

## **1.0 EXECUTIVE SUMMARY**

Land use assumptions, growth trends, and the Capital Improvements Plan (CIP) have been updated in order to develop the revised Flintrock Wastewater System Impact Fee (IF). Land use assumptions were developed to project the number of living unit equivalents (LUEs) in the Service Area. The growth rate was reviewed to project the rate at which LUEs will be added to the System. The capital improvements plan was then updated to include the improvements necessary to provide adequate capacity through the 10-year planning period. The estimated costs of these improvements were developed and used to calculate the revised IF.

This Study supersedes the Flintrock Effluent System CIP, dated August 8, 2019. The information and data included in the previous CIP was incorporated into the CIP contained in this Study.

Land use assumptions for the Service Area were prepared using the assumptions from the Water Capital Recovery Fee Study – 2018 Update as a basis. Adjustments were made based on information currently available and to account for the difference in the assignment of water and wastewater LUEs for a ¾-inch meter. A total of 5,088 wastewater LUEs are ultimately projected in the Service Area, which is higher than the ultimate 4,082 LUE capacity of the Flintrock System. An estimated annual growth rate of 2.9% was used for planning, based on the rate observed since October 2018. At this rate the System would reach capacity at the end of 2030, within the 10-year planning period, and therefore the CIP includes the improvements to meet the projected ultimate capacity of 1.0 MGD.

The Flintrock Wastewater System (System) has a current treatment capacity of 1.0 MGD and a disposal capacity of 0.5015 MGD. Additional effluent pumping, transmission, storage, and irrigation facilities are necessary to increase the disposal capacity to the ultimate 1.0 MGD.

The proposed CIP included in this Study involves several revisions to the previous CIP. TCEQ recently enacted amendments that allow effluent disposal credit to be obtained for beneficial reuse of effluent, including the use of effluent for irrigation of common areas. The proposed revisions to the CIP are predominantly related to the inclusion of a reuse irrigation system and the associated anticipated effluent disposal credit gained from this system. Based on the anticipated credit, several of the previously planned drip irrigation fields in Serene Hills are now proposed as spray irrigation and the Thomas Tract effluent disposal system has been eliminated. The degree of these changes that will be implemented will ultimately depend on the timing of the reuse irrigation system and the amount of water used by these customers. In addition to these changes the proposed CIP also includes revising the location of the Flintrock Effluent Transfer Pump Station from the Flintrock Golf Course to the Creekside Tract adjacent to the WWTP, the addition of an effluent storage tank also located on the Creekside Tract for the Flintrock Effluent Transfer Pumps and Reuse Irrigation Pumps to pump from, and increasing the size of the proposed Serene Hills Effluent Storage Tanks to account for the additional storage required for spray irrigation.

The cost to implement the facilities included in the CIP was evaluated on a per LUE basis. This was based on the estimated future value construction cost and the calculated LUE capacity of each category. The estimated future value costs were estimated based on the projected date of need for

each improvement and an estimated rate of inflation. Non-construction costs, including professional services, were added to the construction costs to develop total project costs.

The costs to implement the proposed facilities on a per LUE basis have increased since the previous Impact Fee Study – 2015 Update. This is primarily due to the actual cost of the Flintrock Wastewater Treatment Plant Expansion and effluent disposal irrigation being higher than previously estimated and projecting the increased irrigation costs to the future effluent irrigation improvements. Utilizing estimated future value costs for the improvements also contributed to the increase.

The District's current Impact Fee is \$14,150 per LUE. The calculations utilizing the construction and non-construction estimates for existing facilities with excess capacity and the improvements proposed in this updated Study yield a maximum Impact Fee of \$19,943 per LUE.

# FLINTROCK WASTEWATER SYSTEM IMPACT FEE STUDY & CAPITAL IMPROVEMENT PLAN 2020 UPDATE

TRAVIS COUNTY WCID NO. 17



September 3, 2020

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**Attachments**

- Attachment A: Flintrock Wastewater System Overall Layout
- Attachment B: Land Use Assumptions Exhibit
- Attachment C: Land Use Assumptions
- Attachment D: Capacity Allocations and Project Cost Detail

## **1.0 EXECUTIVE SUMMARY**

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## **2.0 INTRODUCTION**

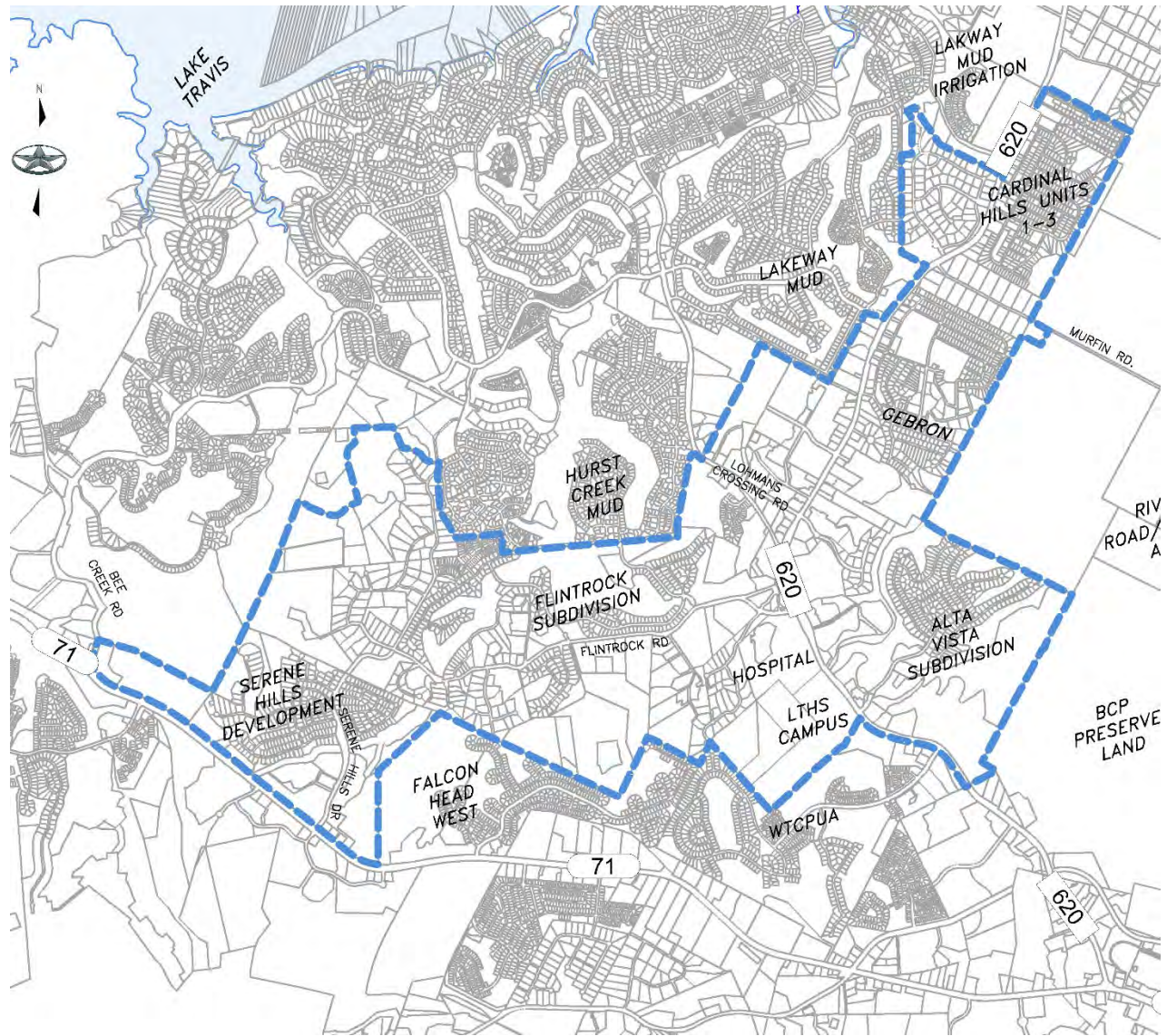
Travis County WCID No. 17 (the District) is a Water Control and Improvement District created by an order of the Commissioner's Court of Travis County, Texas, on December 8, 1958 and confirmed by the voters within the District on February 28, 1959. As a political subdivision of Travis County, the District is a retail non-profit public utility with the rights, powers, privileges, and authority established by the general laws of the State of Texas, particularly Chapter 51 of the Texas Water Code. The District is subject to the continuing supervision of the Texas Commission on Environmental Quality (TCEQ) and federal agencies. The District is empowered, among other things, to purchase, construct, operate and maintain all works, improvements, facilities and plants necessary for the supply and distribution of water; the collection, treatment and disposal of wastewater; and the control and diversion of storm water. The District is located west of the City of Austin in Travis County, Texas, and encompasses approximately 16,000-acres.

The District owns and operates the Flintrock Wastewater System (System), which collects, treats, and disposes of wastewater flows generated in the Flintrock Wastewater Service Area (Service Area). The District operates this system under their existing TCEQ Texas Land Application Permit (TLAP) which authorizes the disposal of up to 1.0-million gallons per day (MGD) of treated effluent via land applied irrigation.

The Impact Fee Area matches the Service Area. They encompass the southern portion of the District and generally encompasses the areas from Serene Hills Drive & State Highway 71 northeast to Kollmeyer Drive & RM 620, and is shown on Figure 2.1.

Water districts, and other political divisions across the state, may use Impact Fees (IFs) "to generate revenue for funding or recouping the costs of capital improvements or facility expansions necessitated by and attributable to new development." (Texas Local Government Code Ann. §395.001(4)). In order to adopt an IF, the District must review current and proposed service and growth trends to ensure that adequate technical and financial planning is in place with which to develop the necessary service facilities and calculate the IF.

This report is an update to the previous Flintrock Wastewater System Impact Fee Study – 2015 Update (2015 Study). Area growth and revised planning have dictated the need to update the land use assumptions, the list of necessary capital improvements, project costs and service projections made in the 2015 Study, and to revise the District's IF. This report identifies the improvements necessary to provide wastewater service to the Service Area for the 10-year planning period, and calculates the IF necessary to recoup the costs of these capital improvements. The District proposes to follow the procedures outlined in Chapter 395 of the Texas Local Government Code in this update to its Flintrock Wastewater System Impact Fee Study.



**Figure 2.1 – Flintrock Wastewater System Impact Fee Area and Service Area**



### **3.0 LAND USE ASSUMPTIONS AND GROWTH PROJECTIONS**

This section describes the current and projected future land use patterns of the Service Area. Living Unit Equivalents (LUEs) are used to quantify wastewater usage in the District, in lieu of population or number of connections.

#### **3.1 Living Unit Equivalents**

The quantification of wastewater usage in terms of LUEs is necessary as the Service Area contains different land uses. An LUE is defined as the wastewater discharged from an average sized single-family residence. The number of LUEs are assigned to each connection based on the size of water meter to be used for the development. Tables 3.1 and 3.2 shows the number of LUEs assigned per Section 4.2 of the District’s current Service Rules and Policies. The size of water meter needed is based on the fixture unit count for the development. Individual plumbing fixtures are assigned a value based on the typical flow used, and the cumulative total of the service is then used to determine the size of meter needed. The plumbing fixture values and meter sizes are taken from the Unified Plumbing Code – 2015 Edition.

**Table 3.1 – Residential Wastewater LUE Allocation**

<b>Water Meter Size</b>	<b>LUEs</b>
5/8”	1
3/4"	1
Duplex with one single 5/8” meter per side	1

**Table 3.2 – Commercial Wastewater LUE Allocation**

<b>Water Meter Size</b>	<b>LUEs</b>
5/8”	1 (D)
3/4"	1.5 (D)
1”	2.5 (D)
1 ½”	5 (D)
2”	8 (D)
3”	15 (D) or 18 (T)
4”	25 (D) or 30 (T)
6”	50 (D) or 60 (T)
8”	90 (T)

(D) Displacement Meter

(T) Turbine Meter

### **3.2 Land Use Assumptions**

Land use assumptions were made for the Service Area to estimate the number of projected LUEs. The assumptions made as part of the Water Capital Recovery Fee Study – 2018 Update were used as a basis, with adjustments made based on currently available information and for the difference in the assignment of water and wastewater LUEs for a ¾-inch meter. Attachment ‘B’, Land Use Assumptions Exhibit, shows each of the evaluation areas utilized. The tracts without current water service, as indicated on the District’s GIS system as of August 2020, or that are under development are color-coded according to their projected use. The projected uses for the tracts within the City of Lakeway’s jurisdiction are based on the City’s current Zoning Map. The projected uses for the remaining tracts are based on development information where known, and on their location and surrounding uses where no information was available. Attachment ‘C’ shows an itemized listing of each area with the associated number of existing, projected number of LUEs, and methodology used.

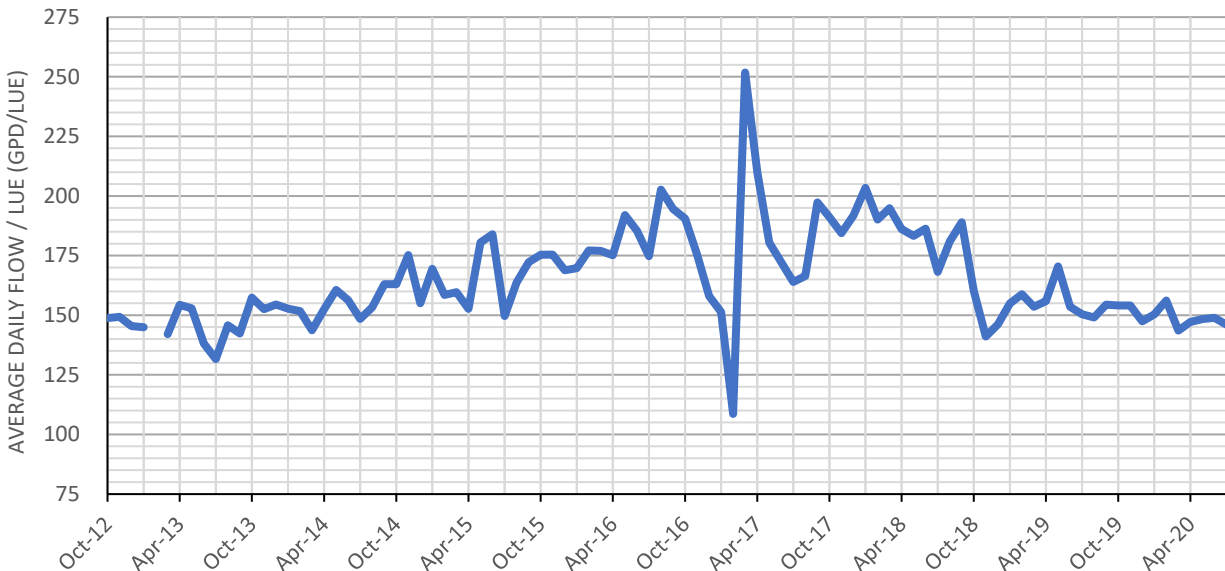
**Table 3.3 – Summary of Land Use Assumptions**

<b>Existing LUEs</b>	<b>Potential LUEs to be Added</b>	<b>Total Potential LUEs</b>
3,028	2,060	<b>5,088</b>

### **3.3 Wastewater Flow Design Standard**

Previous System planning, including the 2015 Study, has used a wastewater flow design standard of 245 gpd/LUE. As shown in Figure 3.1 the observed values, with the exception of one month, have been less than this value. This maximum observed value of 252 gpd/LUE in March 2017 appears to be an outlier and may be due to an error in the data, especially considering the previous month’s value of 109 gpd/LUE. The second highest values (observed twice) were 203 gpd/LUE.

**Figure 3.1 – Average Daily Flow Per LUE**



At this time, it is recommended that the wastewater flow design standard of 245 gpd/LUE be maintained for planning purposes. A future analysis and potential re-rating may be prudent if the flow trends maintain. Using this value corresponds to a System capacity of 4,082 LUEs. Reasons for this recommendation include the following:

- **Potential Increased Infiltration and Inflow (I&I):** As a wastewater collection system ages the I&I tends to increase, which would increase the observed flows in the system. As an example, the Steiner Ranch Wastewater Treatment Plant (WWTP) has seen an increase from an average value of 190 gpd/LUE for the fiscal year period of 2013 (October 2012 – September 2013) to an average of 217 gpd/LUE over the previous 12-months (August 2019 – July 2020).
- **Organic Loadings:** The WWTP was designed for a certain influent organic loading. The existing influent organic loading needs to be evaluated alongside the evaluation of the flows to ensure that the WWTP is able to meet the required effluent standards.
- **System Expansion Difficulty:** Considering the degree of difficulty in expanding this System additional caution is warranted.

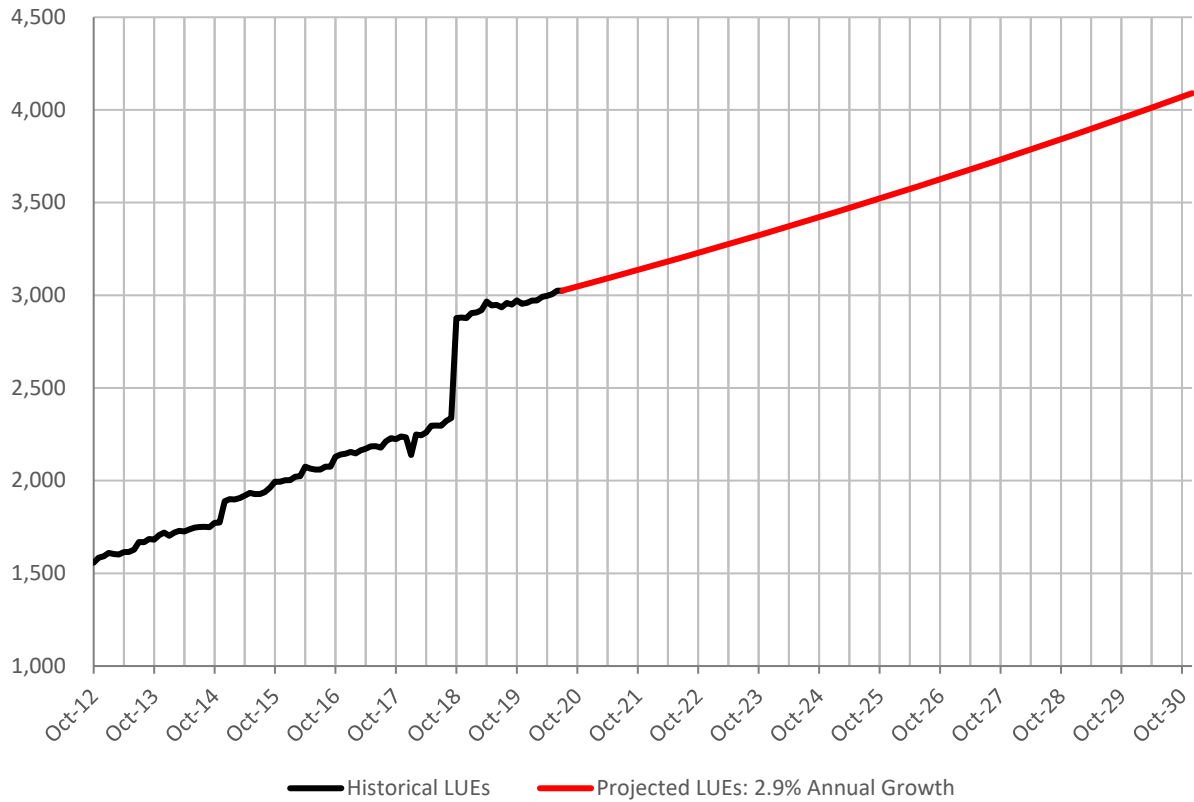
TCEQ Chapter 217.34 stipulates minimum flow and organic loading requirements when re-rating or altering an existing wastewater treatment facility. For facilities that will be affected by future growth, such as this WWTP, the design flow rate shall be based on anticipated changes from existing flows and may use a linear regression or other appropriate method. For facilities that will not be affected by future growth the average plus 1 standard deviation of the previous 5-years of flow data shall be used as the minimum design flow. As a point of reference, the average plus 1 standard deviation for the previous 5-years of data is 192 gpd/LUE, and was exceeded 7 times over this period. TCEQ also mandates that organic loadings be considered and shall be based on a minimum of 3 composite samples per week from the previous year.

### **3.4 Growth Projections**

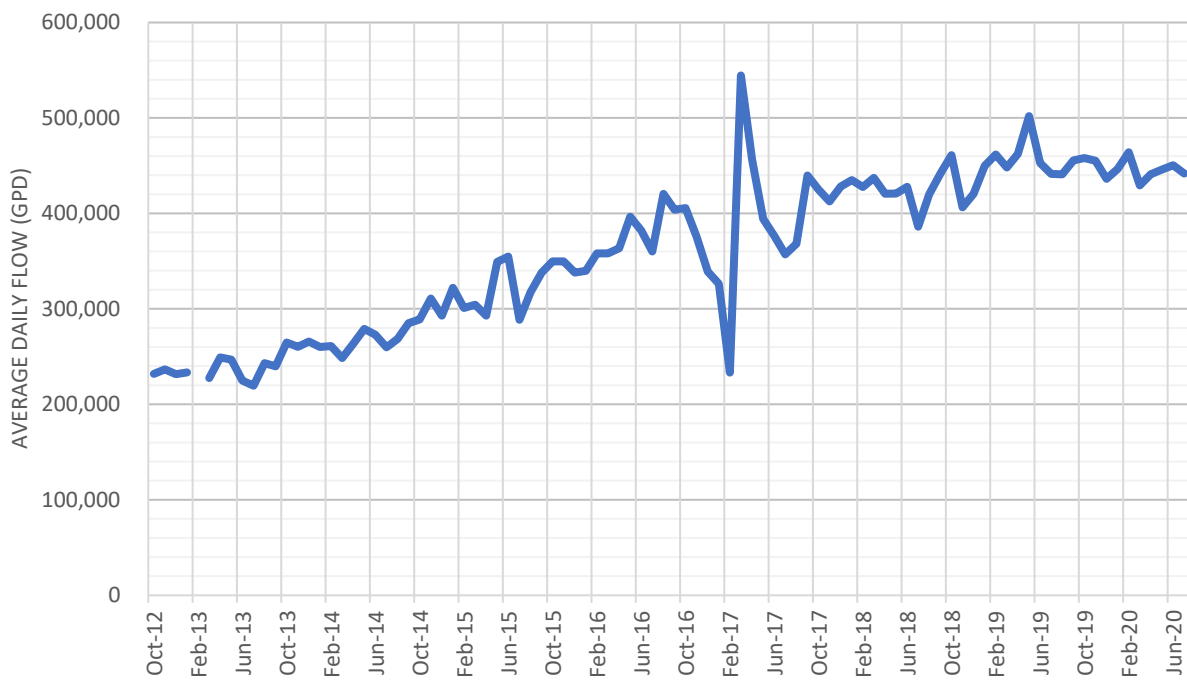
The Flintrock System has continued steady growth since its inception. Evaluation of the growth trends is important in projecting future growth rates and when System improvements will be necessary. As stated in Sections 3.2 and 3.3 the System has an estimated ultimate demand of 5,088 LUEs, but an ultimate capacity to serve 4,082 LUEs. System capacity is anticipated to be the limiting factor. Figures 3.2 and 3.3 show these trends in terms of LUEs and monthly wastewater flows, with the growth rates summarized below.

	<b>LUEs</b>	<b>Average Monthly Wastewater Flows</b>
1-Year Average Annual Growth (July 2019 – July 2020):	3.1%	0.1%
5-Year Average Annual Growth (July 2015 – July 2020):	11.4%	10.6%

**Figure 3.2 – Historical and Projected Flintrock System LUEs**



**Figure 3.3 – Historical Monthly Wastewater Flows**



As shown in Figure 3.3 a large jump of 539 LUEs were added from September 2018 to October 2018. The average annual growth rate prior to this (October 2012 to September 2018) was 8.3% per year and was 2.9% per year after. A planning value of 2.9% annual growth was used for projections, which results in reaching the capacity of 4,082 LUEs at the end of 2030. Since system capacity is projected to occur within 10-years the Capital Improvement Plan includes the improvements to meet the projected ultimate demands of the System.

Many different factors affect growth and development within an area. These include, but are not limited to, the local and regional economy, development restrictions, environmental constraints, the current housing inventory, and existing and proposed roadways. The District does not control any of these factors, and therefore projection is difficult. In addition, there is not an existing collection system for several areas of the Service Area. The timing of a collection system being extended, if at all, will greatly affect the rate of growth in these areas. It is therefore essential that projected wastewater demand and system limitations be evaluated and updated on a routine basis. As such, it is recommended that the number of LUEs in the Service Area and the growth rate be evaluated on an annual basis.

## **4.0 EXISTING FACILITIES**

### **4.1 TCEQ TLAP Permit**

The District currently holds and operates the System according to TCEQ Permit No. WQ0013878-001, which authorizes disposal of a maximum of 1.0 MGD of treated effluent from the Flintrock WWTP via land application on public access lands under the Final Phase. Several Phases are included in the permit to account for incremental expansion of the System. The phases and required effluent quality included in the Permit are summarized below. The Permit includes seven (7) effluent disposal sites with a portion of the sites permitted for spray irrigation, a portion drip irrigation, and expansion of the Flintrock Golf Course irrigation permitted for either spray or drip irrigation. The Permit also stipulates minimum effluent storage requirements to account for times when irrigation is not possible. For spray irrigation a minimum of 45-days of storage is required and a minimum of 5-days of storage is required for drip irrigation.

**Table 4.1 – TCEQ Permit Phases**

<b>Phase</b>	<b>Maximum Daily Average Flow</b>
Interim I	0.4860 MGD
Interim II	0.5015 MGD
Interim III	0.6498 MGD
Final	1.0000 MGD

**Table 4.2 – TCEQ TLAP Effluent Limits**

<b>Constituent</b>	<b>Limitation (Monthly Average)</b>
Biological Oxygen Demand (BOD) – 5 Day	5 mg/L (Maximum)
Total Suspended Solids (TSS)	10 mg/L (Maximum)
Total Phosphorous	2 mg/L (Maximum)
Chlorine Concentration after 20 minutes detention	1 mg/L (Minimum)

**Table 4.3 – TCEQ Permitted Disposal Sites**

	IRRIGATION TYPE	IRRIGATION AREA (AC.)	PERMITTED APPLICATION RATE (GPD/SF)	PERMITTED CAPACITY (GPD)
<b>EXISTING DISPOSAL SYSTEMS</b>				
HURST CREEK MUD	N/A - EVAPORATION	N/A	N/A	100,000
FLINTROCK GOLF COURSE	SPRAY	113.7900	0.078	386,024
LAKEWAY REGIONAL	DRIP	3.5582	0.100	15,500
<b>SUBTOTAL EXISTING EFFLUENT DISPOSAL</b>		<b>117.3482</b>		<b>501,524</b>
<b>FUTURE DISPOSAL SYSTEMS</b>				
SERENE HILLS	DRIP	72.9649		304,591
<i>A-1</i>	<i>DRIP</i>	<i>12.3966</i>	<i>0.100</i>	<i>54,000</i>
<i>A-2</i>	<i>DRIP</i>	<i>11.5000</i>	<i>0.097</i>	<i>48,591</i>
<i>A-3</i>	<i>DRIP</i>	<i>15.6795</i>	<i>0.100</i>	<i>68,300</i>
<i>A-4</i>	<i>DRIP</i>	<i>8.8843</i>	<i>0.100</i>	<i>38,700</i>
<i>A-5</i>	<i>DRIP</i>	<i>24.5045</i>	<i>0.089</i>	<i>95,000</i>
THOMAS TRACT	DRIP	6.0147	0.100	26,200
SERENE HILLS DRIVE	SPRAY	6.8600	0.078	23,272
CREEKSIDE TRACT	DRIP	3.8000	0.100	16,553
FLINTROCK GOLF COURSE	DRIP	30.2607	0.100	
	<i>or</i>	<i>or</i>	<i>or</i>	131,816
	SPRAY	38.8560	0.078	
<b>SUBTOTAL FUTURE DISPOSAL</b>		<b>119.9003 or 128.4956</b>		<b>502,432</b>
<b>TOTAL EFFLUENT DISPOSAL</b>		<b>237.25 or 245.84</b>		<b>1,003,956</b> <b>(Max of 1,000,000 allowable)</b>

**Table 4.4 – TCEQ Permitted Storage Requirements**

	IRRIGATION TYPE	DISPOSAL CAPACITY (GPD)	STORAGE (DAYS)	STORAGE REQUIRED (10 <sup>6</sup> GAL)
<b>EXISTING DISPOSAL SYSTEMS</b>				
HURST CREEK MUD	N/A - EVAPORATION	100,000	N/A	0
FLINTROCK GOLF COURSE	SPRAY	386,024	45	17.371
LAKEWAY REGIONAL	DRIP	15,500	5	0.077
<b>SUBTOTAL EXISTING DISPOSAL SYSTEMS</b>		<b>501,523</b>		<b>17.448</b>
<b>FUTURE DISPOSAL SYSTEMS</b>				
SERENE HILLS	DRIP	304,591	5	1.523
THOMAS TRACT	DRIP	26,200	5	0.131
SERENE HILLS DRIVE	SPRAY	23,272	45	1.047
CREEKSIDE TRACT	DRIP	16,553	5	0.083
FLINTROCK GOLF COURSE	DRIP	131,816	5	0.659
	OR			
	SPRAY	131,816	45	5.932
<b>TOTAL PROPOSED EFFLUENT STORAGE</b> (FLINTROCK GOLF COURSE DRIP IRRIGATION)		<b>1,003,956</b>		<b>20.891</b>
<b>TOTAL PROPOSED EFFLUENT STORAGE</b> (FLINTROCK GOLF COURSE SPRAY IRRIGATION)		<b>1,003,956</b>		<b>26.164</b>

## **4.2 TCEQ Reclaimed Water Authorization**

The District holds TCEQ Reclaimed Water Authorization No. R13878001 for the Flintrock WWTP which allows treated effluent to be used for irrigation and other beneficial non-potable uses. This Authorization is also commonly referred to as a Beneficial Reuse Permit or Chapter 210 Permit, from the TCEQ Chapter 210 that stipulates the regulations. Although the Authorization allows for Type I and Type II reclaimed water uses, the Flintrock WWTP produces effluent meeting the requirements of the higher quality Type I, which allows a wider range of uses of the reclaimed water including where the public may come in contact.

**Table 4.5 – TCEQ Type I Reclaimed Water Limits**

<b>Constituent</b>	<b>Limitation (Monthly Average)</b>
Carbonaceous Biological Oxygen Demand (CBOD) – 5 Day	5 mg/L (Maximum)
Turbidity	3 NTU (Maximum)
Fecal Coliform	20 CFU/100mL (Max Geometric Mean) 75 CFU/100 mL (Max Single Grab Sample)

## **4.3 Land Acquisitions**

The District has acquired entitlements to several properties to enable effluent storage and disposal facilities to be constructed, summarized below.

### Flintrock Golf Course

The District was provided an easement by the Flintrock Estates Developer over the golf course property that allows for effluent storage, irrigation, and associated improvements at no cost and as part of the conveyance of the effluent storage ponds and spray irrigation system.

### Thomas Tract

The District was deeded the ‘Heller Tract’, located south of Flintrock Road, by the Flintrock Estates Developer at no cost. The District subsequently accepted an 11.22-acre permanent easement approximately 1,000 feet west of and in exchange for the Heller Tract. This easement is termed the ‘Thomas Tract’ and allows for effluent storage, irrigation, and associated improvements. The proposed CIP does not include any improvements on this property.

### Lakeway Regional

The District acquired an 8.50-ac effluent storage and irrigation easement to the west of the Lakeway Regional hospital in exchange for 4-wastewater LUEs. The Flintrock Wastewater Impact Fee at the time of the exchange was \$12,600 per LUE, resulting in a cost of \$50,400.



### Creekside

The District acquired a 5.40-ac effluent storage and irrigation easement to the west of and adjacent to the Flintrock WWTP in exchange for 4-wastewater LUEs. The Flintrock Wastewater Impact Fee at the time of the exchange was \$12,600 per LUE, resulting in a cost of \$50,400.

### Serene Hills

The District originally acquired 133-acres, fee simple, in the Serene Hills development in exchange for 315-water and 315-wastewater LUEs. The Water Capital Recovery Fee was \$3,500 per LUE and the Flintrock Wastewater Impact Fee was \$11,547 per LUE at time of exchange, resulting in a total cost of \$4,739,805 or \$35,637.63 per acre. Through subsequent land sales and exchanges the District now has 115.9-acres. Applying the cost per acre of the original acquisition results in a current cost of \$4,130,401.50.

## **4.4 Existing Wastewater Treatment**

Expansion of the District’s existing Flintrock WWTP to 1.0 MGD was completed in June 2020. The WWTP is located on the 1.37-acre Lot 2A of the Amended Plat of Lohman’s Crossing Shopping Center Subdivision Lots 1 and 2, Document No. 200900080, south of Lohmans Crossing and west of RR 620. Treatment is accomplished using a complete mix activated sludge process, utilizing sequencing batch reactors (SBRs). Effluent from the SBRs receives tertiary treatment through disk filters and is then pumped to either the existing Flintrock Golf Course Effluent Holding Ponds, the Hurst Creek MUD Effluent Holding Pond, or the Lakeway Regional Effluent Storage Tank. Wasted sludge from the treatment process is dewatered using a belt filter press and then hauled away.

## **4.5 Existing Effluent Storage**

Effluent storage for the system is currently provided in two (2) effluent storage ponds and one (1) effluent storage tank with a total storage volume of 13.41-million gallons (MG) and through Hurst Creek MUD’s system, summarized below. The District has a contract that allows for a maximum of 0.10 MGD to be sent to Hurst Creek MUD’s Effluent Holding Pond, located west of the WWTP, for storage and disposal by Hurst Creek MUD. The two (2) Flintrock Golf Course (FRGC) Effluent Holding Ponds are located on the golf course. The FRGC Effluent Holding Pond 1 is the upper pond, located at an elevation higher than Pond 2, and under normal operating conditions receives flows from the WWTP and then overflows into a pipe that transports effluent to the lower Pond 2. The Lakeway Regional Effluent Storage Tank is located on the southwest corner of the Lakeway Regional Medical campus.

**Table 4.6 – Existing Effluent Storage Summary**

<b>Effluent Storage Facility</b>	<b>Volume (MG)</b>
Hurst Creek MUD	N/A
Flintrock Golf Course Effluent Holding Pond 1	3.859
Flintrock Golf Course Effluent Holding Pond 2	9.347
Lakeway Regional Effluent Storage Tank	0.208
<b>Total</b>	<b>13.414</b>

#### **4.6 Existing Effluent Disposal**

There are three (3) existing effluent disposal systems, summarized below, with a total permitted disposal capacity of 0.5015 MGD. As discussed in Section 4.3 the District has a contract with Hurst Creek MUD to dispose of up to 0.10 MGD of effluent through the MUD’s Effluent Holding Pond and irrigation system. The largest system is the FRGC irrigation system that uses effluent, pumped from the FRGC Effluent Holding Pond 2, to irrigate the greens, fairways, and tee boxes of the golf course. The Lakeway Regional Drip Irrigation system was recently completed in July 2020 and irrigates approximately 3.6-acres on the west end of the Lakeway Regional Medical campus. The Lakeway Regional Drip Irrigation system is supplied from the Lakeway Regional Effluent Storage Tank.

**Table 4.7 – Existing Effluent Disposal Summary**

<b>Effluent Disposal System</b>	<b>Permitted Disposal Capacity (MGD)</b>
Hurst Creek MUD	0.1000
Flintrock Golf Course Irrigation	0.3860
Lakeway Regional Drip Irrigation	0.0155
<b>Total</b>	<b>0.5015</b>

## **5.0 PROPOSED FACILITIES**

A total system demand of 1.0 MGD is expected at build-out of the Service Area and during the 10-year planning period. The WWTP was recently expanded to a treatment capacity of 1.0 MGD, but a number of improvements are needed to increase the capacity of the effluent storage and disposal facilities.

### **5.1 Revisions from Previous Capital Improvements Plan**

The proposed improvements include several deviations from those included in the 2015 Study Capital Improvements Plan and in the existing TCEQ TLAP. These predominantly are related to the addition of a proposed reuse irrigation system and the associated anticipated beneficial reuse credit that would be gained, and also to the desire to minimize the amount of drip irrigation utilized for effluent disposal due to its higher initial and maintenance costs.

#### **TCEQ Beneficial Reuse Credit**

TCEQ recently enacted amendments to Chapters 210 and 309 that will allow effluent disposal credit to be obtained for beneficial reuse, including irrigation of common areas and other non-potable uses. The amendments include a number of requirements, but will allow for up to 80% of the lowest use period for outdoor reclaimed/reuse water use (such as irrigation) to be claimed towards effluent disposal capacity.

This update to the Study includes installation of a reuse water irrigation system and anticipates obtaining beneficial reuse credit to offset a portion of the effluent disposal capacity. A preliminary reuse irrigation analysis was included in the August 5, 2019 Flintrock Effluent System Improvement Options report. The Service Area was divided into 5 Sections. It is assumed that the 3 Sections closest to the WWTP and proposed Reuse Irrigation Pump Station will be served. Estimates for these 3 Sections yield an estimated peak Summer demand of approximately 1,020,000 gallons per day (gpd), a minimum Winter demand of approximately 100,000 gpd, and a resulting beneficial reuse credit of up to 80,000 gpd. The minimum winter demand was estimated based on the flow trends seen in the existing Steiner Ranch reuse irrigation system. Because these values were based on estimates this Study assumes that approximately 55,000 gpd of beneficial reuse credit is gained for the purposes of sizing disposal improvements, but if additional credit is gained fewer disposal fields will be required. The corresponding estimated peak flow rate for the 3 Sections included is approximately 2,200 gpm. The proposed Reuse Irrigation Pump Station is planned for an initial capacity of 1,500 gpm and a second phase expansion to 3,000 gpm to provide flexibility and contingency.

The anticipated beneficial reuse credit is used to revise a portion of the previously planned drip irrigation fields in Serene Hills to spray irrigation and to eliminate one drip irrigation system (Thomas Tract). The degree of these changes to the effluent disposal fields that will ultimately be implemented will depend on the extent that the reclaimed irrigation system can be grown and the amount of reclaimed water used by these customers. There is potential that additional effluent disposal fields could be eliminated if the reclaimed irrigation use is high enough, but there is also the potential that the use is lower than estimated and a portion of these changes are not able to be

implemented. The proposed plan will allow flexibility in that the effluent disposal fields will be installed in phases as needed.

### Summary of Revisions

- *Added the Flintrock Reuse Irrigation Pump Station.* This Pump Station and associated improvements was added to supply the proposed reuse irrigation system, and will be located adjacent to the WWTP.
- *Beneficial reuse credit of 55,000 gpd assumed.* This credit would decrease the capacity needed from the effluent disposal system.
- *Revised the location of the Effluent Transfer Pump Station.* The location of this Pump Station was previously planned at the FRGC Effluent Holding Ponds and to be used to pump effluent from these Ponds to the Proposed Serene Hills Effluent Storage Tanks. It is now proposed to locate the Pump Station adjacent to the WWTP and in the same building as the Reuse Irrigation Pump Station. This Pump Station will have the ability to transfer effluent to either the existing FRGC Ponds, Hurst Creek MUD Pond, or to the proposed Serene Hills Effluent Storage Tanks.
- *Added the Flintrock Effluent Storage Basin.* This 830,000-gallon Storage Basin will be located adjacent to the WWTP and provide the storage volume needed for the Flintrock Effluent Transfer and Reuse Irrigation Pumps.
- *Removed the Thomas Tract Effluent Disposal System.* This includes the disposal fields and associated pumping, transmission, and storage improvements.
- *Revised Serene Hills Effluent Disposal Fields A-1, 4 & 5 from Drip to Spray Irrigation.*
- *Increased Capacity of Serene Hills Effluent Storage Tanks 1 & 2 to 10.3 MG Each.* The additional volume is needed due to the increase in spray irrigation (45-days storage requirement) versus drip irrigation (5-days storage requirement).

### **5.2 General System Description**

Treated effluent from the WWTP will flow into the proposed Flintrock Effluent Storage Basin, to be located on the Creekside tract adjacent to the WWTP. Both the proposed Flintrock Effluent Transfer Pumps and proposed Flintrock Reuse Irrigation Pumps will take suction from this tank and pump out to the respective systems.

The Flintrock Reuse Irrigation Pumps will be used to pressurize and distribute effluent/reuse water to the proposed Reuse Irrigation System. These pumps will operate as needed to sustain system pressure and therefore meet system demands. The existing 6-inch Effluent Line No. 1 and Lakeway Regional Effluent Storage Tank will be incorporated into the irrigation system, but it is anticipated that the hydraulic grade/pressure needed for this system will be higher than the overflow elevation of the Lakeway Regional Effluent Storage Tank so a fill control valve assembly is proposed at this tank to prevent it from overflowing. An existing pump station at the Lakeway Regional Effluent Storage Tank is used to supply the existing effluent drip irrigation disposal system adjacent to it. A system of proposed transmission/distribution mains will be used to provide reuse irrigation water to various customers in the area. The Flintrock Reuse Irrigation Pumps and

transmission/distribution system will also be used to feed the adjacent proposed Creekside Effluent Disposal System.

The Flintrock Effluent Transfer Pumps will be used to pump water to either the existing FRGC Effluent Holding Ponds, existing Hurst Creek MUD Effluent Storage Pond or the proposed Serene Hills Effluent Storage Tanks. A fill control valve assembly is proposed at both the FRGC Effluent Holding Ponds and Serene Hills Effluent Storage Tanks to control which of these facilities is filled. The manually operated valve feeding the Hurst Creek MUD Effluent Storage Pond is anticipated to remain. Due to the large difference in elevations between these storage facilities a pressure sustaining valve is proposed at both the Flintrock Effluent Transfer Pumps and at the FRGC Effluent Holding Ponds. Effluent will be pumped from each of these storage facilities to the various effluent disposal systems.

An existing pump station at the FRGC Effluent Holding Pond No. 2 is used to supply the existing FRGC irrigation system. This irrigation system is proposed to be expanded into the roughs of the course and it is anticipated that the same pump station will be able to be utilized.

The Serene Hills Effluent Pump Station is proposed adjacent to the proposed Serene Hills Effluent Storage Tanks and will feed the proposed Serene Hills Effluent Disposal System, the existing Serene Hills R.O.W. Irrigation (currently supplied with potable water) and a potential reuse irrigation system.

Descriptions of the proposed improvement projects follow and the Flintrock Wastewater System Overall Layout showing the proposed facilities is included as Attachment 'A'. The Milestone listed for each improvement project is the effluent flow rate from the WWTP when that project will need to be in service and the Projected Date of Need is the anticipated date when this will occur based on the growth projections.

### **5.3 Effluent Pumping, Transmission and Storage Facilities**

#### **5.3.1 Flintrock WWTP Effluent Improvements**

The new Flintrock Effluent Storage Basin and Effluent Transfer Pump Station is proposed on the Creekside tract, adjacent to the WWTP. This facility will be used to distribute effluent from the WWTP to each of the existing and proposed storage sites. The Reuse Irrigation Pump Station, shown as a separate project, is proposed to be housed in the same pump station building and to also utilize the Flintrock Effluent Storage Basin.

A new storage basin is required with this facility to manage the large difference between the relatively constant effluent flow rate from the WWTP and the highly variable flow rates needed to meet the demands of the system. The Flintrock Effluent Storage Basin is proposed to have a minimum usable / equalization volume of 600,000-gallons, and a total volume of approximately 830,000-gallons. Effluent from the WWTP will flow from the existing basin downstream of the existing disk filters to this proposed basin.

The Effluent Transfer Pumps will be used to deliver effluent to the existing FRGC Ponds, Hurst Creek Pond, and the proposed Serene Hills Effluent Storage Tanks. The proposed Serene Hills Effluent Storage Tanks will be located approximately 180-feet higher than the existing FRGC Pond No. 1. The large difference in pumping head created by this will be managed by installing a pressure sustaining valve at the pump station. Two (2) Effluent Transfer Pumps with a minimum capacity of 1,400 gallon per minute (gpm) each are proposed, one (1) as an installed spare, giving a firm pumping capacity of 1,400 gpm.

Effluent mains will be required to convey the flows from the Effluent Pump Station. Approximately 320-linear feet of 12-inch effluent main is proposed from the Effluent Transfer Pumps to the existing 12-inch main that currently runs from the WWTP to the FRGC Ponds. Reuse irrigation mains will be needed when the Reuse Irrigation Pump Station is constructed, however they are proposed with this project to avoid future site disturbance. Approximately 600-linear feet of 8-inch reuse main to connect to the existing main that extends to the Lakeway Regional Effluent Tank, and approximately 1,200-linear feet of 16-inch reuse main from the pump station to the west, where it will later be extended to Lohmans Spur and then to the various future customers.

Additional effluent storage volume is needed currently, which is proposed to be addressed by the construction of the proposed Serene Hills Storage Tank No. 1. The proposed Flintrock Effluent Storage Basin and Pump Station will be used to transport effluent to this site and therefore needs to be installed as soon as possible. Construction of this facility will also enable the reuse irrigation system.

<b>Project</b>	<b>Storage Capacity Added</b>	<b>Projected Date of Need</b>	<b>Milestone</b>	<b>Estimated Project Cost</b>
Flintrock Effluent Storage Basin, Transfer Pump Station, and Mains	0.60 MG	2021	-	\$3,029,000
<b>Total</b>	<b>0.60 MG</b>			<b>\$3,029,000</b>

### 5.3.2 Serene Hills Effluent Storage Improvements Phase I

Two (2) effluent storage tanks are proposed in Serene Hills to provide the remaining necessary and TCEQ required effluent storage for the System. The storage capacity required was calculated based upon the type of irrigation systems currently proposed for each of the effluent disposal sites. With the District’s existing TLAP, TCEQ requires a minimum of 5-days storage for drip irrigation and 45-days storage for spray irrigation. In addition to the proposed Flintrock Effluent Storage Basin, a total of 20.532 MG will still be needed. Two (2) 10.30 MG storage tanks are proposed and are anticipated to be installed in two (2) phases.

Effluent Lines 2A and 2C are proposed to transport effluent to the proposed Serene Hills Effluent Storage Tanks. This 12-inch effluent main will run from the Flintrock Golf Course, connecting into the existing 12-inch main near the existing Effluent Pond No. 2, up to the proposed Serene Hills Effluent Storage Tank site. The middle portion of this main, Effluent Line 2B, was previously constructed as part of the Flintrock Road improvements project. Effluent Line 2A will be approximately 3,500-linear feet and Line 2C will be approximately 2,400-linear feet.

As discussed in Section 5.3.1 the proposed Flintrock Effluent Transfer Pumps will be used to transfer effluent to either the existing FRGC Ponds, Hurst Creek Pond, or the proposed Serene Hills Effluent Storage Tanks. Control valves will be needed to control which storage facility the effluent is transferred to. The FRGC Control Valve Assembly will be installed on the effluent main that feeds the FRGC Ponds and be opened through the SCADA system when it is desired to fill these ponds. A control valve assembly is also needed at the Serene Hills Storage Tank to control when these tanks are filled.

Additional effluent storage is currently needed and therefore this project is needed as soon as possible.

<b>Project</b>	<b>Storage Capacity Added</b>	<b>Projected Date of Need</b>	<b>Milestone</b>	<b>Estimated Project Cost</b>
Serene Hills Effluent Storage Tank No. 1	10.30 MG	2021	-	\$7,054,000
Effluent Lines 2A & 2C and FRGC Control Valve	-	2021	-	\$1,316,000
<b>Total</b>	<b>10.30 MG</b>			<b>\$8,370,000</b>

### 5.3.3 Serene Hills Effluent Storage Improvements Phase II

The proposed 10.30 MG Serene Hills Effluent Storage Tank No. 2 will complete the anticipated effluent storage needs of the System. This tank is proposed to be located adjacent to Serene Hills Tank No. 1.

<b>Project</b>	<b>Storage Capacity Added</b>	<b>Projected Date of Need</b>	<b>Milestone</b>	<b>Estimated Project Cost</b>
Serene Hills Effluent Storage Tank No. 2	10.30 MG	April 2025	649,863 gpd	\$7,500,000
<b>Total</b>	<b>10.30 MG</b>			<b>\$7,500,000</b>

### 5.3.4 Serene Hills Effluent Pump Station

The Serene Hills Effluent Pump Station will pump effluent from the Serene Hills Effluent Storage Tanks and supply the Serene Hills Right-of-Way (ROW) Irrigation system, the Serene Hills Effluent Disposal Fields, and potentially a reuse irrigation system for the area. The Pump Station is proposed adjacent to and downhill of the proposed Serene Hills Storage Tanks. Also included with this project is approximately 840-linear feet of 8-inch effluent main from the Pump Station to Serene Hills Drive. The Pump Station is anticipated to include pumps utilizing VFDs to maintain system pressure, a cartridge filter system to filter the effluent, and either a chlorine or bleach disinfection system. The timing of this project will be driven by the need for either the Serene Hills R.O.W. Irrigation, Serene Hills Effluent Disposal Fields, or if a reuse irrigation system is desired for the area.

<b>Project</b>	<b>Storage Capacity Added</b>	<b>Projected Date of Need</b>	<b>Milestone</b>	<b>Estimated Project Cost</b>
Serene Hills Effluent Pump Station	-	April 2025	649,863 gpd	\$1,670,000
<b>Total</b>	<b>-</b>			<b>\$1,670,000</b>

### 5.3.5 Flintrock Reuse Irrigation Pump Station Phase I

The Flintrock Reuse Irrigation Pump Station will be used to pressurize the proposed reuse irrigation system and to fill the existing Lakeway Regional Effluent Storage Tank. These proposed pumps will be located in the same building as the Flintrock Effluent Transfer Pumps and will also take suction from the proposed Flintrock Effluent Storage Basin. In lieu of installing an elevated storage tank these pumps are proposed to operate utilizing either a hydropneumatic pressure tank or variable frequency drives (VFDs) to maintain system pressure. Two (2) 1,500 gpm pumps are proposed with the initial phase, one (1) as an installed spare, giving a firm pumping capacity of 1,500 gpm. Allowances for a third pump to be installed in the future will be made to allow the system to be expanded.



Daily demand for effluent and reuse irrigation water will be higher than the effluent supply available during at least the summer months. The effluent storage facilities in the system will address this deficiency for a period of time, but it is probable that there will be periods where an additional supply will be necessary. A potable water supplementation system is proposed that will allow potable water to be used to fill the proposed Flintrock Effluent Storage Basin.

A fill control valve assembly will be needed at the existing Lakeway Regional Effluent Storage Tank to control when effluent is allowed to fill this tank. This storage tank is proposed to operate on the proposed reuse irrigation system but will have an overflow elevation that is lower than the anticipated hydraulic grade of the reuse irrigation system. A control valve will therefore be needed to allow the tank to fill but keep it from overflowing.

<b>Project</b>	<b>Disposal Capacity Added</b>	<b>Projected Date of Need</b>	<b>Milestone</b>	<b>Estimated Project Cost</b>
Flintrock Reuse Irrigation Pump Station - Phase I	27,500 gpd	Sept. 2030	945,310 gpd	\$ 614,000
Lakeway Regional Control Valve Assembly	-	Sept. 2030	945,310 gpd	\$ 232,000
<b>Total</b>	<b>27,500 gpd</b>			<b>\$ 846,000</b>

### 5.3.6 Flintrock Reuse Irrigation Pump Station Phase II

The second phase of this project includes installing the third pump and associated piping and electrical improvements. This addition will bring the total to three (3) 1,500 gpm pumps, with a firm pumping capacity of 3,000 gpm. Need for this project will be dependent on the speed that the reuse irrigation system and the associated demand grows.

<b>Project</b>	<b>Disposal Capacity Added</b>	<b>Projected Date of Need</b>	<b>Milestone</b>	<b>Estimated Project Cost</b>
Flintrock Reuse Irrigation Pump Station - Phase II	27,500 gpd	As Needed	As Needed	\$ 281,000
<b>Total</b>	<b>27,500 gpd</b>			<b>\$ 281,000</b>

## **5.4 Effluent Disposal Facilities**

### **5.4.1 Flintrock Golf Course Irrigation Expansion – Roughs**

The existing FRGC Irrigation system irrigates the fairways, tees, and greens and has a permitted disposal capacity of 386,023 gpd. The proposed expansion will extend the spray irrigation system into the roughs of the course and expand its capacity by 131,787 gpd. The expanded system is anticipated to be operated through the existing control panel and fed by the existing irrigation pumps.

The Flintrock Golf Course Irrigation Expansion will need to be complete prior to effluent flows reaching the current effluent disposal capacity of 501,523 gpd.

<b>Project</b>	<b>Disposal Capacity Added</b>	<b>Projected Date of Need</b>	<b>Milestone</b>	<b>Estimated Project Cost</b>
Flintrock Golf Course Irrigation Expansion - Roughs	131,787 gpd	Dec. 2021	501,523 gpd	\$1,154,000
<b>Total</b>	<b>131,787 gpd</b>			<b>\$1,154,000</b>

### **5.4.2 Creekside Effluent Disposal**

A drip irrigation system is proposed to be installed on the Creekside tract, adjacent to the WWTP, to further expand the effluent disposal capacity. The Flintrock Effluent Storage Basin and Pump Station facility is also planned to be located on this tract and so the drip irrigation fields would encompass the land left over. This site is permitted for 16,553 gpd but will need to be reassessed once the available land is determined.

<b>Project</b>	<b>Disposal Capacity Added</b>	<b>Projected Date of Need</b>	<b>Milestone</b>	<b>Estimated Project Cost</b>
Creekside Effluent Disposal	16,553 gpd	Dec. 2024	633,310 gpd	\$ 762,000
<b>Total</b>	<b>16,553 gpd</b>			<b>\$ 762,000</b>

### **5.4.3 Serene Hills R.O.W. Irrigation**

An existing irrigation system irrigates the grass and landscaping along Serene Hills Drive using potable water, from SH 71 to just south of Flintrock Road. This project consists of disconnecting the system from potable water and connecting it to effluent. Coordination with an irrigation company will be needed to confirm the proper connection point and make any needed modifications, but since the conversion was anticipated when the system was installed this is anticipated to be relatively minor. The Serene Hills Effluent Pump Station will need to be

complete prior to making this conversion. This system has a permitted disposal capacity of 23,267 gpd.

<b>Project</b>	<b>Disposal Capacity Added</b>	<b>Projected Date of Need</b>	<b>Milestone</b>	<b>Estimated Project Cost</b>
Serene Hills R.O.W. Irrigation	23,267 gpd	April 2025	649,863 gpd	\$ 133,000
<b>Total</b>	<b>23,267 gpd</b>			<b>\$ 133,000</b>

#### 5.4.4 Serene Hills Effluent Disposal

The last effluent disposal fields proposed to be installed are those in Serene Hills. The proposed system is made up of five (5) non-contiguous areas, A1-5. All five (5) areas are currently approved in the existing TLAP as drip irrigation sites with a total disposal capacity of 304,591 gpd. It is proposed to ultimately revise the TLAP and install spray irrigation on the last three (3) areas, A1, 4 and 5. This would give a total disposal capacity for all five (5) areas of 272,180 gpd. This revision is proposed because although drip irrigation provides more disposal capacity it is more expensive to install and requires more on-going maintenance than spray irrigation. It is proposed to make this revision to the last three (3) areas to be installed because this will allow flexibility in the plan. If less disposal credit is granted from TCEQ for the reuse irrigation system than anticipated, one or more of these areas can be installed with drip irrigation, and if more credit is granted some portion of these fields can be avoided. It is recommended that an amendment to the TCEQ TLAP to revise Areas A1, 4 and 5 to spray irrigation not be applied for until there is more assurance as to the amount of disposal credit that will be gained from the reuse irrigation system.

<b>Project</b>	<b>Disposal Capacity Added</b>	<b>Projected Date of Need</b>	<b>Milestone</b>	<b>Estimated Project Cost</b>
Serene Hills Drip Irrigation Field A-2	48,591 gpd	Nov. 2025	673,130 gpd	\$2,010,000
Serene Hills Drip Irrigation Field A-3	68,300 gpd	Oct. 2026	721,721 gpd	\$2,543,000
Serene Hills Spray Irrigation Field A-1	42,045 gpd	Feb. 2028	790,021 gpd	\$1,200,000
Serene Hills Spray Irrigation Field A-4	30,133 gpd	Nov. 2028	832,066 gpd	\$ 843,000
Serene Hills Spray Irrigation Field A-5	83,111 gpd	May 2029	862,199 gpd	\$2,308,000
<b>Total</b>	<b>272,180 gpd</b>			<b>\$8,904,000</b>

## **5.5 Summary**

The Flintrock Wastewater System is planned to ultimately serve up to 1.0 MGD. The Flintrock WWTP was recently expanded to this capacity and now the disposal system will need to be expanded to 1.0 MGD, in phases to meet or exceed the effluent flows from the WWTP. It is also proposed to install the capital improvements necessary to serve a reuse irrigation system. The improvements proposed will result in an effluent disposal capacity of 0.945 MGD from the dedicated disposal fields and 0.055 MGD ultimately gained from TCEQ for the proposed reuse irrigation system, for a total disposal capacity of 1.0 MGD. A summary of the existing and proposed effluent disposal systems and their associated capacity and storage requirement is shown in Figure 5.1 and the existing and proposed effluent storage facilities in Figure 5.2.

Figure 5.3 gives a summary of each of the proposed improvement projects with the Estimated Project Cost, Milestone and Projected Date of Need for each project listed. The Milestone is the effluent flow rate from the WWTP when that project will need to be on-line, and the Projected Date of Need is the anticipated date that the Milestone will occur based on the anticipated growth rate of wastewater flows. TCEQ's "75/90 rule" will need to be taken into consideration, where planning/ design of the improvements is supposed to commence by the point the system is at 75% capacity and construction by the time capacity is at 90%. Timing of the need for the dedicated effluent disposal fields will be affected by the timing of Flintrock Reuse Irrigation system and anticipated beneficial reuse credit. If reuse credit is gained before construction of these facilities, or a portion thereof, the timing of the remaining facilities could be delayed.

**Figure 5.1 – Effluent Disposal Summary**

System	Type of Irrigation	Disposal Capacity		Storage Requirement (MG)
		System (GPD)	Cumulative (GPD)	
<b>Existing Effluent Disposal</b>				
Flintrock GC – Fairways	Spray	386,024	386,023	17.371
Hurst Creek MUD	N/A	100,000	486,023	0.00
Lakeway Regional	Drip	15,500	501,523	0.077
<b>Subtotal Existing</b>		<b>501,524</b>		<b>17.448</b>
<b>Proposed Effluent Disposal</b>				
Flintrock GC - Roughs	Spray	131,787	633,310	5.930
Creekside	Drip	16,553	649,863	0.083
Serene Hills R.O.W.	Spray	23,272	673,130	1.047
Serene Hills A2	Drip	48,591	721,721	0.243
Serene Hills A3	Drip	68,300	790,021	0.341
Serene Hills A1	Spray	42,045	832,066	1.892
Serene Hills A4	Spray	30,133	862,199	1.356
Serene Hills A5	Spray	83,111	945,310	3.740
<b>Subtotal Proposed Effluent Disposal</b>		<b>443,793</b>		<b>14.633</b>
<b>Proposed Reuse Irrigation (Anticipated TCEQ Credit)</b>				
Various	Spray	54,683	1,000,000	2.461
<b>TOTAL</b>		<b>1,000,000</b>		<b>34.542</b>

**Figure 5.2 – Effluent Storage Summary**

Effluent Storage Facility	Volume (MG)
<b>Existing</b>	
Flintrock Golf Course Effluent Holding Pond 1	3.859
Flintrock Golf Course Effluent Holding Pond 2	9.347
Lakeway Regional Effluent Storage Tank	0.208
<b>Subtotal Existing Effluent Storage</b>	<b>13.414</b>
<b>Proposed</b>	
Flintrock Effluent Storage Basin (0.83 MG Tank, storage volume only included)	0.600
Serene Hills Effluent Storage Tank #1	10.300
Serene Hills Effluent Storage Tank #2	10.300
<b>Subtotal Proposed Effluent Storage</b>	<b>21.200</b>
<b>TOTAL</b>	<b>34.614</b>

**Figure 5.3 – Summary of Proposed Projects**

<b>PROJECT</b>	<b>PROJECTED DATE OF NEED</b>	<b>MILESTONE (GPD)</b>	<b>ESTIMATED PROJECT COST</b>
Flintrock WWTP Effluent Improvements (Effluent Storage Basin, Transfer Pump Station & Mains)	2021	a	\$ 3,029,000
Serene Hills Effluent Storage Imprvts Ph I (Serene Hills Effluent Storage Tank #1, Effluent Lines 2A & 2C, Control Valve)	2021	a	\$ 8,370,000
Flintrock Golf Course Irrigation Expansion	December 2021	501,523 <sup>b</sup>	\$ 1,154,000
Creekside Effluent Disposal	December 2024	633,310 <sup>c</sup>	\$ 762,000
Serene Hills Effluent Storage Imprvts Ph II (Serene Hills Effluent Storage Tank #2)	April 2025	649,863 <sup>d</sup>	\$ 7,500,000
Serene Hills Effluent Pump Station	April 2025	649,863 <sup>e</sup>	\$ 1,670,000
Serene Hills R.O.W. Irrigation	April 2025	649,863 <sup>f</sup>	\$ 133,000
Serene Hills Drip Irrigation Field A-2	November 2025	673,130 <sup>g</sup>	\$ 2,010,000
Serene Hills Drip Irrigation Field A-3	October 2026	721,721 <sup>h</sup>	\$ 2,543,000
Serene Hills Spray Irrigation Field A-1	February 2028	790,021 <sup>i</sup>	\$ 1,200,000
Serene Hills Spray Irrigation Field A-4	November 2028	832,066 <sup>j</sup>	\$ 843,000
Serene Hills Spray Irrigation Field A-5	May 2029	862,199 <sup>k</sup>	\$ 2,308,000
Flintrock Reuse Irrigation Pump Sta. Ph I (Reuse Irrigation Pump Station, Lakeway Regional Control Valve)	September 2030	945,310 <sup>l</sup>	\$ 846,000
Flintrock Reuse Irrigation Pump Sta. Ph II (Reuse Irrigation Pump Station Expansion)		As Needed	\$ 281,000
<b>TOTAL</b>			<b>\$ 32,649,000</b>

Basis of Milestones:

- a. Additional storage is needed currently.
- b. Existing disposal capacity.
- c. Capacity after FRGC Irrigation Expansion installed.
- d. Tied to Serene Hills ROW Irrigation based on anticipated disposal system installation sequence, or when storage requirement reaches 24.31 MG (capacity after Serene Hills Tank #1 installed).
- e. Tied to need for first Serene Hills effluent disposal project.
- f. Capacity after Creekside Effluent Disposal installed.
- g. Capacity after Serene Hills ROW Irrigation installed.
- h. Capacity after Serene Hills Irrigation Field A-2 installed.
- i. Capacity after Serene Hills Irrigation Field A-3 installed.
- j. Capacity after Serene Hills Irrigation Field A-1 installed.
- k. Capacity after Serene Hills Irrigation Field A-4 installed.
- l. Capacity after Serene Hills Irrigation Field A-5 installed.

## **6.0 IMPACT FEE DEVELOPMENT**

### **6.1 Impact Fee Calculation**

Impact Fees allow the District to fund or recoup the costs for facility improvements attributable to System growth. These facilities include wastewater treatment, effluent storage, effluent disposal, and land costs. Included within the effluent disposal category are pumping and transmission main costs. The proposed Impact Fee does not include the cost of extending service to the individual customer (i.e. wastewater collection lines, lift stations, or wastewater force mains). Consistent with the requirements of Chapter 395 of the Texas Local Government Code, fees collected by the District are to be used for the projects identified in this Study.

The actual costs expended were used for the existing infrastructure. Cost estimates for each of the proposed improvements were prepared with the 2019 Flintrock CIP. These estimates were adjusted to present day values using the Construction Cost Index (CCI) published monthly by *Engineering News Record*. To account for future inflation, estimated future value cost estimates were then calculated for the anticipated date of construction for each project, based on the projected date of need and an estimated annual rate of inflation. The estimated annual rate of inflation was calculated using the average rate of increase in the CCI over the previous ten (10) years and subtracting 10% to be conservative. An itemized list of these costs is included in Attachment D.

Table 6.1 includes an itemization of the recommended projects described in the preceding Sections of this Study as well as existing infrastructure with remaining capacity to serve future growth. The capacity of each improvement is given and the unit cost per LUE is calculated for each of the four (4) improvement categories. The maximum calculated Impact Fee is \$19,943 per LUE.

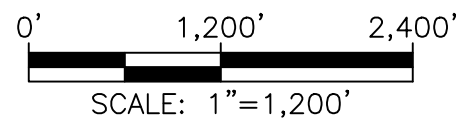
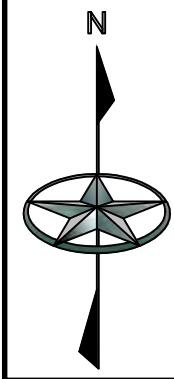
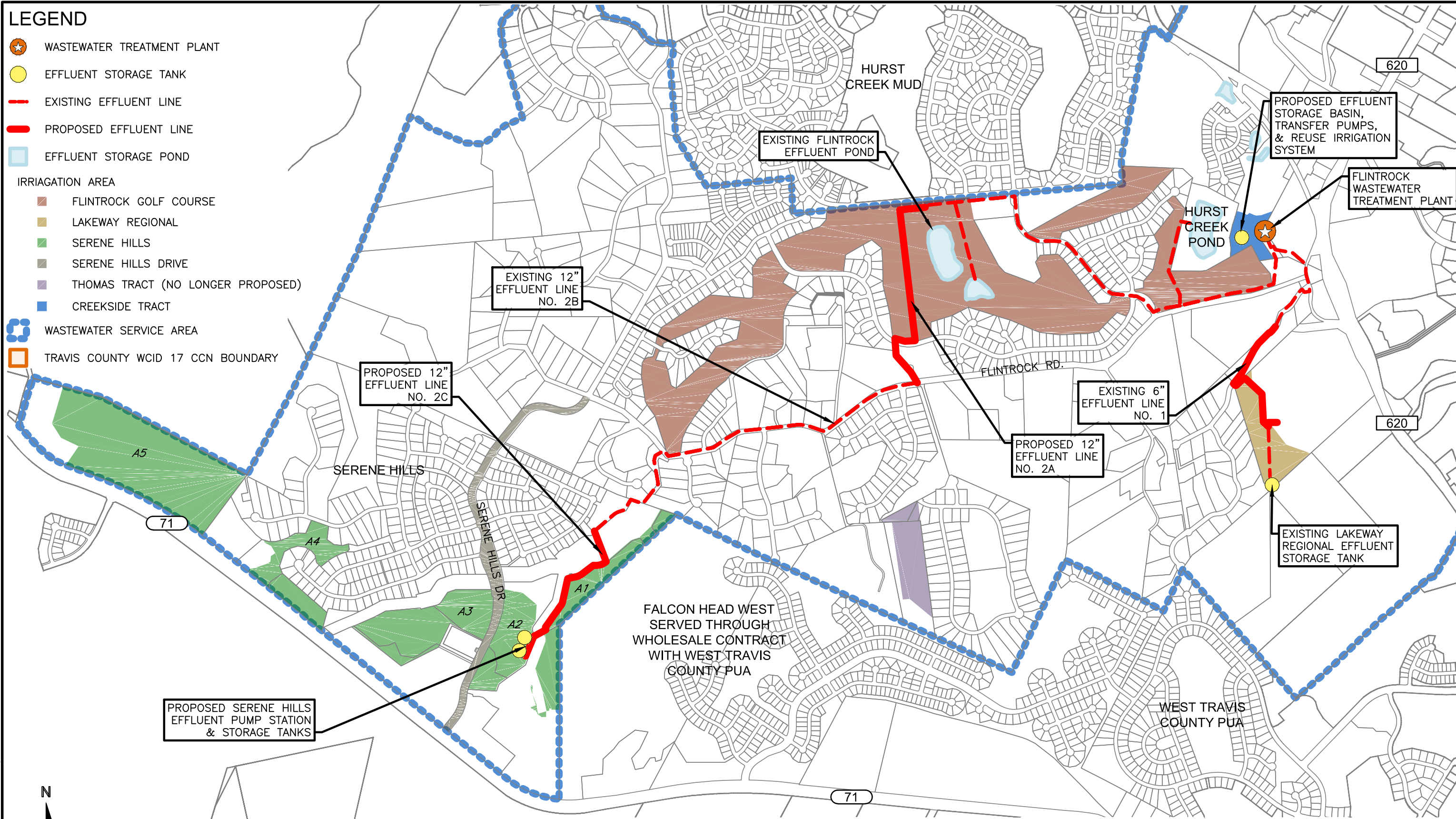
This represents an increase from both the maximum calculated Impact Fee of \$12,725 per LUE in the 2015 Study and the current Impact Fee of \$14,150 per LUE that was adopted in 2019 (2015 Study Impact Fee adjusted for inflation). This is predominantly due to the actual cost of effluent disposal irrigation being higher than previously estimated, projecting the increased cost to the future irrigation systems, and the actual WWTP expansion cost being higher than estimated.

**Table 6.1 - Flintrock Wastewater System Improvements Inventory & Cost**

	Total Project Cost	Capacity		Capacity Allocation (LUEs)				Cost per LUE
		Total	LUEs	Existing	Projected 10yr Growth	Projected Growth Beyond 10 Yr	Excess Capacity	
<b>Wastewater Treatment</b>								
Existing Facilities								
		MGD						
Flintrock WWTP Exp to 1.0 MGD	\$ 9,535,396	0.5	2,041	987	1,054	0	0	
<b>TOTAL WASTEWATER TREATMENT</b>	<b>\$ 9,535,396</b>	<b>2,041</b>		<b>987</b>	<b>1,054</b>	<b>0</b>	<b>0</b>	<b>\$ 4,672</b>
<b>Effluent Storage</b>								
Proposed Facilities								
		MG						
Serene Hills Tank 1	\$ 7,053,520	10.30	1,095	597	498	0	0	
Serene Hills Tank 2	\$ 7,500,212	10.30	1,095	597	498	0	0	
Flintrock Storage Basin	\$ 1,025,873	0.60	64	0	58	0	6	
<b>TOTAL EFFLUENT STORAGE</b>	<b>\$ 15,579,605</b>	<b>2,254</b>		<b>1,194</b>	<b>1,054</b>	<b>0</b>	<b>6</b>	<b>\$ 6,930</b>
<b>Effluent Pumping</b>								
Proposed Facilities								
		GPM						
Flintrock Pump Station	\$ 2,003,385	1,500	0	0	0	0	0	
Serene Hills Pump Station	\$ 1,669,631	205	0	0	0	0	0	
<b>Subtotal Effluent Pumping</b>	<b>\$ 3,673,016</b>	<b>4,082</b>		<b>3,028</b>	<b>1,054</b>	<b>0</b>	<b>0</b>	<b>\$ 900</b>
<b>Effluent Transmission</b>								
Proposed Facilities								
		GPM						
Line 1 (Segments A-C) (6" Dia)	\$ 404,988	420	0	0	0	0	0	
Line 2 (Segments A-C) (12" Dia)	\$ 1,503,796	1,535	0	0	0	0	0	
<b>Subtotal Effluent Transmission</b>	<b>\$ 1,908,784</b>	<b>4,082</b>		<b>3,028</b>	<b>1,054</b>	<b>0</b>	<b>0</b>	<b>\$ 468</b>
<b>Effluent Disposal Irrigation</b>								
Proposed Facilities								
		MGD						
FRGC Roughs	\$ 1,154,209	0.132	538	290	248	0	0	
Creekside Drip	\$ 762,128	0.017	68	38	30	0	0	
Serene Hills ROW	\$ 133,483	0.023	95	53	42	0	0	
Serene Hills Fields A1-A5	\$ 8,904,046	0.272	1,111	600	511	0	0	
Reuse Pump Sta & Mains	\$ 1,127,015	0.055	224	0	223	0	1	
<b>Subtotal Effluent Disposal Irrigation</b>	<b>\$ 12,080,881</b>	<b>2,036</b>		<b>981</b>	<b>1,054</b>	<b>0</b>	<b>1</b>	<b>\$ 5,937</b>
<b>TOTAL EFFLUENT DISPOSAL</b>	<b>\$ 17,662,682</b>							<b>\$ 7,304</b>
<b>LAND</b>								
Existing Facilities								
		MGD						
LW Regional	\$ 50,400	0.386	0	0	0	0	0	
Creekside	\$ 50,400	0.017	0	0	0	0	0	
Serene Hills	\$ 4,130,402	0.272	0	0	0	0	0	
<b>TOTAL LAND</b>	<b>\$ 4,231,202</b>	<b>4,082</b>		<b>3,028</b>	<b>1,054</b>	<b>0</b>	<b>0</b>	<b>\$ 1,037</b>
<b>TOTAL FLINTROCK WW SYSTEM</b>	<b>\$ 47,008,884</b>							<b>\$ 19,943</b>



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**Green  
Civil Design**

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



*Engineering & Consulting*  
Texas Registered Engineering Firm F-17563

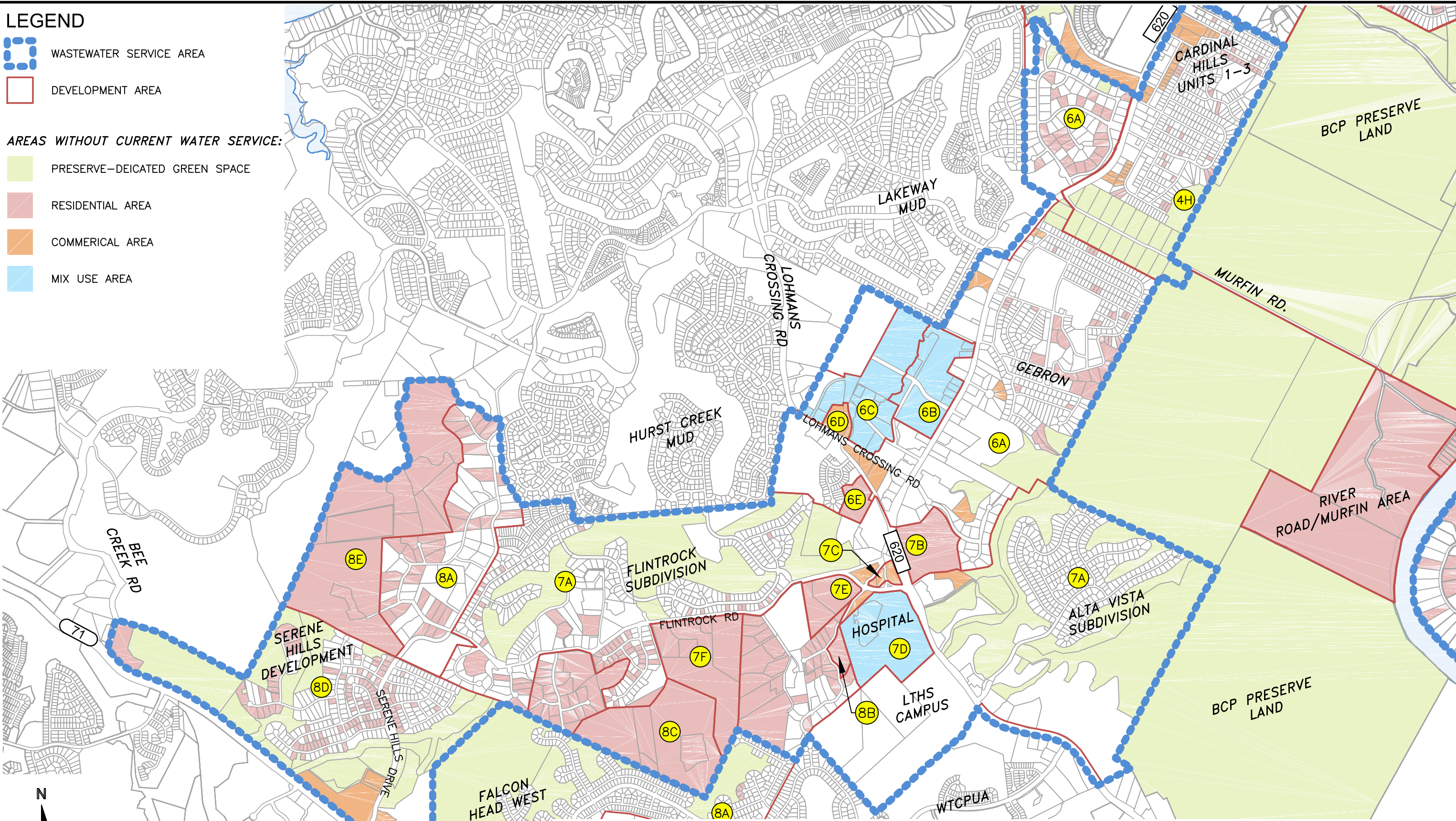
**TRAVIS COUNTY WCID NO.17  
FLINTROCK WASTEWATER SYSTEM  
IMPACT FEE STUDY**

WASTEWATER SYSTEM OVERALL LAYOUT  
ATTACHMENT A

FILE: 2000-028 - LAND USE ASSUMPTION.dwg TAB: EXHIBIT-11X17-L PLOTTED: 8/24/2020 8:21 AM BY: GLENN POPE

# LEGEND

-  WASTEWATER SERVICE AREA
-  DEVELOPMENT AREA
- AREAS WITHOUT CURRENT WATER SERVICE:**
-  PRESERVE-DEICATED GREEN SPACE
-  RESIDENTIAL AREA
-  COMMERICAL AREA
-  MIX USE AREA




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TRAVIS COUNTY WCID NO.17  
 FLINTROCK WASTEWATER SYSTEM  
 IMPACT FEE STUDY

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LAND USE ASSUMPTION EXHIBIT  
 ATTACHMENT B

**ATTACHMENT 'C'**  
**TRAVIS COUNTY WCID No. 17**  
**FLINTROCK WASTEWATER SYSTEM IMPACT FEE**  
**LAND USE ASSUMPTIONS**

**Land Use Assumption Basis**

Code	Class	LUEs /Ac	Source
a	Commercial	2.2	Average of 10 Existing Commercial Accts
b	Mixed Use	2.3	Average of Commercial & Residential w/WW
c	Residential w/WW Available	2.3	Average of 5 Existing Residential Areas
d	Residential w/No WW Available	1.0	Average of 5 Existing Residential Areas
e	Residential - Platted		Based on Number of Lots
f	Submitted/Approved Plan		Plan Data

**Service Level 4 - Central Pressure Plane**

No	Description	Anticipated Use	Area (Ac)	No. of Lots / Tracts	Existing LUEs	Potential LUEs to be Added		Total Potential LUEs	LUEs /Ac	Basis for Land Use Assum. / Notes
						With Ex. Water Service	No Current Service			
4H	Central PP South - Existing	Mixed Use	56.08		137.1			137.1	2.4	N/A
4H	Central PP South - Resid. Platted	Residential	161.14	235	0.0	196.0	39.0	235.0	1.5	e - 1 LUE per Lot
4H	Central PP South - Commercial	Commercial	19.24		0.0	34.0	8.5	42.5	2.2	a
4H	Central PP South - Preserve/Green	N/A	83.45		0.0	0.0	0.0	0.0	0.0	No Development
<b>Total Service Level 4</b>			<b>319.91</b>		<b>137.1</b>	<b>230.0</b>	<b>47.5</b>	<b>414.6</b>	<b>1.3</b>	

**Service Level 6 - Big Bills Pressure Plane**

No	Description	Anticipated Use	Area (Ac)	No. of Lots / Tracts	Existing LUEs	Potential LUEs to be Added		Total Potential LUEs	LUEs /Ac	Basis for Land Use Assum. / Notes
						With Ex. Water Service	No Current Service			
6A	Big Bills PP - Existing	Mixed Use	449.38		883.7			883.7	2.0	N/A
6A	Big Bills PP - Resid. Platted	Residential	61.65	42	0.0	62.0	42.0	104.0	1.7	e - 1 LUE per Lot
6A	Big Bills PP - Commercial	Commercial	17.03	8	0.0	0.0	37.6	37.6	2.2	a
6A	Big Bills PP - Preserve/Green	N/A	45.37	4	0.0	0.0	0.0	0.0	0.0	No Development
6B	Oaks Area	Mixed Use	60.61	9	74.5	0.0	25.0	99.5	1.6	f
6C	Lakeway Arts Development	Mixed Use	74.73	5	32.0	0.0	343.0	375.0	5.0	Total of 375 LUEs planned, from 2020 Draft SUF Rpt by CBD Engr
6D	Lakeway Police Department	Commercial	7.51	1	8.0	0.0	0.0	8.0	1.1	f
6E	Lohmans Spur Townhomes	Multi-Family	10.66	1	0.0	0.0	86.5	86.5	8.1	f
<b>Total Service Level 6</b>			<b>726.94</b>		<b>998.2</b>	<b>62.0</b>	<b>534.1</b>	<b>1,594.3</b>	<b>2.2</b>	

**ATTACHMENT 'C'**  
**TRAVIS COUNTY WCID No. 17**  
**FLINTROCK WASTEWATER SYSTEM IMPACT FEE**  
**LAND USE ASSUMPTIONS**

**Service Level 7 - High School Pressure Plane**

No	Description	Anticipated Use	Area (Ac)	No. of Lots / Tracts	Existing LUEs	Potential LUEs to be Added		Total Potential LUEs	LUEs /Ac	Basis for Land Use Assum. / Notes
						With Ex. Water Service	No Current Service			
7A	High School PP - Existing	Mixed Use	768.72		1,066.7			1,066.7	1.4	N/A
7A	High School PP - Resid. Platted	Residential	57.99	86	0.0	0.0	86.0	86.0	1.5	e - 1 LUE per Lot
7A	High School PP - Commercial	Commercial	9.50	3	0.0	0.0	21.0	21.0	2.2	a
7A	High School PP - Preserve/Green	N/A	455.19	13	0.0	0.0	0.0	0.0	0.0	No Development
7B	Lakeland Park	Residential	33.86	1	0.0	0.0	78.6	78.6	2.3	c
7C	Overlook at Lakeway	Commercial	4.98	1	0.0	0.0	11.0	11.0	2.2	a
7D	Hospital Development	Mixed Use	64.39	2	246.0	0.0	57.5	303.5	4.7	f
7E	Cherry Knoll	Residential	22.83	2	0.0	0.0	53.0	53.0	2.3	c
7F	Twin Creeks Tracts	Residential	77.23	6	3.5	0.0	151.0	154.5	2.0	Half acre lots with 3/4" meters
<b>Total Service Level 7</b>			<b>1,494.69</b>		<b>1,316.2</b>	<b>0.0</b>	<b>458.0</b>	<b>1,774.2</b>	<b>1.2</b>	

**Service Level 8 - Highway 71 Pressure Plane**

No	Description	Anticipated Use	Area (Ac)	No. of Lots / Tracts	Existing LUEs	Potential LUEs to be Added		Total Potential LUEs	LUEs /Ac	Basis for Land Use Assum. / Notes
						With Ex. Water Service	No Current Service			
8A	Hwy 71 PP - Existing	Mixed Use	433.46		0.0			0.0	0.0	N/A
8A	Hwy 71 PP - Resid. Platted	Residential	149.91	114	0.0	51.0	63.0	114.0	0.8	e - 1 LUE per Lot
8A	Hwy 71 PP - Preserve/Green	N/A	187.49	18	0.0	0.0	0.0	0.0	0.0	No Development
8B	Cherry Peak Office Condos	Commercial	6.22	1	66.4	0.0	0.0	66.4	10.7	f - Bldgs 10 & 11 known, others estimated based on size
8C	Tracts North of Falcon Head West	Residential	104.38	5	0.0	0.0	157.5	157.5	1.5	Previous land plan density (1 lot/ac)
8D	Serene Hills Defined Area	Mixed Use	456.63	297	509.5	0.0	184.5	694.0	1.5	f - Bond Issue 4 Rpt + 30 LUEs for 9ac Western Comm. Tract
8E	Serene Hills West - Undeveloped	Residential	227.14	11	0.0	0.0	272.6	272.6	1.2	Rough Terrain
<b>Total Service Level 8</b>			<b>1,565.23</b>		<b>576.0</b>	<b>51.0</b>	<b>677.5</b>	<b>1,304.5</b>	<b>0.8</b>	

**ATTACHMENT 'C'**  
**TRAVIS COUNTY WCID No. 17**  
**FLINTROCK WASTEWATER SYSTEM IMPACT FEE**  
**LAND USE ASSUMPTIONS**

**Summary**

Service Level No.	Pressure Plane	Area (Ac)	Potential		Total Potential LUEs	LUEs /Ac	Existing as Percent of Total Projected
			Existing LUEs	LUEs to be Added			
4	Central Pressure Plane	319.9	137	278	415	1.3	33%
6	Big Bills Pressure Plane	726.9	998	596	1,594	2.2	63%
7	High School Pressure Plane	1,494.7	1,316	458	1,774	1.2	74%
8	Highway 71 Tank Pressure Plane	1,565.2	576	729	1,305	0.8	44%
<b>TOTAL:</b>		<b>4,107</b>	<b>3,028</b>	<b>2,060</b>	<b>5,088</b>	<b>1.2</b>	<b>60%</b>

**Land Use Summary**

Category	Area (Ac)	
Existing	1,708	42%
Preserve/Dedicated Green Space	772	19%
Projected Residential	907	22%
Projected Commercial	60	1%
Projected Mixed Use	656	16%
<b>TOTAL CAPITAL RECOVERY FEE SERVICE AREA</b>	<b>4,107</b>	<b>100%</b>

General Methodology

- Total Existing LUEs for each Service Level based on data obtained from GIS system on 8/20/2020. Data from GIS totalled 2,894 LUEs for the Flintrock System. The most recent Operations Snapshot spreadsheet provided indicates a total of 3,028 LUEs for the system through July 2020. The existing LUE distribution (from GIS) was then multiplied by 1.0463 to account for the difference.
- Water CRF Study 2018 Land Use Assumptions used as basis for this analysis.
  - Noted which areas were noted as undeveloped in CRF Study that now have active meters, and adjusted assumptions.
  - Water meter assumptions of 3/4" revised from 1.5 LUEs to 1 LUE per meter.
  - Potential LUEs with existing water service category added to allow comparison with Water CRF Study, with associated adjustments made.
  - Lakeway Arts Development revised to reflect most recent draft SUF report for Tuscan Village.

**ATTACHMENT D  
CAPACITY ALLOCATIONS**

**Flintrock Capital Improvements Inventory & Cost**

<i>Design Capacity:</i>	245 gpd/LUE	
<i>Storage Requirements (Spray)</i>	45 Days	
<i>Storage Requirements (Drip)</i>	5 Days	
<i>Total Spray Irrigation Disposal</i>	751,056 gpd =	33,797,520 gal <b>Required Spray Storage</b>
<i>Total Drip Irrigation Disposal</i>	148,944 gpd	744,720 gal <b>Required Drip Storage</b>
<i>Total Irrigation Disposal</i>	900,000 gpd	34,542,240 gal <b>Required Total Storage</b>
<i>Effluent Storage Requirement</i>	9,403 gal/LUE (System specific based on amount of drip & spray proposed)	

	Capacity		Capacity Allocation (LUEs)			
	Total	LUEs	Existing	Projected 10yr Growth	Projected Growth Beyond 10 Yr	Excess Capacity
<b>Wastewater Treatment</b>						
Facilities	MGD					
Flintrock WWTP	0.5	2,041	2,041	0	0	0
Flintrock WWTP Exp to 1.0 MGD	0.5	2,041	987	1,054	0	0
<b>TOTAL WASTEWATER TREATMENT</b>		<b>4,082</b>	<b>3,028</b>	<b>1,054</b>	<b>0</b>	<b>0</b>
<b>Effluent Storage</b>						
Existing Facilities	MG					
FRGC Ponds	13.206	1,404	1,404	0	0	0
Hurst Creek MUD		408	408	0	0	0
LW Eff Tank	0.208	22	22	0	0	0
Subtotal Existing		1,834	1,834	0	0	0
Proposed Facilities	MG					
Serene Hills Tank 1	10.30	1,095	597	498	0	0
Serene Hills Tank 2	10.30	1,095	597	498	0	0
Flintrock Eff Storage Basin	0.60	64	0	58	0	6
Subtotal Proposed		2,254	1,194	1,054	0	6
<b>TOTAL EFFLUENT STORAGE</b>		<b>4,088</b>	<b>3,028</b>	<b>1,054</b>	<b>0</b>	<b>6</b>
<b>Effluent Disposal</b>						
Existing Facilities	MGD					
FRGC Greens and Fairways	0.386	1,576	1,576	0	0	0
LW Regional	0.016	63	63	0	0	0
Hurst Creek MUD Transfer	0.100	408	408	0	0	0
Subtotal Existing		2,047	2,047	0	0	0
Proposed Facilities	MGD					
FRGC Roughs	0.1318	538	290	248	0	0
Creekside Drip	0.0166	68	38	30	0	0
Serene Hills ROW	0.0233	95	53	42	0	0
Serene Hills Fields A1-A5	0.2722	1,111	600	511	0	0
Reuse Irrig Pump Sta & Mains	0.055	224	0	223	0	1
Subtotal Proposed		2,036	981	1,054	0	1
<b>TOTAL EFFLUENT DISPOSAL</b>		<b>4,083</b>	<b>3,028</b>	<b>1,054</b>	<b>0</b>	<b>1</b>
<b>Effluent Transmission</b>						
	GPM					
Line 1 (6" Diam)	420					
Line 2 (12" Diam)	1,535					
<b>TOTAL EFFLUENT TRANSMISSION</b>		<b>4,082</b>	<b>3,028</b>	<b>1,054</b>	<b>0</b>	<b>0</b>
<b>Effluent Pumping</b>						
Proposed Facilities	GPM					
Flintrock Pump Station	1500					
Serene Hills Pump Station	205					
<b>TOTAL EFFLUENT PUMPING</b>		<b>4,082</b>	<b>3,028</b>	<b>1,054</b>	<b>0</b>	<b>0</b>
<b>LAND</b>						
Existing Facilities	MGD					
FRGC Fairways (113.79 Ac)	0.386	1,576	1,576	0	0	0
FRGC Roughs (38.86 Ac)	0.132	538	413	125	0	0
LW Regional (8 Acres)	0.016	63	63	0	0	0
Creekside (5 Acres)	0.017	68	52	16	0	0
Serene Hills Dr ROW (6.86 Ac)	0.023	95	72	23	0	0
Serene Hills (50 Acres)	0.272	1,111	852	259	0	0
<b>TOTAL LAND</b>		<b>3,451</b>	<b>3,028</b>	<b>423</b>	<b>0</b>	<b>0</b>

**ATTACHMENT D  
PROJECT COST DETAIL - EXISTING FACILITIES**

**EXISTING FACILITIES**

	<b>Bid Date</b>	<b>Total Construction Costs</b>	<b>Total Engineering Costs</b>	<b>Miscellaneous Costs</b>	<b>Total Project Costs</b>	<b>Notes</b>
<b>WW TREATMENT</b>						
Flintrock WWTP Exp to 1.0 MGD	Dec-15	\$8,595,395.88	\$940,000.00	\$0.00	<b>\$9,535,395.88</b>	B
<b>STORAGE</b>						
LW Eff Tank	Jul-17	\$361,931.68	\$92,797.50	\$0.00	<b>\$454,729.18</b>	C
<b>DISPOSAL</b>						
LW Drip	Dec-18	\$757,042.00	\$36,048.75	\$0.00	<b>\$793,090.75</b>	D
Eff Lines 1A & 1C	Dec-10				<b>\$76,430.00</b>	A
Eff Line 1B	Mar-15 & Jun-17	\$273,716.50	\$54,841.37	\$0.00	<b>\$328,557.87</b>	E
Eff Line 2B	Feb-11				<b>\$481,010.00</b>	A
<b>LAND</b>						
LW Regional					<b>\$50,400.00</b>	A
Creekside					<b>\$50,400.00</b>	A
Serene Hills					<b>\$4,130,401.50</b>	A
<b>TOTAL:</b>		<b>\$9,988,086.06</b>	<b>\$1,123,687.62</b>	<b>\$0.00</b>	<b>\$15,900,415.18</b>	

Notes:

A. From 2015 Study.

B. Total construction costs based on Final Pay-App on 7/16/2020 Board Agenda and includes all change orders, see FR WWTP Construction Costs.

C. Construction costs include payments to CRU through Pay-App #4 approved at the 1/24/2019 Board Meeting and the remainder of work change ordered into WW Solutions Drip Irrigation Project. Total WW Solutions Construction cost for tank includes Remaining work left on CRU contract (via CO1) plus change orders for additional work regarding the tank (CO1 = 286,600, CO2 = 3,503.49 , and CO3 = 5,951.89 ). Engineering fees included the LW Eff Tank and Line 1B. Eng Cost was broken out based on percentage of total construction of the two items (line 1B was 43% of total construction costs of Line 1B and LW Tank). GCD Final Invoice for this project (\$16,996.25) plus the additional 4,551.25 in additional CA Services that was included with the Drip Irrigation project

D. COs included with this project were for LW Eff Tank work. Engineering Costs are based on GCD Eng Service Order Addendum No. 1. The Additional services for CA of LW Tank was included in the LW Tank Project Costs

E. Construction costs include WPM Construction costs from the Wild Cherry Effluent Project as well as From Flintrock Road project (CO1 = 30210 and CO2 = 46191.00). Eng Contract included LW Tank and Line 1B. Eng Cost was broken out based on percentage of total construction of the two items (line 1B was 43% of total construction costs of Line 1B and LW Tank). GCD Costs included CA Services for three utility line projects including Line 1B. Percentage of Eng Cost (based on Final Invoice) was allocated based on percentage of Construction of Line 1B to the total of all three projects

**ATTACHMENT D  
PROJECT COST DETAIL - PROPOSED FACILITIES**

**PROPOSED FACILITIES**

	Construction Est	Construction Contingency	Engr/Soft Cost	Total Project Cost (April 2019)	Total Adjusted Project Costs - Present Value (August 2020)	Projected Date of Need	Projected Construction Date	Estimated Future Value	Notes
		20%	10%						
<b>STORAGE</b>									
Serene Hills Tank 1	\$ 5,089,700	\$ 1,017,900	\$ 611,000	\$ 6,719,000	\$ 6,855,000.00	2021	Sep-2021	\$7,053,520	
Serene Hills Tank 2	\$ 5,089,700	\$ 1,017,900	\$ 611,000	\$ 6,719,000	\$ 6,855,000.00	Apr-2025	Dec-2023	\$7,500,212	
Flintrock Effluent Storage Basin	\$ 739,500	\$ 147,900	\$ 89,000	\$ 977,000	\$ 997,000.00	2021	Sep-2021	\$1,025,873	F
<i>Sub-Total:</i>	<i>\$ 10,918,900</i>	<i>\$ 2,183,700</i>	<i>\$ 1,311,000</i>	<i>\$ 14,415,000</i>	<i>\$ 14,707,000</i>			<i>\$ 15,579,605</i>	
<b>DISPOSAL</b>									
Flintrock Effluent Pump Station, and Main	\$ 1,445,200	\$ 289,000	\$ 173,000	\$ 1,908,000	\$ 1,947,000.00	2021	Sep-2021	\$2,003,385	G
Reuse Irrig Pump Sta Ph I	\$ 362,800	\$ 72,600	\$ 44,000	\$ 480,000	\$ 490,000.00	Sep-2030	Mar-2029	\$614,280	H
Reuse Irrig Pump Sta Ph II	\$ 165,300	\$ 33,100	\$ 20,000	\$ 219,000	\$ 224,000.00	Sep-2030	Mar-2029	\$280,814	
FRGC Control Valve	\$ 211,000	\$ 42,200	\$ 25,000	\$ 279,000	\$ 285,000.00	2021	Sep-2021	\$293,254	
LW Regional Control Valve	\$ 137,300	\$ 27,500	\$ 16,000	\$ 181,000	\$ 185,000.00	Sep-2030	Mar-2029	\$231,922	
Serene Hills Pump Station	\$ 1,132,400	\$ 226,500	\$ 136,000	\$ 1,495,000	\$ 1,526,000.00	Apr-2025	Dec-2023	\$1,669,631	
Eff Line 2A	\$ 420,000	\$ 84,000	\$ 50,000	\$ 554,000	\$ 566,000.00	2021	Sep-2021	\$582,391	
Eff Line 2C	\$ 316,900	\$ 63,400	\$ 38,000	\$ 419,000	\$ 428,000.00	2021	Sep-2021	\$440,395	
FRGC Roughs Irrigation	\$ 845,400	\$ 169,100	\$ 101,000	\$ 1,116,000	\$ 1,139,000.00	Dec-2021	Feb-2021	\$1,154,209	
Creekside Drip Irrigation	\$ 515,100	\$ 103,000	\$ 62,000	\$ 681,000	\$ 695,000.00	Dec-2024	Jan-2024	\$762,128	
Serene Hills ROW Irrigation	\$ 89,500	\$ 17,900	\$ 11,000	\$ 119,000	\$ 122,000.00	Apr-2025	Dec-2023	\$133,483	
Serene Hills Spray Disp Field A-1	\$ 746,800	\$ 149,400	\$ 90,000	\$ 987,000	\$ 1,007,000.00	Feb-2028	Apr-2027	\$1,200,321	I
Serene Hills Drip Disp Field A-2	\$ 1,328,200	\$ 265,600	\$ 159,000	\$ 1,753,000	\$ 1,789,000.00	Nov-2025	Dec-2024	\$2,009,750	
Serene Hills Drip Disp Field A-3	\$ 1,640,100	\$ 328,000	\$ 197,000	\$ 2,166,000	\$ 2,210,000.00	Oct-2026	Nov-2025	\$2,543,204	
Serene Hills Spray Disp Field A-4	\$ 513,900	\$ 102,800	\$ 62,000	\$ 679,000	\$ 693,000.00	Nov-2028	Jan-2028	\$842,519	
Serene Hills Spray Disp Field A-5	\$ 1,390,500	\$ 278,100	\$ 167,000	\$ 1,836,000	\$ 1,874,000.00	May-2029	Jun-2028	\$2,308,252	
<i>Sub-Total:</i>	<i>\$ 11,260,400</i>	<i>\$ 2,252,200</i>	<i>\$ 1,351,000</i>	<i>\$ 14,872,000</i>	<i>\$ 15,180,000</i>			<i>\$ 17,069,937</i>	
<b>TOTAL:</b>	<b>\$ 22,179,300</b>	<b>\$ 4,435,900</b>	<b>\$ 2,662,000</b>	<b>\$ 29,287,000</b>	<b>\$ 29,887,000</b>			<b>\$ 32,649,543</b>	

Notes:

Estimated costs taken from 2019 Flintrock CIP

F. Storage Basin separated from overall FR Eff Storage Basin, Eff Transfer P Sta, Reuse Irrig P Sta & Eff Main Project.

G. Eff P Sta and Main separated from overall FR Eff Storage Basin, Eff Transfer P Sta, Reuse Irrig P Sta & Eff Main Project.

H. Reuse P Sta separated from overall FR Eff Storage Basin, Eff Transfer P Sta, Reuse Irrig P Sta & Eff Main Project.

I. Estimated Construction Cost in 2019 CIP had numbers transposed. \$869,000 entered instead of the correct 896,000 for Estimated Construction Cost Including Contingency.

Adjustment for Inflation to Present Value:

April 2019 CCI: 11,228

August 2020 CCI: 11,455

Adjustment for Inflation to Future Value:

August 2010 CCI: 8,837

August 2020 CCI: 11,455

Avg Annual Change: 2.96%

Estimated Future Inflation: 2.67% per Year



**ATTACHMENT D  
FLINTROCK WWTP EXPANSION TO 1.0 MGD CONSTRUCTION COSTS**

Item No.	Category	Cost	% of Original Contract	Attributable to Original 0.5 MGD WWTP		Attributable to 0.5 MGD WWTP Expansion
1	Bonding, Mobilization & Insurance	\$ 450,000.00	4.7%	10%	\$ 46,239.55	\$ 403,760.45
2	SWPPP	\$ 1,600.00	0.0%	10%	\$ 164.41	\$ 1,435.59
3	Environmental Protection/ESC	\$ 27,200.00	0.3%	10%	\$ 2,794.92	\$ 24,405.08
4	Trench & Excavation Safety	\$ 4,800.00	0.1%	10%	\$ 493.22	\$ 4,306.78
5	Site Work	\$ 241,920.00	2.5%			\$ 241,920.00
6	Yard Piping	\$ 552,200.00	5.8%	10%	\$ 56,741.07	\$ 495,458.93
7	New SBR Basin/Building	\$ 4,143,948.80	43.7%			\$ 4,143,948.80
11	Headworks	\$ 420,640.00	4.4%	50%	\$ 210,320.00	\$ 210,320.00
12	Disk Filters	\$ 699,520.00	7.4%	50%	\$ 349,760.00	\$ 349,760.00
13	Bleach Storage	\$ 215,664.00	2.3%	50%	\$ 107,832.00	\$ 107,832.00
14	Sludge Building	\$ 614,252.00	6.5%	50%	\$ 307,126.00	\$ 307,126.00
15	Existing SBR Basin	\$ 107,680.00	1.1%			\$ 107,680.00
16	Site Demolition	\$ 9,760.00	0.1%			\$ 9,760.00
17	Electrical	\$ 1,999,815.20	21.1%	10%	\$ 205,490.13	\$ 1,794,325.07
<b>ORIGINAL CONTRACT</b>		<b>\$ 9,489,000.00</b>		<b>14%</b>	<b>\$ 1,286,961.30</b>	<b>\$ 8,202,038.70</b>
CO1	Fencing, Transformer Relocate, SBR Controls, SBR Bldg Changes, Add'l Potable Water Connection	\$ 115,495.00		0%	\$ -	\$ 115,495.00
CO2	Elec: 1200 A Panel	\$ 57,882.00		0%	\$ -	\$ 57,882.00
CO3	Piping changes	\$ 24,968.12		0%	\$ -	\$ 24,968.12
CO4	Piping changes, New SBR Bldg Changes	\$ 51,179.47		0%	\$ -	\$ 51,179.47
CO5	New Golf Course Pumps, Elec additions	\$ 40,303.61		0%	\$ -	\$ 40,303.61
CO6	Grinder Pump at new SBR, additional gate, elec additions, WCID 17 invoices	\$ 56,469.98		0%	\$ -	\$ 56,469.98
CO7	Elec additions, Repair existing SBR basins	\$ 47,059.00		0%	\$ -	\$ 47,059.00
<b>TOTAL CHANGE ORDERS</b>		<b>\$ 393,357.18</b>			<b>\$ -</b>	<b>\$ 393,357.18</b>
<b>TOTAL FINAL CONTRACT</b>		<b>\$ 9,882,357.18</b>		<b>13%</b>	<b>\$ 1,286,961.30</b>	<b>\$ 8,595,395.88</b>

Attributable to Original 0.5 MGD WWTP Notes:

1. Headworks (new fine screen), Disk Filters, Bleach Storage, and Sludge Building serve the original 0.5 MGD and new expansion equally.
2. Cost share of items in red calculated by the total of the items split equally divided by the total original contract amount.