712	$257,178	NBCC
North Valley Pkwy**	284	117	8	6	4	22,464	$891,253	NBCC
North Valley Pkwy	285	117	10	6	2	14,040	$414,461	NBCC
North Valley Pkwy	306	140	10	6	1	8,400	$247,968	NBCC
North Valley Pkwy	279	144	10	6	1	8,640	$255,053	NG
North Valley Pkwy	280	112	10	6	3	20,160	$595,123	NG
North Valley Pkwy	281	127	6	6	1	4,572	$134,965	NG
North Valley Pkwy	282	127	10	6	1	7,620	$224,942	NG
North Valley Pkwy	313	110	4	6	1	2,640	$77,933	NG
Subtotal, North Valley Pkwy							**$3,701,084**	12
Pioneer Rd	144	142	8	6	3	20,448	$603,625	NG
Pioneer Rd	145	141	6	6	6	30,456	$899,061	NG
Pioneer Rd**	146	149	8	6	8	57,216	$1,684,580	NG
Pioneer Rd	147	141	8	6	3	20,304	$599,374	NG
Subtotal, Pioneer Rd							**$3,786,640**	4
Total, NBCC/North Gateway culverts							**$102,930,260**	

**Culvert cost has been modified from unit cost calculation to reflect partial completion or other reason.

Source: Planned culverts derived from J E Fuller, *North Gateway Drainage Structure Cost Analysis*, May 11, 2005; project list updated to reflect completed road sections by City of Phoenix Street Transportation Management Services, February 29, 2008; culvert ID and specifications as stated in the J E Fuller study; culvert costs calculated using unit costs from Table 97.

Table 173. Planned Culverts, Desert View

Street Name	Culvert ID	Length (feet)	Width (feet)	Height (feet)	Barrels	Total Length (feet)	Cost	Fee Area
7th Street	51	212	6	6	2	15,264	$450,593	DVIEW
7th Street**	193	150	10	6	1	9,000	$265,961	DVIEW
Subtotal, 7th St							**$716,554**	2
56th St	78	127	6	4	1	3,048	$89,977	D VIEW
56th St**	79	127	10	5	8	50,800	$1,499,614	D VIEW
56th St	80	127	10	4	8	40,640	$1,199,693	D VIEW
56th St	81	127	8	4	7	28,448	$839,785	D VIEW
56th St	82	127	8	4	7	28,448	$839,785	D VIEW
56th St	83	127	8	4	1	4,064	$119,969	D VIEW
56th St	84	127	8	4	3	12,192	$359,908	D VIEW
56th St	86	127	8	4	2	8,128	$239,939	D VIEW
56th St	87	127	8	4	3	12,192	$359,908	D VIEW
56th St	90	127	10	5	8	50,800	$1,499,616	D VIEW
56th St	94	127	8	4	2	8,128	$239,939	D VIEW
56th St	96	127	8	4	4	16,256	$479,877	D VIEW
56th St	99	127	10	4	2	10,160	$299,923	D VIEW
56th St	100	127	10	4	2	10,160	$299,923	D VIEW
56th St	130	127	4	4	1	2,032	$59,985	D VIEW
56th St	131	127	8	4	2	8,128	$239,939	D VIEW
56th St	133	127	6	4	1	3,048	$89,977	D VIEW
56th St	134	127	6	4	1	3,048	$89,977	D VIEW
56th St	178	127	10	4	2	10,160	$299,923	D VIEW
56th St	179	127	10	4	2	10,160	$299,923	D VIEW
56th St	180	127	8	4	2	8,128	$239,939	D VIEW
56th St	221	127	10	4	1	5,080	$149,962	D VIEW
56th St	222	127	8	4	1	4,064	$119,969	D VIEW
56th St	258	127	10	4	5	25,400	$749,808	D VIEW
56th St	259	127	8	4	1	4,064	$119,969	D VIEW
56th St	260	127	10	4	1	5,080	$149,962	D VIEW
Subtotal, 56th St culverts							**$10,977,189**	26
56th St	95	64	10	4	3	7,680	$226,714	D VIEW
56th St	135	64	12	4	5	15,360	$453,427	D VIEW
Subtotal, 56th St culvert extensions							**$680,141**	2

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Table 173 continued

Street Name	Culvert ID	Length (feet)	Width (feet)	Height (feet)	Barrels	Total Length (feet)	Cost	Fee Area
64th St	182	127	8	4	1	4,064	$119,969	D VIEW
64th St	183	127	8	4	2	8,128	$239,939	D VIEW
64th St	184	127	10	4	2	10,160	$299,923	D VIEW
64th St	226	127	10	4	1	5,080	$149,962	D VIEW
64th St	227	127	6	4	6	18,288	$539,862	D VIEW
64th St	228	127	8	4	7	28,448	$839,785	D VIEW
64th St**	265	127	8	5	11	55,880	$1,649,576	D VIEW
64th St	266	127	6	4	6	18,288	$539,862	D VIEW
64th St	267	127	6	4	6	18,288	$539,862	D VIEW
64th St	268	127	10	4	3	15,240	$449,885	D VIEW
Subtotal, 64th St							**$5,368,625**	10
Black Mountain Pkwy	28	150	10	4	2	12,000	$354,240	D VIEW
Black Mountain Pkwy	29	150	6	4	1	3,600	$106,272	D VIEW
Black Mountain Pkwy	30	150	4	4	1	2,400	$70,848	D VIEW
Black Mountain Pkwy	31	150	10	4	3	18,000	$531,360	D VIEW
Black Mountain Pkwy	32	150	8	4	4	19,200	$566,784	D VIEW
Black Mountain Pkwy	104	150	4	4	1	2,400	$70,848	D VIEW
Black Mountain Pkwy	105	150	8	4	3	14,400	$425,088	D VIEW
Black Mountain Pkwy	106	150	4	4	1	2,400	$70,848	D VIEW
Black Mountain Pkwy	107	150	4	4	1	2,400	$70,848	D VIEW
Black Mountain Pkwy	108	150	10	4	7	42,000	$1,239,840	D VIEW
Black Mountain Pkwy**	114	162	10	4	8	51,840	$1,530,315	D VIEW
Black Mountain Pkwy	115	162	4	4	1	2,592	$76,516	D VIEW
Black Mountain Pkwy	116	162	6	4	2	7,776	$229,548	D VIEW
Black Mountain Pkwy	117	162	8	4	6	31,104	$918,190	D VIEW
Black Mountain Pkwy	152	162	8	4	2	10,368	$306,063	D VIEW
Black Mountain Pkwy	153	162	6	4	6	23,328	$688,643	D VIEW
Black Mountain Pkwy	154	162	10	4	5	32,400	$956,448	D VIEW
Black Mountain Pkwy	158	162	4	4	1	2,592	$76,516	D VIEW
Black Mountain Pkwy	203	162	6	4	2	7,776	$229,548	D VIEW
Black Mountain Pkwy	204	162	6	4	1	3,888	$114,774	D VIEW
Black Mountain Pkwy	240	162	10	4	3	19,440	$573,869	D VIEW
Subtotal, Black Mountain Pkwy culverts							**$9,207,406**	21
Black Mountain Pkwy	24	75	8	3	2	3,600	$106,272	D VIEW
Black Mountain Pkwy	25	75	8	4	2	4,800	$141,696	D VIEW
Black Mountain Pkwy	26	75	10	4	3	9,000	$265,680	D VIEW
Black Mountain Pkwy	27	75	8	4	2	4,800	$141,696	D VIEW
Black Mountain Pkwy	155	81	3	3	2	1,458	$43,040	D VIEW
Subtotal, Black Mountain Pkwy culvert extensions							**$698,384**	5
Cave Creek Rd	49	162	10	4	2	12,960	$382,579	D VIEW
Cave Creek Rd	147	162	6	4	1	3,888	$114,774	D VIEW
Subtotal, Cave Creek Rd							**$497,353**	2

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Table 173 continued

Street Name	Culvert ID	Length (feet)	Width (feet)	Height (feet)	Barrels	Total Length (feet)	Cost	Fee Area
Deer Valley	235	150	10	4	4	24,000	$708,480	DVIEW
Deer Valley	237	150	10	4	8	48,000	$1,416,960	DVIEW
Deer Valley	238	150	6	4	1	3,600	$106,272	DVIEW
Deer Valley	239	150	8	4	3	14,400	$425,088	DVIEW
Deer Valley	243	150	8	4	6	28,800	$850,176	DVIEW
Deer Valley**	261	1500	6	6	1	54,000	$1,594,079	DVIEW
Deer Valley	262	162	8	4	3	15,552	$459,095	DVIEW
Deer Valley	263	162	10	4	5	32,400	$956,448	DVIEW
Deer Valley	270	162	8	4	4	20,736	$612,127	DVIEW
Deer Valley	271	162	6	4	2	7,776	$229,548	DVIEW
Deer Valley	272	162	4	4	1	2,592	$76,516	DVIEW
Subtotal, Deer Valley culverts							**$7,434,789**	11
Deer Valley	241	75	8	4	2	4,800	$141,696	DVIEW
Deer Valley	242	75	2.5	2.5	2	938	$27,675	DVIEW
Deer Valley	244	75	8	4	2	4,800	$141,696	DVIEW
Deer Valley	245	75	8	4	2	4,800	$141,696	DVIEW
Deer Valley	246	75	10	5	2	7,500	$221,400	DVIEW
Deer Valley	250	81	25	8	1	16,200	$478,224	DVIEW
Deer Valley	251	81	25	8	1	16,200	$478,224	DVIEW
Subtotal, Deer Valley culvert extensions							**$1,630,611**	7
Desert Willow	76	162	10	4	7	45,360	$1,339,027	D VIEW
Desert Willow	77	162	8	6	12	93,312	$2,754,570	D VIEW
Subtotal, Desert Willow							**$4,093,597**	2
Dixileta	85	127	6	4	3	9,144	$269,931	D VIEW
Subtotal, Dixileta							**$269,931**	1
Dynamite Blvd	57	162	4	4	1	2,592	$76,516	D VIEW
Dynamite Blvd	58	162	10	4	1	6,480	$191,290	D VIEW
Dynamite Blvd	59	162	10	4	6	38,880	$1,147,738	D VIEW
Dynamite Blvd	60	162	10	4	8	51,840	$1,530,316	D VIEW
Subtotal, Dynamite Blvd							**$2,945,860**	4

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Table 173 continued

Street Name	Culvert ID	Length (feet)	Width (feet)	Height (feet)	Barrels	Total Length (feet)	Cost	Fee Area
Happy Valley	47	155	10	6	1	9,300	$274,536	D VIEW
Happy Valley	48	196	8	6	4	37,632	$1,110,897	D VIEW
Happy Valley	49	151	10	6	1	9,060	$267,451	D VIEW
Happy Valley	50	152	6	6	2	10,944	$323,067	D VIEW
Happy Valley	52	160	6	6	3	17,280	$510,106	D VIEW
Happy Valley	53	196	4	6	1	4,704	$138,862	D VIEW
Happy Valley	307	151	4	6	1	3,624	$106,980	D VIEW
Happy Valley	308	151	4	6	1	3,624	$106,980	D VIEW
Happy Valley	148	127	8	4	1	4,064	$119,969	D VIEW
Happy Valley	149	127	8	4	1	4,064	$119,969	D VIEW
Happy Valley**	150	127	10	6	8	60,960	$1,795,275	D VIEW
Happy Valley	151	127	8	4	2	8,128	$239,939	D VIEW
Happy Valley	159	127	4	4	1	2,032	$59,985	D VIEW
Happy Valley	160	127	8	4	2	8,128	$239,939	D VIEW
Happy Valley	161	127	10	4	3	15,240	$449,885	D VIEW
Happy Valley	162	127	8	4	3	12,192	$359,908	D VIEW
Happy Valley	163	127	8	4	3	12,192	$359,908	D VIEW
Happy Valley	164	127	8	4	2	8,128	$239,939	D VIEW
Happy Valley	172	127	8	4	1	4,064	$119,969	D VIEW
Happy Valley	173	127	8	4	1	4,064	$119,969	D VIEW
Happy Valley	174	127	10	4	2	10,160	$299,923	D VIEW
Happy Valley	175	127	10	4	2	10,160	$299,923	D VIEW
Happy Valley	176	127	8	4	2	8,128	$239,939	D VIEW
Happy Valley	177	127	8	4	2	8,128	$239,939	D VIEW
Happy Valley	181	127	8	4	1	4,064	$119,969	D VIEW
Happy Valley	185	127	8	4	6	24,384	$719,816	D VIEW
Happy Valley	186	127	6	4	6	18,288	$539,862	D VIEW
Happy Valley	187	127	8	4	4	16,256	$479,877	D VIEW
Happy Valley	323	151	4	6	1	3,624	$106,980	Deer V
Happy Valley	324	151	6	6	1	5,436	$160,471	Deer V
Happy Valley	325	155	10	6	2	18,600	$549,072	Deer V
Happy Valley	326	151	6	6	1	5,436	$160,471	Deer V
Happy Valley	327	151	8	6	2	14,496	$427,922	Deer V
Happy Valley	328	151	4	6	1	3,624	$106,980	Deer V
Subtotal, Happy Valley Rd							**$11,514,677**	34

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Table 173 continued

Street Name	Culvert ID	Length (feet)	Width (feet)	Height (feet)	Barrels	Total Length (feet)	Cost	Fee Area
Jomax Rd	126	127	8	4	2	8,128	$239,939	D VIEW
Jomax Rd**	127	127	8	4	6	24,384	$719,815	D VIEW
Jomax Rd	128	127	8	4	1	4,064	$119,969	D VIEW
Jomax Rd	129	127	6	4	2	6,096	$179,954	D VIEW
Jomax Rd	136	127	8	4	4	16,256	$479,877	D VIEW
Jomax Rd	137	127	8	4	2	8,128	$239,939	D VIEW
Jomax Rd	138	127	10	4	2	10,160	$299,923	D VIEW
Jomax Rd	139	127	10	4	2	10,160	$299,923	D VIEW
Jomax Rd	140	127	8	4	2	8,128	$239,939	D VIEW
Jomax Rd	141	127	8	4	1	4,064	$119,969	D VIEW
Jomax Rd	142	127	8	4	6	24,384	$719,816	D VIEW
Subtotal, Jomax Rd							**$3,659,063**	11
Lone Mountain	91	150	10	4	4	24,000	$708,480	D VIEW
Lone Mountain	92	150	10	4	8	48,000	$1,416,960	D VIEW
Lone Mountain	101	150	6	4	6	21,600	$637,632	D VIEW
Lone Mountain	102	150	10	4	7	42,000	$1,239,840	D VIEW
Lone Mountain	103	150	8	4	1	4,800	$141,696	D VIEW
Subtotal, Lone Mountain							**$4,144,608**	5
Mayo Blvd	303	127	10	4	8	40,640	$1,199,693	D VIEW
Mayo Blvd	304	127	8	4	2	8,128	$239,939	D VIEW
Mayo Blvd	305	127	6	4	3	9,144	$269,931	D VIEW
Mayo Blvd	306	127	8	4	3	12,192	$359,908	D VIEW
Mayo Blvd	307	127	6	4	1	3,048	$89,977	D VIEW
Mayo Blvd	308	127	4	4	1	2,032	$59,985	D VIEW
Mayo Blvd	309	127	4	4	1	2,032	$59,985	D VIEW
Mayo Blvd	310	162	4	4	1	2,592	$76,516	D VIEW
Mayo Blvd	311	162	4	4	1	2,592	$76,516	D VIEW
Mayo Blvd	312	162	4	4	1	2,592	$76,516	D VIEW
Mayo Blvd	316	162	6	4	1	3,888	$114,774	D VIEW
Mayo Blvd	323	162	6	4	3	11,664	$344,321	D VIEW
Mayo Blvd	324	162	8	5	9	58,320	$1,721,606	D VIEW
Mayo Blvd	325	162	10	4	7	45,360	$1,339,027	D VIEW
Mayo Blvd	326	162	10	4	6	38,880	$1,147,738	D VIEW
Mayo Blvd***	327	162	10	5	10	81,000	$2,391,117	D VIEW
Mayo Blvd	331	162	10	4	8	51,840	$1,530,317	D VIEW
Mayo Blvd	333	162	10	5	8	64,800	$1,912,896	D VIEW
Mayo Blvd	335	162	6	4	9	34,992	$1,032,964	D VIEW
Mayo Blvd	336	162	8	4	1	5,184	$153,032	D VIEW
Mayo Blvd	337	162	10	4	1	6,480	$191,290	D VIEW
Subtotal, Mayo Blvd culverts							**$14,388,048**	21
Mayo Blvd	313	81	8	3	1	1,944	$57,387	D VIEW
Subtotal, Mayo Blvd culvert extensions							**$57,387**	1

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Table 173 continued

Street Name	Culvert ID	Length (feet)	Width (feet)	Height (feet)	Barrels	Total Length (feet)	Cost	Fee Area
Pinnacle Peak	188	162	6	4	3	11,664	$344,321	DVIEW
Pinnacle Peak	189	162	6	4	1	3,888	$114,774	DVIEW
Pinnacle Peak	190	162	4	4	1	2,592	$76,516	DVIEW
Pinnacle Peak	191	162	10	4	3	19,440	$573,869	DVIEW
Pinnacle Peak	192	162	10	4	2	12,960	$382,579	DVIEW
Pinnacle Peak	193	162	4	4	1	2,592	$76,516	DVIEW
Pinnacle Peak	194	162	4	4	1	2,592	$76,516	DVIEW
Pinnacle Peak	195	162	4	4	1	2,592	$76,516	DVIEW
Pinnacle Peak	196	162	10	4	1	6,480	$191,290	DVIEW
Pinnacle Peak	197	162	8	4	3	15,552	$459,095	DVIEW
Pinnacle Peak	198	162	8	4	2	10,368	$306,063	DVIEW
Pinnacle Peak**	199	162	10	6	9	87,480	$2,582,406	DVIEW
Pinnacle Peak	200	162	4	4	1	2,592	$76,516	DVIEW
Pinnacle Peak	201	162	6	4	2	7,776	$229,548	DVIEW
Pinnacle Peak	202	162	8	4	7	36,288	$1,071,222	DVIEW
Pinnacle Peak	205	162	8	4	3	15,552	$459,095	DVIEW
Pinnacle Peak	206	162	8	4	3	15,552	$459,095	DVIEW
Pinnacle Peak	207	162	8	4	2	10,368	$306,063	DVIEW
Pinnacle Peak	208	162	8	4	1	5,184	$153,032	DVIEW
Pinnacle Peak	209	162	8	4	1	5,184	$153,032	DVIEW
Pinnacle Peak	210	162	8	4	1	5,184	$153,032	DVIEW
Pinnacle Peak	211	162	10	4	2	12,960	$382,579	DVIEW
Pinnacle Peak	212	162	10	4	2	12,960	$382,579	DVIEW
Pinnacle Peak	216	162	8	4	2	10,368	$306,063	DVIEW
Pinnacle Peak	217	162	6	4	1	3,888	$114,774	DVIEW
Pinnacle Peak	218	162	10	4	1	6,480	$191,290	DVIEW
Pinnacle Peak	219	162	8	4	7	36,288	$1,071,222	DVIEW
Pinnacle Peak	220	162	4	4	1	2,592	$76,516	DVIEW
Pinnacle Peak	223	162	10	4	3	19,440	$573,869	DVIEW
Pinnacle Peak	224	162	10	4	1	6,480	$191,290	DVIEW
Pinnacle Peak	225	162	6	4	1	3,888	$114,774	DVIEW
Pinnacle Peak	229	162	8	4	3	15,552	$459,095	DVIEW
Pinnacle Peak	230	162	8	4	4	20,736	$612,127	DVIEW
Pinnacle Peak	231	162	6	4	2	7,776	$229,548	DVIEW
Pinnacle Peak	232	162	6	4	3	11,664	$344,321	DVIEW
Pinnacle Peak	233	162	10	4	3	19,440	$573,869	DVIEW
Pinnacle Peak	234	162	8	4	1	5,184	$153,032	DVIEW
Subtotal, Pinnacle Peak							**$14,098,044**	37

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Table 173 continued

Street Name	Culvert ID	Length (feet)	Width (feet)	Height (feet)	Barrels	Total Length (feet)	Cost	Fee Area
Tatum Blvd	121	162	6	4	6	23,328	$688,643	D VIEW
Tatum Blvd	122	162	10	4	5	32,400	$956,448	D VIEW
Tatum Blvd	123	162	8	4	1	5,184	$153,032	D VIEW
Tatum Blvd**	124	162	8	6	12	93,312	$2,754,569	D VIEW
Tatum Blvd	125	162	10	4	7	45,360	$1,339,027	D VIEW
Tatum Blvd	165	162	8	4	2	10,368	$306,063	D VIEW
Tatum Blvd	166	162	6	4	2	7,776	$229,548	D VIEW
Tatum Blvd	167	162	8	4	2	10,368	$306,063	D VIEW
Tatum Blvd	168	162	8	4	1	5,184	$153,032	D VIEW
Tatum Blvd	213	162	10	4	2	12,960	$382,579	D VIEW
Tatum Blvd	214	162	8	4	1	5,184	$153,032	D VIEW
Tatum Blvd	215	162	8	4	1	5,184	$153,032	D VIEW
Subtotal, Tatum Blvd culverts							**$7,575,068**	12
Tatum Blvd	169	81	10	4	4	12,960	$382,579	D VIEW
Tatum Blvd	171	81	10	4	1	3,240	$95,645	D VIEW
Subtotal, Tatum Blvd culvert extensions							**$478,224**	2
Total, Desert View culverts							**$100,435,559**	

**Culvert cost has been modified from unit cost calculation to reflect partial completion or other reason.

Source: Planned culverts derived from J E Fuller, *Desert View Arterial Street Drainage Structure Analysis,* 2002; project list updated to reflect completed road sections by City of Phoenix Street Transportation Management Services, February 29, 2008; culvert ID and specifications as stated in the J E Fuller study; culvert costs calculated using unit costs from Table 97.

Table 174. Planned Culverts, Southern Growth Area

Street Name	Culvert ID	Length (feet)	Width (feet)	Height (feet)	Barrels	Total Length (feet)	Cost	Fee Area
Pecos Rd	C-101	160	6	6	1	5,760	$170,035	AH-W
Pecos Rd	C-102	160	10	6	1	9,600	$283,392	AH-W
Pecos Rd	C-103	160	10	6	1	9,600	$283,392	AH-W
Pecos Rd	C-104	160	10	6	1	9,600	$283,392	AH-W
Pecos Rd	C-105	160	6	6	1	5,760	$170,035	AH-W
Pecos Rd	C-106	160	8	6	2	15,360	$453,427	AH-W
Pecos Rd	C-107	160	12	6	4	46,080	$1,360,282	AH-W
Subtotal, Pecos Rd							**$3,003,955**	7
Chandler Blvd	C-108	160	10	6	7	67,200	$1,983,744	AH-W
35th Ave	C-109	120	10	6	2	14,400	$425,088	ES-LV
59th Ave	B-105	40	10	8	2	6,400	$188,928	ES-LV
75th Ave	B-107	60	10	8	2	9,600	$283,392	ES-LV
Dobbins Road	B-108	100	12	8	3	28,800	$850,176	ES-LV
Total, Southern Growth Area Culverts							**$6,735,283**	

Source: Planned culverts derived from J E Fuller, *Estrella, Laveen and Ahwatukee Foothills Drainage Structure Cost Analysis,* September 24, 2003; project list updated to reflect completed road sections by City of Phoenix Street Transportation Management Services, February 29, 2008; culvert ID and specifications as stated in the J E Fuller study; culvert costs calculated using unit costs from Table 97.

Table 175. Planned Storm Drains, Southern Growth Area

Storm Drain Segment	ID	Class	Segment 1 Size	Segment 1 Length	Segment 2 Size	Segment 2 Length	Segment 3 Size	Segment 3 Length	Segment 4 Size	Segment 4 Length	Plan Cost
Chandler Blvd	174	Lateral	24	500	24	500	30	500	30	700	$458,932
Subtotal, Ahwatukee West Storm Drains											**$458,932**
19th Avenue - Dobbins Rd to Baseline Rd	177	Lateral	24	2000	36	1320	42	1320	0	0	$1,084,114
27th Avenue - Baseline Rd to Southern Ave	178	Lateral	24	1000	24	1000	30	1500	36	1100	$418,136
35th Avenue - Baseline Rd to Southern Ave	169	Lateral	24	1000	30	1000	36	1000	42	1300	$1,008,328
35th Avenue - Dobbins Rd to Baseline Rd	170	Lateral	24	1000	30	1000	36	1000	36	1300	$985,578
35th Avenue - Olney Dr to Dobbins Rd	171	Lateral	24	1000	0	0	0	0	0	0	$203,860
43rd Avenue - Dobbins Rd to Baseline Rd	164	Lateral	24	1000	30	1000	36	1000	36	1300	$985,578
51st Avenue - Estrella Dr to Elliot Rd	165	Lateral	24	1000	30	1000	36	1000	42	1300	$1,008,328
51st Avenue - Southern Ave to LACC	163	Main	42	800	48	800	54	800	54	1100	$1,168,210
59th Avenue - Baseline Rd to LACC	160	Main	54	1000	0	0	0	0	0	0	$369,660
59th Avenue - Broadway Rd to Salt River	143	Main	84	1500	0	0	0	0	0	0	$1,065,240
59th Avenue - Buckeye Rd to Lower Buckeye Rd	141	Lateral	24	1000	30	1000	36	1000	42	1300	$732,440
59th Avenue - Dobbins Rd to LACC	159	Main	36	1100	42	1100	48	1100	54	1200	$1,356,350
59th Avenue - Lower Buckeye Rd to Broadway Rd	142	Main	48	1320	54	1320	60	1320	66	1320	$1,986,653
59th Avenue - Olney Rd to Dobbins Rd	161	Lateral	24	1000	0	0	0	0	0	0	$203,860
59th Avenue - Olney Rd to Elliot Rd	162	Lateral	24	1000	0	0	0	0	0	0	$203,860
59th Avenue - Southern Ave to Baseline Rd	158	Main	30	1320	36	1320	42	1320	48	1320	$1,375,889
75th Avenue - Broadway Rd to Salt River	117	Main	78	1000	78	1000	84	1000	84	1500	$1,532,720
75th Avenue - Buckeye Rd to Lower Buckeye Rd	115	Main	66	1320	66	1320	66	1320	66	1320	$991,056
75th Avenue - Lower Buckeye Rd to Broadway Rd	116	Main	66	1320	66	1320	72	1320	72	1320	$1,341,305
75th Avenue - Southern Ave to Salt River	157	Main	54	700	0	0	0	0	0	0	$258,762
75th Avenue - Van Buren St to Buckeye Rd	114	Main	54	1320	60	1320	66	1320	66	1320	$1,243,361
75th Avenue - Vineyard Rd to Baseline Rd	156	Lateral	36	600	36	600	42	600	42	800	$667,896
75th Avenue - Vineyard Rd to Southern Ave	155	Lateral	24	600	36	600	42	600	48	800	$683,656

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Table 175 continued

Storm Drain Segment	ID	Class	Segment 1 Size	Segment 1 Length	Segment 2 Size	Segment 2 Length	Segment 3 Size	Segment 3 Length	Segment 4 Size	Segment 4 Length	Plan Cost
83rd Avenue - Broadway Road to Salt River	112	Main	54	1500	54	1500	54	1500	54	1700	$2,291,892
83rd Avenue - Buckeye Rd to Lower Buckeye Rd	109	Main	36	1320	42	1320	48	1320	54	1320	$1,583,261
83rd Avenue - DRCC to Broadway Road	111	Lateral	24	400	30	400	30	400	30	400	$336,616
83rd Avenue - Lower Buckeye Rd to DRCC	110	Main	60	660	60	660	60	660	60	660	$999,134
91st Avenue - Broadway Road to DRCC	107	Lateral	24	400	24	400	30	400	30	400	$333,136
91st Avenue - Broadway Road to Salt River	108	Main	36	1500	42	1500	42	1500	42	1700	$1,616,502
91st Avenue - Buckeye Rd to Lower Buckeye Rd	105	Main	36	1320	36	1320	42	1320	42	1320	$1,352,789
91st Avenue - Lower Buckeye Rd to DRCC	106	Main	54	660	54	660	54	660	54	660	$975,902
99th Avenue - Broadway Rd to Southern Ave	103	Main	30	1320	36	1320	36	1320	42	1320	$1,283,621
99th Avenue - Broadway Road to DRCC	102	Lateral	24	400	24	400	24	400	24	400	$326,176
99th Avenue - Buckeye Rd to Lower Buckeye Rd	100	Main	36	1320	42	1320	48	1320	48	1320	$1,514,225
99th Avenue - Lower Buckeye Rd to DRCC	101	Main	66	660	66	660	66	660	66	660	$1,160,438
99th Avenue - Southern Ave to Salt River	104	Main	54	500	54	500	54	500	54	500	$739,320
107th Avenue - Broadway Road to DRCC		Lateral									$717,216
107th Avenue - Broadway Road to Southern Ave		Main									$2,366,813
107th Avenue - Southern Ave to Salt River		Main									$896,520
Baseline Road - 43rd Ave to 51st Ave	153	Lateral	24	1000	30	1000	30	1000	36	1300	$950,678
Baseline Road - 59th Ave to LACC lateral	152	Lateral	24	1000	30	1000	36	1000	42	1300	$1,008,328
Baseline Road - 67th Ave to 75th Ave	150	Lateral	24	1000	30	1000	30	1000	30	1300	$905,308
Baseline Road - 75th Ave to the LACC	151	Main	48	1000	0	0	0	0	0	0	$317,360

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Table 175 continued

Storm Drain Segment	ID	Class	Segment 1 Size	Segment 1 Length	Segment 2 Size	Segment 2 Length	Segment 3 Size	Segment 3 Length	Segment 4 Size	Segment 4 Length	Plan Cost
Broadway Road - 51st Ave to 59th Ave	144	Lateral	24	1000	36	1000	48	1000	54	1300	$1,249,238
Broadway Road - 59th Ave to 67th Ave	145	Lateral	24	1000	36	1000	48	1000	54	1300	$1,249,238
Broadway Road - 67th Ave to 75th Ave	123	Lateral	24	1000	36	1000	42	1000	48	1300	$1,128,848
Broadway Road - 75th Ave to 83rd Ave	124	Lateral	24	1000	36	1000	42	1000	48	1300	$1,128,848
Broadway Road - 83rd Ave to 91st Ave	125	Lateral	18	1000	24	1000	30	1000	36	1300	$915,778
Broadway Road - 91st Ave to 99th Ave	126	Lateral	18	1000	24	1000	30	1000	36	1300	$915,778
Buckeye Road - 75th Ave to 83rd Ave	120	Lateral	24	1000	30	1000	36	1000	42	1300	$1,008,328
Buckeye Road - 83rd Ave to 91st Ave	119	Lateral	24	1000	30	1000	36	1000	42	1300	$1,008,328
Buckeye Road - 91st Ave to 99th Ave	118	Lateral	24	1000	30	1000	36	1000	42	1300	$1,008,328
Dobbins Road - 19th Ave to 27th Ave	176	Lateral	42	1320	54	1320	54	1320	60	1320	$1,825,217
Dobbins Road - 27th Ave to 35th Ave	173	Lateral	24	1000	42	1000	54	1000	60	1300	$1,330,478
Dobbins Road - 35th Ave to 43rd Ave	172	Main	60	1100	66	1100	72	1100	78	1300	$2,043,766
Dobbins Road - 51st Ave to 59th Ave	154	Lateral	24	1000	30	1000	30	1000	36	1300	$950,678
Dobbins Road - Western Canal to 19th Ave	175	Lateral	30	600	0	0	0		0	0	$127,536
Lower Buckeye Road - 43rd Ave to 47th Ave Channel	139	Lateral	18	400	24	400	30	400	36	500	$361,362
Lower Buckeye Road - 47th Ave to 51st Ave	138	Lateral	18	400	24	400	30	400	36	500	$361,362
Lower Buckeye Road - 51st Ave to 59th Ave	137	Lateral	24	1000	36	1000	42	1000	48	1300	$1,128,848
Lower Buckeye Road - 59th Ave to 67th Ave	136	Lateral	24	1000	36	1000	42	1000	48	1300	$1,128,848
Lower Buckeye Road - 67th Ave to DRCC	127	Lateral	24	500	30	800	36	1000	42	1100	$810,894
Lower Buckeye Road - 75th Ave to 83rd Ave	128	Lateral	24	1000	36	1000	42	1000	48	1300	$1,128,848
Lower Buckeye Road - 83rd Ave to 91st Ave	129	Lateral	24	1000	30	1000	36	1000	36	1300	$985,578
Lower Buckeye Road - 91st Ave to 99th Ave	130	Lateral	24	1000	36	1000	42	1000	48	1300	$1,128,848

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Table 175 continued

Storm Drain Segment	ID	Class	Segment 1 Size	Segment 1 Length	Segment 2 Size	Segment 2 Length	Segment 3 Size	Segment 3 Length	Segment 4 Size	Segment 4 Length	Plan Cost
Southern Avenue - 11th Ave to 19th Ave	180	Lateral	24	1000	30	1500	36	1100	0	0	$794,906
Southern Avenue - 19th Ave to 27th Ave	179	Lateral	24	1000	30	1500	36	1500	36	1500	$1,265,080
Southern Avenue - 27th Ave to 35th Ave	167	Lateral	24	700	30	700	36	700	42	900	$703,180
Southern Avenue - 43rd Ave to 51st Ave	149	Lateral	24	1000	30	1000	36	1000	42	1300	$1,008,328
Southern Avenue - 51st Ave to 59th Ave	148	Lateral	24	1000	24	1000	30	1000	30	1300	$896,608
Southern Avenue - 59th Ave to LACC lateral	147	Lateral	24	1000	24	1000	30	1000	30	1300	$896,608
Southern Avenue - 67th Ave to 75th Ave	146	Lateral	24	1000	24	1000	30	1000	30	1300	$896,608
Southern Avenue - 91st Ave to 99th Ave	131	Lateral	24	1000	36	1000	42	1000	48	1300	$1,128,848
Van Buren Street - 67th Ave to 75th Ave	122	Lateral	24	1000	30	1000	36	1000	42	1300	$1,008,328
Subtotal, Estrella/Laveen Storm Drains											**$74,073,544**
Total, Southern Growth Area Storm Drains											**$74,532,476**

Source: Planned storm drains derived from J E Fuller, *Estrella, Laveen and Ahwatukee Foothills Drainage Structure Cost Analysis,* September 24, 2003; project list updated to reflect completed road sections by City of Phoenix Street Transportation Management Services, February 29, 2008; storm drain ID and specifications as stated in the J E Fuller study; storm drain costs calculated using unit costs from Table 98.

APPENDIX I: STORM DRAINAGE FACILITIES

Table 176. Drainage Project Cost Components

Facility	Cost
27th Ave Basin	$3,798,777
43rd Ave/Baseline Basin	$3,798,777
27th Ave Storm Drain (Southern to SR) & 23rd Ave Basin	$7,597,555
27th Ave Storm Drain (Dobbins-Baseline) and Dobbins Basin	$4,334,176
7th Ave Storm Drain (Baseline to South Moutain)	$4,079,224
43rd Ave Storm Drain*	$1,083,544
Subtotal, South Phoenix/Laveen Costs	**$24,692,053**
51st Ave & Baseline Detention Basin	$3,132,649
51st Ave & Dobbins Detention Basin	$2,695,977
51st Ave & Elliot Detention Basin	$2,942,791
51st Ave Storm Drain (Baseline to Elliot)	$4,423,680
67th Ave Channel (Southern to South Mountain Ave)	$5,126,153
44th Ave & Carver Detention Basin	$6,834,870
Carver Hills Storm Drain	$1,196,102
Dobbins Rd. Storm Drain (43rd to 51st)	$1,480,889
43rd Ave & Dobbins Detention Basin	$2,392,205
Reservation Channel (Dobbins to LACC)	$2,126,404
Western Canal Channel	$5,145,138
Subtotal, Laveen Project Costs	**$37,496,858**

Source: City of Phoenix Street Transportation Department costs from *Infrastructure Financing Plan*, November 15, 2006; costs updated with ENR CCI January, 2009.

APPENDIX J: WASTEWATER FACILITIES

Water and Wastewater Infrastructure Unit Cost Study

In 2006, a study was performed to update the water and wastewater unit cost study first provided in 2003. The 2006 study provides descriptions of the attributes and associated costs of the types of large water and wastewater facilities that are included in both the water and wastewater master plans that guide the provision of infrastructure in Phoenix and assist in calculating the impact fees in the City's growth areas. While much of the facility attribute data and basic costing models developed during the 2003 Infrastructure Financing Plan update remain valid, the basic cost inputs (e.g. concrete, steel, labor, etc.) were revised to reflect major changes in the market. Both the 2003 study and the 2006 update were prepared by Black & Veatch and are available to the public by contacting the Water Services Department.

Table 177. Wastewater Network Cost Components by Type

Facility Type	Diameter or MGD	2003 Cost	2006 Cost	Soft Costs[1]	Total Cost
Gravity Sewer ($ per linear ft)	12	$73.30	$114.88	$28.72	$143.60
	15	$87.72	$134.62	$33.66	$168.28
	18	$106.49	$160.84	$40.21	$201.05
	21	$129.51	$191.95	$47.99	$239.94
	24	$155.95	$227.50	$56.88	$284.38
VCP (above)	27	$177.11	$256.96	$64.24	$321.20
RCP/PVC (below)	30	$176.93	$273.24	$68.31	$341.55
	33	$192.43	$296.43	$74.11	$370.54
	36	$200.25	$308.65	$77.16	$385.81
	39	$210.89	$324.23	$81.06	$405.29
	42	$229.60	$348.13	$87.03	$435.16
	48	$269.53	$403.77	$100.94	$504.71
	54	$314.57	$465.83	$116.46	$582.29
	60	$352.51	$519.98	$130.00	$649.98
Gravity Sewer, Ext Depth	12	$288.52	$502.57	$125.64	$628.21
	15	$306.04	$528.52	$132.13	$660.65
	18	$329.95	$563.85	$140.96	$704.81
	21	$357.20	$602.42	$150.61	$753.03
	24	$387.89	$645.44	$161.36	$806.80
VCP (above)	27	$413.07	$682.78	$170.70	$853.48
RCP/PVC (below)	30	$418.20	$708.38	$177.10	$885.48
	33	$437.93	$739.04	$184.76	$923.80
	36	$450.00	$758.73	$189.68	$948.41
	39	$462.36	$777.15	$194.29	$971.44
	42	$482.49	$806.44	$201.61	$1,008.05
	48	$526.76	$872.00	$218.00	$1,090.00
	54	$576.15	$944.88	$236.22	$1,181.10
	60	$618.43	$1,007.60	$251.90	$1,259.50

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Table 177 continued

Facility Type	Diameter or MGD	2003 Cost	2006 Cost	Soft Costs[1]	Total Cost
Lift Station (Per MGD $)	1	$1,142,600	$1,729,500	$432,375	$2,161,875
	3	$1,562,300	$2,430,500	$607,625	$3,038,125
	3.5	$1,825,600	$2,866,000	$716,500	$3,582,500
	5	$2,048,800	$3,169,000	$792,250	$3,961,250
	8	$2,588,500	$4,017,800	$1,004,450	$5,022,250
	12	$2,952,700	$4,899,300	$1,224,825	$6,124,125
	25	$4,573,700	$7,510,600	$1,877,650	$9,388,250
	40	$5,377,000	$9,145,200	$2,286,300	$11,431,500
Dual Force Main ($ per linear ft)	4	$56.65	$83.20	$20.80	$104.00
	6	$63.91	$94.22	$23.56	$117.78
	8	$85.23	$121.16	$30.29	$151.45
	10	$103.83	$148.55	$37.14	$185.69
	12	$113.08	$160.82	$40.21	$201.03
	16	$157.92	$225.04	$56.26	$281.30
	20	$196.32	$277.88	$69.47	$347.35
	24	$240.63	$341.32	$85.33	$426.65
	30	$298.74	$420.37	$105.09	$525.46

1. Soft Costs include the costs of design and construction management, and are assumed to be 25% of the total costs.
Source: Black and Veatch for the City of Phoenix Water Services Department, July 24, 2006.

Table 178. Wastewater Treatment Facility Costs

Wastewater Treatment Facility	Cost per Gallon Capacity per Day	Single Family WW Gallons per Day	Treatment Cost per EDU
91st Ave WWTP, Solids Only	$1.20	307	**$370**
91st Ave WWTP, Full Treatment	$7.38	307	**$2,265**
North Gateway Reclamation Plants	$13.51	307	**$4,149**
Cave Creek Reclamation Plant	$10.92	307	**$3,353**

Source: Water Services Department. Single-Family Wastewater Gallons per Day derived from assumption of 3.07 persons per household, and 100 gallons of water per day per person.

Table 179. Desert View Wastewater Facilities

Location	Item	Length in Ft.	Diameter of Pipe	Cost per Ft.	Project Cost
Reach 11 Sewer - 68th to 64th St.	Gravity Sewer	5,550	24	$284	$1,578,281
64th St.- Mayo to Reach 11	Gravity Sewer	2,500	18	$201	$502,625
Mayo Blvd - 64th to 68th Street	Gravity Sewer	2,800	15	$168	$471,170
Reach 11 - 64th St. to 56th St.	Gravity Sewer	5,600	36	$386	$2,160,550
Reach 11- 56th St to Tatum Lift Station	Gravity Sewer	8,306	24	$284	$2,362,019
Reach 11- Relief Sewer, 56th St to Tatum Lift Station	Gravity Sewer	8,306	18	$201	$1,669,921
N. Side of 101 from 64th St to 56th St.	Gravity Sewer	6,000	36	$386	$2,314,875
N. Side of 101 from 56th St. to Tatum	Gravity Sewer	5,803	36	$386	$2,238,870
N. Side of 101- 52nd St to Tatum Relief Sewer	Gravity Sewer	5,316	27	$321	$1,707,499
56th Street - Deer Valley Drive to 101	Gravity Sewer	2,600	15	$168	$437,515
Black Mountain Pkwy (36th) -Pinnacle Pk to Deer Valley Dr.	Gravity Sewer	5,400	18	$201	$1,085,670
Black Mountain Pkwy (36th) - Deer Valley Dr. to Mayo	Gravity Sewer	1,200	18	$201	$241,260
Pinnacle Peak Rd. - East of Tatum	Gravity Sewer	2,600	18	$201	$522,730
Pinnacle Peak Rd.- Tatum to 40th St	Gravity Sewer	4,001	24	$284	$1,137,784
Pinnacle Peak Rd. - 40th St to Black Mtn. Pkwy	Gravity Sewer	7,004	27	$321	$2,249,685
Pinnacle Peak Rd.- Black Mtn. Pkwy to Cave Creek Rd.	Gravity Sewer	6,266	27	$321	$2,012,639
24th St/Dynamite SE to 34th St/N. of Jomax	Gravity Sewer	6,169	18	$201	$1,240,277
N Side of 101 Mayo to Wildcat Ridge	Gravity Sewer	2,400	18	$201	$482,520
Pinnacle Peak Rd - West of Cave Creek Rd	Gravity Sewer	6,000	21	$240	$1,439,625
Cave Creek Rd Relief- between Happy Valley and Jomax	Gravity Sewer	1,505	36	$386	$580,648
Cave Creek Rd Relief- between Happy Valley and Jomax	Gravity Sewer	1,900	36	$386	$733,044
Cave Creek Rd Relief- betw. Deer Valley to Pinnacle Peak	Gravity Sewer	968	42	$435	$421,238
Total, Desert View Gravity Sewer Costs					**$27,590,445**
LS F5 to 101/Mayo	Dual Force Main	4,160	12	$201	$836,264
LS F6 to 40th/Dove Valley	Dual Force Main	25,600	8	$151	$3,877,120
LS F7 to Cave Creek Rd	Dual Force Main	4,400	12	$201	$884,510
LS F8 to 40th/Dove Valley	Dual Force Main	4,400	8	$151	$666,380
LS F9 to 40th/Lone Mountain	Dual Force Main	4,400	8	$151	$666,380
Tatum LS NW to 40 St./Pima Freeway	Dual Force Main	8,098	30	$525	$4,255,195
Total, Desert View Force Mains					**$11,185,849**
Location	**Unit**	**MGD**			**Project Cost**
LS 64 - 64th St./N. of CAP	Lift Station	4			$3,000,000
LS 64 - Expansion	Lift Station	2			$1,000,000
F5 - Desert Ridge SB 9	Lift Station	4	3.5		$3,756,830
F6 - Carefree Highway and 16th St.	Lift Station	2	3		$3,212,455
F7 - Dynamite and 32nd St	Lift Station	4	5		$4,135,580
F8 - Forest Pleasant Place and 22nd St.	Lift Station	1	1		$2,336,205
F9 - Windstone Trail and 29th St.	Lift Station	1	1		$2,336,205
LS 51 - Tatum Lift Station	Lift Station	12			$4,800,000
Total, Desert View Lift Stations					**$24,577,275**
Location	**Unit**	**Quantity**	**Unit Cost**		**Project Cost**
50 ft. Easement n. of 101 alignment , west of Mayo	Acres	2.75	$174,330		$480,248
Total, Desert View Other Facilities					**$480,248**
Total Cost of Wastewater Facilities, Desert View					**$63,833,817**

Source: Unit costs from Table 177. Project costs have been rounded and may vary slightly from calculations made from this table.

Table 180. North Gateway Wastewater Facilities

Location	Description	Length in Ft.	Diameter of Pipe	Cost per Ft.	Project Cost
59th/Desert Hills to 67th/Cloud	Gravity Sewer	16,000	18	$201	$3,216,800
67th Ave - Cloud to Dove Valley	Gravity Sewer	11,000	21	$240	$2,639,313
67th Ave - Dove Valley to LS F2	Gravity Sewer	1,000	27	$321	$321,200
51st Ave - South of Cloud Road	Gravity Sewer	810	36	$386	$312,508
51st Ave - Between Carefree Hwy and south of	Gravity Sewer	4,400	39	$405	$1,783,265
51st Ave - Carefree Hwy to LS F3 (Lone Mounta	Gravity Sewer	11,000	42	$435	$4,786,788
43rd Ave north of Lone Mountain	Gravity Sewer	600	18	$201	$120,630
43rd Ave from Lone Mountain to Dixeleta	Gravity Sewer	5,700	48	$505	$2,876,860
43rd Ave and Dixeleta to NGWRP	Gravity Sewer	10,000	54	$582	$5,822,875
North Valley Pkwy - Carefree to Dove Valley	Gravity Sewer	7,100	24	$334	$2,371,400
North Valley Pkwy - Dove Valley to Lone Mounta	Gravity Sewer	6,000	24	$334	$2,004,000
North Valley Pkwy - Lone Mountain to Dixeleta	Gravity Sewer	5,900	30	$400	$2,360,000
North Valley Pkwy - Dixeleta to Dynamite	Gravity Sewer	6,000	21	$278	$1,668,000
Sonoran Parkway - From between 19th and 7th	Gravity Sewer	10,000	18	$201	$2,010,500
NGWRP Influent Line from North Valley PW	Gravity Sewer	2,500	36	$401	$1,001,250
Total, North Gateway Gravity Sewers					**$33,295,389**
LS F2 to 51st Ave./Cloud	Dual Force Main	21,800	20	$347	$7,572,230
LS F3 to 43rd Ave/Lone Mountain	Dual Force Main	5,700	36	$781	$4,448,298
LS F4 to 43rd Ave and Dixeleta	Dual Force Main	4,400	10	$186	$817,025
LS 65 to NG Influent line (City Portion)	Dual Force Main		12		$954,000
LS 65 to NG Influent line	Dual Force Main		12		$0
Total, North Gateway Force Mains					**$13,791,553**
Location	**Description**	**MGD**	**MGD(2)**		**Project Cost**
F2 - 67th Avenue and Dove Valley Road	Lift Station	15			$26,863,000
F3 - 51st Avenue and Lone Mountain Road	Lift Station	39			$53,198,000
F4 - Dynamite Blvd and 43rd Ave.	Lift Station	2			$2,970,000
LS 65 (DMR)	Lift Station				$2,000,000
Total, North Gateway Lift Stations					**$85,031,000**
Location	**Unit**	**Quantity**	**Unit Cost**		**Project Cost**
Land for Future Dove Valley WRP	Acres	160	$174,330		$27,892,800
Total, North Gateway Other Facilities					**$27,892,800**
Total Cost of Wastewater Facilities, North Gateway					**$160,010,742**

Source: Unit costs from Table 177. Project costs have been rounded and may vary slightly from calculations made from this table.

Table 181. Deer Valley I - V Wastewater Facilities

Location	Description	Length in Ft.	Diameter of Pipe	Cost per Ft.	Project Cost
63rd Ave & Jomax Credit Agreement (Deer Valley I)	Gravity Sewer	5,862	24	$284	$1,667,006
Norterra Parkway (Deer Valley IV)	Gravity Sewer	6,325	21	$240	$1,517,605
Total, Deer Valley Gravity Sewers					**$3,184,611**
Pinnacle Peak/16th St to Cave Creek Rd (Deer Valley V)	Dual Force Main	8,564	8	$151	$1,297,018
Total, Deer Valley Force Mains					**$1,297,018**
Location	**Description**	**MGD**	**MGD(2)**		**Project Cost**
Pinnacle Peak Road (Deer Valley V)	Lift Station	1			$2,336,205
Total, Deer Valley Lift Stations					**$2,336,205**
Total Cost of Wastewater Facilities, Deer Valley I - V					**$6,817,834**

Source: Unit costs from Table 177. Project costs have been rounded and may vary slightly from calculations made from this table.

Table 182. Laveen Wastewater Facilities

Location	Description	Length in Ft.	Diameter of Pipe	Cost per Ft.	Project Cost
Southern Avenue - 55th Ave. to 75th Ave.L.S.	Gravity Sewer	15,135	36		$4,113,702
Southern Avenue - 51st Ave to 55th Ave.	Gravity Sewer	2,800	30		$1,083,486
75th Avenue - Baseline Rd. to Lift Station	Gravity Sewer	3,085	42	$435	$1,342,476
51st Avenue - Baseline Rd. to Southern Ave.	Gravity Sewer	5,264	21	$240	$1,263,031
51st Avenue - N. of Dobbins to Baseline Rd.	Gravity Sewer	4,463	15	$168	$751,011
Baseline Rd. - 73rd Ave to 75th Ave.	Gravity Sewer	1,285	30	$342	$438,892
Baseline Rd. - 71st Ave to 73rd Ave	Gravity Sewer	1,350	30	$342	$461,093
Baseline Rd. - 63rd Ave to 71st Ave	Gravity Sewer	5,012	30	$885	$4,438,001
Baseline Rd. - 59th Ave to 63rd Ave	Gravity Sewer	2,925	24	$807	$2,359,890
59th Ave south of Baseline	Gravity Sewer	926	24	$284	$263,331
43rd Avenue - Baseline to Southern Ave.	Gravity Sewer	5,280	24	$284	$1,501,500
63rd/South Mountain to 75th/Baseline	Gravity Sewer	9,126	36	$386	$3,520,925
57th/Elliott to 63rd/South Mountain	Gravity Sewer	10,069	30	$342	$3,439,067
55th/Elliott to 57th/Elliott	Gravity Sewer	1,370	24	$284	$389,594
55th/Carver to 55th/Elliott	Gravity Sewer	2,636	21	$240	$632,475
South of 55th/Carver	Gravity Sewer	1,317	18	$201	$264,783
Total, Laveen Gravity Sewers					**$26,263,257**
Location	**Description**	**MGD**			**Project Cost**
LS #43 - 75th Ave south of Southern	Lift Station	25			$14,399,000
LS 43 Expansion	Lift Station	25			$19,536,000
Total					**$33,935,000**
Total Cost of Wastewater Facilities, Laveen					**$60,198,257**

Source: Unit costs from Table 177. Project costs have been rounded and may vary slightly from calculations made from this table.

Table 183. Estrella Wastewater Facilities

Location	Description	Length in Ft.	Diameter of Pipe	Cost per Ft.	Project Cost
107th Ave/Elwood Align. to Broadway	Gravity Sewer	2,297	30	$400	$918,226
99th Ave/Lower Buckeye to Elwood Align.	Gravity Sewer	1,521	15	$167	$254,600
Country Place Ave from 99th Ave to 103rd Ave	Gravity Sewer	2,947	21	$278	$819,001
Elwood Align. 103rd Ave. to 107th Ave.	Gravity Sewer	2,633	24	$334	$880,581
107th/Broadway LS Influent Sewer	Gravity Sewer	148	21	$278	$41,131
107th Ave/Lower Buckeye to Elwood	Gravity Sewer	2,640	18	$201	$530,770
107th Ave/Broadway to Roeser L.S.	Gravity Sewer	3,290	36	$386	$1,269,323
91st Ave/Lower Buckeye to Broadway	Gravity Sewer	5,280	18	$201	$1,061,544
83rd Ave/Lower Buckeye to Broadway	Gravity Sewer	5,280	18	$705	$3,721,410
75th Ave/Lower Buckeye to Getty Dr	Gravity Sewer	4,680	18	$705	$3,298,523
75th Ave/Getty Dr.to Broadway	Gravity Sewer	600	18	$705	$422,888
67th Ave/Lower Buckeye to Broadway	Gravity Sewer	5,280	18	$705	$3,721,410
59th Ave/Lower Buckeye to Broadway	Gravity Sewer	5,280	18	$705	$3,721,410
Broadway/107th to 95th	Gravity Sewer	2,640	18	$705	$1,860,705
Broadway/91st to 75th	Gravity Sewer	10,560	48		$8,300,000
Broadway/75th to 67th	Gravity Sewer	5,280	42	$1,008	$5,322,504
Broadway/67th to 59th	Gravity Sewer	10,560	36	$948	$10,015,236
Broadway/59th to 51st	Gravity Sewer	5,540	24	$807	$4,469,672
91st Ave/Broadway to Roeser	Gravity Sewer	2,640	48	$1,090	$2,877,600
Roeser Rd/107th to 91st	Gravity Sewer	10,560	48	$1,090	$11,510,400
Total, Estrella Gravity Sewers					**$65,016,934**
Location	**Description**	**Length in Ft.**	**Diameter of Pipe**	**Cost per Ft.**	**Project Cost**
Roeser Rd./107th to 87th	3 Force Mains	13,311	30	$788	$10,491,647
Broadway Rd./107th to 91st single FM	1 Force Main	10,314	16	$141	$1,450,664
Total, Estrella Force Mains					**$11,942,311**
Location	**Description**	**MGD**			**Project Cost**
LS 67 - 107th and Roeser	Lift Station	45			$16,000,000
107th and Broadway (semi-permanent)	Lift Station	1			$1,225,000
107th and Broadway expand to 5 mgd	Lift Station	5			$800,000
91st and Broadway (semi-permanent)	Lift Station	3			$1,702,541
91st and Broadway expand to 5 mgd	Lift Station	5			$800,000
Total, Estrella Lift Stations					**$20,527,541**
Total Cost of Wastewater Facilities, Estrella					**$97,486,786**

Source: Unit costs from Table 177. Project costs have been rounded and may vary slightly from calculations made from this table.

Table 184. Ahwatukee Wastewater Facilities (Outstanding Debt and Credits)

Facility	Total Cost	Bond Funded	Interest Remaining	Principal Remaining	Remaining*
I-10 Pecos to Ray; 16" sewer	$1,334,800	$1,334,800	$327,078	$1,081,692	$1,408,769
I-10 Ray to Guadalupe - 24" sewer	$5,627,114	$831,303	$228,460	$707,402	$935,862
South Mntn Sewer	$1,940,697	$1,209,666	$332,443	$1,029,371	$1,361,814
48th St - Guadalupe - Broadway	$4,631,291	$4,631,291	$1,272,781	$3,941,021	$5,213,802
South Mntn Sewer - land	$1,392,270	$769,732	$211,539	$655,007	$866,547
Foothills West Lift Station	$5,727,515	$5,477,317	$1,853,848	$5,083,170	$6,937,019
Upgrades to Lift Stations 55, 56	$868,744	$656,430	$160,851	$531,956	$692,807
Pecos Lift Station	$5,226,566	$4,933,224	$1,355,759	$4,197,952	$5,553,711
Ahwatukee Lift Station Mod.	$2,872,108	$2,872,108	$472,204	$1,952,811	$2,425,015
Total Outstanding Wastewater Debt, Ahwatukee					**$25,395,347**
Facility					**Remaining**
Western Sewer 15", remaining Credits					$463,838
Western Sewer 18", remaining Credits					$340,458
Total Remaining Impact Fee Credits, Ahwatukee					**$804,296**

* Total of Interest Remaining and Principal Remaining as of the date of original adoption, November 15, 2006.

APPENDIX K: WATER FACILITIES

Water and Wastewater Infrastructure Unit Cost Study

In 2006, a study was performed to update the water and wastewater unit cost study first provided in 2003. The 2006 study provides descriptions of the attributes and associated costs of the types of large water and wastewater facilities that are included in both the water and wastewater master plans that guide the provision of infrastructure in Phoenix and assist in calculating the impact fees in the City's growth areas. While much of the facility attribute data and basic costing models developed during the 2003 Infrastructure Financing Plan update remain valid, the basic cost inputs (e.g. concrete, steel, labor, etc.) were revised to reflect major changes in the market. Both the 2003 study and the 2006 update were prepared by Black & Veatch and are available to the public by contacting the Water Services Department.

Table 185. Water Network Cost Components by Type

Facility Type	Diameter (inches)	2003 Construction Cost*	2006 Construction Cost*
Water Main (per linear ft $) (not inlcuding rock excavation)	12	$74.31	$129.12
DIP (above)	16	$83.17	$142.40
PCCP (below)	20	$108.87	$162.16
	24	$129.75	$192.73
	30	$162.88	$248.23
	36	$196.21	$297.68
	42	$220.08	$337.12
	48	$246.76	$374.07
	54	$279.03	$424.62
	60	$313.49	$473.58
	66	$353.76	$585.57
	72	$387.67	$636.89
	78	$424.90	$689.81
	84	$467.24	$743.72

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Table 185 continued

Facility Type	MGD	2003 Construction Cost*	2006 Construction Cost*
Booster Station (Total $)	5	$1,099,100	$1,630,900
(not including on-site chlorine generation)	10	$1,428,100	$2,068,700
	15	$1,832,000	$2,578,500
	20	$2,130,400	$2,954,800
	30	$2,522,200	$3,465,600
	40	$2,945,600	$4,037,400
	60	$3,702,500	$5,075,800
PRV Station (Total $)	3	$730,600	$1,051,800
(including onsite chlorine facility)	10	$969,400	$1,392,900
	20	$1,151,300	$1,648,000
	40	$1,282,900	$1,783,200
	60	$1,395,400	$1,990,000
Reservoir (Total $)	2	$1,664,160	$2,733,700
(not including on-site chlorine generation)	3	$2,177,980	$3,608,000
	5	$2,723,210	$4,645,700
	10	$4,630,200	$8,130,400
	15	$6,409,300	$11,496,200
	20	$8,210,140	$14,902,900
	30	$11,738,280	$21,608,300
	40	$15,935,030	$29,090,500

* Construction costs are inclusive of "soft costs", which include the costs of design and construction management, and are assumed to be 25% of the total construction costs.
Source: Black and Veatch for the City of Phoenix Water Services Department, July 24, 2006.

Table 186. Water Treatment Facility Costs

	MGD	Construction Cost	Soft Costs*	Total Cost
Northern Growth Area				
Union Hills WTP - 160 to 240 mgd	80	$304,000,000	$69,920,000	$373,920,000
Lake Pleasant WTP - 80 to 240 mgd	160	$600,000,000	$138,000,000	$738,000,000
Total Additional Northern Growth Area	240	$904,000,000	$207,920,000	$1,111,920,000
Cost per gallon per day	$4.63			
New SF demand*	463			
Treatment cost per EDU, Northern Growth Area	**$2,145**			
	MGD	**Construction Cost**	**Soft Costs***	**Total Cost**
Southern Growth Area				
Western Canal WTP, 0- 40 MGD	40	$160,000,000	$36,800,000	$196,800,000
Western Canal WTP, 40 0 80 MGD	40	$160,000,000	$36,800,000	$196,800,000
Total Additional Southern Growth Area	80	$320,000,000	$73,600,000	$393,600,000
Cost per gallon per day	$4.92			
New SF unit water demand*	463			
Treatment cost per EDU, Southern Growth Area	**$2,278**			

* Soft Costs include the costs of design and construction management.
Source: Malcolm Pirnie, *2006 Water Master Plan for the City of Phoenix;* unit costs from Table 185. Project costs have been rounded and may vary slightly from calculations made from this table.

Table 187. Northern Area Booster Station Facilities

Project ID	Project Description	Booster Stations (mgd)	Closest B&V Cost Estimate (mgd)	Construction Cost	Soft Costs*	Land Cost	Total Cost
6B-B2F-1-6	Lake Pleasant WTP, New River Rd/Carefree Hwy	160	N/A	$15,000,000	$3,750,000	$174,330	$18,924,330
7D-B1F-1	Lake Pleasant WTP, New River Rd/Carefree Hwy	52.2	60	$5,075,800	$1,268,950	$174,330	$6,519,080
8A-B3F-1	East Side Jomax Booster, Pinnacle Vista Reservoir	5	5	$1,630,900	$407,725	$174,330	$2,212,955
8A-B4-4-F	Desert Hills Reservoir, Galvin St/7th Ave	59.3	60	$5,075,800	$1,268,950	$174,330	$6,519,080
9A-B3-2-F	Carefree Booster, Lone Mountain Rd/56th St	8	10	$2,068,700	$517,175	$174,330	$2,760,205
9A-B4	Dixileta Booster, Jomax Rd/64th St	5	5	$1,630,900	$407,725	$174,330	$2,212,955
10A-B3-1-F	Cave Creek Reservoir, Dove Valley Rd/64th St	7.6	10	$2,068,700	$517,175	$174,330	$2,760,205
	CIG Booster Station 1	23	N/A				$3,712,241
	CIG Booster Station 2	16	N/A				$3,079,735
5E-B4	1st Expansion Cave Creek 5 at UHWTP	20	20	$2,954,800	$738,700	$174,330	$3,867,830
5E-B4	2nd expansion Cave Creek 5 at UHWTP	35	30	$3,465,600	$866,400	$174,330	$4,506,330
6A-B1	1st Expansion Cave Creek 6 (Happy Valley)	20	20	$2,954,800	$738,700	$174,330	$3,867,830
6A-B1	2nd Expansion Cave Creek 6 (Happy Valley)	40	40	$4,037,400	$1,009,350	$174,330	$5,221,080
7A-B1	1st Expansion Cave Creek 7 (Jomax)	10	10	$2,068,700	$517,175	$174,330	$2,760,205
7A-B1	2nd Expansion Cave Creek 7 (Jomax)	10	10	$2,068,700	$517,175	$174,330	$2,760,205
8A-B1	1st Expansion Cave Creek 8 (Dixileta)	8	10	$2,068,700	$517,175	$174,330	$2,760,205
8A-R1	2nd Expansion Cave Creek 8 (Dixileta)	8	10	$2,068,700	$517,175	$174,330	$2,760,205
7A-B3	64th St Booster, Happy Valley Reservoir	5	5	$1,630,900	$407,725	$174,330	$2,212,955
10A-B1	Carefree Booster, Lone Mountain Rd/56th St	3	5	$1,630,900	$407,725	$174,330	$2,212,955
Total Northern Booster Station Facilities				**$57,500,000**	**$14,375,000**	**$2,963,610**	**$81,630,586**

* Soft Costs include the costs of design and construction management.

Source: 6B-B2F-1 cost provided by Malcolm Pirnie, *2006 Water Master Plan for the City of Phoenix;* unit costs from Table 185. Project costs have been rounded and may vary slightly from calculations made from this table.

Table 188. Northern Area PRV Station Facilities

Project ID	Project Description	PRVs (mgd)	Closest B&V Cost Estimate (mgd)	Construction Cost	Soft Costs	Land Cost	Total Cost
5ED-R1F	Expansion of PRV Zone 6B to Zone 5ED, 19th Ave/Jomax Rd	33.1	40	$1,783,200	$445,800	$174,330	$2,403,330
5ED-R2F	PRV from Zone 6B to Zone 5ED, Carefree Hwy/51st Ave	50.5	60	$1,990,000	$497,500	$174,330	$2,661,830
5E-R5F	PRV from Zone 6A to Zone 5E, Scottsdale Rd/Mayo Blvd	5	3	$1,051,800	$262,950	$174,330	$1,489,080
6A-R3F	PRV Zone 7A to Zone 6A, Black Mtn Hwy(40th St)/S of Ramuda	10	10	$1,392,900	$348,225	$174,330	$1,915,455
6B-R3F	PRV Zone 7B to Zone 6B, Pyramid Peak Rd/S of Desert Hills	3	3	$1,051,800	$262,950	$174,330	$1,489,080
7A-R6F	PRV from Zone 8A to Zone 7A, Dove Valley Rd/26th St	8.2	10	$1,392,900	$348,225	$174,330	$1,915,455
	CIG PRV 1 (MGD 3X16")						$218,900
	CIG PRV 2 (MGD 2X16")						$201,500
7A-R5	PRV from Zone 8A to Zone 7A, Tatum Blvd/Jomax Rd	25	25				
Total Northern PRV Station Facilities				**$8,662,600**	**$2,165,650**	**$1,045,980**	**$12,294,630**

* Soft Costs include the costs of design and construction management.
Source: Unit costs from Table 185. Project costs have been rounded and may vary slightly from calculations made from this table.

Table 189. Northern Water Storage Facilities (Reservoirs)

Project ID	Project Description	Storage (MG)	Construction Cost	Soft Costs	Land Cost	Total Cost
5E-ES1F	56th St/Pinnacle Peak Rd	10	$8,130,400	$2,032,600	$871,650	$11,034,650
5EA-ES1F	Pyramid Peak Reservoir, S of Dixileta Dr/47th Ave	10	$8,130,400	$2,032,600	$871,650	$11,034,650
5ED-ES1F	W Union Hills Res, E of N. Valley Pky/Dynamite	10	$8,130,400	$2,032,600	$871,650	$11,034,650
6B-ES1F	Desert Hills Reservoir, Galvin St/11th Ave	40	$29,090,500	$7,272,625	$1,743,300	$38,106,425
6B-GS1F	Lake Pleasant WTP, Carefree Hwy/New River Rd	40	$29,090,500	$7,272,625	$1,743,300	$38,106,425
7A-ES1F	Pinnacle Vista Reservoir, Jomax Rd/56th St	5	$4,645,700	$1,161,425	$871,650	$6,678,775
8A-ES1F	Lone Mtn Reservoir, Lone Mountain Rd/56th St	5	$4,645,700	$1,161,425	$871,650	$6,678,775
9A-ES1F	Dove Valley Reservoir, Dove Valley Rd/64th St	3	$3,608,000	$902,000	$871,650	$5,381,650
Total Northern Water Storage Facilities			**$95,471,600**	**$23,867,900**	**$8,716,500**	**$128,056,000**

* Soft Costs include the costs of design and construction management.
Source: Unit costs from Table 185. Project costs have been rounded and may vary slightly from calculations made from this table.

Table 190. Northern Area Water Mains

ProjectID	Pressure Zone	Size	Length in Feet	Service Area	Cost per Foot	Construction Cost	Soft Costs*	Total Cost
1065-6B-16	6B	16	1,317	NBCC	$142.40	$187,518	$46,879	$234,397
107-5EB-16	5EB	16	143	Deer Valley I	$142.40	$20,410	$5,102	$25,512
10A-P-1F	9A	20	9,129	Desert View	$162.16	$1,480,359	$370,090	$1,850,448
1105-8A-24	8A	24	5,321	Desert View	$192.73	$1,025,446	$256,361	$1,281,807
1143-6B-16	6B	16	8,833	NBCC	$142.40	$1,257,839	$314,460	$1,572,299
114-6B-16	6B	16	2,623	NBCC	$142.40	$373,515	$93,379	$466,894
1173-6A-36	6A	36	6,047	Desert View	$297.68	$1,800,203	$450,051	$2,250,254
1200-6A-36	6A	36	951	Desert View	$297.68	$283,138	$70,785	$353,923
12991-5EA-48	5EA	48	139	Deer Valley III	$374.07	$51,819	$12,955	$64,774
1315-5E-42	5E	42	11,834	Desert View	$337.12	$3,989,500	$997,375	$4,986,875
1316-5E-16	5E	16	1,468	Desert View	$142.40	$209,107	$52,277	$261,384
1318-4A-16	4A	16	114	Deer Valley IV	$142.40	$16,288	$4,072	$20,360
13204-5E-48	5E	48	333		$374.07	$124,458	$31,114	$155,572
13373-5ED-16	5ED	16	830	Deer Valley IV	$142.40	$118,127	$29,532	$147,659
13374-5ED-16	5ED	16	656	Deer Valley IV	$142.40	$93,442	$23,360	$116,802
13375-5ED-16	5ED	16	561	Deer Valley IV	$142.40	$79,914	$19,978	$99,892
13376-6B-24	6B	24	228	NBCC	$192.73	$43,903	$10,976	$54,878
13377-5ED-24	5ED	24	260	NBCC	$192.73	$50,196	$12,549	$62,746
13378-6B-24	6B	24	326	North Gateway	$192.73	$62,844	$15,711	$78,556
13379-6B-24	6B	24	181	NBCC	$192.73	$34,889	$8,722	$43,611
13380-5ED-24	5ED	24	175	North Gateway	$192.73	$33,799	$8,450	$42,248
13381-4A-16	4A	16	631	Deer Valley IV	$142.40	$89,860	$22,465	$112,325
13382-6B-24	6B	24	384	North Gateway	$192.73	$73,929	$18,482	$92,412
13383-4A-16	4A	16	310	Deer Valley IV	$142.40	$44,107	$11,027	$55,133
13384-6B-24	6B	24	350	North Gateway	$192.73	$67,417	$16,854	$84,272
13385-5ED-16	5ED	16	492	Deer Valley IV	$142.40	$70,124	$17,531	$87,655
13386-4A-16	4A	16	190	Deer Valley IV	$142.40	$27,043	$6,761	$33,804
13387-4A-16	4A	16	459	Deer Valley IV	$142.40	$65,300	$16,325	$81,625
13388-6B-24	6B	24	419	North Gateway	$192.73	$80,775	$20,194	$100,969
13389-6B-24	6B	24	460	North Gateway	$192.73	$88,603	$22,151	$110,754
13390-6B-24	6B	24	331	North Gateway	$192.73	$63,851	$15,963	$79,813
13391-5ED-24	5ED	24	120	North Gateway	$192.73	$23,170	$5,793	$28,963
13392-5ED-24	5ED	24	214	NBCC	$192.73	$41,160	$10,290	$51,450
13405-9A-30	9A	16	9,136	Desert View	$142.40	$1,300,966	$325,242	$1,626,208
13408-8A-16	8A	16	4,727	Desert View	$142.40	$673,125	$168,281	$841,406
13410-6A-48	6A	48	2,228	Desert View	$374.07	$833,450	$208,362	$1,041,812
13424-7A-30	7A	30	11,164	Desert View	$248.23	$2,771,240	$692,810	$3,464,050
13429-5E-24	5E	36	10,134	Desert View	$297.68	$3,016,689	$754,172	$3,770,861
13430-6A-48	6A	48	4,084	NBCC	$374.07	$1,527,831	$381,958	$1,909,789
13432-5ED-60	5ED	60	51	North Gateway	$473.58	$24,157	$6,039	$30,196

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Table 190 continued

ProjectID	Pressure Zone	Size	Length in Feet	Service Area	Cost per Foot	Construction Cost	Soft Costs*	Total Cost
13433-7A-30	7A	16	4,231					
13453-6A-48	6A	48	3,163	Desert View	$374.07	$1,183,183	$295,796	$1,478,979
13467-4A-30	4A	30	228	Deer Valley III	$248.23	$56,708	$14,177	$70,885
13470-4A-24	4A	24	146	Deer Valley II	$192.73	$28,185	$7,046	$35,231
13474-5ED-24	5ED	24	227	North Gateway	$192.73	$43,672	$10,918	$54,590
13477-5ED-24	5ED	24	280	North Gateway	$192.73	$54,050	$13,513	$67,563
13478-5ED-24	5ED	24	127	North Gateway	$192.73	$24,562	$6,140	$30,702
13488-5ED-42	5ED	42	8,742	Deer Valley I	$337.12	$2,947,068	$736,767	$3,683,835
13517-6B-78	6B	78	177	NBCC	$689.81	$122,097	$30,524	$152,621
1357-4A-54	4A	54	461	Deer Valley IV	$424.62	$195,619	$48,905	$244,523
13586-5ED-16	5ED	16	252	Deer Valley IV	$142.40	$35,831	$8,958	$44,789
13587-4A-16	4A	16	263	Deer Valley IV	$142.40	$37,388	$9,347	$46,735
13588-5ED-16	5ED	16	264	Deer Valley IV	$142.40	$37,560	$9,390	$46,950
13589-4A-16	4A	16	245	Deer Valley IV	$142.40	$34,893	$8,723	$43,616
13590-5ED-16	5ED	16	282	Deer Valley IV	$142.40	$40,172	$10,043	$50,215
13591-4A-16	4A	16	234	Deer Valley IV	$142.40	$33,282	$8,321	$41,603
13592-5ED-16	5ED	16	265	Deer Valley IV	$142.40	$37,740	$9,435	$47,176
13593-4A-16	4A	16	224	Deer Valley IV	$142.40	$31,934	$7,983	$39,917
13595-4A-24	4A	24	83	Deer Valley I	$192.73	$16,015	$4,004	$20,019
13596-5E-24	5E	24	67	Deer Valley II	$192.73	$12,936	$3,234	$16,170
13597-5E-24	5E	24	66	Deer Valley II	$192.73	$12,675	$3,169	$15,844
13598-6B-24		24	73	North Gateway				
13599-5ED-24	5ED	24	90	NBCC	$192.73	$17,321	$4,330	$21,651
13600-6B-24		24	83	North Gateway				
13601-5ED-24	5ED	24	89	NBCC	$192.73	$17,166	$4,291	$21,457
13602-6B-24		24	74	North Gateway				
13603-5ED-24		24	75	North Gateway				
13604-6B-24		24	73	North Gateway				
13605-5ED-24		24	73	North Gateway				
13606-6B-24		24	73	North Gateway				
13607-5ED-24		24	74	North Gateway				
13608-6B-24		24	73	North Gateway				
13609-5ED-24	5ED	24	74	North Gateway	$192.73	$14,263	$3,566	$17,829
13610-6B-24		24	77	North Gateway				
13611-5ED-24	5ED	24	77	North Gateway	$192.73	$14,841	$3,710	$18,552
13612-6B-24		24	78	North Gateway				
13613-5ED-24	5ED	24	79	North Gateway	$192.73	$15,227	$3,807	$19,034

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Table 190 continued

ProjectID	Pressure Zone	Size	Length in Feet	Service Area	Cost per Foot	Construction Cost	Soft Costs*	Total Cost
13616-8A-20	8A	20	215	Desert View	$162.16	$34,919	$8,730	$43,649
13617-7A-20	7A	20	215	Desert View	$162.16	$34,798	$8,699	$43,497
13746-6A-48	6A	48	5,175	NBCC	$374.07	$1,935,694	$483,923	$2,419,617
13798-6B-24	6B	24	185	North Gateway	$192.73	$35,677	$8,919	$44,596
13843-6B-60	6B	60	6,530	North Gateway	$473.58	$3,092,477	$773,119	$3,865,597
13844-6B-60	6B	60	4,304	NBCC	$473.58	$2,038,288	$509,572	$2,547,860
13862-5ED-42	5ED	42	12,079	Deer Valley II	$337.12	$4,071,968	$1,017,992	$5,089,960
13867-6B-36	6B	36	18,758	NBCC	$297.68	$5,583,950	$1,395,987	$6,979,937
1396-6B-36	6B	36	411	NBCC	$297.68	$122,383	$30,596	$152,978
140-4A-16	4A	16	695	Desert View	$142.40	$98,952	$24,738	$123,690
1407-5E-24	5E	16	2,922	Desert View	$142.40	$416,093	$104,023	$520,116
1409-5E-16	5E	16	120	Desert View	$142.40	$17,159	$4,290	$21,449
1447-6B-16	6B	16	106	NBCC	$142.40	$15,153	$3,788	$18,941
1540-5E-16	5E	16	5,281	Desert View	$142.40	$752,026	$188,007	$940,033
154-6B-54	6B	54	7,026	NBCC	$424.62	$2,983,380	$745,845	$3,729,225
1557-8A-16	8A	16	1,864	Desert View	$142.40	$265,439	$66,360	$331,799
15-5ED-54	5ED	54	19,494	Deer Valley IV	$424.62	$8,277,542	$2,069,386	$10,346,928
1587-7A-36	7A	36	877	Desert View	$297.68	$261,061	$65,265	$326,326
1665-5E-24	5E	24	4,609	Desert View	$192.73	$888,293	$222,073	$1,110,366
1666-5E-36	5E	36	3,404	Desert View	$297.68	$1,013,363	$253,341	$1,266,704
1841-6A-16	6A	16	215	Desert View	$142.40	$30,646	$7,662	$38,308
1848-4A-16	4A	16	2,147	Deer Valley II	$142.40	$305,703	$76,426	$382,129
1914-5E-24	5E	24	1,105	Desert View	$192.73	$213,023	$53,256	$266,279
1919-6B-24	6B	24	175	NBCC	$192.73	$33,728	$8,432	$42,160
1961-7A-16	7A	16	330	Desert View	$142.40	$47,006	$11,752	$58,758
2040-6A-42	6A	42	3,266	Desert View	$337.12	$1,101,022	$275,255	$1,376,277
2103-5E-66	5E	66	168	Desert View	$585.57	$98,641	$24,660	$123,301
2239-7B-36	7B	36	119	NBCC	$297.68	$35,559	$8,890	$44,449
227-8A-36	8A	36	2,511	Desert View	$297.68	$747,464	$186,866	$934,329
243-4A-16	4A	16	1,493	Deer Valley I	$142.40	$212,553	$53,138	$265,691
245-6A-24	6A	24	2,083	Desert View	$192.73	$401,477	$100,369	$501,846
255-8A-16	8A	16	8,674	Desert View	$142.40	$1,235,178	$308,794	$1,543,972
2574-6A-42	6A	42	961	Desert View	$337.12	$324,013	$81,003	$405,017
2686-5EB-16	5EB	16	1,645	Deer Valley I	$142.40	$234,287	$58,572	$292,859
2750-5E-24	5E	24	4,427	Desert View	$192.73	$853,216	$213,304	$1,066,520
275-6A-24	6A	24	102	Desert View	$192.73	$19,623	$4,906	$24,528
2776-4A-16	4A	16	1,078	Deer Valley I	$142.40	$153,449	$38,362	$191,811
2804-8A-36	8A	36	101	Desert View	$297.68	$30,139	$7,535	$37,674
2971-8A-36	8A	36	15,118	Desert View	$297.68	$4,500,194	$1,125,049	$5,625,243
3030-5E-36	5E	36	12,046	Desert View	$297.68	$3,585,853	$896,463	$4,482,317
3106-6A-36	6A	36	14,980	Desert View	$297.68	$4,459,235	$1,114,809	$5,574,044

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Table 190 continued

ProjectID	Pressure Zone	Size	Length in Feet	Service Area	Cost per Foot	Construction Cost	Soft Costs*	Total Cost
345-6B-36	6B	36	3,152	North Gateway				
352-10A-12	10A	12	6,150	Desert View				
361-6A-24	6A	24	10,526	Desert View	$192.73	$2,028,676	$507,169	$2,535,845
364-5E-24	5E	24	2,951	Desert View	$192.73	$568,746	$142,187	$710,933
3650-6B-36	6B	36	140	NBCC	$297.68	$41,542	$10,385	$51,927
367-5E-60	5E	60	2,750	Desert View	$473.58	$1,302,345	$325,586	$1,627,931
368-7A-24	7A	24	5,153	Desert View	$192.73	$993,138	$248,284	$1,241,422
371-7A-20	7A	20	2,541	Desert View	$162.16	$412,049	$103,012	$515,061
373-7A-24	7A	24	5,289	Desert View	$192.73	$1,019,349	$254,837	$1,274,186
375-8A-16	8A	16	178	Desert View	$142.40	$25,302	$6,325	$31,627
376-5E-16	5E	16	8,846	Desert View	$142.40	$1,259,670	$314,918	$1,574,588
377-5E-24	5E	24	5,669	Desert View	$192.73	$1,092,586	$273,147	$1,365,733
3945-6A-24	6A	24	64	Desert View	$192.73	$12,393	$3,098	$15,491
3969-8A-36	8A	36	281	Desert View	$297.68	$83,627	$20,907	$104,534
445-6B-16	6B	16	2,280	NBCC	$142.40	$324,639	$81,160	$405,799
455-4A-48	4A	48	246	Deer Valley III	$374.07	$92,032	$23,008	$115,041
4565-5E-36	5E	36	8,140	Desert View	$297.68	$2,423,115	$605,779	$3,028,894
4665-6A-16	6A	16	1,392	Desert View	$142.40	$198,221	$49,555	$247,776
490-5ED-54	5ED	54	136	Deer Valley IV	$424.62	$57,577	$14,394	$71,971
4954-4A-16	4A	16	229	Deer Valley I	$142.40	$32,626	$8,157	$40,783
516-6A-16	6A	16	3,154	Desert View	$142.40	$449,139	$112,285	$561,423
5409-6A-16	6A	16	3,819		$142.40	$543,826	$135,956	$679,782
5616-6B-54	6B	54	102	NBCC	$424.62	$43,506	$10,876	$54,382
598-5ED-42	5ED	42	2,999	NBCC	$337.12	$1,011,023	$252,756	$1,263,779
599-10A-12	10A	12	1,242	Desert View				
5ED-P-11F	5E	24	7,669	NBCC	$192.73	$1,478,046	$369,512	$1,847,558
5ED-P-2F	5ED	24	10,730	North Gateway	$192.73	$2,067,947	$516,987	$2,584,934
5ED-P-3F	5ED	16	21,889	North Gateway	$142.40	$3,117,038	$779,260	$3,896,298
5ED-P-4F	5ED	16	13,435	North Gateway	$142.40	$1,913,079	$478,270	$2,391,349
5ED-P-7F	5ED	36	20,499	North Gateway	$297.68	$6,102,197	$1,525,549	$7,627,746
5E-P-1F	5E	84	57		$743.72	$42,053	$10,513	$52,566
5E-P-2F	3D	84	48		$743.72	$35,552	$8,888	$44,440
5E-P-3F	3D	84	256		$743.72	$190,246	$47,561	$237,807
5E-P-4F	5E	20	9,606	Desert View	$162.16	$1,557,709	$389,427	$1,947,136
5E-P-5F	5E	20	17,632	NBCC	$162.16	$2,859,233	$714,808	$3,574,041
600-6A-36	6A	36	1,178	Desert View	$297.68	$350,522	$87,631	$438,153
601-5ED-42	5ED	42	3,617	North Gateway				
6233-6A-48	6A	48	2,578	Desert View	$374.07	$964,524	$241,131	$1,205,656
6236-5ED-24	5ED	24	329	North Gateway	$192.73	$63,388	$15,847	$79,235
647-7B-30	7B	30	6,848	NBCC	$248.23	$1,699,958	$424,990	$2,124,948

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Table 190 continued

ProjectID	Pressure Zone	Size	Length in Feet	Service Area	Cost per Foot	Construction Cost	Soft Costs*	Total Cost
6492-4A-16	4A	16	396	Deer Valley II	$142.40	$56,393	$14,098	$70,492
650-5E-24	5E	24	1,100	Desert View	$192.73		$0	
66-6A-36	6A	36	3,513	Desert View	$297.68	$1,045,872	$261,468	$1,307,339
6-6A-36	6A	36	5,526	Desert View	$297.68	$1,644,897	$411,224	$2,056,122
671-6A-24	6A	24	5,641	Desert View	$192.73	$1,087,190	$271,797	$1,358,987
672-6A-24	6A	24	6,125	Desert View	$192.73	$1,180,471	$295,118	$1,475,589
686-5ED-16	5ED	16	2,315	Deer Valley IV	$142.40	$329,630	$82,407	$412,037
6A-P-1F	6A	24	3,942	Desert View	$192.73	$759,742	$189,935	$949,677
6A-P-4F	6A	16	13,546	Desert View	$142.40	$1,928,890	$482,223	$2,411,113
6A-P-5F	6B	16	5,717	NBCC	$142.40	$814,101	$203,525	$1,017,626
6A-P-6F	6A	48	32,245	Desert View	$374.07	$12,061,887	$3,015,472	$15,077,359
6B-P-10F	6B	24	10,044	North Gateway	$192.73	$1,935,778	$483,944	$2,419,722
6B-P-11F	6B	72	14,809	NBCC	$636.89	$9,431,704	$2,357,926	$11,789,630
6B-P-12F	6B	60	143	North Gateway	$473.58	$67,724	$16,931	$84,655
6B-P-13F	8A	54	10,032	NBCC	$424.62	$4,259,788	$1,064,947	$5,324,735
6B-P-14F	6A	48	5,039	Desert View	$374.07	$1,884,788	$471,197	$2,355,985
6B-P-15F	6B	24	4,937	NBCC	$192.73	$951,508	$237,877	$1,189,385
6B-P-16F	6A	16	16,950	Desert View	$142.40	$2,413,680	$603,420	$3,017,100
6B-P-3F	6B	72	29,513	North Gateway	$636.89	$18,796,535	$4,699,134	$23,495,668
6B-P-4F	6A	54	153	North Gateway	$424.62	$65,035	$16,259	$81,293
6B-P-5F	6B	24	2,950	North Gateway	$192.73	$568,481	$142,120	$710,601
6B-P-7F	6B	16	9,625	North Gateway	$142.40	$1,370,615	$342,654	$1,713,269
6B-P-8F	6B	36	13,627	North Gateway	$297.68	$4,056,546	$1,014,136	$5,070,682
6B-P-9F	6B	20	3,717	North Gateway	$162.16	$602,695	$150,674	$753,369
7122-5E-48	5E	48	174		$374.07	$65,026	$16,256	$81,282
714-9A-16	9A	16	5,459	Desert View	$142.40	$777,349	$194,337	$971,686
7521-6A-24	6A	24	108	Desert View	$192.73	$20,722	$5,180	$25,902
7A-P-1F	7A	24	1,261	Desert View	$192.73	$243,010	$60,752	$303,762
7A-P-3F	7A	36	3,837	Desert View	$297.68	$1,142,198	$285,550	$1,427,748
7A-P-4F	7A	24	2,230	Desert View	$192.73	$429,788	$107,447	$537,235
7A-P-6F	7A	36	5,889	Desert View	$297.68	$1,753,038	$438,259	$2,191,297
7A-P-7F	7A	30	5,987	Desert View	$248.23	$1,486,153	$371,538	$1,857,691
7B-P-3F	7B	16	5,108	NBCC	$142.40	$727,379	$181,845	$909,224
802-7B-16	7B	16	848	NBCC	$142.40	$120,696	$30,174	$150,870
806-6A-24	6A	24	747	Desert View	$192.73	$143,963	$35,991	$179,954
810-5EB-16	5EB	16	1,056	Deer Valley I	$142.40	$150,319	$37,580	$187,899
836-6B-54	6B	54	144	NBCC	$424.62	$61,281	$15,320	$76,601
838-7B-30	7B	30	1,150	NBCC	$248.23	$285,466	$71,367	$356,833
866-6A-42	6A	42	6,015	Desert View	$337.12	$2,027,880	$506,970	$2,534,849
867-6A-48	6A	48	118	Desert View	$374.07	$44,146	$11,036	$55,182

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Table 190 continued

ProjectID	Pressure Zone	Size	Length in Feet	Service Area	Cost per Foot	Construction Cost	Soft Costs*	Total Cost
883-6A-42	6A	42	620	Desert View	$337.12	$209,039	$52,260	$261,299
88-6A-16	6A	16	179	Desert View	$142.40	$25,538	$6,384	$31,922
8A-P-1F	8A	48	53,743	Desert View	$374.07	$20,103,644	$5,025,911	$25,129,555
8A-P-2F	8A	30	6,461	Desert View	$248.23	$1,603,787	$400,947	$2,004,734
8A-P-5F	8A	36	7,211	Desert View	$297.68	$2,146,570	$536,643	$2,683,213
8A-P-9F	8A	24	13,729	Desert View	$192.73	$2,645,990	$661,498	$3,307,488
9097-6B-54	6B	54	1,414	NBCC	$424.62	$600,319	$150,080	$750,399
959-4A-16	4A	16	3,512	Deer Valley I	$142.40	$500,044	$125,011	$625,055
979-6B-16	6B	16	1,828	NBCC	$142.40	$260,274	$65,069	$325,343
9A-P-1F	9A	30	7,654	Desert View	$248.23	$1,899,952	$474,988	$2,374,941
9A-P-3F	9A	16	15,769	Desert View	$142.40	$2,245,506	$561,376	$2,806,882
9A-P-5F	9A	16	5,664	Desert View	$142.40	$806,554	$201,638	$1,008,192
Total Northern Area Water Mains								**$273,035,487**

Source: Unit costs from Table 185. Project costs have been rounded and may vary slightly from calculations made from this table.

Table 191. Southern Area Booster Station Facilities

Project ID	Project Description	Booster Stations (mgd)	Closest B&V Cost Estimate (mgd)	Construction Cost	Soft Costs*	Land Costs	Total Cost
1-B5F 1-6	Western Canal WTP, Dobbins Rd/15th Ave	51.7	60	$5,075,800	$1,268,950	$136,256	$6,481,006
Total Southern Area Booster Station Facilities				**$5,075,800**	**$1,268,950**	**$136,256**	**$6,481,006**

* Soft Costs include the costs of design and construction management.
Source: Unit costs from Table 185. Project costs have been rounded and may vary slightly from calculations made from this table.

Table 192. Southern Area PRV Facilities

Project ID	Project Description	PRVs (mgd)	Closest B&V Cost Estimate (mgd)	Construction Cost	Soft Costs*	Land Costs	Total Cost
OS-R8F	OS-R8F 43rd Ave & Estrella Dr.	9.9	10	$1,392,900	$348,225	$174,330	$1,915,455
Total Southern Area PRV Station Facilities				**$1,392,900**	**$348,225**	**$174,330**	**$1,915,455**

* Soft Costs include the costs of design and construction management.
Source: Unit costs from Table 185. Project costs have been rounded and may vary slightly from calculations made from this table.

Table 193. Southern Area Water Storage Facilities (Reservoirs)

Project ID	Project Description	Storage (MG)	Construction Cost	Soft Costs*	Land Costs	Total Cost
0S-ES1F	0S-ES1, Dobbins Rd/15th Ave	10	8130400	$2,032,600	$681,280	$10,844,280
2S-ES3	2S-ES3, 7th St./Mineral Road	10	$8,130,400	$2,032,600	$681,280	$10,844,280
Total Southern Area Storage Facilities			**$16,260,800**	**$4,065,200**	**$1,362,560**	**$21,688,560**

* Soft Costs include the costs of design and construction management.
Source: Unit costs from Table 185. Project costs have been rounded and may vary slightly from calculations made from this table.

Table 194. Southern Area Water Mains

ProjectID	Zone	Size	Length in Feet	Area	Constr per Ft.	Constr Cost	Soft Costs $	Total Cost $
0S-P-13F	0S	42	5,155	Estrella	$337.12	$1,737,854	$434,463	$2,172,317
0S-P-14F	0S	16	1,975	Laveen	$142.40	$281,287	$70,322	$351,609
0S-P-1F	0S	48	5,371	Laveen	$374.07	$2,009,315	$502,329	$2,511,644
0S-P-2F	0S	54	19,517	Laveen	$424.62	$8,287,472	$2,071,868	$10,359,339
0S-P-6F	0S	24	5,340	Laveen	$192.73	$1,029,206	$257,301	$1,286,507
0S-P-9F	0S	24	18,379	Estrella	$192.73	$3,542,108	$885,527	$4,427,635
12692-1-36	1	36	48	Laveen	$297.68	$14,288	$3,572	$17,861
13428-0B-16	0B	16	5,208	Estrella	$142.40	$741,557	$185,389	$926,946
13434-1-48	1	48	5,679	Estrella	$374.07	$2,124,260	$531,065	$2,655,325
13435-0B-16	0B	16	3,193	Estrella	$142.40	$454,715	$113,679	$568,394
13436-1-48	1	48	5,300	Estrella	$374.07	$1,982,614	$495,653	$2,478,267
13440-0S-16	0S	16	5,155	Laveen	$142.40	$734,083	$183,521	$917,604
13441-0S-16	0S	16	5,313	Laveen	$142.40	$756,571	$189,143	$945,714
1344-3SE-16	3SE	16	7,869	Ahwatukee	$142.40	$1,120,610	$280,152	$1,400,762
13447-0S-24	0S	24	5,138	Laveen	$192.73	$990,193	$247,548	$1,237,741
13456-0S-48	0S	48	5,399	Laveen	$374.07	$2,019,785	$504,946	$2,524,731
13457-0S-16	0S	16	5,279	Laveen	$142.40	$751,678	$187,919	$939,597
13458-0S-72	0S	72	59	Laveen	$636.89	$37,636	$9,409	$47,045
13462-1-48	1	48	5,363	Estrella	$374.07	$2,006,233	$501,558	$2,507,791
13475-0S-16	0S	16	5,315	Laveen	$142.40	$756,927	$189,232	$946,159
13479-1-24	1	24	5,252	Laveen	$192.73	$1,012,269	$253,067	$1,265,337
13481-1-48	1	48	8,521	Laveen	$374.07	$3,187,318	$796,829	$3,984,147
13482-1-24	1	24	1,760	Laveen	$192.73	$339,205	$84,801	$424,007
13493-1-24	1	24	3,320	Laveen	$192.73	$639,947	$159,987	$799,933
13534-2S-78		78	116	Laveen	$689.81	$79,862	$19,966	$99,828
13535-1-60	1	60	136	Laveen	$473.58	$64,560	$16,140	$80,700
13536-2S-78		78	97	Laveen	$689.81	$66,915	$16,729	$83,644
13537-1-60	1	60	97	Laveen	$473.58	$45,937	$11,484	$57,422
13538-2S-78		78	116	Laveen	$689.81	$79,807	$19,952	$99,759
13539-1-60	1	60	141	Laveen	$473.58	$66,992	$16,748	$83,740
13540-2S-78		78	173	Laveen	$689.81	$119,016	$29,754	$148,770
13541-1-60	1	60	190	Laveen	$473.58	$89,886	$22,472	$112,358
13542-2S-78		78	301	Laveen	$689.81	$207,672	$51,918	$259,591
13543-1-60	1	60	303	Laveen	$473.58	$143,659	$35,915	$179,574
13544-2S-78		78	407	Laveen	$689.81	$280,801	$70,200	$351,001
13545-1-60	1	60	425	Laveen	$473.58	$201,483	$50,371	$251,854
13655-0S-78	0S	78	32	Laveen	$689.81	$22,085	$5,521	$27,606
13656-0S-72	0S	72	79	Laveen	$636.89	$50,262	$12,565	$62,827
13657-0S-78	0S	78	155	Laveen	$689.81	$107,000	$26,750	$133,751

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Table 194 continued

ProjectID	Zone	Size	Length in Feet	Area	Constr per Ft.	Constr Cost	Soft Costs $	Total Cost $
13706-0S-16	0S	16	19,329	Laveen	$142.40	$2,752,495	$688,124	$3,440,619
13736-2S-24		24	38	Laveen	$192.73	$7,379	$1,845	$9,224
13747-3SE-16	3SE	16	187	Laveen	$142.40	$26,639	$6,660	$33,299
13770-3SE-16	3SE	16	48	Laveen	$142.40	$6,859	$1,715	$8,574
13771-0S-16	0S	16	45	Laveen	$142.40	$6,414	$1,604	$8,018
13785-0S-24	0S	24	5,229	Laveen	$192.73	$1,007,856	$251,964	$1,259,821
13786-0S-24	0S	24	111	Laveen	$192.73	$21,407	$5,352	$26,759
13787-1-24	1	24	2,756	Laveen	$192.73	$531,164	$132,791	$663,955
13793-1-30	1	30	202	Estrella	$248.23	$50,130	$12,533	$62,663
13794-1-16	1	16	1,409	Laveen	$142.40	$200,709	$50,177	$250,886
13795-1-24	1	24	5,323	Laveen	$192.73	$1,025,887	$256,472	$1,282,359
13811-1-54	1	54	8,595	Laveen	$424.62	$3,649,541	$912,385	$4,561,926
2140-3SE-24	3SE	24	116	Laveen	$192.73	$22,382	$5,596	$27,978
2497-1-36	1	36	155	Laveen	$297.68	$46,240	$11,560	$57,800
3357-0S-30	0S	30	2,611	Estrella	$248.23	$648,183	$162,046	$810,229
3479-0S-16	0S	16	2,397	Estrella	$142.40	$341,394	$85,349	$426,743
35-0S-24	0S	24	5,357	Estrella	$192.73	$1,032,503	$258,126	$1,290,629
424-0S-36	0S	36	10,580	Laveen	$297.68	$3,149,454	$787,364	$3,936,818
5123-0S-36	0S	36	101	Estrella	$297.68	$30,006	$7,502	$37,508
5237-3SE-24	3SE	24	1,092	Ahwatukee	$192.73	$210,446	$52,612	$263,058
583-0S-16	0S	16	3,502	Estrella	$142.40	$498,647	$124,662	$623,309
5883-2SE-48	2SE	48	13,077	Ahwatukee	$374.07	$4,891,802	$1,222,950	$6,114,752
5969-2S-36	2S	36	234	Laveen	$297.68	$69,643	$17,411	$87,054
6228-2S-78		78	144	Laveen	$689.81	$99,421	$24,855	$124,277
6234-1-48	1	48	5,113	Estrella	$374.07	$1,912,765	$478,191	$2,390,957
6340-3SE-24	3SE	24	192	Laveen	$192.73	$37,025	$9,256	$46,281
688-0S-36	0S	36	13,075	Estrella	$297.68	$3,892,166	$973,042	$4,865,208
701-0S-30	0S	30	5,203	SW Laveen	$248.23	$1,291,541	$322,885	$1,614,426
702-0S-24	0S	24	12,498	SW Laveen	$192.73	$2,408,740	$602,185	$3,010,924
703-0S-16	0S	16	5,406	SW Laveen	$142.40	$769,814	$192,454	$962,268
704-0S-42	0S	42	9,305	SW Laveen	$337.12	$3,136,902	$784,225	$3,921,127
705-0S-24	0S	24	1,401	SW Laveen	$192.73	$270,015	$67,504	$337,518
706-0S-24	0S	24	7,899	SW Laveen	$192.73	$1,522,374	$380,594	$1,902,968
7689-2S-36	2S	36	132	Laveen	$297.68	$39,310	$9,827	$49,137
967-0S-16	0S	16	36	Estrella	$142.40	$5,135	$1,284	$6,418
Total Southern Area Water Mains								**$92,244,327**

* Soft Costs include the costs of design and construction management.

Source: Unit costs from Table 185. Project costs have been rounded and may vary slightly from calculations made from this table.