SUMMARY

OF

OBSERVATIONS, FINDINGS AND CONCLUSIONS

WIMBERLEY DOWNTOWN WASTEWATER SYSTEM

BASED ON REPORT PREPARED BY CITIZENS AD HOC COMMITTEE ATTACHED HERETO

June 25, 2016

OBSERVATIONS, FINDINGS AND CONCLUSIONS

Having completed its review of the proposed wastewater system, the Committee has unanimously agreed to the following observations, findings and conclusion. These are premised on the assumption that a sewage system in the proposed service area is strategically important to the future of Wimberley as a critical infrastructure. As such, the City is willing to commit its general funds to help support a portion of the debt service required to fund the project to make it affordable to its users:

1. Prior to the agreement of the City to contribute annual funds in the amount of approximately $200,000.00 to help finance infrastructure for the project, it is clear from the analysis of data that the project was not economically feasible whether the City chose to continue to seek its own plant or partner with Aqua Texas to treat the effluent.

2. Without the City contribution, the reduced volume of wastewater within the proposed service area will not generate enough revenue to service the TWDB loan or fund the project under any circumstance.

3. When analyzing the base data, it is apparent that many of the businesses within the downtown area are typically family owned, small operations that would generally find it difficult to meet the financial obligations without some assistance.

4. The TWDB provided a solution when it encouraged and approved additional contributions by the City to provide assistance in meeting the debt service on the loan.

5. The Committee recommends the following in the implementation of the proposed project for a wastewater collection and treatment system to serve the downtown area south of Cypress Creek:

    - Present the updated data to TWDB to verify that the reduced volume of wastewater meets their Proforma used in determining the City's ability to meet the debt service on the loan.

    - Given that the rates to customers will be one of the highest in the area, the City should seek to reduce the cost of the plant and collection system as follows:

        - Consider an alternative gathering system such as the Orenco STEP system for the project
        - The STEP system as an alternate solution should be considered parallel with the present efforts to complete the drawings and plans for bidding purposes
        - Consider reducing the size of the plant
        - Consider removing the purple re-use pipe from the project
        - Seek additional grants to further reduce the economic burden of the project
        - Review ordinances to encourage viable, responsible, managed growth in the downtown area to increase wastewater volume and sales tax revenues
        - Complete the Service Agreement with Blue Hole Regional Park
        - Determine the capital expenses over the life of the plant in order to determine its impact on the project

- Develop a funding method to assist initial customers in the costs of connecting their service to the sewer lines and decommissioning their septic tanks, costs typically paid for by the users.

- Ensure that all costs have been identified, in particular costs for easements, user connection costs, metering and billing, cost for land acquisition for the lift station, costs for future expansion of the effluent irrigation field and costs to operate and maintain the reuse line and reuse pump station

- Implement the following environmental safeguards:

  - The Deed to the 1.3 acre tract for placement of the plant should contain a restriction limiting the size of the plant to 75,000 gallons per day to be enforceable by any property owner along Cypress Creek or the Blanco River
  - Require additional precautions to avoid discharging into the creek by requiring the plant operator to notify and seek approval from the City prior to any discharge
  - Expand the land area within Blue Hole for dispersing treated effluent
  - Ensure compliance with the Legal Settlement Agreement dated September 30, 2015, between the City of Wimberley and the Blanco River Cypress Creek Water Association et al

- Activate the Water/Wastewater Review Committee to oversee and participate in the implementation of the project.

- It is further recommended that the City should explore the viability of the various options with Aqua in greater depth during the bidding process to avoid any delay should the project prove not to be economically feasible.

- Aqua Texas could become an option if the proposed project during the implementation and bidding stage proves not to be economically feasible as defined by the guidelines established by the Central Wimberley Wastewater Stakeholder Committee Report dated November 20, 2013. This option, however, would require extensive negotiations with Aqua Texas, something that is outside the scope of this Committee. Additionally, this would require discussions regarding the watering issues at Blue Hole and would also require the owners within the business district to be closely involved in any negotiations with Aqua in order to help determine the most effective approach in meeting financial obligations and long term solutions.

- Recognize that should the actual bid costs exceed the standards established by the Central Wimberley Wastewater Stakeholder Committee Report dated November 20, 2013, or the project proves to be outside the scope of economic viability because of unforeseen circumstances or conditions, then negotiations with Aqua Texas should commence immediately along with discussions regarding the watering needs of Blue Hole Regional Park, in order to protect the integrity, beauty and purity of Blanco River and Blue Hole.

- A meeting should be held with the customers to inform them of the projected rates based on volumetric fee, monthly base fee, impact fee and connection fee. Open communication should be established with the downtown customers to keep them informed of all developments and to seek their input as the project moves forward.

The Report that follows provides the background and support for the above observations, findings, and conclusions.

WIMBERLEY
DOWNTOWN WASTEWATER SYSTEM

REPORT PRESENTED
BY
CITIZENS AD HOC COMMITTEE

Presented to
Mayor Mac McCullough

June 25, 2016

I.

INTRODUCTION

The Mayor and City Council for the City of Wimberley established an Ad Hoc Committee for the purpose of reviewing and analyzing the Wastewater Collection and Treatment System for the Downtown Area. The scope of the Committee was presented by Mayor Mac McCullough who wanted the Committee to review the process to date and advise of any areas of concern or obstacles that might impact the implementation of the project as well as other alternative solutions. This review follows the approval by the Texas Water Development Board of the City's request for financial assistance. The details of the financial assistance are outlined in a letter from TWDB dated April 25, 2016, committing to a $5,255,000.00 loan with loan forgiveness in the amount of $243,005.00.

The members appointed to the Committee are as follows: Grady Burnette, Chair, David Glenn, Chris Oddo, Gail Pigg, John Urban and Mike Stevens. The Committee members acknowledge that this is an issue that has gained significant interest throughout Wimberley. As a result, the Committee identified two underlying objectives in carrying out its task. First, to provide a meaningful and factual report to the Mayor and the City Council to assist them in the decisions to be made regarding this project. Second, to conduct an independent review in hopes of presenting data and findings that in some way could bring the community together in regards to this particularly sensitive matter.

The Committee recognized that a number of studies and reports have been conducted to date, including the Feasibility Report dated August 15, 2012, prepared by Water Resources Management, LLC, the Final Recommendations from the Central Wimberley Wastewater Stakeholder Committee presented to the City of Wimberley on November 20, 2013, the Wastewater Collection and Treatment Feasibility Study dated December 2013, prepared by Alan Plummer Associates, Inc., and the Independent Review from Dr. Thomas Hardy on January 5, 2015. These reports and recommendations can be found on the City of Wimberley website.

It was not the intent of the Committee to question the integrity of the findings of these reports. The Committee also recognized that the recommendation to date is to build a 75,000 gpd treatment plant and a traditional gravity flow collection system with reclaimed water to be used to water Blue Hole and other determined areas. The Committee as it came together began to focus on three specific areas: (i) to conduct a clear and objective review of the Revenue Bond Proforma presented to the Texas Water Development Board to validate its accuracy in regards to wastewater flow, revenue availability, maintenance and operating costs, growth and debt service; (ii) to review the data used in the financial model to determine the ability of the owners within the proposed downtown area to meet their financial obligations; and (iii) finally, to apply the financial model as presented to the TWDB to other alternative solutions for comparative purposes to ensure that all such options were properly vetted.

II.

IMPACT ON CITY OF WIMBERLEY

The City of Wimberley has been working on this project for many years, and it is the general consensus that a wastewater collection and treatment system is needed due to a number of factors including failed septic systems and the need to clean up our creeks and rivers, the need to secure reclaimed water to provide for the watering needs of Blue Hole, the need to allow for a more controlled and systematic growth within the proposed service area, and finally, to serve as a generator that will bring in additional businesses that would increase the sales tax revenue. The proposed service area is considered the heartbeat of Wimberley, and its genuine character and charm is recognized nationwide. It is imperative that the City of Wimberley work to maintain the integrity of the downtown area and provide confidence that the creeks and rivers are clean. The Committee looked at the impact of the city's contribution in relation to growth, the Blue Hole Regional Park, and in particular, the Blanco River and Cypress Creek as primary contributors to success and future of Wimberley in an effort to bring the community together in understanding this project as it relates to the City of Wimberley.

City Infrastructure Contribution: The City intends to contribute up to $200,000.00 from its general fund for 27 years to provide wastewater infrastructure in the downtown area in order to maintain the economic viability of the project and ensure the repayment of the loan. It is clear from the data gathered and analyzed by the Committee that without this contribution the project would not be feasible. Questions can be raised regarding the contributions by the City, and the impact it will have on the ability of the City to take care of its other responsibilities. The citizens of Wimberley have been opposed to an ad valorem tax and the council has made it clear that no effort will be made to fund this project through ad valorem taxes. The funds being contributed tie directly to the Stakeholders Recommendation that the City pay either through grants, taxes, or contributions for the treatment plant.

As growth occurs within the proposed service area it is hopeful that the infrastructure contribution from the City can be reduced, but the expectation should be for it to continue for the life of the loan. The Committee did not consider the impact that the contribution would have on the City budget from year to year, and that is something that would be beneficial for the City to review. Additionally, the Committee did not evaluate the effect it may have on its future ability to borrow funds for other projects.

Growth in the Service Area: Another key factor that will impact owners and future rates will be the extent of growth to take place in the service area. More customers connecting to the system will result in a potential lessening of the rates and possible reduction in contributions by the City. Growth is difficult to assess but there will no doubt be some new construction, new businesses and expansion that will increase wastewater usage. Tracts have been targeted for development and will have some impact but not significant given the limited availability of vacant tracts as well as the limitations that have been placed on development within Wimberley. The City Codes and Ordinances are restrictive and after taking into consideration impervious cover, drainage, parking and the restrictions against various types of high use businesses (i. e.

Given the low initial flow rates for wastewater as shown below, there is clearly room for growth. The City is encouraged to manage such growth by reaching out to those businesses which would allow for additional volume usage (i.e. restaurants, small hotel, or assisted living) and balance that in such a way as to remain well below the 75,000 gallons per day plant capacity. Managed and responsible growth is critical since the treatment plant is capped at 75,000 gallons per day capacity and will not be available to be increased to meet greater demands.

Additionally, the 2015 floods impacted a number of residential homes and businesses, and it is anticipated that many of those homes or businesses may be rebuilt within the next few years. Their impact will, however, be minimal. Finally, there could be some re-purposing throughout the service area in which structures will be remodeled or rebuilt to bring improvements up to date.

The proposed service area has had some new construction, but it has been sporadic and limited to the area along FM 3237. Without a wastewater treatment system, the downtown area will see little growth.

Reclaimed Water: The City's project qualifies for $243,005 in Green Subsidy in the Clean Water State Revolving Fund which has also been factored in as part of the analysis. This subsidy is the result of the use of treated effluent to water Blue Hole. The proposal, but not a pre-requisite for the green subsidy, also calls for purple pipe or a re-use line to be constructed back to the proposed service area. Given the limited amount of effluent available and the minimal watering needs within the proposed service area the City should examine the feasibility of this cost.

The Committee established the economic value of the reclaimed water revenues based on benchmarking the average reclaimed water rates in the surrounding area. The benchmark of $1.58 per thousand gallons generates annual revenue of approximately $14,000.00 to $17,000.00. Additionally, by opening areas for public use, Blue Hole Park will be able to use most of the reclaimed water to meet the needs of the Park although precise usage requirements have not been determined.

Blue Hole Regional Park: One of the contributing benefits of the wastewater collection and treatment system is that it provides the sustainability of the Park through the use of the reclaimed water. As a condition to the loan a reuse service agreement must be entered into providing for the purchase of treated effluent to irrigate Blue Hole Regional Park. Additionally, there has been an interest to remove the existing treatment plant from the Park and clean up the drain field. The arrangement has been made to exchange the 3acre tract where the Treatment Plant is presently located with a 1.3 acre tract that sits along the outskirts of the Park. With such exchange of property, the new treatment plant will be located outside the Park on the 1.3 acre tract. The 3acre tract will thereafter be cleaned up and returned to park use.

Blanco River and Cypress Creek: The impact of the Blanco River and Cypress Creek on Wimberley is without question. People across the nation are drawn to live and visit Wimberley because of the beauty and serenity of the Blanco River and Cypress Creek. The

Blanco River and Cypress Creek: The impact of the Blanco River and Cypress Creek on Wimberley is without question. People across the nation are drawn to live and visit Wimberley because of the beauty and serenity of the Blanco River and Cypress Creek. The essence of Wimberley is the Blanco River and Cypress Creek as they roll through the valley surrounded by hills that present a picturesque view and a glimpse of what every community dreams of having. That is the treasure that we seek to preserve and protect, and in order to do so, we must at times take steps that call for unique solutions. The benefits in that regard are immeasurable and bring to focus the importance of securing wastewater treatment and collection within the downtown area whether it be through a City owned treatment plant or building a relationship with Aqua Texas.

Environmental Concerns: Many of the citizens of Wimberley have voiced their concern regarding on-going environmental concerns related to discharges into our waterways. In that regard, the City should provide the following environmental safeguards:

- Incorporate in the Deed for the exchange of property for relocation of the treatment plant a restriction limiting the size of the plant to 75,000 gallons per day to be enforceable by any property owner along the Blanco River or Cypress Creek.
- Require additional precautions to avoid discharging into the creek by requiring the plant operator to notify and seek approval from the City prior to any discharge
- Expand the land area within Blue Hole for dispersing treated effluent or additional storage tanks
- Ensure compliance with the Legal Settlement Agreement dated September 30, 2015, between the City of Wimberley and the Blanco River Cypress Creek Water Association et al

III.

VALIDATION OF CITY'S REVENUE BOND PROFORMA

The Committee's first objective was to attempt to validate the City's Revenue Bond Proforma submitted to the TWDB as a basis for the loan application. This Proforma outlines the financial aspects of the project, including:

- Revenues generated by wastewater treatment
- Sales of grey water reuse (which includes the City subsidy)
- Plant operating expenses and maintenance expenses
- Debt service

The process began by reviewing the underlying owner and property data base established by WCIA. This data base has been used by the City as the basis for all subsequent feasibility studies and reports, including the use by TWDB in reviewing the City's Revenue Bond Proforma. Following a review by the Committee of the Hays County Tax Records and the

Official Public Records of Hays County, the data base was purged to remove owners and property not within the proposed service area, to eliminate properties that would not have connections such as parking lots, roads and the cemetery, to consolidate property where two or more lots were now clearly recognized as one lot, to add properties that had been inadvertently left off, and to update owners where conveyances had taken place since the creation of the original data base.

To identify initial wastewater users, the Committee obtained customer data and water usage from the Wimberley Water Supply Corporation for owners within the proposed service area and cross checked the updated information with the customer and water use reports previously provided to the City. This data base was also purged to remove customers not within the service area and to add several that had been inadvertently omitted. Water usage (which can be translated into estimated wastewater flow rates) was then analyzed to identify initial users and expected wastewater flow rates. The analysis of the underlying data revealed the following results:

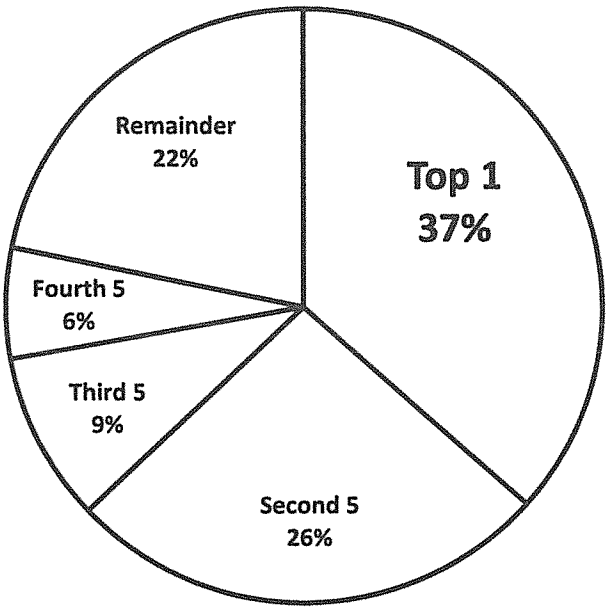
- **Connections:** The number of initial connections based on this analysis is estimated at **96 connections.** This compares with 123 connections used by the City.

- **Water Usage:** Average water use was analyzed for each property in the proposed service area for the months of November 2015 to March 2016, with some adjustments made for anomalies caused by water leaks, water left on or other reasons identified by the Water Company. These months were used to reduce the effect of water use for outside watering, car washing or power washing that does not enter the wastewater system—a common practice for wastewater utilities. The result showed an estimated **25,000 gallons per day** by residences and businesses in the service area. This compares to 37,630 gallons (190 gpd X 198 LUE's) used by the City in its October 22, 2015, amended TWDB application. In prior reports and applications, an estimate of approximately 65,000 gallons per day was used which reflects 300 gallons per day of usage—a typical projection for design purposes. The net result is that based on current water usage rates, the **expected initial flow rates for wastewater are expected to be considerably lower** than both the application amounts and the design criteria.

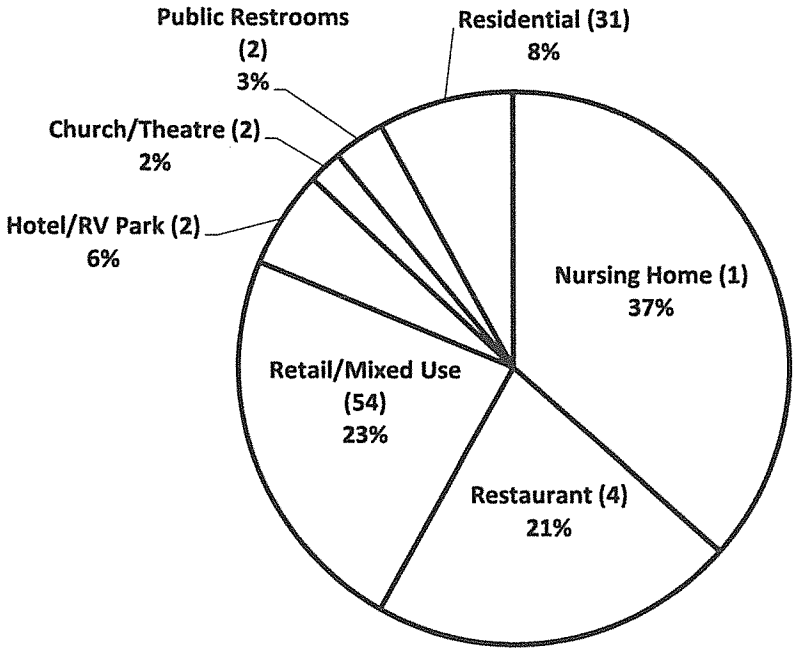
- **Customer Usage:** Further analysis of customer usage identified several interesting observations. The highest user (Deer Creek Nursing Home) represents 37% of the total volume of wastewater. The next 15 customers use 41% percent of the total and the remaining 80 customers use only 22% of the total. This is clearly reflective of the type of businesses within the service area where wastewater usage is certainly much lower for boutiques, antique shops, professional and office buildings, art and collector shops and explains the disparity in usage.

Initial Top Customers Based on Volume

Top 16 of 96 Initial Customers Represent 78% of Volume

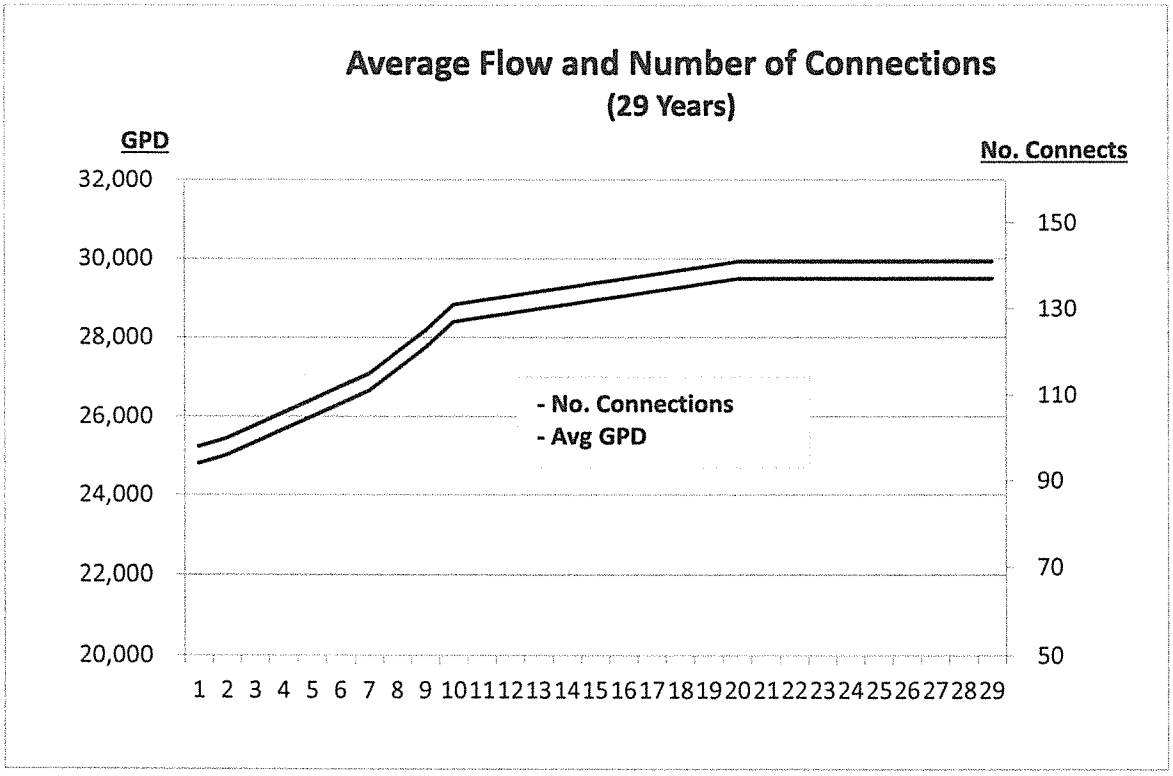


Projected Initial Volume by Property Type



Using this underlying data base, the Committee developed a version of a Proforma Financial Forecast to compare to the Proforma developed and submitted by the City to the TWDB. The key assumptions regarding impact fees, base rates and volumetric rates were verified as being substantially the same as those used by the City in their Proforma. The primary difference is that the City in their Proforma combined the grey water re-use with the contributions to be made by the City as one set of numbers. The Committee felt that the economic value of the grey water re-use (reclaimed water) should be separated from the City's infrastructure contributions to provide a better understanding of the economic benefit of the grey water re-use and its impact on the City's contributions which are likely to be from its General Fund. Therefore, the reclaimed water rates of several area cities were averaged to establish a benchmark for reclaimed water rates to be used in the Committee's Proforma. For presentation purposes, this amount is shown separately from the City's subsidy for analysis purposes.

The Committee also examined the prospect for growth in the area by generally utilizing the same criteria used in the City's Proforma. The assumptions used by the City added 45 new connections over a period of 20 years. It should be noted, however, that these are typical connections with low volume usage. While it would be an increase of 47% in the number of connections, the volume is only increased by an estimated 20%. This was based on the assumption that new connections would use 50% more than the average initial connections by property type. This growth projection is conservative and may be less than actual growth that is likely to occur should the City begin to encourage responsible managed growth in the proposed service area.



To ensure consistency between the Committee's Proforma and the City's Proforma, the following additional assumptions were incorporated into the Financial Proforma

- Approximately $151,000.00 per year was allocated for maintenance and operation expenses.

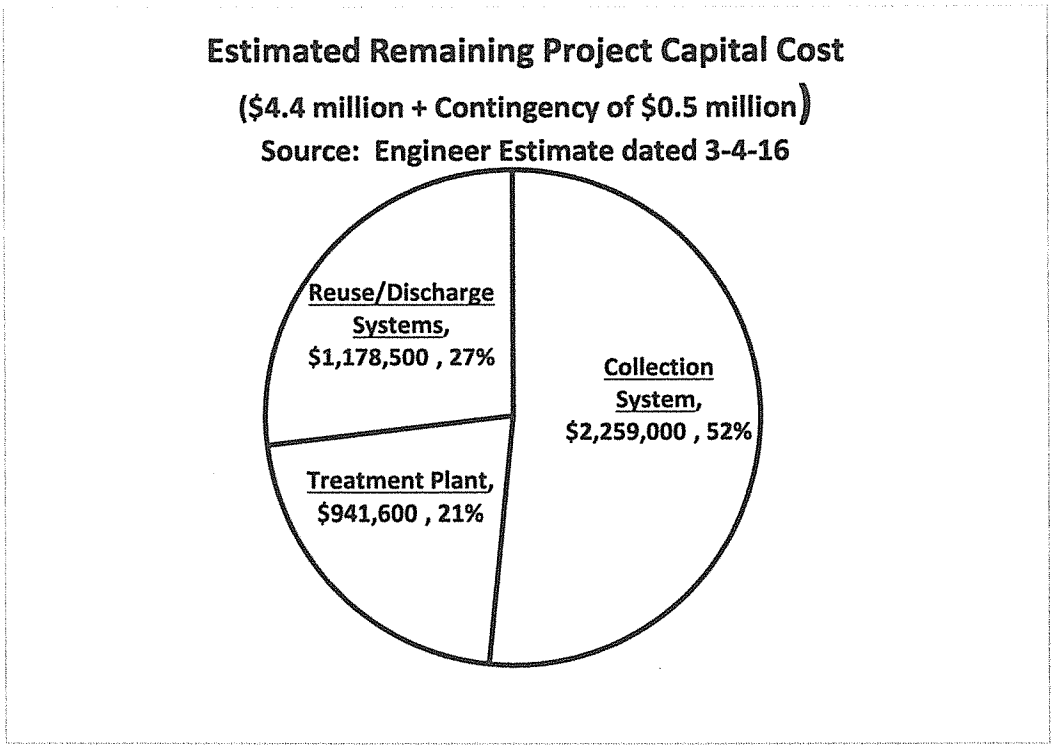
- There was a lack of administrative expense used in the Proforma by the City as the intention is to rely on an outside Independent Contractor to run and operate the plant and that cost is included in the maintenance and operations expenses.

- Capital expenses over the life of the plant were not included within the Proforma as those numbers were not available.

- The initial costs for the project were based on the projected costs provided by Alan Plummer & Associates.

- Debt service is based on the proposed terms from the TWDB approved funding request $5,255,000.00 at 2.29% interest only for the first two years and then amortized over 28 years (a total of 30 years).

The following chart shows the estimated remaining capital costs of the proposed project:



This Proforma provided the Committee with the criteria necessary to evaluate the financial impact on the owners within the proposed service area and the ability to compare the economic viability of alternative solutions which will be discussed in detail below. The Committee's efforts were not intended to call into question the City's Revenue Bond Proforma as presented to TWDB but rather to utilize the same Proforma with minor revisions to provide the City with the data and information necessary to effectively evaluate the project with actual and real numbers. The Committee recognizes that the Proforma could change following construction bids, but with actual data the City will be able to respond quickly to determine the projects viability when the bids come in. Additionally, the impact fees, customer rates and City subsidy may require revisions to be able to properly fund its debt service obligation once more factors are evaluated and assumptions become better known.

IV.

FINANCIAL IMPACT ON OWNERS WITHIN THE DOWNTOWN AREA AND OWNER REVENUES AVAILABLE FOR DEBT SERVICE

Many owners within the proposed service area have been concerned about the financial impact of the project. The Committee wanted to fully evaluate the revenue stream available for debt service and as part of that process required a projection of anticipated fees to be paid by customers in the service area for wastewater usage. The number of LUE's (based on 5,700 gallons per month) for each customer was determined based upon water usage from November 15 to March 16. For purposes of calculating monthly fees for each customer, it is important to understand the total volumetric rate revenues required per year for initial connections and the method of billing that will be assessed each owner.

Total Volumetric Rate Revenues: The objective is to factor in an amount that would generate enough revenue to meet the debt service after taking into consideration grey water re-use fees and city contributions. The assumption made by the City and utilized by the Committee is that it is necessary to generate an annual volumetric rate of $130,000.00 from all initial users in order to meet the annual debt service. That equates to a rate of $14.69 per 1,000 gallons. It is important to note that the City's TWDB application factored in an initial rate of $9.61 per 1,000 gallons because of the estimated 37,630 gallons per day of total anticipated usage as opposed to the Committee's 24,806 gallons per day of total usage. This is an increase of 53% in the volume rates. For further explanation as volume usage decreases, the rate per 1,000 gallons increases in order to generate the $130,000.00 needed to meet the annual total volumetric revenue required by the customers to meet the debt service. For purposes of this report all calculations for volumetric rate are based on $14.69 per 1,000 gallons.

Volumetric Rate: The Volumetric Rate is that rate which is based upon the volume of wastewater used by the customer and is $14.69 per 1,000.00 gallons. For example, a customer using 3,000 gallons per month would pay $44.07 per month. For the customer using 17,100

gallons per month, the volumetric rate would be $238.03. As the volume of wastewater increases the volumetric rate paid by the customer increases proportionately.

Impact Fee: The impact fee is the initial charge for each customer that basically reserves the capacity within the plant for the benefit of the customer. The initial impact fee based on the Proforma is anticipated to be $2,500.00 for each LUE attributed to a customer. LUE's (Living Unit Equivalent) are determined by the expected amount of wastewater for each customer based upon water usage. One LUE is equal to 190 gallons per day or 5,700 gallons per month. A residence and many of the small business owners will use less than 190 gallons per day and will, therefore, be assessed 1 LUE. The impact fee in that case would be $2,500.00. A restaurant or other high user would generally exceed the monthly usage of 5,700 gallons per month and would be assessed more LUE's. If the daily usage for an Owner totaled 570 gallons per day or 17,100 gallons per month, the impact fee would be determined by dividing 5,700 gpm into 17,100 gpm for a total of 3 LUE's. The impact fee in that situation would be $7,500.00. The impact fee will be spread out over a period of 8 years and paid as a part of the monthly fee. For purposes of determining the impact fee, Deer Creek Nursing Home and the City have been exempted from the impact fee because they are current customers of the existing system. It is also possible that some vacant properties may wish to pay an impact fee to reserve their capacity on the system before they are required to. However, there was no assumption made that such funds would be paid early in the forecast.

Base Rate: The Base Rate is designed to capture some of the capital costs and expenses for maintenance and operation. The anticipated fee is expected to be $34.08 per LUE per month. No determination was made as to how this amount was calculated but it represents the amount that has been consistently used in the City's Proforma.

Monthly Fee: The monthly customer bill would equal the sum of the amortized impact fee, the base rate and the volumetric rate. For the user with 1 LUE and a volume usage of 3,000 gallons per month, the expected monthly fee would be $104.19 (Impact Fee of $26.04 plus Base Rate of $34.08 plus the Volumetric Rate of $44.07). The user with 3 LUE's and a volume usage of 17,100 gallons per month should expect a monthly fee of $431.57 (Impact Fee of $78.13 plus the Base Rate of $102.24 and the Volumetric Rate of $251.20).

Connection Fee: The Committee has been advised that the cost to connect initial customers to the system and decommission any septic tank has been factored into the cost of the project at an amount of $500,000.00. This cost is not detailed in the costs certified by Stephen Coonan, the engineer, and there is some concern as to whether the City would be able to provide the connection fee for the benefit of private property. Grant funds may be the best solution for covering this cost and should be explored by the City. The Committee concluded that further information is needed in order to provide a final assessment as to the cost to be allocated to the owner.

Nevertheless, there will be a cost for extending the service line from the house or commercial building to the main sewer line and decommissioning the septic tanks. Septic tanks will need to be pumped, crushed and filled with gravel. If the owner is required to pay this amount, the estimated cost for each connection will range from $1,000.00 to $1,500.00 for

decommissioning a septic tank. The cost of extending the service line based upon 100 feet is estimated at $1,500.00 to $2,000.00 for a basic cut and $2,500 to $3,500.00 for a special cut involving concrete or asphalt or extended distances. In those circumstances where a grinder pump may be required, the additional cost for a grinder pump is estimated at $1,700.00 to $2,300.00.

The following table shows the estimated connections, volumes and billing rates by property type.

Service Area Growth and Monthly Bills

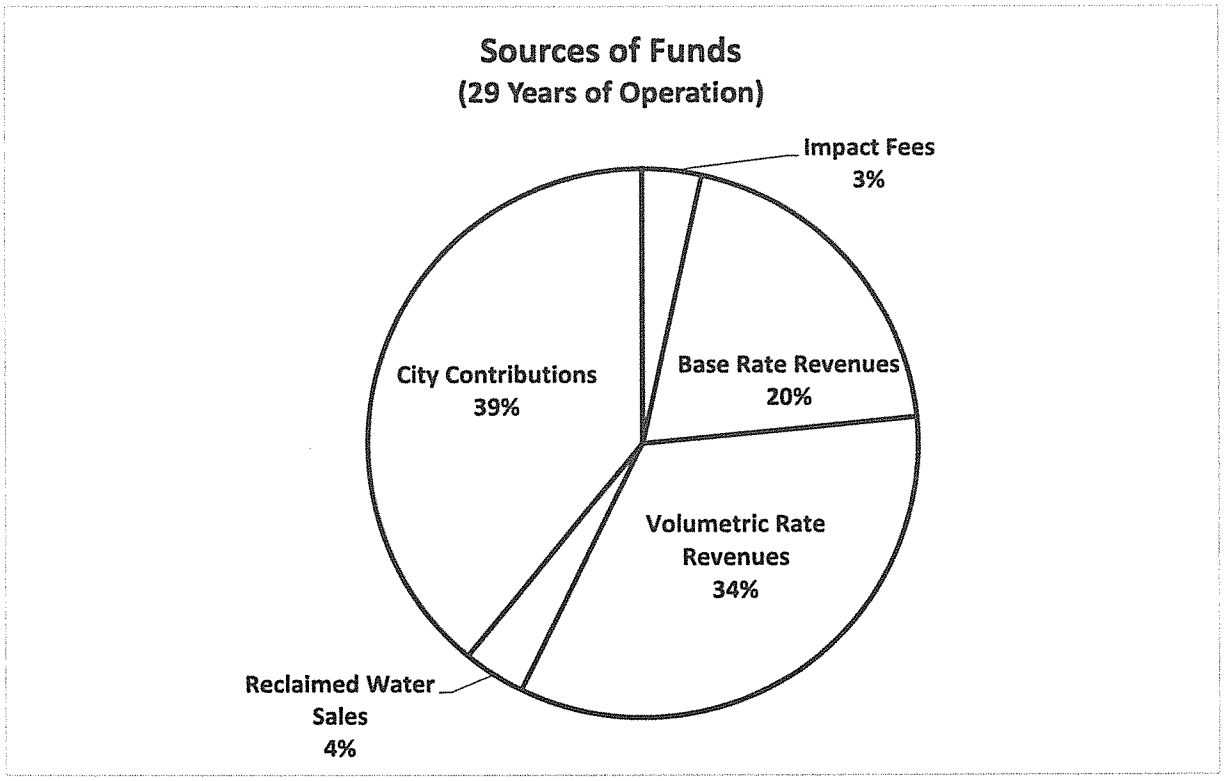
Flow Projections	Initial		Build-Out		Monthly Customer Rates - Initial		
	Number of Connections	Gallons Per Day	Number of Connections	Gallons Per Day	Avg	Low	High
Residential	31	1,964	66	5,299	$ 89	$ 61	$ 223
Restaurant	4	5,284	4	5,284	$ 1,000	$ 156	$ 1,466
Retail/Mixed Use	54	5,706	64	7,275	$ 114	$ 61	$ 429
Hotel/RV Park	2	1,398	2	1,398	$ 529	$ 502	$ 557
Church/Theatre	2	487	2	487	$ 202	$ 96	$ 307
Public Restrooms	2	750	2	750	$ 258	$ 233	$ 284
Nursing Home	1	9,000	1	9,000	$ 5,581	$ 5,581	$ 5,581
Total	96	24,588	141	29,493			

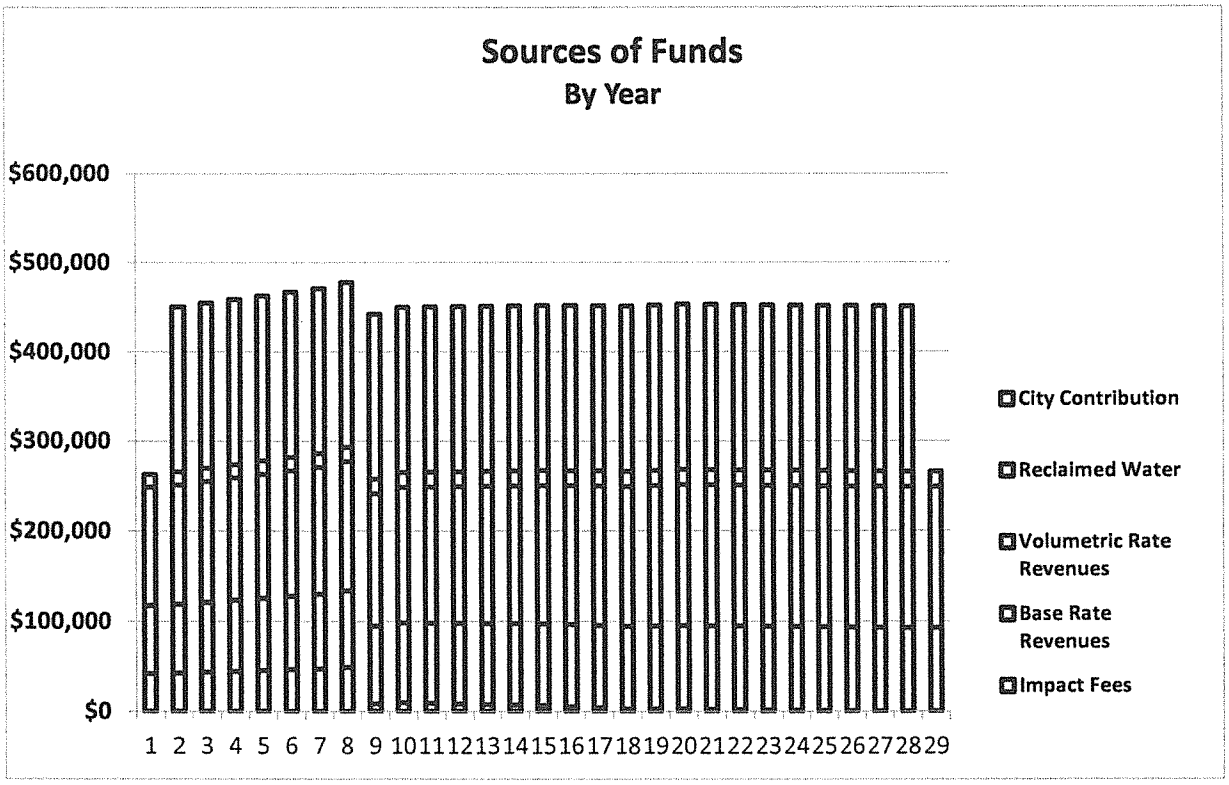
Note: Average rates include impact fee spread over 8 years, except for Deer Creek which has no impact fees. Monthly rates would decrease thereafter.

Exemptions: The City has determined that if an Owner has a new septic system that is in compliance and meets the septic requirements, they may be exempted for a period of time. It is anticipated that the total number of exempted properties will be minimal and will not have a significant impact on the volume of wastewater or the revenue generated. The details are yet to be worked out and the City should advise exempted owners of any benefits that may be available to initial users which would not be available for a later connection.

It is clear from the data that the cost per user is directly impacted by both the volume of wastewater and the contributions made by the City. Based on the assumption that a sewage system in the proposed service area is strategically important to the future of Wimberley as a critical infrastructure, the City determined that it would be in its best interest to commit up to $200,000.00 ($185,000.00 in contributions and $15,000.00 in the value of reclaimed water) annually from its general funds to help support a portion of the debt service required to fund the project and make it affordable to its users. Without this contribution, it is evident that the project would not be economically feasible.

The following charts show the estimated sources of funds, including revenues from customers, reclaimed water sales and City contributions over the life of the loan.


Sources of Funds
(29 Years of Operation)
Impact Fees
3%
Base Rate Revenues
20%
Volumetric Rate
Revenues
34%
Reclaimed Water
Sales
4%
City Contributions
39%


Sources of Funds
By Year
$600,000
$500,000
$400,000
$300,000
$200,000
$100,000
$0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29
City Contribution
Reclaimed Water
Volumetric Rate Revenues
Base Rate Revenues
Impact Fees

This does not, however, take into consideration the Proforma used by TWDB in its review, and the City should provide the updated data to TWDB to ensure that it does not significantly impact its Proforma. This becomes particularly important given the concerns of the TWDB in the Staff Recommendation approving the financial assistance when it was pointed out that the per capita debt per projected customer is approximately $44,000.00. With updated data showing the initial users at 96, the per capita debt per projected customer will exceed $55,000.00. The Staff Recommendations also noted that the project will be monitored and that any issues and concerns will be addressed as appropriate.

V.

AQUA TEXAS ALTERNATIVE OPTION

The Committee applied the Proforma to examine the feasibility of Aqua Texas as an alternative solution. Aqua Texas already serves customers north of Cypress Creek and is making plans to extend service to Mill Race Lane. The Committee examined the feasibility of linking the proposed service area to Aqua Texas in several different scenarios.

Wholesale Approach

The first approach would be for Aqua Texas to serve Wimberley as a wholesale customer and take its wastewater at the Creek to the lift station at Ace Hardware and from there transfer it to the Aqua Plant for treatment. The City of Wimberley would in this case, maintain its CCN (Certificates of Convenience and Necessity), construct and maintain the collection system in the proposed service area, and determine rates and bill wastewater customers.

Rates: The rate as provided by Aqua Texas would be based on a cost of $12.50 per thousand gallons of flow. This rate would remain in effect for a period of 5 years, and thereafter, would be tied to the prevailing retail rate that would apply to its regional customers. Aqua made it clear that they did not want to give any special treatment over and above its regional customers and wanted to establish parity in the rates between those customers in regional and those within the proposed service area. The rate would be spread out over customers within the wastewater system for this region. According to Aqua, there is a distinct difference in the number of wastewater users and the number of water users. It is important to keep in perspective that the rate will not be factored in based upon 14,000 regional customers but rather by a number that generally includes the Woodcreek area (which includes the Wimberley customers north of Cypress Creek) and other wastewater systems owned by Aqua within the region. We were unable to identify in detail how the rate after 5 years would be calculated, but it would be safe to say that it be in parity with the rate that users within Woodcreek would pay.

Initial Costs: The CIAC (Impact Fees) Fees to reserve capacity is an upfront cost of $2,572 per LUE—with one LUE representing 6,300 gallons per month, or 210 gallons per day.

Daily Volume		CIAC Fee	
30,000	$	367,429	
40,000	$	489,905	
50,000	$	612,381	Capped at $600,000
60,000	$	734,857	Capped at $600,000
70,000	$	857,333	Capped at $600,000
75,000	$	918,571	Capped at $600,000

Aqua has also indicated a willingness to use the CIAC fee for other upgrades and costs associated with the infrastructure of its system or the transfer collection system subject to negotiation. As an example, the CIAC fee could be allocated to upgrade the cost of the Aqua plant to improve the quality of the effluent or other infrastructure that would benefit the Wimberley valley. This may be critical should the bid costs exceed the standards established by the Central Wimberley Wastewater Stakeholder Committee Report dated November 20, 2013, or the project proves to be outside the scope of economic viability because of unforeseen circumstances or conditions.

The collection system infrastructure from Cypress Creek to Emergency Lane Lift station would cost approximately $425,000.00 which could be financed over 5 to 10 years at 5% per annum. The estimated cost to bore under Cypress Creek for a sewage line to send it to the north side is estimated to be approximately $250,000.00 and would be the responsibility of the City of Wimberley or the customers within the proposed service area.

Reclaimation of Wastewater: Aqua has a contract to use the wastewater from the plant to the golf course. The responsibility of using the water is up to the golf course. Aqua is not responsible for dispersing the water. The Committee discussed the option with Aqua of making the same volume of water available as it treats under this scenario, but it raised several issues—how to get the effluent treated to Type I and transporting it back to Blue Hole (i. e. trucking or by way of pipe). The Committee did not pursue the feasibility of these options or the cost associated with them.

Project Cost Recap

CIAC (Impact) Fees	$	600,000
Infrastructure		425,000
Line Under Creek		250,000
Subtotal		1,275,000
Collection System + 12% Contingency		2,530,000
Total	$	3,805,000

This table is subject to further clarification regarding verification of the numbers by Aqua Texas.

Retail Approach

The next option would be to release or the partially release the CCN and allow Aqua Texas to serve the owners within the proposed service area on a retail basis. The rate on a retail basis would be a flat rate based upon the number of LUE's times $90.00 per month. LUE's are determined by establishing an average of water use over several months in the winter and then calculating the LUE's based on 210 gallons per day. The costs for boring under the creek and

establishing the transfer line to the lift station at Emergency Lane would remain the same and be spread out over Aqua's customer base throughout the region. The cost of the collection system would be paid for by the customers.

Aqua Texas could become an option either on a wholesale or retail basis if the proposed project during the implementation and bidding stage proves not to be economically feasible as defined by the guidelines established by the Central Wimberley Wastewater Stakeholder Committee Report dated November 20, 2013. Other options could include a blend of Aqua Texas and the City of Wimberley to allow the City of Wimberley to identify those businesses and residents that would be sufficient to provide the sustainability of the Blue Hole Park and then have Aqua cover the balance of customers either through a wholesale or retail basis.

As the Committee began to examine the various options involving Aqua, it became apparent that a full analysis would require extensive negotiations with Aqua Texas, something that is outside the scope of this Committee. Additionally, this would require the City to seriously take the lead in bringing the parties to the table with a genuine effort to seek a viable solution. This would entail discussions regarding the watering issues at Blue Hole. Also, any negotiations with Aqua would more importantly require the owners, or representatives of the downtown owners, within the business district to be closely involved in order to help determine the most effective approach in meeting financial obligations and long term solutions as it relates to Aqua. This would finally depend on Aqua's willingness to participate and work toward a meaningful, practicable and economic solution that would require beneficial concessions to be made on their part as well.

VI.

ALTERNATIVE GATHERING SYSTEM OPTION

It was expressed by Steve Coonan in his presentation to the Committee that Wimberley was unique and that there are no other communities or areas like what exists here. Unique situations deserve unique solutions, and efforts should be made to examine other alternative solutions such as the Orenco STEP system.

The Orenco STEP system has proven to be successful in environmentally sensitive areas (i.e. along rivers, creeks, and estuaries) and is particularly cost effective in small communities with limited potential customers, poor soil conditions (including rocky areas), and where gravity flow systems would disrupt and be invasive to the community. This system has been successfully implemented in many areas throughout the nation and has been used in The Crossing at Havenwood near New Braunfels and is being designed for use in the Canyon Lake area.

Contact was made to Patrick Foley of Orenco, and information was provided regarding how the system could possibly benefit the City of Wimberley in comparison to a gravity flow collection system. The City should consider examining its feasibility in lowering the cost of the collection system and, if practicable, move parallel with the present efforts to complete the drawings and plans for alternate bidding.

The benefits of the STEP system over a gravity flow system are as follows:

- Can tie directly into a gravity flow system that would allow for a mixing of the two collection systems if necessary
- Each property would have a collection tank that would allow the solids to be processed and broken down within the tank rather than at the treatment plant
- This would put less burden on the treatment plant and negate the first step of dealing with the solids
- The liquid would be pumped from the collection tank to the main line and on to the treatment plant which would allow for an easy transition to Aqua Texas if plant capacity exceeded 75,000 gallons per day
- The main line would be a line of 2 to 4 inches depending on the number of customers and would be placed about 3 feet under the ground
- Trenching would be less invasive and disruptive in the downtown area
- The system provides greater flexibility, does not require manholes or a lift station
- It allows for clustering within the downtown square area

The letter and materials provided to the Committee are being submitted with this report to be used as determined by the City.

VII.

CONCLUSIONS

With the City's infrastructure contribution and commitment to the present project, the TWDB loan being in place subject to the City's meeting the required conditions, and the TCEQ permit having been obtained, the City should move forward with the project to construct a wastewater collection and treatment system in the proposed downtown area south of Cypress Creek keeping in perspective that the updated data regarding lower volume of wastewater flow and higher user rates than expected. In that regard, the Committee recommends the following:

- Present the updated data to TWDB to verify that the reduced volume of wastewater meets their Proforma used in determining the City's ability to meet the debt service on the loan.

- Seek to reduce the cost of the plant and collection system as follows:

    - Consider an alternative gathering system such as the Orenco STEP system for the project
    - The STEP system as an alternate solution should be considered parallel with the present efforts to complete the drawings and plans for bidding purposes
    - Consider reducing the size of the plant
    - Consider removing the purple re-use pipe from the project

- Seek additional grants to further reduce the economic burden of the project
- Review ordinances to encourage viable, responsible, managed growth in the downtown area to increase wastewater volume and sales tax revenues
- Complete the Service Agreement with Blue Hole Regional Park

- Determine the capital expenses over the life of the plant in order to determine its impact on the project

- Ensure that all costs have been identified, in particular costs for easements, user connection costs, metering and billing, cost for land acquisition for the lift station, costs for future expansion of the effluent irrigation field and costs to operate and maintain the reuse line and reuse pump station

- Develop a funding method to assist initial customers in the costs of connecting their service to the sewer lines and decommissioning their septic tanks, costs typically paid for by the users.

- Activate the Water/Wastewater Review Committee to oversee and participate in the implementation of the project.

- It is further recommended that the City should explore the viability of the various options with Aqua in greater depth during the bidding process to avoid any delay should the project prove not to be economically feasible.

- Recognize that should the actual bid costs exceed the standards established by the Central Wimberley Wastewater Stakeholder Committee Report dated November 20, 2013, or the project proves to be outside the scope of economic viability because of unforeseen circumstances or conditions, then negotiations with Aqua Texas should commence immediately along with discussions regarding the watering needs of Blue Hole Regional Park, in order to protect the integrity, beauty and purity of Blanco River and Blue Hole.

- A meeting should be held with the customers to inform them of the projected rates based on volumetric fee, monthly base fee, impact fee and connection fee. Open communication should be established with the downtown customers to keep them informed of all developments and to seek their input as the project moves forward.

EXHIBITS

City of Wimberley
Wastewater Project

	Quantity	Units	Cost per Unit	Total Cost
Collection System	**1**	**LS**	**$2,259,000**	**$2,259,000**
Effluent Discharge	**1**	**LS**	**$20,000**	**$20,000**
Treatment Plant	**1**	**LS**	**$941,600**	**$941,600**
Screening & Equalization	*1*	*LS*	*$20,000*	*$20,000*
Aeration / Blowers	*1*	*LS*	*$150,000*	*$150,000*
Final Clarification	*1*	*LS*	*$75,000*	*$75,000*
Filtration	*1*	*LS*	*$100,000*	*$100,000*
UV or Chlorination / Dechlorination	*1*	*LS*	*$25,000*	*$25,000*
Post Aeration	*1*	*LS*	*$30,000*	*$30,000*
Odor Control	*1*	*LS*	*$40,000*	*$40,000*
RAS/WAS Handling	*1*	*LS*	*$20,000*	*$20,000*
Sludge Holding / Aeration	*1*	*LS*	*$30,000*	*$30,000*
Phosphorous Removal	*1*	*LS*	*$20,000*	*$20,000*
Drainfield Decommissioning	*1*	*LS*	*$50,000*	*$50,000*
Site Work and Yard Piping	*1*	*LS*	*$140,800*	*$140,800*
Electrical and Instrumentation	*1*	*LS*	*$240,800*	*$240,800*
Reclaimed Waterline	**13,000**	**LF**	**$58**	**$755,000**
Reclaimed Water Storage Tank	**1**	**LS**	**$300,000**	**$300,000**
Reclaimed Water Pump Station	**1**	**LS**	**$60,000**	**$60,000**
BHRP Spray Irrigation System	**1**	**LS**	**$43,500**	**$43,500**
Subtotal, Construction				**$4,379,100**
Contingency (~12%)				**$512,998**
Total, Construction				**$4,892,098**
Administrative and Legal				**$30,000**
Debt Reserve & Construction Interest				**$480,455**
Loan Origination Fee (1.85% total loan value)				**$95,452**
Total Project Cost				**$5,498,005**

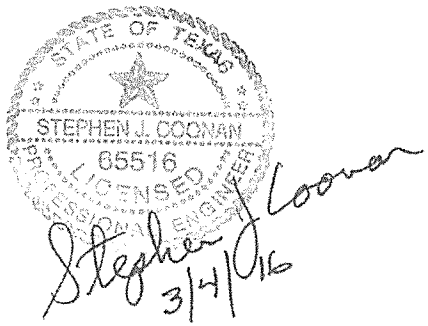
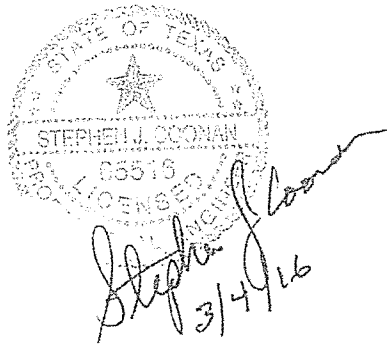


Table 3: Opinion of Probable Collection Construction Cost

Description	Quantity	Unit	Unit Cost	Total Cost
Gravity Sewer, Open Cut	12,575	LF	$68	$855,100
Gravity Sewer,Jack/Bore	450	LF	$265	$119,250
Manholes	50	EA	$5,400	$270,000
Service Connections	160	EA	$1,150	$184,000
Force Main, Open Cut	8,430	LF	$40	$337,200
Force Main, Jack/Bore	200	LF	$150	$30,000
Force Main Valving	1	LS	$18,000	$18,000
Pavement Repair	4,000	SY	$20	$80,000
Erosion Control	1	LS	$35,000	$35,000
Package Lift Stations	3	EA	$90,000	$270,000
Deer Creek Lift Station Upgrade	1	LS	$60,000	$60,000
	Subtotal, Collection System		**$**	**2,258,550**



Proforma Submitted by City of Wimberley to TWDB

Revenue Bond Proforma
Preliminary as of March 7, 2016

Fiscal Year Ending 9/30	Impact Fee Revenues	Utility Base Rate Revenues	Utility Volumetric Rate Revenues	Gray Water Re-Use Rate	Total Combined Utility Revenues	Minus: Projected Maintenance & Operations Expenses	Plus: City Contribution for 2013 PAD Loan Only	**Total Revenue Available for Debt Service**	Existing Debt Service - Wimberley portion of GBRA	Plus: $650,000 TWDB Series 2013 PAD loan Tax Note	Plus: $5,255,000 TWDB Series 2016 Revenue Bonds	Total Debt Service	Projected Coverage
2014	$ -	$ -	$ -	$ -	$ 200,000	$ (146,521)	$ 100,000	**$ 153,479**	$ 31,250	$ 96,715	$ -	$ 127,965	119.94%
2015	-	-	-	-	200,000	(146,521)	100,000	**153,479**	31,250	97,774	-	129,024	118.95%
2016	40,762	80,901	130,080	150,000	401,744	(146,737)	100,000	**355,007**	31,250	97,378	-	128,628	276.00%
2017	37,057	80,901	130,080	200,000	448,038	(146,953)	100,000	**401,086**	31,250	101,622	-	132,872	301.86%
2018	43,426	82,191	130,122	200,000	455,738	(147,168)	100,000	**408,570**	31,250	100,510	158,984	290,744	140.53%
2019	43,426	83,480	130,163	200,000	457,069	(147,483)	100,000	**409,586**	31,250	99,066	252,669	382,985	106.95%
2020	43,426	84,769	130,204	200,000	458,400	(147,797)	100,000	**410,602**	-	97,242	254,575	351,817	116.71%
2021	46,497	86,520	130,261	200,000	463,277	(148,112)		**315,165**	-	-	251,371	251,371	125.38%
2022	46,497	88,271	130,317	200,000	465,085	(148,427)		**316,658**	-	-	253,166	253,166	125.08%
2023	46,497	90,022	130,373	200,000	466,892	(148,741)		**318,150**	-	-	254,851	254,851	124.84%
2024	9,440	91,773	130,430	200,000	431,642	(149,254)		**282,388**	-	-	251,426	251,426	112.31%
2025	9,440	93,523	130,486	200,000	433,450	(149,767)		**283,683**	-	-	253,000	253,000	112.13%
2026	15,581	96,197	130,573	200,000	442,351	(150,280)		**292,071**	-	-	254,464	254,464	114.78%
2027	15,581	98,871	130,659	200,000	445,111	(150,793)		**294,318**	-	-	250,818	250,818	117.34%
2028	15,581	101,544	130,746	200,000	447,871	(151,306)		**296,566**	-	-	252,171	252,171	117.60%
2029	15,581	104,218	130,833	200,000	450,632	(151,819)		**298,813**	-	-	253,414	253,414	117.91%
2030	15,581	106,892	130,919	200,000	453,392	(152,431)		**300,961**	-	-	254,547	254,547	118.23%
2031	15,581	109,566	131,006	200,000	456,152	(153,043)		**303,110**	-	-	255,569	255,569	118.60%
2032	18,651	112,701	131,108	200,000	462,459	(153,043)		**309,417**	-	-	251,480	251,480	123.04%
2033	18,651	115,836	131,209	200,000	465,696	(153,043)		**312,654**	-	-	252,392	252,392	123.88%
2034	18,651	115,836	133,834	200,000	468,320	(153,043)		**315,278**	-	-	253,193	253,193	124.52%
2035	18,651	115,836	136,510	200,000	470,997	(153,043)		**317,955**	-	-	253,883	253,883	125.24%
2036	18,651	115,836	139,240	200,000	473,727	(153,043)		**320,685**	-	-	254,463	254,463	126.02%
2037	18,651	115,836	142,025	200,000	476,512	(153,043)		**323,470**	-	-	254,933	254,933	126.88%
2038	18,651	115,836	144,866	200,000	479,353	(153,043)		**326,310**	-	-	255,292	255,292	127.82%
2039	18,651	115,836	147,763	200,000	482,250	(153,043)		**329,207**	-	-	255,540	255,540	128.83%
2040	18,651	115,836	150,718	200,000	485,205	(153,043)		**332,163**	-	-	250,678	250,678	132.51%
2041	18,651	115,836	153,733	200,000	488,220	(153,043)		**335,177**	-	-	250,816	250,816	133.63%
2042	18,651	115,836	156,807	200,000	491,294	(153,043)		**338,252**	-	-	250,844	250,844	134.85%
2043	18,651	115,836	159,943	200,000	494,430	(153,043)		**341,388**	-	-	250,761	250,761	136.14%
2044	18,651	115,836	163,142	200,000	497,629	(153,043)		**344,587**	-	-	255,567	255,567	134.83%
2044	18,651	115,836	166,405	200,000	500,892	(153,043)		**347,850**	-	-	6,968	6,968	4991.94%
	$ 721,066	$ 3,098,205	$ 4,144,558	$ 5,950,000	$ 14,313,829	$ (4,825,748)		**$ 10,188,081**	$ 187,500	$ 690,306	$ 6,747,835		

Wastewater Treatment Plant
Proforma Financial Forecast
Key Assumptions and Comments

Note: Many of the assumptions are based on the report from the TWDB for the approved funding request and City Revenue Bond Proforma

Revenues						
Wastewater Quantities	Initial customer connect list based on WWSC data for accounts in the proposed service area					
	Customers with zero water usage and city restrooms were excluded - one on well water was included, anomilies were adjusted for					
	Average water usage for the period from November 2015 to March 2016 was used for wastewater treatment quantities for each property					
	The number of new connections assumed	45				
	New connects mix for residential and retail/mix	Residential	78%	Retail/mix	22%	
	New connects volume increase over initial connections	50%				
LUE's	LUE quantity for determination of impact fees:	5,700	Gallons per month			
	LUE calculated based on average monthly water usage divided by the LUE quantity above, with a minimum of one LUE per property					
	New connects assume average rate of LUE:	1.00				
Impact Fees	Impact fee per one LUE	$ 2,500				
	Payable by the customer on a monthly basis over 8 years, with the impact fee reduced to zero after that period					
Base Rates	Base rate per connection per LUE per month			$ 34.08		
Volumetric Rates	Volumetric rate per thousand gallons - initial rate per City TWDB application			$ 9.61		
	Volumetric rate per thousand gallons - for this financial model			$ 14.69	53%	<< % Increase
	Average gallons per day from initial connections - from WWSC data			24,588		
	Total Volumetric Rate Revenues per year for initial connections			130,033		
Connect Tees	Assume zero or included in impact fee					
Timing of Initial Connects	Assume all current water/well customers must connect year 1. Forecast model will allow known deferrals					
Reclaimed Water Revenues	Economic value based on benchmarking area reclaimed water rates			$ 1.58	per thousand gallons	

Costs	
Maintenance and Operations Expenses	Costs directly from Revenue Bond Proforma - not examined for integrity
Connect Costs	No connection costs in proforma
Administrative Expenses	No costs shown separately in Revenue Bond Proforma

Proforma Financial Forecast	
Bond Reserve Fund	Proforma shows available funds from bond reserve fund established at funding for first two years interest and last year's bond payment
Capital Expenditures	Revenue Bond Proforma has no provision for capital expenditures over the life of the bond - should there be?
Debt Payments	Computed on 2 years interest only with balance over 28 years (note TWDB has incorrect borrowings in their Attachment 1)

Proforma Financial Results

Debt Amt	5,255,000
Interest Rate	2.290%
Interest only first 2 years	

Year	Volume	Connections	LUE	Revenue from Wastewater Customers				Reclaimed	Expenses			Net	City	Reserve	Cap Exp	Total	Total	Net
	Avg Daily Volume -	Total	Number of	Impact	Base Rate	Volumetric	Total	Water Sale	Maint & Operations	Administrative	Total	Revenue Over	General Fund	Reserve Fund	Capital	Available For Debt	Debt Service	After Debt Service
Year	Gallons	Number	LUE's	Fees	Revenues	Revenues	Revenues	Revenues	Expenses	Expenses	Expenses	Expenses	Contribution	Use	Expenditures	Service	P&I	Service
0	-	-	-	-	-	-	-	-	-	-	-	-	-	120,340	-	120,340	120,340	-
1	24,806	98	184	42,116	75,296	131,186	248,598	14,306	(146,521)	-	(146,521)	116,383	-	120,340	-	236,722	120,340	116,383
2	25,024	100	186	42,741	76,114	132,338	251,194	14,431	(146,521)	-	(146,521)	119,104	185,000	-	-	304,104	256,305	47,800
3	25,351	103	189	43,679	77,341	134,067	255,087	14,620	(146,737)	-	(146,737)	122,970	185,000	-	-	307,970	256,305	51,665
4	25,678	106	192	44,616	78,568	135,796	258,980	14,809	(146,953)	-	(146,953)	126,836	185,000	-	-	311,836	256,305	55,531
5	26,005	109	195	45,554	79,795	137,525	262,874	14,997	(147,168)	-	(147,168)	130,703	185,000	-	-	315,703	256,305	59,398
6	26,332	112	198	46,491	81,021	139,254	266,767	15,186	(147,483)	-	(147,483)	134,470	185,000	-	-	319,470	256,305	63,165
7	26,659	115	201	47,429	82,248	140,983	270,661	15,374	(147,797)	-	(147,797)	138,238	185,000	-	-	323,238	256,305	66,933
8	27,204	120	206	48,991	84,293	143,865	277,150	15,688	(148,112)	-	(148,112)	144,726	185,000	-	-	329,726	256,305	73,421
9	27,749	125	211	8,438	86,338	146,747	241,522	16,003	(148,427)	-	(148,427)	109,098	185,000	-	-	294,098	256,305	37,793
10	28,403	131	217	9,688	88,792	150,205	248,684	16,380	(148,741)	-	(148,741)	116,323	185,000	-	-	301,323	256,305	45,018
11	28,512	132	218	9,063	89,201	150,781	249,044	16,443	(149,254)	-	(149,254)	116,233	185,000	-	-	301,233	256,305	44,928
12	28,621	133	219	8,438	89,610	151,357	249,405	16,506	(149,767)	-	(149,767)	116,143	185,000	-	-	301,143	256,305	44,839
13	28,730	134	220	7,813	90,019	151,934	249,765	16,568	(150,280)	-	(150,280)	116,053	185,000	-	-	301,053	256,305	44,749
14	28,839	135	221	7,188	90,428	152,510	250,125	16,631	(150,793)	-	(150,793)	115,963	185,000	-	-	300,963	256,305	44,659
15	28,948	136	222	6,563	90,837	153,087	250,486	16,694	(151,306)	-	(151,306)	115,874	185,000	-	-	300,874	256,305	44,569
16	29,057	137	223	5,313	91,245	153,663	250,221	16,757	(151,819)	-	(151,819)	115,159	185,000	-	-	300,159	256,305	43,854
17	29,166	138	224	4,063	91,654	154,239	249,956	16,820	(152,431)	-	(152,431)	114,345	185,000	-	-	299,345	256,305	43,040
18	29,275	139	225	2,500	92,063	154,816	249,379	16,883	(153,043)	-	(153,043)	113,219	185,000	-	-	298,219	256,305	41,914
19	29,384	140	226	2,500	92,472	155,392	250,364	16,945	(153,043)	-	(153,043)	114,267	185,000	-	-	299,267	256,305	42,962
20	29,493	141	227	2,500	92,881	155,968	251,349	17,008	(153,043)	-	(153,043)	115,315	185,000	-	-	300,315	256,305	44,010
21	29,493	141	227	2,188	92,881	155,968	251,037	17,008	(153,043)	-	(153,043)	115,002	185,000	-	-	300,002	256,305	43,698
22	29,493	141	227	1,875	92,881	155,968	250,724	17,008	(153,043)	-	(153,043)	114,690	185,000	-	-	299,690	256,305	43,385
23	29,493	141	227	1,563	92,881	155,968	250,412	17,008	(153,043)	-	(153,043)	114,377	185,000	-	-	299,377	256,305	43,073
24	29,493	141	227	1,250	92,881	155,968	250,099	17,008	(153,043)	-	(153,043)	114,065	185,000	-	-	299,065	256,305	42,760
25	29,493	141	227	938	92,881	155,968	249,787	17,008	(153,043)	-	(153,043)	113,752	185,000	-	-	298,752	256,305	42,448
26	29,493	141	227	625	92,881	155,968	249,474	17,008	(153,043)	-	(153,043)	113,440	185,000	-	-	298,440	256,305	42,135
27	29,493	141	227	313	92,881	155,968	249,162	17,008	(153,043)	-	(153,043)	113,127	185,000	-	-	298,127	256,305	41,823
28	29,493	141	227	-	92,881	155,968	248,849	17,008	(153,043)	-	(153,043)	112,815	185,000	-	-	297,815	256,305	41,510
29	29,493	141	227	-	92,881	155,968	248,849	17,008	(153,043)	-	(153,043)	112,815	-	256,305	-	369,119	256,305	112,815
				444,430	2,556,147	4,329,428	7,330,006	472,124	(4,366,626)	-	(4,366,626)	3,435,504	4,995,000	496,984	-	8,927,488	7,417,207	1,510,281
	298,813	Total thousands of gallons														Interest >>	2,162,207	

Notes:

- Year 0 is the estimated construction term
- Debt service excludes GBRA and PAD loans
- TWDB requires reserve fund of no less than average annual debt service payments - to be accumulated over the intial 60 months (approximately $261,000), but City requested funding of reserve at inception using borrowed funds - for both the first two years interest plus the annual average (totaling approximately $480,000)
- Above debt service includes first two years of interest only, then calculated annual payments for remaining 28 years

Proforma Financial Results
System Revenues from Customers

Key Revenue Assumptions				
Impact Fee Per LUE				$ 2,500.00
Monthly Flat Base Fee per Connection				$ 34.08
Volume Rate per Thousand Gallons				$ 14.69
Monthly Usage Per LUE				
Exempt Impact Fee LUE (Deer Creek)				47.37
Exempt Impact Fee City of Wimberley Blue Hole				1.97
Avg LUE per New Connect				1.00
	Residential	Retail/Mix	Vol Increase	
Avg Mo. Volume fo New Connect	78%	22%	50%	3,269

	Calculation Factors for Revenues - Initial Connections							Revenue - Initial Connections				Calculation Factors for Revenues - New Connections					Revenue - New Connections				Total		Revenue - Total				Avg Daily
Year	Connect No	LUE's	Impact Fees	Exempt Fees (3)	Impact Fees	Daily Volume	Total No. of Connections	Total LUE's	Impact Fees (1)	Base Rate Revenues	Volumetric Revenues	Total Revenues	Connect No.	LUE's	Impact Fees	Daily Volume	Total No. of Connections	Total LUE's	Impact Fees	Base Rate Revenues	Volumetric Revenues	Total Revenues	Connect No	LUE's	Impact Fees	Base Rate Revenues	Volumetric Revenues	Total Revenues	Volume - Gallons
1	96	182.12	455,290	(123,359)	331,930	24,588	96	182	41,491	74,478	130,033	246,002	2	2.0	5,000	218	2	2	625	818	1,153	2,596	98	184	**42,116**	**75,296**	**131,186**	**248,598**	24,806
2	-	-	-	-	-	24,588	96	182	41,491	74,478	130,033	246,002	2	2.0	5,000	436	4	4	1,250	1,636	2,305	5,191	100	186	**42,741**	**76,114**	**132,338**	**251,194**	25,024
3	-	-	-	-	-	24,588	96	182	41,491	74,478	130,033	246,002	3	3.0	7,500	763	7	7	2,188	2,863	4,034	9,085	103	189	**43,679**	**77,341**	**134,087**	**255,087**	25,351
4	-	-	-	-	-	24,588	96	182	41,491	74,478	130,033	246,002	3	3.0	7,500	1,090	10	10	3,125	4,090	5,763	12,978	106	192	**44,616**	**78,568**	**135,796**	**258,980**	25,678
5	-	-	-	-	-	24,588	96	182	41,491	74,478	130,033	246,002	3	3.0	7,500	1,417	13	13	4,063	5,316	7,492	16,871	109	195	**45,554**	**79,795**	**137,525**	**262,874**	26,005
6	-	-	-	-	-	24,588	96	182	41,491	74,478	130,033	246,002	3	3.0	7,500	1,744	16	16	5,000	6,543	9,221	20,765	112	198	**46,491**	**81,021**	**139,254**	**266,767**	26,332
7	-	-	-	-	-	24,588	96	182	41,491	74,478	130,033	246,002	3	3.0	7,500	2,071	19	19	5,938	7,770	10,950	24,658	115	201	**47,429**	**82,248**	**140,983**	**270,661**	26,659
8	-	-	-	-	-	24,588	96	182	41,491	74,478	130,033	246,002	5	5.0	12,500	2,616	24	24	7,500	9,815	13,832	31,147	120	206	**48,991**	**84,293**	**143,665**	**277,150**	27,204
9	-	-	-	-	-	24,588	96	182	-	74,478	130,033	204,511	5	5.0	12,500	3,160	29	29	8,438	11,860	16,714	37,011	125	211	**8,438**	**86,338**	**146,747**	**241,522**	27,749
10	-	-	-	-	-	24,588	96	182	-	74,478	130,033	204,511	6	6.0	15,000	3,814	35	35	9,688	14,314	20,172	44,173	131	217	**9,688**	**88,792**	**150,205**	**248,684**	28,403
11	-	-	-	-	-	24,588	96	182	-	74,478	130,033	204,511	1	1.0	2,500	3,923	36	36	9,063	14,723	20,748	44,533	132	218	**9,063**	**89,201**	**150,781**	**249,044**	28,512
12	-	-	-	-	-	24,588	96	182	-	74,478	130,033	204,511	1	1.0	2,500	4,032	37	37	8,438	15,132	21,324	44,894	133	219	**8,438**	**89,610**	**151,357**	**249,405**	28,621
13	-	-	-	-	-	24,588	96	182	-	74,478	130,033	204,511	1	1.0	2,500	4,141	38	38	7,813	15,540	21,901	45,254	134	220	**7,813**	**90,019**	**151,934**	**249,765**	28,730
14	-	-	-	-	-	24,588	96	182	-	74,478	130,033	204,511	1	1.0	2,500	4,250	39	39	7,188	15,949	22,477	45,614	135	221	**7,188**	**90,428**	**152,510**	**250,125**	28,839
15	-	-	-	-	-	24,588	96	182	-	74,478	130,033	204,511	1	1.0	2,500	4,359	40	40	6,563	16,358	23,053	45,974	136	222	**6,563**	**90,837**	**153,087**	**250,486**	28,948
16	-	-	-	-	-	24,588	96	182	-	74,478	130,033	204,511	1	1.0	2,500	4,468	41	41	5,313	16,767	23,630	45,710	137	223	**5,313**	**91,245**	**153,663**	**250,221**	29,057
17	-	-	-	-	-	24,588	96	182	-	74,478	130,033	204,511	1	1.0	2,500	4,577	42	42	4,063	17,176	24,208	45,445	138	224	**4,063**	**91,654**	**154,239**	**249,956**	29,166
18	-	-	-	-	-	24,588	96	182	-	74,478	130,033	204,511	1	1.0	2,500	4,686	43	43	2,500	17,585	24,783	44,868	139	225	**2,500**	**92,063**	**154,816**	**249,379**	29,275
19	-	-	-	-	-	24,588	96	182	-	74,478	130,033	204,511	1	1.0	2,500	4,795	44	44	2,500	17,994	25,359	45,853	140	226	**2,500**	**92,472**	**155,392**	**250,364**	29,384
20	-	-	-	-	-	24,588	96	182	-	74,478	130,033	204,511	1	1.0	2,500	4,904	45	45	2,500	18,403	25,935	46,838	141	227	**2,500**	**92,881**	**155,968**	**251,349**	29,493
21	-	-	-	-	-	24,588	96	182	-	74,478	130,033	204,511	-	0.0	-	4,904	45	45	2,188	18,403	25,935	46,526	141	227	**2,188**	**92,881**	**155,968**	**251,037**	29,493
22	-	-	-	-	-	24,588	96	182	-	74,478	130,033	204,511	-	0.0	-	4,904	45	45	1,875	18,403	25,935	46,213	141	227	**1,875**	**92,881**	**155,968**	**250,724**	29,493
23	-	-	-	-	-	24,588	96	182	-	74,478	130,033	204,511	-	0.0	-	4,904	45	45	1,563	18,403	25,935	45,901	141	227	**1,563**	**92,881**	**155,968**	**250,412**	29,493
24	-	-	-	-	-	24,588	96	182	-	74,478	130,033	204,511	-	0.0	-	4,904	45	45	1,250	18,403	25,935	45,588	141	227	**1,250**	**92,881**	**155,968**	**250,099**	29,493
25	-	-	-	-	-	24,588	96	182	-	74,478	130,033	204,511	-	0.0	-	4,904	45	45	938	18,403	25,935	45,276	141	227	**938**	**92,881**	**155,968**	**249,787**	29,493
26	-	-	-	-	-	24,588	96	182	-	74,478	130,033	204,511	-	0.0	-	4,904	45	45	625	18,403	25,935	44,963	141	227	**625**	**92,881**	**155,968**	**249,474**	29,493
27	-	-	-	-	-	24,588	96	182	-	74,478	130,033	204,511	-	0.0	-	4,904	45	45	313	18,403	25,935	44,651	141	227	**313**	**92,881**	**155,968**	**249,162**	29,493
28	-	-	-	-	-	24,588	96	182	-	74,478	130,033	204,511	-	0.0	-	4,904	45	45	-	18,403	25,935	44,338	141	227	**-**	**92,881**	**155,968**	**248,849**	29,493
29	-	-	-	-	-	24,588	96	182	-	74,478	130,033	204,511	-	0.0	-	4,904	45	45	-	18,403	25,935	44,338	141	227	**-**	**92,881**	**155,968**	**248,849**	29,493
	96	182			331,930				331,930	2,159,865	3,770,957	6,262,753	45	45	112,500				######	396,282	558,471	1,067,253			**444,430**	**2,556,147**	**4,329,428**	**7,330,006**	

Notes:
(1) Impact fees are shown to be paid over eight years
(2) LUE based on 5,700 gallons, but it is assumed that the volume rate would adjust if different, resulting in same monthly fees
(3) Deer Creek does not pay impact fees

Initial Connect Data
Based on Water Usage (Anomaly Adjusted) for Nov 15 - March 16
LUE Calculations
Estimated Impact Fee and Billing Calculations by Property
(Note: Actual Volume and Rate Adjustments Will Likely Change the Estimated Monthly Billings That Are Shown Here Which Are Based on the Stated Assumptions)

									Total Monthly Gallons>>		737,650							
									Volume Rate/Thousand Gallons>>		$ 14.69				Calculation of Monthly/Annual Customer Bill			
					LUE Monthly Gallons	Impact Fee Per LUE	Monthly Impact Over No. Years		Annual Volume Fees					Monthly Base Rate	Monthly Bill Impact + Base + Volume =	Annual Bill Impact + Base + Volume =		
					5,700	2,500	8		$ 130,033					$ 34.08				
			Nov 15 to Mar 16 Gallons		Number	Total Impact	Mo. Impact	Relative	Relative		Monthly			Monthly	Total	Total		
No.	Type	Type	Mo Avg	D Avg	LUE's	Fee	Fee	Vol %	Annual Vol $		Volume Fee			Base				
94	C	NH	270,000	9,000	47.37	$ -	$ -	36.60%	$ 47,596		$ 3,966.30			$ 1,614.32	$ 5,580.62	$ 66,967		
18	C	REST	58,096	1,937	10.19	$ 25,481	$ 265.42	7.88%	$ 10,241		$ 853.43			$ 347.35	$ 1,466.21	$ 17,594		
34	C	REST	57,918	1,931	10.16	$ 25,403	$ 264.61	7.85%	$ 10,210		$ 850.82			$ 346.29	$ 1,461.71	$ 17,541		
1	C	REST	36,340	1,211	6.38	$ 15,939	$ 166.03	4.93%	$ 6,406		$ 533.83			$ 217.27	$ 917.14	$ 11,006		
92	C	H/RV	22,064	735	3.87	$ 9,677	$ 100.81	2.99%	$ 3,889		$ 324.12			$ 131.92	$ 556.85	$ 6,682		
93	C	H/RV	19,872	662	3.49	$ 8,716	$ 90.79	2.69%	$ 3,503		$ 291.92			$ 118.81	$ 501.52	$ 6,018		
58	C	R/M	16,980	566	2.98	$ 7,447	$ 77.58	2.30%	$ 2,993		$ 249.44			$ 101.52	$ 428.54	$ 5,142		
10	C	R/M	16,714	557	2.93	$ 7,331	$ 76.36	2.27%	$ 2,946		$ 245.53			$ 99.93	$ 421.82	$ 5,062		
86	C	C/T	12,170	406	2.14	$ 5,338	$ 55.60	1.65%	$ 2,145		$ 178.78			$ 72.76	$ 307.14	$ 3,686		
95	C	PR	11,250	375	1.97	$ 4,934	$ 51.40	1.53%	$ 1,983		$ 165.26			$ 67.26	$ 283.92	$ 3,407		
96	C	PR	11,250	375	1.97	$ -	$ -	1.53%	$ 1,983		$ 165.26			$ 67.26	$ 232.53	$ 2,790		
64	C	R/M	9,130	304	1.60	$ 4,004	$ 41.71	1.24%	$ 1,609		$ 134.12			$ 54.59	$ 230.42	$ 2,765		
31	C	R/M	9,074	302	1.59	$ 3,980	$ 41.46	1.23%	$ 1,600		$ 133.30			$ 54.25	$ 229.01	$ 2,748		
59	R	R	8,827	294	1.55	$ 3,871	$ 40.33	1.20%	$ 1,556		$ 129.66			$ 52.77	$ 222.76	$ 2,673		
27	C	R/M	8,692	290	1.52	$ 3,812	$ 39.71	1.18%	$ 1,532		$ 127.69			$ 51.97	$ 219.37	$ 2,632		
75	C	R/M	8,502	283	1.49	$ 3,729	$ 38.84	1.15%	$ 1,499		$ 124.89			$ 50.83	$ 214.57	$ 2,575		
76	C	R/M	8,068	269	1.42	$ 3,539	$ 36.86	1.09%	$ 1,422		$ 118.52			$ 48.24	$ 203.62	$ 2,443		
85	C	R/M	7,032	234	1.23	$ 3,084	$ 32.13	0.95%	$ 1,240		$ 103.30			$ 42.04	$ 177.47	$ 2,130		
11	C	R/M	6,718	224	1.18	$ 2,946	$ 30.69	0.91%	$ 1,184		$ 98.68			$ 40.16	$ 169.54	$ 2,034		
19	C	REST	6,164	205	1.08	$ 2,704	$ 28.16	0.84%	$ 1,087		$ 90.55			$ 36.85	$ 155.56	$ 1,867		
74	C	R/M	5,390	180	1.00	$ 2,500	$ 26.04	0.73%	$ 950		$ 79.18			$ 34.08	$ 139.30	$ 1,672		
33	C	R/M	5,204	173	1.00	$ 2,500	$ 26.04	0.71%	$ 917		$ 76.45			$ 34.08	$ 136.57	$ 1,639		
7	R	R	5,008	167	1.00	$ 2,500	$ 26.04	0.68%	$ 883		$ 73.57			$ 34.08	$ 133.69	$ 1,604		
47	C	R/M	4,550	152	1.00	$ 2,500	$ 26.04	0.62%	$ 802		$ 66.84			$ 34.08	$ 126.96	$ 1,524		
8	R	R	4,524	151	1.00	$ 2,500	$ 26.04	0.61%	$ 797		$ 66.46			$ 34.08	$ 126.58	$ 1,519		
25	C	R/M	4,288	143	1.00	$ 2,500	$ 26.04	0.58%	$ 756		$ 62.98			$ 34.08	$ 123.11	$ 1,477		
67	R	R	4,252	142	1.00	$ 2,500	$ 26.04	0.58%	$ 750		$ 62.46			$ 34.08	$ 122.58	$ 1,471		
72	C	R/M	4,162	139	1.00	$ 2,500	$ 26.04	0.56%	$ 734		$ 61.14			$ 34.08	$ 121.26	$ 1,455		
37	R	R	4,044	135	1.00	$ 2,500	$ 26.04	0.55%	$ 713		$ 59.41			$ 34.08	$ 119.53	$ 1,434		
35	C	R/M	3,898	130	1.00	$ 2,500	$ 26.04	0.53%	$ 687		$ 57.26			$ 34.08	$ 117.38	$ 1,409		
49	C	R/M	3,850	128	1.00	$ 2,500	$ 26.04	0.52%	$ 679		$ 56.56			$ 34.08	$ 116.68	$ 1,400		
40	R	R	3,832	128	1.00	$ 2,500	$ 26.04	0.52%	$ 676		$ 56.29			$ 34.08	$ 116.41	$ 1,397		
73	C	R/M	3,773	126	1.00	$ 2,500	$ 26.04	0.51%	$ 665		$ 55.43			$ 34.08	$ 115.55	$ 1,387		
83	R	R	3,556	119	1.00	$ 2,500	$ 26.04	0.48%	$ 627		$ 52.24			$ 34.08	$ 112.36	$ 1,348		
3	C	R/M	3,528	118	1.00	$ 2,500	$ 26.04	0.48%	$ 622		$ 51.83			$ 34.08	$ 111.95	$ 1,343		
61	C	R/M	3,346	112	1.00	$ 2,500	$ 26.04	0.45%	$ 590		$ 49.15			$ 34.08	$ 109.27	$ 1,311		
68	C	R/M	3,248	108	1.00	$ 2,500	$ 26.04	0.44%	$ 573		$ 47.71			$ 34.08	$ 107.83	$ 1,294		
21	C	R/M	3,216	107	1.00	$ 2,500	$ 26.04	0.44%	$ 567		$ 47.24			$ 34.08	$ 107.36	$ 1,288		
2	C	R/M	2,870	96	1.00	$ 2,500	$ 26.04	0.39%	$ 506		$ 42.16			$ 34.08	$ 102.28	$ 1,227		
84	C	R/M	2,834	94	1.00	$ 2,500	$ 26.04	0.38%	$ 500		$ 41.63			$ 34.08	$ 101.75	$ 1,221		
71	C	C/T	2,444	81	1.00	$ 2,500	$ 26.04	0.33%	$ 431		$ 35.90			$ 34.08	$ 96.02	$ 1,152		
6	R	R	2,436	81	1.00	$ 2,500	$ 26.04	0.33%	$ 429		$ 35.78			$ 34.08	$ 95.91	$ 1,151		
82	R	R	2,408	80	1.00	$ 2,500	$ 26.04	0.33%	$ 424		$ 35.37			$ 34.08	$ 95.49	$ 1,146		
38	R	R	2,328	78	1.00	$ 2,500	$ 26.04	0.32%	$ 410		$ 34.20			$ 34.08	$ 94.32	$ 1,132		
79	C	R/M	2,314	77	1.00	$ 2,500	$ 26.04	0.31%	$ 408		$ 33.99			$ 34.08	$ 94.11	$ 1,129		
4	C	R/M	2,228	74	1.00	$ 2,500	$ 26.04	0.30%	$ 393		$ 32.73			$ 34.08	$ 92.85	$ 1,114		
36	C	R/M	2,218	74	1.00	$ 2,500	$ 26.04	0.30%	$ 391		$ 32.58			$ 34.08	$ 92.70	$ 1,112		
77	R	R	2,188	73	1.00	$ 2,500	$ 26.04	0.30%	$ 386		$ 32.14			$ 34.08	$ 92.26	$ 1,107		
52	R	R	2,016	67	1.00	$ 2,500	$ 26.04	0.27%	$ 355		$ 29.62			$ 34.08	$ 89.74	$ 1,077		
39	R	R	1,998	67	1.00	$ 2,500	$ 26.04	0.27%	$ 352		$ 29.35			$ 34.08	$ 89.47	$ 1,074		

Estimated Impact Fee and Billing Calculations by Property
(Note: Actual Volume and Rate Adjustments Will Likely Change the Estimated Monthly Billings That Are Shown Here Which Are Based on the Stated Assumptions)

						Volume Rate/Thousand Gallons>>			$ 14.69		Calculation of Monthly/Annual Customer Bill			
					LUE Monthly Gallons 5,700	Impact Fee Per LUE 2,500	Monthly Impact Over No. Years 8		Annual Volume Fees $ 130,033			Monthly Base Rate $ 34.08	Monthly Bill Impact + Base + Volume = Total	Annual Bill Impact + Base + Volume = Total
			Nov 15 to Mar 16 Gallons		Number	Total Impact	Mo. Impact	Relative	Relative	Monthly		Monthly		
No.	Type	Type	Mo Avg	D Avg	LUE's	Fee		Vol %	Annual Vol $	Volume Fee		Base		
13	C	R/M	1,974	66	1.00	$ 2,500	$ 26.04	0.27%	$ 348	$ 29.00		$ 34.08	$ 89.12	$ 1,069
24	R	R	1,973	66	1.00	$ 2,500	$ 26.04	0.27%	$ 348	$ 28.98		$ 34.08	$ 89.10	$ 1,069
89	C	R/M	1,800	60	1.00	$ 2,500	$ 26.04	0.24%	$ 317	$ 26.44		$ 34.08	$ 86.56	$ 1,039
26	C	R/M	1,679	56	1.00	$ 2,500	$ 26.04	0.23%	$ 296	$ 24.67		$ 34.08	$ 84.79	$ 1,017
56	R	R	1,630	54	1.00	$ 2,500	$ 26.04	0.22%	$ 287	$ 23.94		$ 34.08	$ 84.07	$ 1,009
57	C	R/M	1,427	48	1.00	$ 2,500	$ 26.04	0.19%	$ 252	$ 20.96		$ 34.08	$ 81.08	$ 973
66	R	R	1,348	45	1.00	$ 2,500	$ 26.04	0.18%	$ 238	$ 19.80		$ 34.08	$ 79.92	$ 959
91	C	R/M	1,318	44	1.00	$ 2,500	$ 26.04	0.18%	$ 232	$ 19.36		$ 34.08	$ 79.48	$ 954
55	R	R	1,210	40	1.00	$ 2,500	$ 26.04	0.16%	$ 213	$ 17.77		$ 34.08	$ 77.90	$ 935
42	C	R/M	1,184	39	1.00	$ 2,500	$ 26.04	0.16%	$ 209	$ 17.39		$ 34.08	$ 77.51	$ 930
45	C	R/M	1,134	38	1.00	$ 2,500	$ 26.04	0.15%	$ 200	$ 16.66		$ 34.08	$ 76.78	$ 921
60	R	R	1,114	37	1.00	$ 2,500	$ 26.04	0.15%	$ 196	$ 16.36		$ 34.08	$ 76.49	$ 918
87	C	R/M	977	33	1.00	$ 2,500	$ 26.04	0.13%	$ 172	$ 14.35		$ 34.08	$ 74.47	$ 894
5	R	R	956	32	1.00	$ 2,500	$ 26.04	0.13%	$ 169	$ 14.04		$ 34.08	$ 74.17	$ 890
65	C	R/M	952	32	1.00	$ 2,500	$ 26.04	0.13%	$ 168	$ 13.98		$ 34.08	$ 74.11	$ 889
53	R	R	930	31	1.00	$ 2,500	$ 26.04	0.13%	$ 164	$ 13.66		$ 34.08	$ 73.78	$ 885
70	C	R/M	758	25	1.00	$ 2,500	$ 26.04	0.10%	$ 134	$ 11.14		$ 34.08	$ 71.26	$ 855
28	R	R	710	24	1.00	$ 2,500	$ 26.04	0.10%	$ 125	$ 10.43		$ 34.08	$ 70.55	$ 847
41	C	R/M	670	22	1.00	$ 2,500	$ 26.04	0.09%	$ 118	$ 9.84		$ 34.08	$ 69.96	$ 840
81	C	R/M	586	20	1.00	$ 2,500	$ 26.04	0.08%	$ 103	$ 8.61		$ 34.08	$ 68.73	$ 825
16	C	R/M	538	18	1.00	$ 2,500	$ 26.04	0.07%	$ 95	$ 7.90		$ 34.08	$ 68.02	$ 816
20	C	R/M	534	18	1.00	$ 2,500	$ 26.04	0.07%	$ 94	$ 7.84		$ 34.08	$ 67.97	$ 816
43	C	R/M	516	17	1.00	$ 2,500	$ 26.04	0.07%	$ 91	$ 7.58		$ 34.08	$ 67.70	$ 812
50	C	R/M	396	13	1.00	$ 2,500	$ 26.04	0.05%	$ 70	$ 5.82		$ 34.08	$ 65.94	$ 791
9	R	R	390	13	1.00	$ 2,500	$ 26.04	0.05%	$ 69	$ 5.73		$ 34.08	$ 65.85	$ 790
23	R	R	386	13	1.00	$ 2,500	$ 26.04	0.05%	$ 68	$ 5.67		$ 34.08	$ 65.79	$ 790
44	C	R/M	373	12	1.00	$ 2,500	$ 26.04	0.05%	$ 66	$ 5.47		$ 34.08	$ 65.60	$ 787
48	C	R/M	346	12	1.00	$ 2,500	$ 26.04	0.05%	$ 61	$ 5.08		$ 34.08	$ 65.20	$ 782
32	C	R/M	322	11	1.00	$ 2,500	$ 26.04	0.04%	$ 57	$ 4.73		$ 34.08	$ 64.85	$ 778
15	C	R/M	302	10	1.00	$ 2,500	$ 26.04	0.04%	$ 53	$ 4.44		$ 34.08	$ 64.56	$ 775
22	C	R/M	282	9	1.00	$ 2,500	$ 26.04	0.04%	$ 50	$ 4.14		$ 34.08	$ 64.26	$ 771
46	C	R/M	254	8	1.00	$ 2,500	$ 26.04	0.03%	$ 45	$ 3.73		$ 34.08	$ 63.85	$ 766
90	C	R/M	232	8	1.00	$ 2,500	$ 26.04	0.03%	$ 41	$ 3.41		$ 34.08	$ 63.53	$ 762
29	C	R/M	210	7	1.00	$ 2,500	$ 26.04	0.03%	$ 37	$ 3.08		$ 34.08	$ 63.21	$ 758
12	C	R/M	202	7	1.00	$ 2,500	$ 26.04	0.03%	$ 36	$ 2.97		$ 34.08	$ 63.09	$ 757
30	R	R	190	6	1.00	$ 2,500	$ 26.04	0.03%	$ 33	$ 2.79		$ 34.08	$ 62.91	$ 755
69	R	R	182	6	1.00	$ 2,500	$ 26.04	0.02%	$ 32	$ 2.67		$ 34.08	$ 62.80	$ 754
14	C	R/M	180	6	1.00	$ 2,500	$ 26.04	0.02%	$ 32	$ 2.64		$ 34.08	$ 62.77	$ 753
51	R	R	138	5	1.00	$ 2,500	$ 26.04	0.02%	$ 24	$ 2.03		$ 34.08	$ 62.15	$ 746
54	R	R	138	5	1.00	$ 2,500	$ 26.04	0.02%	$ 24	$ 2.02		$ 34.08	$ 62.14	$ 746
17	C	R/M	134	4	1.00	$ 2,500	$ 26.04	0.02%	$ 24	$ 1.97		$ 34.08	$ 62.09	$ 745
80	R	R	96	3	1.00	$ 2,500	$ 26.04	0.01%	$ 17	$ 1.41		$ 34.08	$ 61.53	$ 738
88	C	R/M	66	2	1.00	$ 2,500	$ 26.04	0.01%	$ 12	$ 0.97		$ 34.08	$ 61.09	$ 733
62	R	R	42	1	1.00	$ 2,500	$ 26.04	0.01%	$ 7	$ 0.62		$ 34.08	$ 60.74	$ 729
63	R	R	34	1	1.00	$ 2,500	$ 26.04	0.00%	$ 6	$ 0.50		$ 34.08	$ 60.62	$ 727
78	R	R	28	1	1.00	$ 2,500	$ 26.04	0.00%	$ 5	$ 0.41		$ 34.08	$ 60.53	$ 726
			737,650	24,588	182.12	$ 331,934	$ 3,458	100%	$ 130,033	$ 10,836		$ 6,207	$ 20,500	$ 246,003

Estimated Impact Fee and Billing Calculations by Property
(Note: Actual Volume and Rate Adjustments Will Likely Change the Estimated Monthly Billings That Are Shown Here Which Are Based on the Stated Assumptions)

													Volume Rate/Thousand Gallons>>	$ 14.69	Calculation of Monthly/Annual Customer Bill			
									LUE Monthly Gallons	Impact Fee Per LUE	Monthly Impact Over No. Years		Annual Volume Fees			Monthly Base Rate	Monthly Bill Impact + Base + Volume =	Annual Bill Impact + Base + Volume =
									5,700	2,500	8		$ 130,033			$ 34.08		
Ref	Map	No.	St No.	Street	Type	Type	Owner	Water Acct	Connect Year	Nov 15 to Mar 16 Gallons Mo Avg	Nov 15 to Mar 16 Gallons D Avg	Number LUE's	Total Impact Fee	Mo. Impact Fee	Relative Vol %	Relative Annual Vol $	Monthly Volume Fee	Monthly Base	Total	Total

Recap

		Avg Monthly/	Avg Daily/	Average Gallons			Impact Fees			Volume Fees		Base Rates	Total Bill	
	No. of Connections	Connection	Connection	Monthly	Daily		Annual	Monthly		Annual	Monthly	Monthly	Monthly	Annual
Total R - Residential	31	1,900	63	58,910	1,964		78,871	822		10,385	865	1,075	2,762	33,146
Total C- Commercial	65	10,442	348	678,740	22,625		253,063	2,636		119,648	9,971	5,131	17,738	212,857
Total	96			737,650	24,588		331,934	3,458		130,033	10,836	6,207	20,500	246,003
Residential R	31	1,900	63	58,910	1,964		78,871	822		10,385	865	1,075	2,762	33,146
Restaurant REST	4	39,630	1,321	158,518	5,284		69,525	724		27,944	2,329	948	4,001	48,007
Retail/Mixed Use R/M	54	3,170	106	171,172	5,706		152,373	1,587		30,174	2,515	2,077	6,179	74,146
Hotel/RV Park H/RV	2	20,968	699	41,936	1,398		18,393	192		7,393	616	251	1,058	12,700
Church/Theatre C/T	2	7,307	244	14,614	487		7,838	82		2,576	215	107	403	4,838
Public Restrooms PR	2	11,250	375	22,500	750		4,934	51		3,966	331	135	516	6,197
Nursing Home NH	1	270,000	9,000	270,000	9,000		-	-		47,596	3,966	1,614	5,581	66,967
Total	96			737,650	24,588		331,934	3,458		130,033	10,836	6,207	20,500	246,003

		Gallons			
	No. of Connections	Cum Daily	Mo Gallons	Daily Gallons	LUE's
Year 1 Connect	96	24,588	737,650	24,588	182.1
Year 2 Connect	-	24,588	-	-	-
Year 3 Connect	-	24,588	-	-	-
Year 4 Connect	-	24,588	-	-	-
Year 5 Connect	-	24,588	-	-	-
Year 6 Connect	-	24,588	-	-	-
Year 7 Connect	-	24,588	-	-	-
Year 8 Connect	-	24,588	-	-	-
Total	96		737,650	24,588	182.1

Wastewater Treatment Plant
Proforma Financial Forecast
Cost Summary

Capital Cost

	Estimate	Contingency 11.715%	Total
Collection System	$ 2,259,000	$ 264,635	$ 2,523,635
Effluent Discharge	20,000	2,343	22,343
Treatment Plant	941,600	110,306	1,051,906
Reclaimed Water Line	755,000	88,446	843,446
Reclaimed Water Storage Tank	300,000	35,144	335,144
Reclaimed Water Pump Station	60,000	7,029	67,029
BHRP Spray Irrigation System	43,500	5,096	48,596
Subtotal	$ 4,379,100	$ 512,998	4,892,098
Administrative and Loan Fees			125,452
Construction Interest for One Year			120,340
Previous Commitments			650,000
Total Estimated Capital Cost			$ 5,787,890

Source: Published City Estimates, except for one year of construction interest, which is calculated
Note: Excludes debt reserve, except for construction interest

Total Cost for 29 Years of Operation

Capital Cost Above	$ 5,787,890		
Estimated % of Capital Life Utilized	80%	$	4,630,312
Maintenance and Operating Costs			4,366,626
Administrative Costs			-
Capital Expenditures			-
Interest Cost, excluding Construction Interest			2,041,867
Credit for Sale of Reclaimed Water			(472,124)
Total Cost		$	10,566,681
Thousand of Gallons Processed			298,813
Cost per Thousand Gallons		$	35.36

Wastewater Treatment Plant
Benchmark Reclaimed Water Rates

	$/thousand Gallons	
San Antonio	$ 1.19	http://www.saws.org/service/rates/recycled.cfm
San Marcos	$ 1.35	http://sanmarcostx.gov/modules/showdocument.aspx?documentid=12053
Austin	$ 2.19	Per Don Pederson Austin
Average	$ 1.58	

Reclaimed Water Rate for Forecast - Estimated economic value

Wastewater Treatment Plant
Proforma Financial Forecast
Cost Summary

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Wastewater Treatment Plant
Benchmark Reclaimed Water Rates

	$/thousand Gallons	
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Average	$ 1.58	

Reclaimed Water Rate for Forecast - Estimated economic value

Orenco®

June 23, 2016

Mike,

Common challenges to achieving and maintaining sustainable wastewater treatment systems faced by small communities include (but are not limited to): Economic/ financial limitations; Inability to sustain community-wide systems (lack of economies of scale); Inability to attract and maintain system operators; Lack of managerial competency and consistency; Extreme topography and climate; Geographic isolation / remoteness (US EPA, 2012). For these reasons, many small communities, just like Wimberley, remain unsewered today, possibly posing significant environmental problems.

Based upon the estimated listed in the City of Wimberley's '*Wastewater Collection and Treatment System Feasibility Study*,' the collection system costs for option 1 are estimated at $2,259,000. For the initial 124 users, this equates to a cost of $18,217 per connection (collection system only). Moreover, this will **require** immediate connection by users to begin paying back the debt incurred.

This predicament is very similar to many communities that we've sewered, including Vero Beach, Florida. I have enclosed a case study on Vero Beach. It is a perfect example of gravity sewers dwarfing the costs of an Orenco Sewer, and the inability of gravity sewers to facilitate constituent consensus and allow non-mandatory connections.

As discussed in our conversation Wimberley is a unique city in hill country, located on the Blanco River and Cyprus Creek. Although a serene location, this would require extreme construction methods for a gravity sewer, leading to a costly and intrusive construction period. The following lists Wimberley's needs in a wastewater collection and/or treatment system:

- Low up-front costs
- Low long-term costs
- Ability phase in customers (non-mandatory connections)
- Reduced & minimal construction impact
- Reduce long term risk (ability to send flows to Aqua Texas initially, then in the future do something else)

Orenco Sewers (also known as "effluent sewers") were conceived to circumvent the challenges of gravity sewers when they are applied to small communities. STEP/STEG systems are particularly cost effective in ...
(1) Sparsely populated or suburban areas
(2) Hilly or flat terrain
(3) Poor soil conditions: areas with rock
(4) High groundwater
(5) Small communities that require lift station(s) or include creek or river crossings
(6) Small communities with minimal O&M capability

Technology Description
Orenco Sewers (aka effluent sewers) are broken into two main components; (1) on-lot equipment (i.e. components installed on private property with easements for construction and maintenance), and (2) Right-Of-Way (ROW) components that consist of low-pressure mains and ancillary equipment.

The on-lot components of an Orenco Sewer are a 1,000 gallon tank or larger (usually concrete), tank access equipment, pump vault, control panel, high-head effluent pump, service connection, short building sewer, and a service lateral from the tank to mainline. The following table shows constructed costs for on-lot Orenco Sewer equipment. On-lot STEP package installation costs vary as a result of (1) tank volume, (2) tank material, (3) burial depth, (4) geological conditions, (5) groundwater elevation, (6) tank location and building sewer length, and (7) number of units.

Up-Front Capital Costs

Based upon table 1 of the City's feasibility study (Service Area Flow Projections), we estimated tank sizing and budgetary pricing for materials, equipment, shipping and construction. We assumed that the flow was equally distributed to the number of connections. For example there were five restaurant connections with a flow of 7,500 gpd, therefore each restaurant produces ~1,500 gpd of maximum daily flow. Realistically, average day flows would be about half of what the engineer is estimating.

Table 1 enumerates the cost per connection for residences and the restaurants, retail/mixed use, hotel/RV park, church/theatre, public restrooms, and the nursing home. The costs for effluent mainlines varies. Mainline estimates are discussed in the enclosed paper "Small Community Collection Systems: Construction Costs". Effluent sewer line sizing would be relatively close to grinder sewer mainlines, and therefore the engineer could use the same line sizing and lengths, and if desired I can assist him with the design and layout if it needs to be altered.

Estimated costs for the entire collection system are shown in Table 1. Again, this estimate includes materials, construction and shipping. Costs for mainlines are not included.

Table 1. Estimated Collection System Costs

	Units	Total Low	Total High
Residential STEP Packages: 1,250 gal	60	$319,248.00	$444,019.80
Commercial Connections (tanks vary)	64	$690,461.86	$995,701.26
Total Collection System Cost (Installed)		**$1,009,710**	**$1,439,721**

I have enclosed another document "Detailed Cost Estimate" for a detailed breakdown of the costs listed in table 1.

In a previous email you mentioned that there would be 12,000 linear feet of gravity lines. If we were to assume the same line lengths for a pressure sewer and using previous data we have collected for construction costs for effluent sewer mains, there is a large cost savings. Below is a table from the "Small Community Collection System: Construction Costs" paper (enclosed).

Table 2. Installed Unit Costs: Pressure Sewer Mains

Item	Unit	Cost per Unit, in 2008 USD
2-inch (50-mm) diameter mainline	Linear ft (meter)	$10.70 ($35.10)
3-inch (80-mm) diameter mainline	Linear ft (meter)	$11.40 ($37.40)
4-inch (100-mm) diameter mainline	Linear ft (meter)	$12.90 ($42.32)
6-inch (150-mm) diameter mainline	Linear ft (meter)	$18.00 ($59.05)
8-inch (200-mm) diameter mainline	Linear ft (meter)	$20.00 ($65.61)
2-inch (50-mm) diameter isolation valve	Each	$360
3-inch (80-mm) diameter isolation valve	Each	$390
4-inch (100-mm) diameter isolation valve	Each	$500
6-inch (150-mm) diameter isolation valve	Each	$570
8-inch (200-mm) diameter isolation valve	Each	$820
Automatic air release station	Each	$1,430

** Table 18.8, Water Supply and Wastewater Removal, 2011.*

It is doubtful that a pipe larger than 4" would be required. Typically we use 2"-3" in smaller applications like Wimberley. However, if we were to assume all 12,000 linear feet was 4" pipe that still only amounts to ~ **$155,000** installed. A significant cost savings when compared to the estimated installation cost of a gravity sewer. Furthermore, that would easily allow for non-mandatory connections since the up-front cost is so low.

Cost Savings

Although Wimberley is a unique small community Orenco's small community solutions have saved communities millions of dollars. From Vero Beach, Florida to Lacey, Washington and states in between. Orenco is a viable solution and has 35 years of data to back it up.

The water and sewer authority of Mobile, Alabama is building and operating cluster wastewater systems to serve new subdivisions outside the city limits and on the opposite side of a topographic ridge from its gravity sewer shed. The utility has found that the systems are a good match with its strategic objectives of avoiding large capital expenditures for a new treatment plant in another watershed or new force mains to serve the area, avoiding political battles over a new treatment plant, avoiding new flows in its already capacity-limited gravity sewers, providing cost effective service to developing areas around the city, providing environmental stewardship through higher levels of treatment than septic system alternatives, generating new customers and a positive image for the utility, and using wastewater service as a tool to compete with other local water providers for lucrative water service to new development (Valuing Decentralized Wastewater Technologies, 2004).

In fact, a colleague of mine just told me how areas of Cincinnati are looking at expanding their gravity collection network to serve homes in outer lying subdivisions. The local terrain is rocky, and hilly, very similar to Wimberley. Construction estimates to expand the gravity sewer are ~$1,000 per linear foot. To expand service to only 159 homes, costs were estimated in excess of $29,000 per connection.

Small Community Construction Costs

The Municipal Systems Team at Orenco has collected and analyzed constructed costs from more than forty publicly funded and bid collection systems serving small communities. On average, Orenco Sewers cost 41% less than gravity sewers. The table below is a summary of the enclosed document.

Table 3. Constructed Costs for Various Collection System Technologies (USD 2014)

Type	Average	Median	Minimum	Maximum
STEP	$9,702	$9,283	$6,666	$15,687
Gravity	$16,394	$15,304	$10,247	$25,112
Grinder	$11,468	$11,258	$6,488	$15,693

*USD 2014 costs adjusted per ENRCCI.

These costs correlate well with the costs enumerated in collection system fact sheets developed by the Water Environment Research Foundation (2010). In 2010 the Water Environment Research Foundation (WERF) developed fact sheets for gravity sewers, effluent sewers, grinder sewers, and vacuum sewers. The fact sheets include design characteristics, performance, and approximate costs for each collection system technology. A *Wastewater Planning Model* (cost estimating tool) is also available that allows users to compare capital and life cycle costs of effluent sewers to those of grinder, vacuum, and gravity sewers. Figure 1 summarizes WERF's capital cost estimates (for the entire collection system network) for a 200-unit (subdivision) example.

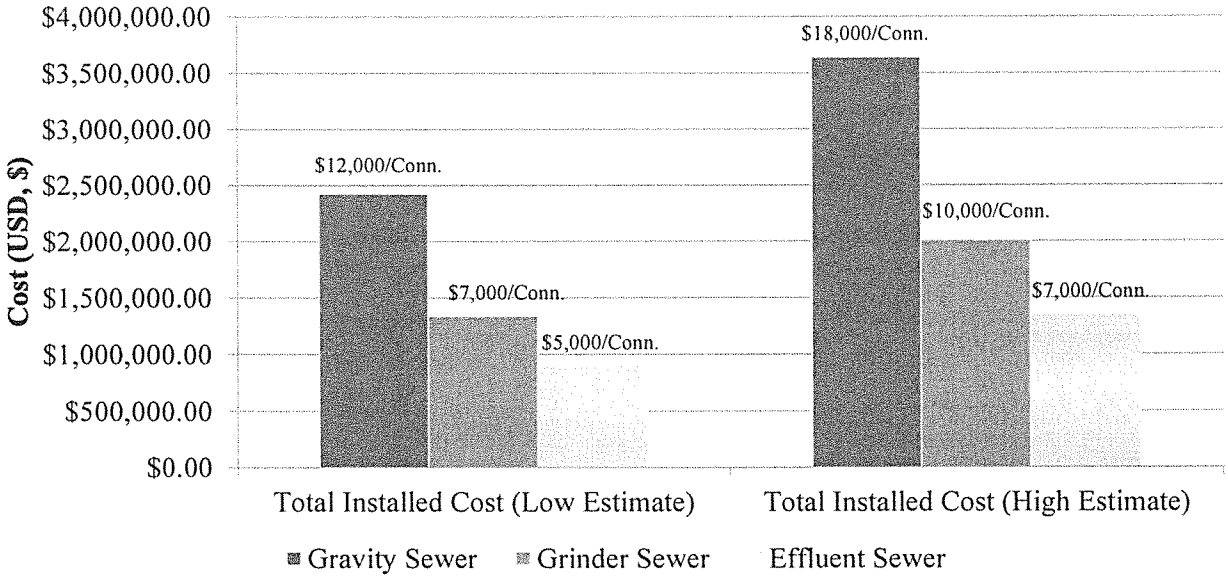

Figure 1. Constructed collection system costs (on-lot and ROW) for 200 homes in USD 2009 (WERF 2010).

Source: http://www.werf.org/i/c/DecentralizedCost/Decentralized_Cost.aspx

Long Term O&M Costs

Under the rubric of operation and maintenance expenditures, virtually all wastewater collection and treatment system owners will spend more on operation and maintenance than on the initial capital cost of the system. Consequently, as you know, when evaluating collection system options or establishing user rates, a thorough understanding of operation and maintenance costs is critical.

Until recently, operation and maintenance costs of alternative collection systems weren't well substantiated with long-term data. As reported in "*Operational Costs of Two Pressure Sewer Technologies: Effluent (STEP) Sewers and Grinder Sewers*," the uniform equivalent monthly costs (estimate) for effluent sewers (Orenco) and grinder sewers is estimated at approximately $7.05/month/EDU and $16.91/month/EDU, respectively (Molatore, p.12).

Orenco®

June 23, 2016

Mike,

Below are the detailed cost estimates as referenced in table 1 of the Wimberley Letter.

Table 1. Estimated Residential STEP Package Cost

1,250 gal STEP System Estimate (Per Unit)	Unit Low ($)	Unit High ($)
Interceptor Tank, 1000 gal	$1,250	$1,500
Access Equipment (2 ft. & 4ft Burial Depth)	$219	$382
STEP Pumping Equipment	$1,112	$1,433
Lateral and Connection (Ball Valve & Check Valve)	$650	$1,000
Control Panel (Non-Telemetry & Telemetry)	$338	$450
Installation Estimate (50% & 60% of Materials)	$1,460	$2,259
Shipping Estimate (10% of materials, not including tank)	$292	$376
Total (Per Unit)	$5,321	$7,400
Total for 60 Units	**$319,248**	**$444,020**

Table 2. Estimated Commercial STEP Package Cost

Tank 1 Restaurant	Unit Low	Unit High	Total Low	Total High
Septic Tank (3,000 gal)	$1.00	$1.25	$3,000	$3,750
Grease Tank (1,000 gal)	$1.00	$1.25	$1,000	$1,250
Access Equipment	$248	$544	$991	$2,177
Biotube Effluent Filter	$427	$509	$427	$509
Pumping Equipment (includes control panel)	$2,407	$2,878	$2,407	$2,878
		Subtotal	$7,825	$10,564

Tank 2 Retail/Mixed Use				
Septic Tank (1,250 gal)	$1.00	$1.25	$1,250	$1,563
Grease Tank (500 gal)	$1.00	$1.25	$500	$625
Access Equipment	$248	$544	$991	$2,177
Biotube Effluent Filter	$427	$509	$427	$509
Pumping Equipment (includes control panel)	$2,407	$2,878	$2,407	$2,878
		Subtotal	$5,575	$7,752

Tank 3 Hotel/RV Park				
Septic Tank (3,000 gal)	$1.00	$1.25	$3,000	$3,750
Grease Tank (1,000 gal)	$1.00	$1.25	$1,000	$1,250
Access Equipment	$248	$544	$991	$2,177
Biotube Effluent Filter	$427	$509	$427	$509
Pumping Equipment (includes control panel)	$2,407	$2,878	$2,407	$2,878
		Subtotal	$7,825	$10,564

Tank 4 Church/Theatre

Septic Tank (3,000 gal)	$1.00	$1.25	$3,000	$3,750
Grease Tank (1,000 gal)	$1.00	$1.25	$1,000	$1,250
Access Equipment	$248	$544	$991	$2,177
Biotube Effluent Filter	$427	$509	$427	$509
Pumping Equipment (includes control panel)	$2,407	$2,878	$2,407	$2,878
		Subtotal	$7,825	$10,564

Tank 5 Public Restrooms

Septic Tank (1,500 gal)	$1.00	$1.25	$1,500	$1,875
Grease Tank (500 gal)	$1.00	$2.50	$500	$1,250
Access Equipment	$248	$544	$991	$2,177
Biotube Effluent Filter	$427	$509	$427	$509
Pumping Equipment (includes control panel)	$2,407	$2,878	$2,407	$2,878
		Subtotal	$5,825	$8,689

Tank 6 Nursing Home

Septic Tank (20,000 gal)	$2.25	$2.50	$45,000	$50,000
Grease Tank (5,000 gal)	$1.00	$1.25	$5,000	$6,250
Access Equipment	$248	$544	$2,230	$4,898
Biotube Effluent Filter	$427	$509	$427	$509
Pumping Equipment (includes control panel)	$2,407	$2,878	$2,407	$2,878
		Subtotal	$55,064	$64,535

Shipping		**Total Low**	**Total High**
Shipping (% of materials)	10%	$8,994	$11,267
	Subtotal	$8,994	$11,267

Construction Estimate

Labor and Misc. Equipment (% of Materials)	50%	60%	$44,969	$67,601.36
		Subtotal	$44,969	$67,601

Materials Total	$89,939	$112,669
Construction Total	$44,969	$67,601
Shipping	$8,994	$11,267
Total	$143,902	$191,537

Best regards,

Patrick

Table 4. Uniform Equivalent Monthly Costs for Grinder Sewers and Orenco Sewers ($/month/connection).

	Proactive Maintenance	Reactive Maintenance	Equipment R&R	Solids Management	Equivalent Monthly Cost
Grinder Sewer	$1.60	$1.90	$13.41	NA	$16.91
Orenco Sewer	$1.60	$0.60	$2.81	$2.04	$7.05

Resources and references from longer-term grinder and effluent sewers are widely available. For instance, Lacey, Washington has a hybrid collection system consisting of 12,000 gravity sewer connections — with 47 lift stations and 152 miles (244 km) of mainlines — 3,000 effluent sewer connections, and 102 grinder pump connections. In a paper presented at WEFTEC 2013, Roger Dickinson[1], Terry Cargil[1], and Bill Cagle[2] concluded that, "With substantially lower up-front capital and repair/replacement costs, and with O&M costs that are virtually the same as those of gravity sewers, the life cycle costs of Lacey's STEP [effluent] sewer are clearly lower than those of a typical gravity sewer" (Cagle et al, p.1). Lacey, Washington's 3,000 connections were installed over 23 years ago. They've replaced less than 10 pumps in the past 15 years.

Phase-Ability

In addition to the overall affordability of Orenco Sewers, the number one benefit of Orenco Sewers is their ability to politically unite Wimberley's constituents. Orenco Sewers circumvent the absolute nature of gravity sewers, which require mandatory connections. This is due to a municipality's need for cash flow to retire the debt associated with the high cost of installing the necessary infrastructure, including large-diameter mainlines, manholes, and lift stations. In addition, gravity sewer installation can severely damage trees, landscapes, and roads. While some residents support the proposed gravity sewer project, dissent is usually widespread among those whose onsite systems were functioning properly. Other residents are probably opposed to the expected disruption, and still others are concerned about the cost. To effectively launch a sewer project, the city needs a more affordable option that doesn't require mandatory connections. It needs an option that allows residents with properly functioning septic systems to opt out of the city sewer, while allowing for future connection if their onsite systems fail. The chosen solution also needs to accommodate the significant percentage of residences located on narrow streets. Orenco Sewers, because of the small diameter force-mains, allow permit non-mandatory connections. This is also another key factor as to why Vero Beach, Florida selected an Orenco Sewer.

Construction Impact Considerations

Pressure sewers (effluent or grinder) and gravity sewers require different methods of construction, different installation techniques, and different degrees of accessibility to install the various products and system components. The construction impact of installing any sewer system technology falls under two main categories: on-lot and right-of-way (ROW).

Due to the use of small diameter mainlines that follow the contour of the land, the typical ROW construction impact of pressure sewers is considerably less than gravity sewers. The on-lot construction impact of effluent sewers is similar to grinder sewers, but effluent sewers provide primary treatment, lower-life cycle costs, and 24-hour reserve capacity.

An Orenco Sewer — also known as a STEP/STEG system or effluent sewer — is a type of pressure sewer. The on-lot components, specifically the watertight tank, typically constitute the largest construction impact relative to the entire effluent sewer collection system. However, installation is rarely unfeasible, even in communities with small (<0.15 acre) parcels.

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[1] City of Lacey, Washington

[2] Orenco Systems, Inc., Sutherlin, Oregon

Orenco has published a paper – Sewer Systems: Construction Considerations that explains the various aspects of effluent sewer construction and how they compare to grinder and gravity sewer requirements. I have enclosed that paper as a reference as well. Again, this was another factor that persuaded Vero Beach to select an Orenco Sewer.

System Flexibility
The flexibility of Orenco Sewers allows the city to adjust capital investments continuously and incrementally, more exactly tracking the unfolding future, with continuously available options for modification or exit to avoid trapped equity. The small unit size of Orenco Sewers allows closer matching of growing demand for wastewater capacity; therefore, less money is tied up in overbuilt capacity.

Orenco Sewers can convey effluent to a decentralized treatment facility or Aqua Texas. Whereas, gravity sewers are designed around sending their flows to a more committed and particular solution; either Aqua Texas or a wastewater treatment plant. An Orenco Sewer allow for flexibility and reduces risk. Flows can easily be re-routed in the future if needed.

I know there is a lot of information to digest, but there is a lot of data out there that gravity sewers dwarf the costs of low pressure sewers in most instances.

Please let me know if there is anything else I can do to help.

Best regards,

Patrick Foley

Patrick Foley
Applications Engineer