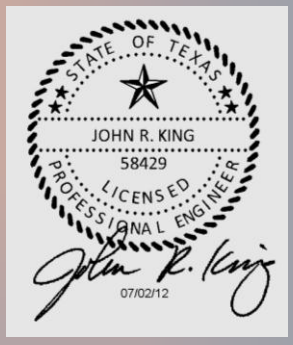
July
2012

Imagine Austin Comprehensive Plan

Infrastructure, Operations, Maintenance & Service Cost Comparison

Preferred Growth Scenario and Trend Growth Scenario



John R. King, P.E.
Chan & Partners Engineering, LLC
4319 James Casey Street, #300 * Austin, Texas 78745
TBPE Firm Registration No. F-13013
www.chanpartners.com

Table of Contents

Table of Contents (continued)

1.0 OVERVIEW AND FINDINGS

Austin and its extra-territorial jurisdiction (ETJ) are projected to add 750,000 new residents and 300,000 new jobs over the next 30 years. The vision generated by citizens for the Imagine Austin Comprehensive Plan is for this growth to occur in a more compact and connected manner. Directing new growth and development to more compact patterns is a fiscally sound policy. During the Imagine Austin planning process, general cost estimates for infrastructure and services determined that the costs of the alternative scenarios favored by the public were up to 15% less than the costs of the trend scenario, in which development occurs in lower density, more dispersed patterns. Past studies (e.g., by the Urban Land Institute) similarly indicate that it is less costly to provide public infrastructure and services to a more dense development within or contiguous to already developed areas (commonly referred to as "infill") than to development in undeveloped areas (commonly referred to as "greenfield" development or "sprawl").

The preferred growth scenario represents the recommended direction for the physical growth of Austin over the next three decades determined by citizen participants in the planning process. An analysis was subsequently conducted of the difference (or increment) in cost to the City of Austin to provide public infrastructure and services between the trend growth scenario (i.e., a continuation of current development trends) and the preferred growth scenario, based on order-of-magnitude cost estimates. This report presents the results of this analysis. (Please note that the preferred growth scenario has been refined and developed into the Growth Concept Map included in the Comprehensive Plan.)

The order-of-magnitude cost estimates were based primarily on the additional land that would be developed under the trend growth scenario, compared to the preferred growth scenario. The model assumes that over the next thirty years, approximately 19,000 additional acres (29.6 square miles) will be consumed by urban "greenfield" development in the trend growth scenario. The infrastructure cost estimates were based on recent Austin area infrastructure bid costs, and Austin Performance Measure budget costs were used to calculate operations, maintenance and service costs. Given the unknowns associated with determining planning level costs for future projects and services over a thirty-year planning period (without performing preliminary engineering or design), an estimated cost range was generated. The low end of the range assumes that the differential costs for the City of Austin to provide infrastructure, operations, maintenance and services between the trend and preferred growth scenarios will be much lower. Conversely, the high end of the range assumes that the differential in costs between the two scenarios will be much higher.

The preliminary estimates project the costs for the City of Austin of providing public infrastructure and services under the trend growth scenario to be between $4.8 billion and $21.5 billion higher than the preferred growth scenario over the thirty-year planning period. These results are summarized on Table 1-1. All costs related to the trend growth scenario represent an increase in cost over and above the cost of the preferred growth scenario, with the exception of regional transportation costs. The reason for this is that the preferred growth scenario includes a comprehensive transit network and associated infrastructure costs. The trend scenario includes a far less extensive transit network.

The actual degree to which the City of Austin would incur additional costs to provide infrastructure and services associated with the nearly 19,000 acres of additional land consumed in the trend growth scenario over the next 30 years depends upon many factors. The primary factors that influence the infrastructure and services cost ranges include:

- the degree to which private development pays for the initial infrastructure installation costs and provides right-of-way for the new infrastructure[1];
- the service lives of the new infrastructure and how often the City of Austin must repair/replace the infrastructure[2];
- the degree to which the City of Austin will incur infrastructure or service costs regardless of where the new population reside[3];
- the degree to which the City of Austin is able to realize operational efficiencies to provide additional services and maintenance to the trend growth population and infrastructure, by taking advantage of existing staffing and service infrastructure;
- the degree to which the more dispersed population under the trend growth scenario will demand its fair share of infrastructure, utilities and services;
- the degree to which the more dispersed development under the trend growth scenario will be connected to the central core of Austin and to the major transportation arteries (e.g., with rapid transit, corridors, light rail, etc.);
- the degree to which development under the trend growth scenario will be residential in nature[4].

[1] The cost estimates contained in this report assume that even if private development pays for initial installation/construction of new infrastructure, the City will take over ownership, operations and maintenance upon installation/construction of the infrastructure.

[2] This report assumes the new infrastructure is to be constructed where the high plasticity clays of East Austin will reduce the service lives of infrastructure.

[3] This report assumes that there will be no additional water/wastewater treatment costs, but that there will be additional water transmission and wastewater collection costs, associated with the trend growth scenario.

[4] This report assumes that development under the trend growth scenario will be primarily residential in nature with pockets of commercial development (town centers).

TABLE 1-1
Summary of Incremental Service, Capital, and Operations & Maintenance Costs
Associated with Trend Growth Scenario as Compared to the Preferred Growth Scenario Over the Next 30 years

				Cost Range (in 2011 dollars)	
Infrastructure	**Unit Cost Information**	**Units**	**Baseline Cost, Present Worth (PW, EOY2011)**	**Low**	**High**
Water Utilities					
Local Wastewater Collection Capital Improvements	$7,483,632/60 acres	18,944 acres	$2,362,832,077	$330,800,000	$2,362,900,000
Local Potable Water Distribution Capital Improvements	$7,734,675/60 acres	18,944 acres	$2,442,094,720	$341,900,000	$2,442,100,000
Local Reclaimed Water Distribution Capital Improvements	$11,382,450.00/60 acres	4 Town Centers x 60 acres/Town Center = 240 acres	$45,329,800	$12,800,000	$45,600,000
Potable Water Transmission Main Capital Improvements	$4,168,000/mile	20 miles	$83,360,000	$39,000,000	$182,200,000
Wastewater Interceptor Main Capital Improvements	$2,591,000/mile	15 miles	$38,865,000	$17,000,000	$53,000,000
Reclaimed Water Transmission Main Capital Improvements	$4,676,000/mile	22 miles	$102,872,000	$40,700,000	$145,700,000
Water Utility (Water, Wastewater, Reclaimed Water) Operations & Maintenance	$111/capita/year	248,500 residental growth over 30 years	$428,513,863	$156,900,000	$428,600,000
Transportation					
Local Street Capital Improvements	$12,042,237/60 acres	18,944 acres	$3,802,135,629	$106,500,000	$3,802,200,000
Corridor Capital Improvements	$14,887,047/mile	4 corridors x 10 miles/corridor =40 miles	$595,481,880	$222,600,000	$624,400,000
Commercial Street Capital Improvements	$1,500,000/block	4 Town Centers x 16 blocks/Town Center = 64 blocks	$96,000,000	$11,200,000	$96,000,000
Regional Hike & Bike Trail Capital Improvements	$1,780,000/mile	(82 miles/256,975 developed acres) x 18,944 acres = 6 miles	$10,680,000	$9,500,000	$21,500,000
Regional Transportation (Roadway & Rail)			($700,000,000)	($490,000,000)	($910,000,000)
Transportation Operations & Maintenance	$16/capita/year	248,500 residental growth over 30 years	$61,012,670	$18,000,000	$61,100,000
Public Works Operations & Maintenance	$51/capita/year	248,500 residental growth over 30 years	$196,057,129	$115,800,000	$196,100,000
Resource Recovery					
Austin Resource Recovery (Solid Waste) Operations, Maintenance & Capital Improvements	$89 to $130/resident/yr	248,500 residental growth over 30 years	$461,843,925	$139,900,000	$461,900,000
Watershed Protection					
Storm Water Detention Facilities Capital Improvements	$1,007,902/100 acres	18,944 acres	$190,936,955	$89,200,000	$235,200,000
Storm Water Quality Treatment Facilities Capital Improvements	$77,694/acre	18,944 acres	$1,471,835,136	$545,300,000	$1,900,100,000
Local Storm Drain Capital Improvements	$8,881,110/60 acres	18,944 acres	$2,804,062, 246	$392,600,000	$2,804,100,000
Stream Stabilization/Restoration Capital Improvements	$13,680,000/mile	9 miles	$123,120,000	$57,500,000	$123,200,000
Watershed Maintenance Facility	$7.5million/site	1 site	$7,500,000	$7,200,000	$11,000,000
Watershed Protection Operations & Maintenance	$35/capita/year	248,500 residental growth over 30 years	$134,004,470	$93,400,000	$134,100,000
Public Library					
Community Public Library Capital Improvements	$9,650,000/site	(1 community library/12.56 sqmi) x 18,944 acres x 1 sqmi/640 acres = 3 sites	$28,950,000	$19,300,000	$40,500,000
Public Library Operations & Maintenance	$31/capita/year	248,500 residental growth over 30 years	$118,212,049	$59,200,000	$118,300,000
Parks & Recreation					
Recreation/Aquatic/Gymnasium Center Capital Improvements	$34,500,000/site	(20 centers/256,975 developed acres) x 18,944 acres = 2 centers	$69,000,000	$32,400,000	$82,000,000
Parkland Acquisition	$300,000/acre	(24 acres/1,000 residents) x 248,500 residents = 5,964 acres	$1,789,200,000	$373,500,000	$2,982,000,000
Parks & Recreation Operations & Maintenance	$65/capita/yr	248,500 residental growth over 30 years	$250,329,132	$179,400,000	$250,400,000
Public Safety					
Fire/EMS Station Capital Improvements	$9,650,000/site	(43 fire sta/256,975 developed acres) x 18,944 acres = 4 stations	$38,600,000	$19,300,000	$54,000,000
Police Substation Capital Improvements	$9,650,000/site	(1 substation/87 sqmi) x 18,944 acres x 1 sqmi/640 acres = 1 substation	$9,650,000	$9,700,000	$13,500,000
Austin Fire/EMS Operations & Support	$214/capita/year	248,500 residental growth over 30 years	$824,749,557	$685,600,000	$824,800,000
Austin Police Operations & Support	$292/capita/year	248,500 residental growth over 30 years	$1,125,884,063	$739,000,000	$1,125,900,000
Electric Utilities					
Austin Energy (Residential) Operations & Maintenance	$408/yr/residential customer	118,334 homes over 30 years	$748,344,216	$498,900,000	$748,400,000
			$16,957,394,271	**$4,874,100,000**	**$21,460,800,000**

2.0 GENERAL ASSUMPTIONS

2.1 Primary Assumptions

All costs presented in this report, related to the trend growth scenario, represent the estimated incremental increase in infrastructure, utilities and service costs over and above the costs associated with the preferred growth scenario. The actual degree to which the City of Austin would incur additional costs to provide infrastructure and services associated with the nearly 19,000 acres of additional "greenfield" land consumed in the trend growth scenario over the next thirty years (see Section 2.2 for discussion of acreage calculations) depends upon many assumptions. The primary assumptions used to calculate the infrastructure and services cost ranges include:

- Most of the additional land consumed by the trend growth scenario as "greenfield" development is assumed to be concentrated in the eastern sector of Austin, east of Interstate Highway 35.
- Even if private development pays for the initial installation costs of infrastructure and provides right-of-way for construction of new local infrastructure (wastewater collection, potable and reclaimed water distribution, streets, storm water conveyance), the City will reimburse private development for the infrastructure improvements within the public rights-of-ways and easements and will assume ownership, operations and maintenance upon installation/construction of the new infrastructure.
- The City will fund and construct the major infrastructure improvements: water transmission mains, wastewater interceptor mains, corridor improvements, commercial street improvements, regional hike & bike trails, regional transportation systems, resource recovery facilities, stream channel stabilization, maintenance facilities, libraries, recreation centers, parkland acquisition, Fire/EMS stations, police substations, electric power facilities.
- No land acquisition is required for infrastructure and utility improvements, as it is assumed that private development provides rights-of-ways and easements for local utility and street construction and that major utilities (such as water utility mains) are constructed within existing rights-of-ways and easements. Land acquisition costs are included in the costs for maintenance facilities, libraries, recreation centers, parkland acquisition, Fire/EMS stations, and police substations.
- The high plasticity clays of East Austin, where additional "greenfield" land consumed by the trend growth scenario development is assumed to be concentrated, will reduce the service lives of streets and buried utility conduits and will increase the frequency at which the streets and buried utility conduits are replaced or reconstructed.
- There will be no additional water or wastewater treatment costs associated with the trend growth scenario development; however, due to the assumed dispersed nature of the trend growth scenario development, new water transmission mains and wastewater interceptor mains will be constructed to provide water and wastewater services to the trend growth scenario development.
- The City will realize varying degrees of efficiencies in providing services to the trend growth scenario development to reduce the costs of duplication of services. However, the City will provide the same levels of service to the trend growth scenario population that it provides to the preferred growth scenario population.
- The trend growth scenario population will be connected to the central core of Austin and to the major transportation arteries to the same degree the preferred growth scenario population is connected to the central core of Austin and to the major transportation arteries.
- The trend growth scenario population is assumed to be single-family residential. Trend growth scenario commercial development is assumed to be concentrated within Town Centers.

- Growth in population, area of development and residences is assumed to be linear over the 30-year study period.
- Revenues (e.g. taxes, fees, grants) generated by the trend growth scenario and by the preferred growth scenario are not assessed in this report.
- All costs in this report are in terms of costs to the City of Austin and are given in 2011 dollars. Costs to other governmental entities (e.g. Austin I.S.D.) and to private utility providers (e.g. telecommunications and gas) are not assessed in this report. No allowances are made for inflation.

2.2 Acreage and Population

Wallace, Roberts & Todd, LLC (WRT) modeled the trend growth and the preferred growth scenarios over the 30-year study period, with the following results with respect to area of development and population increase.

Trend Growth Scenario:

161 square miles of total development with 54% infill and 46% greenfield development
- 86.94 square miles of infill development
- 74.06 square miles of greenfield development

750,000 population increase
- 295,500 infill development population increase
- 454,500 greenfield development population increase

Preferred Growth Scenario:

117 square miles of total development with 62% infill and 38% greenfield development
- 72.54 square miles of infill development
- 44.46 square miles of greenfield development

750,000 population increase
- 544,000 infill development population increase
- 206,000 greenfield development increase.

Based upon the results of the WRT modeling, the trend growth scenario, in comparison to the preferred growth scenario, has the following significant characteristics:

- has 44 square miles (28,160 acres) more of total developed area,
- has 14.4 square miles (9,216 acres) more of infill development,
- has 29.6 square miles (18,944 acres) more of greenfield development,
- has the same total population growth over the next 30 years (750,000) but has 248,500 greater population increase living within the greenfield development.

For cost estimation purposes of this report, it is assumed that the 30-year cost of providing infrastructure, utilities and services for the infill development of the trend growth scenario is approximately the same cost to provide infrastructure, utilities and services for the infill development of the preferred growth scenario. Therefore, the additional infrastructure, utilities and service costs for the trend growth scenario, over and above the costs for the preferred growth scenario, are assumed to be the costs to provide infrastructure, utilities and services for the trend growth scenario's **18,944 acres and 248,500 population** of the additional greenfield development.

2.3 Residential Housing

The number of residential homes associated with the additional 18,944 acres of greenfield development of the trend growth scenario was calculated to be **118,334 homes** based upon an assumed residential population density of 2.1 persons per residence.

2.4 Town Centers

WRT modeling of the trend growth and preferred growth scenarios determined that the trend growth scenario will likely result in four (4) more Town Centers than associated with the preferred growth scenario. The Town Centers associated with the trend growth scenario are shown on the Trend Growth Map, and the Town Centers associated with the preferred growth scenario are shown on Growth Concept Map of the Imagine Austin Comprehensive Plan. The trend growth Town Centers located on Springdale Road, between U.S. Highway 183 and Yager Lane, and on Dessau Road, between Yager Lane and East Dessau Road, were used as the centers of trend growth greenfield development for the purpose of water utility main development cost estimates (discussed in Section 3).

2.5 Operations, Maintenance & Support Services

The annual costs to provide public utilities and services for the additional trend growth greenfield development area were derived from the annual City of Austin departmental budgets as presented in the Austin Performance Measures Database. Only the budget categories considered applicable to providing operations, maintenance and support services for the trend growth development area were considered for trend growth cost estimation purposes.

2.6 Baseline Costs and Cost Ranges

The costs to provide public infrastructure, utilities and services for the additional trend growth greenfield development area are presented in Section 3 of this report in terms of baseline costs and cost ranges. The baseline cost represent the average un-factored cost to provide infrastructure, utilities and services for the additional 18,944 acres of trend growth Greenfield development and are simply the product of multiplying the unit cost of development (e.g. cost per acre or cost per person) times the number of units of development (e.g. number of additional acres or total population increase). The cost ranges represent adjustments to the baseline costs to factor uncertainties in cost projections over 30 years.

3.0 PUBLIC INFRASTRUCTURE AND SERVICE COST ESTIMATES

3.1 Water Utility Costs

Local Wastewater Collection

A 4-block by 4-block grid of residential development of approximate area of 60 acres was assumed as the basis for calculation of local wastewater collection capital improvements for the trend growth scenario (see Exhibit A.1, Appendix A). A general wastewater collection system layout was prepared with wastewater piping, manholes and residential service connections. Based upon the layout of Exhibit A.1, a conceptual opinion of probable construction cost was prepared using recent City of Austin bid prices (see Table B.1, Appendix B). A 25% construction cost contingency and a 50% non-construction cost factor (for City management, engineering, surveys, inspections, fees, legal, etc.) were applied to the construction cost, resulting in a baseline unit cost of $7,483,632 per 60 acres and $2,362,832,077 total cost for 18,944 acres for local wastewater collection improvements for the trend growth scenario (see Table B.1, Appendix B).

To calculate the potential range in costs of local wastewater collection capital improvements for trend growth development, the following cost range factors were applied to the baseline costs:

1. Range in City participation in funding initial wastewater improvements: 25% to 100% of baseline construction cost.
2. Range in construction contingencies: 25% to 50% of baseline construction cost.
3. Range in non-construction costs: 40% to 50% of baseline construction cost (after construction contingencies applied).
4. Range in area of additional trend growth greenfield development: 50% to 100% of 18,944 acres.

The following local wastewater collection capital improvements cost ranges for the trend growth scenario resulted from the application of the cost range factors summarized above:

Construction cost range:	$997,818 to $3,991,290
Contingences cost range:	$498,909 to $997,818
Non-construction cost range:	$598,691 to $2,494,514
Unit Cost Range/60 acres:	$2,095,417 to $7,483,601
Range in area:	9,472 acres to 18,944 acres
Total Cost Range:	$330,796,458 to $2,362,832,077

Table 1-1 summarizes the local wastewater collection capital improvement baseline costs and cost ranges associated with the trend growth scenario.

Local Potable Water Distribution

A 4-block by 4-block grid of residential development of approximate area of 60 acres was assumed as the basis for calculation of local potable water distribution capital improvements for the trend growth scenario (see Exhibit A.2, Appendix A). A general water distribution system layout was prepared with water system piping, valves and residential service connections. Based upon the layout of Exhibit A.2, a

conceptual opinion of probable construction cost was prepared using recent City of Austin bid prices (see Table B.2, Appendix B). A 25% construction cost contingency and a 50% non-construction cost factor (for City management, engineering, surveys, inspections, fees, legal, etc.) were applied to the construction cost, resulting in a baseline unit cost of $7,734,675 per 60 acres and $2,442,094,720 total cost for 18,944 acres for local potable water distribution improvements for the trend growth scenario (see Table B.2, Appendix B).

To calculate the potential range in costs of local potable water distribution capital improvements for the trend growth scenario, the following cost range factors were applied to the baseline costs:

1. Range in City participation in funding initial local potable water distribution improvements: 25% to 100% of baseline construction cost.
2. Range in construction contingencies: 25% to 50% of baseline construction cost.
3. Range in non-construction costs: 40% to 50% of baseline construction cost (after construction contingencies applied).
4. Range in area of additional trend growth greenfield development: 50% to 100% of 18,944 acres.

The following local potable water distribution capital improvements cost ranges for the trend growth scenario resulted from the application of the cost range factors summarized above:

Construction cost range:	$1,031,290 to $4,125,160
Contingences cost range:	$515,645 to $1,031,290
Non-construction cost range:	$618,774 to $2,578,225
Unit Cost Range/60 acres:	$2,165,709 to $7,734,675
Range in area:	9,472 acres to 18,944 acres
Total Cost Range:	$341,893,261 to $2,442,094,720

Table 1-1 summarizes the local potable water distribution capital improvement baseline costs and cost ranges associated with the trend growth scenario.

Local Reclaimed Water Distribution

A 4-block by 4-block grid of Town Center commercial development of approximate area of 60 acres was assumed as the basis for calculation of local reclaimed water distribution capital improvements for the trend growth scenario (see Exhibit A.3, Appendix A). A general reclaimed water distribution system layout was prepared with reclaimed water system piping, valves and commercial service connections. Based upon the layout of Exhibit A.3, a conceptual opinion of probable construction cost was prepared using recent City of Austin bid prices (see Table B.3, Appendix B). A 25% construction cost contingency and a 50% non-construction cost factor (for City management, engineering, surveys, inspections, fees, legal, etc.) were applied to the construction cost, resulting in a baseline unit cost of $11,382,450 per 60-acre Town Center and $45,329,800 total cost for four (4) Town Centers for local reclaimed water distribution improvements for the trend growth scenario (see Table B.3, Appendix B).

To calculate the potential range in costs of local reclaimed water distribution capital improvements for the trend growth scenario, the following cost range factors were applied to the baseline costs:

1. Range in City participation in funding initial local reclaimed water distribution improvements: 50% to 100% of baseline construction cost.
2. Range in construction contingencies: 25% to 50% of baseline construction cost.
3. Range in non-construction costs: 40% to 50% of baseline construction cost (after construction contingencies applied).
4. Range in area of additional trend growth greenfield development: 50% to 100% of 4 Town Centers (240 acres).

The following local reclaimed water distribution capital improvements cost ranges for the trend growth scenario resulted from the application of the cost range factors summarized above:

Construction cost range:	$3,035,320 to $6,070,640
Contingences cost range:	$1,517,660 to $1,517,660
Non-construction cost range:	$1,821,192 to $3,794,150
Unit Cost Range/60 acres:	$6,374,172 to $11,382,450
Range in area:	120 acres to 240 acres (2 to 4 Town Centers)
Total Cost Range:	$12,748,344 to $45,529,800

Table 1-1 summarizes the local reclaimed water distribution capital improvement baseline costs and cost ranges associated with the trend growth scenario.

Potable Water Transmission Main

For the trend growth scenario cost estimation purposes, a 20-mile new potable water transmission main was assumed to be routed from the existing water transmission main at F.M. 969 and north along U.S. 183, Springdale Road, Cameron Road, Yager Lane, and Dessau Road to the two Town Center locations identified in Section 2.4 (see Exhibit A.5 for the routing map of the new potable water transmission main for construction cost calculation purposes). The average of the three lowest bid prices for the "Anderson Mill/RR620 Transmission Main NW Zone C 36" was used to calculate a potable water transmission main construction cost of $2,778,603 per mile. A 50% non-construction cost factor (for City management, engineering, surveys, inspections, fees, legal, etc.) was applied to the construction cost, resulting in a baseline unit cost of $4,167,904 per mile and $83,360,000 total cost for 20 miles of potable water transmission main improvements for the trend growth scenario.

To calculate the potential range in costs of potable water transmission main capital improvements for the trend growth scenario, the following cost range factors were applied to the baseline costs:

1. Range in maximum transmission main pipe size: 36" to 60" diameter pipe.
2. Range in non-construction costs: 40% to 50% of baseline construction cost (after construction contingencies applied).
3. Range in pipe length: 10 miles to 30 miles.

The following potable water transmission main capital improvements cost ranges for the trend growth scenario resulted from the application of the cost range factors summarized above:

Pipe size cost range:	$2,778,602 to $4,048,195
Non-construction cost range:	$1,111,442 to $2,024,097
Unit Cost Range/mile:	$3,890,044 to $6,072,292
Range in pipe length:	10 miles to 30 miles
Total Cost Range:	$38,900,400 to $182,168,741

Table 1-1 summarizes the potable water transmission main capital improvement baseline costs and cost ranges associated with the trend growth scenario.

Wastewater Interceptor Main

For the trend growth scenario cost estimation purposes, a 15-mile new wastewater interceptor main was assumed to be routed from the existing wastewater interceptor main at U.S. 290 and north along Springdale Road, Cameron Road, Yager Lane, and Dessau Road to the two Town Center locations identified in Section 2.4 (see Exhibit A.6 for the routing map of the new wastewater interceptor main for construction cost calculation purposes). The average of the three lowest bid prices for the "Wildhorse Ranch NW Interceptor Phase 2" was used to calculate a wastewater interceptor main construction cost of $1,726,905 per mile. A 50% non-construction cost factor (for City management, engineering, surveys, inspections, fees, legal, etc.) was applied to the construction cost, resulting in a baseline unit cost of $2,590,357 per mile and $38,855,354 total cost for 15 miles of wastewater interceptor main improvements for the trend growth scenario.

To calculate the potential range in costs of wastewater interceptor main capital improvements for the trend growth scenario, the following cost range factors were applied to the baseline costs:

1. Range in maximum transmission main pipe size: 24" to 36".
2. Range in non-construction costs: 40% to 50% of baseline construction cost (after construction contingencies applied).
3. Range in pipe length: 7 miles to 17 miles.

The following wastewater interceptor main capital improvements cost ranges for the trend growth scenario resulted from the application of the cost range factors summarized above:

Pipe size cost range:	$1,726,905 to $2,076,969
Non-construction cost range:	$690.762 to $1,038,484
Unit Cost Range/mile:	$2,417,667 to 3,115,453
Range in pipe length:	7 miles to 17 miles
Total Cost Range:	$16,923,984 to $52,962,888

Table 1-1 summarizes the wastewater interceptor main capital improvement baseline costs and cost ranges associated with the trend growth scenario.

Reclaimed Water Transmission Main

For the trend growth scenario cost estimation purposes, a 22-mile new reclaimed water transmission main was assumed to be routed from the Walnut Creek Wastewater Treatment Plant at F.M. 969 and north along F.M. 969, U.S. 183, Springdale Road, Cameron Road, Yager Lane, and Dessau Road to the two Town Center locations identified in Section 2.4 (see Exhibit A.7 for the routing map of the new reclaimed water transmission main for construction cost calculation purposes). The average of the three lowest bid prices for the "Main to Montopolis Reclaimed Water Main" was used to calculate a reclaimed water transmission main construction cost of $3,116,800 per mile. A 50% non-construction cost factor (for City management, engineering, surveys, inspections, fees, legal, etc.) was applied to the construction cost, resulting in a baseline unit cost of $4,676,000 per mile and $102,872,000 total cost for 22 miles of reclaimed water transmission main improvements for the trend growth scenario.

To calculate the potential range in costs of reclaimed water transmission main capital improvements for the trend growth scenario, the following cost range factors were applied to the baseline costs:

1. Range in maximum transmission main pipe size: 16" to 30" diameter pipe.
2. Range in non-construction costs: 40% to 50% of baseline construction cost (after construction contingencies applied).
3. Range in pipe length: 10 miles to 30 miles.

The following reclaimed water transmission main capital improvements cost ranges for the trend growth scenario resulted from the application of the cost range factors summarized above:

Pipe size cost range:	$2,857,265 to $3,189,876
Non-construction cost range:	$1,142,906 to $1,594,938
Unit Cost Range/mile:	$4,000,171 to $4,784,814
Range in pipe length:	10 miles to 30 miles
Total Cost Range:	$46,601,835 to $145,698,427

Table 1-1 summarizes the reclaimed water transmission main capital improvement baseline costs and cost ranges associated with the trend growth scenario.

Water Utility Operations & Maintenance

The Austin Water Utility annual operations and maintenance budget costs were used to calculate the cost range of total annual operations and maintenance costs to provide water utility services to the trend growth greenfield development area. Table C.1, Appendix C, provides a summary of the estimated $93,449,288 annual operations and maintenance costs at 100% budget level for the Austin Water Utility activities considered applicable to providing water utility services to the trend growth greenfield development area. Table C.1 also provides a summary of the estimated $34,206,538 lower range of annual operations and maintenance costs for the Austin Water Utility activities considered applicable to providing water utility services to the trend growth greenfield development area.

The 100% budget level and the lower range budget level annual operations and maintenance costs were pro-rated over the current City of Austin population of approximately 840,000 to result in a range of water utility operations and maintenance unit costs of $40.72 to $111.25 per capita per year (see Table

C.1). These two per-capita unit costs were applied on an annual basis to a straight-line projection of the trend growth population increase of 248,500 people over the 30-year study period, resulting in a $156,845,703 to $428,513,863 range in total cost of water utility operations and maintenance associated with the trend growth scenario (see Table C.2, Appendix C).

Table 1-1 summarizes the water utility operations and maintenance baseline costs and cost ranges associated with the trend growth scenario.

3.2 Transportation Costs

Local Streets

A 4-block by 4-block grid of residential development of approximate area of 60 acres was assumed as the basis for calculation of local street capital improvements for the trend growth scenario (see Exhibit A.4, Appendix A). A general local street construction layout was prepared with pavement, curb & gutter, sidewalks, curb ramps, and driveways. Based upon the layout of Exhibit A.4, a conceptual opinion of probable construction cost was prepared using recent City of Austin bid prices (see Table B.4, Appendix B). A 25% construction cost contingency and a 50% non-construction cost factor (for City management, engineering, surveys, inspections, fees, legal, etc.) were applied to the construction cost, resulting in a baseline unit cost of $12,042,237 per 60 acres and $3,802,135,569 total cost for 18,944 acres for local street improvements for the trend growth scenario (see Table B.4, Appendix B).

To calculate the potential range in costs of local street capital improvements for the trend growth scenario, the following cost range factors were applied to the baseline costs:

1. Range in City participation in funding initial local street improvements: 50% to 100% of baseline construction cost.
2. Range in construction contingencies: 25% to 50% of baseline construction cost.
3. Range in non-construction costs: 40% to 50% of baseline construction cost (after construction contingencies applied).
4. Range in area of trend growth greenfield development: 50% to 100% of 18,944 acres.

The following local street capital improvements cost ranges for the trend growth scenario resulted from the application of the cost range factors summarized above:

Construction cost range:	$3,211,263 to $6,422,526
Contingences cost:	$1,605,632
Non-construction cost range:	$1,926,758 to $4,014,079
Unit Cost Range/60 acres:	$6,743,653 to $12,042,237
Range in area:	9,472 acres to 18,944 acres
Total Cost Range:	$106,459,797 to $3,802,135,569

Table 1-1 summarizes the local street capital improvement baseline costs and cost ranges associated with the trend growth scenario.

Corridors

For the trend growth scenario cost estimation purposes, four 10-mile corridors were assumed to be constructed to connect the four additional Town Centers of greenfield development to the transportation corridors of Central Austin. The average of the three lowest bid prices for the "East 7th Street Improvements, Navasota to Northwestern" and "East 7th Street Improvements, Northwestern to Pleasant Valley" was used to calculate a corridor construction cost of $10,102,161 per mile. A 50% non-construction cost factor (for City management, engineering, surveys, inspections, fees, legal, etc.) was applied to the construction cost, resulting in a baseline unit cost of $14,887,047 per mile and $595,481,880 total cost for 40 miles of corridor construction for the trend growth scenario.

To calculate the potential range in costs of corridor capital improvements for the trend growth scenario, the following cost range factors were applied to the baseline costs:

1. Range in inclusion of water utility upgrades along corridor: 0% to 100%.
2. Range in non-construction costs: 40% to 50% of baseline construction cost (after construction contingencies applied).
3. Range in corridor length: 20 miles to 40 miles.

The following corridor capital improvements cost ranges for the trend growth scenario resulted from the application of the cost range factors summarized above:

Water utility cost range:	$7,947,382 to $10,405,226
Non-construction cost range:	$3,178,953 to $5,202,614
Unit Cost Range/mile:	$11,126,336 to $15,607,840
Range in corridor length:	20 miles to 40 miles
Total Cost Range:	$222,526,720 to $624,313,600

Table 1-1 summarizes the corridor capital improvement baseline costs and cost ranges associated with the trend growth scenario.

Commercial Streets

Four Town Centers (64 blocks) of commercial streets were assumed as the basis for calculation of commercial street capital improvements for the trend growth scenario. The City of Austin Great Streets Project manager reported that construction costs for commercial street reconstruction are averaging about $1 million per block. A 50% non-construction cost factor (for City management, engineering, surveys, inspections, fees, legal, etc.) was applied to the construction cost, resulting in a baseline unit cost of $1,500,000 per block and $96,000,000 total cost for 64 blocks (4 Town Centers) of commercial street improvements for the trend growth scenario.

To calculate the potential range in costs of commercial street capital improvements for the trend growth scenario, the following cost range factors were applied to the baseline cost:

1. Range in City participation in construction of commercial street improvements: 25% to 100%.
2. Range in non-construction costs: 40% to 50% of baseline construction cost (after construction contingencies applied).

3. Range in commercial street improvements: 32 blocks to 64 blocks.

The following commercial street capital improvements cost ranges for the trend growth scenario resulted from the application of the cost range factors summarized above:

City construction participation cost range:	$250,000 to $1,000,000
Non-construction cost range:	$100,000 to $500,000
Unit Cost Range/block:	$350,000 to $1,500,000
Range in commercial street length:	32 blocks to 64 blocks
Total Cost Range:	$11,200,000 to 96,000,000

Table 1-1 summarizes the commercial street capital improvement baseline costs and cost ranges associated with the trend growth scenario.

Regional Hike & Bike Trails

The City of Austin currently has approximately 82 miles of hike & bike trails in its September of 2011 inventory serving a developed area of 256,975 acres. This provides a current "hike & bike trail density" of .0003191 miles of hike & bike trails per acre of developed area. For trend growth scenario cost estimation purposes, 18,944 acres of trend growth greenfield development would require 6 miles of hike & bike trails at the current "hike & bike trail density" of .0003191 miles of hike & bike trail per acre of developed area. The average of the three lowest bid prices for the "Southern Walnut Creek Hike and Bike Trail" was used to calculate a regional hike & bike construction cost of $1,186,518 per mile. A 50% non-construction cost factor (for City management, engineering, surveys, inspections, fees, legal, etc.) was applied to the construction cost, resulting in a baseline unit cost of $1,780,000 per mile and $10,680,000 total cost for 6 miles of regional hike & bike trail construction for the trend growth scenario.

To calculate the potential range in costs of regional hike & bike trail capital improvements for the trend growth scenario, the following cost range factors were applied to the baseline costs:

1. Range in inclusion of creek channel stabilization measures along the hike & bike trail: 0% to 100%.
2. Range in non-construction costs: 40% to 50% of baseline construction cost (after construction contingencies applied).
3. Range in hike & bike trail length: 6 miles to 12 miles.

The following regional hike & bike trail capital improvements cost ranges for the trend growth scenario resulted from the application of the cost range factors summarized above:

Channel stabilization cost range:	$1,129,230 to $1,192,451
Non-construction cost range:	$451,692 to $596,225
Unit Cost Range/mile:	$1,580,922 to $1,788,676
Range in trail length:	6 miles to 12 miles

Total Cost Range: $9,485,530 to $21,464,108

Table 1-1 summarizes the regional hike & bike trail capital improvement baseline costs and cost ranges associated with the trend growth scenario.

Regional Transportation

The following regional rail and roadway unit cost information was provided by Kimley-Horn & Associates and WRT:

Urban Rail	$40 million/mile
Commuter Rail	$20 million/mile
Roadway	$6 million/mile

Total Cost Range: -$490,000,000 to -$910,000,000

The regional roadway, urban rail, and commuter rail costs were calculated by Kimley-Horn & Associates as part of the Imagine Austin scenario modeling process. For each of the transportation scenarios an order of magnitude cost estimate (for general planning purposes) was generated based on the projected infrastructure expenditure expected in each of the different alternatives. Roadway and transit improvements costs were generated at the study area level (City and ETJ) level to compare the differences between the planning scenarios.

The estimated regional transportation costs for the trend growth and preferred growth scenarios are included in this analysis. The roadway costs were adapted from the CAMPO 2035 Plan Priority Project List from the 2035 Regional Transportation Plan (RTP). Each line item in the priority project list has a YOE (year of expenditure) cost associated with the planned project. For the transportation scenario process, only the projects in the RTP that are within the City of Austin limits and ETJ were included in the cost projections. The projects that are funded in this category include: new freeways; new arterials; expanded freeways; expanded arterials; interchanges/overpasses; and managed lanes.

For transit cost estimation purposes, only the costs for urban rail (i.e., light rail) and commuter rail were projected. These costs were developed using the Central Austin Transit Study and the Austin Strategic Mobility Plan estimates. Typical price numbers for urban rail ($40 million/mile) and commuter ($20 million/mile) were used to determine the regional rail transit costs. This type of per-mile estimate is for planning purposes only and is not based on site specific estimates of construction quantities. The cost estimates include rolling stock (e.g., railroad cars) as well as soft costs such as engineering, administration, and approval. Additional capital expenditure costs for related inspection and maintenance facilities to service the rail lines are not included.

The total costs for regional transportation represent a decrease in cost for the trend growth scenario, as compared to the preferred growth scenario. The reason for this is that the preferred growth scenario includes a comprehensive transit network and associated infrastructure costs. The trend growth scenario includes a far less extensive transit network. Unit costs for urban and commuter rail are significantly higher than typical roadway costs per mile.

Transportation Operations & Maintenance

The Austin Transportation Department annual operations and maintenance budget costs were used to calculate the cost range of total annual operations and maintenance costs to provide transportation services to the trend growth greenfield development area. Table C.3, Appendix C, provides a summary of the estimated $13,301,850 annual operations and maintenance costs at 100% budget level for the Austin Transportation activities considered applicable to providing transportation services to the trend growth greenfield development area. Table C.3 also provides a summary of the estimated $3,926,584 lower range of annual operations and maintenance costs for the Austin Transportation activities considered applicable to providing transportation services to the trend growth greenfield development area.

The 100% budget level and the lower range budget level for annual operations and maintenance costs were pro-rated over the current City of Austin population of approximately 840,000 to result in a range of transportation operations and maintenance unit costs of $4.67 to $15.84 per capita per year (see Table C.3). These two per-capita unit costs were applied on an annual basis to a straight-line projection of the trend growth population increase of 248,500 people over the 30-year study period, resulting in a $17,987,953 to $61,012,670 range in total cost of transportation operations and maintenance associated with the trend growth scenario (see Table C.4, Appendix C).

Table 1-1 summarizes the transportation operations and maintenance baseline costs and cost ranges associated with the trend growth scenario.

Public Works Operations & Maintenance

The Austin Public Works Department annual operations and maintenance budget costs were used to calculate the cost range of total annual operations and maintenance costs to provide engineering, project management, and maintenance services to the trend growth greenfield development area. Table C.5, Appendix C, provides a summary of the estimated $42,754,800 annual operations and maintenance costs at 100% budget level for the Austin Public Works Department activities considered applicable to providing engineering, project management, and maintenance services to the trend growth greenfield development area. Table C.5 also provides a summary of the estimated $25,242,296 lower range of annual engineering, project management, and maintenance costs for the Austin Public Works Department activities considered applicable to providing engineering, project management, and maintenance services to the trend growth greenfield development area.

The 100% budget level and the lower range budget level annual operations and maintenance costs were pro-rated over the current City of Austin population of approximately 840,000 to result in a range of engineering, project management, and maintenance unit costs of $30.05 to $50.90 per capita per year (see Table C.5). These two per-capita unit costs were applied on an annual basis to a straight-line projection of the trend growth population increase of 248,500 people over the 30-year study period, resulting in a $115,746,891 to $196,057,129 range in total cost of engineering, project management, and maintenance associated with the trend growth scenario (see Table C.6, Appendix C).

Table 1-1 summarizes the public works engineering, project management, and maintenance baseline costs and cost ranges associated with the trend growth scenario.

3.3 Resource Recovery Costs

Austin Resource Recovery Operations & Maintenance

The City of Austin's "Austin Resource Recovery Master Plan, Austin's Roadmap Toward Zero Waste" was used to calculate program, operations and maintenance costs to provide resource recovery services to the trend growth greenfield development area. The Zero Waste Master Plan provides estimated program costs for an eight-year period, FY2013 through FY2020, for new programs, programs covered by the anti-litter fee, and programs covered by cart fees. Table C.7, Appendix C, provides calculations of per-capita resource recovery costs for those eight years of program cost data, resulting in per-capita costs ranging from $88.73 to $110.27. Table C.9, Appendix C, applies the Zero Waste Master Plan per-capita cost, with a cost escalation of $1/year to provide a per-capita cost range of $89 to $130, to a straight-line projection of the trend growth population increase of 248,500 people over the 30-year study period. A total cost of $461,843,925 was calculated to provide Zero Waste resource recovery services to the trend growth greenfield development area; this cost was considered as the upper range of the cost to provide resource recovery services to the trend growth greenfield development area.

The Austin Resource Recovery annual operations and maintenance budget costs were used to calculate the lower cost range of total program, operations and maintenance costs to provide resource recovery services to the trend growth greenfield development area. Table C.8, Appendix C, provides a summary of the estimated $52,478,496 annual operations and maintenance costs at 100% budget level for the Austin Resource Recovery activities considered applicable to providing resource recovery services to the trend growth greenfield development area. Table C.8 also provides a summary of the estimated $30,498,835 lower range of annual operations and maintenance costs for the Austin Resource Recovery activities considered applicable to providing resource recovery services to the trend growth greenfield development area.

The 100% budget level and the lower range budget level annual operations and maintenance costs were pro-rated over the current City of Austin population of approximately 840,000 to result in a range of resource recovery program, operations and maintenance unit costs of $36.31 to $62.47 per capita per year (see Table C.8). These two per-capita unit costs were applied on an annual basis to a straight-line projection of the trend growth population increase of 248,500 people over the 30-year study period, resulting in a $139,859,221 to $240,622,571 range in total cost of resource recovery services associated with the trend growth scenario (see Table C.9, Appendix C).

Table 1-1 summarizes the resource recovery program, operation and maintenance baseline costs and cost ranges associated with the trend growth scenario.

3.4 Watershed Protection Costs

Storm Water Detention Facilities

The City of Austin Regional Stormwater Management Program (RSMP) cost calculator was used to calculate an approximate cost of storm water detention capital improvements for the trend growth scenario. The RSMP cost calculator resulted in a storm water construction cost of $671,935 per 100-acre tract of trend growth greenfield residential development. A 50% non-construction cost factor (for City management, engineering, surveys, inspections, fees, legal, etc.) was applied to the construction cost, resulting in a baseline unit cost of $1,007,902 per 100-acres and $190,936,955 total cost for 18,944 acres for storm water detention improvements for the trend growth scenario.

To calculate the potential range in costs of storm water detention capital improvements for the trend growth scenario, the following cost range factors were applied to the baseline costs:

1. Range in City participation in construction of storm water detention structures: 25% to 100%.
2. Range in non-construction costs: 40% to 50% of baseline construction cost (after construction contingencies applied).
3. Range in area of trend growth greenfield development: 50% to 100% of 18,944 acres.

The following storm water detention capital improvements cost ranges for the trend growth scenario resulted from the application of the cost range factors summarized above:

City construction participation cost range:	$671,935 to $827,481
Non-construction cost range:	$268,774 to $413,741
Unit Cost Range/100 acres:	$940,709 to $1,241,222
Range in area:	9,472 acres to 18,944 acres
Total Cost Range:	$89,103,985 to $235,137,115

Table 1-1 summarizes the storm water detention capital improvement baseline costs and cost ranges associated with the trend growth scenario.

Storm Water Quality Treatment Facilities

A bio-retention type storm water quality treatment system was assumed as the basis to calculate the cost of storm water quality treatment capital improvements for the trend growth scenario. The bids for a 7'x13' bio-retention water quality device for the "Shoal Creek-Rosedale Storm Drain Improvements Ph. 2" project were used to calculate a storm water quality treatment construction cost of $51,796 per acre of trend growth greenfield development. A 50% non-construction cost factor (for City management, engineering, surveys, inspections, fees, legal, etc.) was applied to the construction cost, resulting in a baseline unit cost of $77,694 per acre and $1,471,835,136 total cost for 18,944 acres for storm water quality treatment improvements for the trend growth scenario.

To calculate the potential range in costs of storm water quality treatment capital improvements for the trend growth scenario, the following cost range factors were applied to the baseline costs:

1. Range in non-construction costs: 40% to 50% of baseline construction cost (after construction contingencies applied).
2. Range in area treated per 7'x13' bio-retention unit: 0.67 acres to 1.14 acres.
3. Range in area of trend growth greenfield development: 50% to 100% of 18,944 acres.

The following storm water quality treatment capital improvements cost ranges for the trend growth scenario resulted from the application of the cost range factors summarized above:

Baseline construction cost:	$46,875 per 7'x13' bio-retention unit
Non-construction cost range:	$18,750 to $23,438

Treatment area cost range:	$57,567/acre for 1.14-acre treatment area per unit $104,945/acre for 0.67-acre treatment area per unit
Range in area:	9,472 acres to 18,944 acres
Total Cost Range:	$545,266,648 to $1,988,078,080

Table 1-1 summarizes the storm water quality treatment capital improvement baseline costs and cost ranges associated with the trend growth scenario.

Local Storm Drain Capital Improvement Costs

A 4-block by 4-block grid of residential development of approximate area of 60 acres was assumed as the basis for calculation of local storm drain capital improvements for the trend growth scenario (see Exhibit A.8, Appendix A). A general local street storm drainage system layout was prepared with storm drain conduits, manholes and curb inlets. Based upon the layout of Exhibit A.8, a conceptual opinion of probable construction cost was prepared using recent City of Austin bid prices (see Table B.5, Appendix B). A 25% construction cost contingency and a 50% non-construction cost factor (for City management, engineering, surveys, inspections, fees, legal, etc.) were applied to the construction cost, resulting in a baseline unit cost of $8,881,110 per 60 acres and $2,804,062,464 total cost for 18,944 acres for local storm drain improvements for the trend growth scenario (see Table B.5, Appendix B).

To calculate the potential range in costs of local storm drain capital improvements for the trend growth scenario, the following cost range factors were applied to the baseline costs:

1. Range in City participation in funding initial wastewater improvements: 25% to 100% of baseline construction cost.
2. Range in construction contingencies: 25% to 50% of baseline construction cost.
3. Range in non-construction costs: 40% to 50% of baseline construction cost (after construction contingencies applied).
4. Range in area of trend growth greenfield development: 50% to 100% of 18,944 acres.

The following local storm drain capital improvements cost ranges for the trend growth scenario resulted from the application of the cost range factors summarized above:

Construction cost range:	$1,184,148 to $4,736,592
Contingences cost range:	$592,074 to $1,184,148
Non-construction cost range:	$710,489 to $2,920,740
Unit Cost Range/60 acres:	$2,486,711 to $8,881,110
Range in area:	9,472 acres to 18,944 acres
Total Cost Range:	$392,568,745 to $2,804,062,464

Table 1-1 summarizes the local storm drain capital improvement baseline costs and cost ranges associated with the trend growth scenario.

Stream Stabilization/Restoration

For the trend growth scenario cost estimation purposes, the current erosive condition of the Walnut Creek channel in east Austin was used as the basis to calculate the length of stream channel impacted by the trend growth scenario (see the City of Austin "Watershed Protection Master Plan, Phase I Watershed Report", June 2001, for description of the Walnut Creek channel and watershed). The Walnut Creek drainage area is approximately 56.5 square miles, and the Walnut Creek stream channel length is about 16 miles, giving a "development impact density" of 2,259.2 acres of development contributing (i.e. impacting) runoff per mile of stream channel. Therefore, 18,944 acres of trend growth greenfield development would impact approximately 9 miles of stream channel in the east sector of Austin at the "development impact density" of 2,259.2 acres of development per mile of stream channel. A conceptual opinion of probable construction cost was prepared using the bid prices of the stream stabilization elements of the "Southern Walnut Creek Hike and Bike Trail" (see Table B.6, Appendix B). A 25% construction cost contingency and a 50% non-construction cost factor (for City management, engineering, surveys, inspections, fees, legal, etc.) were applied to the construction cost, resulting in a baseline unit cost of $410,380,931 per 30 miles ($13,680,000 per mile) of stream channel stabilization and $123,120,000 total cost for nine miles of stream stabilization/restoration improvements for the trend growth scenario (see Table B.6, Appendix B).

To calculate the potential range in costs of stream channel stabilization/restoration capital improvements for the trend growth scenario, the following cost range factors were applied to the baseline costs:

1. Range in City participation in funding initial channel improvements: 75% to 100% of baseline construction cost.
2. Range in construction contingencies: 25% to 50% of baseline construction cost.
3. Range in non-construction costs: 40% to 50% of baseline construction cost (after construction contingencies applied).
4. Range in stream channel stabilization length: 5 miles to 9 miles.

The following stream channel stabilization/restoration capital improvements cost ranges for the trend growth scenario resulted from the application of the cost range factors summarized above:

City construction participation cost range:	$164,152,373 to $218,869,830
Contingencies cost range:	$82,076,186 to $54,717,458
Non-construction cost range:	$98,491,424 to $136,793,644
Unit Cost Range/30 miles:	$344,719,983 to $410,380,932
Range in creek channel stabilization length:	5 miles to 9 miles
Total Cost Range:	$57,453,331 to $123,114,280

Table 1-1 summarizes the stream channel stabilization/restoration capital improvement baseline costs and cost ranges associated with the trend growth scenario.

Watershed Maintenance Facility

For the trend growth scenario cost estimation purposes, it was assumed that 18,944 acres of trend growth greenfield development would require the construction of at least one new 10-acre watershed

maintenance facility located in the east or northeast sector of Austin. A conceptual opinion of probable construction cost for the trend growth scenario was prepared based upon the following assumptions:

Land acquisition cost for 10-acre site:	$3,000,000
Construction cost:	$3,000,000
Non-construction costs:	$1,500,000
Unit site cost:	$7,500,000

To calculate the potential range in cost of watershed maintenance facility capital improvements for the trend growth scenario, the following cost range factors were applied to the baseline costs:

1. Range in land acquisition cost per acre: $300,000 to $500,000.
2. Range in construction cost: 100% to 133%.
3. Range in non-construction costs: 40% to 50% of baseline construction cost.

The following watershed maintenance facility capital improvements cost ranges for the trend growth scenario resulted from the application of the cost range factors summarized above:

Land acquisition cost range (10-acre site):	$3,000,000 to $5,000,000
Construction cost range:	$3,000,000 to $4,000,000
Non-construction cost range:	$1,200,000 to $2,000,000
Total Cost Range/site:	$7,200,000 to $11,000,000

Table 1-1 summarizes the watershed maintenance facility capital improvement baseline costs and cost ranges associated with the trend growth scenario.

Watershed Protection Operations & Maintenance

The Austin Watershed Protection Department annual operations and maintenance budget costs were used to calculate the cost range of total annual operations and maintenance costs of providing services to the trend growth greenfield development area. Table C.10, Appendix C, provides a summary of the estimated $29,220,363 annual operations and maintenance costs at 100% budget level for the Austin Watershed Protection Department activities considered applicable to providing operations and maintenance services to the trend growth greenfield development area. Table C.10 also provides a summary of the estimated $20,352,842 lower range of annual operations and maintenance costs for the Austin Watershed Protection Department activities considered applicable to providing operations and maintenance services to the trend growth greenfield development area.

The 100% budget level and the lower range budget level annual operations and maintenance costs were pro-rated over the current City of Austin population of approximately 840,000 to result in a range of operations and maintenance unit costs of $24.23 to $34.79 per capita per year (see Table C.10). These two per-capita unit costs were applied on an annual basis to a straight-line projection of the trend growth population increase of 248,500 people over the 30-year study period, resulting in a $93,329,356 to $134,004,470 range in total cost of operations and maintenance associated with the trend growth scenario (see Table C.11, Appendix C).

Table 1-1 summarizes the watershed protection operations and maintenance baseline costs and cost ranges associated with the trend growth scenario.

3.5 Public Library Costs

Community Public Libraries

The Austin Public Library Facilities Master Plan, November of 2003, estimates a 2-mile service radius (i.e. 12.56 square miles) for a branch library. For trend growth scenario cost estimation purposes, three new community (branch) libraries would be needed to service a trend growth greenfield development area of 18,944 acres at a service area of 1 branch library per 12.56 square miles of developed area. A conceptual opinion of probable construction cost for the trend growth scenario was prepared based upon the following assumptions:

Land acquisition cost for 3-acre site:	$900,000
Construction cost:	$7,000,000
Non-construction costs:	$1,750,000
Total site cost:	$9,650,000

To calculate the potential range in cost of community public library capital improvements for the trend growth scenario, the following cost range factors were applied to the baseline costs:

1. Range in land acquisition cost per acre: $300,000 to $500,000.
2. Range in construction cost: 100% to 114%.
3. Range in non-construction costs: 25% to 50% of baseline construction cost.
4. Range in number of community libraries: 2 to 3 sites.

The following community public library capital improvements cost ranges for the trend growth scenario resulted from the application of the cost range factors summarized above:

Land acquisition cost range (3-acre site):	$900,000 to $1,500,000
Construction cost range:	$7,000,000 to $8,000,000
Non-construction cost range:	$1,750,000 to $4,000,000
Unit Cost Range/site:	$9,650,000 to $13,500,000
Range in number of community libraries:	2 to 3
Total Cost range:	$19,300,000 to $40,500,000

Table 1-1 summarizes the community public library capital improvement baseline costs and cost ranges associated with the trend growth scenario.

Public Library Operations & Maintenance

The Austin Public Library annual operations and maintenance budget costs were used to calculate the cost range of total annual operations and maintenance costs to provide services to the trend growth greenfield development area. Table C.12, Appendix C, provides a summary of the estimated $25,782,446 annual operations and maintenance costs at 100% budget level for the Austin Public Library activities considered applicable to providing operations and maintenance services to the trend growth greenfield development area. Table C.12 also provides a summary of the estimated $12,891,223 lower range of

annual costs for the Austin Public Library to provide operations and maintenance services to the trend growth greenfield development area.

The 100% budget level and the lower range budget level annual operations and maintenance costs were pro-rated over the current City of Austin population of approximately 840,000 to result in a range of operations and maintenance unit costs of $15.35 to $30.69 per capita per year (see Table C.12). These two per-capita unit costs were applied on an annual basis to a straight-line projection of the trend growth population increase of 248,500 people over the 30-year study period, resulting in a $59,125,284 to $118,212,049 range in total cost of operations and maintenance associated with the trend growth scenario (see Table C.13, Appendix C).

Table 1-1 summarizes the public library operations and maintenance baseline costs and cost ranges associated with the trend growth scenario.

3.6 Parks & Recreation Costs

Community Recreation/Aquatic/Gymnasium Centers

The City of Austin currently has 20 recreation centers (see "Austin Parks & Recreation Long Range Plan for Land, Facilities and Programs 2011-2016") serving a developed area of 256,975 acres. This equates to a current "recreation center density" of 1 recreation center per 12,849 acres of developed area. For the trend growth scenario cost estimation purposes, 18,944 acres of trend growth greenfield development would require two 10-acre new recreation centers at the "recreation center density" of 1 recreation center per 12,849 acres of developed area. A conceptual opinion of probable construction cost for the trend growth scenario was prepared based upon the following assumptions:

Land acquisition cost for 10-acre site:	$3,000,000
Construction cost:	$21,000,000
Non-construction costs:	$10,500,000
Total site cost:	$34,500,000

To calculate the potential range in cost of community recreation center capital improvements for the trend growth scenario, the following cost range factors were applied to the baseline costs:

1. Range in land acquisition cost per acre: $300,000 to $500,000.
2. Range in construction cost: 100% to 114%.
3. Range in non-construction costs: 40% to 50% of baseline construction cost.
4. Range in number of recreation centers: 1 to 2 sites.

The following community recreation center capital improvements cost ranges for the trend growth scenario resulted from the application of the cost range factors summarized above:

Land acquisition cost range (10-acre site):	$3,000,000 to $5,000,000
Construction cost range:	$21,000,000 to $24,000,000
Non-construction cost range:	$8,400,000 to $12,000,000
Unit Cost Range/site:	$32,400,000 to $41,000,000
Range in number of recreation centers:	1 to 2

Total Cost range: $32,400,000 to $82,000,000

Table 1-1 summarizes the community recreation center capital improvement baseline costs and cost ranges associated with the trend growth scenario.

Parkland Acquisition

The "Austin Parks & Recreation Long Range Plan for Land, Facilities and Programs 2011-2016" proposes a target of 24 acres of parkland per 1,000 residents. For the trend growth scenario cost estimation purposes, a trend growth population of 248,500 would require parkland acquisition of 5,964 acres at the targeted 24 acres per 1,000 residents. A conceptual opinion of probable parkland acquisition cost of $1,789,200,000 was based upon an assumed land acquisition cost of $300,000 per acre.

To calculate the potential range in cost of parkland acquisition for the trend growth scenario, the following cost range factors were applied to the baseline costs:

1. Range in acquisition cost per acre: $300,000 to $500,000.
2. Range in parkland acreage per 1000 residents: 10 acres to 24 acres.
3. Range in residents in the trend growth greenfield development area: 50% to 100% of 248,500.

The application of the cost range factors summarized above resulted in a parkland acquisition cost range of $373,500,000 to $2,982,000,000 for the trend growth scenario.

Table 1-1 summarizes the parkland acquisition baseline costs and cost ranges associated with the trend growth scenario.

Parks & Recreation Operations & Maintenance

The Austin Parks & Recreation Department annual operations and maintenance budget costs were used to calculate the cost range to provide operations and maintenance services to the trend growth greenfield development area. Table C.14, Appendix C, provides a summary of the estimated $54,593,698 annual operations and maintenance costs at 100% budget level for the Austin Parks & Recreation Department activities to provide operations and maintenance services to the trend growth greenfield development area. Table C.14 also provides a summary of the estimated $39,117,973 lower range of costs for the Austin Parks & Recreation Department activities to provide operations and maintenance services to the trend growth greenfield development area.

The 100% budget level and the lower range budget level annual operations and maintenance costs were pro-rated over the current City of Austin population of approximately 840,000 to result in a range of operations and maintenance unit costs of $46.57 to $64.99 per capita per year (see Table C.14). These two per-capita unit costs were applied on an annual basis to a straight-line projection of the trend growth population increase of 248,500 people over the 30-year study period, resulting in a $179,378,792 to $250,329,132 range in total cost of operations and maintenance associated with the trend growth scenario (see Table C.15, Appendix C).

Table 1-1 summarizes the parks and recreation operations and maintenance baseline costs and cost ranges associated with the trend growth scenario.

3.7 Public Safety Costs

Fire/EMS Stations

The Austin Fire Department currently has 43 fire stations servicing a developed area of 256,975 acres. This equates to a "fire station density" of 1 fire station per 5,976 acres of developed area. For the trend growth scenario cost estimation purposes, 18,944 acres of trend growth greenfield development would require four new 3-acre fire/emergency management services stations at the "fire station density" of 1 fire station per 5,976 acres of developed area. A conceptual opinion of probable construction cost for the trend growth scenario was prepared based upon the following assumptions:

Land acquisition cost for 3-acre site:	$900,000
Construction cost:	$7,000,000
Non-construction costs:	$1,750,000
Total site cost:	$9,650,000.
Total cost for four sites:	$38,600,000

To calculate the potential range in cost of Fire/EMS station capital improvements for the trend growth scenario, the following cost range factors were applied to the baseline costs:

1. Range in land acquisition cost per acre: $300,000 to $500,000.
2. Range in construction cost: 100% to 114%.
3. Range in non-construction costs: 25% to 50% of baseline construction cost.
4. Range in number of Fire/EMS stations: 2 to 4 sites.

The following Fire/EMS station capital improvements cost ranges for the trend growth scenario resulted from the application of the cost range factors summarized above:

Land acquisition cost range (3-acre site):	$900,000 to $1,500,000
Construction cost range:	$7,000,000 to $8,000,000
Non-construction cost range:	$1,750,000 to $4,000,000
Unit Cost Range/site:	$9,650,000 to $13,500,000
Range in number of recreation centers:	2 to 4
Total Cost range:	$19,300,000 to $54,000,000

Table 1-1 summarizes the Fire/EMS station capital improvement baseline costs and cost ranges associated with the trend growth scenario.

Police Substations

The Austin Police Department currently has three substations serving an area of 261 square miles. This equates to a "police substation density" of 1 police station per 87 square miles of area. For the trend growth scenario cost estimation purposes, 18,944 acres of trend growth greenfield development would require one new 3-acre police substation at the "police substation density" of 1 police substation per 87 square miles of developed area. A conceptual opinion of probable construction cost for the trend growth scenario was prepared based upon the following assumptions:

Land acquisition cost for 3-acre site:	$900,000
Construction cost:	$7,000,000
Non-construction costs:	$1,750,000
Total site cost:	$9,650,000

To calculate the potential range in cost of police substation capital improvements for the trend growth scenario, the following cost range factors were applied to the baseline costs:

1. Range in land acquisition cost per acre: $300,000 to $500,000.
2. Range in construction cost: 100% to 114%.
3. Range in non-construction costs: 25% to 50% of baseline construction cost.

The following police substation capital improvements cost ranges for the trend growth scenario resulted from the application of the cost range factors summarized above:

Land acquisition cost range (3-acre site):	$900,000 to $1,500,000
Construction cost range:	$7,000,000 to $8,000,000
Non-construction cost range:	$1,750,000 to $4,000,000
Unit Cost Range/site:	$9,650,000 to $13,500,000

Table 1-1 summarizes the police substation capital improvement baseline costs and cost ranges associated with the trend growth scenario.

Fire/EMS Operations & Support Costs

The Austin Fire Department and Austin-Travis County EMS annual budgets were used to calculate the cost range to provide fire and emergency management services to the trend growth greenfield development area. Table C.16, Appendix C, provides a summary of the estimated $179,859,058 annual operations and support costs at 100% budget level for the fire and emergency management services to provide services to the trend growth greenfield development area. Table C.16 also provides a summary of the estimated $149,503,852 lower range of costs for the fire and emergency management services to provide services to the trend growth greenfield development area.

The 100% budget level and the lower range budget level annual operations and support costs were pro-rated over the current City of Austin population of approximately 840,000 to result in a range of operations and support unit costs of $177.98 to $214.12 per capita per year (see Table C.16). These two per-capita unit costs were applied on an annual basis to a straight-line projection of the trend growth population increase of 248,500 people over the 30-year study period, resulting in a $685,545,144 to $824,749,557 range in total cost of fire and emergency management operations and support services associated with the trend growth scenario (see Table C.17, Appendix C).

Table 1-1 summarizes the fire and emergency management operations and support service baseline costs and cost ranges associated with the trend growth scenario.

Police Operations & Support

The Austin Police Department annual budget was used to calculate the cost range to provide police services to the trend growth greenfield development area. Table C.18, Appendix C, provides a summary of the estimated $245,528,373 annual operations and support costs at 100% budget level for providing

police services to the trend growth greenfield development area. Table C.18 also provides a summary of the estimated $161,143,270 lower range of annual operations and support costs for providing police services to the trend growth greenfield development area.

The 100% budget level and the lower range budget level annual operations and support costs were pro-rated over the current City of Austin population of approximately 840,000 to result in a range of operations and support unit costs of $191.84 to $292.30 per capita per year (see Table C.18). These two per-capita unit costs were applied on an annual basis to a straight-line projection of the trend growth population increase of 248,500 people over the 30-year study period, resulting in a $738,931,230 to $1,125,884,063 range in total cost of police operations and support services associated with the trend growth scenario (see Table C.19, Appendix C).

Table 1-1 summarizes the police operations and support service baseline costs and cost ranges associated with the trend growth scenario.

3.8 Electric Utility Costs

Austin Energy (Residential) Operations & Maintenance

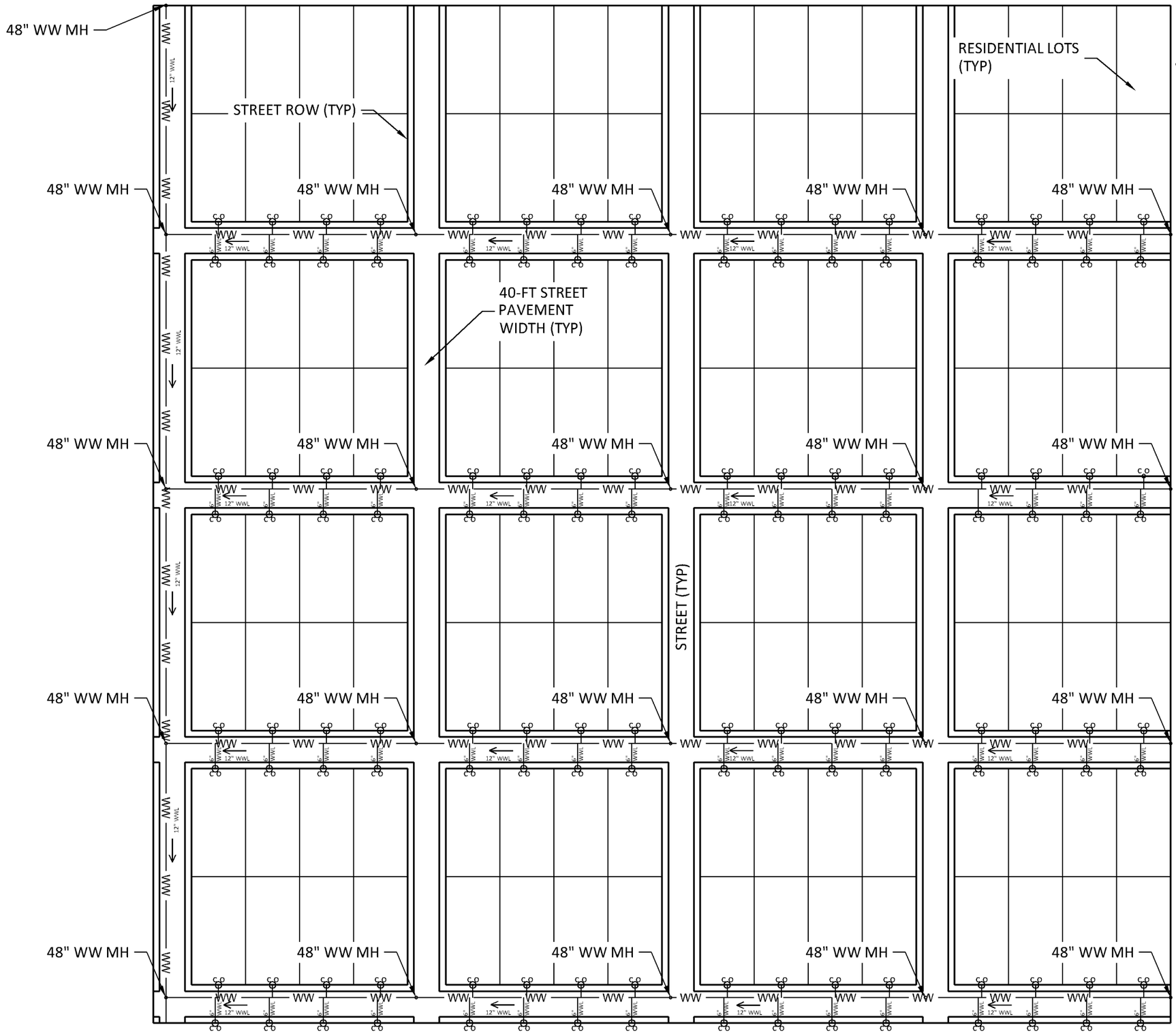
The Austin Energy rate information was used to calculate the cost range of total annual operations and maintenance costs to provide residential electric utility services to the trend growth greenfield development area. Austin Energy reported that it currently costs approximately $20 per month to serve each residential customer for billing, meters, customer service (“customer charge”) and customer account management, and it costs approximately $14 per month to serve each residential customer for the construction, maintenance, equipment and operation of the electric system (“electric delivery charge”). These customer and electric delivery costs equate to an annual operations and maintenance cost of $408 per residential customer. The lower bound of customer and electric delivery cost was assumed to be 2/3 of the annual operations and maintenance cost ($272 per residential customer), based upon Austin Energy’s requested rate increase to recover approximately 2/3 of its residential service costs.

The range of residential electric utility operations and maintenance unit costs of $272 to $408 per residential customer were applied on an annual basis to a straight-line projection of the trend growth residential increase of 118,334 houses over the 30-year study period, resulting in a $498,896,144 to $748,344,216 range in total cost of residential electrical utility operations and maintenance associated with the trend growth scenario (see Table C.20, Appendix C).

Table 1-1 summarizes the residential electric utility operations and maintenance baseline costs and cost ranges associated with the trend growth scenario.

APPENDIX A

EXHIBITS



LEGEND

- FLOW ARROW
- RW — PROP. RECL. WATER
- W — PROP. POTABLE WATER
- WW — PROP. WASTEWATER
- SD — PROP. STORM DRAIN
- PROP. WATER VALVE
- PROP. FIRE HYDRANT
- WM — PROP. POTABLE WATER METER
- RWM — PROP. RECLAIMED WATER METER
- PROP. WASTEWATER MANHOLE
- PROP. STORM DRAIN MANHOLE
- PROP. STORM DRAIN INLET WITH LATERAL
- CO. PROP. WASTEWATER CLEANOUT

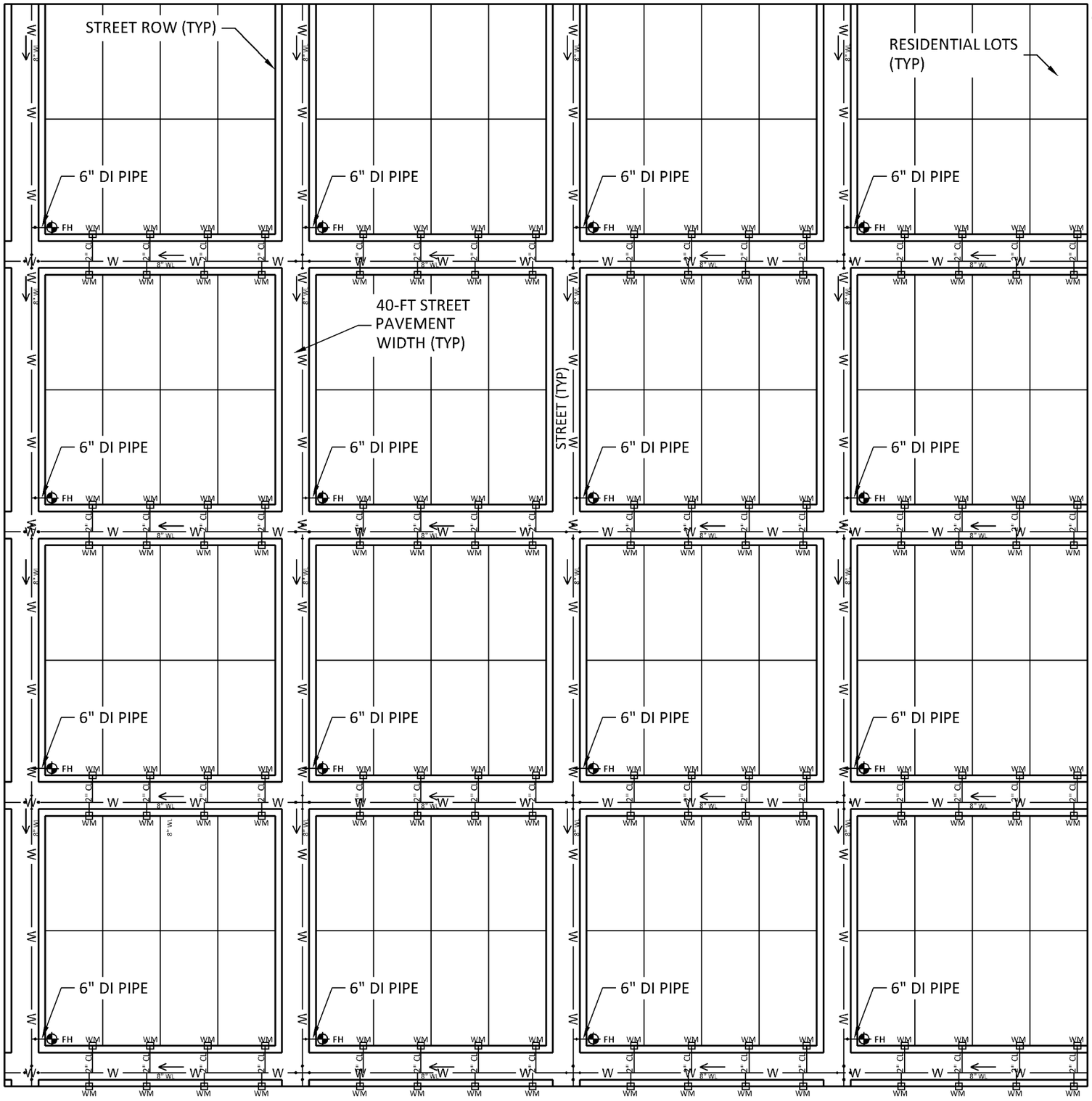
CHAN & PARTNERS
CONSULTING CIVIL ENGINEERS

CHAN & PARTNERS ENGINEERING, LLC
4319 JAMES CASEY STREET, #300
AUSTIN, TEXAS 78745
512-480-8155 (PH) • 512-480-8811 (FAX)
E-mail: info@chanpartners.com
WWW.CHANPARTNERS.COM
TEXAS REGISTRATION NO. F-13013

LOCAL WASTEWATER COLLECTION IMPROVEMENTS (60-ACRE TRACT)

A.1

PLOTTED: Jun 29, 2012 - 11:23am
Drawing name: I:\899-Austin Comprehensive Plan\CAD\Exhibits.dwg



LEGEND

- FLOW ARROW
- RW — PROP. RECL. WATER
- W — PROP. POTABLE WATER
- WW — PROP. WASTEWATER
- SD — PROP. STORM DRAIN
- PROP. WATER VALVE
- PROP. FIRE HYDRANT
- WM — PROP. POTABLE WATER METER
- RWM — PROP. RECLAIMED WATER METER
- PROP. WASTEWATER MANHOLE
- PROP. STORM DRAIN MANHOLE
- PROP. STORM DRAIN INLET WITH LATERAL
- CO. PROP. WASTEWATER CLEANOUT

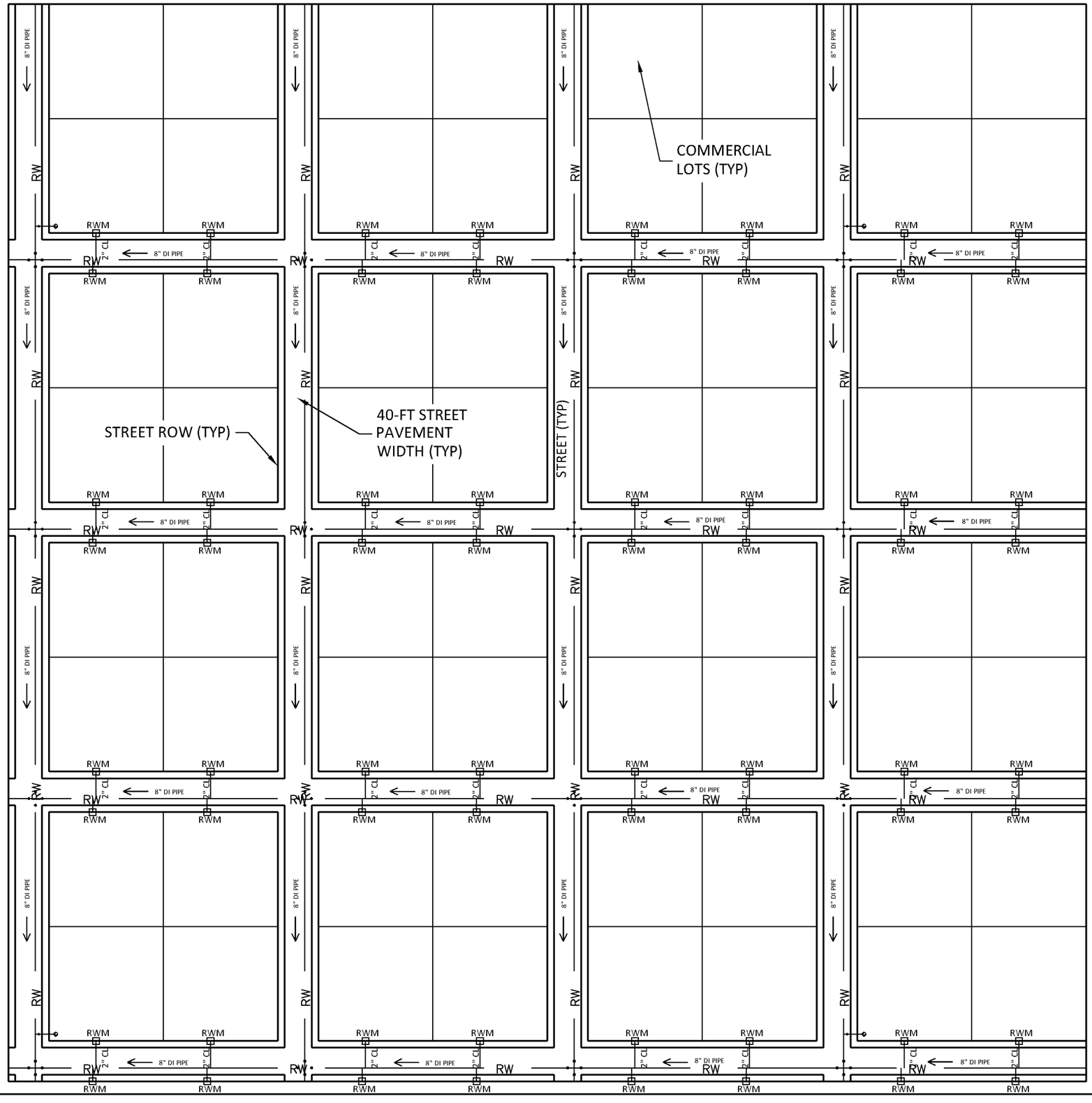
CHAN & PARTNERS CONSULTING CIVIL ENGINEERS

CHAN & PARTNERS ENGINEERING, LLC
4319 JAMES CASEY STREET, #300
AUSTIN, TEXAS 78745
512-460-6155 (PH) ♦ 512-460-8611 (FAX)
E-mail: info@chanpartners.com
WWW.CHANPARTNERS.COM
TEXAS REGISTRATION NO. F-13013

LOCAL POTABLE WATER DISTRIBUTION & IMPROVEMENTS (60-ACRE TRACT)

A.2

PLOTTED: Jun 29, 2012 - 11:23am
Drawing name: i:\899-Austin Comprehensive Plan\CAD\Exhibits.dwg



LEGEND

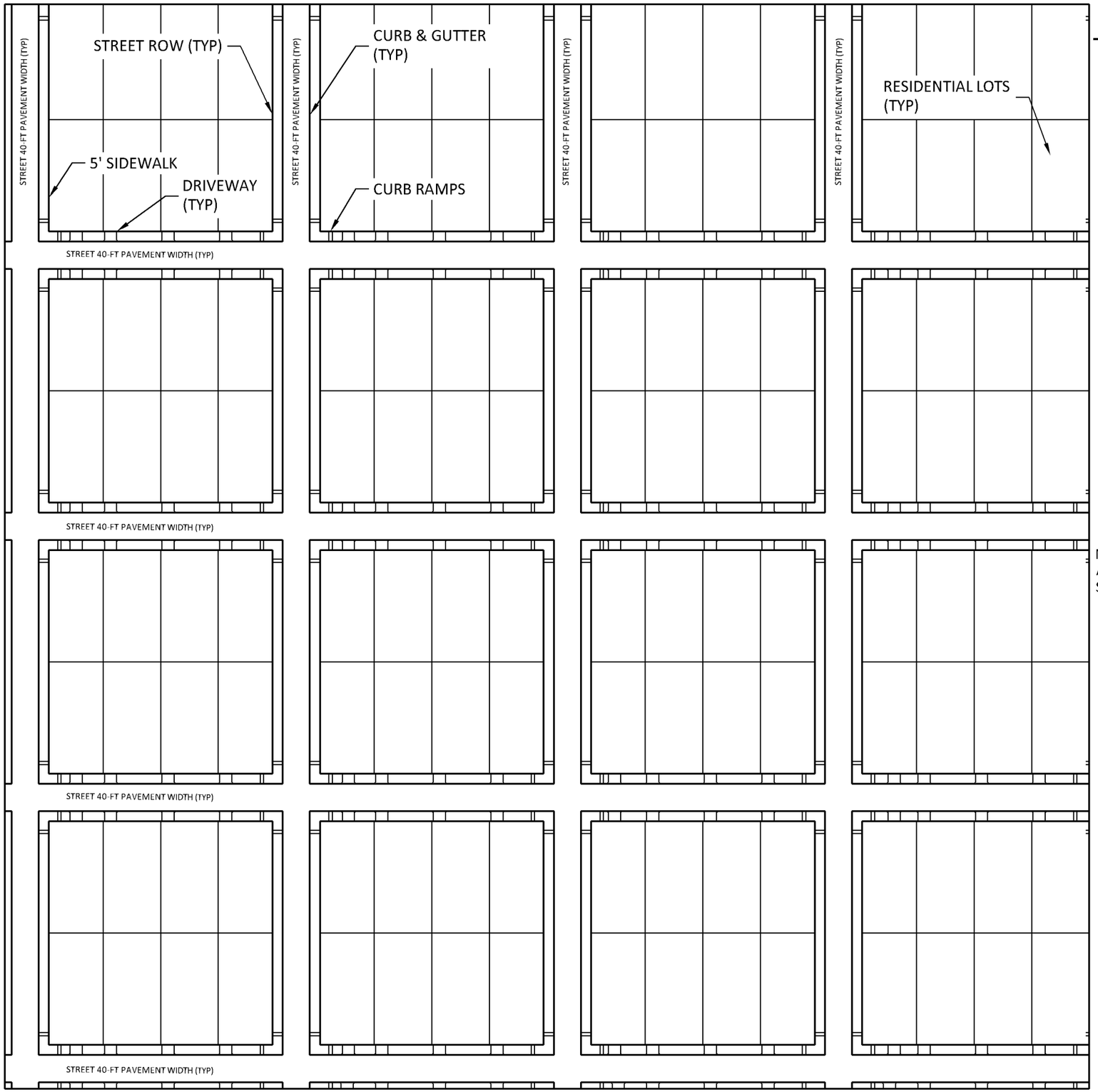
- FLOW ARROW
- RW — PROP. RECL. WATER
- W — PROP. POTABLE WATER
- WW — PROP. WASTEWATER
- SD — PROP. STORM DRAIN
- PROP. WATER VALVE
- PROP. FIRE HYDRANT
- WM — PROP. POTABLE WATER METER
- RWM — PROP. RECLAIMED WATER METER
- PROP. WASTEWATER MANHOLE
- PROP. STORM DRAIN MANHOLE
- PROP. STORM DRAIN INLET WITH LATERAL
- CO. PROP. WASTEWATER CLEANOUT

CHAN & PARTNERS CONSULTING CIVIL ENGINEERS
CHAN & PARTNERS ENGINEERING, LLC
4319 JAMES CASEY STREET, #300
AUSTIN, TEXAS 78745
512-480-8155 (PH) • 512-480-8811 (FAX)
E-mail: info@chanpartners.com
WWW.CHANPARTNERS.COM
TEXAS REGISTRATION NO. F-13013

LOCAL RECLAIMED WATER DISTRIBUTION IMPROVEMENTS (60-ACRE TRACT)

A.3

PLOTTED: Jun 29, 2017 - 11:23am
Drawing name: I:\899-Austin Comprehensive Plan\CAD\Exhibits.dwg



LEGEND

- FLOW ARROW
- RW — PROP. RECL. WATER
- W — PROP. POTABLE WATER
- WW — PROP. WASTEWATER
- SD — PROP. STORM DRAIN
- PROP. WATER VALVE
- PROP. FIRE HYDRANT
- WM — PROP. POTABLE WATER METER
- RWM — PROP. RECLAIMED WATER METER
- PROP. WASTEWATER MANHOLE
- PROP. STORM DRAIN MANHOLE
- PROP. STORM DRAIN INLET WITH LATERAL
- CO. PROP. WASTEWATER CLEANOUT

NOTE: LOCAL STREETS ASSUMED TO BE ASPHALT PAVEMENT WITH LIME STABILIZED SUBGRADE

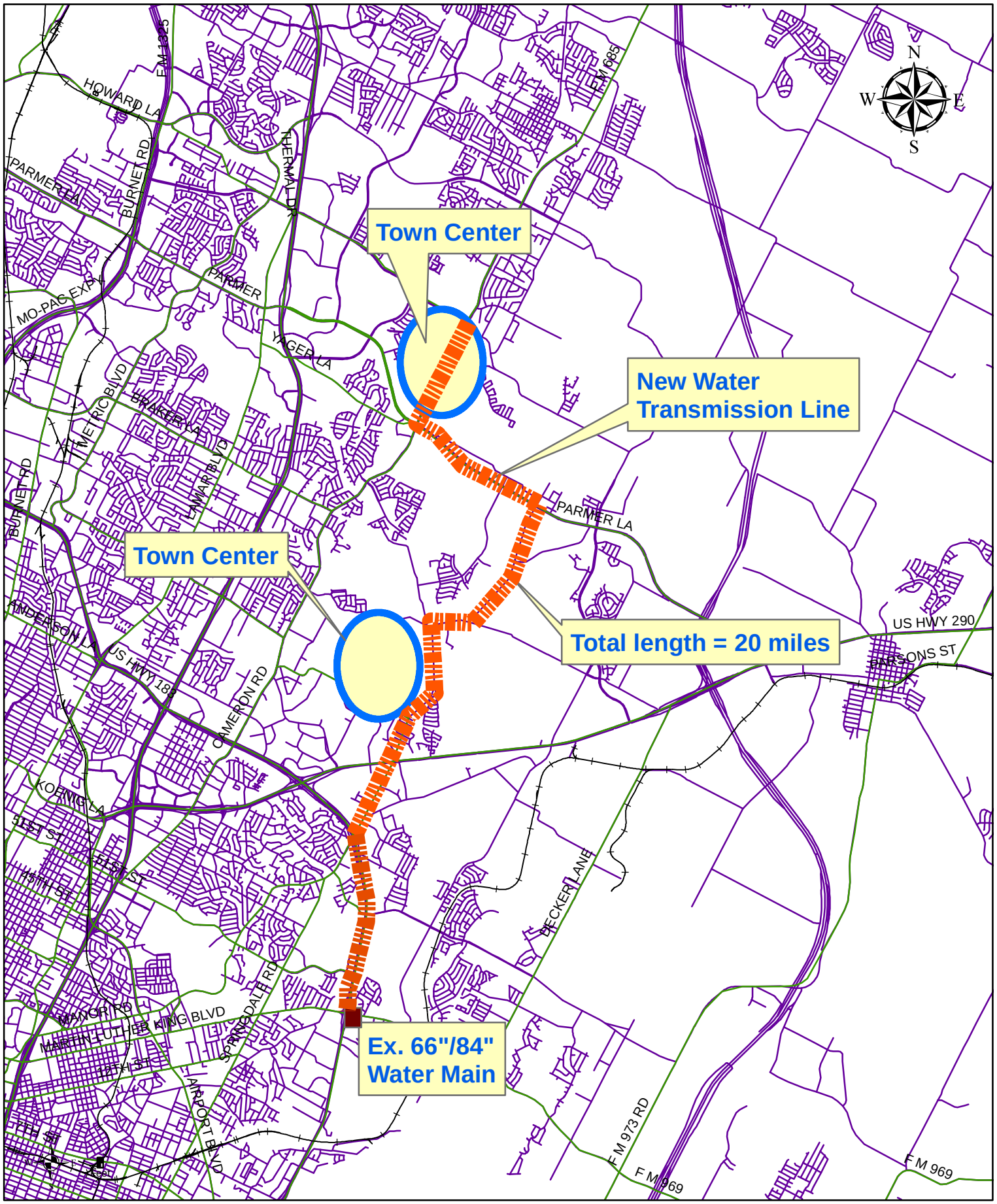
CHAN & PARTNERS CONSULTING CIVIL ENGINEERS

CHAN & PARTNERS ENGINEERING, LLC
4319 JAMES CASEY STREET, #300
AUSTIN, TEXAS 78745
512-460-8155 (PH) • 512-460-8611 (FAX)
E-mail: info@chanpartners.com
WWW.CHANPARTNERS.COM
TEXAS REGISTRATION NO. F-13013

LOCAL STREET IMPROVEMENTS (60-ACRE TRACT)

A.4

PLOTTED: Jun 29, 2012 - 11:23am
Drawing name: i:\899-Austin Comprehensive Plan\CAD\Exhibits.dwg

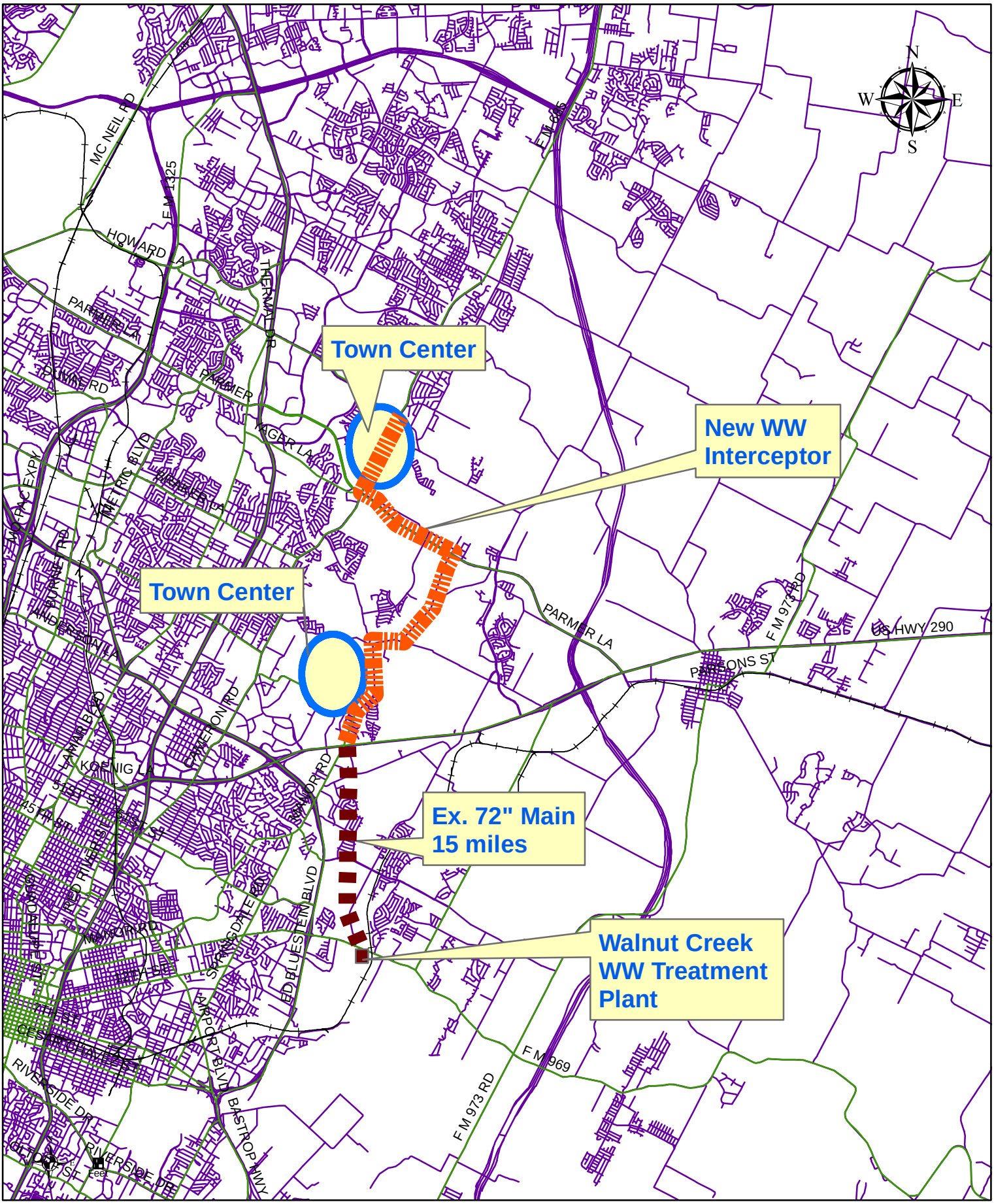


Chan & Partners Engineering, LLC
4319 James Casey #300 * Austin, Texas 78745
(512) 480-8155
www.chanpartners.com
TBPE #F-13013

Potable Water Transmission Main Route

EXHIBIT A.5

N:\RCA\JOBS\899-Austin Comprehensive Plan\Cost Estimate Report\Appendix A Exhibits\Exhibit A4.mxd

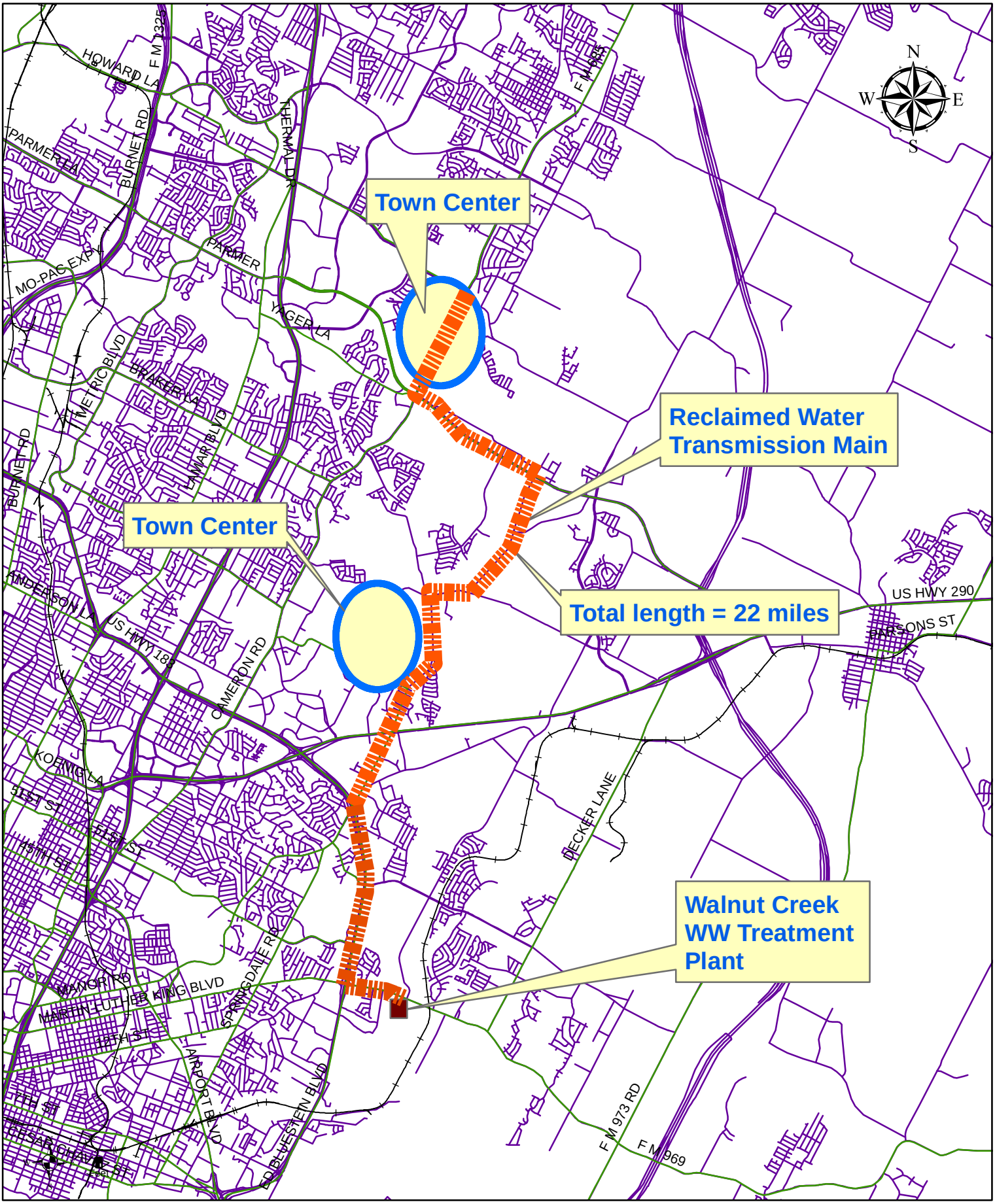


Chan & Partners Engineering, LLC
4319 James Casey #300 * Austin, Texas 78745
(512) 480-8155
www.chanpartners.com
TBPE #F-13013

Wastewater Interceptor Main Route

EXHIBIT A.6

N:\RCA\JOBS\899-Austin Comprehensive Plan\Cost Estimate Report\Appendix A Exhibits\Exhibit A5.mxd

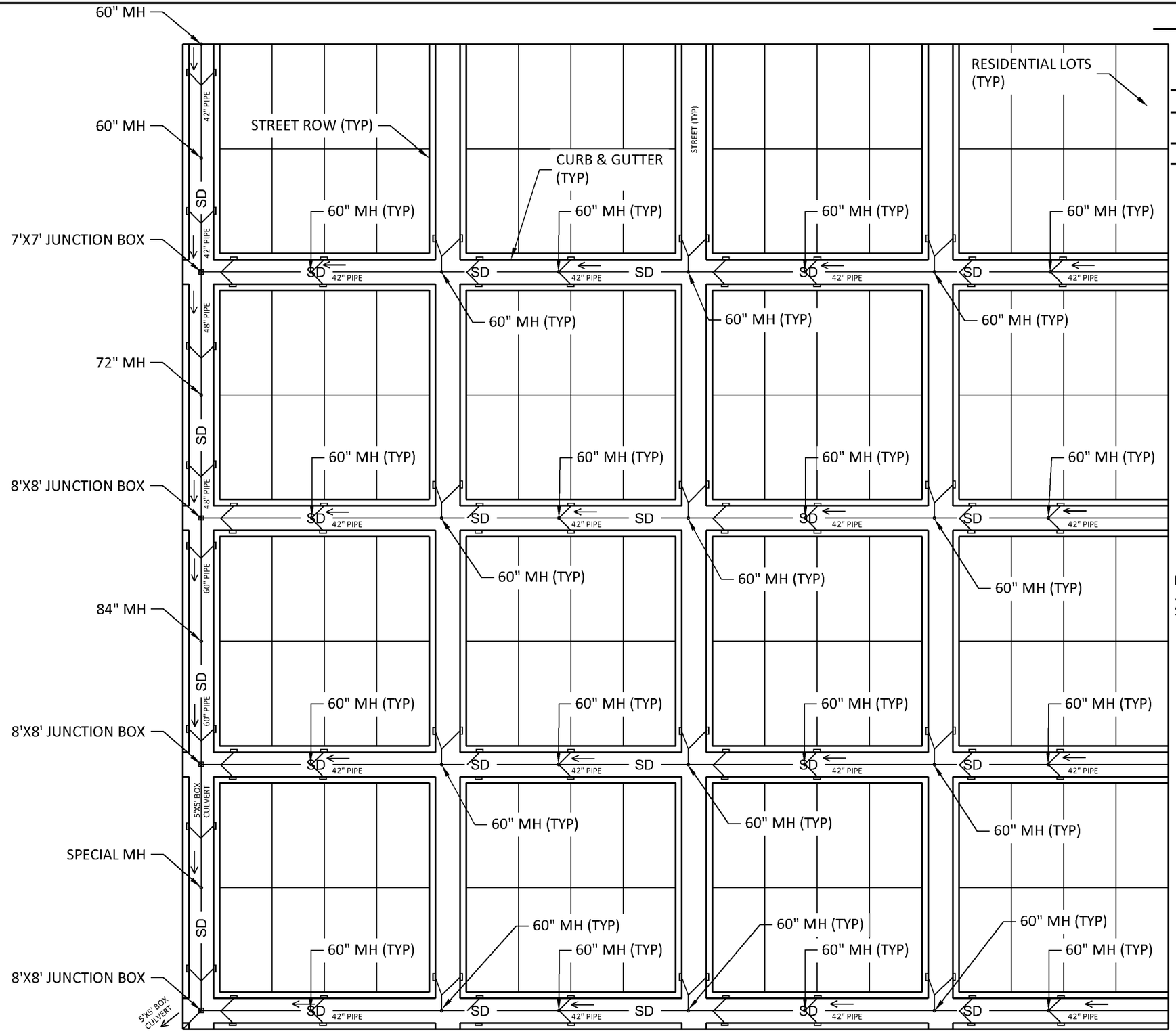


Chan & Partners Engineering, LLC
4319 James Casey #300 * Austin, Texas 78745
(512) 480-8155
www.chanpartners.com
TBPE #F-13013

Reclaimed Water Transmission Main Route

EXHIBIT A.7

N:\RCA\JOBS\899-Austin Comprehensive Plan\Cost Estimate Report\Appendix A Exhibits\Exhibit A6.mxd



LEGEND

- FLOW ARROW
- RW — PROP. RECL. WATER
- W — PROP. POTABLE WATER WATER
- WW — PROP. WASTEWATER
- SD — PROP. STORM DRAIN
- PROP. WATER VALVE
- PROP. FIRE HYDRANT
- WM — PROP. POTABLE WATER METER
- RWM — PROP. RECLAIMED WATER METER
- PROP. WASTEWATER MANHOLE
- PROP. STORM DRAIN MANHOLE
- PROP. STORM DRAIN INLET WITH LATERAL
- CO. PROP. WASTEWATER CLEANOUT

NOTE: LOCAL STORM DRAIN SYSTEM ASSUMED TO BE AN ENCLOSED SYSTEM WITHOUT OPEN CHANNELS

CHAN & PARTNERS CONSULTING CIVIL ENGINEERS
CHAN & PARTNERS ENGINEERING, LLC
4319 JAMES CASEY STREET, #300
AUSTIN, TEXAS 78745
512-460-6155 (PH) • 512-460-6811 (FAX)
E-mail: info@chanpartners.com
WWW.CHANPARTNERS.COM
TEXAS REGISTRATION NO. F-13013

LOCAL STORM DRAIN IMPROVEMENTS (60-ACRE TRACT)

A.8

PLOTTED: Jun 29, 2017 - 11:22am
Drawing name: I:\899-Austin Comprehensive Plan\CAD\Exhibits.dwg

APPENDIX B

CONSTRUCTION COST TABLES

Table B.1 Local Wastewater Collection Improvements

Engineer's Opinion of Probable Construction Cost

60-Acre Tract

Item No.	Quantity	Unit	Item Description	Unit Price	Amount	
101S-B	78	STA	Preparing Right of Way	$2,900	$226,200.00	Prep for entire width of ROW
315S-A3	34,700	SY	Surface Milling, 3-Inch Depth	$11.00	$381,700.00	full street width
340S-B-C3	34,700	SY	Hot Mix Asphaltic Concrete Pavement, 3 Inches, Type C	$21.00	$728,700.00	full street width
430S-A	640	LF	P.C. Concrete Curb and Gutter (Excavation)	$23.00	$14,720.00	10' at each clean-out
505S-A8	1,860	LF	Concrete Encasement for 8 In. Dia. Pipe	$60.00	$111,600.00	20' at each crossing with storm drain pipe
506-ABWW	21	EA	Abandonment of Existing Wastewater Manholes	$960.00	$20,160.00	same number as new manholes
506-CNWW	15	EA	Connection of New Manhole to Existing Wastewater Pipe	$3,000.00	$45,000.00	at each manhole around periphery of tract
506-DWW48	1	EA	Drop Manhole w/ Pre-Cast Base, 48 In. Dia.	$7,400.00	$7,400.00	
506-MWW4	20	EA	Standard Pre-Cast Manhole w/Pre-Cast Base, 48 In. Dia.	$5,400.00	$108,000.00	
SP506-BP	21	EA	By-Pass Pumping	$4,550.00	$95,550.00	per each new manhole
509S-1	11,760	LF	Trench Excavation Safety Protective Systems (all depths)	$5.00	$58,800.00	
510-AWW6	3,840	LF	Pipe, 6 Inch Dia., PVC SDR 26 (All Depths), including Excavation and Backfill	$90.00	$345,600.00	service to each clean-out
510-AWW8	6,320	LF	Pipe, 8 Inch Dia., PVC SDR 26 (All Depths), including Excavation and Backfill	$110.00	$695,200.00	
510-AWW12	1,600	LF	Pipe, 12 Inch Dia., PVC SDR 26 (All Depths), including Excavation and Backfill	$125.00	$200,000.00	
510-BWW	128	EA	Connecting New 6 In. Service to Existing Private Service	$1,800.00	$230,400.00	at each clean-out
602S-A	2,140	SY	Bermuda Block Sodding	$8.00	$17,120.00	15'x10' at each clean-out
605S-A	400	SY	Soil Retention Blanket	$9.00	$3,600.00	
610S-A	20,600	LF	Protective Fencing Type A Chain Link Fence	$3.00	$61,800.00	
SP610S-E	64	EA	Tree Trunk Protection, Wood Planking	$150.00	$9,600.00	
628S-B	480	LF	Sediment Containment Dikes with Filter Fabric	$9.00	$4,320.00	
628S-D	48	EA	Filter Curb Inlet Protection (Existing Inlet)	$150.00	$7,200.00	
639S	350	LF	Rock Berm	$50.00	$17,500.00	
641S	2	EA	Stabilized Construction Entrance	$1,000.00	$2,000.00	
SP642S	7,000	LF	Mulch Sock	$13.00	$91,000.00	
700S-TM	1	LS	Total Mobilization Payment	$181,000.00	$181,000.00	4.75% of all costs excluding Mob cost
802S-B C.I.P.	2	EA	C.I.P. Project Sign	$500.00	$1,000.00	
SP803S-CD	546	CD	Barricades, Signs, and Traffic Handling.	$230.00	$125,580.00	
SP803S-PS	546	CD	Portable Changeable Message Signs	$100.00	$54,600.00	
871S-A	24,320	LF	Reflectorized Type 1 Thermoplastic Pavement Markings	$6.00	$145,920.00	

SUB-TOTAL	**$3,991,270.00**
25% Contingency	**$997,817.50**
Total Construction	**$4,989,087.50**
50% Non-Construction Cost	**$2,494,543.75**
Total Cost per 60-Acre Tract	**$7,483,631.25**

Exhibit B

B.2 Local Potable Water Distribution Improvements

Engineer's Opinion of Proable Construction Cost

60-Acre Tract

Item No.	Quantity	Unit	Item Description	Unit Price	Amount	
101S-B	121.6	STA	Preparing Right of Way	$2,900	$352,640.00	Prep for entire width of ROW
315S-A3	13,510	SY	Surface Milling, 3-Inch Depth	$11.00	$148,610.00	full road width
340S-B-C3	13,510	SY	Hot Mix Asphaltic Concrete Pavement, 3 Inches, Type C	$21.00	$283,710.00	full road width
430S-A	1,280	LF	P.C. Concrete Curb and Gutter (Excavation)	$23.00	$29,440.00	10' at each water meter
504S-1WM	128	EA	Adjusting Water Meters	$420.00	$53,760.00	each water meter
505S-A8	2,800	LF	Concrete Encasement for 8 In. Dia. Pipe	$60.00	$168,000.00	20' at each crossing with SD line
509S-1	16,480	LF	Trench Excavation Safety Protective Systems (all depths)	$5.00	$82,400.00	
510-AW2C	3,840	LF	Pipe, 2-inch Dia. Copper (All Depths), Including Excavation and Backfill	$82.00	$314,880.00	service to each water meter
510-AW6DI	480	LF	Pipe, 6-Inch Dia. Ductile Iron Class 350 (All Depths), Including Excavation and Backfill	$90.00	$43,200.00	service to each fire hydrant
510-AW8	12,800	LF	Pipe, 8-Inch Dia. PVC C-900 DR14 (All Depths), Including Excavation and Backfill	$94.00	$1,203,200.00	main water line
510-BW2x8S	128	EA	Connecting New 2-Inch Service to Existing Private Service, Single Meter Service Connection	$3,200.00	$409,600.00	at each water meter
510-JW8x8	25	EA	Wet Connections, 8-inch Dia. x 8-inch Dia.	$3,200.00	$80,000.00	at each street intersection around periphery of tract
510-KW	3	Ton	Ductile Iron Fittings, 4-Inch through 24-Inch	$7,600.00	$22,800.00	
511S-A6	16	EA	Valves, Gate Type, 6-Inch Dia.	$1,500.00	$24,000.00	at each fire hydrant
511S-A8	64	EA	Valves, Gate Type, 8-Inch Dia.	$1,800.00	$115,200.00	
511S-B	16	EA	Fire Hydrants	$4,000.00	$64,000.00	
602S-A	2,140	SY	Bermuda Block Sodding	$8.00	$17,120.00	10'x15' at each water meter
605S-A	400	SY	Soil Retention Blanket	$9.00	$3,600.00	
610S-A	20,600	LF	Protective Fencing Type A Chain Link Fence	$3.00	$61,800.00	
SP610S-E	64	EA	Tree Trunk Protection, Wood Planking	$150.00	$9,600.00	
628S-B	480	LF	Sediment Containment Dikes with Filter Fabric	$9.00	$4,320.00	
628S-D	48	EA	Filter Curb Inlet Protection (Existing Inlet)	$150.00	$7,200.00	
639S	350	LF	Rock Berm	$50.00	$17,500.00	
641S	2	EA	Stabilized Construction Entrance	$1,000.00	$2,000.00	
SP642S	7,000	LF	Mulch Sock	$13.00	$91,000.00	
700S-TM	1	LS	Total Mobilization Payment	$188,000.00	$188,000.00	4.75% of all costs excluding Mob cost
802S-B C.I.P.	2	EA	C.I.P. Project Sign	$500.00	$1,000.00	
SP803S-CD	546	CD	Barricades, Signs, and Traffic Handling.	$230.00	$125,580.00	
SP803S-PS	546	CD	Portable Changeable Message Signs	$100.00	$54,600.00	
863S-4	16	EA	Reflectorized Pavement Markers (Type II-B-B) for Fire Hydrants	$30.00	$480.00	at each fire hydrant
871S-A	24,320	LF	Reflectorized Type 1 Thermoplastic Pavement Markings	$6.00	$145,920.00	

SUB-TOTAL	**$4,125,160.00**
25% Contingency	**$1,031,290.00**
Total Construction	**$5,156,450.00**
50% Non-Construction Cost	**$2,578,225.00**
Total Cost per 60-Acre Tract	**$7,734,675.00**

Exhibit B

B.3 Local Reclaimed Water Distribution Improvements

Engineer's Opinion of Probable Construction Cost

60-Acre Tract

Item No.	Quantity	Unit	Item Description	Unit Price	Amount	
101S-B	121.6	STA	Preparing Right of Way	$2,900	$352,640.00	Prep for entire width of ROW
315S-A3	13,510	SY	Surface Milling, 3-Inch Depth	$11.00	$148,610.00	40' width
340S-B-C3	13,510	SY	Hot Mix Asphaltic Concrete Pavement, 3 Inches, Type C	$21.00	$283,710.00	40' width
430S-A	640	LF	P.C. Concrete Curb and Gutter (Excavation)	$23.00	$14,720.00	10' at each vault
505S-A8	1,500	LF	Concrete Encasement for 8 In. Dia. Pipe	$60.00	$90,000.00	20' at each crossing with SD line
509S-1	14,200	LF	Trench Excavation Safety Protective Systems (all depths)	$5.00	$71,000.00	
510-ARRJ6	1,920	LF	Factory Restrained Joint Pipe, 6-inch Dia. Class 350 Ductile Iron (All Depths), including Excavaation and Backfill	$35.00	$67,200.00	service to each property
510-ARRJ8	12,160	LF	Factory Restrained Joint Pipe, 8-inch Dia. Class 350 Ductile Iron (All Depths), including Excavaation and Backfill	$45.00	$547,200.00	main line
510-JW8x8	24	EA	Wet Connections, 8-inch Dia. x 8-inch Dia.	$3,200.00	$76,800.00	at each street intersection around periphery of tract
510-KW	6	Ton	Ductile Iron Fittings, 4-Inch through 24-Inch	$7,600.00	$45,600.00	
511S-J	4	EA	Reclaimed Water Blow-Off Hydrant Assembly	$2,200.00	$8,800.00	1 hydrant per each 4 blocks
SP511S-A6	4	EA	Valves, Reclaimed Water Gate Valve, 6-Inch Dia.	$1,100.00	$4,400.00	
SP511S-A8	64	EA	Valves, Reclaimed Water Gate Valve, 8-Inch Dia.	$1,400.00	$89,600.00	
520S-	64	EA	Reclaimed Water Meter Station and Vault	$14,000.00	$896,000.00	1 vault at each property
520S-	64	EA	Reclaimed Water Meter and Backflow Preventer	$40,000.00	$2,560,000.00	1 meter at each property
602S-A	1,780	SY	Bermuda Block Sodding	$8.00	$14,240.00	10'x25' at each meter vault
605S-A	400	SY	Soil Retention Blanket	$9.00	$3,600.00	
610S-A	20,600	LF	Protective Fencing Type A Chain Link Fence	$3.00	$61,800.00	
SP610S-E	64	EA	Tree Trunk Protection, Wood Planking	$150.00	$9,600.00	
628S-B	480	LF	Sediment Containment Dikes with Filter Fabric	$9.00	$4,320.00	
628S-D	48	EA	Filter Curb Inlet Protection (Existing Inlet)	$150.00	$7,200.00	
639S	350	LF	Rock Berm	$50.00	$17,500.00	
641S	2	EA	Stabilized Construction Entrance	$1,000.00	$2,000.00	
SP642S	7,000	LF	Mulch Sock	$13.00	$91,000.00	
700S-TM	1	LS	Total Mobilization Payment	$276,000.00	$276,000.00	4.75% of all costs excluding Mob cost
802S-B C.I.P.	2	EA	C.I.P. Project Sign	$500.00	$1,000.00	
SP803S-CD	546	CD	Barricades, Signs, and Traffic Handling.	$230.00	$125,580.00	
SP803S-PS	546	CD	Portable Changeable Message Signs	$100.00	$54,600.00	
871S-A	24,320	LF	Reflectorized Type 1 Thermoplastic Pavement Markings	$6.00	$145,920.00	

SUB-TOTAL	**$6,070,640.00**
25% Contingency	**$1,517,660.00**
Total Construction	**$7,588,300.00**
50% Non-Construction Cost	**$3,794,150.00**
Total Cost	**$11,382,450.00**

Exhibit B

Table B.4 Local Streets

Engineer's Opinion of Probable Construction Cost

60-Acre Tract

Item No.	Quantity	Unit	Item Description	Unit Price	Amount	
101S-B	121.6	STA	Preparing Right of Way	$2,900	$352,640.00	Prep for entire width of ROW
110S-B	19,816	CY	Street Excavation	$24.00	$475,591.20	12" deep x 44' wide
203S-A10	59,449	SY	Lime Treated Subgrade (10" Thick)	$14.00	$832,286.00	10" thick x 44' wide
210S-A	9,908	CY	Flexible Base (6" Thick)	$53.00	$525,134.60	6" thick x 44' wide
340S-B-C3	54,045	SY	Hot Mix Asphaltic Concrete Pavement, 3 Inches, Type C	$21.00	$1,134,934.50	40' wide
341S-GG	400	SY	Paving Fabric, Tensar GlassGrid 8512	$20.00	$8,000.00	Tensile strength over shallow SD JBs
430S-A	23,040	LF	P.C. Concrete Curb and Gutter (Excavation)	$23.00	$529,920.00	both sides of street
432S-4	115,200	SF	New P.C. Concrete Sidewalks, 4 Inch thickness	$7.00	$806,400.00	5' wide, both sides of street
432S-RP-1	144	EA	P.C. Sidewalk Curb Ramp with Pavers (Type I)	$1,300.00	$187,200.00	2 at each corner
433S-C	28,800	SF	Type II P.C. Concrete Driveway	$10.00	$288,000.00	10'x15'/each driveway
504S-3W	256	EA	Adjusting Water Valve Boxes to Grade	$500.00	$128,000.00	4 each block
506-4SW	128	EA	Minor Manhole Heights Adjustment, 48" Dia.	$1,300.00	$166,400.00	2 each block
602S-A	12,800	SY	Bermuda Block Sodding	$8.00	$102,400.00	5' wide along each side of each road
605S-A	400	SY	Soil Retention Blanket	$9.00	$3,600.00	
610S-A	20,600	LF	Protective Fencing Type A Chain Link Fence	$3.00	$61,800.00	
SP610S-E	64	EA	Tree Trunk Protection, Wood Planking	$150.00	$9,600.00	1 along each side of each road
628S-B	480	LF	Sediment Containment Dikes with Filter Fabric	$9.00	$4,320.00	
628S-D	48	EA	Filter Curb Inlet Protection (Existing Inlet)	$150.00	$7,200.00	
639S	350	LF	Rock Berm	$50.00	$17,500.00	
641S	2	EA	Stabilized Construction Entrance	$1,000.00	$2,000.00	
SP642S	7,000	LF	Mulch Sock	$13.00	$91,000.00	
700S-TM	1	LS	Total Mobilization Payment	$292,000.00	$292,000.00	4.75% of all costs excluding Mob cost
802S-B C.I.P.	2	EA	C.I.P. Project Sign	$500.00	$1,000.00	
SP803S-CD	546	CD	Barricades, Signs, and Traffic Handling.	$230.00	$125,580.00	1-1/2 years
SP803S-PS	546	CD	Portable Changeable Message Signs	$100.00	$54,600.00	
831S-2	2	EA	36" Diameter Traffic Signal Drilled Shaft Foundations 10' Depth	$5,200.00	$10,400.00	
833S-PPB	2	EA	Pedestrian Pushbutton	$650.00	$1,300.00	
834S-C	2	EA	Traffic Signal Pull Box, Type C	$3,200.00	$6,400.00	
853S-LTM	200	LF	Installing Traffic Signal Conduit with 3 Conduits 3 inch in Diameter	$52.00	$10,400.00	
839S-MAP1	2	EA	Type 1 Mast Arm Pole	$4,000.00	$8,000.00	
839S-MA25	2	EA	25 Foot Mast Arm	$4,000.00	$8,000.00	
840S-TSI	2	EA	Traffic Signal Installation	$2,500.00	$5,000.00	
844S-3	200	LF	Class 3 Trenching for Traffic Signal Conduit	$100.00	$20,000.00	
871S-A	24,320	LF	Reflectorized Type 1 Thermoplastic Pavement Markings	$6.00	$145,920.00	2 x total length of streets

SUB-TOTAL	**$6,422,526.30**
25% Contingency	**$1,605,631.58**
Total Construction	**$8,028,157.88**
50% Non-Construction Cost	**$4,014,078.94**
Total Cost per 60-Acre Tract	**$12,042,236.81**

Exhibit B

Table B.5 Local Storm Drain Improvements

Engineer's Opinion of Probable Construction Cost

60-Acre Tract

Item No.	Quantity	Unit	Item Description	Unit Price	Amount	
101S-B	78	STA	Preparing Right of Way	$2,900	$226,200.00	Prep for entire width of ROW
315S-A3	34,667	SY	Surface Milling, 3-Inch Depth	$11.00	$381,337.00	Entire street surface
340S-B-C3	34,667	SY	Hot Mix Asphaltic Concrete Pavement, 3 Inches, Type C	$21.00	$728,007.00	Entire street surface
430S-A	720	LF	P.C. Concrete Curb and Gutter (Excavation)	$23.00	$16,560.00	15 feet replaced at each inlet location
432S-4	3,600	SF	New P.C. Concrete Sidewalks, 4 Inch thickness	$7.00	$25,200.00	15'x5' at each inlet location
432S-RP-1	144	EA	P.C. Sidewalk Curb Ramp with Pavers (Type I)	$1,300.00	$187,200.00	new ramps at each corner
504S-3W	256	EA	Adjusting Water Valve Boxes to Grade	$500.00	$128,000.00	same as local streets
506-4SW	128	EA	Minor Manhole Heights Adjustment, 48" Dia.	$1,300.00	$166,400.00	same as local streets
506-BSW7x7	1	EA.	Box Manhole, 7ft x 7ft	$13,500.00	$13,500.00	
506-BSW8x8	3	EA.	Box Manhole, 8ft x 8ft	$17,000.00	$51,000.00	
506-SSW48	1	EA	Special Storm Water Manhole, 48 In. Dia.	$3,900.00	$3,900.00	
506-MSW60	30	EA	Standard Pre-Cast Manhole w/ Pre-Cast Base, 60 In. Dia.	$5,400.00	$162,000.00	
506-MSW72	1	EA	Standard Pre-Cast Manhole w/ Pre-Cast Base, 72 In. Dia.	$5,600.00	$5,600.00	
506-MSW84	1	EA	Standard Pre-Cast Manhole w/ Pre-Cast Base, 84 In. Dia.	$7,600.00	$7,600.00	
508S-I10S	48	EA.	Inlet, Standard 10 Foot	$3,900.00	$187,200.00	1 inlet per 8cfs
509S-1	9,838	LF	Trench Excavation Safety Protective Systems (all depths)	$5.00	$49,190.00	total length of pipe and inlets
510-ASW18	1,358	LF	Pipe, 18 - inch R.C.P. Storm Drain (all depths), including Excavation and Backfill	$96.00	$130,368.00	at each inlet
510-ASW42	6,650	LF	Pipe, 42 - inch R.C.P. Storm Drain (all depths), including Excavation and Backfill	$156.00	$1,037,400.00	
510-ASW48	370	LF	Pipe, 48 - inch R.C.P. Storm Drain (all depths), including Excavation and Backfill	$178.00	$65,860.00	
510-ASW60	370	LF	Pipe, 60 - inch R.C.P. Storm Drain (all depths), including Excavation and Backfill	$223.00	$82,510.00	
559S-5x5	370	LF	Precast Concrete Box Culverts, 5ft x 5ft	$582.00	$215,340.00	
602S-A	7,200	SY	Bermuda Block Sodding	$8.00	$57,600.00	30 feet x 5' at each inlet location
605S-A	400	SY	Soil Retention Blanket	$9.00	$3,600.00	
610S-A	20,600	LF	Protective Fencing Type A Chain Link Fence	$3.00	$61,800.00	
SP610S-E	64	EA	Tree Trunk Protection, Wood Planking	$150.00	$9,600.00	same as local streets
628S-B	480	LF	Sediment Containment Dikes with Filter Fabric	$9.00	$4,320.00	
628S-D	48	EA	Filter Curb Inlet Protection (Existing Inlet)	$150.00	$7,200.00	same as local streets
639S	350	LF	Rock Berm	$50.00	$17,500.00	
641S	2	EA	Stabilized Construction Entrance	$1,000.00	$2,000.00	
SP642S	7,000	LF	Mulch Sock	$13.00	$91,000.00	
700S-TM	1	LS	Total Mobilization Payment	$215,000.00	$215,000.00	4.75% of all costs excluding Mob cost
802S-B C.I.P.	2	EA	C.I.P. Project Sign	$500.00	$1,000.00	
SP803S-CD	546	CD	Barricades, Signs, and Traffic Handling.	$230.00	$125,580.00	
SP803S-PS	546	CD	Portable Changeable Message Signs	$100.00	$54,600.00	
831S-2	2	EA	36" Diameter Traffic Signal Drilled Shaft Foundations 10' Depth	$5,200.00	$10,400.00	
833S-PPB	2	EA	Pedestrian Pushbutton	$650.00	$1,300.00	
834S-C	2	EA	Traffic Signal Pull Box, Type C	$3,200.00	$6,400.00	
853S-LTM	200	LF	Installing Traffic Signal Conduit with 3 Conduits 3 inch in Diameter	$52.00	$10,400.00	
839S-MAP1	2	EA	Type 1 Mast Arm Pole	$4,000.00	$8,000.00	
839S-MA25	2	EA	25 Foot Mast Arm	$4,000.00	$8,000.00	
840S-TSI	2	EA	Traffic Signal Installation	$2,500.00	$5,000.00	
844S-3	200	LF	Class 3 Trenching for Traffic Signal Conduit	$100.00	$20,000.00	
871S-A	24,320	LF	Reflectorized Type 1 Thermoplastic Pavement Markings	$6.00	$145,920.00	same as local streets
			SUB-TOTAL		**$4,736,592.00**	
			25% Contingency		**$1,184,148.00**	
			Total Construction		**$5,920,740.00**	
			50% Non-Construction Cost		**$2,960,370.00**	
			Total Cost per 60-Acre Tract		**$8,881,110.00**	

Exhibit B

Table B.6 Stream Channel Stabilization
Engineer's Opnion of Probable Construction Cost
30 Stream Miles (158,400 feet)

Item No.	Quantity	Unit	Item Description	Unit Price	Amount	
102S-A	238	AC	Clearing and Grubbing	$8,200	$1,951,600.00	.84ac every 560ft
130-A	43,560	CY	Class A (Select Borrow)	$22.00	$958,320.00	154cy every 560ft
130-T	60,814	CY	Class C (Top Soil)	$30.00	$1,824,420.00	215cy every 560ft
132-A	95,322	CY	Embankment	$12.00	$1,143,864.00	337cy every 560ft
SP401S-I	1	LS	Cofferdams	$7,071,429.00	$7,071,429.00	$25k every 560ft
SP401S-J	1	LS	Dewatering	$4,242,857.00	$4,242,857.00	$15k every 560ft
SP401S-K	45,258	CY	Drain Aggregate for Limestone Block Wall	$60.00	$2,715,480.00	160cy every 560ft
508S-E	30	EA	Energy Dissipators, 36 In. Dia.	$5,000.00	$150,000.00	1 every mile
508S-H	30	EA	Headwalls, Type _, 36 In. Dia. Pipe	$5,000.00	$150,000.00	1 every mile
509S-1	286,534	LF	Trench Excavation Safety Protection System (All Depths)	$5.00	$1,432,670.00	1013ft every 560ft
510-ASW36	12,000	LF	Pipe, 36 - inch R.C.P. Storm Drain (all depths), including Excavation and Backfil	$138.00	$1,656,000.00	1 pipe per mile; 400ft per pipe
510-GWW	240	LF	Concrete Cap and Encasement, 24-Inch/42-Inch/48-Inch Dia. Pipes in One Trench	$250.00	$60,000.00	40ft every 5 miles
SP591S-B18	424,286	CY	Dry-Riprap, 18" D50 Gradation	$85.00	$36,064,310.00	1500cy every 560ft
SP591S-B30	135,772	CY	Dry-Riprap, 30" D50 Gradation	$95.00	$12,898,340.00	480cy every 560ft
SP591S-C	101,830	CY	Dry-Riprap, Salvage and Re-Use Ex Dry Riprap	$70.00	$7,128,100.00	360cy every 560ft
594S-G	146,238	CY	Gabions, Twisted Woven Wire	$200.00	$29,247,600.00	517cy every 560ft
605S-A	495,850	SY	Soil Retention Blanket Class 2, Type H	$8.00	$3,966,800.00	1753sy every 560ft
SP605S-A	560,060	SY	Landlok TRM 450 or Approved Equal	$7.00	$3,920,420.00	1980sy every 560ft
SP607S-A	62,230	CY	Angular Limestone Block	$300.00	$18,669,000.00	220cy every 560ft
SP607S-B1200	43,840	SY	Geogrid, Tensar BX1200 or Approved Equa	$14.00	$613,760.00	155sy every 560ft
SP607S-B1220	277,200	SY	Geogrid, Tensar BX1220 or Approved Equa	$12.00	$3,326,400.00	980sy every 560ft
608S-1	6,336	EA	Planting Type, Tree, Burr Oak, 3 Inches in Size	$500.00	$3,168,000.00	2 trees every 50 feet
SP608S-3G1-1	80,330	EA	Planting Type, Perennial, Grey Spears, Size 1 Gallor	$11.00	$883,630.00	284 every 560ft
SP608S-3G1-2	46,670	EA	Planting Type, Perennial, Green Rush, Size 1 Gallor	$11.00	$513,370.00	165 every 560ft
SP608S-3G3-1	15,270	EA	Planting Type, Perennial, Wood Rose, Size 1 Gallon	$32.00	$488,640.00	54 every 560ft
SP608S-3G20-1	570	EA	Planting Type, Tree, River Birch, Size 20 Gallor	$300.00	$171,000.00	2 every 560ft
SP608S-3G20-2	5,660	EA	Planting Type, Tree, Mexican Plum, Size 20 Gallor	$300.00	$1,698,000.00	20 every 560ft
SP608S-3G20-3	9,620	EA	Planting Type, Tree, Possum Haw Holly (Female), Size 20 Gallor	$300.00	$2,886,000.00	34 every 560ft
SP608S-3G20-4	1,700	EA	Planting Type, Tree, Carolina Buckthorn, Size 20 Gallor	$300.00	$510,000.00	6 every 560ft
SP608S-5P4-1	16,120	EA	Planting Type, Perennial, Swamp Verbena, Size 4 Inch Po	$6.00	$96,720.00	57 every 560ft
SP608S-5P4-2	14,140	EA	Planting Type, Perennial, Beaked Spikerush, Size 4 Inch Po	$6.00	$84,840.00	50 every 560ft
SP608S-5P4-3	50,910	EA	Planting Type, Perennial, Spike Rush, Size 4 Inch Po	$6.00	$305,460.00	180 every 560ft
SP608S-5P4-4	622,290	EA	Planting Type, Perennial, Emory Sedge, Size 4 Inch Po	$5.00	$3,111,450.00	2200 every 560ft
SP608S-5P4-5	526,110	EA	Planting Type, Perennial, Cherokee Sedge, Size 4 Inch Po	$5.00	$2,630,550.00	1860 every 560ft
SP608S-5P4-6	192,340	EA	Planting Type, Perennial, Copper Lilly, Size 4 Inch Po	$5.00	$961,700.00	680 every 560ft
SP608S-5P4-7	328,110	EA	Planting Type, Perennial, Missouri Violet, Size 4 Inch Po	$5.00	$1,640,550.00	1160 every 560ft
SP608S-6B1-1	19,520	EA	Planting Type, Bulbs, Zigag Iris	$4.00	$78,080.00	69 every 560ft
SP608S-6B1-2	43,560	EA	Planting Type, Bulbs, American Water Willow	$4.00	$174,240.00	154 every 560ft
SP608S	28,290	EA	Planting Type, Bulbs, Native Planting	$85.00	$2,404,650.00	100 every 560ft
609S-C	471,800	SY	Native Grassland Seeding and Planting	$5.00	$2,359,000.00	1668sy every 560ft
SP609S-I-1	195,170	SY	Native Grassland Seeding and Planting, Type Big Red Sage	$6.00	$1,171,020.00	690sy every 560ft
SP609S-I-2	251,740	SY	Native Grassland Seeding and Planting, Type Switchgrass	$6.00	$1,510,440.00	890sy every 560sf
SP609S-I-3	251,740	SY	Native Grassland Seeding and Planting, Type Indian Grass	$6.00	$1,510,440.00	890sy every 560sf
SP609S-J	2,859,690	SY	Native Wetland Mitigation Seeding	$4.00	$11,438,760.00	10,110sy every 560ft
SP609S-K	2,859,690	SY	Watering for Wetland Mitigation	$1.00	$2,859,690.00	10110sy every 560ft
SP609S-L	2,859,690	SY	De-Weeding by Phisical Removal for Wetland Mitigation	$3.00	$8,579,070.00	10110sy every 560ft
610S-A	316,800	LF	Protective Fencing Type A Chain Link Fence	$3.00	$950,400.00	1120ft every 560ft
610S-D	1,130	EA	Tree Well (Tree Protection)	$3,000.00	$3,390,000.00	4 every 560ft
620S	212,140	SY	Filter Fabric	$4.00	$848,560.00	750sy every 560ft
639S	154,160	LF	Rock Berm	$50.00	$7,708,000.00	545ft every 560ft
641S	1,410	EA	Stabilized Construction Entrance	$1,000.00	$1,410,000.00	5 every 560ft
642S	316,800	LF	Silt Fence for Erosion Control	$2.00	$633,600.00	1120ft every 560ft
700S-TM	1	LS	Total Mobilization Payment	$9,925,000.00	$9,925,000.00	4.75% of all costs excluding Mob cost
701S-T	84,860	LF	Temporary 4' High Woven Wire Fencing	$7.00	$594,020.00	300 ft every 560ft
702S-A	99,280	LF	Removing and Relocating Existing 4 Ft Chain Link Fence	$11.00	$1,092,080.00	351ft every 560ft

Exhibit B

Table B.6 Stream Channel Stabilization
Engineer's Opnion of Probable Construction Cost
30 Stream Miles (158,400 feet)

Item No.	Quantity	Unit	Item Description	Unit Price	Amount	
802S-B C.I.P.	280	EA	C.I.P. Project Sign	$500.00	$140,000.00	1 every 560ft
SP803S-MO	1,130	MO	Barricades, Signs, and Traffic Handling.	$1,550.00	$1,751,500.00	4mo every 560ft

SUB-TOTAL	**$218,869,830.00**
25% Contingency	**$54,717,457.50**
Total Construction	**$273,587,287.50**
50% Non-Construction Cost	**$136,793,643.75**
Total Cost per 30 Miles	**$410,380,931.25**

APPENDIX C

OPERATIONS, MAINTENANCE & SERVICE COST TABLES

Table C.1 Austin Water Utility
Annual Operations & Maintanance Costs

Program	Activity	100% Annual Budget	Low-End Range of Annual Cost, %	Low-End Total Annual Cost	Notes
Engineering Services					
	Distribution Engineering	$ 2,771,364	25%	$ 692,841	(1)
	Facility Engineeing	$ 2,989,570	25%	$ 747,393	(2)
	Collection Engineering	$ 3,996,303	25%	$ 999,076	(1)
	Pipeline Engineering	$ 1,031,728	25%	$ 257,932	(1)
	Infrastructure Records	$ 1,223,789	25%	$ 305,947	(1)
Environmental Affairs & Conservation					
	Wildlife Conservation	$ 2,476,957	90%	$ 2,229,261	(3)
	Water Conservation	$ 6,644,349	25%	$ 1,661,087	(1)
	Special Services	$ 2,092,232	25%	$ 523,058	(1)
One Stop Shop					
	Inspection, Review & Support	$ 523,962	25%	$ 130,991	(1)
Pipeline Operations					
	Water Meter Operations	$ 4,635,146	25%	$ 1,158,787	(1)
	Collection System Services	$ 11,078,811	25%	$ 2,769,703	(1)
	Distribution System Maintenance	$ 12,345,018	25%	$ 3,086,255	(1)
	Construction & Rehabilitation Services	$ 4,223,699	50%	$ 2,111,850	(4)
	Maintenance Services	$ 1,508,114	25%	$ 377,029	(1)
Reclaimed Water Services		$ 262,585	25%	$ 65,646	(1)
Support Services		$ 16,938,781	25%	$ 4,234,695	(1)
Treatment					
	Lift Stations & Remote Facilities	$ 4,338,304	90%	$ 3,904,474	(3)
	Pump Station & Reservoir Management	$ 6,627,966	90%	$ 5,965,169	(3)
	Maintenance Services	$ 4,200,776	50%	$ 2,100,388	(4)
Water Resources Management					
	Utility Services Development	$ 1,162,075	25%	$ 290,519	(1)
	Systems Planning	$ 2,377,759	25%	$ 594,440	(1)
Total Annual Cost:		**$ 93,449,288**		**$ 34,206,538**	
Current Population		840,000		840,000	
Annual Cost Per Capita		$ 111.25		$ 40.72	

Notes:
(1) 75% cost reduction due to efficiencies in support services and minimal support needed for first 15 years due to new infrastructure.
(2) 75% cost reduction due to minimal increase in treatment costs.
(3) 10% cost reduction due to duplication of services in greenfield area.
(4) 50% cost reduction due to considerable maintenance in eastern sector of City caused by high plasticity clay soils.

Table C.2 Austin Water Utility
30-Year Operations & Maintenance Costs

Year	1	2	3	4	5	6	7	8	9	10
Trend Growth Population	8,284	16,567	24,850	33,134	41,417	49,700	57,984	66,267	74,550	82,834
Program Cost per Capita-High Range (1)	$111.25	$111.25	$111.25	$111.25	$111.25	$111.25	$111.25	$111.25	$111.25	$111.25
Program Cost for Trend Population (High Range)	$921,595	$1,843,079	$2,764,563	$3,686,158	$4,607,641	$5,529,125	$6,450,720	$7,372,204	$8,293,688	$9,215,283
Program Cost per Capita-Low Range (1)	$40.72	$40.72	$40.72	$40.72	$40.72	$40.72	$40.72	$40.72	$40.72	$40.72
Program Cost for Trend Population (Low Range)	337,324	674,608	1,011,892	1,349,216	1,686,500	2,023,784	2,361,108	2,698,392	3,035,676	3,373,000

Year	11	12	13	14	15	16	17	18	19	20
Trend Growth Population	91,167	99,400	107,684	115,967	124,250	132,534	140,817	149,100	157,384	165,667
Program Cost per Capita-High Range (1)	$111.25	$111.25	$111.25	$111.25	$111.25	$111.25	$111.25	$111.25	$111.25	$111.25
Program Cost for Trend Population (High Range)	$10,142,329	$11,058,250	$11,979,845	$12,901,329	$13,822,813	$14,744,408	$15,665,891	$16,587,375	$17,508,970	$18,430,454
Program Cost per Capita-Low Range (1)	$40.72	$40.72	$40.72	$40.72	$40.72	$40.72	$40.72	$40.72	$40.72	$40.72
Program Cost for Trend Population (Low Range)	3,712,320	4,047,568	4,384,892	4,722,176	5,059,460	5,396,784	5,734,068	6,071,352	6,408,676	6,745,960

Year	21	22	23	24	25	26	27	28	29	30
Trend Growth Population	173,950	182,234	190,517	198,800	207,084	215,367	223,650	231,934	240,217	248,500
Program Cost per Capita-High Range (1)	$111.25	$111.25	$111.25	$111.25	$111.25	$111.25	$111.25	$111.25	$111.25	$111.25
Program Cost for Trend Population (High Range)	$19,351,938	$20,273,533	$21,195,016	$22,116,500	$23,038,095	$23,959,579	$24,881,063	$25,802,658	$26,724,141	$27,645,625
Program Cost per Capita-Low Range (1)	$40.72	$40.72	$40.72	$40.72	$40.72	$40.72	$40.72	$40.72	$40.72	$40.72
Program Cost for Trend Population (Low Range)	7,083,244	7,420,568	7,757,852	8,095,136	8,432,460	8,769,744	9,107,028	9,444,352	9,781,636	10,118,920

Total 30-Year Program Cost for Trend Population (High Range) **$428,513,863**
Total 30-Year Program Cost for Trend Population (Low Range) **$156,845,703**

(1) See Table C.1 for Per-Capita cost calculations.

Table C.3 Austin Transportation Department
Annual Operations & Maintanance Costs

Program	Activity	100% Annual Budget	Low-End Range of Annual Cost, %	Low-End Total Annual Cost	Notes
Parking Management		$ 4,023,526	25%	$ 1,005,882	(1)
Support Services		$ 976,973	50%	$ 488,487	(2)
Traffic Management					
	Traffic Signs	$ 1,645,351	25%	$ 411,338	(1)
	Transportation Engineering	$ 1,427,514	50%	$ 713,757	(2)
	Transportation Markings	$ 1,972,142	25%	$ 493,036	(1)
	Arterial Management	$ 3,256,344	25%	$ 814,086	(1)
Total Annual Cost:		**$ 13,301,850**		**$ 3,926,584**	
Current Population		840,000		840,000	
Annual Cost Per Capita		$ 15.84		$ 4.67	

Notes:
(1) 75% cost reduction due to mostly residential use in the greenfield areas.
(2) 50% cost reduction due to some efficiencies in support services.

Table C.4 Austin Transportation Department
30-Year Operations & Maintenance Costs

Year	1	2	3	4	5	6	7	8	9	10
Trend Growth Population	8,284	16,567	24,850	33,134	41,417	49,700	57,984	66,267	74,550	82,834
Program Cost per Capita-High Range (1)	$15.84	$15.84	$15.84	$15.84	$15.84	$15.84	$15.84	$15.84	$15.84	$15.84
Program Cost for Trend Population (High Range)	$131,219	$262,421	$393,624	$524,843	$656,045	$787,248	$918,467	$1,049,669	$1,180,872	$1,312,091
Program Cost per Capita-Low Range (1)	$4.67	$4.67	$4.67	$4.67	$4.67	$4.67	$4.67	$4.67	$4.67	$4.67
Program Cost for Trend Population (Low Range)	38,686	77,368	116,050	154,736	193,417	232,099	270,785	309,467	348,149	386,835

Year	11	12	13	14	15	16	17	18	19	20
Trend Growth Population	91,167	99,400	107,684	115,967	124,250	132,534	140,817	149,100	157,384	165,667
Program Cost per Capita-High Range (1)	$15.84	$15.84	$15.84	$15.84	$15.84	$15.84	$15.84	$15.84	$15.84	$15.84
Program Cost for Trend Population (High Range)	$1,444,085	$1,574,496	$1,705,715	$1,836,917	$1,968,120	$2,099,339	$2,230,541	$2,361,744	$2,492,963	$2,624,165
Program Cost per Capita-Low Range (1)	$4.67	$4.67	$4.67	$4.67	$4.67	$4.67	$4.67	$4.67	$4.67	$4.67
Program Cost for Trend Population (Low Range)	425,750	464,198	502,884	541,566	580,248	618,934	657,615	696,297	734,983	773,665

Year	21	22	23	24	25	26	27	28	29	30
Trend Growth Population	173,950	182,234	190,517	198,800	207,084	215,367	223,650	231,934	240,217	248,500
Program Cost per Capita-High Range (1)	$15.84	$15.84	$15.84	$15.84	$15.84	$15.84	$15.84	$15.84	$15.84	$15.84
Program Cost for Trend Population (High Range)	$2,755,368	$2,886,587	$3,017,789	$3,148,992	$3,280,211	$3,411,413	$3,542,616	$3,673,835	$3,805,037	$3,936,240
Program Cost per Capita-Low Range (1)	$4.67	$4.67	$4.67	$4.67	$4.67	$4.67	$4.67	$4.67	$4.67	$4.67
Program Cost for Trend Population (Low Range)	812,347	851,033	889,714	928,396	967,082	1,005,764	1,044,446	1,083,132	1,121,813	1,160,495

Total 30-Year Program Cost for Trend Population (High Range) **$61,012,670**
Total 30-Year Program Cost for Trend Population (Low Range) **$17,987,953**

(1) See Table C.3 for Per-Capita cost calculations.

Table C.5 Austin Public Works Department
Annual Operations & Maintanance Costs

Program	Activity	100% Annual Budget	Low-End Range of Annual Cost, %	Low-End Total Annual Cost	Notes
Bicycle & Pedestrian Infrastructure Management		$ 436,776	50%	$ 218,388	(1)
Bridge Maintenance		$ 747,000	50%	$ 373,500	(1)
Child Safety					
	Safety Education	$ 126,202	90%	$ 113,582	(2)
	School Infrastructure	$ 50,000	90%	$ 45,000	(2)
	School Crossing Guards	$ 1,353,346	90%	$ 1,218,011	(2)
Minor Construction and Repair					
	Utility Excavation Repair	$ 4,518,825	50%	$ 2,259,413	(1)
	Concrete Repair & Construction	$ 2,058,732	50%	$ 1,029,366	(1)
Street Preventative Maintenance					
	Crack Seal Resurfacing	$ 762,035	90%	$ 685,832	(3)
	Asphalt Overlay	$ 12,350,230	50%	$ 6,175,115	(1)
	Operations Management	$ 1,614,457	50%	$ 807,229	(4)
	Seal Coat	$ 7,370,658	90%	$ 6,633,592	(3)
Routine Roadway & Alley Maintenance		$ 6,001,686	50%	$ 3,000,843	(1)
Support Services		$ 5,364,853	50%	$ 2,682,427	(4)
Total Annual Cost:		**$ 42,754,800**		**$ 25,242,296**	
Current Population		840,000		840,000	
Annual Cost Per Capita		$ 50.90		$ 30.05	

Notes:
(1) 50% cost reduction due to lesser infrastructure management over the first 15 years due to new infrastructure construction.
(2) 10% cost reduction due to higher percentage of trend population assumed to be children.
(3) 10% cost reduction due to considerable maintenance services in eastern sector of City caused by high plasticity clay soils.
(4) 50% cost reduction due to some efficiencies in support services.

Table C.6 Austin Public Works Department
30-Year Operations & Maintenance Costs

Year	1	2	3	4	5	6	7	8	9	10
Trend Growth Population	8,284	16,567	24,850	33,134	41,417	49,700	57,984	66,267	74,550	82,834
Program Cost per Capita-High Range (1)	$50.90	$50.90	$50.90	$50.90	$50.90	$50.90	$50.90	$50.90	$50.90	$50.90
Program Cost for Trend Population (High Range)	$421,656	$843,260	$1,264,865	$1,686,521	$2,108,125	$2,529,730	$2,951,386	$3,372,990	$3,794,595	$4,216,251
Program Cost per Capita-Low Range (1)	$30.05	$30.05	$30.05	$30.05	$30.05	$30.05	$30.05	$30.05	$30.05	$30.05
Program Cost for Trend Population (Low Range)	248,934	497,838	746,743	995,677	1,244,581	1,493,485	1,742,419	1,991,323	2,240,228	2,489,162

Year	11	12	13	14	15	16	17	18	19	20
Trend Growth Population	91,167	99,400	107,684	115,967	124,250	132,534	140,817	149,100	157,384	165,667
Program Cost per Capita-High Range (1)	$50.90	$50.90	$50.90	$50.90	$50.90	$50.90	$50.90	$50.90	$50.90	$50.90
Program Cost for Trend Population (High Range)	$4,640,400	$5,059,460	$5,481,116	$5,902,720	$6,324,325	$6,745,981	$7,167,585	$7,589,190	$8,010,846	$8,432,450
Program Cost per Capita-Low Range (1)	$30.05	$30.05	$30.05	$30.05	$30.05	$30.05	$30.05	$30.05	$30.05	$30.05
Program Cost for Trend Population (Low Range)	2,739,568	2,986,970	3,235,904	3,484,808	3,733,713	3,982,647	4,231,551	4,480,455	4,729,389	4,978,293

Year	21	22	23	24	25	26	27	28	29	30
Trend Growth Population	173,950	182,234	190,517	198,800	207,084	215,367	223,650	231,934	240,217	248,500
Program Cost per Capita-High Range (1)	$50.90	$50.90	$50.90	$50.90	$50.90	$50.90	$50.90	$50.90	$50.90	$50.90
Program Cost for Trend Population (High Range)	$8,854,055	$9,275,711	$9,697,315	$10,118,920	$10,540,576	$10,962,180	$11,383,785	$11,805,441	$12,227,045	$12,648,650
Program Cost per Capita-Low Range (1)	$30.05	$30.05	$30.05	$30.05	$30.05	$30.05	$30.05	$30.05	$30.05	$30.05
Program Cost for Trend Population (Low Range)	5,227,198	5,476,132	5,725,036	5,973,940	6,222,874	6,471,778	6,720,683	6,969,617	7,218,521	7,467,425

Total 30-Year Program Cost for Trend Population (High Range) **$196,057,129**
Total 30-Year Program Cost for Trend Population (Low Range) **$115,746,891**

(1) See Table C.5 for Per-Capita cost calculations.

Table C.7 Austin Resource Recovery
8-Year Zero Waste Master Plan Implementation Cost

Fiscal Year	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
New Program Costs	$4,340,000	$6,420,000	$8,536,000	$9,243,000	$9,331,000	$9,475,000	$9,620,000	$9,652,000
Cart Fee Program Costs	$46,320,000	$48,382,000	$53,155,000	$56,401,000	$59,222,000	$62,294,000	$65,427,000	$68,477,000
Anti-Litter Fee Program Costs	$26,126,000	$28,884,000	$29,444,000	$30,710,000	$32,116,000	$33,627,000	$35,145,000	$36,594,000
Total Program Costs (1)	**$76,786,000**	**$83,686,000**	**$91,135,000**	**$96,354,000**	**$100,669,000**	**$105,396,000**	**$110,192,000**	**$114,723,000**
Total Population	865,390	890,390	915,390	940,000	965,390	990,390	1,015,390	1,040,390
Prrogram Cost Per Capita	$88.73	$93.99	$99.56	$102.50	$104.28	$106.42	$108.52	$110.27

(1) Program cost data from "Austin Resource Recovery Master Plan, Austin's Roadmap Toward Zero Waste".

Table C.8 Austin Resource Recovery

Annual Operations & Maintanance Costs

Program	Activity	100% Annual Budget	Low-End Range of Annual Cost, %	Low-End Total Annual Cost	Notes
Brownfields Redevelopment		$ 214,139	10%	$ 21,414	(1)
Collection Services					
	Brush Processing	$ 661,887	90%	$ 595,698	(2)
	Brush/Bulk Collection	$ 3,996,670	90%	$ 3,597,003	(2)
	Yard Trimmings Collection	$ 2,832,387	90%	$ 2,549,148	(2)
	Garbage Collection	$ 14,387,229	50%	$ 7,193,615	(3)
	Recycling Collection	$ 10,244,079	50%	$ 5,122,040	(3)
Litter Abatement					
	Street Cleaning	$ 2,461,825	75%	$ 1,846,369	(4)
	Household Hazardous Waste	$ 1,157,528	10%	$ 115,753	(5)
	Litter Control	$ 2,489,494	50%	$ 1,244,747	(3)
Operations Support					
	Service Request Center	$ 1,192,392	50%	$ 596,196	(6)
	Routing/Cart Operations	$ 2,939,700	50%	$ 1,469,850	(6)
Support Services		$ 6,910,115	50%	$ 3,455,058	(6)
Waste Diversion					
	Zero Waste	$ 2,991,051	90%	$ 2,691,946	(2)
Total Annual Cost:		**$ 52,478,496**		**$ 30,498,835**	
Current Population		840,000		840,000	
Annual Cost Per Capita		$ 62.47		$ 36.31	

Notes:
(1) 90% cost reduction due to few assumed brownfields in the east sector of the City.
(2) 10% cost reduction due to duplication of services in the greenfield areas.
(3) 50% cost reduction due to dispersed population and larger lots.
(4) 25% cost reduction due to exclusion of cost in the Central Business District.
(5) 90% cost reduction due to common services regardless of location.
(6) 50% cost reduction due to efficiencies in support services.

Table C.9 Austin Resource Recovery
30-Year Program (Zero Waste Program), Operations & Maintenance Costs

Year	1	2	3	4	5	6	7	8	9	10
Trend Growth Population	8,284	16,567	24,850	33,134	41,417	49,700	57,984	66,267	74,550	82,834
Zero Waste Program Cost per Capita	$89	$89	$89	$94	$100	$103	$104	$106	$109	$110
Zero Waste Program Cost	$737,276	$1,474,463	$2,211,650	$3,114,596	$4,141,700	$5,119,100	$6,030,336	$7,024,302	$8,125,950	$9,111,740
O&M Program Cost per Capita-High Range (1)	$62.47	$62.47	$62.47	$62.47	$62.47	$62.47	$62.47	$62.47	$62.47	$62.47
O&M Program Cost for Trend Population (High Range)	$517,501	$1,034,940	$1,552,380	$2,069,881	$2,587,320	$3,104,759	$3,622,260	$4,139,699	$4,657,139	$5,174,640
O&M Program Cost per Capita-Low Range (1)	$36.31	$36.31	$36.31	$36.31	$36.31	$36.31	$36.31	$36.31	$36.31	$36.31
O&M Program Cost for Trend Population (Low Range)	300,792	601,548	902,304	1,203,096	1,503,851	1,804,607	2,105,399	2,406,155	2,706,911	3,007,703

Year	11	12	13	14	15	16	17	18	19	20
Trend Growth Population	91,167	99,400	107,684	115,967	124,250	132,534	140,817	149,100	157,384	165,667
Zero Waste Program Cost per Capita	$111	$112	$113	$114	$115	$116	$117	$118	$119	$120
Zero Waste Program Cost	$10,119,537	$11,132,800	$12,168,292	$13,220,238	$14,288,750	$15,373,944	$16,475,589	$17,593,800	$18,728,696	$19,880,040
O&M Program Cost per Capita-High Range (1)	$62.47	$62.47	$62.47	$62.47	$62.47	$62.47	$62.47	$62.47	$62.47	$62.47
O&M Program Cost for Trend Population (High Range)	$5,695,202	$6,209,518	$6,727,019	$7,244,458	$7,761,898	$8,279,399	$8,796,838	$9,314,277	$9,831,778	$10,349,217
O&M Program Cost per Capita-Low Range (1)	$36.31	$36.31	$36.31	$36.31	$36.31	$36.31	$36.31	$36.31	$36.31	$36.31
O&M Program Cost for Trend Population (Low Range)	3,310,274	3,609,214	3,910,006	4,210,762	4,511,518	4,812,310	5,113,065	5,413,821	5,714,613	6,015,369

Year	21	22	23	24	25	26	27	28	29	30
Trend Growth Population	173,950	182,234	190,517	198,800	207,084	215,367	223,650	231,934	240,217	248,500
Zero Waste Program Cost per Capita	$121	$122	$123	$124	$125	$126	$127	$128	$129	$130
Zero Waste Program Cost	$21,047,950	$22,232,548	$23,433,591	$24,651,200	$25,885,500	$27,136,242	$28,403,550	$29,687,552	$30,987,993	$32,305,000
O&M Program Cost per Capita-High Range (1)	$62.47	$62.47	$62.47	$62.47	$62.47	$62.47	$62.47	$62.47	$62.47	$62.47
O&M Program Cost for Trend Population (High Range)	$10,866,657	$11,384,158	$11,901,597	$12,419,036	$12,936,537	$13,453,976	$13,971,416	$14,488,917	$15,006,356	$15,523,795
O&M Program Cost per Capita-Low Range (1)	$36.31	$36.31	$36.31	$36.31	$36.31	$36.31	$36.31	$36.31	$36.31	$36.31
O&M Program Cost for Trend Population (Low Range)	6,316,125	6,616,917	6,917,672	7,218,428	7,519,220	7,819,976	8,120,732	8,421,524	8,722,279	9,023,035

Total 30-Year Zero Waste Program Cost for Trend Population **$461,843,925**
Total 30-Year O&M Program Cost for Trend Population (High Range) **$240,622,571**
Total 30-Year O&M Program Cost for Trend Population (Low Range) **$139,859,221**

(1) See Table C.8 for Per-Capita cost calculations.

Table C.10 Austin Watershed Maintenance
Annual Operations & Maintanance Costs

Program	Activity	100% Annual Budget	Low-End Range of Annual Cost, %	Low-End Total Annual Cost	Notes
Flood Hazard Mitigation					
	Watershed Management	$ 966,990	90%	$ 870,291	(2)
	Flood Safety	$ 3,843,552	67%	$ 2,575,180	(1)
Infrastructure & Waterway Maintenance					
	Drainage Pipeline Management	$ 3,828,371	50%	$ 1,914,186	(3)
	Storm Water Management	$ 3,444,309	90%	$ 3,099,878	(4)
	Field Operations Management	$ 5,274,220	50%	$ 2,637,110	(3)
Master Planning					
	Data Management	$ 978,384	75%	$ 733,788	(5)
	Watershed Protection Master Planning	$ 338,186	100%	$ 338,186	(6)
Stream Restoration Services		$ 830,153	100%	$ 830,153	(6)
Support Services		$ 3,476,268	50%	$ 1,738,134	(7)
Water Quality Protection					
	Stormwater Monitoring & Treatment	$ 2,648,935	90%	$ 2,384,042	(6)
	Surface & Groundwater Protection	$ 2,009,473	90%	$ 1,808,526	(6)
	Pollution Prevention & Reduction	$ 1,581,522	90%	$ 1,423,370	(6)
Total Annual Cost:		**$ 29,220,363**		**$ 20,352,842**	
Current Population		840,000		840,000	
Annual Cost Per Capita		$ 34.79		$ 24.23	

Notes:
(1) 1/3 cost reduction due to exclusion of pond dam safety program costs.
(2) 10% cost reduction due to considerable floodplain issues to be addressed in the east sector of the City.
(3) 50% cost reduction due to reduced drainage facility maintenance for new storm drain infrastructure for the first 15 years.
(4) 10% cost reduction due to all storm water management activities to continue except for lake cleanup/monitoring.
(5) 25% cost reduction due to less GIS support for new infrastructure, but considerable water resources issues still remain in the east sector of the City.
(6) No cost reduction due to considerable water resources issues remain in the east sector of the City.
(7) 50% cost reduction due to efficiencies in providing support services.

Table C.11 Austin Watershed Protection Department
30-Year Operations & Maintenance Costs

Year	1	2	3	4	5	6	7	8	9	10
Trend Growth Population	8,284	16,567	24,850	33,134	41,417	49,700	57,984	66,267	74,550	82,834
Program Cost per Capita-High Range (1)	$34.79	$34.79	$34.79	$34.79	$34.79	$34.79	$34.79	$34.79	$34.79	$34.79
Program Cost for Trend Population (High Range)	$288,200	$576,366	$864,532	$1,152,732	$1,440,897	$1,729,063	$2,017,263	$2,305,429	$2,593,595	$2,881,795
Program Cost per Capita-Low Range (1)	$24.23	$24.23	$24.23	$24.23	$24.23	$24.23	$24.23	$24.23	$24.23	$24.23
Program Cost for Trend Population (Low Range)	200,721	401,418	602,116	802,837	1,003,534	1,204,231	1,404,952	1,605,649	1,806,347	2,007,068

Year	11	12	13	14	15	16	17	18	19	20
Trend Growth Population	91,167	99,400	107,684	115,967	124,250	132,534	140,817	149,100	157,384	165,667
Program Cost per Capita-High Range (1)	$34.79	$34.79	$34.79	$34.79	$34.79	$34.79	$34.79	$34.79	$34.79	$34.79
Program Cost for Trend Population (High Range)	$3,171,700	$3,458,126	$3,746,326	$4,034,492	$4,322,658	$4,610,858	$4,899,023	$5,187,189	$5,475,389	$5,763,555
Program Cost per Capita-Low Range (1)	$24.23	$24.23	$24.23	$24.23	$24.23	$24.23	$24.23	$24.23	$24.23	$24.23
Program Cost for Trend Population (Low Range)	2,208,976	2,408,462	2,609,183	2,809,880	3,010,578	3,211,299	3,411,996	3,612,693	3,813,414	4,014,111

Year	21	22	23	24	25	26	27	28	29	30
Trend Growth Population	173,950	182,234	190,517	198,800	207,084	215,367	223,650	231,934	240,217	248,500
Program Cost per Capita-High Range (1)	$34.79	$34.79	$34.79	$34.79	$34.79	$34.79	$34.79	$34.79	$34.79	$34.79
Program Cost for Trend Population (High Range)	$6,051,721	$6,339,921	$6,628,086	$6,916,252	$7,204,452	$7,492,618	$7,780,784	$8,068,984	$8,357,149	$8,645,315
Program Cost per Capita-Low Range (1)	$24.23	$24.23	$24.23	$24.23	$24.23	$24.23	$24.23	$24.23	$24.23	$24.23
Program Cost for Trend Population (Low Range)	4,214,809	4,415,530	4,616,227	4,816,924	5,017,645	5,218,342	5,419,040	5,619,761	5,820,458	6,021,155

Total 30-Year Program Cost for Trend Population (High Range) **$134,004,470**
Total 30-Year Program Cost for Trend Population (Low Range) **$93,329,356**

(1) See Table C.10 for Per-Capita cost calculations.

Table C.12 Austin Public Library
Annual Operations & Maintanance Costs

Program	Activity	100% Annual Budget	Low-End Range of Annual Cost, %	Low-End Total Annual Cost	Notes
Materials Management Services					
	Collection Support	$ 4,015,812	50%	$ 2,007,906	(1)
	Cataloging Support	$ 1,034,312	50%	$ 517,156	(1)
Public Services					
	Circulation	$ 11,326,351	50%	$ 5,663,176	(1)
	Youth Services	$ 1,853,152	50%	$ 926,576	(1)
	Reference & Information Services	$ 1,194,874	50%	$ 597,437	(1)
Support Services		$ 6,357,945	50%	$ 3,178,973	(1)
Total Annual Cost:		**$ 25,782,446**		**$ 12,891,223**	
Current Population		840,000		840,000	
Annual Cost Per Capita		$ 30.69		$ 15.35	

Notes:
(1) 50% cost reduction due to efficiencies in providing support services.

Table C.13 Austin Public Library
30-Year Operations & Maintenance Costs

Year	1	2	3	4	5	6	7	8	9	10
Trend Growth Population	8,284	16,567	24,850	33,134	41,417	49,700	57,984	66,267	74,550	82,834
Program Cost per Capita-High Range (1)	$30.69	$30.69	$30.69	$30.69	$30.69	$30.69	$30.69	$30.69	$30.69	$30.69
Program Cost for Trend Population (High Range)	$254,236	$508,441	$762,647	$1,016,882	$1,271,088	$1,525,293	$1,779,529	$2,033,734	$2,287,940	$2,542,175
Program Cost per Capita-Low Range (1)	$15.35	$15.35	$15.35	$15.35	$15.35	$15.35	$15.35	$15.35	$15.35	$15.35
Program Cost for Trend Population (Low Range)	127,159	254,303	381,448	508,607	635,751	762,895	890,054	1,017,198	1,144,343	1,271,502

Year	11	12	13	14	15	16	17	18	19	20
Trend Growth Population	91,167	99,400	107,684	115,967	124,250	132,534	140,817	149,100	157,384	165,667
Program Cost per Capita-High Range (1)	$30.69	$30.69	$30.69	$30.69	$30.69	$30.69	$30.69	$30.69	$30.69	$30.69
Program Cost for Trend Population (High Range)	$2,797,915	$3,050,586	$3,304,822	$3,559,027	$3,813,233	$4,067,468	$4,321,674	$4,575,879	$4,830,115	$5,084,320
Program Cost per Capita-Low Range (1)	$15.35	$15.35	$15.35	$15.35	$15.35	$15.35	$15.35	$15.35	$15.35	$15.35
Program Cost for Trend Population (Low Range)	1,399,413	1,525,790	1,652,949	1,780,093	1,907,238	2,034,397	2,161,541	2,288,685	2,415,844	2,542,988

Year	21	22	23	24	25	26	27	28	29	30
Trend Growth Population	173,950	182,234	190,517	198,800	207,084	215,367	223,650	231,934	240,217	248,500
Program Cost per Capita-High Range (1)	$30.69	$30.69	$30.69	$30.69	$30.69	$30.69	$30.69	$30.69	$30.69	$30.69
Program Cost for Trend Population (High Range)	$5,338,526	$5,592,761	$5,846,967	$6,101,172	$6,355,408	$6,609,613	$6,863,819	$7,118,054	$7,372,260	$7,626,465
Program Cost per Capita-Low Range (1)	$15.35	$15.35	$15.35	$15.35	$15.35	$15.35	$15.35	$15.35	$15.35	$15.35
Program Cost for Trend Population (Low Range)	2,670,133	2,797,292	2,924,436	3,051,580	3,178,739	3,305,883	3,433,028	3,560,187	3,687,331	3,814,475

Total 30-Year Program Cost for Trend Population (High Range) **$118,212,049**
Total 30-Year Program Cost for Trend Population (Low Range) **$59,125,284**

(1) See Table C.12 for Per-Capita cost calculations.

Table C.14 Austin Parks & Recreation
Annual Operations & Maintanance Costs

Program	Activity	100% Annual Budget	Low-End Range of Annual Cost, %	Low-End Total Annual Cost	Notes
Community Services					
	History, Arts & Nature	$ 5,610,884	25%	$ 1,402,721	(1)
	Aquatics	$ 4,799,690	90%	$ 4,319,721	(2)
	Golf	$ 5,298,972	25%	$ 1,324,743	(3)
	Recreation & Program Services	$ 12,836,143	90%	$ 11,552,529	(2)
	Athletics	$ 2,383,466	90%	$ 2,145,119	(2)
Maintenance Services					
	Facility Services	$ 3,979,271	75%	$ 2,984,453	(4)
	Grounds Maintenance	$ 9,946,448	75%	$ 7,459,836	(4)
Natural Resource Management					
	Environmental Education	$ 50,000	90%	$ 45,000	(2)
	Forestry	$ 1,660,575	90%	$ 1,494,518	(2)
	Nature Preserves System	$ 200,000	90%	$ 180,000	(2)
	Park Ranger Program	$ 1,116,023	90%	$ 1,004,421	(2)
One Stop Shop					
	Inspection, Review & Support	$ 9,341	50%	$ 4,671	(5)
	Planning	$ 2,080,886	50%	$ 1,040,443	(5)
	Support Services	$ 4,621,999	90%	$ 4,159,799	(5)
Total Annual Cost:		**$ 54,593,698**		**$ 39,117,973**	
Current Population		840,000		840,000	
Annual Cost Per Capita		$ 64.99		$ 46.57	

Notes:
(1) 75% cost reduction due to efficiencies in operations at Dougherty, Hillside Theater, O Henry, Ney, Carver Museums, Nature Center, and Botanical Garden.
(2) 10% cost reduction due to duplication in services in greenfield areas.
(3) 75% cost reduction due to efficiencies in providing services from existing PARD facilities.
(4) 25% cost reduction due to some efficiencies in providing O&M from existing facilities.
(5) 10% to 50% cost reduction due to efficiencies in providing support services.

Table C.15 Austin Parks & Recreation
30-Year Operations & Maintenance Costs

Year	1	2	3	4	5	6	7	8	9	10
Trend Growth Population	8,284	16,567	24,850	33,134	41,417	49,700	57,984	66,267	74,550	82,834
Program Cost per Capita-High Range (1)	$64.99	$64.99	$64.99	$64.99	$64.99	$64.99	$64.99	$64.99	$64.99	$64.99
Program Cost for Trend Population (High Range)	$538,377	$1,076,689	$1,615,002	$2,153,379	$2,691,691	$3,230,003	$3,768,380	$4,306,692	$4,845,005	$5,383,382
Program Cost per Capita-Low Range (1)	$46.57	$46.57	$46.57	$46.57	$46.57	$46.57	$46.57	$46.57	$46.57	$46.57
Program Cost for Trend Population (Low Range)	385,786	771,525	1,157,265	1,543,050	1,928,790	2,314,529	2,700,315	3,086,054	3,471,794	3,857,579

Year	11	12	13	14	15	16	17	18	19	20
Trend Growth Population	91,167	99,400	107,684	115,967	124,250	132,534	140,817	149,100	157,384	165,667
Program Cost per Capita-High Range (1)	$64.99	$64.99	$64.99	$64.99	$64.99	$64.99	$64.99	$64.99	$64.99	$64.99
Program Cost for Trend Population (High Range)	$5,924,943	$6,460,006	$6,998,383	$7,536,695	$8,075,008	$8,613,385	$9,151,697	$9,690,009	$10,228,386	$10,766,698
Program Cost per Capita-Low Range (1)	$46.57	$46.57	$46.57	$46.57	$46.57	$46.57	$46.57	$46.57	$46.57	$46.57
Program Cost for Trend Population (Low Range)	4,245,647	4,629,058	5,014,844	5,400,583	5,786,323	6,172,108	6,557,848	6,943,587	7,329,373	7,715,112

Year	21	22	23	24	25	26	27	28	29	30
Trend Growth Population	173,950	182,234	190,517	198,800	207,084	215,367	223,650	231,934	240,217	248,500
Program Cost per Capita-High Range (1)	$64.99	$64.99	$64.99	$64.99	$64.99	$64.99	$64.99	$64.99	$64.99	$64.99
Program Cost for Trend Population (High Range)	$11,305,011	$11,843,388	$12,381,700	$12,920,012	$13,458,389	$13,996,701	$14,535,014	$15,073,391	$15,611,703	$16,150,015
Program Cost per Capita-Low Range (1)	$46.57	$46.57	$46.57	$46.57	$46.57	$46.57	$46.57	$46.57	$46.57	$46.57
Program Cost for Trend Population (Low Range)	8,100,852	8,486,637	8,872,377	9,258,116	9,643,902	10,029,641	10,415,381	10,801,166	11,186,906	11,572,645

Total 30-Year Program Cost for Trend Population (High Range) **$250,329,132**
Total 30-Year Program Cost for Trend Population (Low Range) **$179,378,792**

(1) See Table C.14 for Per-Capita cost calculations.

Table C.16 Austin Fire & Emergency Management Services
Annual Operations & Support Costs

Program	Activity	100% Annual Budget	Low-End Range of Annual Cost, %	Low-End Total Annual Cost	Notes
FIRE					
Emergency Prevention					
	Engineering & Inspection Services	$ 2,152,270	50%	$ 1,076,135	(1)
	Investigations	$ 1,800,022	50%	$ 900,011	(2)
Combat Operations		$ 111,086,166	90%	$ 99,977,549	(2)
Operations Support					
	Air, Equipment & Vehicle Support	$ 1,383,854	90%	$ 1,245,469	(2)
	Employment & Education Services	$ 4,738,111	50%	$ 2,369,056	(1)
	Employee Safety & Wellness	$ 2,513,533	50%	$ 1,256,767	(1)
	Communications Section	$ 4,823,940	50%	$ 2,411,970	(1)
Support Services		$ 5,141,644	50%	$ 2,570,822	(1)
EMS					
Billing Services		$ 1,280,033	50%	$ 640,017	(1)
Emergency Communications & Ops Support					
	Community Partnership & Special Events	$ 370,663	90%	$ 333,597	(2)
	Safety	$ 280,324	90%	$ 252,292	(2)
	Emergency Communications	$ 4,281,924	50%	$ 2,140,962	(1)
Office of the Medical Director		$ 1,171,499	50%	$ 585,750	(1)
Operations-Emergency Services		$ 35,814,800	90%	$ 32,233,320	(2)
Professional Practices & Standards					
	Staff Development	$ 2,096,309	50%	$ 1,048,155	(1)
	Performance Management	$ 923,966	50%	$ 461,983	(1)
Total Annual Cost:		**$ 179,859,058**		**$ 149,503,852**	
Current Population		840,000		840,000	
Annual Cost Per Capita		$ 214.12		$ 177.98	

Notes:
(1) 50% cost reduction due to efficiencies in providing support services.
(2) 10% cost reduction due to duplication of services in greenfield areas.

Table C.17 Austin Fire & Emergency Management Services
30-Year Operations & Maintenance Costs

Year	1	2	3	4	5	6	7	8	9	10
Trend Growth Population	8,284	16,567	24,850	33,134	41,417	49,700	57,984	66,267	74,550	82,834
Program Cost per Capita-High Range (1)	$214.12	$214.12	$214.12	$214.12	$214.12	$214.12	$214.12	$214.12	$214.12	$214.12
Program Cost for Trend Population (High Range)	$1,773,770	$3,547,326	$5,320,882	$7,094,652	$8,868,208	$10,641,764	$12,415,534	$14,189,090	$15,962,646	$17,736,416
Program Cost per Capita-Low Range (1)	$177.98	$177.98	$177.98	$177.98	$177.98	$177.98	$177.98	$177.98	$177.98	$177.98
Program Cost for Trend Population (Low Range)	1,474,386	2,948,595	4,422,803	5,897,189	7,371,398	8,845,606	10,319,992	11,794,201	13,268,409	14,742,795

Year	11	12	13	14	15	16	17	18	19	20
Trend Growth Population	91,167	99,400	107,684	115,967	124,250	132,534	140,817	149,100	157,384	165,667
Program Cost per Capita-High Range (1)	$214.12	$214.12	$214.12	$214.12	$214.12	$214.12	$214.12	$214.12	$214.12	$214.12
Program Cost for Trend Population (High Range)	$19,520,678	$21,283,528	$23,057,298	$24,830,854	$26,604,410	$28,378,180	$30,151,736	$31,925,292	$33,699,062	$35,472,618
Program Cost per Capita-Low Range (1)	$177.98	$177.98	$177.98	$177.98	$177.98	$177.98	$177.98	$177.98	$177.98	$177.98
Program Cost for Trend Population (Low Range)	16,225,903	17,691,212	19,165,598	20,639,807	22,114,015	23,588,401	25,062,610	26,536,818	28,011,204	29,485,413

Year	21	22	23	24	25	26	27	28	29	30
Trend Growth Population	173,950	182,234	190,517	198,800	207,084	215,367	223,650	231,934	240,217	248,500
Program Cost per Capita-High Range (1)	$214.12	$214.12	$214.12	$214.12	$214.12	$214.12	$214.12	$214.12	$214.12	$214.12
Program Cost for Trend Population (High Range)	$37,246,174	$39,019,944	$40,793,500	$42,567,056	$44,340,826	$46,114,382	$47,887,938	$49,661,708	$51,435,264	$53,208,820
Program Cost per Capita-Low Range (1)	$177.98	$177.98	$177.98	$177.98	$177.98	$177.98	$177.98	$177.98	$177.98	$177.98
Program Cost for Trend Population (Low Range)	30,959,621	32,434,007	33,908,216	35,382,424	36,856,810	38,331,019	39,805,227	41,279,613	42,753,822	44,228,030

Total 30-Year Program Cost for Trend Population (High Range) **$824,749,557**
Total 30-Year Program Cost for Trend Population (Low Range) **$685,545,144**

(1) See Table C.16 for Per-Capita cost calculations.

Table C.18 Austin Police Services
Annual Operations & Support Costs

Program	Activity	100% Annual Budget	Low-End Range of Annual Cost, %	Low-End Total Annual Cost	Notes
Investigations (Centralized)		$ 34,249,978	75%	$ 25,687,484	(2)
Neighborhood Based Policing					
	Traffic Enforcement	$ 19,349,901	75%	$ 14,512,426	(2)
	Community Partnerships	$ 2,760,362	75%	$ 2,070,272	(2)
	Patrol Support	$ 34,671,156	50%	$ 17,335,578	(3)
	Patrol	$ 93,785,537	75%	$ 70,339,153	(2)
Operations Support					
	Victim Services	$ 2,106,597	90%	$ 1,895,937	(1)
	Forensics Science Services	$ 7,357,645	50%	$ 3,678,823	(3)
	Communications	$ 11,927,981	50%	$ 5,963,991	(3)
	Strategic Support	$ 11,612,765	50%	$ 5,806,383	(3)
Professional Standards					
	Training	$ 9,322,661	50%	$ 4,661,331	(3)
	Recruiting	$ 1,798,950	50%	$ 899,475	(3)
Support Services		$ 16,584,840	50%	$ 8,292,420	(3)
Total Annual Cost:		**$ 245,528,373**		**$ 161,143,270**	
Current Population		840,000		840,000	
Annual Cost Per Capita		$ 292.30		$ 191.84	

Notes:
(1) 10% cost reduction due to duplication of services in the greenfield areas.
(2) 25% cost reduction due to mostly residential nature of the greenfield areas.
(3) 50% cost reduction due to efficiencies in providing support services.

Table C.19 Austin Police Services
30-Year Operations & Maintenance Costs

Year	1	2	3	4	5	6	7	8	9	10
Trend Growth Population	8,284	16,567	24,850	33,134	41,417	49,700	57,984	66,267	74,550	82,834
Program Cost per Capita-High Range (1)	$292.30	$292.30	$292.30	$292.30	$292.30	$292.30	$292.30	$292.30	$292.30	$292.30
Program Cost for Trend Population (High Range)	$2,421,413	$4,842,534	$7,263,655	$9,685,068	$12,106,189	$14,527,310	$16,948,723	$19,369,844	$21,790,965	$24,212,378
Program Cost per Capita-Low Range (1)	$191.84	$191.84	$191.84	$191.84	$191.84	$191.84	$191.84	$191.84	$191.84	$191.84
Program Cost for Trend Population (Low Range)	1,589,203	3,178,213	4,767,224	6,356,427	7,945,437	9,534,448	11,123,651	12,712,661	14,301,672	15,890,875

Year	11	12	13	14	15	16	17	18	19	20
Trend Growth Population	91,167	99,400	107,684	115,967	124,250	132,534	140,817	149,100	157,384	165,667
Program Cost per Capita-High Range (1)	$292.30	$292.30	$292.30	$292.30	$292.30	$292.30	$292.30	$292.30	$292.30	$292.30
Program Cost for Trend Population (High Range)	$26,648,114	$29,054,620	$31,476,033	$33,897,154	$36,318,275	$38,739,688	$41,160,809	$43,581,930	$46,003,343	$48,424,464
Program Cost per Capita-Low Range (1)	$191.84	$191.84	$191.84	$191.84	$191.84	$191.84	$191.84	$191.84	$191.84	$191.84
Program Cost for Trend Population (Low Range)	17,489,477	19,068,896	20,658,099	22,247,109	23,836,120	25,425,323	27,014,333	28,603,344	30,192,547	31,781,557

Year	21	22	23	24	25	26	27	28	29	30
Trend Growth Population	173,950	182,234	190,517	198,800	207,084	215,367	223,650	231,934	240,217	248,500
Program Cost per Capita-High Range (1)	$292.30	$292.30	$292.30	$292.30	$292.30	$292.30	$292.30	$292.30	$292.30	$292.30
Program Cost for Trend Population (High Range)	$50,845,585	$53,266,998	$55,688,119	$58,109,240	$60,530,653	$62,951,774	$65,372,895	$67,794,308	$70,215,429	$72,636,550
Program Cost per Capita-Low Range (1)	$191.84	$191.84	$191.84	$191.84	$191.84	$191.84	$191.84	$191.84	$191.84	$191.84
Program Cost for Trend Population (Low Range)	33,370,568	34,959,771	36,548,781	38,137,792	39,726,995	41,316,005	42,905,016	44,494,219	46,083,229	47,672,240

Total 30-Year Program Cost for Trend Population (High Range) **$1,125,884,063**
Total 30-Year Program Cost for Trend Population (Low Range) **$738,931,230**

(1) See Table C.18 for Per-Capita cost calculations.

Table C.20 Austin Energy Residential Services
30-Year Operations & Maintenance Costs

Year	1	2	3	4	5	6	7	8	9	10
Trend Growth Residences	3,944	7,889	11,833	15,778	19,722	23,667	27,611	31,556	35,500	39,445
Program Cost per Residence-High Range (1)	$408.00	$408.00	$408.00	$408.00	$408.00	$408.00	$408.00	$408.00	$408.00	$408.00
Program Cost for Trend Residences (High Range)	$1,609,152	$3,218,712	$4,827,864	$6,437,424	$8,046,576	$9,656,136	$11,265,288	$12,874,848	$14,484,000	$16,093,560
Program Cost per Residence-Low Range (2)	$272.00	$272.00	$272.00	$272.00	$272.00	$272.00	$272.00	$272.00	$272.00	$272.00
Program Cost for Trend Residences (Low Range)	1,072,768	2,145,808	3,218,576	4,291,616	5,364,384	6,437,424	7,510,192	8,583,232	9,656,000	10,729,040

Year	11	12	13	14	15	16	17	18	19	20
Trend Growth Residences	43,389	47,334	51,278	55,223	59,167	63,111	67,056	71,000	74,945	78,889
Program Cost per Residence-High Range (1)	$408.00	$408.00	$408.00	$408.00	$408.00	$408.00	$408.00	$408.00	$408.00	$408.00
Program Cost for Trend Residences (High Range)	$17,702,712	$19,312,272	$20,921,424	$22,530,984	$24,140,136	$25,749,288	$27,358,848	$28,968,000	$30,577,560	$32,186,712
Program Cost per Residence-Low Range (2)	$272.00	$272.00	$272.00	$272.00	$272.00	$272.00	$272.00	$272.00	$272.00	$272.00
Program Cost for Trend Residences (Low Range)	11,801,808	12,874,848	13,947,616	15,020,656	16,093,424	17,166,192	18,239,232	19,312,000	20,385,040	21,457,808

Year	21	22	23	24	25	26	27	28	29	30
Trend Growth Residences	82,834	86,778	90,723	94,667	98,612	102,556	106,501	110,445	114,390	118,334
Program Cost per Residence-High Range (1)	$408.00	$408.00	$408.00	$408.00	$408.00	$408.00	$408.00	$408.00	$408.00	$408.00
Program Cost for Trend Residences (High Range)	$33,796,272	$35,405,424	$37,014,984	$38,624,136	$40,233,696	$41,842,848	$43,452,408	$45,061,560	$46,671,120	$48,280,272
Program Cost per Residence-Low Range (2)	$272.00	$272.00	$272.00	$272.00	$272.00	$272.00	$272.00	$272.00	$272.00	$272.00
Program Cost for Trend Residences (Low Range)	22,530,848	23,603,616	24,676,656	25,749,424	26,822,464	27,895,232	28,968,272	30,041,040	31,114,080	32,186,848

Total 30-Year Program Cost for Trend Residences (High Range) **$748,344,216**
Total 30-Year Program Cost for Trend Residences (Low Range) **$498,896,144**

(1) Costs: Customer Charge of $20/month/customer + Electric Delivery Charge of $14/month/customer.
(2) Costs: Customer Charge of 2/3 of $20/month/customer + Electric Delivery Charge of 2/3 of $14/month/customer.