

PREPARED FOR:



MARCH 2024



CITY OF CEDAR HILL

WATER AND WASTEWATER MASTER PLAN



PREPARED BY:

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1.0 EXECUTIVE SUMMARY

1.1 INTRODUCTION

OBJECTIVE

The primary goal of both the Cedar Hill Water Master Plan (WMP) and Wastewater Master Plan (WWMP) was to develop a plan for the City of Cedar Hill (City) to provide systematic upgrades and expansions of the water and wastewater systems to serve existing and future development within the Study Area. Recommended upgrades are included for the 5-Year, 10-Year, and Buildout planning periods.

SCOPE

The scope of the studies for both the WMP and WWMP was to update and calibrate the City's existing hydraulic models, analyze the existing systems for deficiencies, and make recommendations to serve the projected developments of the Study Area through buildout. Significant scope elements include:

1. Existing & Future Land Use Determination for the 5-year, 10-year, & Buildout Planning Periods
2. Existing & Future Demand Determination for the 5-year, 10-year, & Buildout Planning Periods
3. Existing Hydraulic Model & Calibration
4. Existing System Analysis
5. Future System Analysis
6. Capital Improvement Plan development for the 5-year, 10-year, & Buildout Planning Periods

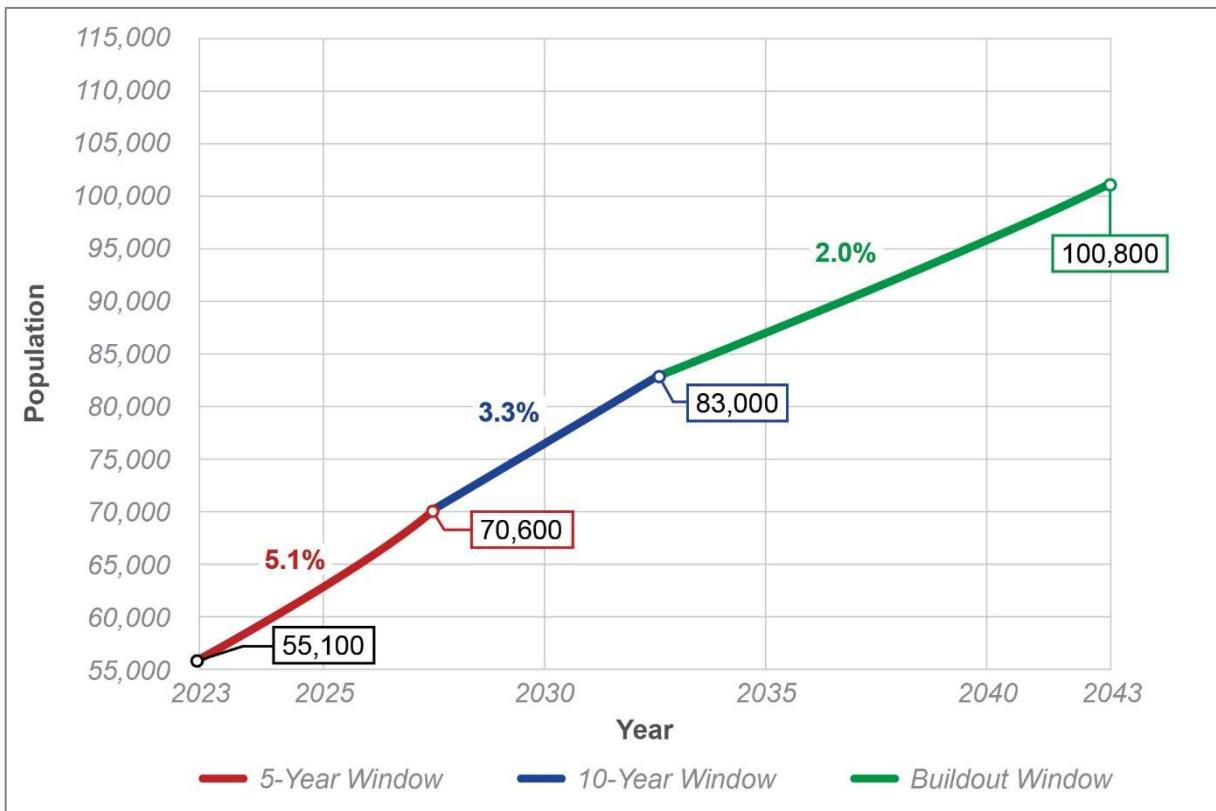
STUDY AREA BOUNDARY

Kimley-Horn worked with City staff to determine the Study Area Boundary for both the WMP and WWMP. The Study Area Boundary aligns with the Water and Wastewater Certificate of Convenience and Necessity (CCNs) and is approximately 20,700 acres. See **Exhibit A** for an illustration of the Study Area Boundary.

1.2 LAND USE, GROWTH PROJECTIONS, & PHASING

The City has experienced an average compound annual growth rate of 1.9% over the last decade with a current population of approximately 55,100. Based on projected residential unit counts and the 2022 Comprehensive Plan, Kimley-Horn projected a 5.1% growth rate in the 5-year window, 3.3% in the 10-year window, and 2.0% to buildout of the service area. The City is projected to reach a buildout population of 100,800 within 20 years (2043). The projected population and accompanying growth rates are shown in **Figure 1**.

FIGURE 1 – POPULATION & GROWTH RATES



Kimley-Horn also worked with City staff to determine where the projected growth was expected to occur within each planning period based on projected residential unit counts, major known developments, and the future construction of major roadways like Loop 9. The growth areas for the 5-Year, 10-Year, and Buildout planning periods are shown in **Exhibit D**.

Of the total 20,700 acres in the Study Area, 11,070 acres, or slightly more than 50% of the available area, are currently developed. The total developed acreage per land use type for each planning period is listed in **Table 1**.

TABLE 1 – DEVELOPED ACREAGE PER LAND USE TYPE

Future Land Use Category	Existing (2023) Developed Acreage	5-Year (2028) Developed Acreage	10-Year (2033) Developed Acreage	Buildout (2043) Developed Acreage
Conservation Opportunity Area – Institutional	1,270	1,520	1,520	1,810
Conservation Opportunity Area – Mixed Use	50	50	310	310
Conservation Opportunity Area – Residential Single Family	260	700	900	1,260
Employment Center	430	860	980	1,190
Historic Downtown	150	170	230	250
Neighborhood Center	60	130	220	370
Open Space Public Ownership	2,300	2,460	2,570	3,740
Regional Center	270	760	1,370	1,610
Residential Mixed Density	50	450	770	1,720
Residential Multifamily	190	190	190	190
Residential Single Family	4,420	4,790	4,920	5,890
Retail Center Retrofit	140	150	150	150
Rural Open Space	840	890	1,120	1,350
Suburban Institutional Area	410	430	470	470
Suburban Non-Residential	100	100	110	140
Uptown/Midtown	130	210	210	240
Total Developed Acreage:	11,070	13,860	16,040	20,690

The existing and future land use is shown in **Exhibits B and C**, respectively.

1.3 WATER MASTER PLAN (WMP)

EXISTING AND FUTURE WATER DEMAND

The average day demand (ADD), maximum day demand (MDD), and peak hour demand (PHD) for each planning period is listed in **Table 2**.

TABLE 2 – DEMAND SUMMARY PER PLANNING PERIOD

Planning Period	ADD (MGD)	MDD (MGD)	PHD (MGD)
Existing (2023)	6.4	11.2	17.9
5-Year (2028)	8.5	14.8	23.7
10-Year (2033)	10.4	18.3	29.2
Buildout (2043)	12.8	22.4	35.8

WATER CIP

Infrastructure included in the CIP was sized to accommodate buildout demand and satisfy both City and TCEQ Design Criteria. Projects are phased to serve growth where and when it is projected to develop as outlined in **Section 3.2**. The project names and costs for the 5-year, 10-year, and Buildout planning periods are listed in **Tables 3, 4, and 5**, respectively. The CIP is shown in **Exhibit G**.

TABLE 3 – 5-YEAR CIP PROJECTS

Project No.	Project Name	Project Cost
1	Highway 67 EST Repair and Painting	\$2,000,000
2	Mount Lebanon Rd 16" Water Line	\$3,464,000
3	Mount Lebanon Rd 20" Water Line	\$4,442,000
4	Highway 67 10" Water Line (Pleasant Run to Joe Wilson)	\$1,532,000
5	Bennett Street 8" Water Line Replacement	\$588,000
6	Parkerville EST Repair and Painting	\$2,000,000
7	Stonehill/Vineyard 12" Water Line Connection	\$848,000
8	Hendricks Street 8" Water Line Replacement	\$1,408,000
9	Lorch Park 10" Water Line	\$2,595,000
10	Lorch Park Water Distribution Line	\$1,933,000
11	Loop 9 12" Water Line Phase 1 - North	\$8,087,000
12	S Tar Rd 8" Water Line Replacement	\$470,000
13	Mobley Rd to W Belt Line Rd 8" Water Line	\$2,701,000
14	W Belt Line Rd 12" Water Line Replacement	\$2,188,000
15	Tindle St 8" Water Line	\$1,123,000
16	Randy Rd 8" Water Line	\$506,000
17	Kingswood 8" Water Line Replacements	\$1,175,000
18	Bluff Ridge Dr 8" Water Line Replacement	\$723,000
19	Community Center Park 8" Water Line Replacement	\$817,000
20	Cobblestone Ct 8" Water Line Replacement	\$574,000
21	Cedar Hill Church of Christ 8" Water Line Replacement	\$723,000
22	Cedar Hill State Park 10" Water Line	\$3,669,000
23	Southwest Cedar Hill 12" Water Line	\$6,020,000
24	Texas Plume Rd 12" Water Line	\$5,403,000
25	E Parkerville Rd 16/18/24" Water Line Replacement Phase 1	\$2,447,000
26	Northeast Cedar Hill 10" Water Line	\$4,295,000
27	Highway 67 EST 24" Water Line Parallel	\$788,000
28	S Cedar Hill Rd 18" Water Line	\$859,000
5-Year Projects Sub-Total:		\$63,378,000

TABLE 4 – 10-YEAR CIP PROJECTS

Project No.	Project Name	Project Cost
29	Parkerville EST 24" Water Line Parallel	\$2,397,000
30	E Parkerville Rd 16/18/24" Water Line Replacement Phase 2	\$4,059,000
31	E FM 1382 10/12" Water Line	\$4,096,000
32	N Duncanville Rd 12" Water Line	\$2,502,000
33	East Little Creek 12" Water Line Phase 1	\$4,603,000
34	Pecan Trails Golf Course 8" Water Line	\$1,986,000
35	Loop 9 12" Water Line Phase 1 – South	\$4,914,000
36	Rocky Acres Rd 10/12" Water Line	\$3,787,000
37	Loop 9 12" Water Line Phase 2 – North	\$3,336,000
38	Loop 9 12" Water Line Phase 2 – South	\$2,632,000
39	Loop 9 12" Water Line Phase 3 – North	\$4,763,000
40	Loop 9 12" Water Line Phase 3 – South	\$4,886,000
41	Loop 9 12" Water Line Phase 4 – North	\$5,605,000
42	Loop 9 12" Water Line Phase 4 – South	\$5,353,000
43	Cedar Hill Rd 20" Water Line	\$13,276,000
10-Year Projects Sub-Total:		\$68,195,000

TABLE 5 – BUILDOUT CIP PROJECTS

Project No.	Project Name	Project Cost
44	Meadowcrest Pump Station Improvements	\$910,000
45	Meadowcrest 16/18/24" Water Line	\$4,883,000
46	E Parkerville Rd 16/18/24" Water Line Replacement Phase 3	\$952,000
47	S Duncanville Rd 12" Water Line	\$7,209,000
48	W Parkerville Rd 12" Water Line	\$5,793,000
49	East Little Creek 12" Water Line Phase 2	\$2,427,000
50	S Waterford Oaks Dr 12" Water Line	\$4,160,000
51	East Windsor Park 12" Water Line	\$1,802,000
52	S Clark Rd 8" Water Line	\$1,087,000
53	6.0 MG Meadowcrest Ground Storage Tank	\$10,395,000
Buildout Projects Sub-Total:		\$39,618,000

The Opinion of Probable Construction Costs (OPCCs) for proposed water infrastructure have been included in **Appendix A – Opinion of Probable Construction Costs (Water)**. The opinion of probable costs for each capital project assumes no design completed, are based on 2023 dollars, and does not include annual construction cost increases.

1.4 WASTEWATER MASTER PLAN (WWMP)

EXISTING AND FUTURE WASTEWATER FLOW

The dry weather flow and wet weather flow for each planning period is listed in **Table 6**.

TABLE 6 – WASTEWATER FLOW PROJECTIONS

Planning Period	Dry Weather Flow (MGD)	Wet Weather Flow (MGD)
Existing	4.17	18.76
5-Year	5.82	26.17
10-Year	7.39	33.24
Buildout	9.27	41.70

WASTEWATER CIP

Infrastructure included in the CIP was sized to accommodate buildout demand and satisfy both City and TCEQ Design Criteria as outlined in **Table 41**. Projects are phased to serve growth where and when it is projected to develop as outlined in **Section 3.2**. The project names and costs for the 5-year, 10-year, and Buildout planning periods are listed in **Tables 7, 8, and 9**, respectively.

TABLE 7 – 5-YEAR CIP PROJECTS

Project No.	Project Name	Project Cost
1	Lake Ridge Parkway 8" Gravity Line Connection	\$933,000
2	Mt. Lebanon Lift Station Decommission 8/10" Gravity Line	\$3,439,000
2.1	Mt. Lebanon Lift Station Decommission	\$274,000
3	Hollings Lift Station Expansion	\$2,651,000
4	Mansfield Road 10" Force Main	\$585,000
5	American Lift Station Decommission 10/12" Gravity Line	\$1,584,000
5.1	American Lift Station Decommission	\$337,000
6	W Parkerville 10" Gravity Line	\$2,848,000
5-Year Projects Sub-Total:		\$12,651,000

TABLE 8 – 10-YEAR CIP PROJECTS

Project No.	Project Name	Project Cost
7	Baggett Branch Expansion	\$1,545,000
8	Lake Ridge II and Lake Ridge III Lift Station Decommission 8/10/12" Gravity Lines	\$2,749,000
8.1	Lake Ridge II Lift Station Decommission	\$259,000
8.2	Lake Ridge III Lift Station Decommission	\$259,000
9	High Meadows Lift Station 8/10" Gravity Line	\$3,193,000
9.1	High Meadows Lift Station Decommission	\$260,000
10	8/15/18" West Red Oak Gravity Lines	\$6,799,000
11	8/12" West Red Oak Gravity Lines	\$2,676,000
11.1	West Red Oak Lift Station and Force Main	\$1,960,000
12	Loop 9 8" Gravity Main - South	\$674,000
13	Loop 9 12" Gravity Main - North	\$2,907,000
14	Loop 9 12" Gravity Main - North	\$2,907,000
15	8/10/15" Bear Creek Road and South Joe Wilson Road Gravity Lines	\$3,673,000
16	East Red Oak 10-inch Gravity Line	\$788,000
16.1	East Red Oak Lift Station	\$816,000
17	Windsor Park 8/15-inch Gravity Line	\$6,196,000
17.1	Windsor Park Decommission	\$764,000
18	18" Red Oak Gravity Line	\$5,371,000
19	Lake Ridge Lift Station I Expansion	\$4,004,000
20	Autumn Run Court 10"" Gravity Line Connection	\$1,022,000
21	TRA Central South 15" Gravity Main I	\$5,363,000
22	Hollings Lift Station Expansion	\$3,079,000
23	TRA Central South 15" Gravity Main II	\$3,198,000
10-Year Projects Sub-Total:		\$60,462,000

TABLE 9 – BUILDOUT CIP PROJECTS

Project No.	Project Name	Project Cost
24	Sherwood 8" Gravity Line	\$952,000
24.1	Sherwood Lift Station Decommission	\$260,000
25	TRA Central North 8" Gravity Line	\$3,079,000
26	TRA Central South 8" Gravity Line	\$2,451,000
27	Little Creek Lift Station 8" Gravity Line	\$1,299,000
27.1	Little Creek Lift Station Decommission	\$260,000
28	10/12/18" Red Oak Gravity Line	\$3,573,000
28.1	Springfield Lift Station Decommission	\$260,000
29	Highlands 10/15" Gravity Line	\$5,193,000
29.1	Highlands Lift Station Decommission	\$260,000
30	Highway 67 12" Gravity Line	\$3,874,000
31	TRA Central North 10" Gravity Main	\$655,000
31.1	TRA Central North Lift Station	\$816,000
32	TRA Central South 15" Gravity Line Connection	\$5,179,000
<i>Buildout Projects Sub-Total:</i>		\$28,111,000

2.0 INTRODUCTION

2.1 OBJECTIVE

The primary goal of both the Cedar Hill Water Master Plan (WMP) and Wastewater Master Plan (WWMP) was to develop a plan for the City of Cedar Hill (City) to provide systematic upgrades and expansions of the water and wastewater systems to serve existing and future development within the Study Area. Recommended upgrades are included for the 5-Year, 10-Year, and Buildout planning periods.

2.2 SCOPE

The scope of the study relating to both the WMP and WWMP was to update and calibrate the City's existing hydraulic model, analyze the existing system for deficiencies, and to make recommendations to serve the projected developments through buildout of the Study Area. Significant scope elements include:

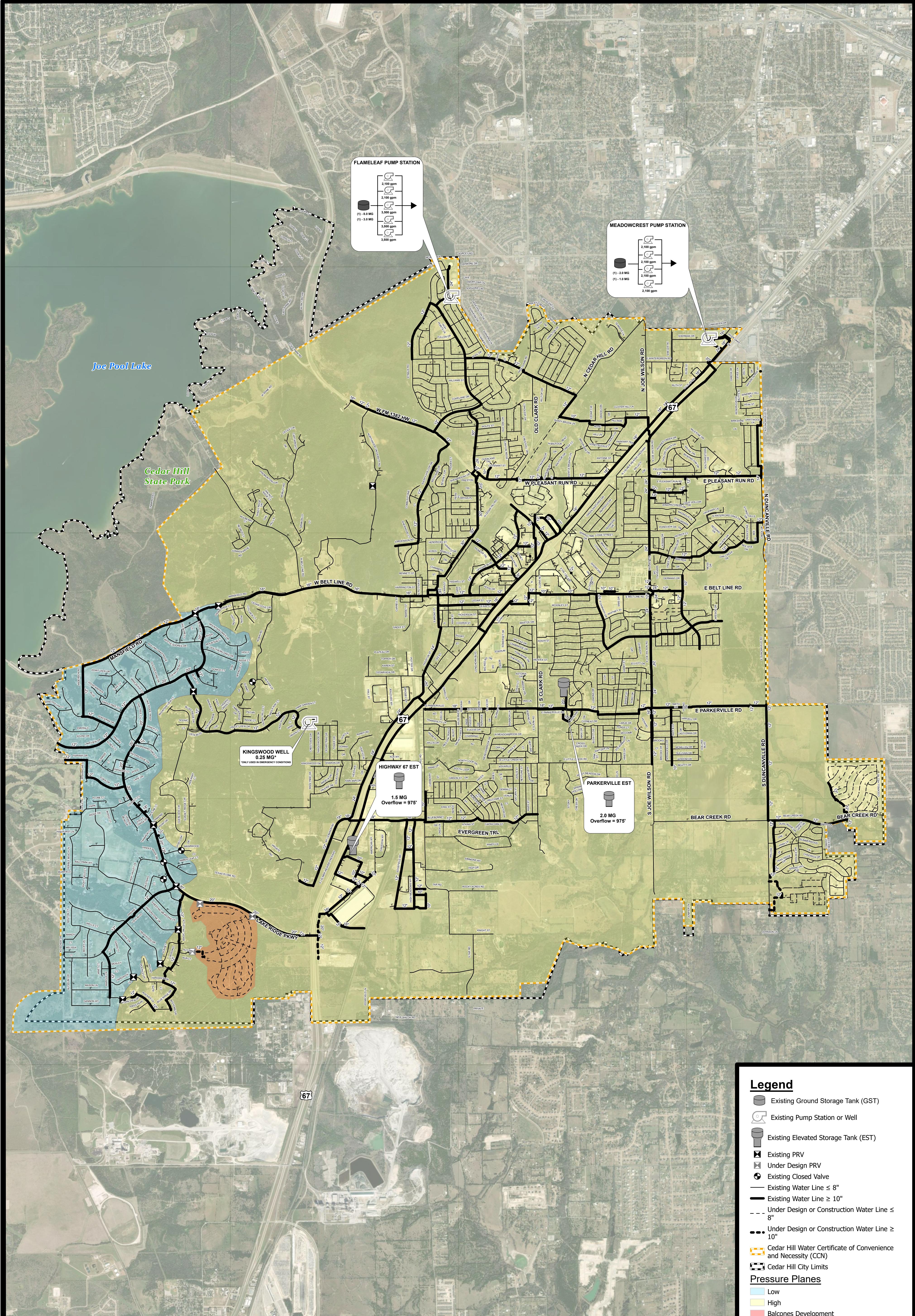
1. Existing & Future Land Use Determination for the 5-year, 10-year, & Buildout Planning Periods
2. Existing & Future Demand Determination for the 5-year, 10-year, & Buildout Planning Periods
3. Existing Hydraulic Model & Calibration
4. Existing System Analysis
5. Future System Analysis

6. Capital Improvement Plan development for the 5-year, 10-year, & Buildout Planning Periods

Scope items related specifically to the WMP or WWMP are discussed in **Section 4.1** and **Section 5.1**, respectively.

2.3 STUDY AREA BOUNDARY

Kimley-Horn worked with City staff to determine that the Study Area Boundary for both the WMP and WWMP. The Study Area Boundary aligns with the Water and Wastewater CCN's and is approximately 20,700 acres. See **Exhibit A** for an illustration of the Study Area Boundary.



2.4 DEFINITIONS AND ABBREVIATIONS

The following terms are used throughout this report. The definitions may provide the reader a better understanding of the subtle difference between several of these terms.

Average Day Demand (ADD) – Annual water consumption divided by the number of days in a year. The average daily water demand is the average water demand a system experiences over a one-day period. Typically measured in units of Million Gallons Per Day (MGD).

Average Day Flow (ADF) – Annual wastewater flow in the system divided by the number of days in a year. The average daily wastewater flow is the average wastewater flow a system experiences over a one-day period. Typically measured in units of Million Gallons Per Day (MGD).

Certificate of Convenience and Necessity (CCN) – This is a state defined and certified geographic area granting its owner exclusive rights to provide water and sewer service within its designated boundary.

Capital Improvement Plan (CIP) – Recommended improvements to the water or wastewater system to mitigate existing deficiencies or serve future development.

Demand (Consumption) – Volume of water used for a given time period, typically measured in units of Million Gallons Per Day (MGD) or Gallons Per Minute (gpm).

Distribution System (Piping) – Distribution piping typically consists of 10-inch diameter and smaller piping. Distribution piping functions primarily to serve local customer water connections.

Diurnal Curve – A graph depicting typical or average water demand or dry weather wastewater flow over a 24-hour period with water/wastewater demand plotted on the y-axis and time plotted on the x-axis.

Dry Weather – A period of time during which no rainfall occurs. No rainfall influenced inflow and infiltration into the sewer system is expected during this time.

Firm Pumping Capacity – The total pumping capacity that a pump station or lift station can deliver with the largest pump out of service.

Flow (Discharge) – Volume of wastewater discharged into the system for a given time period, typically measured in units of Million Gallons Per Day (MGD) or Gallons Per Minute (gpm).

Force Main – A pressurized sewer pipe that conveys wastewater under pressure from the discharge side of the pump.

Inflow – Stormwater that enters the sewer system from direct connections to the sewer system, such as household gutters.

Infiltration – Stormwater that enters the sewer system through cracked or leaky pipes and manholes.

Interceptor – Wastewater interceptor lines typically consist of 12-inch diameter and large piping. Interceptor piping is utilized to collect wastewater flow from collector lines.

Lift Station – A lift station is a pumping station that moves wastewater from a lower elevation to a higher elevation.

Maximum Day Demand (MDD) – Water consumption, in volume of water, used on the highest consumption day in a year. Typically measured in units of Million Gallons Per Day (MGD) or Gallons Per Minute (gpm)

Peak Hour Demand (PHD) – The maximum one-hour water demand that a system experienced or is anticipated to experience during a particular year or other time period. Typically measured in units of Million Gallons Per Day (MGD) or Gallons Per Minute (gpm).

Peaking Factors – A peaking factor is applied to the average day demand to determine maximum day demand in water applications. An additional peaking factor is then applied to the maximum day demand to determine peak hour demand. In wastewater applications, the peaking factor is a factor applied to the average day flow to determine wet weather flow conditions.

Pressure Plane – A network of water pipes having a common pressure range; each plane may be separated from the other planes by closed valves, pressure-regulating valves, pump stations, and storage facilities.

SCADA Data – Supervisory control and data acquisition (SCADA) data is system data (flow, pressure, tank level, etc.) that is digitally collected in real time.

Total Pumping Capacity – The total pumping capacity that a pump station or lift station can deliver.

Transmission System (Piping) – Transmission piping typically consists of 10-inch diameter and larger piping. Transmission piping has minimal service connections and functions primarily as the vehicle to move large quantities of water throughout the water system.

Wet Weather – A period of time during which rainfall occurs. Rainfall-influenced inflow and infiltration into the sewer system is expected during this time.

Refer to **Table 10** for abbreviations frequently used in this report.

TABLE 10 – ABBREVIATIONS

Abbreviation	Meaning
ADD	Average Day Demand
ADF	Average Day Flow
CCN	Certificate of Convenience and Necessity
CIP	Capital Improvement Plan
DWU	Dallas Water Utilities
ETJ	Extra Territorial Jurisdiction
EST	Elevated Storage Tank
GIS	Geographic Information System
GPD	Gallons Per Day
gpm	Gallons Per Minute
GST	Ground Storage Tank
HGL	Hydraulic Grade Line (Feet)
In	Inch
LF	Linear Feet
MDD	Maximum Day Demand
MG	Million Gallons
MGD	Million Gallons Per Day
PHD	Peak Hour Demand
PRV	Pressure Reducing Valve
PS	Pump Station
PSI	Pounds Per Square Inch
SCADA	Supervisory Control and Data Acquisition
TCEQ	Texas Commission on Environmental Quality
TRA	Trinity River Authority
WTP	Water Treatment Plant
WWTP	Wastewater Treatment Plant

3.0 LAND USE & GROWTH PROJECTIONS

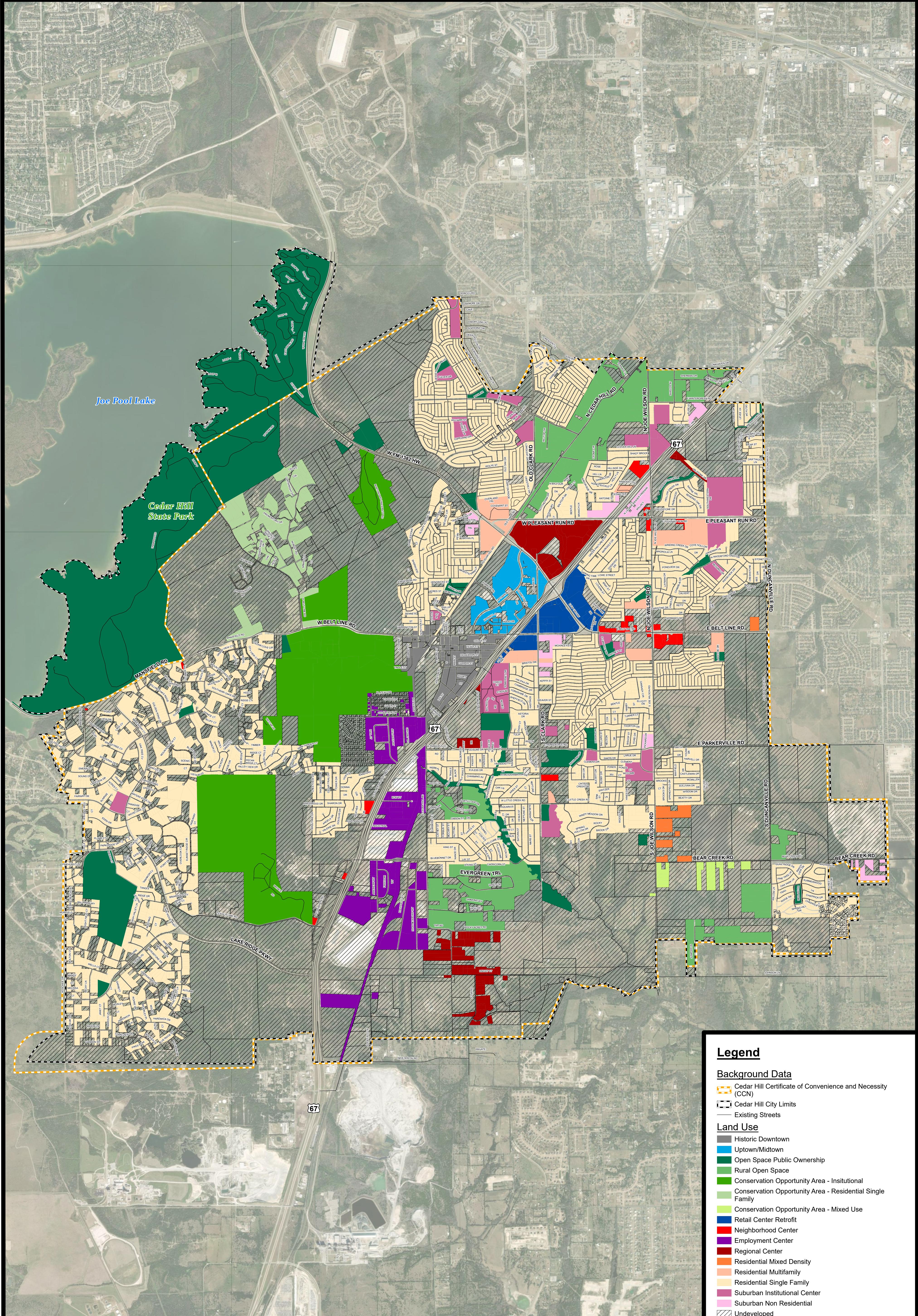
3.1 LAND USE

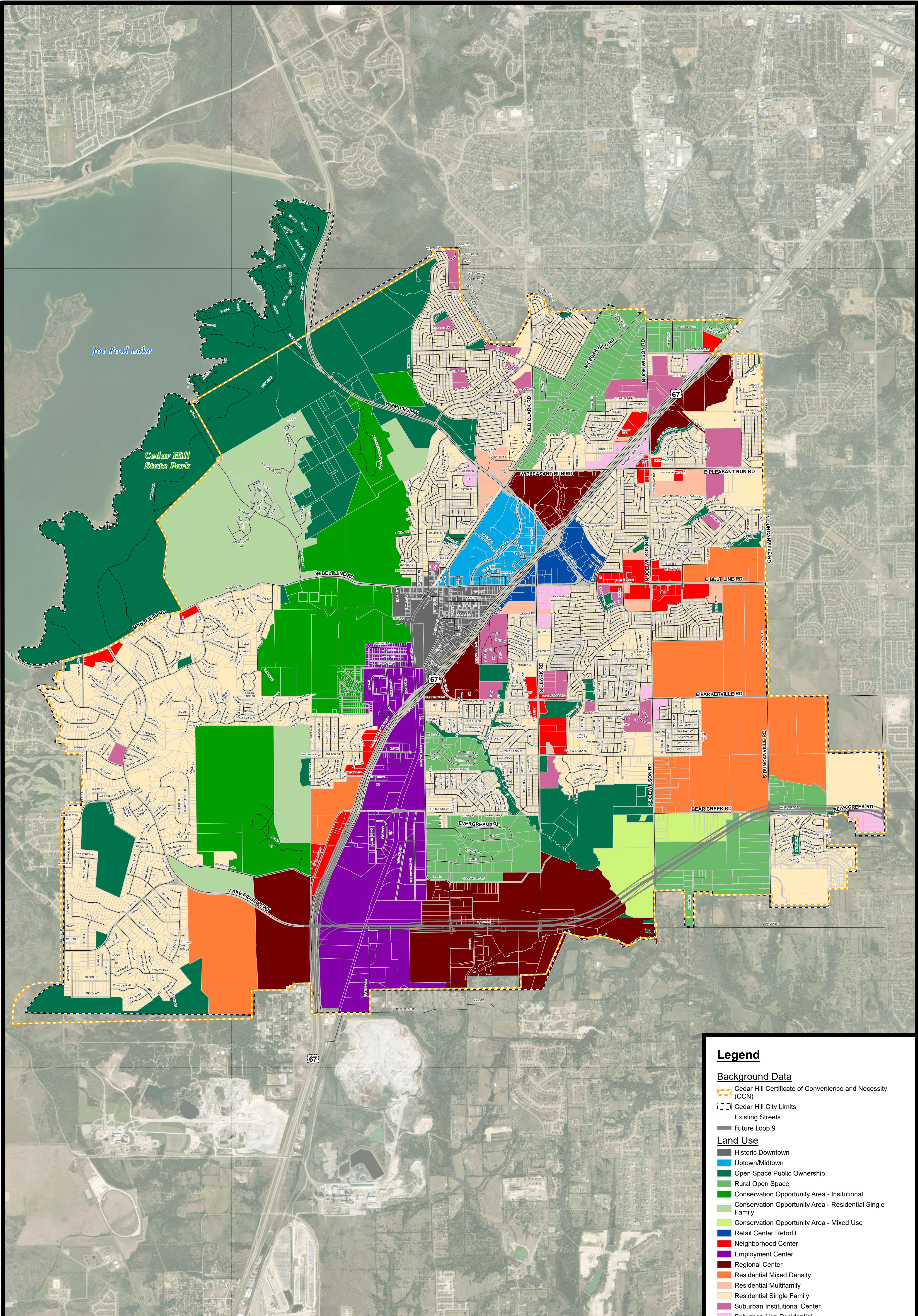
Kimley-Horn utilized the land use categories identified in the City's 2022 Comprehensive Plan. A brief description of each land use type is provided in **Table 11**.

TABLE 11 – LAND USE DESCRIPTIONS

Future Land Use Category	Description
Conservation Opportunity Area – Institutional	Institutional land use with opportunities for public/private partnerships for preservation and conservation of open space.
Conservation Opportunity Area – Mixed Use	Mixed land use with common areas available for public recreational uses.
Conservation Opportunity Area – Residential Single Family	Residential land use with common areas available for public recreational uses.
Employment Center	Primarily light industrial and commercial land use.
Historic Downtown	Combination of residential and non-residential land use specific to Downtown area.
Neighborhood Center	Primarily commercial land use with complementary residential land use.
Open Space Public Ownership	Open space utilized for recreational activities and environmental protection.
Regional Center	Primarily master planned commercial land use located along major roadways.
Residential Mixed Density	Large-scale developments with a mixture of residential and non-residential land use as determined by the developer through master planned developments.
Residential Multifamily	Residential land use with a density of 16 residential units/acre.
Residential Single Family	Residential land use with a density of 3 residential units/acre.
Retail Center Retrofit	Existing retail land use tailored to mixed use.
Rural Open Space	Residential land use with a density of .5 residential units/acre or less.
Suburban Institutional Area	Land uses associated with non-profit, educational, or religious institutions.
Suburban Non-Residential	Primarily commercial land use near major roadways.
Uptown/Midtown	Mixed land use like Historic Downtown but larger in scale.

The existing land use is shown in **Exhibit B** and the future land use at buildout is shown in **Exhibit C**.





3.2 GROWTH PROJECTIONS & PHASING

Based on current development trends and the 2022 Comprehensive Plan, the City provided projected residential unit counts for each planning period (**Table 12**).

TABLE 12 – RESIDENTIAL UNITS

	Residential Units
Existing	17,258
5-Year	22,673
10-Year	26,879
Buildout	32,508

The City has experienced an average compound annual growth rate of 1.9% over the last decade with a current population of approximately 55,100. Based on projected residential unit counts and the 2022 Comprehensive Plan, Kimley-Horn projected a 5.1% growth rate in the 5-year, 3.3% in the 10-year, and 2.0% to buildout of the service area. Based on these growth rates, the City is projected to reach a buildout population of 100,800 within 20 years (2043). For reference, the projected buildout population listed in the 2022 Comprehensive Plan was just slightly lower at 95,200. The projected population and accompanying growth rates are shown in **Figure 2**.

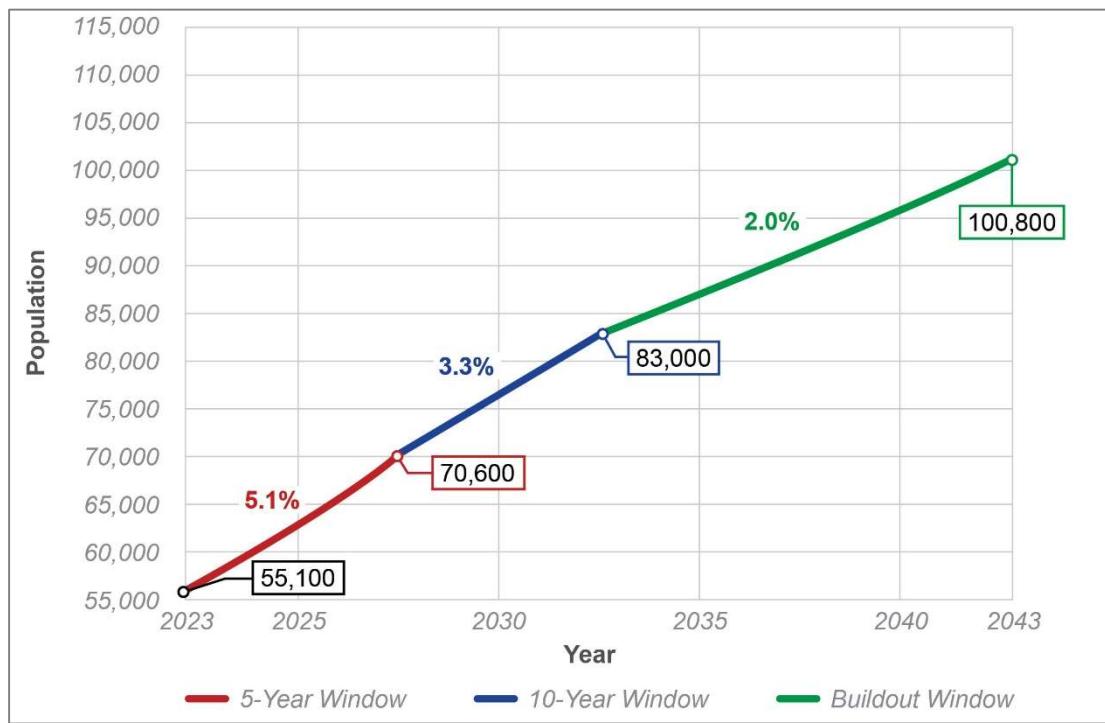
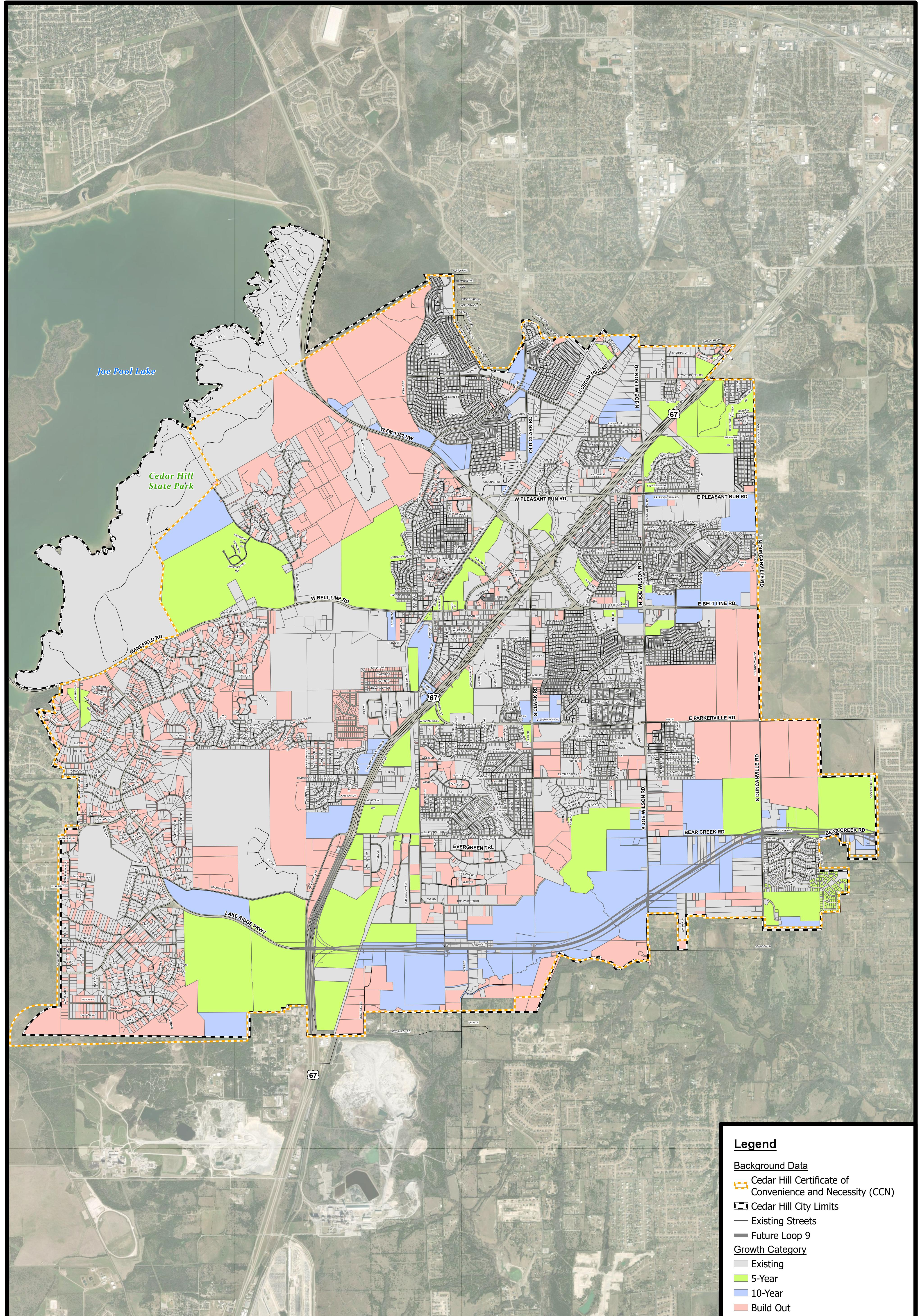
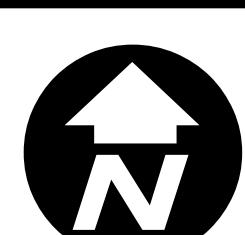


FIGURE 2 – POPULATION & GROWTH RATES

Kimley-Horn also worked with City staff to determine where the projected growth was expected to occur within each planning period based on projected residential unit counts, major known developments, and the future construction of major roadways like Loop 9. The growth areas for the 5-Year, 10-Year, and Buildout planning periods are shown in **Exhibit D**.



Cedar Hill, Texas
Water and Wastewater
Master Plan
Growth Category Map



2,000 0 2,000
Feet

March 2024

Kimley»Horn

This map product is for informational purposes and may not have been prepared for or be suitable for legal, engineering, or surveying purposes. It does not represent an on-the-ground survey and represents only the approximate relative location of property boundaries.

D

Of the total 20,700 acres in the Study Area, 11,070 acres, or slightly more than 50% of the available area, are currently developed. The total developed acreage per land use type for each planning period is listed in **Table 13**.

TABLE 13 – DEVELOPED ACREAGE PER LAND USE TYPE

Future Land Use Category	Existing (2023) Developed Acreage	5-Year (2028) Developed Acreage	10-Year (2033) Developed Acreage	Buildout (2043) Developed Acreage
Conservation Opportunity Area – Institutional	1,270	1,520	1,520	1,810
Conservation Opportunity Area – Mixed Use	50	50	310	310
Conservation Opportunity Area – Residential Single Family	260	700	900	1,260
Employment Center	430	860	980	1,190
Historic Downtown	150	170	230	250
Neighborhood Center	60	130	220	370
Open Space Public Ownership	2,300	2,460	2,570	3,740
Regional Center	270	760	1,370	1,610
Residential Mixed Density	50	450	770	1,720
Residential Multifamily	190	190	190	190
Residential Single Family	4,420	4,790	4,920	5,890
Retail Center Retrofit	140	150	150	150
Rural Open Space	840	890	1,120	1,350
Suburban Institutional Area	410	430	470	470
Suburban Non-Residential	100	100	110	140
Uptown/Midtown	130	210	210	240
Total Developed Acreage:	11,070	13,860	16,040	20,690

The future water demand and wastewater flow based on land use and projected growth are discussed in [Section 4.2](#) and [Section 5.3](#), respectively.

4.0 WATER MASTER PLAN (WMP)

4.1 WMP SCOPE ITEMS

Scope items specific to the WMP include:

1. **Fire flow testing & calibration** – Kimley-Horn conducted fire flow testing to calibrate the City's existing hydraulic model.
2. **Peaking factor evaluation** – Kimley-Horn utilized historic demand data to determine the City average to max day and max day to peak hour peaking factors.
3. **EST maintenance plan** – Kimley-Horn analyzed two additional scenarios in the hydraulic model – 1) Existing system with the Highway 67 EST offline, and 2) Existing system with the Parkerville EST offline to ensure either tank can be taken offline for maintenance without negatively impacting existing customers.
4. **New pressure plane evaluation** – Kimley-Horn provided recommendations regarding the previously proposed pressure plane delineation.
5. **Water supply evaluation** – Kimley-Horn compared existing supply to projected buildout demand and summarized findings.
6. **Known undersized water line evaluation** – Kimley-Horn identified up to five known locations of undersized water lines below 8”.
7. **Loop 9 evaluation** – Kimley-Horn identified the water infrastructure required to serve projected development along the future loop 9 corridor.

4.2 WATER DEMAND

The City provided customer meter billing data including monthly usage, account type, and meter location, from April 2022 to April 2023. The average demand was determined per customer and was loaded to the model at the location specified in the billing data.

Utilizing the customer meter data, an average demand per unit for single-family and multi-family was determined (**Table 14**). Combined with parcel data, the average non-residential demand per acre per land use type was also determined (**Table 15**).

TABLE 14 – RESIDENTIAL DEMAND PER UNIT

Residential Category	Average Demand per Unit (GPD/unit)
Single-Family	270
Multi-Family	210

TABLE 15 – NON-RESIDENTIAL LOADING FACTORS

Future Land Use Category	Non-residential Loading Factor (gal/acre)
Conservation Opportunity Area – Institutional	120
Conservation Opportunity Area – Mixed Use	900
Conservation Opportunity Area – Residential Single	0 ¹
Employment Center	290
Historic Downtown	900
Neighborhood Center	900
Open Space Public Ownership	140
Regional Center	900
Residential Mixed Density	750
Residential Multifamily	0 ¹
Residential Single Family	0 ¹
Retail Center Retrofit	900
Rural Open Space	0 ¹
Suburban Institutional Area	120
Suburban Non-Residential	900
Uptown	590

¹100% Residential Land Use, demand calculated utilizing values in **Table 14**.

Utilizing the values listed in **Tables 14 and 15**, the average demand per parcel was calculated based on the projected land use and unit count or acreage. Based on the growth areas for the 5-year, 10-year, and Buildout planning periods identified in **Section 3.2**, the total average demand for each planning period was determined (**Table 16**).

TABLE 16 – ADD PER PLANNING PERIOD

Planning Period	ADD (MGD)
Existing (2023)	6.4
5-Year (2028)	8.5
10-Year (2033)	10.4
Buildout (2043)	12.8

An average to max day peaking factor of 1.75 was then determined based on historical average day and max day demand. The historical average day demand (ADD), maximum day demand (MDD), and corresponding peaking factors from 2014 to 2022 was provided by Dallas Water Utilities (DWU) and is listed in **Table 17**.

TABLE 17 – HISTORICAL PEAKING FACTORS

Year	ADD (MGD)	MDD (MGD)	Peaking Factor
2014	5.7	9.0	1.58
2015	6.0	10.7	1.78
2016	5.7	8.9	1.56
2017	5.7	8.5	1.49
2018	5.9	10.3	1.75
2019	5.5	9.1	1.65
2020	5.7	9.1	1.60
2021	5.6	8.8	1.57
2022	6.4	11.2	1.75

A max day to peak hour peaking factor of 1.6 was identified from the observed diurnal pattern. The diurnal pattern was determined by calculating hourly demand based on SCADA data collected during the 2022 MDD. The diurnal pattern is shown in **Figure 3**.

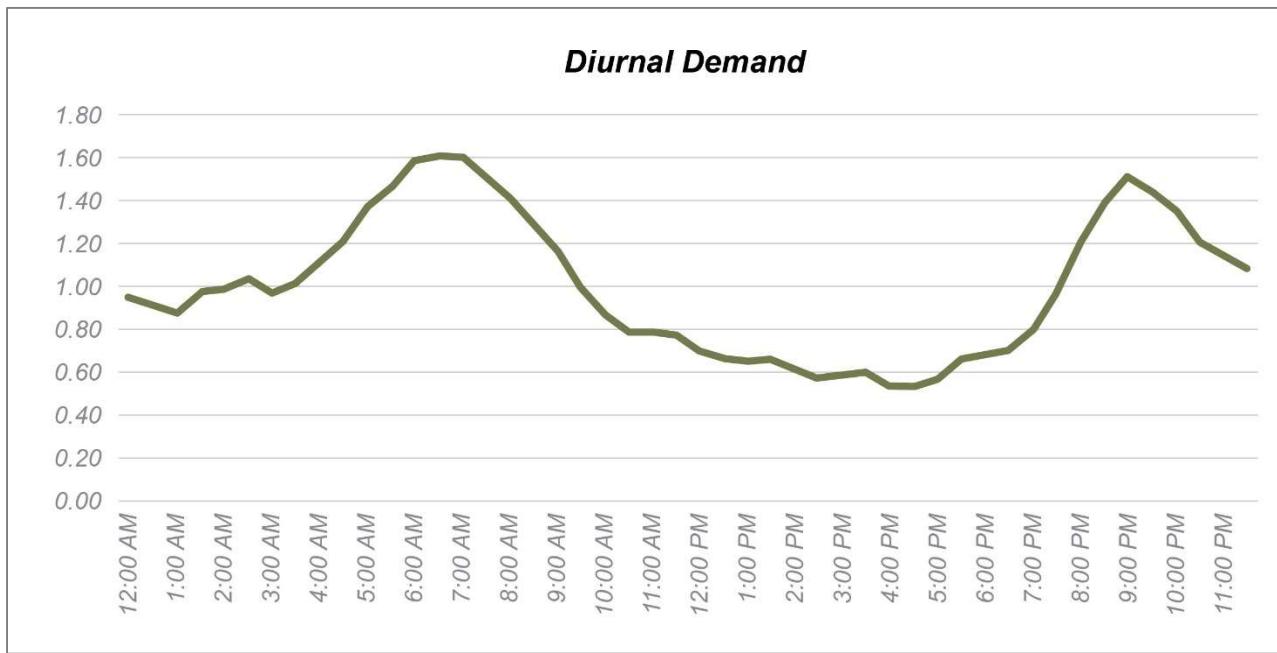


FIGURE 3 – DIURNAL PATTERN

The ADD, MDD and PHD for each planning period is listed in **Table 18**.

TABLE 18 – DEMAND SUMMARY PER PLANNING PERIOD

Planning Period	ADD (MGD)	MDD (MGD)	PHD (MGD)
Existing (2023)	6.4 ¹	11.2	17.9
5-Year (2028)	8.5	14.8	23.7
10-Year (2033)	10.4	18.3	29.2
Buildout (2043)	12.8	22.4	35.8

¹Existing demand was allocated based on customer meter data and scaled to match recorded DWU total flow listed in Table 17.

As discussed, demand was projected based on land use and the loading factors listed in **Tables 14 and 15**. The average demand per capita at Buildout was then calculated to compare to historical values both for Cedar Hill and surrounding cities of comparable size. The projected average demand at Buildout equates to 127 gallons per capita per day (GPCPD), which is the highest observed average demand per capita from the last 5 years for Cedar Hill (**Table 19**).

TABLE 19 – CEDAR HILL HISTORIC AVERAGE DEMAND PER CAPITA

Year	Average Demand per Capita (GPCPD)
2018	122
2019	113
2020	116
2021	112
2022	127

For reference, the average demand per capita for several similarly sized cities based on the most recent year of analysis is listed in **Table 20**.

TABLE 20 –CITY AVERAGE DEMAND PER CAPITA VALUES

City	Year	Average Demand per Capita (GPCPD)
Cedar Hill	2023	127
Corinth	2023	147
Lancaster	2021	152
Duncanville	2019	109

It should be noted that the projected buildout demand is significantly lower than the 2013 WMP projection. The current and previous projected buildout ADD, MDD, and PHD are listed in **Table 21**.

TABLE 21 – CURRENT AND PREVIOUS PROJECTED BUILDOUT DEMAND

	ADD (MGD)	ADD to MDD Peaking Factor	MDD (MGD)	MDD to PHD Peaking Factor	PHD (MGD)
2013 WMP	17.0	1.75	30.6	2.0	61.2
2023 WMP	12.8	1.75	22.4	1.6	35.8

The 2013 MP utilized projected population and an average demand per person to project buildout demand. The average demand per person utilized was based on historical demand data. However, the historical demand data utilized was artificially inflated since the City was unknowingly supplying approximately 1 MGD of water to a neighboring city at the time. The resulting average demand per person was therefore inflated, resulting in a high projected ADD. As discussed above, Kimley-Horn utilized future land use and projected unit counts to project ADD rather than population.

In both the 2013 and 2023 WMP, an average to max day peaking factor of 1.75 was utilized based on historical demand. However, the 2013 MP utilized an assumed max day to peak hour peaking factor of 2.0, which is higher than the 1.6 peaking factor utilized in the current WMP. The 2.0 peaking factor was an assumed value to be used in the absence of historical data whereas the 1.6 peaking factor is based on historic hourly demand data from the City.

The artificially high ADD and assumed peaking factor of 2.0 utilized in the 2013 MP produced an overall PHD almost twice as large as the current projection, resulting in a significantly larger CIP both in terms of capacity and total number of projects.

4.3 EXISTING WATER INFRASTRUCTURE

The City owns and operates two pump stations (Flameleaf and Meadowcrest), and two ESTs (Parkerville and Highway 67). The City is currently supplied by DWU through multiple flow meters located at both the Flameleaf and Meadowcrest Pump Stations. The Cedar Hill system consists of an upper and lower pressure plane, delineated by multiple pressure reducing valves (PRVs) and closed valves (**Exhibit A**). The City's existing ground storage, elevated storage, and pumping capacity of the existing system is listed in **Tables 22, 23, and 24**, respectively.

TABLE 22 – GST CAPACITY

	GST	Capacity (MG)
Flameleaf	Flameleaf	8.0
	Summit	3.0
Meadowcrest	Meadowcrest #1	1.0
	Meadowcrest #2	2.0
Total		14.0

TABLE 23 – EST CAPACITY

EST	Capacity (MG)	Overflow Elevation (ft)
Highway 67	1.5	975
Parkerville	2.0	975
Total	3.5	

TABLE 24 – PUMPING CAPACITY

Pump Station	Pump	Capacity (GPM)	Data Source
Flameleaf	0	2,800	Xak Pack Field Testing
	1	2,800	Xak Pack Field Testing
	2	2,800	Xak Pack Field Testing
	3	1,100	Xak Pack Field Testing
	4	4,300	Xak Pack Field Testing
	5	2,100	2013 MP
Flameleaf Total Capacity		15,900	
Flameleaf Firm Capacity		11,600	
Meadowcrest (1)	1	1,400	Manufacturer Data
	2	1,400	Manufacturer Data
	3	1,400	Manufacturer Data
	4	1,400	Manufacturer Data
	5	2,800	Manufacturer Data
	6	2,800	Manufacturer Data
Meadowcrest Total Capacity		11,200	
Meadowcrest Firm Capacity		8,400	
System Total Capacity		27,100	
System Firm Capacity¹		22,800	

¹System capacity with the largest pump out of service (Pump 4 at Flameleaf)

4.4 WATER MODEL

WATER MODEL BUILD

A hydraulic model was created in WaterGEMS for the existing, 5-year, 10-year, and Buildout scenarios. The information required to build the model and the corresponding data sources used are listed in **Table 25**.

TABLE 25 – WATER MODEL BUILD DATA

Infrastructure	Required Data	Data Source
Piping	► Length ► Age ► Material ► Diameter	► City GIS
Junctions	► Elevation	► TNRIS Topographic Data
Pumps	► Pump Curves ► Invert Elevations	► Record drawings ► Xak Pack Field Testing1
Tanks	► Elevation ► Head Range ► Tank Diameter	► Record drawings

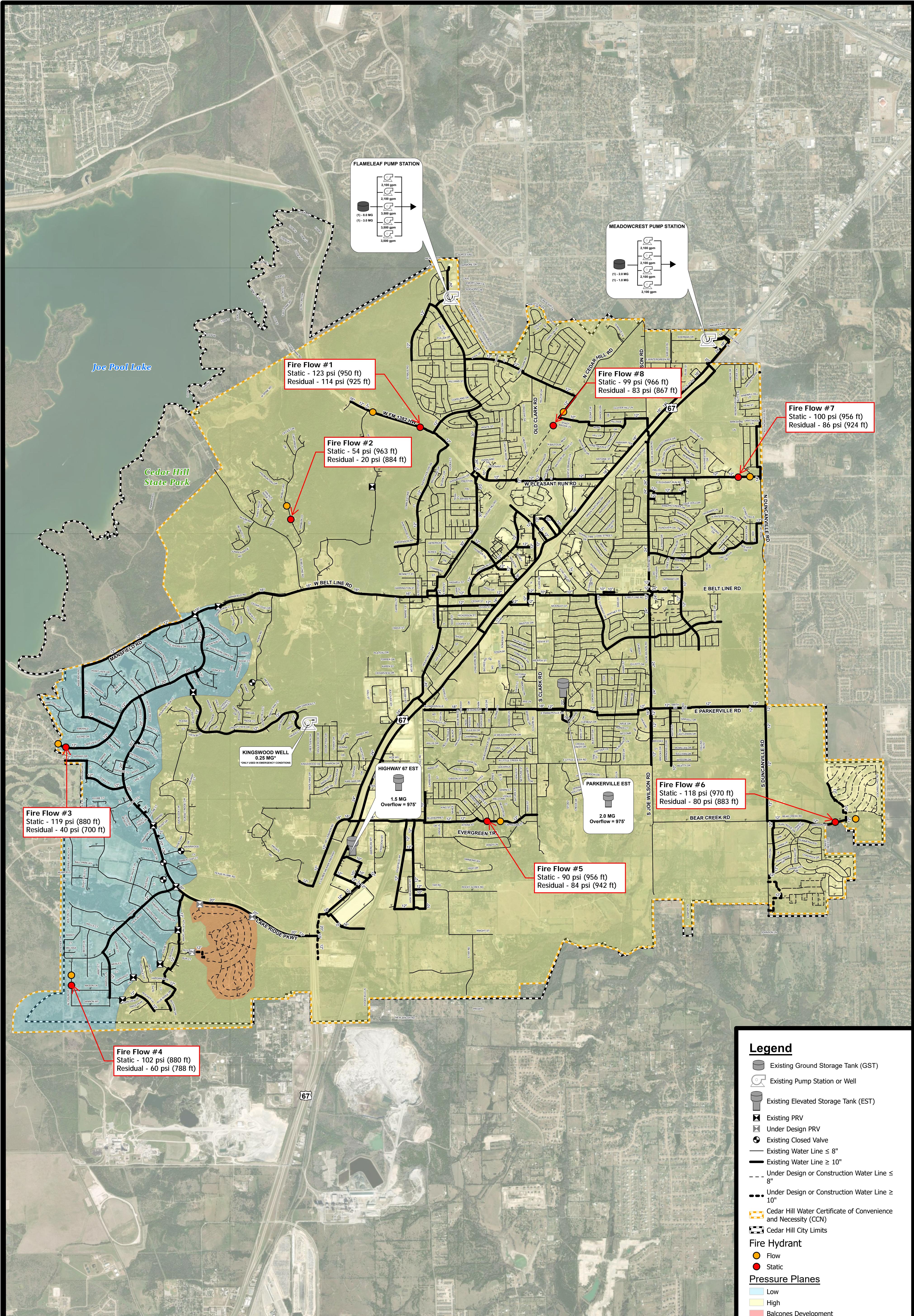
¹Xak Pack Report included in *Appendix D – Xak Pack Report*

WATER MODEL CALIBRATION

Kimley-Horn and City staff conducted eight (8) fire flow tests with eight (8) pressure loggers installed to record the system response at various locations throughout the water system. For each fire flow test, there is a static and flow hydrant. In addition to the eight pressure loggers installed throughout the system, a pressure logger is also installed at the static hydrant to measure the static and residual pressure.

The static pressure is the pressure observed right before the test begins. Residual pressure is the pressure observed as the hydrant is flowed. The difference between the static and residual pressure is the observed pressure drop. By measuring the total flow and corresponding pressure drop during each fire flow test, pipe roughness and valve settings can be accurately determined to ensure that the water model accurately reflects the physical system.

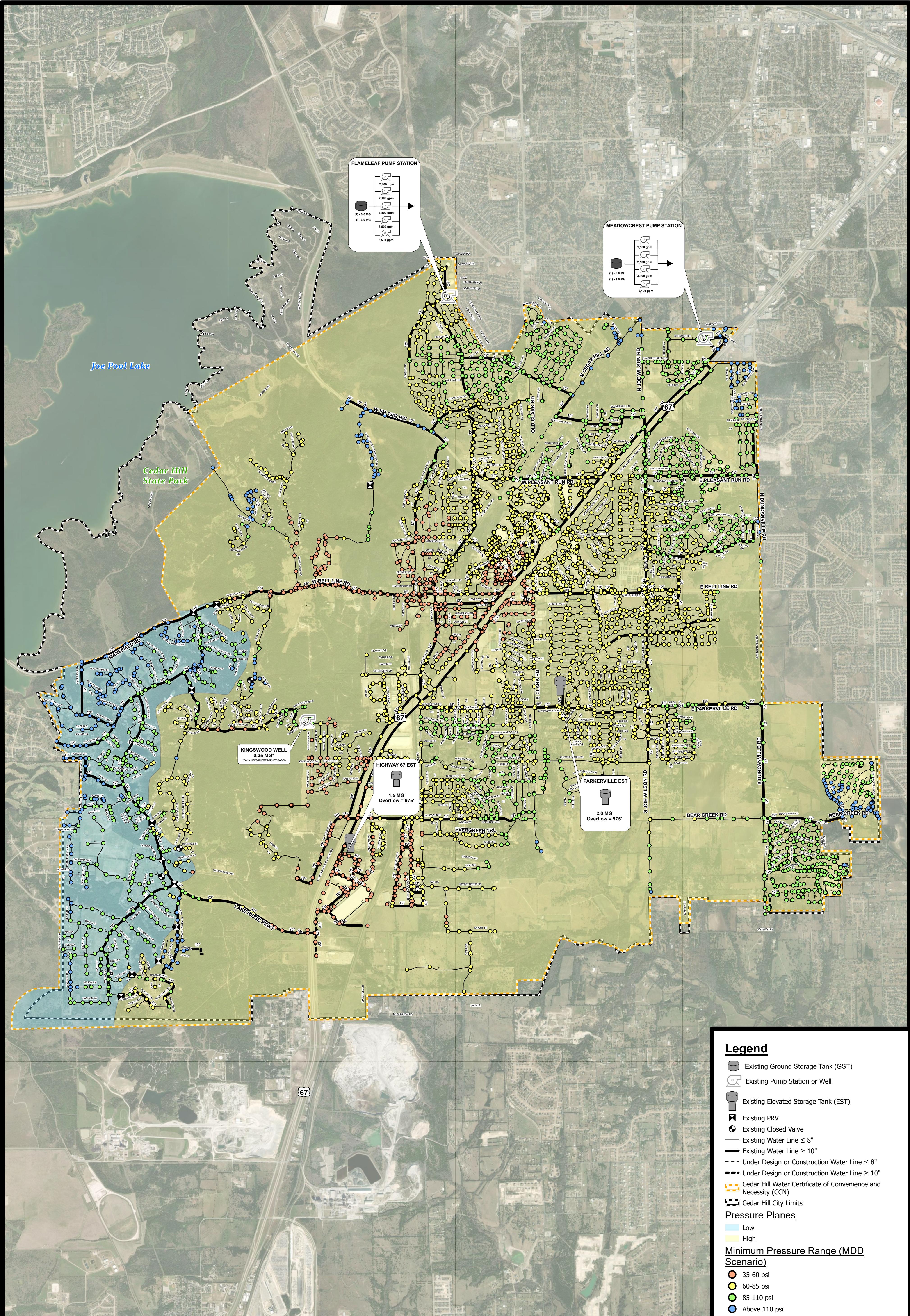
The locations of each fire flow test and pressure logger are shown in **Exhibit E**. It should be noted that Tests 3 and 4 produced higher pressure drops than what could be reasonably replicated in the hydraulic model. Kimley-Horn recommends the City conduct additional fire flow tests in this area to verify system conditions.



WATER MODEL SCENARIOS

The following scenarios were modeled over a 24-hour period:

1. **Average day demand (ADD)** – Run for 24 hours under normal operating conditions for the existing, 5, 10, and 25-year scenarios. The minimum observed pressure was 40 psi in the existing scenario.
2. **Maximum day demand (MDD)** – Run for 24 hours under normal operating conditions for the existing, 5, 10, and 25-year scenarios. The diurnal shown in **Figure 3** is applied in the model so that the PHD will occur during the MDD scenario. The minimum observed pressure was 38 psi. The minimum and maximum pressures observed at each junction in the model during the MDD existing scenario are shown in **Exhibit F**.
3. **MDD plus fire flow** – MDD plus 1,500 gpm fire flow in the 5-year scenario. Junctions unable to flow at 1,500 gpm while maintaining the TCEQ minimum pressure of 20 psi throughout the system fail fire flow. Conveyance projects to increase available fire flow are included in the Water Capital Improvement Plan (CIP).
4. **ADD with Highway 67 EST offline** – ADD with Highway 67 EST offline to ensure the EST can be taken offline during the winter without negatively impacting existing customers in the existing scenario. Parkerville EST satisfied ADD, with a minimum observed pressure in the system of 38 psi.
5. **ADD with Parkerville EST offline** – ADD with Parkerville EST offline to ensure the EST can be taken offline during the winter without negatively impacting existing customers in the existing scenario. Highway 67 EST satisfied ADD, with a minimum observed pressure in the system of 38 psi.



4.5 PRESSURE PLANE ANALYSIS

The existing system consists of an upper and lower pressure plane, delineated by multiple pressure reducing valves (PRVs) and closed valves. Elevations throughout the City range from 548 to 866 feet, creating challenges for pressure regulation. The existing PRVs are set to an HGL of 880 feet. The existing pressure plane boundaries and resulting pressure ranges during MDD conditions are shown in **Exhibit F**.

Within the lower pressure plane, elevations range from 548 to 715 feet, requiring lower elevation households within the lower pressure plane to install personal household PRVs to further reduce the pressure. In the upper pressure plane, elevations range from 568 to 866 feet with both ESTs set to an overflow elevation of 975 feet. Lower elevation households within the upper pressure plane must also install personal household PRVs to further reduce pressure. Existing households in these areas are understood to already have the needed PRVs in place at this time and were not evaluated further as part of this study. The scope of this analysis only includes pressure regulation issues regarding the lower pressure plane and proposed Balcones development, which is planned to be in the southwest corner of the City between the existing lower pressure plane and US 67, south of Lake Ridge Parkway.

Kimley-Horn recommends the City keep the existing PRVs in place at an HGL of 880 feet. For the proposed Balcones development, Kimley-Horn recommends the City install additional PRVs each set at an HGL of 917 feet to regulate pressure solely in the Balcones development. The locations of those PRVs are shown in **Exhibit A**. The proposed PRVs for the Balcones development and the existing personal household PRVs will appropriately regulate pressure throughout the system. The previously proposed Lakeridge EST is therefore no longer required for pressure regulation.

4.6 WATER SUPPLY EVALUATION

The projected demand at buildout is 12.8 MGD for ADD and 22.4 MGD for MDD, as listed in **Table 18**. However, based on the TCEQ requirement of providing 0.6 gpm/connection (**Table 27**) and the projected connections of 36,261 (**Table 28**), the City must be able to provide 31.1 MGD during MDD conditions at buildout (2048).

Based on the 2014 Dallas Long Range Water Supply Plan, DWU anticipates providing up to 15.2 MGD (ADD) to Cedar Hill by 2070. Based on the provided ADD value of 15.2 MGD, it is estimated that DWU anticipates providing approximately 30.4 MGD during MDD conditions based on a 2.0 peaking factor. Kimley-Horn recommends the City coordinate with DWU regarding the City's projected MDD to ensure the City has sufficient supply at each planning period through buildout.

DWU supplies water to the City through flow control valves at the Flameleaf and Meadowcrest Pump Stations. DWU has communicated an MDD limit of approximately 7 MGD at Flameleaf due to current capacity limitations within DWU's system. DWU has not communicated an existing capacity limitation at Meadowcrest. There are planned improvements to the DWU system that will eventually increase the available capacity at Flameleaf, although the timeframe is unknown.

Kimley-Horn recommends the City coordinate with DWU regarding the City's projected MDD at each pump station for each planning period to ensure the City will have sufficient supply through buildout at both pump stations. The flow supplied at the Flameleaf and Meadowcrest Pump Stations is shown in **Table 26**.

TABLE 26 – FLOW SUPPLIED PER PUMP STATION

Planning Period	Flameleaf (MGD)	Meadowcrest (MGD)
5-Year (2028)	6.7	8.6
10-Year (2033)	8.1	10.8
Buildout (2048)	9.5	12.7

Additionally, the City has sufficient ground storage to supply enough buffer in emergency conditions (**Table 27**). The City also has the existing Kingswood well that is not used in normal operating conditions but could be used in an emergency.

4.7 LOOP 9 WATER INFRASTRUCTURE

Proposed transmission mains are located on both sides of the future Loop 9 corridor and sized to serve projected development anticipated along the future service roads. Construction of Loop 9 is expected to begin within the next 10 years. The proposed conveyance infrastructure is discussed in detail in [Section 4.9](#).

4.8 WATER INFRASTRUCTURE ANALYSIS

Kimley-Horn worked with City staff to determine design criteria for each major infrastructure component of the water system. Criteria established by the Texas Commission on Environmental Quality (TCEQ) must also be satisfied. City and TCEQ criteria are summarized in **Table 27**.

TABLE 27 – DESIGN CRITERIA SUMMARY

	City Criteria	TCEQ Criteria
Supply & Production	Overall capacity to meet Maximum Day Demand (MDD)	Overall capacity to meet 0.60 gpm per connection
Minimum Pressure	Normal conditions = 40 psi Extreme conditions = 20 psi	Normal conditions = 35 psi Extreme conditions = 20 psi
Maximum Velocity	3 – 5 ft/s preferable 7 ft/s maximum	N/A
Pumping Facilities	Firm capacity to meet MDD	Total capacity of at least 2.0 gpm per connection or 1,000 gpm and the ability to meet peak hourly demands with the largest pump out of service at each pressure plane, whichever is less. Or total capacity of at least 0.60 gpm per connection if 200 gallons of elevated storage per connection is met.
Ground Storage	50% of MDD	N/A
Elevated Storage	Sufficient storage to satisfy required ISO Fire rating ¹ plus MDD in conjunction with pump firm capacity	Equal to 100 gallons per connection or equal to 200 gallons per connection for pumping requirement discount.
Total Storage	N/A	Equal to 200 gallons per connection

¹City must supply 3,500 gpm for 3 hours to maintain ISO Fire Rating

To determine compliance with TCEQ design criteria, existing and projected connection counts must first be determined. Per TCEQ guidance, each water meter is counted as a connection except for multi-family meters. For multi-family meters, each unit associated with that multi-family meter is counted as a separate connection. Previous connection count estimates for the City are lower because each multi-family meter was not counted as a separate connection. The current and projected connection counts are listed in **Table 28**.

TABLE 28 – CONNECTION COUNT

Planning Period	Connection Count
Existing (2023)	18,875
5-Year (2028)	25,001
10-Year (2033)	30,010
Buildout (2043)	36,261

The available capacity compared to both City and TCEQ design criteria for pumping, elevated, and total storage capacity is listed in **Tables 29, 30, and 31**, respectively.

TABLE 29 – PUMPING CAPACITY

Planning Period	Connection Count	Capacity (GPM)	Req'd Capacity – City (GPM)	Req'd Capacity – TCEQ (GPM)
Existing (2023)	18,875	22,800	7,785	12,456
5-Year (2028)	25,001	22,800	10,287	16,459
10-Year (2033)	30,010	22,800	12,677	20,283
Buildout (2043)	36,261	25,600 ¹	15,545	24,872

¹Empty pump slot must be filled at Meadowcrest Pump Station (2) to meet TCEQ criteria.

TABLE 30 – EST CAPACITY

Planning Period	Connection Count	Capacity (MG)	Req'd Capacity - City (MG)	Req'd Capacity – TCEQ (MG)
Existing (2023)	18,875	3.5	0.6	1.9
5-Year (2028)	25,001	3.5	0.6	2.5
10-Year (2033)	30,010	3.5	1.2	3.0
Buildout (2043)	36,261	3.5	1.7	3.6

TCEQ 290 defines elevated storage as “that portion of water which can be stored at least 80 feet above the highest service connection in the pressure plane served by the tank.” There is one service connection in the Cedar Hill system at an elevation 7 feet higher than the next highest service connection. This one service connection reduces the elevated storage capacity of the system from the nominal capacity of 3.5 MG to approximately 2.9 MG according to TCEQ. The elevated storage capacity required per TCEQ is not projected to surpass 2.9 MG for approximately 10 years. Several potential solutions could be implemented when the required capacity does surpass 2.9 MG.

Those solutions include:

1. Install an inline booster just upstream of the highest elevation connection to maintain the nominal capacity of 3.5 MG.
2. Apply for an Alternative Capacity Requirement (ACR) through TCEQ to reduce elevated storage requirements below 100 gallons per connection.
3. When the 1.5 MG Highway 67 EST is required to be replaced due to condition/age, replace with a 2.0 or 2.5 MG EST.

It should be noted that the 2013 WMP recommendation included an additional EST near Lake Ridge Parkway to both satisfy design criteria and solve pressure regulation issues in the lower pressure plane. However, the design criteria utilized in the 2013 WMP was significantly more conservative than both TCEQ and City design criteria. Additionally, the proposed EST is no longer required to mitigate existing pressure regulation issues as discussed in **Section 4.5**. The proposed Lakeridge EST is therefore no longer recommended.

TABLE 31 – TOTAL STORAGE CAPACITY

Planning Period	Connection Count	Capacity (MG)	Req'd Capacity - City (MG)	Req'd Capacity – TCEQ (MG)
Existing (2023)	18,875	17.5	6.2	3.8
5-Year (2028)	25,001	17.5	8.0	5.0
10-Year (2033)	30,010	17.5	10.3	6.0
Buildout (2043)	36,261	20.5	12.9	7.3

Although not required to satisfy capacity criteria, the City plans to replace the existing 1.0 and 2.0 MG GSTs at the Meadowcrest Pump Station with one 6.0 MG GST due to the age and condition of the existing GSTs. This project is included in the Water CIP discussed in the section below.

4.9 WATER CAPITAL IMPROVEMENT PLAN (CIP)

Infrastructure included in the CIP is sized to accommodate buildout demand and satisfy both City and TCEQ Design Criteria as outlined in **Table 27**. Projects are phased to serve growth where and when it is projected to develop as outlined in **Section 3.2**. The project names and costs for the 5-year, 10-year, and Buildout planning periods are listed in **Tables 32, 33, and 34**, respectively and shown in **Exhibit G**. Projects that are currently under design or construction are shown as dashed.

TABLE 32 – 5-YEAR CIP PROJECTS

Project No.	Project Name	Project Cost
1	Highway 67 EST Repair and Painting	\$2,000,000
2	Mount Lebanon Rd 16" Water Line	\$3,464,000
3	Mount Lebanon Rd 20" Water Line	\$4,442,000
4	Highway 67 10" Water Line (Pleasant Run to Joe Wilson)	\$1,532,000
5	Bennett Street 8" Water Line Replacement	\$588,000
6	Parkerville EST Repair and Painting	\$2,000,000
7	Stonehill/Vineyard 12" Water Line Connection	\$848,000
8	Hendricks Street 8" Water Line Replacement	\$1,408,000
9	Lorch Park 10" Water Line	\$2,595,000
10	Lorch Park Water Distribution Line	\$1,933,000
11	Loop 9 12" Water Line Phase 1 - North	\$8,087,000
12	S Tar Rd 8" Water Line Replacement	\$470,000
13	Mobley Rd to W Belt Line Rd 8" Water Line	\$2,701,000
14	W Belt Line Rd 12" Water Line Replacement	\$2,188,000
15	Tindle St 8" Water Line	\$1,123,000
16	Randy Rd 8" Water Line	\$506,000
17	Kingswood 8" Water Line Replacements	\$1,175,000
18	Bluff Ridge Dr 8" Water Line Replacement	\$723,000
19	Community Center Park 8" Water Line Replacement	\$817,000
20	Cobblestone Ct 8" Water Line Replacement	\$574,000
21	Cedar Hill Church of Christ 8" Water Line Replacement	\$723,000
22	Cedar Hill State Park 10" Water Line	\$3,669,000
23	Southwest Cedar Hill 12" Water Line	\$6,020,000
24	Texas Plume Rd 12" Water Line	\$5,403,000
25	E Parkerville Rd 16/18/24" Water Line Replacement Phase 1	\$2,447,000
26	Northeast Cedar Hill 10" Water Line	\$4,295,000
27	Highway 67 EST 24" Water Line Parallel	\$788,000
28	S Cedar Hill Rd 18" Water Line	\$859,000
5-Year Projects Sub-Total:		\$63,378,000

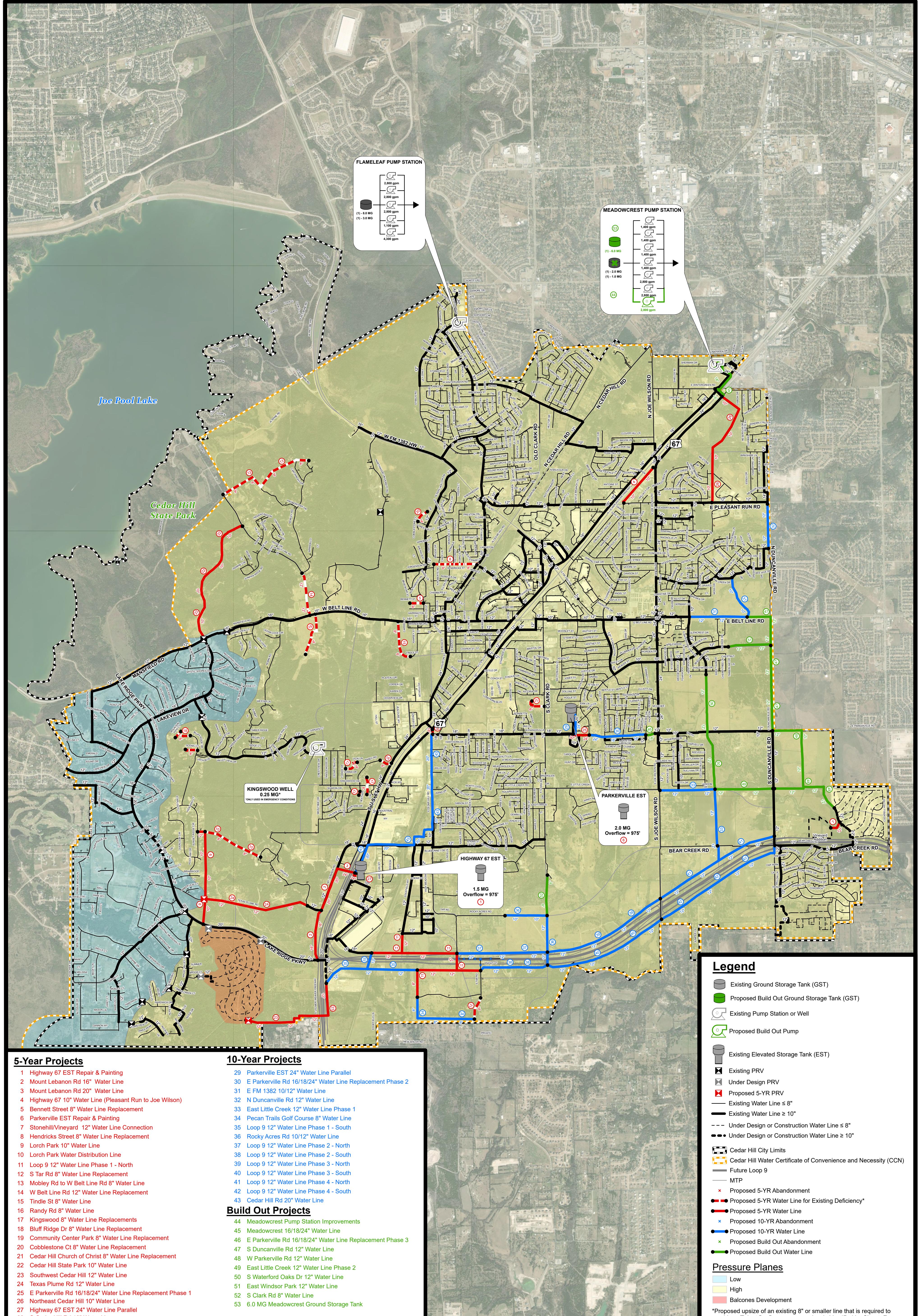
TABLE 33 – 10-YEAR CIP PROJECTS

Project No.	Project Name	Project Cost
29	Parkerville EST 24" Water Line Parallel	\$2,397,000
30	E Parkerville Rd 16/18/24" Water Line Replacement Phase 2	\$4,059,000
31	E FM 1382 10/12" Water Line	\$4,096,000
32	N Duncanville Rd 12" Water Line	\$2,502,000
33	East Little Creek 12" Water Line Phase 1	\$4,603,000
34	Pecan Trails Golf Course 8" Water Line	\$1,986,000
35	Loop 9 12" Water Line Phase 1 – South	\$4,914,000
36	Rocky Acres Rd 10/12" Water Line	\$3,787,000
37	Loop 9 12" Water Line Phase 2 – North	\$3,336,000
38	Loop 9 12" Water Line Phase 2 – South	\$2,632,000
39	Loop 9 12" Water Line Phase 3 – North	\$4,763,000
40	Loop 9 12" Water Line Phase 3 – South	\$4,886,000
41	Loop 9 12" Water Line Phase 4 – North	\$5,605,000
42	Loop 9 12" Water Line Phase 4 – South	\$5,353,000
43	Cedar Hill Rd 20" Water Line	\$13,276,000
10-Year Projects Sub-Total:		\$68,195,000

TABLE 34 – BUILDOUT CIP PROJECTS

Project No.	Project Name	Project Cost
44	Meadowcrest Pump Station Improvements	\$910,000
45	Meadowcrest 16/18/24" Water Line	\$4,883,000
46	E Parkerville Rd 16/18/24" Water Line Replacement Phase 3	\$952,000
47	S Duncanville Rd 12" Water Line	\$7,209,000
48	W Parkerville Rd 12" Water Line	\$5,793,000
49	East Little Creek 12" Water Line Phase 2	\$2,427,000
50	S Waterford Oaks Dr 12" Water Line	\$4,160,000
51	East Windsor Park 12" Water Line	\$1,802,000
52	S Clark Rd 8" Water Line	\$1,087,000
53	6.0 MG Meadowcrest Ground Storage Tank	\$10,395,000
Buildout Projects Sub-Total:		\$39,618,000

The Opinion of Probable Construction Costs (OPCCs) for proposed water infrastructure have been included in **Appendix A – Opinion of Probable Construction Costs (Water)**. The opinion of probable costs for each capital project assumes no design completed, are based on 2023 dollars, and does not include annual construction cost increases.



It should be noted that the CIP does not include the systematic replacement of 4" water lines and smaller. There are a total of 27,333 linear feet of 4" and smaller water lines in the system (**Table 35**). Existing 4" and smaller lines that would be eligible for replacement are shown in **Exhibit H**.

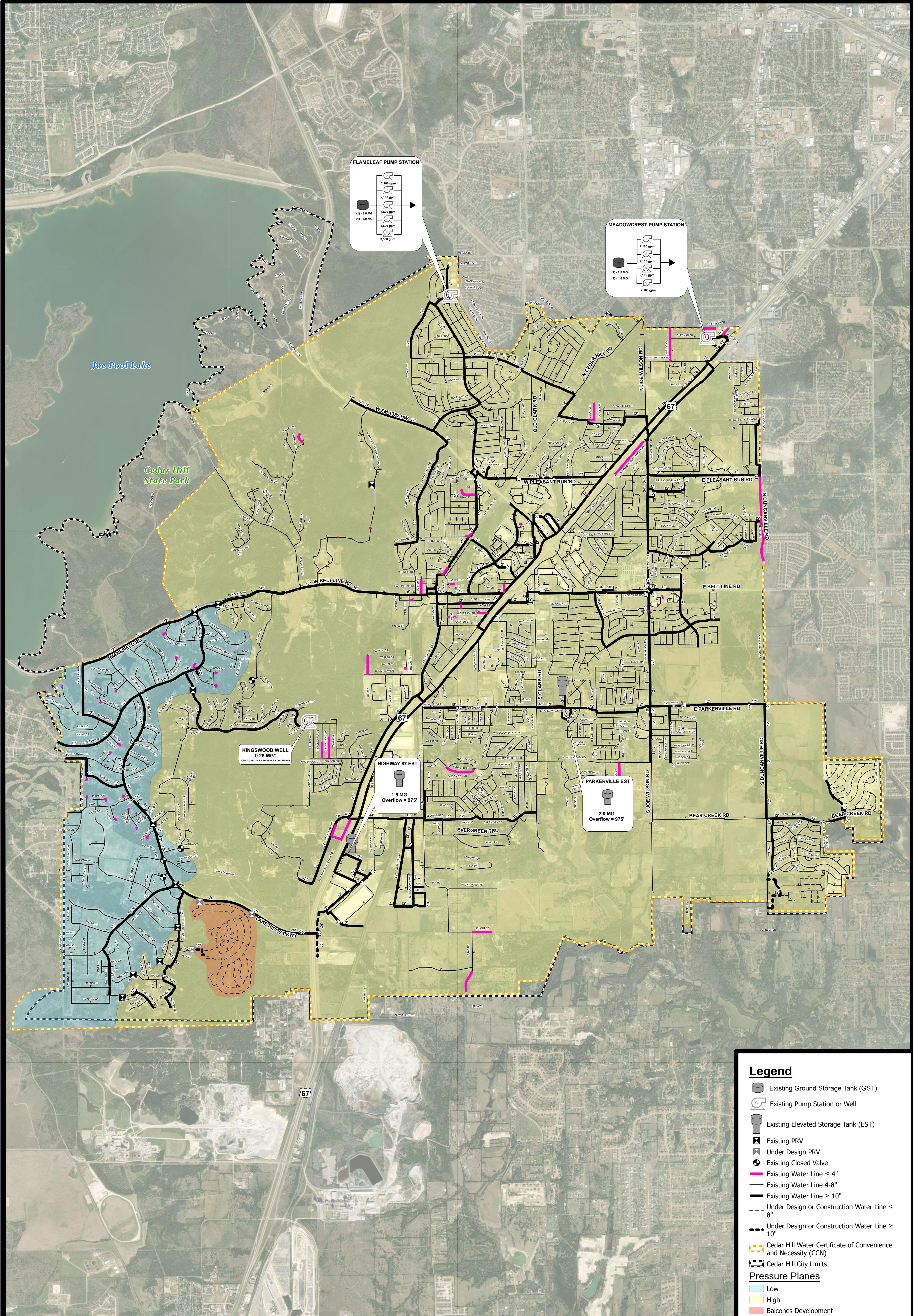
TABLE 35 – 4" AND BELOW WATER LINES

Size	Linear Feet
1"	1,935
2"	21,040
4"	4,358
Total	27,333

4.10 WATER MASTER PLAN SUMMARY

Based on the land use and growth projections outlined in [**Section 3.0**](#), the average, maximum and peak hour water demand was projected for the 5-year, 10-year, and Buildout planning periods ([**Section 4.2**](#)). A water model was built and calibrated to analyze existing and future system conditions. Modeled scenarios are discussed in detail in [**Section 4.4**](#).

Based on model results, infrastructure was proposed to mitigate existing deficiencies, serve future development, and satisfy both City and TCEQ design criteria ([**Section 4.8**](#)). Proposed infrastructure is discussed in detail in [**Section 4.9**](#). Additional analyses completed as part of the WMP include an analysis of the previously proposed pressure plane delineation ([**Section 4.5**](#)), a water supply evaluation ([**Section 4.6**](#)), and identification of proposed infrastructure to accommodate the construction of Loop 9 ([**Section 4.7**](#)). Construction cost estimates and field testing reports are also provided in the Appendix of this document.



5.0 WASTEWATER MASTER PLAN (WWMP)

5.1 WWMP SCOPE ITEMS

Scope items specific to the WWMP include:

1. **Peaking Factor Evaluation** – Kimley-Horn utilized historic flow meter data to estimate the current wastewater peaking factor to be utilized in the wastewater model.
2. **Wastewater Infill Evaluation** – Kimley-Horn evaluated the City's future wastewater system with anticipated flows for currently undeveloped parcels, including areas of infill within the existing system. Areas were considered as infill if they are currently on septic systems with the potential to move to city sewer in the future. These flows were considered as part of the overall master planning effort to determine anticipated system-wide wastewater improvements.
3. **Loop 9 Evaluation** – Kimley-Horn identified the Wastewater infrastructure required to serve projected development along the future Loop 9 corridor.

5.2 EXISTING WASTEWATER SYSTEM

EXISTING WASTEWATER LINES

The City's existing wastewater system consists of over 45,000 feet of 30" – 15" interceptor lines and approximately 1,200,000 feet of 12" and below wastewater collector lines. A large portion of the large interceptor lines within the City are owned by the Trinity River Authority (TRA).

WASTEWATER BASINS

Wastewater from the City is collected and transferred to TRA for treatment. The City consists of three wastewater basins where flow is collected by TRA: the TRA Central North and South basins, the TRA Ten Mile Basin, and the TRA Red Oak basin. **Exhibit I** shows the location of each wastewater basin.

TRA Central North and South

The TRA Central North Basin serves the northwest part of the City. This basin is approximately 2880 acres (4.5 square miles). The TRA Central South Basin serves the southwest part of the City and is approximately 5440 acres (8.5 square mile).

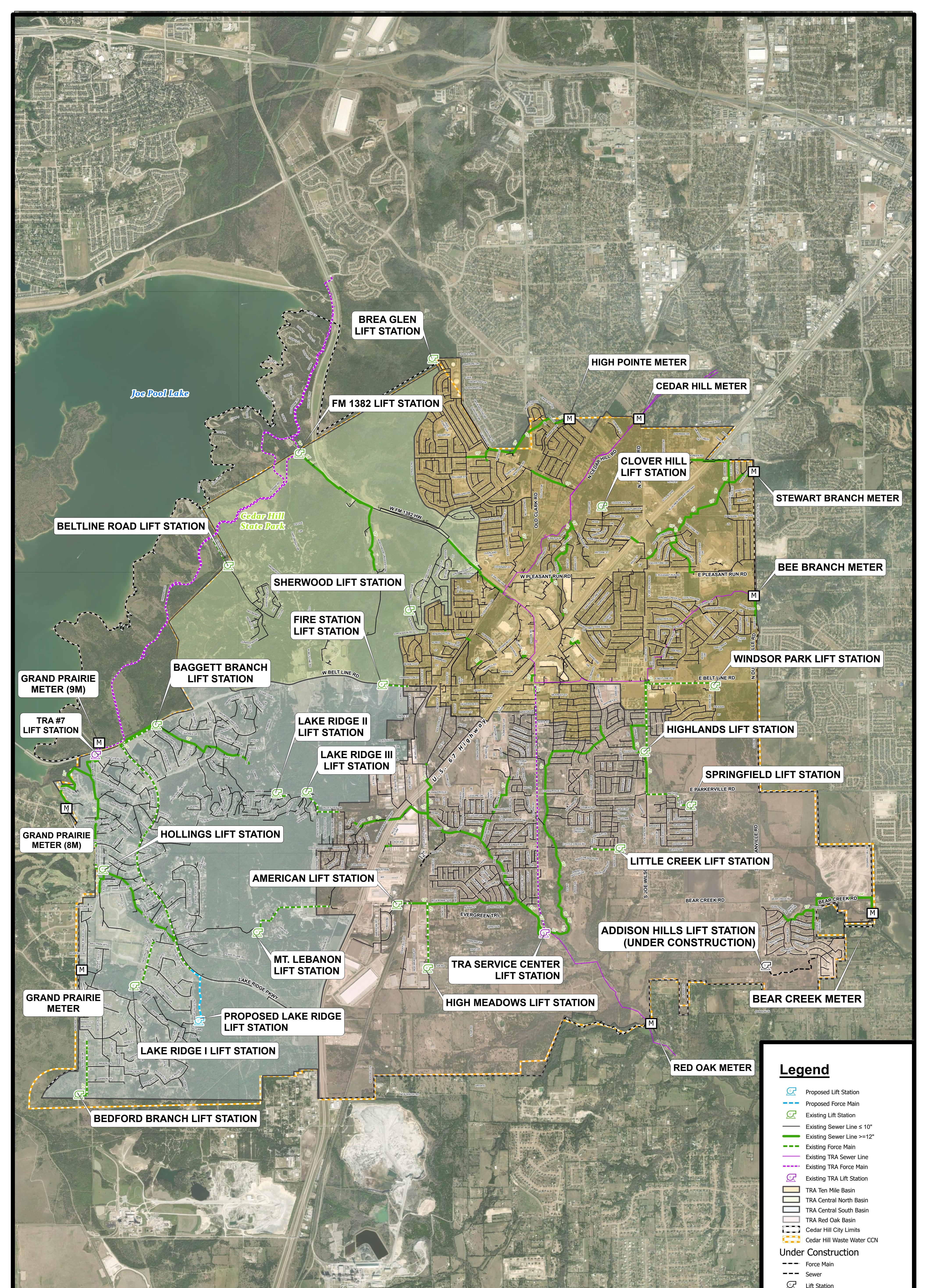
TRA's Lift Station #7 collects flow from the TRA Central South basin. The lift station pumps into a 30-inch force main that runs through Cedar Hill State Park. Three existing City-owned lift stations, Belt Line Road Lift Station, FM 1382 Lift Station, and Baggett Branch Lift Station, pump directly into the 30-inch force main. Beltline Road Lift Station and FM 1382 Lift Station collect flow from the TRA Central North basin. Flow from the TRA Lift Station #7 is pumped north and gravity flows into TRA's gravity system. A portion of wastewater flow from the TRA Central South basin gravity flows into Grand Prairie's wastewater system. This flow ultimately gravity flows into TRA Lift Station #7. TRA Meter 8M meters this flow and also includes wastewater flow from Grand Prairie. There is an agreement between TRA, Grand Prairie, and Cedar Hill that is utilized to calculate the wastewater flow provided by Cedar Hill to TRA Meter 8M. In addition, wastewater flow from Grand Prairie discharges into TRA Lift Station #7 through an 18" force main along Lakeridge Parkway and through a 12" gravity line north of TRA Lift Station #7.

TRA Ten Mile

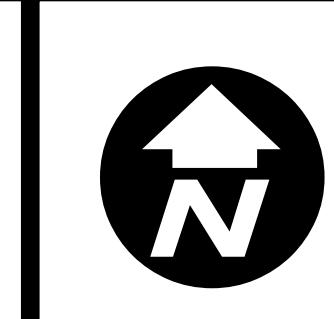
The TRA Ten Mile Basin serves the northeast part of the City and is approximately 5,120 acres (8 square miles). The TRA Ten Mile basin is served by five TRA interceptors: the 18-inch Stewart Branch interceptor, 24-inch Bee Branch interceptor, 15-inch High Pointe interceptor, and 21- and 18-inch Cedar Hill interceptors. These interceptors feed into their respective meter stations: Stewart Branch, Bee Branch, High Pointe, and Cedar Hill meters.

TRA Red Oak

The Red Oak Basin serves the southeast part of the City. The basin is approximately 7,950 acres (12.5 square miles). Both the 21-inch Red Oak and 24-inch Bear Creek TRA interceptors serve the Red Oak basin. The interceptors flow to their respective meters, the Bear Creek, and Red Oak meters. A portion of the flow from the Red Oak Basin discharges into the TRA Service Center Lift Station. The TRA Service Center Lift Station pumps flow north through a 16-inch force main and discharges into the Ten Mile Basin. The City of Cedar Hill has an agreement with TRA that requires TRA to pump 750,000 gallons a day to the Ten Mile basin from the TRA Service Center Lift Station. The Red Oak interceptor allows



Cedar Hill, Texas
Wastewater Master Plan
Existing Wastewater
Infrastructure Map



2,000 0 2,000
Feet
February 2024

Kimley » Horn

This map product is for informational purposes and may not have been prepared for or be suitable for legal, engineering, or surveying purposes. It does not represent an on-the-ground survey and represents only the approximate relative location of property boundaries.

EXISTING LIFT STATIONS

The City owns and operates eighteen (18) lift stations throughout their wastewater system. Two TRA lift stations are located in the City's wastewater service area; TRA Service Center Lift Station and TRA Lift Station #7. The TRA Service Center Lift Station is located in the Red Oak Basin and pumps flow north to the Ten Mile Basin, and the TRA Lift Station #7 is located in the TRA Central South basin and services the TRA Central South and North Basins. An existing 10-inch force main is located along Lake Ridge Parkway and discharges into a 12-inch gravity main along Mansfield Road. This force main is currently not in use and is anticipated to be utilized by the future developments south of Lake Ridge Parkway. **Exhibit I** shows the location of each existing lift station. The table below summarizes the existing capacities of each lift station within the City limits:

TABLE 36 – EXISTING LIFT STATION SUMMARY

Basin	Lift Station	Firm Capacity (gpm)	# of Pumps
TRA Central North	FM 1382 ²	1,500	2
	Sherwood ⁵	100	2
	Beltline Road ²	490	2
TRA Central South	Baggett Branch ⁵	400	2
	Bedford Branch ²	400	2
	Lakeridge I ⁵	260	2
	Lakeridge II ²	400	3
	Lakeridge III ²	920	3
	Hollings Branch ⁵	550	2
	Mount Lebanon ⁵	-	-
	TRA #7 ^{1,4}	9,000	2
Ten Mile	Clover Hill ³	-	-
	Brea Glen ²	100	2
	Windsor Park ⁵	600	2
Red Oak	American ⁵	275	2
	High Meadows ⁵	250	2
	Springfield ⁵	400	
	Highlands ⁵	2,400	3
	Little Creek ³	-	-
	TRA Service Center ¹	2,000	3

¹Owned by TRA

²Record information indicating firm capacity of lift station unavailable. Firm capacity of lift station from previous master plan report verified with City.

³Record information indicating firm capacity of lift station unavailable. Lift station not included in model due to size.

⁴Lift Station expansion of TRA #7 currently in design.

⁵Firm capacity from existing record information.

5.3 EXISTING & FUTURE WASTEWATER FLOW

HISTORICAL WASTEWATER FLOW PROJECTIONS

Kimley-Horn received wastewater flow meter data from TRA for each of the three wastewater basins in the City of Cedar Hill. The data received ranged from December 2019 – February 2023 in daily and 15-minute intervals. Kimley-Horn utilized TRA meter data to determine an average dry weather flow for the system and for each wastewater basin. Dry weather days selected for analysis were determined utilizing historical rainfall data. Days immediately after a wet weather event were excluded from the dry weather analysis.

TRA meter data was utilized to determine historical wet weather peaking factors caused by infiltration and inflow (I/I). I/I occurs when stormwater flow enters the wastewater system during rainfall events through manholes or pipes. Historic rain gauge data was utilized to identify two major storm events that occurred in each of the years 2020, 2021, and 2022. Historic wastewater flow observed during these rain events was analyzed in comparison to the average dry weather flow to determine a wet weather peaking factor.

The table below summarizes dry and wet weather data for each basin observed for the years 2020, 2021, and 2022.

TABLE 37 – HISTORIC WASTEWATER DRY WEATHER DATA SUMMARY

Basin	Average Dry Weather Flow (MGD)	Average Wet Weather Flow (MGD)	Average Peaking Factor
2020			
TRA Central North and South	0.45	2.45	5.44
Ten Mile	2.79	13.33	4.78
Red Oak	0.65	3.21	4.94
Total	3.89	18.99	4.88
2021			
TRA Central North and South	0.47	1.82	3.87
Ten Mile	2.58	15.17	5.88
Red Oak	0.65	3.61	5.55
Total	3.69	20.60	5.58
2022			
TRA Central North and South	0.43	1.95	4.55
Ten Mile	2.83	10.04	3.55
Red Oak	0.58	2.72	4.68
Total	3.84	14.71	3.83
Average	3.81	18.10	4.76

¹Historic rain events utilized to generate wet weather flow and average peaking factors observed on 3/18/2020, 5/17/2020, 5/17/2021, 5/25/2021, 8/22/2022, 11/26/2022.

Analyzing select major rain events, an average wet weather peaking factor of 4.76 was observed by TRA historic meter data for the years 2020 through 2022. Based on calibration of the existing wastewater flows and discussions with the City on how the existing system currently operates, it was determined that a peaking factor of 4.5 would adequately represent the current conditions of the system. A peaking factor of 4.5 was utilized in the hydraulic modelling analysis.

Based on historical TRA flow meter data, a dry weather wastewater diurnal curve was generated. A peaking factor of 1.6 was observed during an average dry weather day.

FUTURE WASTEWATER FLOW PROJECTIONS

In addition to historical flow data from TRA, the City provided customer water meter billing data from April 2022 to April 2023. Water use during the winter months was assumed to be almost exclusively translated to wastewater flows. Water billing data from single-family units from January 2023 – February 2023 was therefore utilized to determine dry weather wastewater flows per capita. Historical TRA flow meter data was utilized to verify the calculated baseline wastewater flow aligned with observed dry weather flow for the same time period. To be conservative, a wastewater loading factor of 80% of the water demands was utilized for the master plan analysis. This value is larger than the observed meter data.

Utilizing customer meter data and TRA meter data, a dry weather wastewater loading factor was determined (**Table 38**) for single-family and multifamily units. Dry weather wastewater loading factors for non-residential land use types were determined per acre (**Table 39**).

TABLE 38 – RESIDENTIAL LOADING PER UNIT

Residential Category	Average Flow per Unit (GPD/unit)
Single-Family	216
Multi-Family	168

TABLE 39 – NON-RESIDENTIAL LOADING FACTORS

Future Land Use Category	Non-residential Loading Factor (gal/acre)
Conservation Opportunity Area – Institutional	96
Conservation Opportunity Area – Mixed Use	720
Conservation Opportunity Area – Residential Single	0 ¹
Employment Center	232
Historic Downtown	720
Neighborhood Center	720
Open Space Public Ownership	112
Regional Center	720
Residential Mixed Density	600
Residential Multifamily	0 ¹
Residential Single Family	0 ¹
Retail Center Retrofit	720
Rural Open Space	0 ¹
Suburban Institutional Area	96
Suburban Non-Residential	720
Uptown/Midtown	472

¹100% Residential Land Use, demand calculated utilizing values in Table 38

Based on the identified growth areas identified in **Section 3.2**, the total dry weather loading projections for the 5-year, 10-year, and Buildout planning periods was determined (**Table 40**).

TABLE 40 – WASTEWATER FLOW PROJECTIONS

Planning Period	Dry Weather Flow (MGD)	Wet Weather Flow (MGD)
Existing	4.17	18.76
5-Year	5.82	26.17
10-Year	7.39	33.24
Buildout	9.27	41.70

5.4 WASTEWATER MODEL UPDATE

The 2013 Wastewater Master Plan and wastewater hydraulic model was completed by a previous consulting firm. The previous wastewater model was performed in H₂OMap Sewer. The software H₂OMap Sewer is no longer supported by the manufacturer. Kimley-Horn received the previous H₂OMap Sewer model from the City and upgraded the model to the software InfoWorks ICM. Kimley-Horn utilized existing lift station record drawings to verify the lift station information in the existing model. Kimley-Horn identified areas in the previous model that had discrepancies between slopes and flow lines and obtained record drawings from the City. Kimley-Horn utilized these record drawings to update pipe slopes and flow lines in the existing model to correspond with record information for these areas. No other gravity mains were verified by record drawings as part of this model update. All other pipes were assumed to be accurate based on previous modeling efforts by others.

EXISTING SYSTEM WASTEWATER MODEL CALIBRATION

The existing model was calibrated utilizing historical flow meter data. A dry weather scenario simulated over a 24-hour period was created to calibrate the model. Dry weather historical wastewater flow data from each TRA wastewater basin was evaluated and model adjustments were implemented to develop a model which more closely represents existing system conditions. A 24-hour wet weather scenario utilizing the observed historic peaking factor was also used for model calibration.

FUTURE WASTEWATER MODEL SCENARIOS

Hydraulic analysis was conducted for each planning year to determine necessary wastewater infrastructure improvements. Dry and wet weather scenarios were created for the 5-year, 10-year, and buildout planning windows and were simulated over a 24-hour period. Wastewater flows based on land use, identified in [**Section 5.3**](#), were utilized to load these scenarios. Wet weather scenarios utilized the historically observed peaking factor identified in [**Section 5.3**](#). Peak wet weather flow for each planning period was analyzed to determine the adequacy of existing infrastructure and identify improvements necessary to serve projected wastewater flows for each planning window.

5.5 LOOP 9 WASTEWATER INFRASTRUCTURE

Proposed wastewater gravity lines are located near the future Loop 9 corridor and sized to serve projected development anticipated in this area. The routing of proposed wastewater infrastructure in this area was determined utilizing existing topography, the proposed master thoroughfare plan, and the proposed alignment of Loop 9. Wastewater flow in this area ultimately discharges to TRA's wastewater interceptor. Construction of Loop 9 is expected to begin within the next 10 years. The proposed wastewater infrastructure is discussed in detail in [**Section 5.7**](#).

5.6 WASTEWATER INFRASTRUCTURE ANALYSIS

EVALUATION AND DESIGN CRITERIA

Kimley-Horn utilized criteria established by the TCEQ to evaluate each major infrastructure component of the wastewater system. TCEQ criteria are summarized in **Table 41**.

TABLE 41 – DESIGN CRITERIA SUMMARY

	TCEQ Criteria
Gravity Main	<ul style="list-style-type: none"> ▶ Wastewater collection system must handle the transport of the peak dry weather flow plus inflow and infiltration (TCEQ Section §217.53(a)) ▶ Minimum Diameter allowed for a gravity pipe is six inches (TCEQ Section §217.53(j)) ▶ All wastewater collection systems must contain slopes sufficient to allow a velocity when flowing full of not less than 2.0 feet per second (TCEQ Section §217.53(l))
Force Main	<ul style="list-style-type: none"> ▶ Force mains shall be a minimum of four inches in diameter unless it is used in conjunction with a grinder pump station. The executive director may approve pipes with a diameter less than 4.0 inches where grinder pumps are used, on a case-by-case basis in writing. ▶ For a lift station with two pumps: <ul style="list-style-type: none"> ○ A minimum velocity of 3.0 feet per second. ▶ For a lift station with three or more pumps: <ul style="list-style-type: none"> ○ A minimum velocity of 2.0 feet per second with only the smallest pump operating at full speed. ○ A minimum velocity of 5.0 feet per second or greater must occur in a force main at least twice. ▶ A maximum velocity of 6.0 feet per second. For pipelines higher than 6.0 feet per second, a report must certify that the pipeline can withstand high and low negative surge pressures in event of sudden pump failure. (TCEQ Section §217.67(a))
Lift Station	<ul style="list-style-type: none"> ▶ A lift station must have at least two pumps. The firm pumping capacity of a lift station must handle the peak flow. (TCEQ Section §217.61(c))

Kimley-Horn utilized the TCEQ criteria outlined in **Table 41** to determine wastewater infrastructure improvements. In addition to the criteria outlined by TCEQ, the City would like to operate lift stations with two or more pumps at a minimum velocity of 3 feet per second with the largest pump out of service. This criteria was utilized to determine infrastructure improvements.

It is recommended for existing gravity mains to be evaluated for improvement when the ratio of flow to the full flow of the pipe (q/Q) exceeds 0.85. This indicates that a gravity main has not yet reached its full flow capacity but is nearing full flow capacity. Gravity mains were recommended for replacement when the q/Q ratio exceeded 0.95. When the q/Q is greater than 1, this implies the gravity line's pipe capacity has been surpassed. This could lead to surcharged manholes throughout the system.

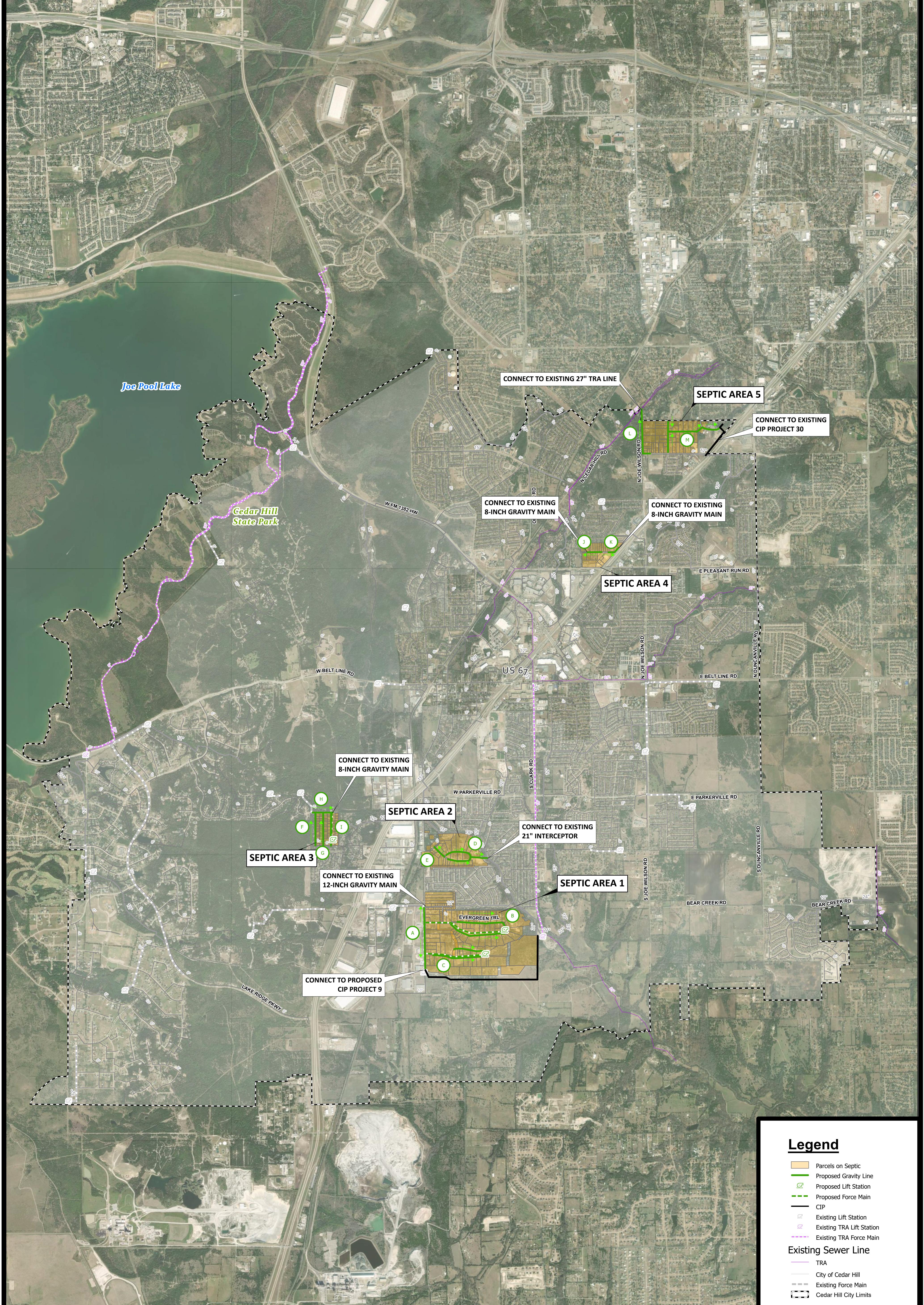
INFILL EVALUATION

The City currently has rural developments and undeveloped parcels that are on septic systems and are not connected to the City's wastewater system. As part of buildout planning, these areas were evaluated to determine what City infrastructure would be needed to provide City sewer service, if needed, in the future. **Exhibit J** shows the areas in the City that are currently on septic and do not currently have City wastewater service. Kimley-Horn analyzed these areas to determine the wastewater infrastructure improvements necessary to serve these areas, should they desire to redevelop and/or connect to the City sewer system in the future.

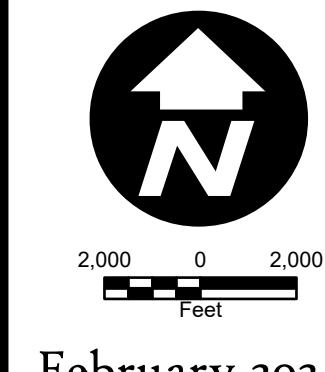
As shown in **Exhibit J**, the evaluation includes five areas that are currently on septic. Infrastructure improvements necessary to connect to the City's wastewater system were determined conceptually utilizing existing topography and the location of existing City infrastructure. Further evaluation will be necessary to determine the feasibility of the recommended infrastructure.

Gravity lines within the existing developments, where feasible, will be the most economical option to collect flow from the five areas on septic. Gravity lines are shown to connect directly into City or TRA wastewater lines for Septic Area 2, 4, and 5. Based on the existing topography of Areas 1 and 3, lift stations may be required to connect into the City's wastewater system in addition to gravity lines. The parcels served by gravity main segments B, C, and I may require lift stations to connect to the City's system. Due to topography and potential easement requirements, further analysis would need to be performed to determine if Septic Area 2, 3, and 4 can be conveyed by gravity flow or if lift stations and force mains may be needed instead. At this time, gravity lines were assumed for this analysis. Parcels served by gravity main K and gravity main D are shown to connect directly into TRA's wastewater system. Coordination with TRA would be required to determine the feasibility of these connections.

OPCC's for infrastructure improvements necessary to connect to the City's wastewater system have been generated for each evaluated existing development. **See Appendix C – Opinion of Probable Construction Costs (Wastewater – Infill Evaluation).**



Cedar Hill, Texas Wastewater Master Plan Existing Septic Areas



February 2024

Kimley » Horn

This map product is for informational purposes and may not have been prepared for or be suitable for legal, engineering, or surveying purposes. It does not represent an on-the-ground survey and represents only the approximate relative location of property boundaries.

J

The projected peak wastewater flow from these parcels were included in each planning year scenario evaluation.

5.7 WASTEWATER CAPITAL IMPROVEMENT PLAN (CIP)

Based on the evaluation criteria identified in **Section 5.5**, the following infrastructure improvements were identified for each planning period and are shown in **Exhibit K**:

TABLE 42 – 5-YEAR CIP PROJECTS

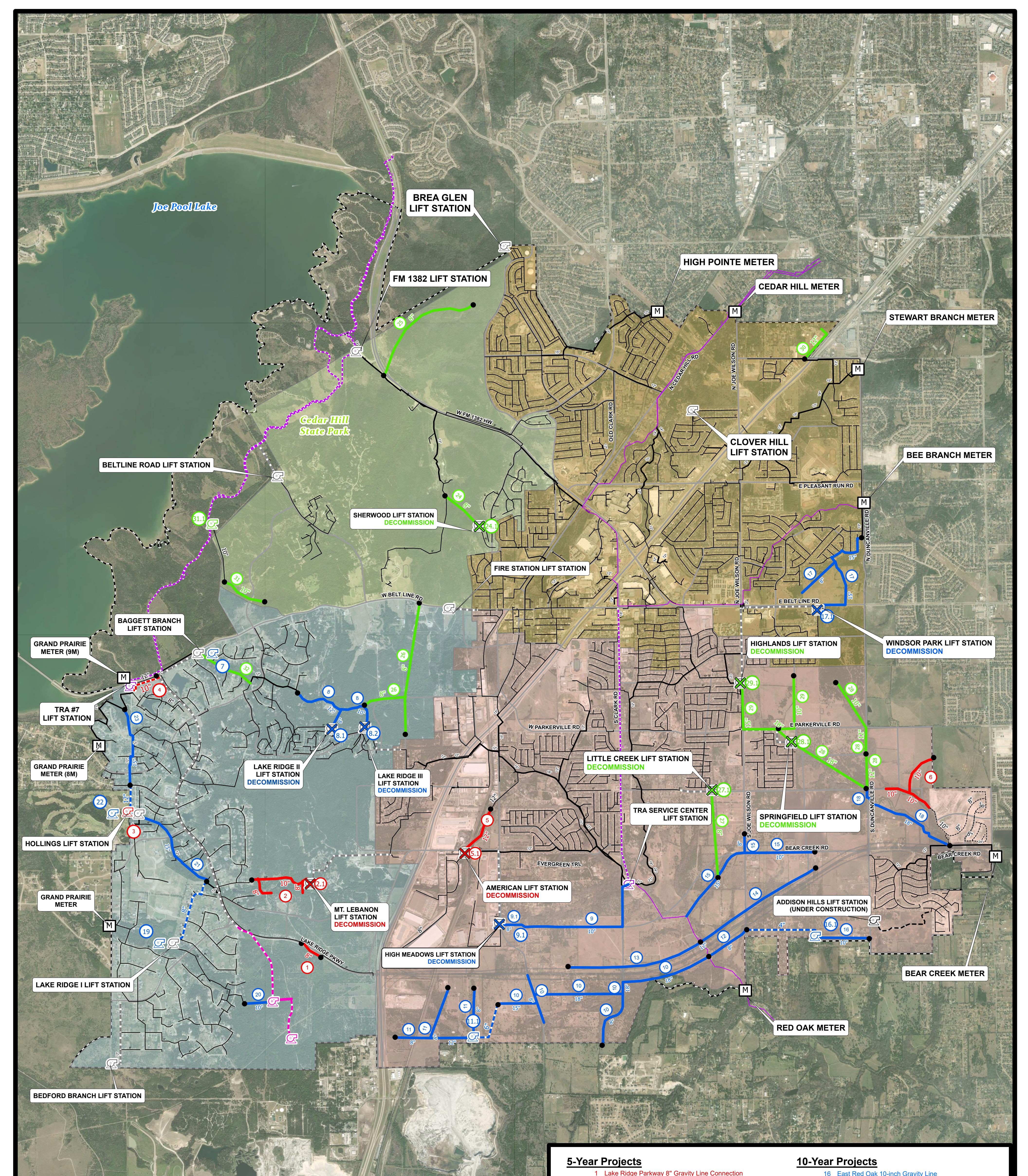
Project No.	Project Name	Project Cost
1	Lake Ridge Parkway 8" Gravity Line Connection	\$933,000
2	Mt. Lebanon Lift Station Decommission 8/10" Gravity Line	\$3,439,000
2.1	Mt. Lebanon Lift Station Decommission	\$274,000
3	Hollings Lift Station Expansion	\$2,651,000
4	Mansfield Road 10" Force Main	\$585,000
5	American Lift Station Decommission 10/12" Gravity Line	\$1,584,000
5.1	American Lift Station Decommission	\$337,000
6	W Parkerville 10" Gravity Line	\$2,848,000
5-Year Projects Sub-Total:		\$12,651,000

TABLE 43 – 10-YEAR CIP PROJECTS

Project No.	Project Name	Project Cost
7	Baggett Branch Expansion	\$1,545,000
8	Lake Ridge II and Lake Ridge III Lift Station Decommission 8/10/12" Gravity Lines	\$2,749,000
8.1	Lake Ridge II Lift Station Decommission	\$259,000
8.2	Lake Ridge III Lift Station Decommission	\$259,000
9	High Meadows Lift Station 8/10" Gravity Line	\$3,193,000
9.1	High Meadows Lift Station Decommission	\$260,000
10	8/15/18" West Red Oak Gravity Lines	\$6,799,000
11	8/12" West Red Oak Gravity Lines	\$2,676,000
11.1	West Red Oak Lift Station and Force Main	\$1,960,000
12	Loop 9 8" Gravity Main - South	\$674,000
13	Loop 9 12" Gravity Main - North	\$2,907,000
14	Loop 9 12" Gravity Main - North	\$2,907,000
15	8/10/15" Bear Creek Road and South Joe Wilson Road Gravity Lines	\$3,673,000
16	East Red Oak 10-inch Gravity Line	\$788,000
16.1	East Red Oak Lift Station	\$816,000
17	Windsor Park 8/15-inch Gravity Line	\$6,196,000
17.1	Windsor Park Decommission	\$764,000
18	18" Red Oak Gravity Line	\$5,371,000
19	Lake Ridge Lift Station I Expansion	\$4,004,000
20	Autumn Run Court 10"" Gravity Line Connection	\$1,022,000
21	TRA Central South 15" Gravity Main I	\$5,363,000
22	Hollings Lift Station Expansion	\$3,079,000
23	TRA Central South 15" Gravity Main II	\$3,198,000
10-Year Projects Sub-Total:		\$60,462,000

TABLE 44 – BUILDOUT CIP PROJECTS

Project No.	Project Name	Project Cost
24	Sherwood 8" Gravity Line	\$952,000
24.1	Sherwood Lift Station Decommission	\$260,000
25	TRA Central North 8" Gravity Line	\$3,079,000
26	TRA Central South 8" Gravity Line	\$2,451,000
27	Little Creek Lift Station 8" Gravity Line	\$1,299,000
27.1	Little Creek Lift Station Decommission	\$260,000
28	10/12/18" Red Oak Gravity Line	\$3,573,000
28.1	Springfield Lift Station Decommission	\$260,000
29	Highlands 10/15" Gravity Line	\$5,193,000
29.1	Highlands Lift Station Decommission	\$260,000
30	Highway 67 12" Gravity Line	\$3,874,000
31	TRA Central North 10" Gravity Main	\$655,000
31.1	TRA Central North Lift Station	\$816,000
32	TRA Central South 15" Gravity Line Connection	\$5,179,000
<i>Buildout Projects Sub-Total:</i>		\$28,111,000



Legend

Existing Lift Station	Gravity Main Improvements	Lift Station Decommission
Existing Sewer Line ≤ 10"	5 Year	5 Year
Existing Sewer Line >=12"	10 Year	10 Year
Existing Force Main	Buildout	Buildout
Existing TRA Force Main	Proposed by Developer	Proposed by Developer
Existing TRA Sewer Line		
Project Limit Junction		
Existing TRA Lift Station		
TRA Red Oak Basin		
TRA Central South		
TRA Central North		
TRA Ten Mile Basin		
Thoroughfare Plan		
Cedar Hill City Limits		
Future Loop 9		
M		
Existing TRA Meter		

Lift Station Improvements	Under Construction
5 Year	Force Main
10 Year	Sewer
Buildout	Lift Station
Proposed by Developer	
Under Construction	

Forcemain Improvements
5 Year
10 Year
Buildout
Proposed by Developer

5-Year Projects

- 1 Lake Ridge Parkway 8" Gravity Line Connection
- 2 Mt. Lebanon Lift Station Decommission 8/10" Gravity Line
- 2.1 Mt. Lebanon Lift Station Decommission
- 3 Hollings Lift Station Expansion
- 4 Mansfield Road 10" Force Main
- 5 American Lift Station Decommission 12" Gravity Line
- 5.1 American Lift Station Decommission
- 6 W Parkerville 10" Gravity Line

10-Year Projects

- 7 Baggett Branch Expansion
- 8 Lake Ridge II and Lake Ridge III Lift Station Decommission 8/10/12" Gravity Lines
- 8.1 Lake Ridge II Lift Station Decommission
- 8.2 Lake Ridge III Lift Station Decommission
- 9 High Meadows Lift Station 8/10" Gravity Line
- 9.1 High Meadows Lift Station Decommission
- 10 8/15/18" West Red Oak Gravity Lines
- 11 8/12" West Red Oak Gravity Lines
- 11.1 West Red Oak Lift Station and Force Main
- 12 Loop 9 8" Gravity Main - South
- 13 Loop 9 12" Gravity Main - North
- 14 Loop 9 12" Gravity Main - North
- 15 8/10/15" Bear Creek Road and South Joe Wilson Road Gravity Lines

10-Year Projects

- 16 East Red Oak 10-inch Gravity Line
- 16.1 East Red Oak Lift Station
- 17 Windsor Park 8/15-inch Gravity Line
- 17.1 Windsor Park Lift Station Decommission
- 18 18" Red Oak Gravity Line
- 19 Lake Ridge Lift Station I Expansion
- 20 Autumn Run Court 10" Gravity Line Connection
- 21 TRA Central South 15" Gravity Main I
- 22 Hollings Lift Station Expansion
- 23 TRA Central South 15" Gravity Main II

Build Out Projects

- 24 Sherwood 8" Gravity Line
- 24.1 Sherwood Lift Station Decommission
- 25 TRA Central North 8" Gravity Line
- 26 TRA Central South 8" Gravity Line
- 27 Little Creek Lift Station 8" Gravity Line
- 27.1 Little Creek Lift Station Decommission
- 28 10/12/18" Red Oak Gravity Line
- 28.1 Springfield Lift Station Decommission
- 29 Highlands 10/15" Gravity Line
- 29.1 Highlands Lift Station Decommission
- 30 Highway 67 12" Gravity Main
- 31 TRA Central North 10" Gravity Main
- 31.1 TRA Central North Lift Station
- 32 TRA Central South 15" Gravity Line Connection

The Opinion of Probable Construction Costs (OPCCs) for proposed wastewater infrastructure have been included in **Appendix B – Opinion of Probable Construction Costs (Wastewater)**. The opinion of probable costs for each capital project assumes no design completed, are based on 2023 dollars, and does not include annual construction cost increases.

5.8 WASTEWATER MASTER PLAN SUMMARY

Based on the land use and growth projections outlined in **Section 3.0**, the dry weather and peak wastewater flow was projected for the 5-year, 10-year, and Buildout planning periods (**Section 5.3**). A wastewater model was utilized analyze existing and future system conditions. Modeled scenarios are discussed in detail in **Section 5.4**.

Based on model results, infrastructure was proposed to handle existing and future wastewater peak flows. Proposed infrastructure and design criteria is discussed in detail in **Section 5.6**. Additional analyses completed as part of the WWMP include an infill analysis (**Section 5.6**) and identification of proposed infrastructure to accommodate the construction of Loop 9 (**Section 5.5**). Construction cost estimates and field testing reports are also provided in the Appendix of this document.

**APPENDIX A – OPINION OF PROBABLE CONSTRUCTION COSTS
(WATER)**

Client:	City of Cedar Hill	Date:	3/5/2024
Project:	Cedar Hill Water Master Plan	Prepared By:	EKM
KHA No.:	061075049	Checked By:	TCT

Item No.	Item Description	Item Cost
Capital Improvement Projects		
5-Year Projects		
1	Highway 67 EST Repair and Painting	\$2,000,000
2	Mount Lebanon Rd 16" Water Line	\$3,464,000
3	Mount Lebanon Rd 20" Water Line	\$4,442,000
4	Highway 67 10" Water Line (Pleasant Run to Joe Wilson)	\$1,532,000
5	Bennett Street 8" Water Line Replacement	\$588,000
6	Parkerville EST Repair and Painting	\$2,000,000
7	Stonehill/Vineyard 12" Water Line Connection	\$848,000
8	Hendricks Street 8" Water Line Replacement	\$1,408,000
9	Lorch Park 10" Water Line	\$2,595,000
10	Lorch Park Water Distribution Line	\$1,933,000
11	Loop 9 12" Water Line Phase 1 - North	\$8,087,000
12	S Tar Rd 8" Water Line Replacement	\$470,000
13	Mobley Rd to W Belt Line Rd 8" Water Line	\$2,701,000
14	W Belt Line Rd 12" Water Line Replacement	\$2,188,000
15	Tindle St 8" Water Line	\$1,123,000
16	Randy Rd 8" Water Line	\$506,000
17	Kingswood 8" Water Line Replacements	\$1,175,000
18	Bluff Ridge Dr 8" Water Line Replacements	\$723,000
19	Community Center Park 8" Water Line Replacement	\$817,000
20	Cobblestone Ct 8" Water Line Replacement	\$574,000
21	Cedar Hill Church of Christ 8" Water Line Replacement	\$723,000
22	Cedar Hill State Park 10" Water Line	\$3,669,000
23	Southwest Cedar Hill 12" Water Line	\$6,020,000
24	Texas Plume Rd 12" Water Line	\$5,403,000
25	E Parkerville Rd 16/18/24" Water Line Replacement Phase 1	\$2,447,000
26	Northeast Cedar Hill 10" Water Line	\$4,295,000
27	Highway 67 EST 24" Water Line Parallel	\$788,000
28	S Cedar Hill Rd 18" Water Line	\$859,000
10-Year Projects		
29	Parkerville EST 24" Water Line Parallel	\$2,397,000
30	E Parkerville Rd 16/18/24" Water Line Replacement Phase 2	\$4,059,000
31	E FM 1382 10/12" Water Line	\$4,096,000
32	N Duncanville Rd 12" Water Line	\$2,502,000
33	East Little Creek 12" Water Line Phase 1	\$4,603,000
34	Pecan Trails Golf Course 8" Water Line	\$1,986,000
35	Loop 9 12" Water Line Phase 1 - South	\$4,914,000
36	Rocky Acres Rd 10/12" Water Line	\$3,787,000
37	Loop 9 12" Water Line Phase 2 - North	\$3,336,000
38	Loop 9 12" Water Line Phase 2 - South	\$2,632,000
39	Loop 9 12" Water Line Phase 3 - North	\$4,763,000
40	Loop 9 12" Water Line Phase 3 - South	\$4,886,000
41	Loop 9 12" Water Line Phase 4 - North	\$5,605,000
42	Loop 9 12" Water Line Phase 4 - South	\$5,353,000
43	Cedar Hill Rd 20" Water Line	\$13,276,000
Build Out Projects		
44	Meadowcrest Pump Station Improvements	\$910,000
45	Meadowcrest 16/18/24" Water Line	\$4,883,000
46	E Parkerville Rd 16/18/24" Water Line Replacement Phase 3	\$952,000
47	S Duncanville Rd 12" Water Line	\$7,209,000
48	W Parkerville Rd 12" Water Line	\$5,793,000
49	East Little Creek 12" Water Line Phase 2	\$2,427,000
50	S Waterford Oaks Dr 12" Water Line	\$4,160,000
51	East Windsor Park 12" Water Line	\$1,802,000
52	S Clark Rd 8" Water Line	\$1,087,000
53	6.0 MG Meadowcrest Ground Storage Tank	\$10,395,000

Projects Total: \$171,191,000

Basis for Cost Projection:

- No Design Completed
 Preliminary Design
 Final Design

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Client: City of Cedar Hill
 Project: Cedar Hill Water Master Plan
 KHA No.: 061075049

Date: 2/12/2024
 Prepared By: EKM
 Checked By: TCT

2 Mount Lebanon Rd 16" Water Line

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization	1	LS	\$ 225,000	\$ 225,000
2	Traffic Control	1	LS	\$ 35,000	\$ 35,000
3	Miscellaneous	1	LS	\$ 175,000	\$ 175,000
4	Erosion Control	0.45	MI	\$ 10,000	\$ 9,500
5	16" Water Pipe	2,400	LF	\$ 300	\$ 720,000
6	16" Resilient Seated Gate Valve	5	EA	\$ 15,000	\$ 75,000
7	Air Release Valve	2	EA	\$ 30,000	\$ 60,000
8	Blow Off Valve	2	EA	\$ 30,000	\$ 60,000
9	Fire Hydrant Assembly	5	EA	\$ 5,000	\$ 25,000
10	Connect to Existing Water Line (12-16")	3	EA	\$ 30,000	\$ 90,000
11	Water Line Trench Safety	2,400	LF	\$ 3	\$ 7,200
12	Pavement Repair	3,200	SY	\$ 150	\$ 480,000
Subtotal:					\$ 1,961,700
<input checked="" type="checkbox"/> No Design Completed	Conting. (%,+/-)	25%		\$ 490,425	
<input type="checkbox"/> Preliminary Design	Professional Services (%,+/-)	15%		\$ 294,255	
<input type="checkbox"/> Final Design	Easement Acquisition			\$ 717,000	
*Total:					\$ 3,464,000

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*Total is rounded up to the nearest \$1,000.

Client: City of Cedar Hill
 Project: Cedar Hill Water Master Plan
 KHA No.: 061075049

Date: 2/12/2024
 Prepared By: EKM
 Checked By: TCT

3 Mount Lebanon Rd 20" Water Line

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization	1	LS	\$ 270,000	\$ 270,000
2	Traffic Control	1	LS	\$ 35,000	\$ 35,000
3	Miscellaneous	1	LS	\$ 175,000	\$ 175,000
4	Erosion Control	0.49	MI	\$ 10,000	\$ 9,900
5	20" Water Pipe	2,100	LF	\$ 350	\$ 735,000
6	24" Water Pipe	500	LF	\$ 400	\$ 200,000
7	42" Casing BOTOC w/24" Carrier Pipe	400	LF	\$ 1,800	\$ 720,000
8	20" Resilient Seated Gate Valve	3	EA	\$ 25,000	\$ 75,000
9	24" Resilient Seated Gate Valve & Vault	3	EA	\$ 50,000	\$ 150,000
10	Air Release Valve	2	EA	\$ 30,000	\$ 60,000
11	Blow Off Valve	2	EA	\$ 30,000	\$ 60,000
12	Connect to Existing Water Line (>16")	3	EA	\$ 50,000	\$ 150,000
13	Water Line Trench Safety	2,600	LF	\$ 3	\$ 7,800
14	Pavement Repair	3,500	SY	\$ 150	\$ 525,000
Subtotal:					\$ 3,172,700
<input checked="" type="checkbox"/> No Design Completed	Conting. (%,+/-)	25%			\$ 793,175
<input type="checkbox"/> Preliminary Design	Professional Services (%,+/-)	15%			\$ 475,905
<input type="checkbox"/> Final Design	Easement Acquisition				\$ -
*Total:					\$ 4,442,000

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*Total is rounded up to the nearest \$1,000.

Client: City of Cedar Hill
 Project: Cedar Hill Water Master Plan
 KHA No.: 061075049

Date: 3/5/2024
 Prepared By: EKM
 Checked By: TCT

4 Highway 67 10" Water Line (Pleasant Run to Joe Wilson)

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization	1	LS	\$ 88,000	\$ 88,000
2	Traffic Control	1	LS	\$ 35,000	\$ 35,000
3	Miscellaneous	1	LS	\$ 100,000	\$ 100,000
4	Erosion Control	0.42	MI	\$ 10,000	\$ 9,200
5	10" Water Pipe	2,200	LF	\$ 150	\$ 330,000
6	10" Resilient Seated Gate Valve	5	EA	\$ 6,000	\$ 30,000
7	Fire Hydrant Assembly	5	EA	\$ 5,000	\$ 25,000
8	Connect to Existing Water Line (<12")	2	EA	\$ 10,000	\$ 20,000
9	Water Line Trench Safety	2,200	LF	\$ 3	\$ 6,600
10	Pavement Repair	3,000	SY	\$ 150	\$ 450,000
Subtotal:					\$ 1,093,800
<input checked="" type="checkbox"/> No Design Completed	Conting. (%,+/-)	25%		\$ 273,450	
<input type="checkbox"/> Preliminary Design	Professional Services (%,+/-)	15%		\$ 164,070	
<input type="checkbox"/> Final Design	Easement Acquisition			\$ -	
*Total:					\$ 1,532,000

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*Total is rounded up to the nearest \$1,000.

Client: City of Cedar Hill
 Project: Cedar Hill Water Master Plan
 KHA No.: 061075049
 5 Bennett Street 8" Water Line Replacement

Date: 2/12/2024
 Prepared By: EKM
 Checked By: TCT

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization	1	LS	\$ 26,000	\$ 26,000
2	Traffic Control	1	LS	\$ 35,000	\$ 35,000
3	Miscellaneous	1	LS	\$ 100,000	\$ 100,000
4	Erosion Control	0.13	MI	\$ 10,000	\$ 6,300
5	8" Water Pipe	700	LF	\$ 100	\$ 70,000
6	8" Resilient Seated Gate Valve	2	EA	\$ 5,000	\$ 10,000
7	Fire Hydrant Assembly	2	EA	\$ 5,000	\$ 10,000
8	Connect to Existing Water Line (<12")	1	EA	\$ 10,000	\$ 10,000
9	Water Line Trench Safety	700	LF	\$ 3	\$ 2,100
10	Pavement Repair	1,000	SY	\$ 150	\$ 150,000
		Subtotal:			\$ 419,400
<input checked="" type="checkbox"/> No Design Completed		Conting. (%,+/-)	25%	\$ 104,850	
<input type="checkbox"/> Preliminary Design		Professional Services (%,+/-)	15%	\$ 62,910	
<input type="checkbox"/> Final Design		Easement Acquisition		\$ -	
		*Total:			\$ 588,000

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*Total is rounded up to the nearest \$1,000.

Client: City of Cedar Hill
 Project: Cedar Hill Water Master Plan
 KHA No.: 061075049

Date: 2/12/2024
 Prepared By: EKM
 Checked By: TCT

7 Stonehill/Vineyard 12" Water Line Connection

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization	1	LS	\$ 49,000	\$ 49,000
2	Traffic Control	1	LS	\$ 25,000	\$ 25,000
3	Miscellaneous	1	LS	\$ 100,000	\$ 100,000
4	Erosion Control	0.09	MI	\$ 10,000	\$ 5,900
5	12" Water Pipe	500	LF	\$ 200	\$ 100,000
6	24" Casing BOTOC w/12" Carrier Pipe	100	LF	\$ 1,100	\$ 110,000
7	12" Resilient Seated Gate Valve	3	EA	\$ 7,000	\$ 21,000
8	Fire Hydrant Assembly	1	EA	\$ 5,000	\$ 5,000
9	Connect to Existing Water Line (12-16")	2	EA	\$ 30,000	\$ 60,000
10	Water Line Trench Safety	500	LF	\$ 3	\$ 1,500
11	Hydromulch Repair	1,300	SY	\$ 3	\$ 3,900
Subtotal:					\$ 481,300
<input checked="" type="checkbox"/> No Design Completed	Conting. (%,+/-)	25%			\$ 120,325
<input type="checkbox"/> Preliminary Design	Professional Services (%,+/-)	15%			\$ 72,195
<input type="checkbox"/> Final Design	Easement Acquisition				\$ 174,000
	*Total:				\$ 848,000

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*Total is rounded up to the nearest \$1,000.

Client: City of Cedar Hill
 Project: Cedar Hill Water Master Plan
 KHA No.: 061075049
 8 Hendricks Street 8" Water Line Replacement

Date: 2/12/2024
 Prepared By: EKM
 Checked By: TCT

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization	1	LS	\$ 80,000	\$ 80,000
2	Traffic Control	1	LS	\$ 35,000	\$ 35,000
3	Miscellaneous	1	LS	\$ 100,000	\$ 100,000
4	Erosion Control	0.40	MI	\$ 10,000	\$ 9,000
5	8" Water Pipe	2,100	LF	\$ 100	\$ 210,000
6	8" Resilient Seated Gate Valve	10	EA	\$ 5,000	\$ 50,000
7	Fire Hydrant Assembly	5	EA	\$ 5,000	\$ 25,000
8	Connect to Existing Water Line (<12")	7	EA	\$ 10,000	\$ 70,000
9	Water Line Trench Safety	2,100	LF	\$ 3	\$ 6,300
10	Pavement Repair	2,800	SY	\$ 150	\$ 420,000
		Subtotal:			\$ 1,005,300
<input checked="" type="checkbox"/> No Design Completed		Conting. (%,+/-)			\$ 251,325
<input type="checkbox"/> Preliminary Design		Professional Services (%,+/-)			\$ 150,795
<input type="checkbox"/> Final Design		Easement Acquisition			\$ -
		*Total:			\$ 1,408,000

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*Total is rounded up to the nearest \$1,000.

Client: City of Cedar Hill
 Project: Cedar Hill Water Master Plan
 KHA No.: 061075049

Date: 2/12/2024
 Prepared By: EKM
 Checked By: TCT

9 Lorch Park 10" Water Line

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization	1	LS	\$ 176,000	\$ 176,000
2	Traffic Control	1	LS	\$ 25,000	\$ 25,000
3	Miscellaneous	1	LS	\$ 175,000	\$ 175,000
4	Erosion Control	0.81	MI	\$ 10,000	\$ 13,100
5	10" Water Pipe	4,300	LF	\$ 150	\$ 645,000
6	10" Resilient Seated Gate Valve	7	EA	\$ 6,000	\$ 42,000
7	Fire Hydrant Assembly	9	EA	\$ 5,000	\$ 45,000
8	Connect to Existing Water Line (<12")	1	EA	\$ 10,000	\$ 10,000
9	Water Line Trench Safety	4,300	LF	\$ 3	\$ 12,900
10	Hydromulch Repair	7,200	SY	\$ 3	\$ 21,600
Subtotal:					\$ 1,165,600
<input checked="" type="checkbox"/> No Design Completed	Conting. (%,+/-)	25%		\$ 291,400	
<input type="checkbox"/> Preliminary Design	Professional Services (%,+/-)	15%		\$ 174,840	
<input type="checkbox"/> Final Design	Easement Acquisition			\$ 963,000	
*Total:					\$ 2,595,000

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*Total is rounded up to the nearest \$1,000.

Client: City of Cedar Hill
 Project: Cedar Hill Water Master Plan
 KHA No.: 061075049

Date: 2/12/2024
 Prepared By: EKM
 Checked By: TCT

10 Lorch Park Water Distribution Line

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization	1	LS	\$ 127,000	\$ 127,000
2	Traffic Control	1	LS	\$ 25,000	\$ 25,000
3	Miscellaneous	1	LS	\$ 175,000	\$ 175,000
4	Erosion Control	0.63	MI	\$ 10,000	\$ 11,300
5	8" Water Pipe	2,900	LF	\$ 100	\$ 290,000
6	12" Water Pipe	400	LF	\$ 200	\$ 80,000
7	8" Resilient Seated Gate Valve	5	EA	\$ 5,000	\$ 25,000
8	12" Resilient Seated Gate Valve	2	EA	\$ 7,000	\$ 14,000
9	Fire Hydrant Assembly	7	EA	\$ 5,000	\$ 35,000
10	Connect to Existing Water Line (<12")	1	EA	\$ 10,000	\$ 10,000
11	Connect to Existing Water Line (12-16")	1	EA	\$ 30,000	\$ 30,000
12	Water Line Trench Safety	3,300	LF	\$ 3	\$ 9,900
13	Hydromulch Repair	5,600	SY	\$ 3	\$ 16,800
Subtotal:					\$ 849,000
<input checked="" type="checkbox"/> No Design Completed	Conting. (%,+/-)	25%			\$ 212,250
<input type="checkbox"/> Preliminary Design	Professional Services (%,+/-)	15%			\$ 127,350
<input type="checkbox"/> Final Design	Easement Acquisition				\$ 744,000
*Total:					\$ 1,933,000

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*Total is rounded up to the nearest \$1,000.

Client: City of Cedar Hill
 Project: Cedar Hill Water Master Plan
 KHA No.: 061075049

Date: 2/12/2024
 Prepared By: EKM
 Checked By: TCT

11 Loop 9 12" Water Line Phase 1 - North

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization	1	LS	\$ 574,000	\$ 574,000
2	Traffic Control	1	LS	\$ 25,000	\$ 25,000
3	Miscellaneous	1	LS	\$ 250,000	\$ 250,000
4	Erosion Control	1.72	MI	\$ 10,000	\$ 22,200
5	8" Water Pipe	1,300	LF	\$ 100	\$ 130,000
6	12" Water Pipe	7,800	LF	\$ 200	\$ 1,560,000
7	24" Casing BOTOC w/12" Carrier Pipe	700	LF	\$ 1,100	\$ 770,000
8	8" Resilient Seated Gate Valve	3	EA	\$ 5,000	\$ 15,000
9	12" Resilient Seated Gate Valve	14	EA	\$ 7,000	\$ 98,000
10	Fire Hydrant Assembly	19	EA	\$ 5,000	\$ 95,000
11	Connect to Existing Water Line (<12")	1	EA	\$ 10,000	\$ 10,000
12	Connect to Existing Water Line (12-16")	4	EA	\$ 30,000	\$ 120,000
13	Water Line Trench Safety	9,100	LF	\$ 3	\$ 27,300
14	Hydromulch Repair	21,000	SY	\$ 3	\$ 63,000
Subtotal:					\$ 3,759,500
<input checked="" type="checkbox"/> No Design Completed	Conting. (%,+/-)	25%			\$ 939,875
<input type="checkbox"/> Preliminary Design	Professional Services (%,+/-)	15%			\$ 563,925
<input type="checkbox"/> Final Design	Easement Acquisition				\$ 2,823,000
*Total:					\$ 8,087,000

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*Total is rounded up to the nearest \$1,000.

Client: City of Cedar Hill
 Project: Cedar Hill Water Master Plan
 KHA No.: 061075049

Date: 2/12/2024
 Prepared By: EKM
 Checked By: TCT

12 S Tar Rd 8" Water Line Replacement

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization	1	LS	\$ 20,000	\$ 20,000
2	Traffic Control	1	LS	\$ 25,000	\$ 25,000
3	Miscellaneous	1	LS	\$ 100,000	\$ 100,000
4	Erosion Control	0.21	MI	\$ 10,000	\$ 7,100
5	8" Water Pipe	1,100	LF	\$ 100	\$ 110,000
6	8" Resilient Seated Gate Valve	4	EA	\$ 5,000	\$ 20,000
7	Fire Hydrant Assembly	3	EA	\$ 5,000	\$ 15,000
8	Connect to Existing Water Line (<12")	2	EA	\$ 10,000	\$ 20,000
9	Water Line Trench Safety	1,100	LF	\$ 3	\$ 3,300
10	Hydromulch Repair	4,900	SY	\$ 3	\$ 14,700
Subtotal:				\$ 335,100	
<input checked="" type="checkbox"/> No Design Completed	Conting. (%,+/-)	25%		\$ 83,775	
<input type="checkbox"/> Preliminary Design	Professional Services (%,+/-)	15%		\$ 50,265	
<input type="checkbox"/> Final Design	Easement Acquisition			\$ -	
*Total:				\$ 470,000	

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*Total is rounded up to the nearest \$1,000.

Client: City of Cedar Hill
 Project: Cedar Hill Water Master Plan
 KHA No.: 061075049
 13 Mobley Rd to W Belt Line Rd 8" Water Line

Date: 2/12/2024
 Prepared By: EKM
 Checked By: TCT

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization	1	LS	\$ 186,000	\$ 186,000
2	Traffic Control	1	LS	\$ 25,000	\$ 25,000
3	Miscellaneous	1	LS	\$ 175,000	\$ 175,000
4	Erosion Control	0.93	MI	\$ 10,000	\$ 14,300
5	8" Water Pipe	4,900	LF	\$ 100	\$ 490,000
6	16" Casing BOTOC w/8" Carrier Pipe	100	LF	\$ 700	\$ 70,000
7	8" Resilient Seated Gate Valve	11	EA	\$ 5,000	\$ 55,000
8	Fire Hydrant Assembly	10	EA	\$ 5,000	\$ 50,000
9	Connect to Existing Water Line (<12")	4	EA	\$ 10,000	\$ 40,000
10	Water Line Trench Safety	4,900	LF	\$ 3	\$ 14,700
11	Hydromulch Repair	8,200	SY	\$ 3	\$ 24,600
Subtotal:					\$ 1,144,600
<input checked="" type="checkbox"/> No Design Completed	Conting. (%,+/-)	25%		\$ 286,150	
<input type="checkbox"/> Preliminary Design	Professional Services (%,+/-)	15%		\$ 171,690	
<input type="checkbox"/> Final Design	Easement Acquisition			\$ 1,098,000	
*Total:					\$ 2,701,000

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*Total is rounded up to the nearest \$1,000.

Client: City of Cedar Hill
 Project: Cedar Hill Water Master Plan
 KHA No.: 061075049
 14 W Belt Line Rd 12" Water Line Replacement

Date: 2/12/2024
 Prepared By: EKM
 Checked By: TCT

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization	1	LS	\$ 123,000	\$ 123,000
2	Traffic Control	1	LS	\$ 35,000	\$ 35,000
3	Miscellaneous	1	LS	\$ 175,000	\$ 175,000
4	Erosion Control	0.36	MI	\$ 10,000	\$ 8,600
5	12" Water Pipe	1,900	LF	\$ 200	\$ 380,000
6	24" Casing BOTOC w/12" Carrier Pipe	300	LF	\$ 1,100	\$ 330,000
7	12" Resilient Seated Gate Valve	5	EA	\$ 7,000	\$ 35,000
8	Fire Hydrant Assembly	4	EA	\$ 5,000	\$ 20,000
9	Connect to Existing Water Line (12-16")	2	EA	\$ 30,000	\$ 60,000
10	Water Line Trench Safety	1,900	LF	\$ 3	\$ 5,700
11	Pavement Repair	2,600	SY	\$ 150	\$ 390,000
Subtotal:					\$ 1,562,300
<input checked="" type="checkbox"/> No Design Completed	Conting. (%,+/-)	25%			\$ 390,575
<input type="checkbox"/> Preliminary Design	Professional Services (%,+/-)	15%			\$ 234,345
<input type="checkbox"/> Final Design	Easement Acquisition				\$ -
*Total:					\$ 2,188,000

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*Total is rounded up to the nearest \$1,000.

Client: City of Cedar Hill
 Project: Cedar Hill Water Master Plan
 KHA No.: 061075049

Date: 2/12/2024
 Prepared By: EKM
 Checked By: TCT

15 Tindle St 8" Water Line

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization	1	LS	\$ 73,000	\$ 73,000
2	Traffic Control	1	LS	\$ 25,000	\$ 25,000
3	Miscellaneous	1	LS	\$ 100,000	\$ 100,000
4	Erosion Control	0.38	MI	\$ 10,000	\$ 8,800
5	8" Water Pipe	2,000	LF	\$ 100	\$ 200,000
6	8" Resilient Seated Gate Valve	5	EA	\$ 5,000	\$ 25,000
7	Fire Hydrant Assembly	4	EA	\$ 5,000	\$ 20,000
8	Connect to Existing Water Line (<12")	2	EA	\$ 10,000	\$ 20,000
9	Water Line Trench Safety	2,000	LF	\$ 3	\$ 6,000
10	Hydromulch Repair	3,300	SY	\$ 3	\$ 9,900
Subtotal:				\$ 487,700	
<input checked="" type="checkbox"/> No Design Completed	Conting. (%,+/-)	25%		\$ 121,925	
<input type="checkbox"/> Preliminary Design	Professional Services (%,+/-)	15%		\$ 73,155	
<input type="checkbox"/> Final Design	Easement Acquisition			\$ 439,500	
*Total:				\$ 1,123,000	

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*Total is rounded up to the nearest \$1,000.

Client: City of Cedar Hill
 Project: Cedar Hill Water Master Plan
 KHA No.: 061075049

Date: 2/12/2024
 Prepared By: EKM
 Checked By: TCT

16 Randy Rd 8" Water Line

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization	1	LS	\$ 25,000	\$ 25,000
2	Traffic Control	1	LS	\$ 25,000	\$ 25,000
3	Miscellaneous	1	LS	\$ 100,000	\$ 100,000
4	Erosion Control	0.11	MI	\$ 10,000	\$ 6,100
5	8" Water Pipe	600	LF	\$ 100	\$ 60,000
6	8" Resilient Seated Gate Valve	3	EA	\$ 5,000	\$ 15,000
7	Fire Hydrant Assembly	2	EA	\$ 5,000	\$ 10,000
8	Connect to Existing Water Line (<12")	2	EA	\$ 10,000	\$ 20,000
9	Water Line Trench Safety	600	LF	\$ 3	\$ 1,800
10	Hydromulch Repair	1,000	SY	\$ 3	\$ 3,000
Subtotal:				\$ 265,900	
<input checked="" type="checkbox"/> No Design Completed	Conting. (%,+/-)	25%		\$ 66,475	
<input type="checkbox"/> Preliminary Design	Professional Services (%,+/-)	15%		\$ 39,885	
<input type="checkbox"/> Final Design	Easement Acquisition			\$ 133,500	
*Total:				\$ 506,000	

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*Total is rounded up to the nearest \$1,000.

Client: City of Cedar Hill
 Project: Cedar Hill Water Master Plan
 KHA No.: 061075049

Date: 2/12/2024
 Prepared By: EKM
 Checked By: TCT

17 Kingswood 8" Water Line Replacements

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization	1	LS	\$ 65,000	\$ 65,000
2	Traffic Control	1	LS	\$ 25,000	\$ 25,000
3	Miscellaneous	1	LS	\$ 100,000	\$ 100,000
4	Erosion Control	0.34	MI	\$ 10,000	\$ 8,400
5	8" Water Pipe	1,800	LF	\$ 100	\$ 180,000
6	8" Resilient Seated Gate Valve	7	EA	\$ 5,000	\$ 35,000
7	Fire Hydrant Assembly	4	EA	\$ 5,000	\$ 20,000
8	Connect to Existing Water Line (<12")	4	EA	\$ 10,000	\$ 40,000
9	Water Line Trench Safety	1,800	LF	\$ 3	\$ 5,400
10	Pavement Repair	2,400	SY	\$ 150	\$ 360,000
		Subtotal:			\$ 838,800
<input checked="" type="checkbox"/>	No Design Completed	Conting. (%,+/-)			\$ 209,700
<input type="checkbox"/>	Preliminary Design	Professional Services (%,+/-)			\$ 125,820
<input type="checkbox"/>	Final Design	Easement Acquisition			\$ -
		*Total:			\$ 1,175,000

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*Total is rounded up to the nearest \$1,000.

Client: City of Cedar Hill
 Project: Cedar Hill Water Master Plan
 KHA No.: 061075049

Date: 2/12/2024
 Prepared By: EKM
 Checked By: TCT

18 Bluff Ridge Dr 8" Water Line Replacements

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization	1	LS	\$ 36,000	\$ 36,000
2	Traffic Control	1	LS	\$ 25,000	\$ 25,000
3	Miscellaneous	1	LS	\$ 100,000	\$ 100,000
4	Erosion Control	0.19	MI	\$ 10,000	\$ 6,900
5	8" Water Pipe	1,000	LF	\$ 100	\$ 100,000
6	8" Resilient Seated Gate Valve	3	EA	\$ 5,000	\$ 15,000
7	Fire Hydrant Assembly	2	EA	\$ 5,000	\$ 10,000
8	Connect to Existing Water Line (<12")	1	EA	\$ 10,000	\$ 10,000
9	Water Line Trench Safety	1,000	LF	\$ 3	\$ 3,000
10	Pavement Repair	1,400	SY	\$ 150	\$ 210,000
		Subtotal:			\$ 515,900
<input checked="" type="checkbox"/>	No Design Completed	Conting. (%,+/-)			\$ 128,975
<input type="checkbox"/>	Preliminary Design	Professional Services (%,+/-)			\$ 77,385
<input type="checkbox"/>	Final Design	Easement Acquisition			\$ -
		*Total:			\$ 723,000

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*Total is rounded up to the nearest \$1,000.

Client: City of Cedar Hill
 Project: Cedar Hill Water Master Plan
 KHA No.: 061075049

Date: 2/12/2024
 Prepared By: EKM
 Checked By: TCT

19 Community Center Park 8" Water Line Replacement

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization	1	LS	\$ 42,000	\$ 42,000
2	Traffic Control	1	LS	\$ 25,000	\$ 25,000
3	Miscellaneous	1	LS	\$ 100,000	\$ 100,000
4	Erosion Control	0.53	MI	\$ 10,000	\$ 10,300
5	8" Water Pipe	2,800	LF	\$ 100	\$ 280,000
6	8" Resilient Seated Gate Valve	6	EA	\$ 5,000	\$ 30,000
7	Fire Hydrant Assembly	6	EA	\$ 5,000	\$ 30,000
8	Connect to Existing Water Line (<12")	2	EA	\$ 10,000	\$ 20,000
9	Water Line Trench Safety	2,800	LF	\$ 3	\$ 8,400
10	Hydromulch Repair	12,500	SY	\$ 3	\$ 37,500
Subtotal:				\$ 583,200	
<input checked="" type="checkbox"/> No Design Completed	Conting. (%,+/-)	25%		\$ 145,800	
<input type="checkbox"/> Preliminary Design	Professional Services (%,+/-)	15%		\$ 87,480	
<input type="checkbox"/> Final Design	Easement Acquisition			\$ -	
*Total:				\$ 817,000	

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*Total is rounded up to the nearest \$1,000.

Client: City of Cedar Hill
 Project: Cedar Hill Water Master Plan
 KHA No.: 061075049
 20 Cobblestone Ct 8" Water Line Replacement

Date: 2/12/2024
 Prepared By: EKM
 Checked By: TCT

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization	1	LS	\$ 26,000	\$ 26,000
2	Traffic Control	1	LS	\$ 25,000	\$ 25,000
3	Miscellaneous	1	LS	\$ 100,000	\$ 100,000
4	Erosion Control	0.13	MI	\$ 10,000	\$ 6,300
5	8" Water Pipe	700	LF	\$ 100	\$ 70,000
6	8" Resilient Seated Gate Valve	2	EA	\$ 5,000	\$ 10,000
7	Fire Hydrant Assembly	2	EA	\$ 5,000	\$ 10,000
8	Connect to Existing Water Line (<12")	1	EA	\$ 10,000	\$ 10,000
9	Water Line Trench Safety	700	LF	\$ 3	\$ 2,100
10	Pavement Repair	1,000	SY	\$ 150	\$ 150,000
		Subtotal:			\$ 409,400
<input checked="" type="checkbox"/> No Design Completed		Conting. (%,+/-)			\$ 102,350
<input type="checkbox"/> Preliminary Design		Professional Services (%,+/-)			\$ 61,410
<input type="checkbox"/> Final Design		Easement Acquisition			\$ -
		*Total:			\$ 574,000

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*Total is rounded up to the nearest \$1,000.

Client: City of Cedar Hill
 Project: Cedar Hill Water Master Plan
 KHA No.: 061075049

Date: 2/12/2024
 Prepared By: EKM
 Checked By: TCT

21 Cedar Hill Church of Christ 8" Water Line Replacement

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization	1	LS	\$ 36,000	\$ 36,000
2	Traffic Control	1	LS	\$ 25,000	\$ 25,000
3	Miscellaneous	1	LS	\$ 100,000	\$ 100,000
4	Erosion Control	0.19	MI	\$ 10,000	\$ 6,900
5	8" Water Pipe	1,000	LF	\$ 100	\$ 100,000
6	8" Resilient Seated Gate Valve	3	EA	\$ 5,000	\$ 15,000
7	Fire Hydrant Assembly	2	EA	\$ 5,000	\$ 10,000
8	Connect to Existing Water Line (<12")	1	EA	\$ 10,000	\$ 10,000
9	Water Line Trench Safety	1,000	LF	\$ 3	\$ 3,000
10	Pavement Repair	1,400	SY	\$ 150	\$ 210,000
		Subtotal:			\$ 515,900
<input checked="" type="checkbox"/> No Design Completed		Conting. (%,+/-)			\$ 128,975
<input type="checkbox"/> Preliminary Design		Professional Services (%,+/-)			\$ 77,385
<input type="checkbox"/> Final Design		Easement Acquisition			\$ -
		*Total:			\$ 723,000

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*Total is rounded up to the nearest \$1,000.

Client: City of Cedar Hill
 Project: Cedar Hill Water Master Plan
 KHA No.: 061075049

Date: 2/12/2024
 Prepared By: EKM
 Checked By: TCT

22 Cedar Hill State Park 10" Water Line

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization	1	LS	\$ 257,000	\$ 257,000
2	Traffic Control	1	LS	\$ 25,000	\$ 25,000
3	Miscellaneous	1	LS	\$ 175,000	\$ 175,000
4	Erosion Control	1.19	MI	\$ 10,000	\$ 16,900
5	10" Water Pipe	6,300	LF	\$ 150	\$ 945,000
6	10" Resilient Seated Gate Valve	10	EA	\$ 6,000	\$ 60,000
7	Fire Hydrant Assembly	13	EA	\$ 5,000	\$ 65,000
8	Connect to Existing Water Line (<12")	2	EA	\$ 10,000	\$ 20,000
9	Water Line Trench Safety	6,300	LF	\$ 3	\$ 18,900
10	Hydromulch Repair	10,500	SY	\$ 3	\$ 31,500
Subtotal:				\$ 1,614,300	
<input checked="" type="checkbox"/> No Design Completed	Conting. (%,+/-)	25%	\$ 403,575		
<input type="checkbox"/> Preliminary Design	Professional Services (%,+/-)	15%	\$ 242,145		
<input type="checkbox"/> Final Design	Easement Acquisition		\$ 1,408,500		
*Total:				\$ 3,669,000	

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*Total is rounded up to the nearest \$1,000.

Client: City of Cedar Hill
 Project: Cedar Hill Water Master Plan
 KHA No.: 061075049

Date: 2/12/2024
 Prepared By: EKM
 Checked By: TCT

23 Southwest Cedar Hill 12" Water Line

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization	1	LS	\$ 410,000	\$ 410,000
2	Traffic Control	1	LS	\$ 25,000	\$ 25,000
3	Miscellaneous	1	LS	\$ 250,000	\$ 250,000
4	Erosion Control	0.97	MI	\$ 10,000	\$ 14,700
5	12" Water Pipe	5,100	LF	\$ 200	\$ 1,020,000
6	24" Casing BOTOC w/12" Carrier Pipe	600	LF	\$ 1,100	\$ 660,000
7	12" Resilient Seated Gate Valve	9	EA	\$ 7,000	\$ 63,000
8	Fire Hydrant Assembly	11	EA	\$ 5,000	\$ 55,000
9	Connect to Existing Water Line (12-16")	2	EA	\$ 30,000	\$ 60,000
10	Water Line Trench Safety	5,100	LF	\$ 3	\$ 15,300
11	Hydromulch Repair	6,300	SY	\$ 3	\$ 18,900
12	Pavement Repair	3,400	SY	\$ 150	\$ 510,000
Subtotal:					\$ 3,101,900
<input checked="" type="checkbox"/> No Design Completed	Conting. (%,+/-)	25%			\$ 775,475
<input type="checkbox"/> Preliminary Design	Professional Services (%,+/-)	15%			\$ 465,285
<input type="checkbox"/> Final Design	Easement Acquisition				\$ 1,677,000
*Total:					\$ 6,020,000

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*Total is rounded up to the nearest \$1,000.

Client: City of Cedar Hill
 Project: Cedar Hill Water Master Plan
 KHA No.: 061075049

Date: 2/12/2024
 Prepared By: EKM
 Checked By: TCT

24 Texas Plume Rd 12" Water Line

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization	1	LS	\$ 363,000	\$ 363,000
2	Traffic Control	1	LS	\$ 35,000	\$ 35,000
3	Miscellaneous	1	LS	\$ 250,000	\$ 250,000
4	Erosion Control	0.93	MI	\$ 10,000	\$ 14,300
5	12" Water Pipe	4,900	LF	\$ 200	\$ 980,000
6	12" Resilient Seated Gate Valve	9	EA	\$ 7,000	\$ 63,000
7	Fire Hydrant Assembly	10	EA	\$ 5,000	\$ 50,000
8	Connect to Existing Water Line (12-16")	2	EA	\$ 30,000	\$ 60,000
9	Water Line Trench Safety	4,900	LF	\$ 3	\$ 14,700
10	Pavement Repair	6,600	SY	\$ 150	\$ 990,000
Subtotal:					\$ 2,820,000
<input checked="" type="checkbox"/> No Design Completed	Conting. (%,+/-)	25%		\$ 705,000	
<input type="checkbox"/> Preliminary Design	Professional Services (%,+/-)	15%		\$ 423,000	
<input type="checkbox"/> Final Design	Easement Acquisition			\$ 1,455,000	
*Total:					\$ 5,403,000

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*Total is rounded up to the nearest \$1,000.

Kimley-Horn & Associates, Inc.		Opinion of Probable Construction Cost							
Client:	City of Cedar Hill				Date:	2/12/2024			
Project:	Cedar Hill Water Master Plan				Prepared By:	EKM			
KHA No.:	061075049				Checked By:	TCT			
25 E Parkerville Rd 16/18/24" Water Line Replacement Phase 1									
Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost				
1	Mobilization	1	LS	\$ 140,000	\$ 140,000				
2	Traffic Control	1	LS	\$ 35,000	\$ 35,000				
3	Miscellaneous	1	LS	\$ 175,000	\$ 175,000				
4	Erosion Control	0.19	MI	\$ 10,000	\$ 6,900				
5	24" Water Pipe	900	LF	\$ 400	\$ 360,000				
6	30" Water Pipe	100	LF	\$ 475	\$ 47,500				
7	24" Resilient Seated Gate Valve & Vault	6	EA	\$ 50,000	\$ 300,000				
8	30" Resilient Seated Gate Valve & Vault	2	EA	\$ 55,000	\$ 110,000				
9	Air Release Valve	1	EA	\$ 30,000	\$ 30,000				
10	Blow Off Valve	1	EA	\$ 30,000	\$ 30,000				
11	Connect to Existing Water Line (>16")	6	EA	\$ 50,000	\$ 300,000				
12	Water Line Trench Safety	1,000	LF	\$ 3	\$ 3,000				
13	Pavement Repair	1,400	SY	\$ 150	\$ 210,000				
Subtotal:						\$ 1,747,400			
<input checked="" type="checkbox"/> No Design Completed	Conting. (%,+/-)			25%	\$ 436,850				
<input type="checkbox"/> Preliminary Design	Professional Services (%,+/-)			15%	\$ 262,110				
<input type="checkbox"/> Final Design	Easement Acquisition				\$ -				
*Total:						\$ 2,447,000			
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*Total is rounded up to the nearest \$1,000.									

Client: City of Cedar Hill
 Project: Cedar Hill Water Master Plan
 KHA No.: 061075049

Date: 2/12/2024
 Prepared By: EKM
 Checked By: TCT

26 Northeast Cedar Hill 10" Water Line

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization	1	LS	\$ 294,000	\$ 294,000
2	Traffic Control	1	LS	\$ 35,000	\$ 35,000
3	Miscellaneous	1	LS	\$ 175,000	\$ 175,000
4	Erosion Control	1.10	MI	\$ 10,000	\$ 16,000
5	10" Water Pipe	5,800	LF	\$ 150	\$ 870,000
6	10" Resilient Seated Gate Valve	10	EA	\$ 6,000	\$ 60,000
7	Fire Hydrant Assembly	12	EA	\$ 5,000	\$ 60,000
8	Connect to Existing Water Line (<12")	2	EA	\$ 10,000	\$ 20,000
9	Water Line Trench Safety	5,800	LF	\$ 3	\$ 17,400
10	Hydromulch Repair	4,800	SY	\$ 3	\$ 14,400
11	Pavement Repair	3,900	SY	\$ 150	\$ 585,000
Subtotal:					\$ 2,146,800
<input checked="" type="checkbox"/> No Design Completed	Conting. (%,+/-)	25%			\$ 536,700
<input type="checkbox"/> Preliminary Design	Professional Services (%,+/-)	15%			\$ 322,020
<input type="checkbox"/> Final Design	Easement Acquisition				\$ 1,288,500
*Total:					\$ 4,295,000

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*Total is rounded up to the nearest \$1,000.

Client: City of Cedar Hill
 Project: Cedar Hill Water Master Plan
 KHA No.: 061075049

Date: 2/12/2024
 Prepared By: EKM
 Checked By: TCT

27 Highway 67 EST 24" Water Line Parallel

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization	1	LS	\$ 42,000	\$ 42,000
2	Traffic Control	1	LS	\$ 25,000	\$ 25,000
3	Miscellaneous	1	LS	\$ 100,000	\$ 100,000
4	Erosion Control	0.02	MI	\$ 10,000	\$ 5,200
5	24" Water Pipe	100	LF	\$ 400	\$ 40,000
6	24" Resilient Seated Gate Valve & Vault	3	EA	\$ 50,000	\$ 150,000
7	Air Release Valve	1	EA	\$ 30,000	\$ 30,000
8	Blow Off Valve	1	EA	\$ 30,000	\$ 30,000
9	Connect to Existing Water Line (>16")	2	EA	\$ 50,000	\$ 100,000
10	Water Line Trench Safety	100	LF	\$ 3	\$ 300
11	Hydromulch Repair	400	SY	\$ 3	\$ 1,200
Subtotal:				\$ 523,700	
<input checked="" type="checkbox"/> No Design Completed	Conting. (%,+/-)	25%		\$ 130,925	
<input type="checkbox"/> Preliminary Design	Professional Services (%,+/-)	15%		\$ 78,555	
<input type="checkbox"/> Final Design	Easement Acquisition			\$ 54,000	
	*Total:			\$ 788,000	

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*Total is rounded up to the nearest \$1,000.

Client: City of Cedar Hill
 Project: Cedar Hill Water Master Plan
 KHA No.: 061075049

Date: 2/12/2024
 Prepared By: EKM
 Checked By: TCT

28 S Cedar Hill Rd 18" Water Line

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization	1	LS	\$ 46,000	\$ 46,000
2	Traffic Control	1	LS	\$ 35,000	\$ 35,000
3	Miscellaneous	1	LS	\$ 100,000	\$ 100,000
4	Erosion Control	0.06	MI	\$ 10,000	\$ 5,600
5	18" Water Pipe	300	LF	\$ 325	\$ 97,500
6	18" Resilient Seated Gate Valve	3	EA	\$ 20,000	\$ 60,000
7	Air Release Valve	1	EA	\$ 30,000	\$ 30,000
8	Blow Off Valve	1	EA	\$ 30,000	\$ 30,000
9	Connect to Existing Water Line (>16")	2	EA	\$ 50,000	\$ 100,000
10	Water Line Trench Safety	300	LF	\$ 3	\$ 900
11	Pavement Repair	400	SY	\$ 150	\$ 60,000
Subtotal:					\$ 565,000
<input checked="" type="checkbox"/> No Design Completed	Conting. (%,+/-)	25%			\$ 141,250
<input type="checkbox"/> Preliminary Design	Professional Services (%,+/-)	15%			\$ 84,750
<input type="checkbox"/> Final Design	Easement Acquisition				\$ 67,500
	*Total:				\$ 859,000

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*Total is rounded up to the nearest \$1,000.

Client: City of Cedar Hill
 Project: Cedar Hill Water Master Plan
 KHA No.: 061075049

Date: 2/12/2024
 Prepared By: EKM
 Checked By: TCT

29 Parkerville EST 24" Water Line Parallel

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization	1	LS	\$ 152,000	\$ 152,000
2	Traffic Control	1	LS	\$ 35,000	\$ 35,000
3	Miscellaneous	1	LS	\$ 175,000	\$ 175,000
4	Erosion Control	0.19	MI	\$ 10,000	\$ 6,900
5	24" Water Pipe	1,000	LF	\$ 400	\$ 400,000
6	24" Resilient Seated Gate Valve & Vault	3	EA	\$ 50,000	\$ 150,000
7	Air Release Valve	1	EA	\$ 30,000	\$ 30,000
8	Blow Off Valve	1	EA	\$ 30,000	\$ 30,000
9	Connect to Existing Water Line (>16")	2	EA	\$ 50,000	\$ 100,000
10	Water Line Trench Safety	1,000	LF	\$ 3	\$ 3,000
11	Pavement Repair	1,400	SY	\$ 150	\$ 210,000
Subtotal:					\$ 1,291,900
<input checked="" type="checkbox"/> No Design Completed	Conting. (%,+/-)	25%			\$ 322,975
<input type="checkbox"/> Preliminary Design	Professional Services (%,+/-)	15%			\$ 193,785
<input type="checkbox"/> Final Design	Easement Acquisition				\$ 588,000
*Total:					\$ 2,397,000

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*Total is rounded up to the nearest \$1,000.

Client: City of Cedar Hill
 Project: Cedar Hill Water Master Plan
 KHA No.: 061075049

Date: 2/12/2024
 Prepared By: EKM
 Checked By: TCT

30 E Parkerville Rd 16/18/24" Water Line Replacement Phase 2

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization	1	LS	\$ 260,000	\$ 260,000
2	Traffic Control	1	LS	\$ 35,000	\$ 35,000
3	Miscellaneous	1	LS	\$ 175,000	\$ 175,000
4	Erosion Control	0.53	MI	\$ 10,000	\$ 10,300
5	16" Water Pipe	2,000	LF	\$ 300	\$ 600,000
6	24" Water Pipe	800	LF	\$ 400	\$ 320,000
7	16" Resilient Seated Gate Valve	4	EA	\$ 15,000	\$ 60,000
8	24" Resilient Seated Gate Valve & Vault	3	EA	\$ 50,000	\$ 150,000
9	Air Release Valve	2	EA	\$ 30,000	\$ 60,000
10	Blow Off Valve	2	EA	\$ 30,000	\$ 60,000
11	Fire Hydrant Assembly	4	EA	\$ 5,000	\$ 20,000
12	Connect to Existing Water Line (12-16")	2	EA	\$ 30,000	\$ 60,000
13	Connect to Existing Water Line (>16")	2	EA	\$ 50,000	\$ 100,000
14	Water Line Trench Safety	2,800	LF	\$ 3	\$ 8,400
15	Pavement Repair	3,800	SY	\$ 150	\$ 570,000
Subtotal:					\$ 2,488,700
<input checked="" type="checkbox"/> No Design Completed	Conting. (%,+/-)	25%			\$ 622,175
<input type="checkbox"/> Preliminary Design	Professional Services (%,+/-)	15%			\$ 373,305
<input type="checkbox"/> Final Design	Easement Acquisition				\$ 574,500
*Total:					\$ 4,059,000

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*Total is rounded up to the nearest \$1,000.

Client: City of Cedar Hill
 Project: Cedar Hill Water Master Plan
 KHA No.: 061075049

Date: 2/12/2024
 Prepared By: EKM
 Checked By: TCT

31 E FM 1382 10/12" Water Line

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization	1	LS	\$ 280,000	\$ 280,000
2	Traffic Control	1	LS	\$ 35,000	\$ 35,000
3	Miscellaneous	1	LS	\$ 175,000	\$ 175,000
4	Erosion Control	0.91	MI	\$ 10,000	\$ 14,100
5	10" Water Pipe	2,100	LF	\$ 150	\$ 315,000
6	12" Water Pipe	2,700	LF	\$ 200	\$ 540,000
7	10" Resilient Seated Gate Valve	4	EA	\$ 6,000	\$ 24,000
8	12" Resilient Seated Gate Valve	5	EA	\$ 7,000	\$ 35,000
9	Fire Hydrant Assembly	10	EA	\$ 5,000	\$ 50,000
10	Connect to Existing Water Line (<12")	1	EA	\$ 10,000	\$ 10,000
11	Connect to Existing Water Line (12-16")	1	EA	\$ 30,000	\$ 30,000
12	Water Line Trench Safety	4,800	LF	\$ 3	\$ 14,400
13	Hydromulch Repair	4,800	SY	\$ 3	\$ 14,400
14	Pavement Repair	3,200	SY	\$ 150	\$ 480,000
Subtotal:					\$ 2,016,900
<input checked="" type="checkbox"/> No Design Completed	Conting. (%,+/-)	25%			\$ 504,225
<input type="checkbox"/> Preliminary Design	Professional Services (%,+/-)	15%			\$ 302,535
<input type="checkbox"/> Final Design	Easement Acquisition				\$ 1,272,000
*Total:					\$ 4,096,000

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*Total is rounded up to the nearest \$1,000.

Client: City of Cedar Hill
 Project: Cedar Hill Water Master Plan
 KHA No.: 061075049

Date: 2/12/2024
 Prepared By: EKM
 Checked By: TCT

32 N Duncanville Rd 12" Water Line

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization	1	LS	\$ 160,000	\$ 160,000
2	Traffic Control	1	LS	\$ 35,000	\$ 35,000
3	Miscellaneous	1	LS	\$ 175,000	\$ 175,000
4	Erosion Control	0.40	MI	\$ 10,000	\$ 9,000
5	12" Water Pipe	2,100	LF	\$ 200	\$ 420,000
6	12" Resilient Seated Gate Valve	5	EA	\$ 7,000	\$ 35,000
7	Fire Hydrant Assembly	5	EA	\$ 5,000	\$ 25,000
8	Connect to Existing Water Line (12-16")	2	EA	\$ 30,000	\$ 60,000
9	Water Line Trench Safety	2,100	LF	\$ 3	\$ 6,300
10	Pavement Repair	2,800	SY	\$ 150	\$ 420,000
Subtotal:					\$ 1,345,300
<input checked="" type="checkbox"/> No Design Completed	Conting. (%,+/-)	25%		\$ 336,325	
<input type="checkbox"/> Preliminary Design	Professional Services (%,+/-)	15%		\$ 201,795	
<input type="checkbox"/> Final Design	Easement Acquisition			\$ 618,000	
*Total:					\$ 2,502,000

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*Total is rounded up to the nearest \$1,000.

Client: City of Cedar Hill
 Project: Cedar Hill Water Master Plan
 KHA No.: 061075049

Date: 2/12/2024
 Prepared By: EKM
 Checked By: TCT

33 East Little Creek 12" Water Line Phase 1

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization	1	LS	\$ 320,000	\$ 320,000
2	Traffic Control	1	LS	\$ 25,000	\$ 25,000
3	Miscellaneous	1	LS	\$ 250,000	\$ 250,000
4	Erosion Control	1.12	MI	\$ 10,000	\$ 16,200
5	12" Water Pipe	5,900	LF	\$ 200	\$ 1,180,000
6	12" Resilient Seated Gate Valve	10	EA	\$ 7,000	\$ 70,000
7	Fire Hydrant Assembly	12	EA	\$ 5,000	\$ 60,000
8	Connect to Existing Water Line (12-16")	2	EA	\$ 30,000	\$ 60,000
9	Water Line Trench Safety	5,900	LF	\$ 3	\$ 17,700
10	Hydromulch Repair	13,000	SY	\$ 3	\$ 39,000
Subtotal:					\$ 2,037,900
<input checked="" type="checkbox"/> No Design Completed	Conting. (%,+/-)	25%		\$ 509,475	
<input type="checkbox"/> Preliminary Design	Professional Services (%,+/-)	15%		\$ 305,685	
<input type="checkbox"/> Final Design	Easement Acquisition			\$ 1,749,000	
*Total:					\$ 4,603,000

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*Total is rounded up to the nearest \$1,000.

Client: City of Cedar Hill
 Project: Cedar Hill Water Master Plan
 KHA No.: 061075049

Date: 2/12/2024
 Prepared By: EKM
 Checked By: TCT

34 Pecan Trails Golf Course 8" Water Line

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization	1	LS	\$ 132,000	\$ 132,000
2	Traffic Control	1	LS	\$ 25,000	\$ 25,000
3	Miscellaneous	1	LS	\$ 175,000	\$ 175,000
4	Erosion Control	0.70	MI	\$ 10,000	\$ 12,000
5	8" Water Pipe	3,700	LF	\$ 100	\$ 370,000
6	8" Resilient Seated Gate Valve	7	EA	\$ 5,000	\$ 35,000
7	Fire Hydrant Assembly	8	EA	\$ 5,000	\$ 40,000
8	Connect to Existing Water Line (<12")	2	EA	\$ 10,000	\$ 20,000
9	Water Line Trench Safety	3,700	LF	\$ 3	\$ 11,100
10	Hydromulch Repair	6,100	SY	\$ 3	\$ 18,300
Subtotal:					\$ 838,400
<input checked="" type="checkbox"/> No Design Completed	Conting. (%,+/-)	25%		\$ 209,600	
<input type="checkbox"/> Preliminary Design	Professional Services (%,+/-)	15%		\$ 125,760	
<input type="checkbox"/> Final Design	Easement Acquisition			\$ 811,500	
*Total:					\$ 1,986,000

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*Total is rounded up to the nearest \$1,000.

Client: City of Cedar Hill
 Project: Cedar Hill Water Master Plan
 KHA No.: 061075049

Date: 2/12/2024
 Prepared By: EKM
 Checked By: TCT

35 Loop 9 12" Water Line Phase 1 - South

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization	1	LS	\$ 335,000	\$ 335,000
2	Traffic Control	1	LS	\$ 25,000	\$ 25,000
3	Miscellaneous	1	LS	\$ 250,000	\$ 250,000
4	Erosion Control	0.91	MI	\$ 10,000	\$ 14,100
5	12" Water Pipe	4,800	LF	\$ 200	\$ 960,000
6	24" Casing BOTOC w/12" Carrier Pipe	500	LF	\$ 1,100	\$ 550,000
7	12" Resilient Seated Gate Valve	9	EA	\$ 7,000	\$ 63,000
8	Fire Hydrant Assembly	10	EA	\$ 5,000	\$ 50,000
9	Connect to Existing Water Line (12-16")	3	EA	\$ 30,000	\$ 90,000
10	Water Line Trench Safety	4,800	LF	\$ 3	\$ 14,400
11	Hydromulch Repair	11,700	SY	\$ 3	\$ 35,100
Subtotal:					\$ 2,386,600
<input checked="" type="checkbox"/> No Design Completed	Conting. (%,+/-)	25%		\$ 596,650	
<input type="checkbox"/> Preliminary Design	Professional Services (%,+/-)	15%		\$ 357,990	
<input type="checkbox"/> Final Design	Easement Acquisition			\$ 1,572,000	
*Total:					\$ 4,914,000

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*Total is rounded up to the nearest \$1,000.

Client: City of Cedar Hill
 Project: Cedar Hill Water Master Plan
 KHA No.: 061075049

Date: 2/12/2024
 Prepared By: EKM
 Checked By: TCT

36 Rocky Acres Rd 10/12" Water Line

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization	1	LS	\$ 257,000	\$ 257,000
2	Traffic Control	1	LS	\$ 25,000	\$ 25,000
3	Miscellaneous	1	LS	\$ 175,000	\$ 175,000
4	Erosion Control	0.70	MI	\$ 10,000	\$ 12,000
5	10" Water Pipe	2,000	LF	\$ 150	\$ 300,000
6	12" Water Pipe	1,700	LF	\$ 200	\$ 340,000
7	24" Casing BOTOC w/12" Carrier Pipe	600	LF	\$ 1,100	\$ 660,000
8	10" Resilient Seated Gate Valve	4	EA	\$ 6,000	\$ 24,000
9	12" Resilient Seated Gate Valve	3	EA	\$ 7,000	\$ 21,000
10	Fire Hydrant Assembly	8	EA	\$ 5,000	\$ 40,000
11	Connect to Existing Water Line (<12")	1	EA	\$ 10,000	\$ 10,000
12	Water Line Trench Safety	3,700	LF	\$ 3	\$ 11,100
13	Hydromulch Repair	8,400	SY	\$ 3	\$ 25,200
Subtotal:					\$ 1,900,300
<input checked="" type="checkbox"/> No Design Completed	Conting. (%,+/-)	25%		\$ 475,075	
<input type="checkbox"/> Preliminary Design	Professional Services (%,+/-)	15%		\$ 285,045	
<input type="checkbox"/> Final Design	Easement Acquisition			\$ 1,126,500	
	*Total:			\$ 3,787,000	

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*Total is rounded up to the nearest \$1,000.

Client: City of Cedar Hill
 Project: Cedar Hill Water Master Plan
 KHA No.: 061075049

Date: 2/12/2024
 Prepared By: EKM
 Checked By: TCT

37 Loop 9 12" Water Line Phase 2 - North

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization	1	LS	\$ 231,000	\$ 231,000
2	Traffic Control	1	LS	\$ 25,000	\$ 25,000
3	Miscellaneous	1	LS	\$ 175,000	\$ 175,000
4	Erosion Control	0.80	MI	\$ 10,000	\$ 13,000
5	12" Water Pipe	4,200	LF	\$ 200	\$ 840,000
6	12" Resilient Seated Gate Valve	8	EA	\$ 7,000	\$ 56,000
7	Fire Hydrant Assembly	9	EA	\$ 5,000	\$ 45,000
8	Connect to Existing Water Line (12-16")	2	EA	\$ 30,000	\$ 60,000
9	Water Line Trench Safety	4,200	LF	\$ 3	\$ 12,600
10	Hydromulch Repair	9,300	SY	\$ 3	\$ 27,900
Subtotal:					\$ 1,485,500
<input checked="" type="checkbox"/> No Design Completed	Conting. (%,+/-)	25%		\$ 371,375	
<input type="checkbox"/> Preliminary Design	Professional Services (%,+/-)	15%		\$ 222,825	
<input type="checkbox"/> Final Design	Easement Acquisition			\$ 1,255,500	
*Total:					\$ 3,336,000

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*Total is rounded up to the nearest \$1,000.

Client: City of Cedar Hill
 Project: Cedar Hill Water Master Plan
 KHA No.: 061075049

Date: 2/12/2024
 Prepared By: EKM
 Checked By: TCT

38 Loop 9 12" Water Line Phase 2 - South

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization	1	LS	\$ 178,000	\$ 178,000
2	Traffic Control	1	LS	\$ 25,000	\$ 25,000
3	Miscellaneous	1	LS	\$ 175,000	\$ 175,000
4	Erosion Control	0.61	MI	\$ 10,000	\$ 11,100
5	12" Water Pipe	3,200	LF	\$ 200	\$ 640,000
6	12" Resilient Seated Gate Valve	6	EA	\$ 7,000	\$ 42,000
7	Fire Hydrant Assembly	7	EA	\$ 5,000	\$ 35,000
8	Connect to Existing Water Line (12-16")	2	EA	\$ 30,000	\$ 60,000
9	Water Line Trench Safety	3,200	LF	\$ 3	\$ 9,600
10	Hydromulch Repair	7,100	SY	\$ 3	\$ 21,300
Subtotal:					\$ 1,197,000
<input checked="" type="checkbox"/> No Design Completed	Conting. (%,+/-)	25%		\$ 299,250	
<input type="checkbox"/> Preliminary Design	Professional Services (%,+/-)	15%		\$ 179,550	
<input type="checkbox"/> Final Design	Easement Acquisition			\$ 955,500	
*Total:					\$ 2,632,000

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*Total is rounded up to the nearest \$1,000.

Client: City of Cedar Hill
 Project: Cedar Hill Water Master Plan
 KHA No.: 061075049

Date: 2/12/2024
 Prepared By: EKM
 Checked By: TCT

39 Loop 9 12" Water Line Phase 3 - North

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization	1	LS	\$ 331,000	\$ 331,000
2	Traffic Control	1	LS	\$ 25,000	\$ 25,000
3	Miscellaneous	1	LS	\$ 250,000	\$ 250,000
4	Erosion Control	1.10	MI	\$ 10,000	\$ 16,000
5	12" Water Pipe	5,800	LF	\$ 200	\$ 1,160,000
6	24" Casing BOTOC w/12" Carrier Pipe	100	LF	\$ 1,100	\$ 110,000
7	12" Resilient Seated Gate Valve	10	EA	\$ 7,000	\$ 70,000
8	Fire Hydrant Assembly	12	EA	\$ 5,000	\$ 60,000
9	Connect to Existing Water Line (12-16")	2	EA	\$ 30,000	\$ 60,000
10	Water Line Trench Safety	5,800	LF	\$ 3	\$ 17,400
11	Hydromulch Repair	13,100	SY	\$ 3	\$ 39,300
Subtotal:					\$ 2,138,700
<input checked="" type="checkbox"/> No Design Completed	Conting. (%,+/-)	25%			\$ 534,675
<input type="checkbox"/> Preliminary Design	Professional Services (%,+/-)	15%			\$ 320,805
<input type="checkbox"/> Final Design	Easement Acquisition				\$ 1,768,500
*Total:					\$ 4,763,000

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*Total is rounded up to the nearest \$1,000.

Client: City of Cedar Hill
 Project: Cedar Hill Water Master Plan
 KHA No.: 061075049

Date: 2/12/2024
 Prepared By: EKM
 Checked By: TCT

40 Loop 9 12" Water Line Phase 3 - South

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization	1	LS	\$ 338,000	\$ 338,000
2	Traffic Control	1	LS	\$ 25,000	\$ 25,000
3	Miscellaneous	1	LS	\$ 250,000	\$ 250,000
4	Erosion Control	1.08	MI	\$ 10,000	\$ 15,800
5	12" Water Pipe	5,700	LF	\$ 200	\$ 1,140,000
6	24" Casing BOTOC w/12" Carrier Pipe	200	LF	\$ 1,100	\$ 220,000
7	12" Resilient Seated Gate Valve	10	EA	\$ 7,000	\$ 70,000
8	Fire Hydrant Assembly	12	EA	\$ 5,000	\$ 60,000
9	Connect to Existing Water Line (12-16")	2	EA	\$ 30,000	\$ 60,000
10	Water Line Trench Safety	5,700	LF	\$ 3	\$ 17,100
11	Hydromulch Repair	13,100	SY	\$ 3	\$ 39,300
Subtotal:					\$ 2,235,200
<input checked="" type="checkbox"/> No Design Completed	Conting. (%,+/-)	25%			\$ 558,800
<input type="checkbox"/> Preliminary Design	Professional Services (%,+/-)	15%			\$ 335,280
<input type="checkbox"/> Final Design	Easement Acquisition				\$ 1,756,500
*Total:					\$ 4,886,000

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*Total is rounded up to the nearest \$1,000.

Client: City of Cedar Hill
 Project: Cedar Hill Water Master Plan
 KHA No.: 061075049

Date: 2/12/2024
 Prepared By: EKM
 Checked By: TCT

41 Loop 9 12" Water Line Phase 4 - North

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization	1	LS	\$ 388,000	\$ 388,000
2	Traffic Control	1	LS	\$ 25,000	\$ 25,000
3	Miscellaneous	1	LS	\$ 250,000	\$ 250,000
4	Erosion Control	1.12	MI	\$ 10,000	\$ 16,200
5	12" Water Pipe	5,900	LF	\$ 200	\$ 1,180,000
6	24" Casing BOTOC w/12" Carrier Pipe	500	LF	\$ 1,100	\$ 550,000
7	12" Resilient Seated Gate Valve	10	EA	\$ 7,000	\$ 70,000
8	Fire Hydrant Assembly	12	EA	\$ 5,000	\$ 60,000
9	Connect to Existing Water Line (12-16")	2	EA	\$ 30,000	\$ 60,000
10	Water Line Trench Safety	5,900	LF	\$ 3	\$ 17,700
11	Hydromulch Repair	14,000	SY	\$ 3	\$ 42,000
Subtotal:					\$ 2,658,900
<input checked="" type="checkbox"/> No Design Completed					Conting. (%,+/-) 25% \$ 664,725
<input type="checkbox"/> Preliminary Design					Professional Services (%,+/-) 15% \$ 398,835
<input type="checkbox"/> Final Design					Easement Acquisition \$ 1,882,500
					*Total: \$ 5,605,000

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*Total is rounded up to the nearest \$1,000.

Client: City of Cedar Hill
 Project: Cedar Hill Water Master Plan
 KHA No.: 061075049

Date: 2/12/2024
 Prepared By: EKM
 Checked By: TCT

42 Loop 9 12" Water Line Phase 4 - South

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization	1	LS	\$ 372,000	\$ 372,000
2	Traffic Control	1	LS	\$ 25,000	\$ 25,000
3	Miscellaneous	1	LS	\$ 250,000	\$ 250,000
4	Erosion Control	1.16	MI	\$ 10,000	\$ 16,600
5	12" Water Pipe	6,100	LF	\$ 200	\$ 1,220,000
6	24" Casing BOTOC w/12" Carrier Pipe	300	LF	\$ 1,100	\$ 330,000
7	12" Resilient Seated Gate Valve	10	EA	\$ 7,000	\$ 70,000
8	Fire Hydrant Assembly	13	EA	\$ 5,000	\$ 65,000
9	Connect to Existing Water Line (12-16")	2	EA	\$ 30,000	\$ 60,000
10	Water Line Trench Safety	6,100	LF	\$ 3	\$ 18,300
11	Hydromulch Repair	14,100	SY	\$ 3	\$ 42,300
Subtotal:					\$ 2,469,200
<input checked="" type="checkbox"/> No Design Completed	Conting. (%,+/-)	25%			\$ 617,300
<input type="checkbox"/> Preliminary Design	Professional Services (%,+/-)	15%			\$ 370,380
<input type="checkbox"/> Final Design	Easement Acquisition				\$ 1,896,000
*Total:					\$ 5,353,000

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*Total is rounded up to the nearest \$1,000.

Client: City of Cedar Hill
 Project: Cedar Hill Water Master Plan
 KHA No.: 061075049
 43 Cedar Hill Rd 20" Water Line

Date: 2/12/2024
 Prepared By: EKM
 Checked By: TCT

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization	1	LS	\$ 911,000	\$ 911,000
2	Traffic Control	1	LS	\$ 35,000	\$ 35,000
3	Miscellaneous	1	LS	\$ 250,000	\$ 250,000
4	Erosion Control	1.80	MI	\$ 10,000	\$ 23,000
5	20" Water Pipe	9,500	LF	\$ 350	\$ 3,325,000
6	36" Casing BOTOC w/20" Carrier Pipe	100	LF	\$ 1,600	\$ 160,000
7	20" Resilient Seated Gate Valve	12	EA	\$ 25,000	\$ 300,000
8	Air Release Valve	5	EA	\$ 30,000	\$ 150,000
9	Blow Off Valve	5	EA	\$ 30,000	\$ 150,000
10	Connect to Existing Water Line (>16")	4	EA	\$ 50,000	\$ 200,000
11	Water Line Trench Safety	9,500	LF	\$ 3	\$ 28,500
12	Pavement Repair	12,700	SY	\$ 150	\$ 1,905,000
Subtotal:					\$ 7,437,500
<input checked="" type="checkbox"/> No Design Completed	Conting. (%,+/-)	25%			\$ 1,859,375
<input type="checkbox"/> Preliminary Design	Professional Services (%,+/-)	15%			\$ 1,115,625
<input type="checkbox"/> Final Design	Easement Acquisition				\$ 2,863,500
*Total:					\$ 13,276,000

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*Total is rounded up to the nearest \$1,000.

Client:	City of Cedar Hill	Date:	2/12/2024		
Project:	Cedar Hill Water Master Plan	Prepared By:	EKM		
KHA No.:	061075049	Checked By:	TCT		
44	Meadowcrest Pump Station Improvements				
Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization	1	LS	\$ 75,000	\$ 75,000
2	Miscellaneous	1	LS	\$ 100,000	\$ 100,000
3	2,800 GPM Pumps and Motors	1	EA	\$ 125,000	\$ 125,000
4	Pump Station Mechanical Piping and Valves	50	LF	\$ 5,000	\$ 250,000
5	VFDRVSS	1	EA	\$ 100,000	\$ 100,000
Subtotal:				\$ 650,000	
<input checked="" type="checkbox"/> No Design Completed	Conting. (%,+/-)	25%		\$ 162,500	
<input type="checkbox"/> Preliminary Design	Professional Services (%,+/-)	15%		\$ 97,500	
<input type="checkbox"/> Final Design	Property Purchase			\$ -	
*Total:				\$ 910,000	

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*Total is rounded up to the nearest \$1,000.

Client: City of Cedar Hill
 Project: Cedar Hill Water Master Plan
 KHA No.: 061075049

Date: 2/12/2024
 Prepared By: EKM
 Checked By: TCT

45 Meadowcrest 16/18/24" Water Line

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization	1	LS	\$ 319,000	\$ 319,000
2	Traffic Control	1	LS	\$ 35,000	\$ 35,000
3	Miscellaneous	1	LS	\$ 250,000	\$ 250,000
4	Erosion Control	0.40	MI	\$ 10,000	\$ 9,000
5	12" Water Pipe	100	LF	\$ 200	\$ 20,000
6	16" Water Pipe	100	LF	\$ 300	\$ 30,000
7	18" Water Pipe	1,800	LF	\$ 325	\$ 585,000
8	24" Water Pipe	100	LF	\$ 400	\$ 40,000
9	30" Casing BOTOC w/16" Carrier Pipe	400	LF	\$ 1,400	\$ 560,000
10	12" Resilient Seated Gate Valve	2	EA	\$ 7,000	\$ 14,000
11	16" Resilient Seated Gate Valve	2	EA	\$ 15,000	\$ 30,000
12	18" Resilient Seated Gate Valve	2	EA	\$ 20,000	\$ 40,000
13	24" Resilient Seated Gate Valve & Vault	3	EA	\$ 50,000	\$ 150,000
14	Air Release Valve	1	EA	\$ 30,000	\$ 30,000
15	Blow Off Valve	1	EA	\$ 30,000	\$ 30,000
16	Fire Hydrant Assembly	1	EA	\$ 5,000	\$ 5,000
17	Connect to Existing Water Line (12-16")	2	EA	\$ 30,000	\$ 60,000
18	Connect to Existing Water Line (>16")	2	EA	\$ 50,000	\$ 100,000
19	Water Line Trench Safety	2,100	LF	\$ 3	\$ 6,300
20	Pavement Repair	2,800	SY	\$ 150	\$ 420,000
Subtotal:					\$ 2,733,300
<input checked="" type="checkbox"/> No Design Completed	Conting. (%,+/-)		25%		\$ 683,325
<input type="checkbox"/> Preliminary Design	Professional Services (%,+/-)		15%		\$ 409,995
<input type="checkbox"/> Final Design	Easement Acquisition				\$ 1,056,000
*Total:					\$ 4,883,000

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*Total is rounded up to the nearest \$1,000.

Client: City of Cedar Hill
 Project: Cedar Hill Water Master Plan
 KHA No.: 061075049

Date: 2/12/2024
 Prepared By: EKM
 Checked By: TCT

46 E Parkerville Rd 16/18/24" Water Line Replacement Phase 3

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization	1	LS	\$ 50,000	\$ 50,000
2	Traffic Control	1	LS	\$ 35,000	\$ 35,000
3	Miscellaneous	1	LS	\$ 100,000	\$ 100,000
4	Erosion Control	0.09	MI	\$ 10,000	\$ 5,900
5	18" Water Pipe	500	LF	\$ 325	\$ 162,500
6	18" Resilient Seated Gate Valve	3	EA	\$ 20,000	\$ 60,000
7	Air Release Valve	1	EA	\$ 30,000	\$ 30,000
8	Blow Off Valve	1	EA	\$ 30,000	\$ 30,000
9	Connect to Existing Water Line (>16")	2	EA	\$ 50,000	\$ 100,000
10	Water Line Trench Safety	500	LF	\$ 3	\$ 1,500
11	Pavement Repair	700	SY	\$ 150	\$ 105,000
Subtotal:					\$ 679,900
<input checked="" type="checkbox"/> No Design Completed	Conting. (%,+/-)	25%		\$ 169,975	
<input type="checkbox"/> Preliminary Design	Professional Services (%,+/-)	15%		\$ 101,985	
<input type="checkbox"/> Final Design	Easement Acquisition			\$ -	
*Total:					\$ 952,000

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*Total is rounded up to the nearest \$1,000.

Client: City of Cedar Hill
 Project: Cedar Hill Water Master Plan
 KHA No.: 061075049

Date: 2/12/2024
 Prepared By: EKM
 Checked By: TCT

47 S Duncanville Rd 12" Water Line

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization	1	LS	\$ 492,000	\$ 492,000
2	Traffic Control	1	LS	\$ 35,000	\$ 35,000
3	Miscellaneous	1	LS	\$ 250,000	\$ 250,000
4	Erosion Control	1.19	MI	\$ 10,000	\$ 16,900
5	12" Water Pipe	6,300	LF	\$ 200	\$ 1,260,000
6	24" Casing BOTOC w/12" Carrier Pipe	200	LF	\$ 1,100	\$ 220,000
7	12" Resilient Seated Gate Valve	11	EA	\$ 7,000	\$ 77,000
8	Fire Hydrant Assembly	13	EA	\$ 5,000	\$ 65,000
9	Connect to Existing Water Line (12-16")	3	EA	\$ 30,000	\$ 90,000
10	Water Line Trench Safety	6,300	LF	\$ 3	\$ 18,900
11	Pavement Repair	8,400	SY	\$ 150	\$ 1,260,000
Subtotal:					\$ 3,784,800
<input checked="" type="checkbox"/> No Design Completed	Conting. (%,+/-)	25%			\$ 946,200
<input type="checkbox"/> Preliminary Design	Professional Services (%,+/-)	15%			\$ 567,720
<input type="checkbox"/> Final Design	Easement Acquisition				\$ 1,909,500
*Total:					\$ 7,209,000

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*Total is rounded up to the nearest \$1,000.

Client: City of Cedar Hill
 Project: Cedar Hill Water Master Plan
 KHA No.: 061075049

Date: 2/12/2024
 Prepared By: EKM
 Checked By: TCT

48 W Parkerville Rd 12" Water Line

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization	1	LS	\$ 410,000	\$ 410,000
2	Traffic Control	1	LS	\$ 25,000	\$ 25,000
3	Miscellaneous	1	LS	\$ 250,000	\$ 250,000
4	Erosion Control	1.42	MI	\$ 10,000	\$ 19,200
5	12" Water Pipe	7,500	LF	\$ 200	\$ 1,500,000
6	12" Resilient Seated Gate Valve	13	EA	\$ 7,000	\$ 91,000
7	Fire Hydrant Assembly	15	EA	\$ 5,000	\$ 75,000
8	Connect to Existing Water Line (12-16")	3	EA	\$ 30,000	\$ 90,000
9	Water Line Trench Safety	7,500	LF	\$ 3	\$ 22,500
10	Hydromulch Repair	16,700	SY	\$ 3	\$ 50,100
Subtotal:					\$ 2,532,800
<input checked="" type="checkbox"/> No Design Completed	Conting. (%,+/-)	25%		\$ 633,200	
<input type="checkbox"/> Preliminary Design	Professional Services (%,+/-)	15%		\$ 379,920	
<input type="checkbox"/> Final Design	Easement Acquisition			\$ 2,247,000	
*Total:					\$ 5,793,000

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*Total is rounded up to the nearest \$1,000.

Client: City of Cedar Hill
 Project: Cedar Hill Water Master Plan
 KHA No.: 061075049

Date: 2/12/2024
 Prepared By: EKM
 Checked By: TCT

49 East Little Creek 12" Water Line Phase 2

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization	1	LS	\$ 161,000	\$ 161,000
2	Traffic Control	1	LS	\$ 25,000	\$ 25,000
3	Miscellaneous	1	LS	\$ 175,000	\$ 175,000
4	Erosion Control	0.49	MI	\$ 10,000	\$ 9,900
5	12" Water Pipe	2,600	LF	\$ 200	\$ 520,000
6	24" Casing BOTOC w/12" Carrier Pipe	100	LF	\$ 1,100	\$ 110,000
7	12" Resilient Seated Gate Valve	6	EA	\$ 7,000	\$ 42,000
8	Fire Hydrant Assembly	6	EA	\$ 5,000	\$ 30,000
9	Connect to Existing Water Line (12-16")	2	EA	\$ 30,000	\$ 60,000
10	Water Line Trench Safety	2,600	LF	\$ 3	\$ 7,800
11	Hydromulch Repair	6,000	SY	\$ 3	\$ 18,000
Subtotal:				\$ 1,158,700	
<input checked="" type="checkbox"/> No Design Completed	Conting. (%,+/-)	25%		\$ 289,675	
<input type="checkbox"/> Preliminary Design	Professional Services (%,+/-)	15%		\$ 173,805	
<input type="checkbox"/> Final Design	Easement Acquisition			\$ 804,000	
*Total:				\$ 2,427,000	

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*Total is rounded up to the nearest \$1,000.

Client: City of Cedar Hill
 Project: Cedar Hill Water Master Plan
 KHA No.: 061075049

Date: 2/12/2024
 Prepared By: EKM
 Checked By: TCT

50 S Waterford Oaks Dr 12" Water Line

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization	1	LS	\$ 294,000	\$ 294,000
2	Traffic Control	1	LS	\$ 25,000	\$ 25,000
3	Miscellaneous	1	LS	\$ 175,000	\$ 175,000
4	Erosion Control	1.02	MI	\$ 10,000	\$ 15,200
5	12" Water Pipe	5,400	LF	\$ 200	\$ 1,080,000
6	12" Resilient Seated Gate Valve	9	EA	\$ 7,000	\$ 63,000
7	Fire Hydrant Assembly	11	EA	\$ 5,000	\$ 55,000
8	Connect to Existing Water Line (12-16")	2	EA	\$ 30,000	\$ 60,000
9	Water Line Trench Safety	5,400	LF	\$ 3	\$ 16,200
10	Hydromulch Repair	12,000	SY	\$ 3	\$ 36,000
Subtotal:					\$ 1,819,400
<input checked="" type="checkbox"/> No Design Completed	Conting. (%,+/-)	25%		\$ 454,850	
<input type="checkbox"/> Preliminary Design	Professional Services (%,+/-)	15%		\$ 272,910	
<input type="checkbox"/> Final Design	Easement Acquisition			\$ 1,612,500	
*Total:					\$ 4,160,000

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*Total is rounded up to the nearest \$1,000.

Client: City of Cedar Hill
 Project: Cedar Hill Water Master Plan
 KHA No.: 061075049

Date: 2/12/2024
 Prepared By: EKM
 Checked By: TCT

51 East Windsor Park 12" Water Line

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization	1	LS	\$ 115,000	\$ 115,000
2	Traffic Control	1	LS	\$ 25,000	\$ 25,000
3	Miscellaneous	1	LS	\$ 175,000	\$ 175,000
4	Erosion Control	0.38	MI	\$ 10,000	\$ 8,800
5	12" Water Pipe	2,000	LF	\$ 200	\$ 400,000
6	12" Resilient Seated Gate Valve	5	EA	\$ 7,000	\$ 35,000
7	Fire Hydrant Assembly	4	EA	\$ 5,000	\$ 20,000
8	Connect to Existing Water Line (12-16")	2	EA	\$ 30,000	\$ 60,000
9	Water Line Trench Safety	2,000	LF	\$ 3	\$ 6,000
10	Hydromulch Repair	4,500	SY	\$ 3	\$ 13,500
Subtotal:					\$ 858,300
<input checked="" type="checkbox"/> No Design Completed	Conting. (%,+/-)	25%		\$ 214,575	
<input type="checkbox"/> Preliminary Design	Professional Services (%,+/-)	15%		\$ 128,745	
<input type="checkbox"/> Final Design	Easement Acquisition			\$ 600,000	
*Total:					\$ 1,802,000

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*Total is rounded up to the nearest \$1,000.

Client: City of Cedar Hill
 Project: Cedar Hill Water Master Plan
 KHA No.: 061075049

Date: 2/12/2024
 Prepared By: EKM
 Checked By: TCT

52 S Clark Rd 8" Water Line

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization	1	LS	\$ 71,000	\$ 71,000
2	Traffic Control	1	LS	\$ 25,000	\$ 25,000
3	Miscellaneous	1	LS	\$ 100,000	\$ 100,000
4	Erosion Control	0.36	MI	\$ 10,000	\$ 8,600
5	8" Water Pipe	1,900	LF	\$ 100	\$ 190,000
6	8" Resilient Seated Gate Valve	5	EA	\$ 5,000	\$ 25,000
7	Fire Hydrant Assembly	4	EA	\$ 5,000	\$ 20,000
8	Connect to Existing Water Line (<12")	2	EA	\$ 10,000	\$ 20,000
9	Water Line Trench Safety	1,900	LF	\$ 3	\$ 5,700
10	Hydromulch Repair	3,200	SY	\$ 3	\$ 9,600
Subtotal:					\$ 474,900
<input checked="" type="checkbox"/> No Design Completed	Conting. (%,+/-)	25%			\$ 118,725
<input type="checkbox"/> Preliminary Design	Professional Services (%,+/-)	15%			\$ 71,235
<input type="checkbox"/> Final Design	Easement Acquisition				\$ 421,500
*Total:					\$ 1,087,000

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*Total is rounded up to the nearest \$1,000.

Client: City of Cedar Hill
 Project: Cedar Hill Water Master Plan
 KHA No.: 061075049

Date: 2/12/2024
 Prepared By: EKM
 Checked By: TCT

53 6.0 MG Meadowcrest Ground Storage Tank

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization	1	LS	\$ 400,000	\$ 400,000
2	Miscellaneous	1	LS	\$ 500,000	\$ 500,000
3	Allowance	1	LS	\$ 300,000	\$ 300,000
4	Erosion Control and SWPPP	1	LS	\$ 25,000	\$ 25,000
5	6.0 MG Prestressed Concrete Ground Storage Tank	1	EA	\$6,000,000	\$ 6,000,000
6	Site Work - GST	1	LS	\$200,000	\$ 200,000
Subtotal:					\$ 7,425,000
<input checked="" type="checkbox"/> No Design Completed	Conting. (%,+/-)	25%			\$ 1,856,250
<input type="checkbox"/> Preliminary Design	Professional Services (%,+/-)	15%			\$ 1,113,750
<input type="checkbox"/> Final Design	Property Purchase				\$ -
*Total:					\$ 10,395,000

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*Total is rounded up to the nearest \$1,000.

**APPENDIX B – OPINION OF PROBABLE CONSTRUCTION COSTS
(WASTEWATER)**

Kimley-Horn & Associates, Inc.		Opinion of Probable Construction Cost
Client:	City of Cedar Hill	Date: 3/7/2024
Project:	Cedar Hill Wastewater Master Plan	Prepared By: KJF
KHA No.:	061075049	Checked By: LMW/JDJ
Item No.	Item Description	Item Cost
Capital Improvement Projects		
5-Year Projects		
1	Lake Ridge Parkway 8" Gravity Line Connection	\$933,000
2	Mt. Lebanon Lift Station Decommission 8/10" Gravity Line	\$3,439,000
2.1	Mt. Lebanon Lift Station Decommission	\$274,000
3	Hollings Lift Station Expansion	\$2,651,000
4	Mansfield Road 10" Force Main	\$585,000
5	American Lift Station Decommission 10/12" Gravity Line	\$1,584,000
5.1	American Lift Station Decommission	\$337,000
6	W Parkerville 10" Gravity Line	\$2,848,000
10-Year Projects		
7	Baggett Branch Expansion	\$1,545,000
8	Lake Ridge II and Lake Ridge III Lift Station Decommission 8/10/12" Gravity Lines	\$2,749,000
8.1	Lake Ridge II Lift Station Decommission	\$259,000
8.2	Lake Ridge III Lift Station Decommission	\$259,000
9	High Meadows Lift Station 8/10" Gravity Line	\$3,193,000
9.1	High Meadows Lift Station Decommission	\$260,000
10	8/15/18" West Red Oak Gravity Lines	\$6,799,000
11	8/12" West Red Oak Gravity Lines	\$2,676,000
11.1	West Red Oak Lift Station and Force Main	\$1,960,000
12	Loop 9 8" Gravity Main - South	\$674,000
13	Loop 9 12" Gravity Main - North	\$2,907,000
14	Loop 9 12" Gravity Main - North	\$2,907,000
15	8/10/15" Bear Creek Road and South Joe Wilson Road Gravity Lines	\$3,673,000
16	East Red Oak 10-inch Gravity Line	\$788,000
16.1	East Red Oak Lift Station	\$816,000
17	Windsor Park 8/15-inch Gravity Line	\$6,196,000
17.1	Windsor Park Decommission	\$764,000
18	18" Red Oak Gravity Line	\$5,371,000
19	Lake Ridge Lift Station I Expansion	\$4,004,000
20	Autumn Run Court 10" Gravity Line Connection	\$1,022,000
21	TRA Central South 15" Gravity Main I	\$5,363,000
22	Hollings Lift Station Expansion	\$3,079,000
23	TRA Central South 15" Gravity Main II	\$3,198,000
Buildout Projects		
24	Sherwood 8" Gravity Line	\$952,000
24.1	Sherwood Lift Station Decommission	\$260,000
25	TRA Central North 8" Gravity Line	\$3,079,000
26	TRA Central South 8" Gravity Line	\$2,451,000
27	Little Creek Lift Station 8" Gravity Line	\$1,299,000
27.1	Little Creek Lift Station Decommission	\$260,000
28	10/12/18" Red Oak Gravity Line	\$3,573,000
28.1	Springfield Lift Station Decommission	\$260,000
29	Highlands 10/15" Gravity Line	\$5,193,000
29.1	Highlands Lift Station Decommission	\$260,000
30	Highway 67 12" Gravity Line	\$3,874,000
31	TRA Central North 10" Gravity Main	\$655,000
31.1	TRA Central North Lift Station	\$816,000
32	TRA Central South 15" Gravity Line Connection	\$5,179,000
Basis for Cost Projection:		Projects Total: \$101,224,000
<input checked="" type="checkbox"/>	No Design Completed	
<input type="checkbox"/>	Preliminary Design	
<input type="checkbox"/>	Final Design	
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Kimley-Horn & Associates, Inc.		Opinion of Probable Construction Cost			
Client:	City of Cedar Hill	Date:	3/7/2024		
Project:	Cedar Hill Wastewater Master Plan	Prepared By:	KJF		
KHA No.:	061075049	Checked By:	LMW/JDJ		
1	Lake Ridge Parkway 8" Gravity Line Connection				
Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization	1	LS	\$ 33,990	\$ 33,990
2	Traffic Control	1	LS	\$ 35,000	\$ 35,000
3	Miscellaneous	1	LS	\$ 100,000	\$ 100,000
4	Erosion Control	1	LS	\$ 6,900	\$ 6,900
5	8" Sanitary Sewer	1,000	LF	\$ 100	\$ 100,000
6	Sewer Line Trench Safety	1,000	LF	\$ 3	\$ 3,000
7	Pavement Repair	1,400	SY	\$ 150	\$ 210,000
8	4' Manhole	2	EA	\$ 10,000	\$ 20,000
Basis for Cost Projection:		Subtotal:			\$ 508,890
<input checked="" type="checkbox"/>	No Design Completed	Conting. (%,+/-)		25%	\$ 127,223
<input type="checkbox"/>	Preliminary Design	Professional Services (%,+/-)		15%	\$ 76,334
<input type="checkbox"/>	Final Design	Easement Acquisition			\$ 220,500
		Total:			\$ 933,000
<p>The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.</p> <p>*Total is rounded up to the nearest \$1,000.</p>					

Client:	City of Cedar Hill	Date:	3/7/2024
Project:	Cedar Hill Wastewater Master Plan	Prepared By:	KJF
KHA No.:	061075049	Checked By:	LMW/JDJ
2 Mt. Lebanon Lift Station Decommission 8/10-inch Gravity Line			

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization	1	LS	\$ 121,230	\$ 121,230
2	Traffic Control	1	LS	\$ 35,000	\$ 35,000
3	Miscellaneous	1	LS	\$ 175,000	\$ 175,000
4	Erosion Control	1	LS	\$ 13,100	\$ 13,100
5	8" Sanitary Sewer	1,600	LF	\$ 100	\$ 160,000
6	10" Sanitary Sewer	2,700	LF	\$ 135	\$ 364,500
7	16" Bore and Steel Casing	300	LF	\$ 700	\$ 210,000
8	Sewer Line Trench Safety	4,300	LF	\$ 3	\$ 12,900
9	Hydromulch Repair	8,600	SY	\$ 3	\$ 25,800
10	Pavement Repair	600	SY	\$ 150	\$ 90,000
11	4' Manhole	9	EA	\$ 10,000	\$ 86,000
12	Bypass Pumping	1	EA	\$ 250,000	\$ 250,000

Basis for Cost Projection:	Subtotal:	\$ 1,543,530
<input checked="" type="checkbox"/> No Design Completed	Conting. (%,+/-)	25%
<input type="checkbox"/> Preliminary Design	Professional Services (%,+/-)	15%
<input type="checkbox"/> Final Design	Easement Acquisition	\$ 1,278,000
	Total:	\$ 3,439,000

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*Total is rounded up to the nearest \$1,000.

Kimley-Horn & Associates, Inc.		Opinion of Probable Construction Cost			
Client:	City of Cedar Hill	Date:			3/7/2024
Project:	Cedar Hill Wastewater Master Plan	Prepared By:			KJF
KHA No.:	061075049	Checked By:			LMW/JDJ
2.1	Mt. Lebanon Lift Station Decommission				
Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization	1	LS	\$ 5,500	\$ 5,500
2	Traffic Control	1	LS	\$ 35,000	\$ 35,000
3	Miscellaneous	1	LS	\$ 100,000	\$ 100,000
4	Erosion Control	1	LS	\$ 5,000	\$ 5,000
5	Decommission	1	LS	\$ 50,000	\$ 50,000
Basis for Cost Projection:		Subtotal:			\$ 195,500
<input checked="" type="checkbox"/>	No Design Completed	Conting. (%,+/-)			\$ 48,875
<input type="checkbox"/>	Preliminary Design	Professional Services (%,+/-)			\$ 29,325
<input type="checkbox"/>	Final Design	Easement Acquisition			\$ -
		Total:			\$ 274,000
<p>The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.</p> <p>*Total is rounded up to the nearest \$1,000.</p>					

Kimley-Horn & Associates, Inc.		Opinion of Probable Construction Cost							
Client:	City of Cedar Hill		Date:	3/7/2024					
Project:	Cedar Hill Wastewater Master Plan		Prepared By:	KJF					
KHA No.:	061075049		Checked By:	LMW/JDJ					
3 Hollings Branch Lift Station Expansion									
Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost				
1	Mobilization	1	LS	\$ 168,930	\$ 168,930				
2	Traffic Control	1	LS	\$ 35,000	\$ 35,000				
3	Miscellaneous	1	LS	\$ 175,000	\$ 175,000				
4	Erosion Control	1	LS	\$ 5,900	\$ 5,900				
5	Sewer Line Trench Safety	500	LF	\$ 3	\$ 1,500				
6	Hydromulch Repair	2,300	SY	\$ 3	\$ 6,900				
7	1.5 MGD Lift Station Expansion	1	LS	\$ 1,500,000	\$ 1,500,000				
Basis for Cost Projection:		Subtotal:		\$ 1,893,230					
<input checked="" type="checkbox"/>	No Design Completed	Conting. (%,+/-)		25%	\$ 473,308				
<input type="checkbox"/>	Preliminary Design	Professional Services (%,+/-)		15%	\$ 283,985				
<input type="checkbox"/>	Final Design	Easement Acquisition		\$ -					
		Total:		\$ 2,651,000					
The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.									
*Total is rounded up to the nearest \$1,000.									

Opinion of Probable Construction Cost					
Client:	City of Cedar Hill	Date:	3/7/2024		
Project:	Cedar Hill Wastewater Master Plan	Prepared By:	KJF		
KHA No.:	061075049	Checked By:	LMW/JDJ		
4	Mansfield Road 10" Force Main				
Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization	1	LS	\$ 75,000	\$ 75,000
2	Traffic Control	1	LS	\$ 35,000	\$ 35,000
3	Miscellaneous	1	LS	\$ 100,000	\$ 100,000
4	Erosion Control	1	LS	\$ 7,700	\$ 7,700
5	10" Force Main	1,400	LF	\$ 135	\$ 189,000
6	Sewer Line Trench Safety	1,400	LF	\$ 3	\$ 4,200
7	Hydromulch Repair	2,300	SY	\$ 3	\$ 6,900
Basis for Cost Projection:		Subtotal:		\$ 417,800	
<input checked="" type="checkbox"/>	No Design Completed	Conting. (%,+/-)	25%	\$ 104,450	
<input type="checkbox"/>	Preliminary Design	Professional Services (%,+/-)	15%	\$ 62,670	
<input type="checkbox"/>	Final Design	Easement Acquisition		\$ 309,000	
		Total:		\$ 585,000	
The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.					
*Total is rounded up to the nearest \$1,000.					

Kimley-Horn & Associates, Inc.						Opinion of Probable Construction Cost
Client:	City of Cedar Hill			Date:	3/7/2024	
Project:	Cedar Hill Wastewater Master Plan			Prepared By:	KJF	
KHA No.:	061075049			Checked By:	LMW/JDJ	
5	American Lift Station Decommission 12-inch Gravity Line					
Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost	
1	Mobilization	1	LS	\$ 91,470	\$ 91,470	
2	Traffic Control	1	LS	\$ 25,000	\$ 25,000	
3	Miscellaneous	1	LS	\$ 100,000	\$ 100,000	
4	Erosion Control	1	LS	\$ 9,500	\$ 9,500	
5	12" Sanitary Sewer	2,400	LF	\$ 250	\$ 600,000	
6	Sewer Line Trench Safety	2,400	LF	\$ 3	\$ 7,200	
7	4' Manhole	5	EA	\$ 10,000	\$ 48,000	
8	Bypass Pumping	1	EA	\$ 250,000	\$ 250,000	
Basis for Cost Projection:		Subtotal:				\$ 1,131,170
<input checked="" type="checkbox"/>	No Design Completed	Conting. (%,+/-)		25%	\$ 282,793	
<input type="checkbox"/>	Preliminary Design	Professional Services (%,+/-)		15%	\$ 169,676	
<input type="checkbox"/>	Final Design	Easement Acquisition			\$ -	
		Total:				\$ 1,584,000
<p>The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.</p> <p>*Total is rounded up to the nearest \$1,000.</p>						

Kimley-Horn & Associates, Inc.		Opinion of Probable Construction Cost			
Client:	City of Cedar Hill	Date:	3/7/2024		
Project:	Cedar Hill Wastewater Master Plan	Prepared By:	KJF		
KHA No.:	061075049	Checked By:	LMW/JDJ		
5.1	American Lift Station Decommission				
Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization	1	LS	\$ 10,500	\$ 10,500
2	Traffic Control	1	LS	\$ 25,000	\$ 25,000
3	Miscellaneous	1	LS	\$ 100,000	\$ 100,000
4	Erosion Control	1	LS	\$ 5,000	\$ 5,000
5	Decommission	1	LS	\$ 100,000	\$ 100,000
Basis for Cost Projection:		Subtotal:			
<input checked="" type="checkbox"/>	No Design Completed	Conting. (%,+/-)	25%	\$ 60,125	
<input type="checkbox"/>	Preliminary Design	Professional Services (%,+/-)	15%	\$ 36,075	
<input type="checkbox"/>	Final Design	Easement Acquisition		\$ -	
		Total:		\$ 337,000	
The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.					
*Total is rounded up to the nearest \$1,000.					

Kimley-Horn & Associates, Inc.		Opinion of Probable Construction Cost									
Client:	City of Cedar Hill			Date:	3/7/2024						
Project:	Cedar Hill Wastewater Master Plan			Prepared By:	KJF						
KHA No.:	061075049			Checked By:	LMW/JDJ						
6 W Parkerville 10" Gravity Line											
Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost						
1	Mobilization	1	LS	\$ 150,000	\$ 150,000						
2	Traffic Control	1	LS	\$ 25,000	\$ 25,000						
3	Miscellaneous	1	LS	\$ 175,000	\$ 175,000						
4	Erosion Control	1	LS	\$ 12,800	\$ 12,800						
5	10" Sanitary Sewer	4,100	LF	\$ 135	\$ 553,500						
6	16" Bore and Steel Casing	1,000	LF	\$ 700	\$ 700,000						
7	Sewer Line Trench Safety	4,100	LF	\$ 3	\$ 12,300						
8	Hydromulch Repair	6,300	SY	\$ 3	\$ 18,900						
9	Pavement Repair	1,700	SY	\$ 150	\$ 255,000						
10	4' Manhole	8	EA	\$ 10,000	\$ 82,000						
Basis for Cost Projection:		Subtotal:			\$ 2,034,500						
<input checked="" type="checkbox"/>	No Design Completed	Conting. (%,+/-)			\$ 508,625						
<input type="checkbox"/>	Preliminary Design	Professional Services (%,+/-)			\$ 305,175						
<input type="checkbox"/>	Final Design	Easement Acquisition			\$ 1,213,500						
		Total:			\$ 2,848,000						
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*Total is rounded up to the nearest \$1,000.											

Kimley-Horn & Associates, Inc.						Opinion of Probable Construction Cost			
Client:	City of Cedar Hill			Date:	3/7/2024				
Project:	Cedar Hill Wastewater Master Plan			Prepared By:	KJF				
KHA No.:	061075049			Checked By:	LMW/JDJ				
7 Baggett Branch Lift Station									
Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost				
1	Mobilization	1	LS	\$ 75,000	\$ 75,000				
2	Traffic Control	1	LS	\$ 35,000	\$ 35,000				
3	Miscellaneous	1	LS	\$ 100,000	\$ 100,000				
4	Erosion Control	1	LS	\$ 8,400	\$ 8,400				
5	12" Force Main	1,800	LF	\$ 150	\$ 270,000				
6	Sewer Line Trench Safety	1,800	LF	\$ 3	\$ 5,400				
7	Pavement Repair	2,400	SY	\$ 150	\$ 360,000				
8	Bypass Pumping	1	EA	\$ 250,000	\$ 250,000				
9	0.6 MGD Lift Station Upgrade	1	EA	\$ 400,000	\$ 400,000				
Basis for Cost Projection:		Subtotal:			\$ 1,103,800				
<input checked="" type="checkbox"/>	No Design Completed	Conting. (%,+/-)			25%	\$ 275,950			
<input type="checkbox"/>	Preliminary Design	Professional Services (%,+/-)			15%	\$ 165,570			
<input type="checkbox"/>	Final Design	Easement Acquisition				\$ -			
						\$ 1,545,000			
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*Total is rounded up to the nearest \$1,000.									

Kimley-Horn & Associates, Inc.		Opinion of Probable Construction Cost					
Client:	City of Cedar Hill		Date:	3/7/2024			
Project:	Cedar Hill Wastewater Master Plan		Prepared By:	KJF			
KHA No.:	061075049		Checked By:	LMW/JDJ			
8 Lake Ridge II and Lake Ridge III Lift Station Decommission 8/10/12-inch Gravity Lines							
Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost		
1	Mobilization	1	LS	\$ 158,100	\$ 158,100		
2	Traffic Control	1	LS	\$ 35,000	\$ 35,000		
3	Miscellaneous	1	LS	\$ 175,000	\$ 175,000		
4	Erosion Control	1	LS	\$ 14,700	\$ 14,700		
5	8" Sanitary Sewer	1,000	LF	\$ 100	\$ 100,000		
6	10" Sanitary Sewer	2,100	LF	\$ 135	\$ 283,500		
7	12" Sanitary Sewer	2,100	LF	\$ 250	\$ 525,000		
8	24" Bore and Steel Casing	400	LF	\$ 850	\$ 340,000		
9	Sewer Line Trench Safety	5,100	LF	\$ 3	\$ 15,300		
10	Hydromulch Repair	8,400	SY	\$ 3	\$ 25,200		
11	4' Manhole	4	EA	\$ 10,000	\$ 42,000		
12	Bypass Pumping	1	EA	\$ 250,000	\$ 250,000		
Basis for Cost Projection:		Subtotal:					
<input checked="" type="checkbox"/>	No Design Completed	Conting. (%,+/-)		25%	\$ 490,950		
<input type="checkbox"/>	Preliminary Design	Professional Services (%,+/-)		15%	\$ 294,570		
<input type="checkbox"/>	Final Design	Easement Acquisition			\$ 1,134,000		
		Total:			\$ 2,749,000		
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*Total is rounded up to the nearest \$1,000.							

Kimley-Horn & Associates, Inc.		Opinion of Probable Construction Cost							
Client:	City of Cedar Hill			Date:	3/7/2024				
Project:	Cedar Hill Wastewater Master Plan			Prepared By:	KJF				
KHA No.:	061075049			Checked By:	LMW/JDJ				
8.1 Lake Ridge II Lift Station Decommission									
Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost				
1	Mobilization	1	LS	\$ 5,000	\$ 5,000				
2	Traffic Control	1	LS	\$ 25,000	\$ 25,000				
3	Miscellaneous	1	LS	\$ 100,000	\$ 100,000				
4	Erosion Control	1	LS	\$ 5,000	\$ 5,000				
5	Decommission	1	LS	\$ 50,000	\$ 50,000				
Basis for Cost Projection:		Subtotal:			\$ 185,000				
<input checked="" type="checkbox"/>	No Design Completed	Conting. (%,+/-)			25%	\$ 46,250			
<input type="checkbox"/>	Preliminary Design	Professional Services (%,+/-)			15%	\$ 27,750			
<input type="checkbox"/>	Final Design	Easement Acquisition				\$ -			
		Total:				\$ 259,000			
The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.									
*Total is rounded up to the nearest \$1,000.									

Kimley-Horn & Associates, Inc.		Opinion of Probable Construction Cost							
Client:	City of Cedar Hill			Date:	3/7/2024				
Project:	Cedar Hill Wastewater Master Plan			Prepared By:	KJF				
KHA No.:	061075049			Checked By:	LMW/JDJ				
8.2	Lake Ridge III Lift Station Decommission								
Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost				
1	Mobilization	1	LS	\$ 5,000	\$ 5,000				
2	Traffic Control	1	LS	\$ 25,000	\$ 25,000				
3	Miscellaneous	1	LS	\$ 100,000	\$ 100,000				
4	Erosion Control	1	LS	\$ 5,000	\$ 5,000				
5	Decommission	1	LS	\$ 50,000	\$ 50,000				
Basis for Cost Projection:		Subtotal:			\$ 185,000				
<input checked="" type="checkbox"/>	No Design Completed	Conting. (%,+/-)			25%	\$ 46,250			
<input type="checkbox"/>	Preliminary Design	Professional Services (%,+/-)			15%	\$ 27,750			
<input type="checkbox"/>	Final Design	Easement Acquisition				\$ -			
		Total:				\$ 259,000			
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*Total is rounded up to the nearest \$1,000.									

Kimley-Horn & Associates, Inc.		Opinion of Probable Construction Cost					
Client:	City of Cedar Hill		Date:	3/7/2024			
Project:	Cedar Hill Wastewater Master Plan		Prepared By:	KJF			
KHA No.:	061075049		Checked By:	LMW/JDJ			
9 High Meadows Lift Station 8/10" Gravity Line							
Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost		
1	Mobilization	1	LS	\$ 150,000	\$ 150,000		
2	Traffic Control	1	LS	\$ 25,000	\$ 25,000		
3	Miscellaneous	1	LS	\$ 175,000	\$ 175,000		
4	Erosion Control	1	LS	\$ 18,800	\$ 18,800		
5	8" Sanitary Sewer	700	LF	\$ 100	\$ 70,000		
6	10" Sanitary Sewer	6,700	LF	\$ 135	\$ 904,500		
7	16" Bore and Steel Casing	600	LF	\$ 700	\$ 420,000		
8	Sewer Line Trench Safety	7,300	LF	\$ 3	\$ 21,900		
9	Hydromulch Repair	32,500	SY	\$ 3	\$ 97,500		
10	4' Manhole	15	EA	\$ 10,000	\$ 148,000		
11	Bypass Pumping	1	EA	\$ 250,000	\$ 250,000		
Basis for Cost Projection:		Subtotal:		\$ 2,280,700			
<input checked="" type="checkbox"/> No Design Completed		Conting. (%,+/-)	25%	\$ 570,175			
<input type="checkbox"/> Preliminary Design		Professional Services (%,+/-)	15%	\$ 342,105			
<input type="checkbox"/> Final Design		Easement Acquisition		\$ -			
		Total:		\$ 3,193,000			
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*Total is rounded up to the nearest \$1,000.							

Kimley-Horn & Associates, Inc.		Opinion of Probable Construction Cost			
Client:	City of Cedar Hill	Date:	3/7/2024		
Project:	Cedar Hill Wastewater Master Plan	Prepared By:	KJF		
KHA No.:	061075049	Checked By:	LMW/JDJ		
9.1	High Meadows Lift Station Decommission				
Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization	1	LS	\$ 5,500	\$ 5,500
2	Traffic Control	1	LS	\$ 25,000	\$ 25,000
3	Miscellaneous	1	LS	\$ 100,000	\$ 100,000
4	Erosion Control	1	LS	\$ 5,000	\$ 5,000
5	Decommission	1	LS	\$ 50,000	\$ 50,000
Basis for Cost Projection:		Subtotal:			
<input checked="" type="checkbox"/>	No Design Completed	Conting. (%,+/-)		25%	\$ 46,375
<input type="checkbox"/>	Preliminary Design	Professional Services (%,+/-)		15%	\$ 27,825
<input type="checkbox"/>	Final Design	Easement Acquisition			\$ -
		Total:			\$ 260,000
<p>The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.</p> <p>*Total is rounded up to the nearest \$1,000.</p>					

Kimley-Horn & Associates, Inc.						Opinion of Probable Construction Cost						
Client:	City of Cedar Hill			Date:	3/7/2024							
Project:	Cedar Hill Wastewater Master Plan			Prepared By:	KJF							
KHA No.:	061075049			Checked By:	LMW/JDJ							
10	8/15/18" West Red Oak Gravity Lines											
Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost							
1	Mobilization	1	LS	\$ 416,500	\$ 416,500							
2	Traffic Control	1	LS	\$ 25,000	\$ 25,000							
3	Miscellaneous	1	LS	\$ 250,000	\$ 250,000							
4	Erosion Control	1	LS	\$ 32,700	\$ 32,700							
5	8" Sanitary Sewer	4,900	LF	\$ 100	\$ 490,000							
6	15" Sanitary Sewer	1,700	LF	\$ 265	\$ 450,500							
7	18" Sanitary Sewer	8,200	LF	\$ 290	\$ 2,378,000							
8	Sewer Line Trench Safety	14,600	LF	\$ 3	\$ 43,800							
9	Hydromulch Repair	26,000	SY	\$ 3	\$ 78,000							
10	5' Manhole	20	EA	\$ 15,000	\$ 297,000							
11	4' Manhole	10	EA	\$ 10,000	\$ 98,000							
Basis for Cost Projection:												
<input checked="" type="checkbox"/> No Design Completed	Subtotal:			\$ 4,856,500								
<input type="checkbox"/> Preliminary Design	Conting. (%,+/-)			\$ 1,214,125								
<input type="checkbox"/> Final Design	Professional Services (%,+/-)			\$ 728,475								
	Easement Acquisition			\$ 3,888,000								
	Total:			\$ 6,799,000								
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*Total is rounded up to the nearest \$1,000.												

Kimley-Horn & Associates, Inc.		Opinion of Probable Construction Cost									
Client:	City of Cedar Hill			Date:	3/7/2024						
Project:	Cedar Hill Wastewater Master Plan			Prepared By:	KJF						
KHA No.:	061075049			Checked By:	LMW/JDJ						
11	8/12" West Red Oak Gravity Lines										
Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost						
1	Mobilization	1	LS	\$ 150,000	\$ 150,000						
2	Traffic Control	1	LS	\$ 35,000	\$ 35,000						
3	Miscellaneous	1	LS	\$ 250,000	\$ 250,000						
4	Erosion Control	1	LS	\$ 19,800	\$ 19,800						
5	8" Sanitary Sewer	6,000	LF	\$ 100	\$ 600,000						
6	12" Sanitary Sewer	1,900	LF	\$ 250	\$ 475,000						
7	Sewer Line Trench Safety	7,800	LF	\$ 3	\$ 23,400						
8	Hydromulch Repair	11,700	SY	\$ 3	\$ 35,100						
9	Pavement Repair	1,100	SY	\$ 150	\$ 165,000						
10	4' Manhole	16	EA	\$ 10,000	\$ 158,000						
Basis for Cost Projection:		Subtotal:			\$ 1,911,300						
<input checked="" type="checkbox"/>	No Design Completed	Conting. (%,+/-)			\$ 477,825						
<input type="checkbox"/>	Preliminary Design	Professional Services (%,+/-)			\$ 286,695						
<input type="checkbox"/>	Final Design	Easement Acquisition			\$ 1,744,500						
		Total:			\$ 2,676,000						
The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.											
*Total is rounded up to the nearest \$1,000.											

Opinion of Probable Construction Cost								
Client:	City of Cedar Hill	Date:	3/7/2024					
Project:	Cedar Hill Wastewater Master Plan	Prepared By:	KJF					
KHA No.:	061075049	Checked By:	LMW/JDJ					
11.1	West Red Oak Lift Station and Force Main							
Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost			
1	Mobilization	1	LS	\$ 109,060	\$ 109,060			
2	Traffic Control	1	LS	\$ 25,000	\$ 25,000			
3	Miscellaneous	1	LS	\$ 175,000	\$ 175,000			
4	Erosion Control	1	LS	\$ 9,200	\$ 9,200			
5	6" Force Main	2,200	LF	\$ 100	\$ 220,000			
6	Sewer Line Trench Safety	2,200	LF	\$ 3	\$ 6,600			
7	Hydromulch Repair	3,600	SY	\$ 3	\$ 10,800			
8	0.75 MGD Lift Station Upgrade	1	LS	\$ 800,000	\$ 800,000			
9	4' Manhole	4	EA	\$ 10,000	\$ 44,000			
Basis for Cost Projection:		Subtotal:			\$ 1,399,660			
<input checked="" type="checkbox"/>	No Design Completed	Conting. (%,+/-)			\$ 349,915			
<input type="checkbox"/>	Preliminary Design	Professional Services (%,+/-)			\$ 209,949			
<input type="checkbox"/>	Final Design	Easement Acquisition			\$ 486,000			
		Total:			\$ 1,960,000			
The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.								
*Total is rounded up to the nearest \$1,000.								

Kimley-Horn & Associates, Inc.						Opinion of Probable Construction Cost
Client:	City of Cedar Hill			Date:	3/7/2024	
Project:	Cedar Hill Wastewater Master Plan			Prepared By:	KJF	
KHA No.:	061075049			Checked By:	LMW/JDJ	
12 Loop 9 8" Gravity Main - South						
Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost	
1	Mobilization	1	LS	\$ 75,000	\$ 75,000	
2	Traffic Control	1	LS	\$ 25,000	\$ 25,000	
3	Miscellaneous	1	LS	\$ 100,000	\$ 100,000	
4	Erosion Control	1	LS	\$ 8,800	\$ 8,800	
5	8" Sanitary Sewer	2,000	LF	\$ 100	\$ 200,000	
6	Sewer Line Trench Safety	2,000	LF	\$ 3	\$ 6,000	
7	Hydromulch Repair	8,900	SY	\$ 3	\$ 26,700	
8	4' Manhole	4	EA	\$ 10,000	\$ 40,000	
Basis for Cost Projection:		Subtotal:			\$ 481,500	
<input checked="" type="checkbox"/>	No Design Completed	Conting. (%,+/-)			25%	\$ 120,375
<input type="checkbox"/>	Preliminary Design	Professional Services (%,+/-)			15%	\$ 72,225
<input type="checkbox"/>	Final Design	Easement Acquisition				\$ -
		Total:				\$ 674,000
<p>The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.</p> <p>*Total is rounded up to the nearest \$1,000.</p>						

Opinion of Probable Construction Cost					
Client:	City of Cedar Hill	Date:	3/7/2024		
Project:	Cedar Hill Wastewater Master Plan	Prepared By:	KJF		
KHA No.:	061075049	Checked By:	LMW/JDJ		
13	Loop 9 12" Gravity Main - North				
Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization	1	LS	\$ 170,580	\$ 170,580
2	Traffic Control	1	LS	\$ 25,000	\$ 25,000
3	Miscellaneous	1	LS	\$ 175,000	\$ 175,000
4	Erosion Control	1	LS	\$ 16,200	\$ 16,200
5	12" Sanitary Sewer	5,900	LF	\$ 250	\$ 1,475,000
6	Sewer Line Trench Safety	5,900	LF	\$ 3	\$ 17,700
7	Hydromulch Repair	26,300	SY	\$ 3	\$ 78,900
8	4' Manhole	12	EA	\$ 10,000	\$ 118,000
Basis for Cost Projection:		Subtotal:			\$ 2,076,380
<input checked="" type="checkbox"/>	No Design Completed	Conting. (%,+/-)	25%	\$ 519,095	
<input type="checkbox"/>	Preliminary Design	Professional Services (%,+/-)	15%	\$ 311,457	
<input type="checkbox"/>	Final Design	Easement Acquisition		\$ -	
		Total:			\$ 2,907,000

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*Total is rounded up to the nearest \$1,000.

Kimley-Horn & Associates, Inc.		Opinion of Probable Construction Cost						
Client:	City of Cedar Hill		Date:	3/7/2024				
Project:	Cedar Hill Wastewater Master Plan		Prepared By:	KJF				
KHA No.:	061075049		Checked By:	LMW/JDJ				
14 Loop 9 12" Gravity Main - North								
Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost			
1	Mobilization	1	LS	\$ 170,580	\$ 170,580			
2	Traffic Control	1	LS	\$ 25,000	\$ 25,000			
3	Miscellaneous	1	LS	\$ 175,000	\$ 175,000			
4	Erosion Control	1	LS	\$ 16,200	\$ 16,200			
5	12" Sanitary Sewer	5,900	LF	\$ 250	\$ 1,475,000			
6	Sewer Line Trench Safety	5,900	LF	\$ 3	\$ 17,700			
7	Hydromulch Repair	26,300	SY	\$ 3	\$ 78,900			
8	4' Manhole	12	EA	\$ 10,000	\$ 118,000			
Basis for Cost Projection:		Subtotal:			\$ 2,076,380			
<input checked="" type="checkbox"/>	No Design Completed	Conting. (%,+/-)		25%	\$ 519,095			
<input type="checkbox"/>	Preliminary Design	Professional Services (%,+/-)		15%	\$ 311,457			
<input type="checkbox"/>	Final Design	Easement Acquisition			\$ -			
		Total:			\$ 2,907,000			
The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.								
*Total is rounded up to the nearest \$1,000.								

Opinion of Probable Construction Cost					
Client: City of Cedar Hill	Date: 3/7/2024				
Project: Cedar Hill Wastewater Master Plan	Prepared By: KJF				
KHA No.: 061075049	Checked By: LMW/JDJ				
15 8/10/15" Bear Creek Road and South Joe Wilson Road Gravity Lines					
Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization	1	LS	\$ 219,410	\$ 219,410
2	Traffic Control	1	LS	\$ 35,000	\$ 35,000
3	Miscellaneous	1	LS	\$ 175,000	\$ 175,000
4	Erosion Control	1	LS	\$ 19,600	\$ 19,600
5	8" Sanitary Sewer	900	LF	\$ 100	\$ 90,000
6	10" Sanitary Sewer	3,100	LF	\$ 135	\$ 418,500
7	15" Sanitary Sewer	3,900	LF	\$ 265	\$ 1,033,500
9	16" Bore and Steel Casing	100	LF	\$ 700	\$ 70,000
10	Sewer Line Trench Safety	7,700	LF	\$ 3	\$ 23,100
11	Hydromulch Repair	30,800	SY	\$ 3	\$ 92,400
12	4' Manhole	8	EA	\$ 10,000	\$ 80,000
13	5' Manhole	8	EA	\$ 15,000	\$ 117,000
14	Bypass Pumping	1	EA	\$ 250,000	\$ 250,000
Basis for Cost Projection:		Subtotal:			\$ 2,623,510
<input checked="" type="checkbox"/> No Design Completed		Conting. (%,+/-)	25%		\$ 655,878
<input type="checkbox"/> Preliminary Design		Professional Services (%,+/-)	15%		\$ 393,527
<input type="checkbox"/> Final Design		Easement Acquisition			\$ -
		Total:			\$ 3,673,000
The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.					
*Total is rounded up to the nearest \$1,000.					

Opinion of Probable Construction Cost					
Client:	City of Cedar Hill	Date:	3/7/2024		
Project:	Cedar Hill Wastewater Master Plan	Prepared By:	KJF		
KHA No.:	061075049	Checked By:	LMW/JDJ		
16	East Red Oak 10" Gravity Line				
Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization	1	LS	\$ 42,080	\$ 42,080
2	Miscellaneous	1	LS	\$ 100,000	\$ 100,000
3	Erosion Control	1	LS	\$ 9,500	\$ 9,500
4	10" Sanitary Sewer	2,400	LF	\$ 135	\$ 324,000
5	Sewer Line Trench Safety	2,400	LF	\$ 3	\$ 7,200
6	Hydromulch Repair	10,700	SY	\$ 3	\$ 32,100
7	4' Manhole	5	EA	\$ 10,000	\$ 48,000
Basis for Cost Projection:		Subtotal:		\$ 562,880	
<input checked="" type="checkbox"/>	No Design Completed	Conting. (%,+/-)	25%	\$ 140,720	
<input type="checkbox"/>	Preliminary Design	Professional Services (%,+/-)	15%	\$ 84,432	
<input type="checkbox"/>	Final Design	Easement Acquisition		\$ -	
		Total:		\$ 788,000	
The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.					
*Total is rounded up to the nearest \$1,000.					

Kimley-Horn & Associates, Inc.		Opinion of Probable Construction Cost							
Client:	City of Cedar Hill			Date:	3/7/2024				
Project:	Cedar Hill Wastewater Master Plan			Prepared By:	KJF				
KHA No.:	061075049			Checked By:	LMW/JDJ				
16.1 East Red Oak Lift Station									
Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost				
1	Mobilization	1	LS	\$ 43,920	\$ 43,920				
2	Miscellaneous	1	LS	\$ 100,000	\$ 100,000				
3	Erosion Control	1	LS	\$ 5,600	\$ 5,600				
4	4" Force Main	300	LF	\$ 75	\$ 22,500				
5	Sewer Line Trench Safety	300	LF	\$ 3	\$ 900				
6	Hydromulch Repair	1,400	SY	\$ 3	\$ 4,200				
7	0.20 MGD	1	LS	\$ 400,000	\$ 400,000				
8	4' Manhole	1	EA	\$ 10,000	\$ 6,000				
Basis for Cost Projection:		Subtotal:			\$ 583,120				
<input checked="" type="checkbox"/>	No Design Completed	Conting. (%,+/-)			\$ 145,780				
<input type="checkbox"/>	Preliminary Design	Professional Services (%,+/-)			\$ 87,468				
<input type="checkbox"/>	Final Design	Easement Acquisition			\$ -				
		Total:			\$ 816,000				
The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.									
*Total is rounded up to the nearest \$1,000.									

Kimley-Horn & Associates, Inc.						Opinion of Probable Construction Cost			
Client:	City of Cedar Hill			Date:	3/7/2024				
Project:	Cedar Hill Wastewater Master Plan			Prepared By:	KJF				
KHA No.:	061075049			Checked By:	LMW/JDJ				
17 Windsor Park 8/15" Gravity Line									
Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost				
1	Mobilization	1	LS	\$ 150,000	\$ 150,000				
2	Traffic Control	1	LS	\$ 35,000	\$ 35,000				
3	Miscellaneous	1	LS	\$ 250,000	\$ 250,000				
4	Erosion Control	1	LS	\$ 19,400	\$ 19,400				
5	8" Sanitary Sewer	2,000	LS	\$ 100	\$ 200,000				
6	15" Sanitary Sewer	5,700	LF	\$ 265	\$ 1,510,500				
7	16" Bore and Steel Casing	100	LF	\$ 700	\$ 70,000				
8	Sewer Line Trench Safety	7,600	LF	\$ 3	\$ 22,800				
9	Hydromulch Repair	8,900	SY	\$ 3	\$ 26,700				
10	Pavement Repair	3,100	SY	\$ 150	\$ 465,000				
11	4' Manhole	4	EA	\$ 10,000	\$ 40,000				
12	5' Manhole	11	EA	\$ 15,000	\$ 171,000				
13	Bypass Pumping	1	EA	\$ 250,000	\$ 250,000				
Basis for Cost Projection:		Subtotal:			\$ 3,210,400				
<input checked="" type="checkbox"/>	No Design Completed	Conting. (%,+/-)			\$ 802,600				
<input type="checkbox"/>	Preliminary Design	Professional Services (%,+/-)			\$ 481,560				
<input type="checkbox"/>	Final Design	Easement Acquisition			\$ 1,701,000				
		Total:			\$ 6,196,000				
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*Total is rounded up to the nearest \$1,000.									

Kimley-Horn & Associates, Inc.		Opinion of Probable Construction Cost			
Client:	City of Cedar Hill	Date:	3/7/2024		
Project:	Cedar Hill Wastewater Master Plan	Prepared By:		KJF	
KHA No.:	061075049	Checked By:		LMW/JDJ	
17.1	Windsor Park Lift Station Decommission				
Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization	1	LS	\$ 40,500	\$ 40,500
2	Miscellaneous	1	LS	\$ 100,000	\$ 100,000
3	Erosion Control	1	LS	\$ 5,000	\$ 5,000
4	0.20 MGD	1	LS	\$ 400,000	\$ 400,000
Basis for Cost Projection:		Subtotal:			\$ 545,500
<input checked="" type="checkbox"/>	No Design Completed	Conting. (%,+/-)		25%	\$ 136,375
<input type="checkbox"/>	Preliminary Design	Professional Services (%,+/-)		15%	\$ 81,825
<input type="checkbox"/>	Final Design	Easement Acquisition			\$ -
		Total:			\$ 764,000
<p>The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.</p> <p>*Total is rounded up to the nearest \$1,000.</p>					

Kimley-Horn & Associates, Inc.		Opinion of Probable Construction Cost						
Client:	City of Cedar Hill		Date:	3/7/2024				
Project:	Cedar Hill Wastewater Master Plan		Prepared By:	KJF				
KHA No.:	061075049		Checked By:	LMW/JDJ				
18	18" Red Oak Gravity Line							
Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost			
1	Mobilization	1	LS	\$ 150,000	\$ 150,000			
2	Traffic Control	1	LS	\$ 25,000	\$ 25,000			
3	Miscellaneous	1	LS	\$ 250,000	\$ 250,000			
4	Erosion Control	1	LS	\$ 13,300	\$ 13,300			
5	18" Sanitary Sewer	4,400	LF	\$ 290	\$ 1,276,000			
6	24" Bore and Steel Casing	1,000	LF	\$ 850	\$ 850,000			
7	Sewer Line Trench Safety	4,400	LF	\$ 3	\$ 13,200			
8	Hydromulch Repair	7,700	SY	\$ 3	\$ 23,100			
9	Pavement Repair	1,200	SY	\$ 150	\$ 180,000			
10	5' Manhole	9	EA	\$ 15,000	\$ 132,000			
Basis for Cost Projection:		Subtotal:			\$ 2,912,600			
<input checked="" type="checkbox"/>	No Design Completed	Conting. (%,+/-)			\$ 728,150			
<input type="checkbox"/>	Preliminary Design	Professional Services (%,+/-)			\$ 436,890			
<input type="checkbox"/>	Final Design	Easement Acquisition			\$ 1,293,000			
		Total:			\$ 5,371,000			
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*Total is rounded up to the nearest \$1,000.								

Kimley-Horn & Associates, Inc.		Opinion of Probable Construction Cost						
Client:	City of Cedar Hill		Date:	3/7/2024				
Project:	Cedar Hill Wastewater Master Plan		Prepared By:	KJF				
KHA No.:	061075049		Checked By:	LMW/JDJ				
19	Lake Ridge Lift Station I Expansion							
Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost			
1	Mobilization	1	LS	\$ 256,850	\$ 256,850			
2	Traffic Control	1	LS	\$ 35,000	\$ 35,000			
3	Miscellaneous	1	LS	\$ 250,000	\$ 250,000			
4	Erosion Control	1	LS	\$ 11,300	\$ 11,300			
5	10" Force Main	3,300	LF	\$ 135	\$ 445,500			
6	Sewer Line Trench Safety	3,300	LF	\$ 3	\$ 9,900			
7	Hydromulch Repair	600	SY	\$ 3	\$ 1,800			
8	Pavement Repair	4,000	SY	\$ 150	\$ 600,000			
9	1.5 MGD Lift Station Expansion	1	LS	\$ 1,000,000	\$ 1,000,000			
10	Bypass Pumping	1	EA	\$ 250,000	\$ 250,000			
Basis for Cost Projection:		Subtotal:			\$ 2,860,350			
<input checked="" type="checkbox"/>	No Design Completed	Conting. (%,+/-)			\$ 715,088			
<input type="checkbox"/>	Preliminary Design	Professional Services (%,+/-)			\$ 429,053			
<input type="checkbox"/>	Final Design	Easement Acquisition			\$ 729,000			
		Total:			\$ 4,004,000			
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*Total is rounded up to the nearest \$1,000.								

Kimley-Horn & Associates, Inc.		Opinion of Probable Construction Cost						
Client:	City of Cedar Hill	Date:			3/7/2024			
Project:	Cedar Hill Wastewater Master Plan	Prepared By:			KJF			
KHA No.:	061075049	Checked By:			LMW/JDJ			
20	Autumn Run Court 10" Gravity Line Connection							
Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost			
1	Mobilization	1	LS	\$ 34,580	\$ 34,580			
2	Traffic Control	1	LS	\$ 35,000	\$ 35,000			
3	Miscellaneous	1	LS	\$ 100,000	\$ 100,000			
4	Erosion Control	1	LS	\$ 6,900	\$ 6,900			
5	10" Sanitary Sewer	1,000	LF	\$ 135	\$ 135,000			
6	Sewer Line Trench Safety	1,000	LF	\$ 3	\$ 3,000			
7	Hydromulch Repair	300	SY	\$ 3	\$ 900			
8	Pavement Repair	1,200	SY	\$ 150	\$ 180,000			
9	4' Manhole	2	EA	\$ 10,000	\$ 20,000			
Basis for Cost Projection:		Subtotal:			\$ 515,380			
<input checked="" type="checkbox"/>	No Design Completed	Conting. (%,+/-)			\$ 128,845			
<input type="checkbox"/>	Preliminary Design	Professional Services (%,+/-)			\$ 77,307			
<input type="checkbox"/>	Final Design	Easement Acquisition			\$ 300,000			
		Total:			\$ 1,022,000			
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*Total is rounded up to the nearest \$1,000.								

Kimley-Horn & Associates, Inc.						Opinion of Probable Construction Cost				
Client:	City of Cedar Hill			Date:	3/7/2024					
Project:	Cedar Hill Wastewater Master Plan			Prepared By:	KJF					
KHA No.:	061075049			Checked By:	LMW/JDJ					
21	TRA Central South 15" Gravity Main I									
Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost					
2	Traffic Control	1	LS	\$ 35,000	\$ 35,000					
3	Miscellaneous	1	LS	\$ 250,000	\$ 250,000					
4	Erosion Control	1	LS	\$ 14,500	\$ 14,500					
3	15" Sanitary Sewer	5,000	LF	\$ 265	\$ 1,325,000					
4	Sewer Line Trench Safety	5,000	LF	\$ 3	\$ 15,000					
5	Hydromulch Repair	5,000	SY	\$ 3	\$ 15,000					
6	Pavement Repair	3,700	SY	\$ 150	\$ 555,000					
7	5' Manhole	10	EA	\$ 15,000	\$ 150,000					
8	Bypass Pumping	1	EA	\$ 250,000	\$ 250,000					
Basis for Cost Projection:		Subtotal:				\$ 2,759,500				
<input checked="" type="checkbox"/>	No Design Completed	Conting. (%,+/-)		25%	\$ 689,875					
<input type="checkbox"/>	Preliminary Design	Professional Services (%,+/-)		15%	\$ 413,925					
<input type="checkbox"/>	Final Design	Easement Acquisition			\$ 1,500,000					
		Total:			\$ 5,363,000					
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*Total is rounded up to the nearest \$1,000.										

Kimley-Horn & Associates, Inc.		Opinion of Probable Construction Cost			
Client:	City of Cedar Hill		Date:	3/7/2024	
Project:	Cedar Hill Wastewater Master Plan		Prepared By:	KJF	
KHA No.:	061075049		Checked By:	LMW/JDJ	
22 Hollings Lift Station Expansion					
Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization	1	LS	\$ 196,780	\$ 196,780
2	Traffic Control	1	LS	\$ 35,000	\$ 35,000
3	Miscellaneous	1	LS	\$ 175,000	\$ 175,000
4	Erosion Control	1	LS	\$ 8,400	\$ 8,400
5	12" Force Main	1,800	LF	\$ 150	\$ 270,000
6	Sewer Line Trench Safety	1,800	LF	\$ 3	\$ 5,400
7	Hydromulch Repair	3,000	SY	\$ 3	\$ 9,000
8	1.5 MGD Lift Station Expansion	1	LS	\$ 1,500,000	\$ 1,500,000
Basis for Cost Projection:		Subtotal:			\$ 2,199,580
<input checked="" type="checkbox"/>	No Design Completed	Conting. (%,+/-)			\$ 549,895
<input type="checkbox"/>	Preliminary Design	Professional Services (%,+/-)			\$ 329,937
<input type="checkbox"/>	Final Design	Easement Acquisition			\$ 394,500
		Total:			\$ 3,079,000
<p>The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.</p> <p>*Total is rounded up to the nearest \$1,000.</p>					

Opinion of Probable Construction Cost					
Client:	City of Cedar Hill	Date:	3/7/2024		
Project:	Cedar Hill Wastewater Master Plan	Prepared By:	KJF		
KHA No.:	061075049	Checked By:	LMW/JDJ		
27	Little Creek Lift Station 8" Gravity Line				
Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization	1	LS	\$ 75,260	\$ 75,260
2	Miscellaneous	1	LS	\$ 100,000	\$ 100,000
3	Erosion Control	1	LS	\$ 11,800	\$ 11,800
4	8" Sanitary Sewer	3,600	LF	\$ 100	\$ 360,000
5	Sewer Line Trench Safety	3,600	LF	\$ 3	\$ 10,800
6	Hydromulch Repair	16,000	SY	\$ 3	\$ 48,000
7	4' Manhole	7	EA	\$ 10,000	\$ 72,000
8	Bypass Pumping	1	EA	\$ 250,000	\$ 250,000
Basis for Cost Projection:		Subtotal:			\$ 927,860
<input checked="" type="checkbox"/>	No Design Completed	Conting. (%,+/-)	25%		\$ 231,965
<input type="checkbox"/>	Preliminary Design	Professional Services (%,+/-)	15%		\$ 139,179
<input type="checkbox"/>	Final Design	Easement Acquisition			\$ -
		Total:			\$ 1,299,000
The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.					
*Total is rounded up to the nearest \$1,000.					

Kimley-Horn & Associates, Inc.		Opinion of Probable Construction Cost			
Client:	City of Cedar Hill	Date:			3/7/2024
Project:	Cedar Hill Wastewater Master Plan	Prepared By:			KJF
KHA No.:	061075049	Checked By:			LMW/JDJ
27.1	Little Creek Lift Station Decommission				
Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization	1	LS	\$ 5,500	\$ 5,500
2	Traffic Control	1	LS	\$ 25,000	\$ 25,000
3	Miscellaneous	1	LS	\$ 100,000	\$ 100,000
4	Erosion Control	1	LS	\$ 5,000	\$ 5,000
5	Decommission	1	LS	\$ 50,000	\$ 50,000
Basis for Cost Projection:		Subtotal:			
<input checked="" type="checkbox"/>	No Design Completed	Conting. (%,+/-)		25%	\$ 46,375
<input type="checkbox"/>	Preliminary Design	Professional Services (%,+/-)		15%	\$ 27,825
<input type="checkbox"/>	Final Design	Easement Acquisition			\$ -
		Total:			\$ 260,000
<p>The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.</p> <p>*Total is rounded up to the nearest \$1,000.</p>					

Opinion of Probable Construction Cost							
Client:	City of Cedar Hill	Date:	3/7/2024				
Project:	Cedar Hill Wastewater Master Plan	Prepared By:	KJF				
KHA No.:	061075049	Checked By:	LMW/JDJ				
24	Sherwood 8" Gravity Line						
Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost		
1	Mobilization	1	LS	\$ 30,590	\$ 30,590		
2	Traffic Control	1	LS	\$ 35,000	\$ 35,000		
3	Miscellaneous	1	LS	\$ 100,000	\$ 100,000		
4	Erosion Control	1	LS	\$ 8,800	\$ 8,800		
5	8" Sanitary Sewer	2,000	LF	\$ 100	\$ 200,000		
6	Sewer Line Trench Safety	2,000	LF	\$ 3	\$ 6,000		
7	Hydromulch Repair	3,300	SY	\$ 3	\$ 9,900		
8	4' Manhole	4	EA	\$ 10,000	\$ 40,000		
9	Bypass Pumping	1	EA	\$ 250,000	\$ 250,000		
Basis for Cost Projection:		Subtotal:			\$ 680,290		
<input checked="" type="checkbox"/>	No Design Completed	Conting. (%,+/-)		25%	\$ 170,073		
<input type="checkbox"/>	Preliminary Design	Professional Services (%,+/-)		15%	\$ 102,044		
<input type="checkbox"/>	Final Design	Easement Acquisition			\$ 435,000		
		Total:			\$ 952,000		
The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.							
*Total is rounded up to the nearest \$1,000.							

Kimley-Horn & Associates, Inc.		Opinion of Probable Construction Cost			
Client:	City of Cedar Hill		Date:	3/7/2024	
Project:	Cedar Hill Wastewater Master Plan		Prepared By:	KJF	
KHA No.:	061075049		Checked By:	LMW/JDJ	
24.1 Sherwood Lift Station Decommission					
Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization	1	LS	\$ 5,500	\$ 5,500
2	Traffic Control	1	LS	\$ 25,000	\$ 25,000
3	Miscellaneous	1	LS	\$ 100,000	\$ 100,000
4	Erosion Control	1	LS	\$ 5,000	\$ 5,000
5	Decommission	1	LS	\$ 50,000	\$ 50,000
Basis for Cost Projection:		Subtotal:		\$ 185,500	
<input checked="" type="checkbox"/>	No Design Completed	Conting. (%,+/-)		25%	\$ 46,375
<input type="checkbox"/>	Preliminary Design	Professional Services (%,+/-)		15%	\$ 27,825
<input type="checkbox"/>	Final Design	Easement Acquisition			\$ -
		Total:		\$ 260,000	
<p>The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.</p> <p>*Total is rounded up to the nearest \$1,000.</p>					

Kimley-Horn & Associates, Inc.						Opinion of Probable Construction Cost				
Client:	City of Cedar Hill			Date:	3/7/2024					
Project:	Cedar Hill Wastewater Master Plan			Prepared By:	KJF					
KHA No.:	061075049			Checked By:	LMW/JDJ					
25	TRA Central North 8" Gravity Line									
Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost					
1	Mobilization	1	LS	\$ 150,000	\$ 150,000					
2	Traffic Control	1	LS	\$ 35,000	\$ 35,000					
3	Miscellaneous	1	LS	\$ 175,000	\$ 175,000					
4	Erosion Control	1	LS	\$ 15,400	\$ 15,400					
5	8" Sanitary Sewer	5,500	LF	\$ 100	\$ 550,000					
6	Sewer Line Trench Safety	5,500	LF	\$ 3	\$ 16,500					
7	Hydromulch Repair	9,100	SY	\$ 3	\$ 27,300					
8	4' Manhole	11	EA	\$ 10,000	\$ 110,000					
9	Bypass Pumping	1	EA	\$ 250,000	\$ 250,000					
Basis for Cost Projection:		Subtotal:				\$ 1,329,200				
<input checked="" type="checkbox"/>	No Design Completed	Conting. (%,+/-)		25%	\$ 332,300					
<input type="checkbox"/>	Preliminary Design	Professional Services (%,+/-)		15%	\$ 199,380					
<input type="checkbox"/>	Final Design	Easement Acquisition			\$ 1,218,000					
		Total:			\$ 3,079,000					
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*Total is rounded up to the nearest \$1,000.										

Kimley-Horn & Associates, Inc.		Opinion of Probable Construction Cost				
Client:	City of Cedar Hill			Date:	3/7/2024	
Project:	Cedar Hill Wastewater Master Plan			Prepared By:	KJF	
KHA No.:	061075049			Checked By:	LMW/JDJ	
26	TRA Central South 8" Gravity Line					
Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost	
1	Mobilization	1	LS	\$ 62,370	\$ 62,370	
2	Traffic Control	1	LS	\$ 35,000	\$ 35,000	
3	Miscellaneous	1	LS	\$ 250,000	\$ 250,000	
4	Erosion Control	1	LS	\$ 19,400	\$ 19,400	
5	8" Sanitary Sewer	7,600	LF	\$ 100	\$ 760,000	
6	Sewer Line Trench Safety	7,600	LF	\$ 3	\$ 22,800	
7	Hydromulch Repair	11,300	SY	\$ 3	\$ 33,900	
8	Pavement Repair	1,100	SY	\$ 150	\$ 165,000	
9	4' Manhole	15	EA	\$ 10,000	\$ 152,000	
10	Bypass Pumping	1	EA	\$ 250,000	\$ 250,000	
Basis for Cost Projection:		Subtotal:			\$ 1,750,470	
<input checked="" type="checkbox"/>	No Design Completed	Conting. (%,+/-)			25%	\$ 437,618
<input type="checkbox"/>	Preliminary Design	Professional Services (%,+/-)			15%	\$ 262,571
<input type="checkbox"/>	Final Design	Easement Acquisition				\$ 1,693,500
		Total:				\$ 2,451,000
<p>The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.</p> <p>*Total is rounded up to the nearest \$1,000.</p>						

Kimley-Horn & Associates, Inc.						Opinion of Probable Construction Cost			
Client:	City of Cedar Hill			Date:	3/7/2024				
Project:	Cedar Hill Wastewater Master Plan			Prepared By:	KJF				
KHA No.:	061075049			Checked By:	LMW/JDJ				
28	10/12/18" Red Oak Gravity Line								
Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost				
1	Mobilization	1	LS	\$ 206,130	\$ 206,130				
2	Traffic Control	1	LS	\$ 35,000	\$ 35,000				
3	Miscellaneous	1	LS	\$ 250,000	\$ 250,000				
4	Erosion Control	1	LS	\$ 18,300	\$ 18,300				
5	10" Sanitary Sewer	2,300	LF	\$ 135	\$ 310,500				
6	12" Sanitary Sewer	1,200	LF	\$ 250	\$ 300,000				
7	18" Sanitary Sewer	3,700	LF	\$ 290	\$ 1,073,000				
8	Sewer Line Trench Safety	7,000	LF	\$ 3	\$ 21,000				
9	Hydromulch Repair	10,500	SY	\$ 3	\$ 31,500				
10	Pavement Repair	1,000	SY	\$ 150	\$ 150,000				
11	4' Manhole	5	EA	\$ 10,000	\$ 46,000				
12	5' Manhole	7	EA	\$ 15,000	\$ 111,000				
Basis for Cost Projection:		Subtotal:			\$ 2,552,430				
<input checked="" type="checkbox"/>	No Design Completed	Conting. (%,+/-)			25%	\$ 638,108			
<input type="checkbox"/>	Preliminary Design	Professional Services (%,+/-)			15%	\$ 382,865			
<input type="checkbox"/>	Final Design	Easement Acquisition				\$ 1,570,500			
		Total:				\$ 3,573,000			
The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.									
*Total is rounded up to the nearest \$1,000.									

Kimley-Horn & Associates, Inc.		Opinion of Probable Construction Cost							
Client:	City of Cedar Hill		Date:	3/7/2024					
Project:	Cedar Hill Wastewater Master Plan		Prepared By:	KJF					
KHA No.:	061075049		Checked By:	LMW/JDJ					
23	TRA Central South 15" Gravity Main II								
Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost				
1	Mobilization	1	LS	\$ 150,000	\$ 150,000				
2	Traffic Control	1	LS	\$ 25,000	\$ 25,000				
3	Miscellaneous	1	LS	\$ 175,000	\$ 175,000				
4	Erosion Control	1	LS	\$ 9,900	\$ 9,900				
5	15" Sanitary Sewer	2,600	LF	\$ 265	\$ 689,000				
6	Sewer Line Trench Safety	2,600	LF	\$ 3	\$ 7,800				
7	Hydromulch Repair	500	SY	\$ 3	\$ 1,500				
8	Pavement Repair	3,200	SY	\$ 150	\$ 480,000				
9	5' Manhole	5	EA	\$ 15,000	\$ 78,000				
10	Bypass Pumping	1	EA	\$ 250,000	\$ 250,000				
Basis for Cost Projection:		Subtotal:		\$ 1,866,200					
<input checked="" type="checkbox"/>	No Design Completed	Conting. (%,+/-)		25%	\$ 466,550				
<input type="checkbox"/>	Preliminary Design	Professional Services (%,+/-)		15%	\$ 279,930				
<input type="checkbox"/>	Final Design	Easement Acquisition			\$ 585,000				
		Total:		\$ 3,198,000					
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*Total is rounded up to the nearest \$1,000.									

Kimley-Horn & Associates, Inc.		Opinion of Probable Construction Cost			
Client:	City of Cedar Hill		Date:	3/7/2024	
Project:	Cedar Hill Wastewater Master Plan		Prepared By:	KJF	
KHA No.:	061075049		Checked By:	LMW/JDJ	
28.1	Springfield Lift Station Decommission				
Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization	1	LS	\$ 5,500	\$ 5,500
2	Traffic Control	1	LS	\$ 25,000	\$ 25,000
3	Miscellaneous	1	LS	\$ 100,000	\$ 100,000
4	Erosion Control	1	LS	\$ 5,000	\$ 5,000
5	Decommission	1	LS	\$ 50,000	\$ 50,000
Basis for Cost Projection:		Subtotal:		\$ 185,500	
<input checked="" type="checkbox"/>	No Design Completed	Conting. (%,+/-)		25%	\$ 46,375
<input type="checkbox"/>	Preliminary Design	Professional Services (%,+/-)		15%	\$ 27,825
<input type="checkbox"/>	Final Design	Easement Acquisition			\$ -
		Total:		\$ 260,000	
<p>The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.</p> <p>*Total is rounded up to the nearest \$1,000.</p>					

Kimley-Horn & Associates, Inc.						Opinion of Probable Construction Cost			
Client:	City of Cedar Hill			Date:	3/7/2024				
Project:	Cedar Hill Wastewater Master Plan			Prepared By:	KJF				
KHA No.:	061075049			Checked By:	LMW/JDJ				
29 Highlands 10/15" Gravity Line									
Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost				
1	Mobilization	1	LS	\$ 150,000	\$ 150,000				
2	Traffic Control	1	LS	\$ 35,000	\$ 35,000				
3	Miscellaneous	1	LS	\$ 250,000	\$ 250,000				
4	Erosion Control	1	LS	\$ 18,800	\$ 18,800				
5	10" Sanitary Sewer	3,100	LF	\$ 135	\$ 418,500				
6	15" Sanitary Sewer	4,300	LF	\$ 265	\$ 1,139,500				
7	24" Bore and Steel Casing	200	LF	\$ 850	\$ 170,000				
8	Sewer Line Trench Safety	7,300	LF	\$ 3	\$ 21,900				
9	Hydromulch Repair	9,800	SY	\$ 3	\$ 29,400				
10	Pavement Repair	6,900	SY	\$ 150	\$ 1,035,000				
11	4' Manhole	6	EA	\$ 10,000	\$ 62,000				
12	5' Manhole	9	EA	\$ 15,000	\$ 129,000				
13	Bypass Pumping	1	EA	\$ 250,000	\$ 250,000				
Basis for Cost Projection:		Subtotal:			\$ 3,709,100				
<input checked="" type="checkbox"/>	No Design Completed	Conting. (%,+/-)			\$ 927,275				
<input type="checkbox"/>	Preliminary Design	Professional Services (%,+/-)			\$ 556,365				
<input type="checkbox"/>	Final Design	Easement Acquisition			\$ -				
		Total:			\$ 5,193,000				
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*Total is rounded up to the nearest \$1,000.									

Kimley-Horn & Associates, Inc.		Opinion of Probable Construction Cost			
Client:	City of Cedar Hill		Date:	3/7/2024	
Project:	Cedar Hill Wastewater Master Plan		Prepared By:	KJF	
KHA No.:	061075049		Checked By:	LMW/JDJ	
29.1	Highlands Lift Station Decommission				
Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
1	Mobilization	1	LS	\$ 5,500	\$ 5,500
2	Traffic Control	1	LS	\$ 25,000	\$ 25,000
3	Miscellaneous	1	LS	\$ 100,000	\$ 100,000
4	Erosion Control	1	LS	\$ 5,000	\$ 5,000
5	Decommission	1	LS	\$ 50,000	\$ 50,000
Basis for Cost Projection:		Subtotal:		\$ 185,500	
<input checked="" type="checkbox"/>	No Design Completed	Conting. (%,+/-)		25%	\$ 46,375
<input type="checkbox"/>	Preliminary Design	Professional Services (%,+/-)		15%	\$ 27,825
<input type="checkbox"/>	Final Design	Easement Acquisition			\$ -
		Total:		\$ 260,000	
<p>The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.</p> <p>*Total is rounded up to the nearest \$1,000.</p>					

Kimley-Horn & Associates, Inc.						Opinion of Probable Construction Cost						
Client:	City of Cedar Hill			Date:	3/7/2024							
Project:	Cedar Hill Wastewater Master Plan			Prepared By:	KJF							
KHA No.:	061075049			Checked By:	LMW/JDJ							
30 Highway 67 12" Gravity Line												
Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost							
1	Mobilization	1	LS	\$ 150,000	\$ 150,000							
2	Traffic Control	1	LS	\$ 35,000	\$ 35,000							
3	Miscellaneous	1	LS	\$ 175,000	\$ 175,000							
4	Erosion Control	1	LS	\$ 14,100	\$ 14,100							
5	12" Sanitary Sewer	4,800	LF	\$ 250	\$ 1,200,000							
6	Sewer Line Trench Safety	4,800	LF	\$ 3	\$ 14,400							
7	Hydromulch Repair	5,600	SY	\$ 3	\$ 16,800							
8	Pavement Repair	2,000	SY	\$ 150	\$ 300,000							
9	4' Manhole	10	EA	\$ 10,000	\$ 96,000							
Basis for Cost Projection:												
<input checked="" type="checkbox"/> No Design Completed	Subtotal:			\$ 2,001,300								
<input type="checkbox"/> Preliminary Design	Conting. (%,+/-)			25%								
<input type="checkbox"/> Final Design	Professional Services (%,+/-)			\$ 500,325								
	Easement Acquisition			\$ 300,195								
	Total:			\$ 1,072,500								
				\$ 3,874,000								
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*Total is rounded up to the nearest \$1,000.												

Kimley-Horn & Associates, Inc.						Opinion of Probable Construction Cost
Client:	City of Cedar Hill			Date:	3/7/2024	
Project:	Cedar Hill Wastewater Master Plan			Prepared By:	KJF	
KHA No.:	061075049			Checked By:	LMW/JDJ	
31 TRA Central North 10" Gravity Main						
Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost	
1	Mobilization	1	LS	\$ 33,470	\$ 33,470	
2	Miscellaneous	1	LS	\$ 100,000	\$ 100,000	
3	Erosion Control	1	LS	\$ 8,800	\$ 8,800	
4	10" Sanitary Sewer	2,000	LF	\$ 135	\$ 270,000	
5	Sewer Line Trench Safety	2,000	LF	\$ 3	\$ 6,000	
6	Hydromulch Repair	3,300	SY	\$ 3	\$ 9,900	
7	4' Manhole	4	EA	\$ 10,000	\$ 40,000	
Basis for Cost Projection:						
<input checked="" type="checkbox"/> No Design Completed		Subtotal:			\$ 468,170	
<input type="checkbox"/> Preliminary Design		Conting. (%,+/-)	25%		\$ 117,043	
<input type="checkbox"/> Final Design		Professional Services (%,+/-)	15%		\$ 70,226	
		Easement Acquisition			\$ 438,000	
		Total:			\$ 655,000	
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*Total is rounded up to the nearest \$1,000.						

Kimley-Horn & Associates, Inc.						Opinion of Probable Construction Cost
Client:	City of Cedar Hill			Date:	3/7/2024	
Project:	Cedar Hill Wastewater Master Plan			Prepared By:	KJF	
KHA No.:	061075049			Checked By:	LMW/JDJ	
31.1 TRA Central North Lift Station						
Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost	
1	Mobilization	1	LS	\$ 43,920	\$ 43,920	
2	Miscellaneous	1	LS	\$ 100,000	\$ 100,000	
3	Erosion Control	1	LS	\$ 5,600	\$ 5,600	
4	4" Force Main	300	LF	\$ 75	\$ 22,500	
5	Sewer Line Trench Safety	300	LF	\$ 3	\$ 900	
6	Hydromulch Repair	1,400	SY	\$ 3	\$ 4,200	
7	0.20 MGD	1	LS	\$ 400,000	\$ 400,000	
8	4' Manhole	1	EA	\$ 10,000	\$ 6,000	
Basis for Cost Projection:		Subtotal:			\$ 583,120	
<input checked="" type="checkbox"/>	No Design Completed	Conting. (%,+/-)			\$ 145,780	
<input type="checkbox"/>	Preliminary Design	Professional Services (%,+/-)			\$ 87,468	
<input type="checkbox"/>	Final Design	Easement Acquisition			\$ -	
		Total:			\$ 816,000	
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Kimley-Horn & Associates, Inc.		Opinion of Probable Construction Cost					
Client:	City of Cedar Hill		Date:	3/7/2024			
Project:	Cedar Hill Wastewater Master Plan		Prepared By:	KJF			
KHA No.:	061075049		Checked By:	LMW/JDJ			
32	TRA Central North Connection 15" Gravity Main						
Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost		
1	Mobilization	1	LS	\$ 150,000	\$ 150,000		
2	Traffic Control	1	LS	\$ 25,000	\$ 25,000		
3	Miscellaneous	1	LS	\$ 250,000	\$ 250,000		
4	Erosion Control	1	LS	\$ 13,700	\$ 13,700		
5	15" Sanitary Sewer	4,600	LF	\$ 265	\$ 1,219,000		
6	Sewer Line Trench Safety	4,600	LF	\$ 3	\$ 13,800		
7	Hydromulch Repair	3,100	SY	\$ 3	\$ 9,300		
8	Pavement Repair	4,300	SY	\$ 150	\$ 645,000		
9	5' Manhole	9	EA	\$ 15,000	\$ 138,000		
10	Bypass Pumping	1	EA	\$ 250,000	\$ 250,000		
Basis for Cost Projection:		Subtotal:		\$ 2,713,800			
<input checked="" type="checkbox"/>	No Design Completed	Conting. (%,+/-)		25%	\$ 678,450		
<input type="checkbox"/>	Preliminary Design	Professional Services (%,+/-)		15%	\$ 407,070		
<input type="checkbox"/>	Final Design	Easement Acquisition			\$ 1,380,000		
		Total:			\$ 5,179,000		
The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.							
*Total is rounded up to the nearest \$1,000.							

**APPENDIX C – OPINION OF PROBABLE CONSTRUCTION COSTS
(WASTEWATER – INFILL EVALUATION)**

Kimley-Horn & Associates, Inc.						Opinion of Probable Construction Cost
Client:	City of Cedar Hill			Date:	2/2/2024	
Project:	Cedar Hill Wastewater Master Plan			Prepared By:	JDJ	
KHA No.:	061075049			Checked By:	LMW/JDJ	
1	Septic Area 1					
Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost	
Segment A						
1	Mobilization	1	LS	\$ 4,595	\$ 4,595	
2	Traffic Control	1	LS	\$ 25,000	\$ 25,000	
3	Erosion Control	1	LS	\$ 10,700	\$ 10,700	
4	8" Sanitary Sewer	3,000	LF	\$ 100	\$ 300,000	
5	Sewer Line Trench Safety	3,000	LF	\$ 3	\$ 9,000	
6	Pavement Repair	1,700	SY	\$ 150	\$ 255,000	
7	4' Manhole	6	EA	\$ 10,000	\$ 60,000	
					Subtotal	\$ 664,295
Segment B						
1	Mobilization	1	LS	\$ 60,433	\$ 60,433	
2	Traffic Control	1	LS	\$ 25,000	\$ 25,000	
3	Erosion Control	1	LS	\$ 18,300	\$ 18,300	
4	8" Sanitary Sewer	7,000	LF	\$ 100	\$ 700,000	
5	Sewer Line Trench Safety	7,000	LF	\$ 3	\$ 21,000	
6	Pavement Repair	3,100	SY	\$ 150	\$ 465,000	
7	Hydromulch Repair	900	SY	\$ 3	\$ 2,700	
8	4' Manhole	14	EA	\$ 10,000	\$ 140,000	
9	4" Force Main	4,500	LF	\$ 75	\$ 337,500	
10	Lift Station	1	EA	\$ 200,000	\$ 200,000	
11	Easement Acquisition	1	EA	\$ 350,000	\$ 350,000	
12	16" Bore and Steel Casing	300	LF	\$ 700	\$ 210,000	
					Subtotal	\$ 2,529,933
Segment C						
1	Mobilization	1	LS	\$ 24,883	\$ 24,883	
2	Traffic Control	1	LS	\$ 25,000	\$ 25,000	
3	Erosion Control	1	LS	\$ 13,500	\$ 13,500	
4	8" Sanitary Sewer	4,500	LF	\$ 100	\$ 450,000	
5	Sewer Line Trench Safety	4,500	LF	\$ 3	\$ 13,500	
6	Pavement Repair	2,500	SY	\$ 150	\$ 375,000	
7	4' Manhole	9	EA	\$ 10,000	\$ 90,000	
8	4" Force Main	3,500	LF	\$ 75	\$ 262,500	
9	Lift Station	1	EA	\$ 200,000	\$ 200,000	
					Subtotal	\$ 1,454,383
Basis for Cost Projection:		Subtotal:			\$ 4,648,611	
<input checked="" type="checkbox"/>	No Design Completed	Conting. (%,+/-)			\$ 1,162,153	
<input type="checkbox"/>	Preliminary Design	Professional Services (%,+/-)			\$ 697,292	
<input type="checkbox"/>	Final Design	Total:			\$ 6,508,100	
The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.						

Client:	City of Cedar Hill	Date:	2/2/2024
Project:	Cedar Hill Wastewater Master Plan	Prepared By:	JDJ
KHA No.:	061075049	Checked By:	LMW/JDJ
2 Septic Area 2			

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
Segment D					
1	Mobilization	1	LS	\$ 4,165	\$ 4,165
2	Traffic Control	1	LS	\$ 25,000	\$ 25,000
3	Erosion Control	1	LS	\$ 6,400	\$ 6,400
4	8" Sanitary Sewer	750	LF	\$ 100	\$ 75,000
5	Sewer Line Trench Safety	750	LF	\$ 3	\$ 2,250
6	Pavement Repair	500	SY	\$ 150	\$ 75,000
7	4' Manhole	2	EA	\$ 10,000	\$ 15,000
				Subtotal	\$ 202,815
Segment E					
1	Mobilization	1	LS	\$ 20,706	\$ 20,706
2	Traffic Control	1	LS	\$ 25,000	\$ 25,000
3	Erosion Control	1	LS	\$ 11,100	\$ 11,100
4	8" Sanitary Sewer	3,200	LF	\$ 100	\$ 320,000
5	Sewer Line Trench Safety	3,200	LF	\$ 3	\$ 9,600
6	Pavement Repair	1,400	SY	\$ 150	\$ 210,000
7	Hydromulch Repair	400	SY	\$ 3	\$ 1,200
8	4' Manhole	6	EA	\$ 10,000	\$ 64,000
9	Easement Acquisition	1	EA	\$ 160,000	\$ 160,000
10	16" Bore and Steel Casing	300	LF	\$ 700	\$ 210,000
				Subtotal	\$ 1,031,606
Basis for Cost Projection:		Subtotal:			
<input checked="" type="checkbox"/>	No Design Completed	Conting. (%,+/-)			
<input type="checkbox"/>	Preliminary Design	25%			
<input type="checkbox"/>	Final Design	Professional Services (%,+/-)			
		Total:			
		\$ 1,234,421			
		\$ 308,605			
		\$ 185,163			
		\$ 1,728,200			

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Client:	City of Cedar Hill	Date:	2/2/2024
Project:	Cedar Hill Wastewater Master Plan	Prepared By:	JDJ
KHA No.:	061075049	Checked By:	LMW/JDJ
3	Septic Area 3		

Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost
Segment F					
1	Mobilization	1	LS	\$ 4,325	\$ 4,325
2	Traffic Control	1	LS	\$ 25,000	\$ 25,000
3	Erosion Control	1	LS	\$ 8,000	\$ 8,000
4	8" Sanitary Sewer	1,600	LF	\$ 100	\$ 160,000
5	Sewer Line Trench Safety	1,600	LF	\$ 3	\$ 4,800
6	Pavement Repair	900	SY	\$ 150	\$ 135,000
7	4' Manhole	3	EA	\$ 10,000	\$ 32,000
				Subtotal	\$ 369,125
Segment G					
1	Mobilization	1	LS	\$ 4,325	\$ 4,325
2	Traffic Control	1	LS	\$ 25,000	\$ 25,000
3	Erosion Control	1	LS	\$ 8,000	\$ 8,000
4	8" Sanitary Sewer	1,600	LF	\$ 100	\$ 160,000
5	Sewer Line Trench Safety	1,600	LF	\$ 3	\$ 4,800
6	Pavement Repair	3,100	SY	\$ 150	\$ 465,000
7	4' Manhole	3	EA	\$ 10,000	\$ 32,000
				Subtotal	\$ 699,125
Segment H					
1	Mobilization	1	LS	\$ 4,175	\$ 4,175
2	Traffic Control	1	LS	\$ 25,000	\$ 25,000
3	Erosion Control	1	LS	\$ 6,500	\$ 6,500
4	8" Sanitary Sewer	800	LF	\$ 100	\$ 80,000
5	Sewer Line Trench Safety	800	LF	\$ 3	\$ 2,400
6	Pavement Repair	500	SY	\$ 150	\$ 75,000
7	4' Manhole	2	EA	\$ 10,000	\$ 16,000
				Subtotal	\$ 209,075
Segment I					
1	Mobilization	1	LS	\$ 14,263	\$ 14,263
2	Traffic Control	1	LS	\$ 25,000	\$ 25,000
3	Erosion Control	1	LS	\$ 7,300	\$ 7,300
4	8" Sanitary Sewer	1,200	LF	\$ 100	\$ 120,000
5	Sewer Line Trench Safety	1,200	LF	\$ 3	\$ 3,600
6	Pavement Repair	700	SY	\$ 150	\$ 105,000
7	4' Manhole	2	EA	\$ 10,000	\$ 24,000
8	4" Force Main	1,100	LF	\$ 75	\$ 82,500
9	Lift Station	1	EA	\$ 100,000	\$ 100,000
				Subtotal	\$ 442,400
Basis for Cost Projection:		Subtotal:			\$ 1,758,989
<input checked="" type="checkbox"/> No Design Completed		Conting. (%,+/-)	25%		\$ 439,747
<input type="checkbox"/> Preliminary Design		Professional Services (%,+/-)	15%		\$ 263,848
<input type="checkbox"/> Final Design		Total:			\$ 2,462,600

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Kimley-Horn & Associates, Inc.					Opinion of Probable Construction Cost		
Client:	City of Cedar Hill					Date:	2/2/2024
Project:	Cedar Hill Wastewater Master Plan					Prepared By:	JDJ
KHA No.:	061075049					Checked By:	LMW/JDJ
4	Septic Area 4						
Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost		
Segment J							
1	Mobilization	1	LS	\$ 4,215	\$ 4,215		
2	Traffic Control	1	LS	\$ 25,000	\$ 25,000		
3	Erosion Control	1	LS	\$ 6,900	\$ 6,900		
4	8" Sanitary Sewer	1,000	LF	\$ 100	\$ 100,000		
5	Sewer Line Trench Safety	1,000	LF	\$ 3	\$ 3,000		
6	Pavement Repair	600	SY	\$ 150	\$ 90,000		
7	4' Manhole	2	EA	\$ 10,000	\$ 20,000		
					<i>Subtotal</i>	\$ 249,115	
Segment K							
1	Mobilization	1	LS	\$ 4,155	\$ 4,155		
2	Traffic Control	1	LS	\$ 25,000	\$ 25,000		
3	Erosion Control	1	LS	\$ 6,300	\$ 6,300		
4	8" Sanitary Sewer	700	LF	\$ 100	\$ 70,000		
5	Sewer Line Trench Safety	700	LF	\$ 3	\$ 2,100		
6	Pavement Repair	400	SY	\$ 150	\$ 60,000		
7	4' Manhole	1	EA	\$ 10,000	\$ 14,000		
					<i>Subtotal</i>	\$ 181,555	
Basis for Cost Projection:		Subtotal:			\$ 430,671		
<input checked="" type="checkbox"/>	No Design Completed	Conting. (%,+/-)			25%	\$ 107,668	
<input type="checkbox"/>	Preliminary Design	Professional Services (%,+/-)			15%	\$ 64,601	
<input type="checkbox"/>	Final Design	Total:				\$ 602,900	
The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.							

Kimley-Horn & Associates, Inc.					Opinion of Probable Construction Cost		
Client:	City of Cedar Hill					Date:	2/2/2024
Project:	Cedar Hill Wastewater Master Plan					Prepared By:	JDJ
KHA No.:	061075049					Checked By:	LMW/JDJ
5	Septic Area 5						
Item No.	Item Description	Quantity	Unit	Unit Price	Item Cost		
Segment L							
1	Mobilization	1	LS	\$ 4,785	\$ 4,785		
2	Traffic Control	1	LS	\$ 25,000	\$ 25,000		
3	Erosion Control	1	LS	\$ 12,600	\$ 12,600		
4	8" Sanitary Sewer	4,000	LF	\$ 100	\$ 400,000		
5	Sewer Line Trench Safety	4,000	LF	\$ 3	\$ 12,000		
6	Pavement Repair	2,300	SY	\$ 150	\$ 345,000		
7	4' Manhole	8	EA	\$ 10,000	\$ 80,000		
					Subtotal	\$ 879,385	
Segment M							
1	Mobilization	1	LS	\$ 4,495	\$ 4,495		
2	Traffic Control	1	LS	\$ 25,000	\$ 25,000		
3	Erosion Control	1	LS	\$ 9,700	\$ 9,700		
4	8" Sanitary Sewer	2,500	LF	\$ 100	\$ 250,000		
5	Sewer Line Trench Safety	2,500	LF	\$ 3	\$ 7,500		
6	Pavement Repair	1,400	SY	\$ 150	\$ 210,000		
7	4' Manhole	5	EA	\$ 10,000	\$ 50,000		
8	Easement Acquisition	1	EA	\$ 70,000	\$ 70,000		
					Subtotal	\$ 626,695	
Basis for Cost Projection:		Subtotal:				\$ 1,506,081	
<input checked="" type="checkbox"/>	No Design Completed	Conting. (%,+/-)			25%	\$ 376,520	
<input type="checkbox"/>	Preliminary Design	Professional Services (%,+/-)			15%	\$ 225,912	
<input type="checkbox"/>	Final Design						
		Total:				\$ 2,108,500	
The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.							

APPENDIX D – XAK PACK REPORT

Pump Station Evaluation Report

City of Cedar Hill – Flameleaf Pump Station

Prepared For:



Prepared By:

Kimley»Horn

Texas Board of Professional Engineers
Firm Registration No. F-928

Evaluation Date:

April 4, 2023

Report Date:

August 14, 2023

Version 2



Version	Publish Date	Description
1	See Cover	Original/Version 1
2	8/14/2023	Updated Recommendations

Table 0.1 - Revision History

Version	Publish Date	Test Date	Description

Table 0.2 - Previous Evaluation History

This document, together with the concepts and designs presented herein, as an instrument of service, is intended only for the specific purpose and client for which it was prepared. Reuse of and improper reliance on this document without written authorization and adaptation by Kimley-Horn shall be without liability to Kimley-Horn.

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ATTACHMENTS

Attachment 1.....	Test Data Graphs
Attachment 2.....	Supplementary Pump Information
Attachment 3.....	Record Drawings

ABBREVIATIONS

Ø	Phase
AC	Alternating Current
ADD	Automated Draw Down
ADF	Average Daily Flow
ARR	Automated Rate of Rise
ATL	Across The Line
Avg	Average
BEP	Best Efficiency Point
CL	Center Line
Disch	Discharge
ETM	Elapsed Time Meter
FLA	Full Load Amps
FM	Force Main
Ft	Feet
FPS	Feet Per Second
FSFO	Full Speed Full Open
Gal	Gallons
GPM	Gallons Per Minute
HGL	Hydraulic Grade Line
HP	Horsepower
Hrs	Hours
H:M:S	Hours:Minutes:Seconds
Hz	Hertz
In	Inches
InvIn	Invert In
KWH	Kilowatt-Hours
L	Length
L1, L2, L3	Leg 1, 2 & 3 or Length 1, 2 & 3
MSL	Mean Sea Level
MTBF	Mean Time Between Failures
N	Neutral
P	Pump
PCL	Pump Center Line
PCP	Pump Control Panel
PF	Power Factor
PSI	Pounds Per Square Inch
PT	Point
RPM	Revolutions Per Minute
TDH	Total Dynamic Head
TVSS	Transient Voltage Surge Suppressor
V	Volts
VFD	Variable Frequency Drive
WTW	Wire To Water
WW	Wet Well
Yr	Year

1 INTRODUCTION

Kimley-Horn and Associates, Inc. evaluated the pump station through pump performance testing and a condition assessment. This report summarizes the data and results of that evaluation. The performance tests were conducted using the XAK-PACK pump performance monitoring device. The following pages provide summaries of the data collected and notes about the pumps' performance.

1.1 SITE INFORMATION

Site Name/Number:	Flameleaf		
Date of Evaluation:	4/4/2023		
Address:	300 Flameleaf Place, Cedar Hill, TX		
Coordinates:	32.62771, -96.95436		
Fluid Conveyed:	Potable Water		
Station Style:	Outdoor High Service Pumps		
Number of Pumps:	5	Number of Pump Slots:	5
Firm Capacity (Design):	11,200 GPM / 16.13 MGD		
Firm Capacity (Test):	11,775 GPM / 16.96 MGD		
Pump Type:	Vertical Turbine		
Pump Manufacturer:	Fairbanks/Johnston		
Year of Construction / Rehabilitation:	Circa 1986	Based on:	<input checked="" type="checkbox"/> Record Drawings <input type="checkbox"/> Field Observation <input type="checkbox"/> Other
Basin/Zone:	Upper Pressure Plane		
Ground Storage Size:	8.0 MG Flameleaf & 3.0 MG Summit		
Ground Storage Material:	Concrete		
Electrical Service:	240/480 Wye		
Site Generator:	Generator and ATS on Site (Unknown Capacity)		
Bypass Ability:	No Bypass Present		
VFD Motors:	Robicon (Pump #0)		
Flow Meter Type:	Vortex Flow Meter		
Miscellaneous Features:	N/A		

1.2 SITE MAPS



Figure 1.1 - Site Location Map

Legend

- 1 - Flameleaf Pump Station
- 2 - Sunset Ground Storage Tank

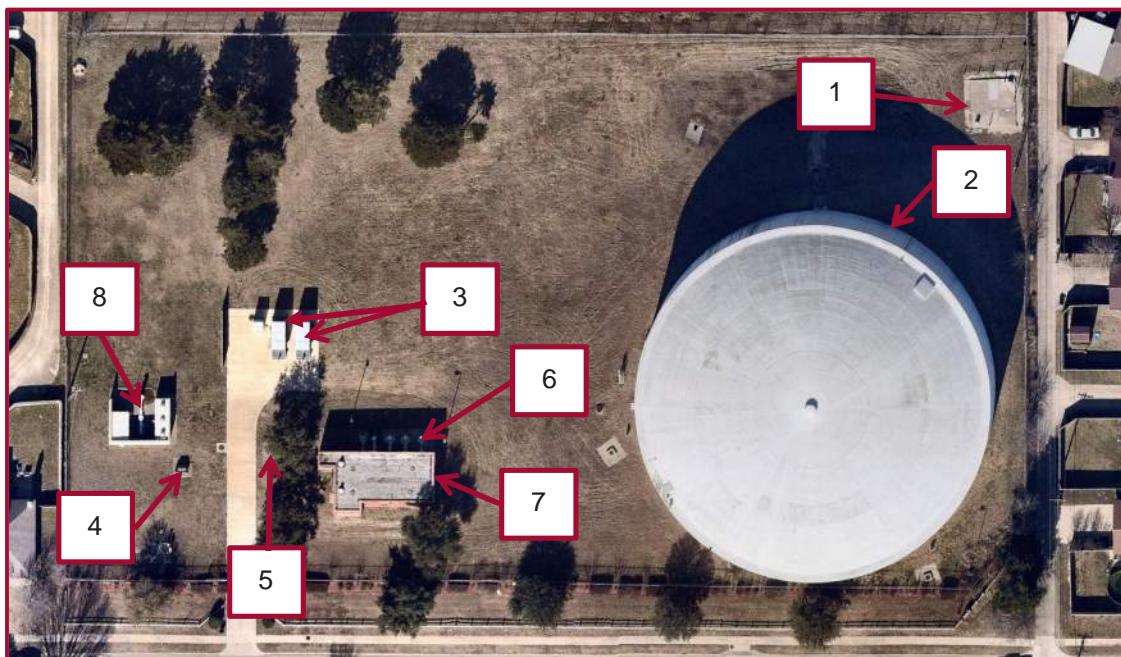


Figure 1.2 - Site Layout

Legend

- 1 – DWU Supply Line Vault
- 2 – 8.0 MG Ground Storage Tank
- 3 – Generators
- 4 – Discharge Meter Vault
- 5 – Discharge Valve Vault
- 6 – Outdoor Vertical Turbine Pumps
- 7 – Pump Station and Electrical Building
- 8 – Supplementary Summit Pump Station and Electrical Room

2 GENERAL PHOTOS

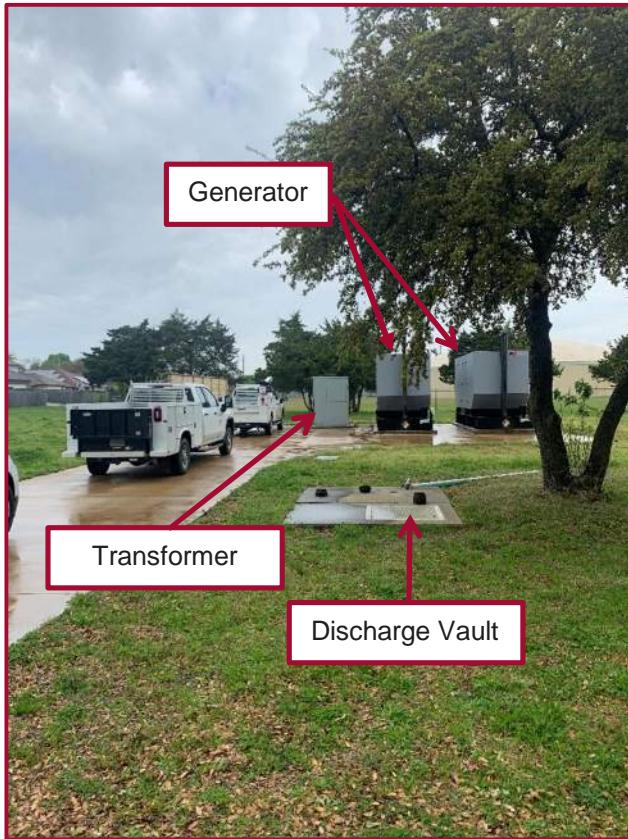


Photo 2.1 – Site Photo

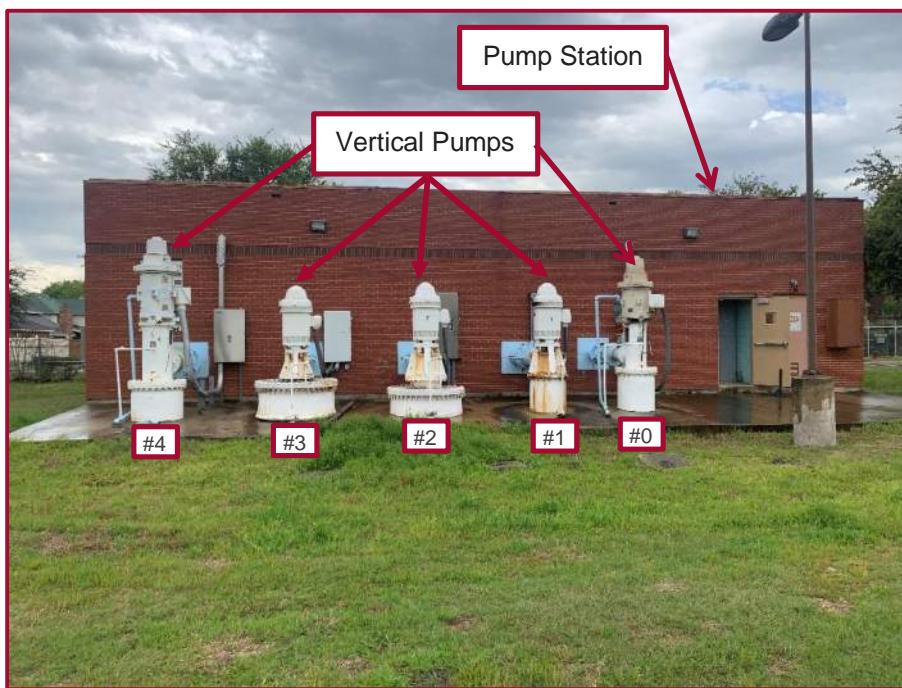


Photo 2.2 – Site Photo



Photo 2.3 – Pump Station Building



Photo 2.4 – Pump Station Building



Photo 2.5 – Pump Station Building



Photo 2.6 – Discharge Vault



Photo 2.7 – Flow Meter Vault



Photo 2.8 – Flow Meter Control Panel



Photo 2.9 – Summit Vertical Turbine Pump



Photo 2.10 – Summit Pump Discharge Piping



Photo 2.11 – 8.0 MG Ground Storage Tank



Photo 2.12 – Site Access

3 CONDITION ASSESSMENT

A condition assessment was conducted of all the pump station's major components. The condition assessment consisted of onsite observations and digital photography. A summary of the assessment is provided in the tables below and is broken into three major categories: civil, mechanical, and electrical. Each major category is made up of multiple components. Each component was given a condition score of 0 to 5. **Table 3.1 - Condition Assessment Score Descriptions** provides a description of what each condition score represents. Scores are representative of the worst condition observed at the pump station for a component type. In some cases, multiple items may be represented on a single line and will be indicated as such in the description. Where available, photos are provided for items with a score greater than or equal to 4 or if an item requires a visual reference.

Condition Score	Score Description
Blank	Not Applicable
0	Component doesn't exist but is applicable.
1	Component is like new showing no signs of wear or damage. Fully functional. The likelihood of failure is very low.
2	Component is fully functional, lightly used with minimal signs of wear, damage and corrosion. The likelihood of failure is low.
3	Component has moderate signs of wear, damage, and corrosion expected after several years of service. Component may have minorly reduced functionality but does not appear to be in danger of failure.
4	Component has significant signs of wear, damage, or corrosion. Component has limited functionality and appears to be in danger of failure if issues are not addressed.
5	Component is in imminent danger of failure or has already failed. Functionality is reduced to marginal levels, or is completely non-functional. The likelihood of failure is extremely high.

Table 3.1 - Condition Assessment Score Descriptions

3.1 CIVIL COMPONENTS

Component	Score	Description
Access	3	
Drainage	3	
Bypass Pumping	0	Not Present
Security	3	6' chain link fence with 3-strand barbed wire. Motorized sliding gate
Serviceability	4	CLA-VAL and isolation valves difficult to access between discharge piping
Flood	3	
Site	3	
Structures	4	Discharge vault was completely flooded
Penetrations/Joints	3	
Ground Storage Tank	3	
Civil Other	4	Pump #4 wooden pipe support

Table 3.2 - Civil Components Condition Scores

Civil Condition Photos

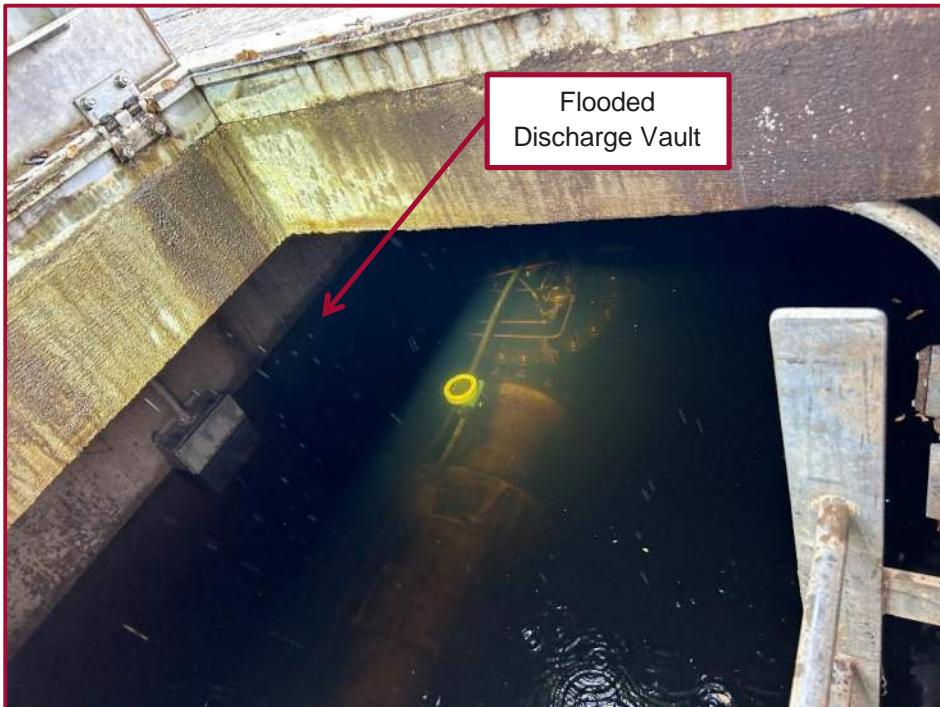


Photo 3.1 – Discharge Valve Vault Flooding



Photo 3.2 – Wooden Pipe Support

MECHANICAL COMPONENTS

Component	Score	Description
Bolts	4	Bolts located outside with pump have major corrosion
Fittings	3	
Hardware	3	
Piping – Suction	3	
Piping – Discharge	3	
Pumps	4	Pump exposed shaft is corroded, seal water accumulation is causing plant growth around pump shaft
Valves – Pump Control	4	Control valve experiences excessive leaking and has major corrosion on the body. Control Valve on Pump #1 slams shut.
Valves – Isolation	3	Isolation valves are oversized and difficult to operate. Isolation valves are placed downstream of reducer increasing pipe diameter.
Valves – Other	3	
Ventilation/HVAC	4	A/C unit appears to be undersized for the pump station
Mechanical – Other	3	

Table 3.3 - Mechanical Components Condition Scores

Mechanical Condition Photos



Photo 3.3 – Summit Pump Bolt Corrosion



Photo 3.4 – Pump #3 Corrosion



Photo 3.5 – Pump Seal Leak and Shaft Corrosion



Photo 3.6 – Pump Seal Leak and Shaft Corrosion



Photo 3.7 – Undersized A/C Unit

3.2 ELECTRICAL COMPONENTS

Component	Score	Description
Conduits	3	
Control Panel	3	
Generator	3	
Lighting	3	
Motor Starters	3	
Panels	3	
RTU	3	
TVSS	3	
Wiring	3	
Electrical - Other	4	Electrical equipment is aged and are recommended to be inspected.

Table 3.4 - Electrical Components Condition Scores

4 PUMP PERFORMANCE TESTS

Pump performance tests were conducted on the pumps utilizing the measurement tools detailed below.

Table 4.1 - Measurement Methods describes the measurements taken during the test and the measurement method. Some measurements were confirmed utilizing a secondary measurement method. See **Attachment 1** for graphs of the digitally recorded data. For each test, note the following:

1. Common accuracies for measurements of flow, pressure, voltage and current are $\pm 1\%$.
2. Friction loss is calculated using the Hazen-Williams formula and the Bernoulli equation. Piping characteristics are based on best available data.

Parameter	Measurement Method	
	Primary	Secondary
Flow	Flow Meter (XAK-PACK)	Flow Meter Output Recordings
Pressure	Pressure Transducer (XAK-PACK)	Liquid Filled Pressure Gauge
Pump Speed	Tachometer (XAK-PACK)	Handheld Tachometer
Volts	Voltage Probes (XAK-PACK)	Fluke 376FC
Amps	Current Transducers (XAK-PACK)	Fluke 376FC
Power Factor	Power Factor Monitor (XAK-PACK)	N/A

Table 4.1 - Measurement Methods

4.1 PUMP #0

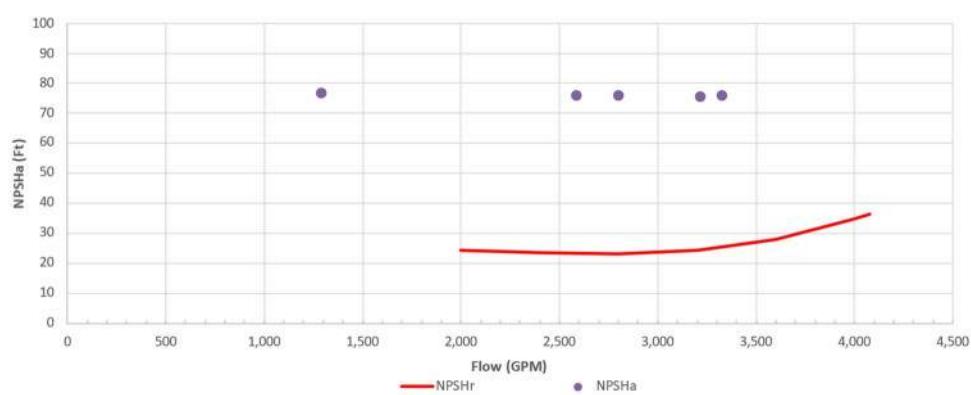
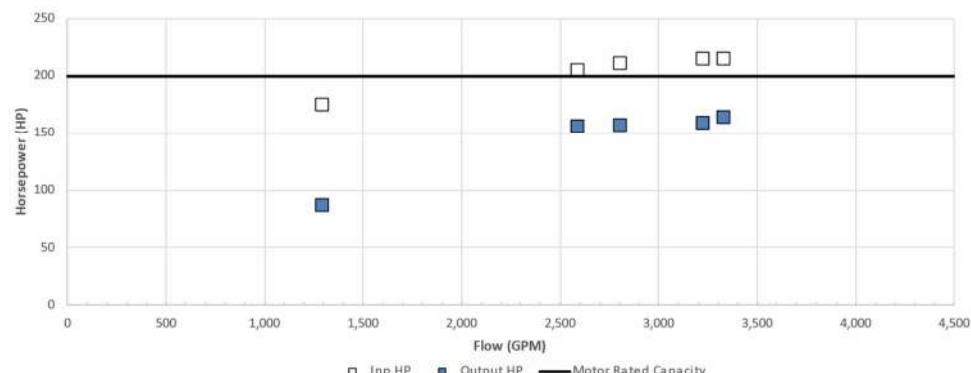
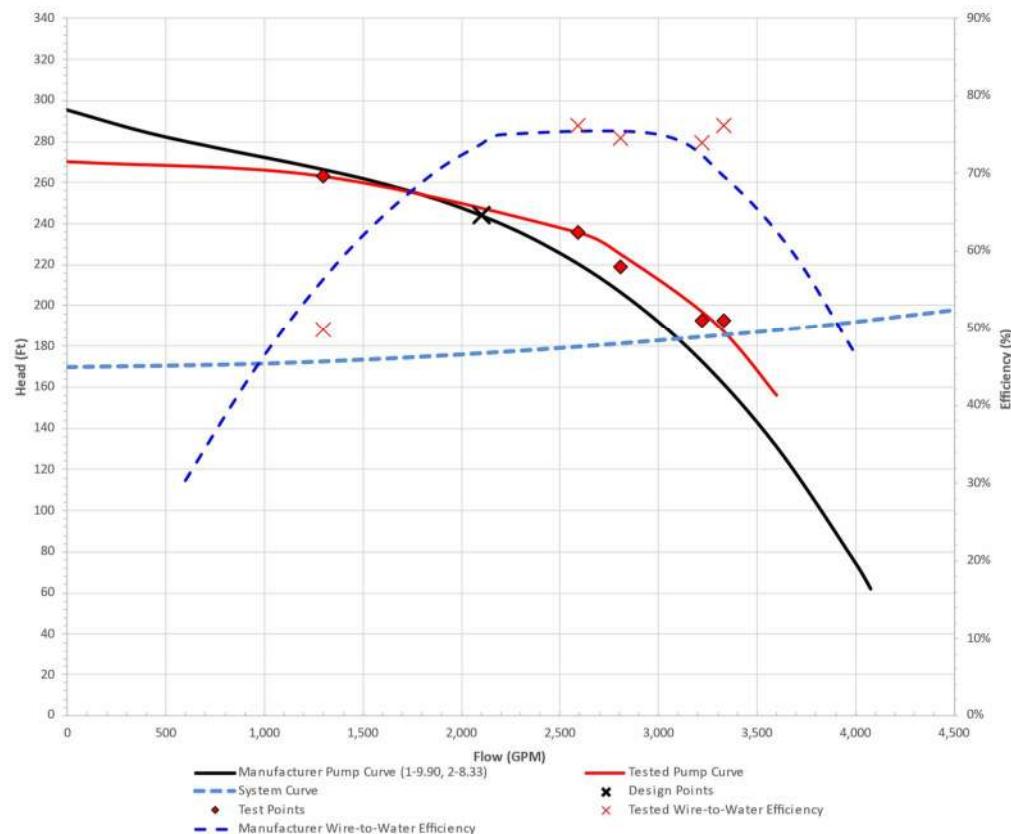
Below is a summary of the pump characteristics and performance test results.

Parameter	Units	Value
Pump		
<i>Pump Information</i>		
Manufacturer	-	Fairbanks/Morse
Model	-	7000AW – 15H
Style	-	Vertical Turbine
# of Stages	-	3
Impeller Diameter	Inches	1 – 9.90 / 2 – 8.33
<i>Pump Rated/Design Characteristics</i>		
Flow Capacity	GPM	2,100
Head	Ft	244
Hydraulic Efficiency	%	77.7
Wire-to-Water Efficiency	%	73.8
Net-Positive Suction-Head Required	Ft	24.0
<i>Pump Characteristics at Best-Efficiency Point</i>		
Flow Capacity	GPM	2,615
Head	Ft	220
Hydraulic Efficiency	%	80.3
Wire-to-Water Efficiency	%	76.3
Net-Positive Suction-Head Required	Ft	23.4
Motor		
Manufacturer	-	GE Motors
Model	-	NXG90457A
Synchronous Speed	RPM	1800
Rated Speed	RPM	1785
No. Phases	No	3
Starter	-	Variable Frequency Drive
Rated Voltage	Volts	460
Rated Horsepower	HP	200
Service Factor	-	1.15
Full Load Amps	Amps	221.0
Efficiency @ Design Point	%	95.0
Efficiency @ Operating Point	%	95.0

Table 4.2 - Pump #0 Design Characteristics



Photo 4.1 - Pump #0 (Western Pump)


Table 4.3 - Pump #0 Test Results Graphs

	Parameter	Units	Lower Limit	Test Value	Upper Limit	Anticipated	Comment
Measured	Discharge Flow	GPM	-	3,276	-	2,100	1
	Total Dynamic Head	Ft	-	192.5	-	244	
	Wire-to-Water Efficiency	%	-	75.0%	-	73.8	
	Input Horsepower	HP	-	214.5	200	200	
	Current Draw	Amps	-	192.7	221	-	
	Vibration	IPS	-		0.15	-	
	Suction Velocity	FPS	2	3.8	5	-	
	Discharge Velocity	FPS	2	13.4	8	-	2
	Rotational Speed	RPM	-	1786	-	1785	
	Net-Positivity Suction-Head Available	Ft	24.6	75.3	N/A	-	
Compared	<i>Pump</i>						
	Discharge Flow	%	80%	125%	115%	-	3
	Total Dynamic Head	%	-	78.9%	-	-	
	Wire-to-Water Efficiency	%	-5%	2.7%	5%	-	
	Net-Positive Suction-Head Available	Ft	24.6	75.3	N/A	-	
	<i>Motor</i>						
	Input Frequency	%	-5%	0.0%	5%	-	
	Input Voltage (L-L)	%	-10%	4.6%	10%	-	
	Voltage Imbalance	%	-10%	0.6%	10%	-	
	Current Imbalance	%	-10%	4.5%	10%	-	
Observed	Full Load Amps	%	50%	87.2%	105%	-	
	Load	%	50%	107.2%	115%	-	4
	Surge	1-5	1	3	3	-	
	Vibration	1-5	1	3	3	-	
	Cavitation	1-5	1	3	3	-	
	Mechanical Noise	1-5	1	3	3	-	
	Leaks	1-5	1	3	3	-	
	Exterior Condition	1-5	1	3	3	-	
	Overall Score	1-5	1	3	3	-	

Table 4.4 - Pump #0 Test Summary

Pump #0 - Test Comments

1. The pump is operating at a flow that is much greater than the design flow. The cause of this could be attributed to an increase in transmission pipe sizing throughout the City that has consequently flattened out the system curve and caused the pump to run on the right hand side of the curve.
2. The discharge velocity is greater than the recommended maximum value of 8 ft/s. The increase in velocity causes a significant amount of head loss to occur in the discharge piping of the pump.
3. The pump is operating at approximately 125% (or 3,276 gpm) of the best efficiency point with only Pump #0 in operation. Normal operation is with 1-2 pumps on in the station. Pumps are typically recommended to operate within the manufacturer defined acceptable operation region or within 80% to 115% of the best efficiency point if the manufacturer data is unavailable. Operating outside the given window for long periods of time may lead to excessive maintenance or premature pump failure.
4. The measured loading of the motor is approximately 107% of the motor rated capacity. The motor is overloading during normal operation. With a motor service factor of 1.15, the motor can be operated above its rated capacity, however, it should not be done for extended periods of time

4.2 PUMP #1

Below is a summary of the pump characteristics and performance test results.

Parameter	Units	Value
Pump		
<i>Pump Information</i>		
Manufacturer	-	Johnston
Model	-	16CHC-3
Style	-	Vertical Turbine
# of Stages	-	3
Impeller Diameter	Inches	11.25
<i>Pump Rated/Design Characteristics</i>		
Flow Capacity	GPM	3,500
Head	Ft	204
Hydraulic Efficiency	%	82.4
Wire-to-Water Efficiency	%	78.3
Net-Positive Suction-Head Required	Ft	35.5
<i>Pump Characteristics at Best-Efficiency Point</i>		
Flow Capacity	GPM	3,500
Head	Ft	204
Hydraulic Efficiency	%	82.4
Wire-to-Water Efficiency	%	78.3
Net-Positive Suction-Head Required	Ft	35.5
Motor		
Manufacturer	-	US Electrical Motors
Model	-	P02N3020184R-1
Synchronous Speed	RPM	1800
Rated Speed	RPM	1770
No. Phases	No	3
Starter	-	Across-the-Line
Rated Voltage	Volts	460
Rated Horsepower	HP	250
Service Factor	-	1.15
Full Load Amps	Amps	283.0
Efficiency @ Design Point	%	95.0 (Assumed)
Efficiency @ Operating Point	%	95.0 (Assumed)

Table 4.5 - Pump #1 Design Characteristics



Photo 4.2 - Pump #1

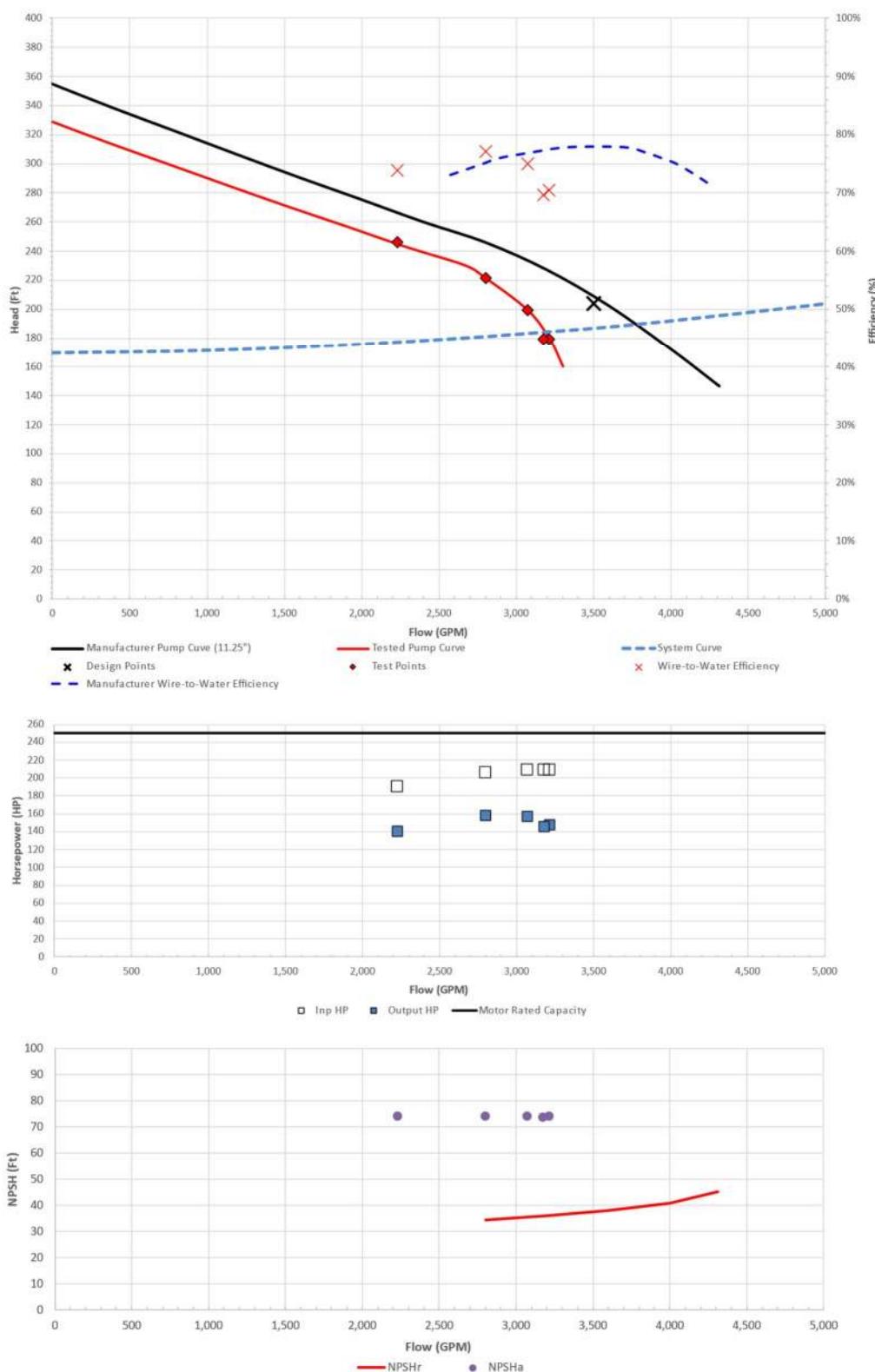


Table 4.6 - Pump #1 Test Results Graphs

	Parameter	Units	Lower Limit	Test Value	Upper Limit	Anticipated	Comment
Measured	Discharge Flow	GPM	-	3,198	-	3,500	
	Total Dynamic Head	Ft	-	179.2	-	204	
	Wire-to-Water Efficiency	%	-	69.9	-	78.3	1
	Input Horsepower	HP	-	208.9	250	250	
	Current Draw	Amps	-	192.7	283	-	
	Vibration	IPS	-		0.15	-	
	Suction Velocity	FPS	2	4.0	5	-	
	Discharge Velocity	FPS	2	6.7	8	-	
	Rotational Speed	RPM	-	1770	-	1770	
	Net-Positivity Suction-Head Available	Ft	36.5	74.0	N/A	-	
Compared	<i>Pump</i>						
	Discharge Flow	%	80%	91.4%	115%	-	
	Total Dynamic Head	%	-	87.8%	-	-	
	Wire-to-Water Efficiency	%	-5%	-15.2%	5%	-	
	Net-Positive Suction-Head Available	Ft	26.5	74.0	N/A	-	
	<i>Motor</i>						
	Input Frequency	%	-5%	0.0%	5%	-	
	Input Voltage (L-L)	%	-10%	4.1%	10%	-	
	Voltage Imbalance	%	-10%	0.5%	10%	-	
	Current Imbalance	%	-10%	1.7%	10%	-	
Observed	Full Load Amps	%	50%	74.1%	105%	-	
	Load	%	50%	83.6%	115%	-	
	Surge	1-5	1	3	3	-	
	Vibration	1-5	1	3	3	-	
	Cavitation	1-5	1	3	3	-	
	Mechanical Noise	1-5	1	3	3	-	
	Leaks	1-5	1	4	3	-	2
	Exterior Condition	1-5	1	4	3	-	3
	Overall Score	1-5	1	3	3	-	

Table 4.7 - Pump #1 Test Summary

Pump #1 - Test Comments

1. The wire-to-water efficiency is greater than 10% below the best efficiency point. Running pumps at this point will cause excessive use of energy and will cause an increase in operation cost overtime.
2. The CLA-VAL pump control valve was observed to be excessively leaking during pump operation and would slam loudly during pump shut down.
3. Major corrosion can be seen on the outside of the pump assembly. Pump seal water has accumulated around the shaft and caused algae growth and shaft corrosion.

4.3 PUMP #2

Below is a summary of the pump characteristics and performance test results.

Parameter	Units	Value
Pump		
<i>Pump Information</i>		
Manufacturer	-	Johnston
Model	-	16CHC-3
Style	-	Vertical Turbine
# of Stages	-	3
Impeller Diameter	Inches	11.25
<i>Pump Rated/Design Characteristics</i>		
Flow Capacity	GPM	3,500
Head	Ft	204
Hydraulic Efficiency	%	82.4
Wire-to-Water Efficiency	%	78.3
Net-Positive Suction-Head Required	Ft	35.5
<i>Pump Characteristics at Best-Efficiency Point</i>		
Flow Capacity	GPM	3,500
Head	Ft	204
Hydraulic Efficiency	%	82.4
Wire-to-Water Efficiency	%	78.3
Net-Positive Suction-Head Required	Ft	35.5
Motor		
Manufacturer	-	US Electrical Motors
Model	-	P02N3020184R-2
Synchronous Speed	RPM	1800
Rated Speed	RPM	1770
No. Phases	No	3
Starter	-	Across-the-Line
Rated Voltage	Volts	460
Rated Horsepower	HP	250
Service Factor	-	1.15
Full Load Amps	Amps	283.0
Efficiency @ Design Point	%	95.0 (Assumed)
Efficiency @ Operating Point	%	95.0 (Assumed)

Table 4.8 - Pump #2 Design Characteristics



Photo 4.3 - Pump #2

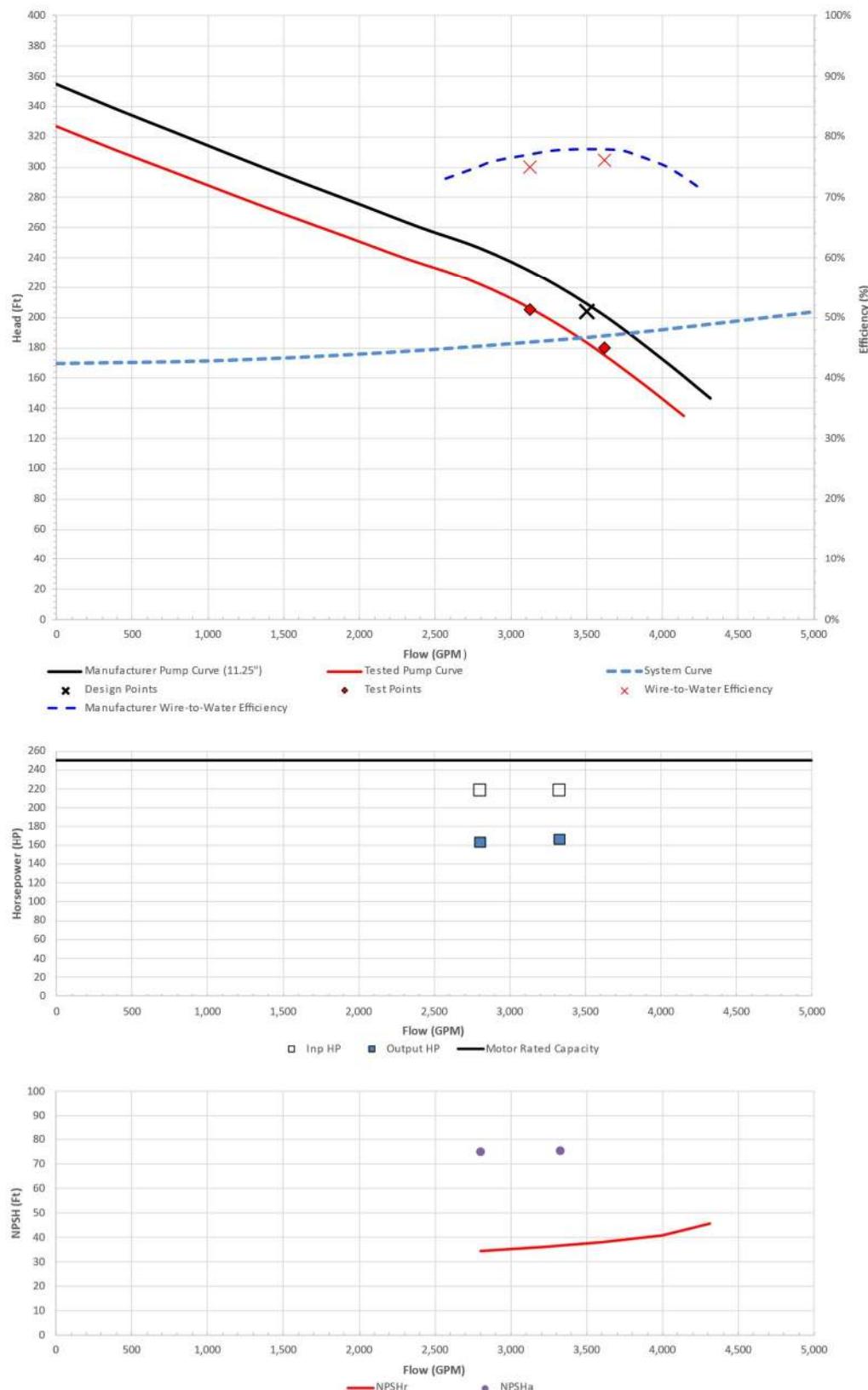


Table 4.9 - Pump #2 Test Results Graphs

	Parameter	Units	Lower Limit	Test Value	Upper Limit	Anticipated	Comment
Measured	Discharge Flow	GPM	-	3,617	-	3,500	
	Total Dynamic Head	Ft	-	179.6	-	204	
	Wire-to-Water Efficiency	%	-	76.0	-	78.3	
	Input Horsepower	HP	-	218.0	250	250	
	Current Draw	Amps	-	124.5	283	-	
	Vibration	IPS	-		0.15	-	
	Suction Velocity	FPS	2	2.6	5	-	
	Discharge Velocity	FPS	2	7.5	8	-	
	Rotational Speed	RPM	-	1770	-	1770	
	Net-Positivity Suction-Head Available	Ft	36.5	75.0	N/A	-	
Compared	<i>Pump</i>						
	Discharge Flow	%	80%	103.3%	115%	-	
	Total Dynamic Head	%	-	88.0%	-	-	1
	Wire-to-Water Efficiency	%	-5%	-2.9%	5%	-	
	Net-Positive Suction-Head Available	Ft	26.5	75.0	N/A	-	
	<i>Motor</i>						
Observed	Input Frequency	%	-5%	0.0%	5%	-	
	Input Voltage (L-L)	%	-10%	4.2%	10%	-	
	Voltage Imbalance	%	-10%	0.6%	10%	-	
	Current Imbalance	%	-10%	8.5%	10%	-	
	Full Load Amps	%	50%	76.2%	105%	-	
	Load	%	50%	87.2%	115%	-	
Observed	Surge	1-5	1	3	3	-	
	Vibration	1-5	1	3	3	-	2
	Cavitation	1-5	1	3	3	-	
	Mechanical Noise	1-5	1	3	3	-	
	Leaks	1-5	1	3	3	-	
	Exterior Condition	1-5	1	4	3	-	3
	Overall Score	1-5	1	3	3	-	

Table 4.10 - Pump #2 Test Summary

Pump #2 - Test Comments

1. The total dynamic head produced by the pump is approximately 88% of the design total dynamic head. The cause of this can be an increase in transmission pipe sizing throughout the City that has flattened out the system curve over time. This may also have been caused due to the increased height in the ground storage tank and the reduced height in the elevated storage tank while testing.
2. The vibration measured during pump testing was 0.136 in/s and is close to the maximum limit of 0.15 in/s determined by the Hydraulic Institute – Rotodynamic Pumps for Vibration and Allowable Values (2022).
3. Major corrosion can be seen on the outside of the pump assembly. Pump seal water has accumulated around the shaft and caused algae growth and shaft corrosion.

4.4 PUMP #3

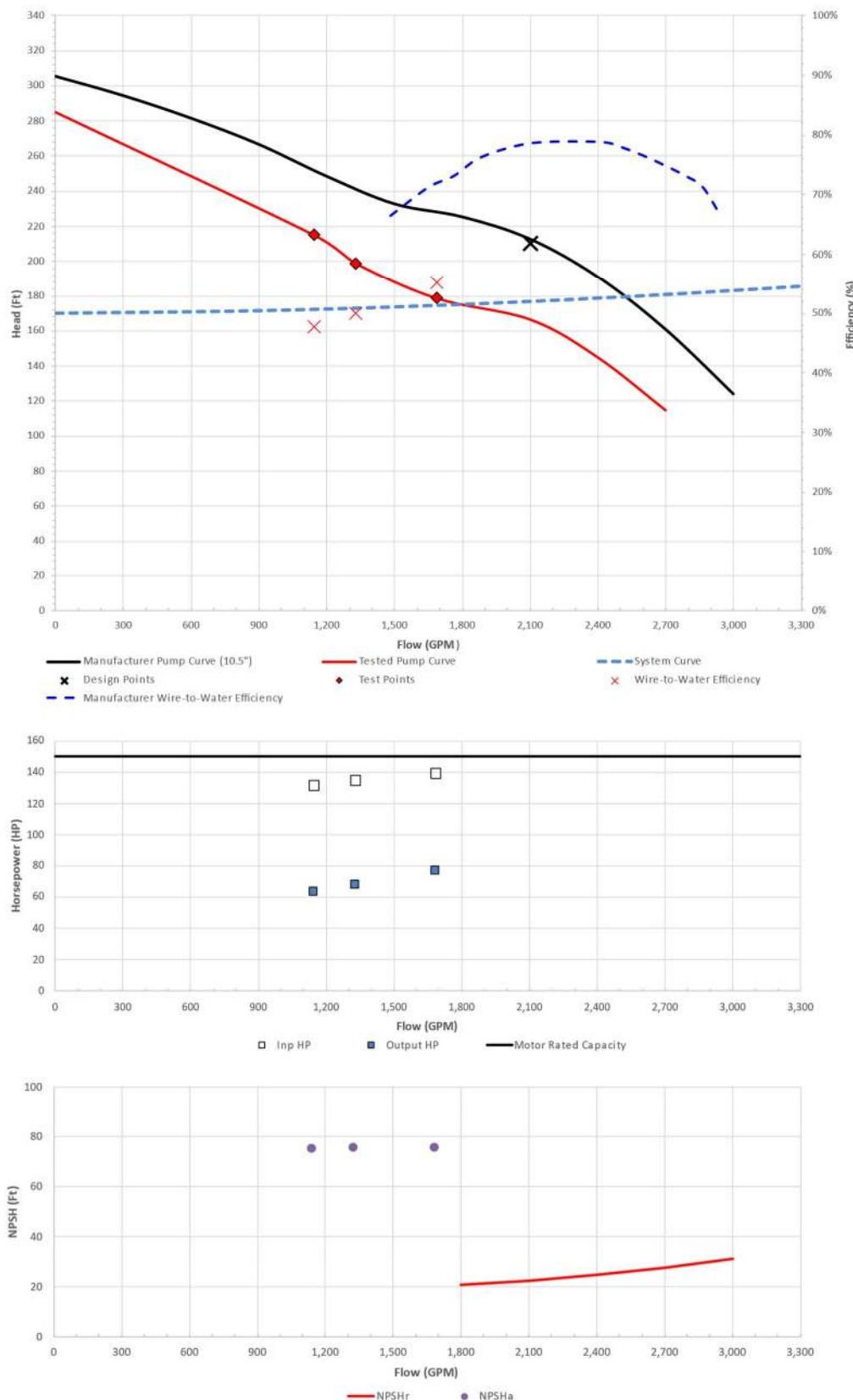
Below is a summary of the pump characteristics and performance test results.

Parameter	Units	Value
Pump		
<i>Pump Information</i>		
Manufacturer	-	Johnston
Model	-	14DC
Style	-	Vertical Turbine
# of Stages	-	3
Impeller Diameter	Inches	10.50
<i>Pump Rated/Design Characteristics</i>		
Flow Capacity	GPM	2,100
Head	Ft	210
Hydraulic Efficiency	%	83.4
Wire-to-Water Efficiency	%	79.2
Net-Positive Suction-Head Required	Ft	20.0
<i>Pump Characteristics at Best-Efficiency Point</i>		
Flow Capacity	GPM	2,100
Head	Ft	210
Hydraulic Efficiency	%	83.4
Wire-to-Water Efficiency	%	79.2
Net-Positive Suction-Head Required	Ft	20.0
Motor		
Manufacturer	-	US Electrical Motors
Model	-	P02N30202004R-1
Synchronous Speed	RPM	1800
Rated Speed	RPM	1770
No. Phases	No	3
Starter	-	Across-the-Line
Rated Voltage	Volts	460
Rated Horsepower	HP	150
Service Factor	-	1.15
Full Load Amps	Amps	179.0
Efficiency @ Design Point	%	95.0 (Assumed)
Efficiency @ Operating Point	%	95.0 (Assumed)

Table 4.11 - Pump #3 Design Characteristics



Photo 4.4 - Pump #3


Table 4.12 - Pump #3 Test Results Graphs

	Parameter	Units	Lower Limit	Test Value	Upper Limit	Anticipated	Comment
Measured	Discharge Flow	GPM	-	1,686	-	2,100	
	Total Dynamic Head	Ft	-	178.6	-	210	
	Wire-to-Water Efficiency	%	-	55.2	-	79.2	
	Input Horsepower	HP	-	139.1	150	150	
	Current Draw	Amps	-	137.8	179	-	
	Vibration	IPS	-		0.15	-	
	Suction Velocity	FPS	2	1.2	5	-	
	Discharge Velocity	FPS	2	6.9	8	-	
	Rotational Speed	RPM	-	1775	-	1775	
	Net-Positivity Suction-Head Available	Ft	20.0	75.2	N/A	-	
Compared	<i>Pump</i>						
	Discharge Flow	%	80%	80.3%	115%	-	1
	Total Dynamic Head	%	-	85.0%	-	-	2
	Wire-to-Water Efficiency	%	-5%	-30.3%	5%	-	3
	Net-Positive Suction-Head Available	Ft	20.0	75.2	N/A	-	
	<i>Motor</i>						
	Input Frequency	%	-5%	0.0%	5%	-	
	Input Voltage (L-L)	%	-10%	5.0%	10%	-	
	Voltage Imbalance	%	-10%	0.5%	10%	-	
	Current Imbalance	%	-10%	2.8%	10%	-	
Observed	Full Load Amps	%	50%	77.0%	105%	-	
	Load	%	50%	92.7%	115%	-	
	Surge	1-5	1	3	3	-	
	Vibration	1-5	1	3	3	-	
	Cavitation	1-5	1	3	3	-	
	Mechanical Noise	1-5	1	3	3	-	
	Leaks	1-5	1	3	3	-	
	Exterior Condition	1-5	1	4	3	-	4
	Overall Score	1-5	1	3	3	-	

Table 4.13 - Pump #3 Test Summary

Pump #3 - Test Comments

1. The pump is operating at approximately 125% of the best efficiency point during normal operation. Normal operation is with 1-2 pumps on in the station. Pumps are typically recommended to operate within the manufacturer defined acceptable operation region or within 80% to 115% of the best efficiency point if the manufacturer data is unavailable. Operating outside the given window for long periods of time may lead to excessive maintenance or premature pump failure.
2. The total dynamic head produced by the pump is approximately 85% of the design total dynamic head. The cause of this can be an increase in transmission pipe sizing throughout the City that has flattened out the system curve over time. This may also have been caused due to the increased height in the ground storage tank and the reduced height in the elevated storage tank while testing.
3. The wire-to-water efficiency is greater than 10% below the best efficiency point. Running pumps at this point will cause excessive use of energy and will cause an increase in operation cost overtime.
4. Major corrosion can be seen on the outside of the pump assembly. Pump seal water has accumulated around the shaft and caused algae growth and shaft corrosion.

4.5 PUMP #4

Below is a summary of the pump characteristics and performance test results.

Parameter	Units	Value
Pump		
<i>Pump Information</i>		
Manufacturer	-	Fairbanks/Morse
Model	-	7000AW – 19A
Style	-	Vertical Turbine
# of Stages	-	2
Impeller Diameter	Inches	13.15
<i>Pump Rated/Design Characteristics</i>		
Flow Capacity	GPM	3,500
Head	Ft	244
Hydraulic Efficiency	%	74.2
Wire-to-Water Efficiency	%	70.5
Net-Positive Suction-Head Required	Ft	25.5
<i>Pump Characteristics at Best-Efficiency Point</i>		
Flow Capacity	GPM	4,779
Head	Ft	205
Hydraulic Efficiency	%	81.0
Wire-to-Water Efficiency	%	76.9
Net-Positive Suction-Head Required	Ft	26.0
Motor		
Manufacturer	-	GE Motors
Model	-	RXG05243A
Synchronous Speed	RPM	1800
Rated Speed	RPM	1785
No. Phases	No	3
Starter	-	Variable Frequency Drive
Rated Voltage	Volts	460
Rated Horsepower	HP	300
Service Factor	-	1.15
Full Load Amps	Amps	337.0
Efficiency @ Design Point	%	95.0
Efficiency @ Operating Point	%	95.0

Table 4.14 - Pump #4 Design Characteristics



Photo 4.5 - Pump #4 (Eastern Pump)

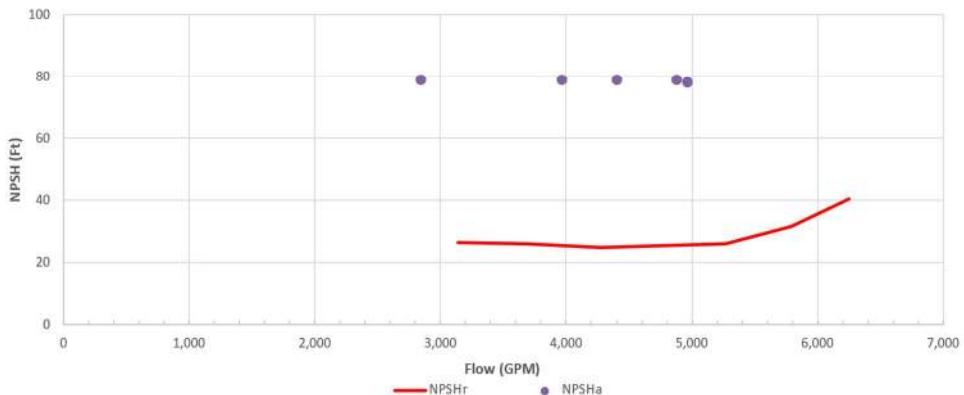
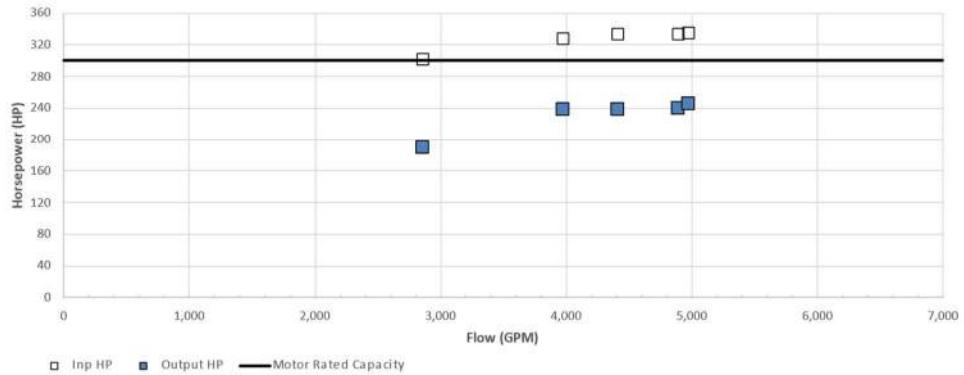
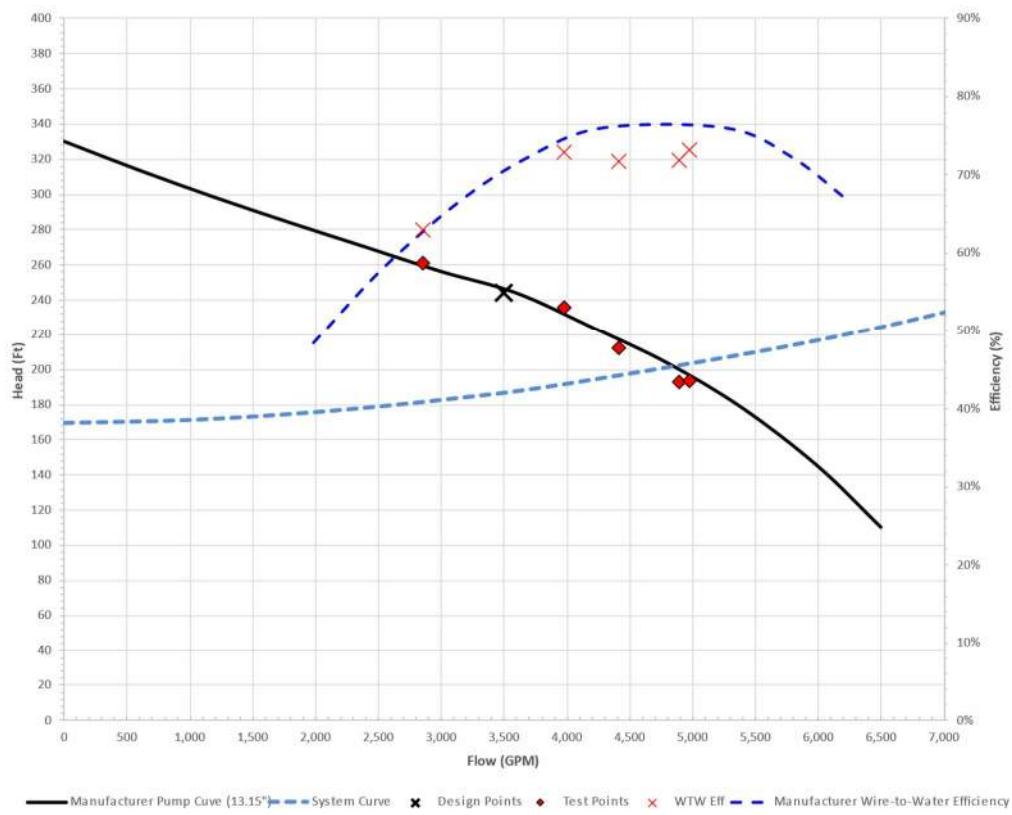


Table 4.15 - Pump #4 Test Results Graphs

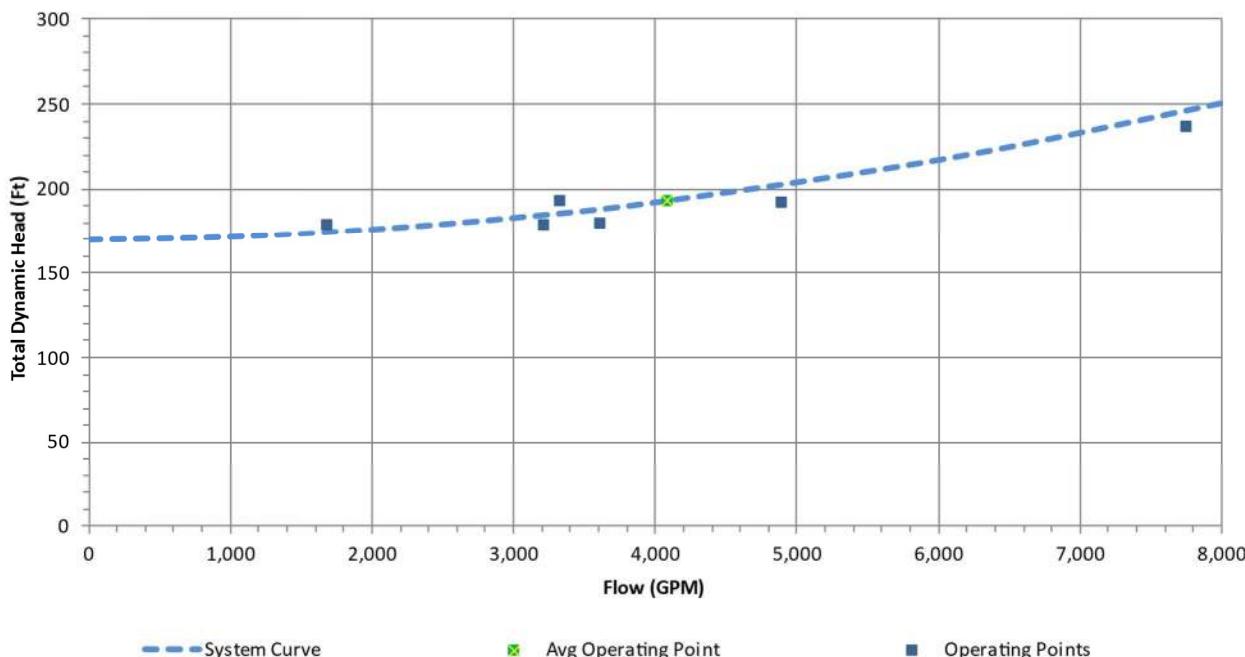
	Parameter	Units	Lower Limit	Test Value	Upper Limit	Anticipated	Comment
Measured	Discharge Flow	GPM	-	4,933	-	3,500	
	Total Dynamic Head	Ft	-	192.7	-	244	
	Wire-to-Water Efficiency	%	-	72.5	-	76.9	
	Input Horsepower	HP	-	334.6	300	300	
	Current Draw	Amps	-	334.9	337	-	
	Vibration	IPS	-		0.15	-	
	Suction Velocity	FPS	2	5.0	5	-	
	Discharge Velocity	FPS	2	10.3	8	-	
	Rotational Speed	RPM	-	1785	-	1785	
	Net-Positivity Suction-Head Available	Ft	26.0	78.5	N/A	-	
Compared	<i>Pump</i>						
	Discharge Flow	%	80%	103.2%	115%	-	
	Total Dynamic Head	%	-	79.0%	-	-	
	Wire-to-Water Efficiency	%	-5%	-5.7%	5%	-	1
	Net-Positive Suction-Head Available	Ft	26.0	78.5	N/A	-	
	<i>Motor</i>						
Observed	Input Frequency	%	-5%	0.0%	5%	-	
	Input Voltage (L-L)	%	-10%	-3.2%	10%	-	
	Voltage Imbalance	%	-10%	0.6%	10%	-	
	Current Imbalance	%	-10%	3.1%	10%	-	
	Full Load Amps	%	50%	99.4%	105%	-	
	Load	%	50%	111.5%	115%	-	2
Observed	Surge	1-5	1	3	3	-	
	Vibration	1-5	1	3	3	-	
	Cavitation	1-5	1	3	3	-	
	Mechanical Noise	1-5	1	3	3	-	
	Leaks	1-5	1	3	3	-	
	Exterior Condition	1-5	1	3	3	-	
	Overall Score	1-5	1	3	3	-	

Table 4.16 - Pump #4 Test Summary

Pump #4 - Test Comments

1. The wire-to-water efficiency is greater than 10% below the best efficiency point. Running pumps at this point will cause excessive use of energy and will cause an increase in operation cost overtime.
2. The measured loading of the motor is approximately 111% of the motor rated capacity. The motor is overloading during normal operation. With a motor service factor of 1.15, the motor can be operated above its rated capacity, however, it should not be done for extended periods of time.

4.6 SYSTEM CURVES



The static head of the system curve is determined by the water elevation in the 8.0 MG Ground Storage Tank on-site of the Flameleaf pump station and the water elevation for the 2.0 MG Parkerville Elevated Storage Tank and 1.5 MG Highway 67 Elevated Storage Tank. Please note that during the day of testing the static head condition did vary throughout the day of testing. The system curve above is a best estimate representation of the system curve.

5 RECOMMENDATIONS

The following recommendations are a result of the findings of this evaluation and should be considered for implementation. See **Section 4 Pump Performance Tests** for pump specific recommendations. In addition to the recommendations below, this site should/ be considered for the following overall planning and budgeting activities.

5.1 OVERALL RECOMMENDATIONS

Overall Site Rating	Score	Description
	1	No recommendations currently. Monitor station for worsening conditions, perform regular O&M, reassess condition in 2-5 years.
	2	Complete recommendations listed in Section 5.2, monitor station for worsening conditions, perform regular O&M, reassess condition in 1-3 years.
	3	Station requires improvements beyond replacement of individual components. Begin planning and budgeting for a major rehabilitation. Place under regular observation until rehabilitation is complete.
	4	Station does not appear to be brought into conformance with standards without replacement. Begin planning and budgeting for a station replacement. Place under regular observation until replacement is complete.
	5	Station appears to be in a hazardous condition and poses a safety hazard to operations staff. Immediate planning and budgeting for a station replacement is recommended. Operations staff to closely observe condition of the station until replacement is complete.

5.2 PRIORITIZED IMPROVEMENTS

1. Rebuild CLA-VAL pump control valve for Pump #1. Blast and recoat CLA-VAL.
2. Remove and upsize HVAC system to improve temperatures for electrical equipment operation. Regulating temperature will prevent damaging electrical equipment and prolong the service life.
3. Install pump seal drain for all pumps to prevent organic growth and further corrosion at the exposed shafts.
4. Pull Pump #3 and conduct full inspection, identify any deficiencies, and rehabilitate as necessary. Inspect motor, identify any deficiencies, and rehabilitate as necessary. Consider replacing electrical equipment due to age.
5. Pull Pump #1 and conduct full inspection, identify any deficiencies, and rehabilitate as necessary. Inspect motor, identify any deficiencies, and rehabilitate as necessary. Consider replacing electrical equipment due to age.
6. Pull Pump #2 and conduct full inspection, identify any deficiencies, and rehabilitate as necessary. Inspect motor, identify any deficiencies, and rehabilitate as necessary. Consider replacing electrical equipment due to age.
7. Pull Pump #0 and conduct full inspection, identify any deficiencies, and rehabilitate as necessary. Inspect motor, identify any deficiencies, and rehabilitate as necessary. Inspect VFD in motor control center, identify any deficiencies, and rehabilitate as necessary. Consider replacing electrical equipment due to age.
8. Pull Pump #4 and conduct full inspection, identify any deficiencies, and rehabilitate as necessary. Inspect motor, identify any deficiencies, and rehabilitate as necessary. Inspect VFD in motor control center, identify any deficiencies, and rehabilitate as necessary. Consider replacing electrical equipment due to age.
9. Recoat pump and piping systems at locations where original coating is showing signs of failure to prevent further corrosion.