

March 2024 Preliminary

Preliminary Engineering Report

WWTP, Septic Elimination &
Collections Improvements

Turkey Creek Regional Sewer District

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Executive Summary

This preliminary engineering report is a comprehensive report focusing on Wastewater Treatment Plant improvements, collection system improvements, and collection system modeling for septic elimination. The Wastewater Treatment Plant section will focus on flow capacity upgrades, biosolids handling, and administration building improvements. The collection system component of the report will focus on much needed septic system eliminations around Papakeechee Lake, and the Enchanted Hills subdivision that is adjacent to the waterways and channels connected to Lake Wawasee. The collection system report will also address relocation of two existing lift stations to provide a safer distance and greater separation from Lake Wawasee. Finally, the collection system component will address future development within the existing sewer district boundaries for a project called South Shore development that is currently in the early stages of planning and funding. The District has given the developer preapproval for 21 homes, but future growth will require additional improvements and upgrades to the collection system.

The projects discussed in this report are wholly contained within the defined service district of the Turkey Creek Regional Sewer District in Kosciusko Co., Indiana. The Turkey Creek Regional Sewer District (TCRSD) was established by the Indiana stream pollution control board on October 18, 1977. The service area that was defined when the district was established includes Lake Wawasee, Syracuse Lake, Boner Lake, and Papakeechee Lake.

The TCRSD Utility has grown steadily from its inception in 1977. The district serves properties adjacent to the largest natural lake in the state and it protects one of our most beautiful assets. TCRSD has continued to grow and improve both its collection system and treatment process. In 1988 and 2015 the TCRSD expanded the WWTP and installed new sanitary sewer collection systems around a large portion of Lake Wawasee. Significant and needed collection system projects followed, as well as improvements to the district's treatment plant, improved clarifier capacity, and upcoming improvements to aeration. The district currently has a service area of approximately 4300 acres. The area currently has about 2100 sewer customers and is predominantly residential with a significant number of seasonal occupants. However, in the post-Covid era, a significant uptick in year-round occupants has been witnessed. While 2020 census numbers did not show significant growth, increased flows and clear population growth within the community of Lake Wawasee, and the town of Syracuse has increased the flows to the point that the district has requested and received an increased capacity rating from .37 to .50 MGD.

As a result of this increase in flows and general population, the primary purpose and need of the projects included in this report is to improve treatment capacities and collection abilities and eliminate septic systems in the ever-growing population within the defined district. Public requests have resulted in a significant need for improvements to the collection system for both new residents and new construction as well as replacements, and elimination of septic systems that are at end of life, and likely failing. These projects will contribute to significant improvements to water quality of both Lake Wawasee, and the downstream feed to Syracuse Lake. Many residents have commented and appreciate the improved water quality over the last two decades. The District has even received public recognition and statements of appreciation by members of the community who were not necessarily initially supportive of increasing the sewer collections area, and the resulting sewer bill they receive. However, the benefits to the environment and the community have been undeniable and the District

provides very capable and cost-effective protection of their environment. Superintendent Timothy Woodward has been with the District from the time it began and intends to serve a long and significant career with the District. Tim is proud of the District and the people he works with daily. The projects addressed in this report are the next critical steps in fulfilling the mandate by the state to provide sewer service to the defined service territory of the political entity, known as Turkey Creek Regional Sewer District as created on October 18, 1977. We look forward to again working with the Indiana Finance Authority, State Revolving Fund program to serve our community and protect our environment.

Introduction:

A brief history of Turkey Creek Regional Sewer District

The study area is in Kosciusko County, Indiana; Lake Wawasee USGS Quadrangle, Turkey Creek Township, Section 9; T34N, R7E, see Figure 0.1, County Location Map and Figure 0.2 District Location Map. The Turkey Creek Regional Sewer District (TCRSD) was established by the Indiana Stream Pollution Control Board in October 18, 1977. The service area that was defined when the District was established includes Lake Wawasee, Syracuse Lake, Boner Lake, and Papakeeche Lake. The District received requests for service for the eastern and northern portion of Syracuse Lake, see Figure 0.3, District Boundary and Sewer Area Map.



Figure 0.1 – County Location Map

This report is a comprehensive report focusing on the wastewater treatment plant and collection system modeling with septic elimination areas. The wastewater treatment plant report will focus on the following: flow capacity upgrades, bio-solids handling, and administration building improvements. The collections report will focus on the following: septic elimination at SD No. 5 Papakeeche & Enchanted Hills subdivisions, relocating Buttermilk & Sunset lift stations, and a future development called Southshore Development.

The TCRSD has continued to grow and improve both its' collection system and treatment processes. In 1988 & 2015 the TCRSD expanded the WWTP and installed a new sanitary sewer collection system around a large portion of Lake Wawasee. The District currently has a service area of approximately 4,300 acres (not counting water surface). These areas currently have a total of 2,349 sewer use

customers. Sewer use customers are predominantly residential, and a significant number are seasonal. There are pockets within the sewered areas without service. These areas were not developed enough or had newer septic systems installed at the time. Enchanted Hills had little development at the time. The existing homes were sewered. The later homes were granted septic systems. These homes' systems are now failing. There are many lots in the development that are waiting for sewer to be developed now. Papakeeche SD No. 5 was not developed until after the sewers were installed. They were granted septic systems back in the day. Their septic systems are past or at the end of their useful life.

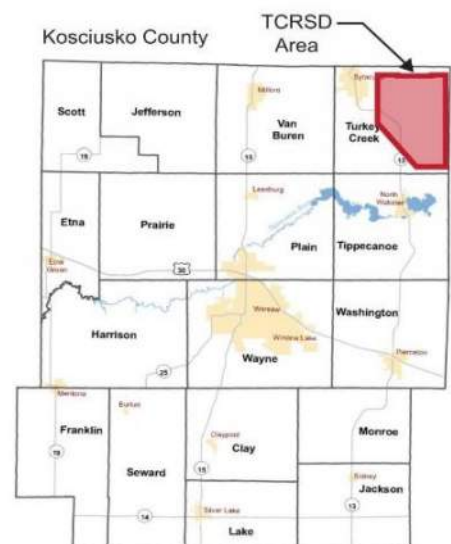


Figure 0.2 – District Location Map

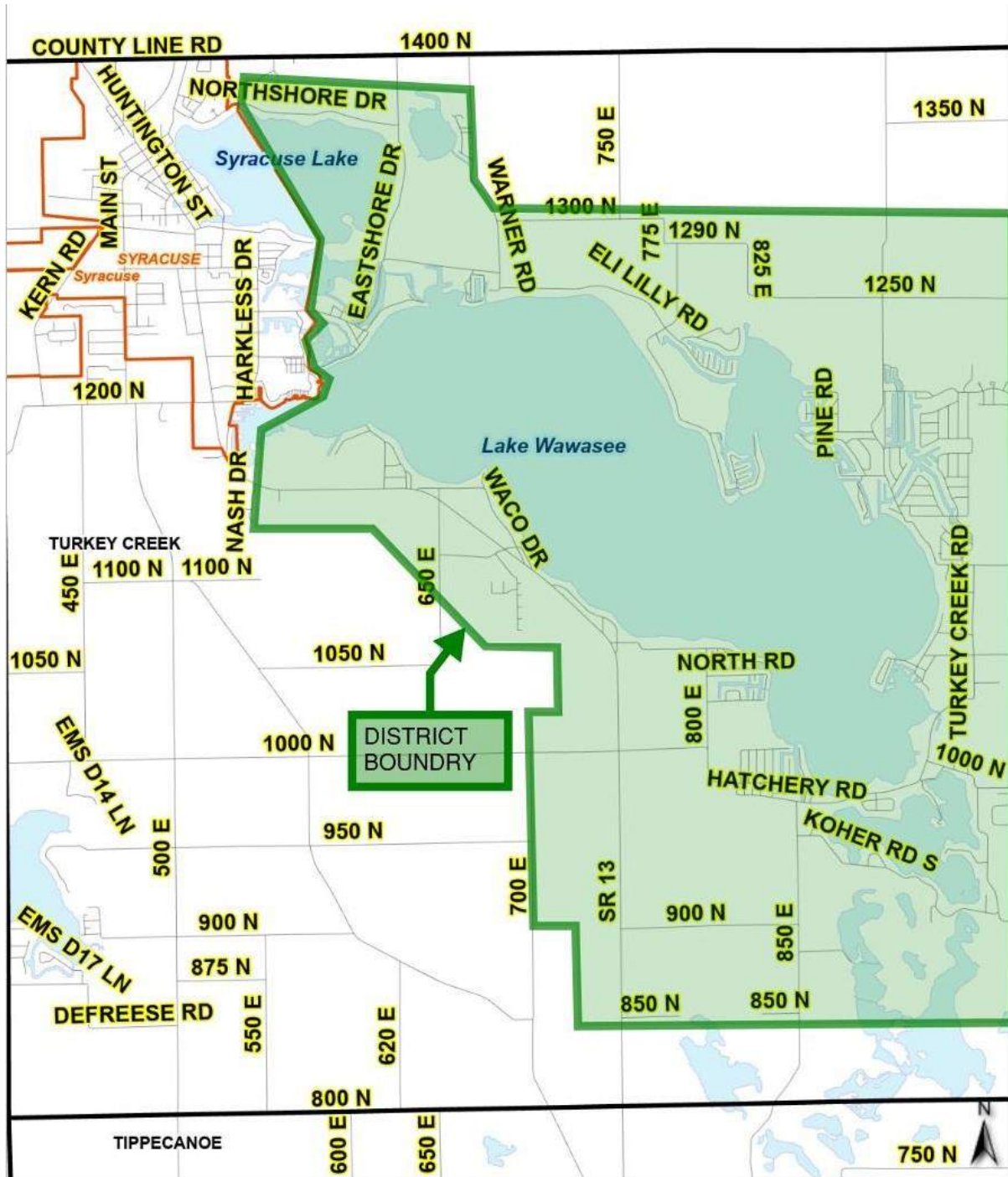


Figure 0.3 – District Boundary and Sewer Area Map.

Chapter 1 – Current Situations

Wastewater Treatment Plant

Wastewater Treatment Plant Report

The WWTP has an average design flow of 0.37 MGD and a design peak flow of 1.5 mgd (max.day). The WWTP is a Class II oxidation ditch treatment facility consisting of an influent flow meter, a rotary screen with bypass bar screen, raw sewage pump station, two Teacup grit removal systems, two oxidation ditches, four secondary clarifiers, two aerobic digesters, a septic sludge receiving tank, sand drying beds, ultra-violet light disinfection, post aeration and an effluent flow meter, See Figure 1.1, Aerial Photograph of Wastewater Treatment Plant, for plant layout. The wastewater plant discharges treated effluent into the Cromwell Ditch. The current WWTP flows and loadings are presented in Chapter 3 of this report long with the projected flows and loadings.

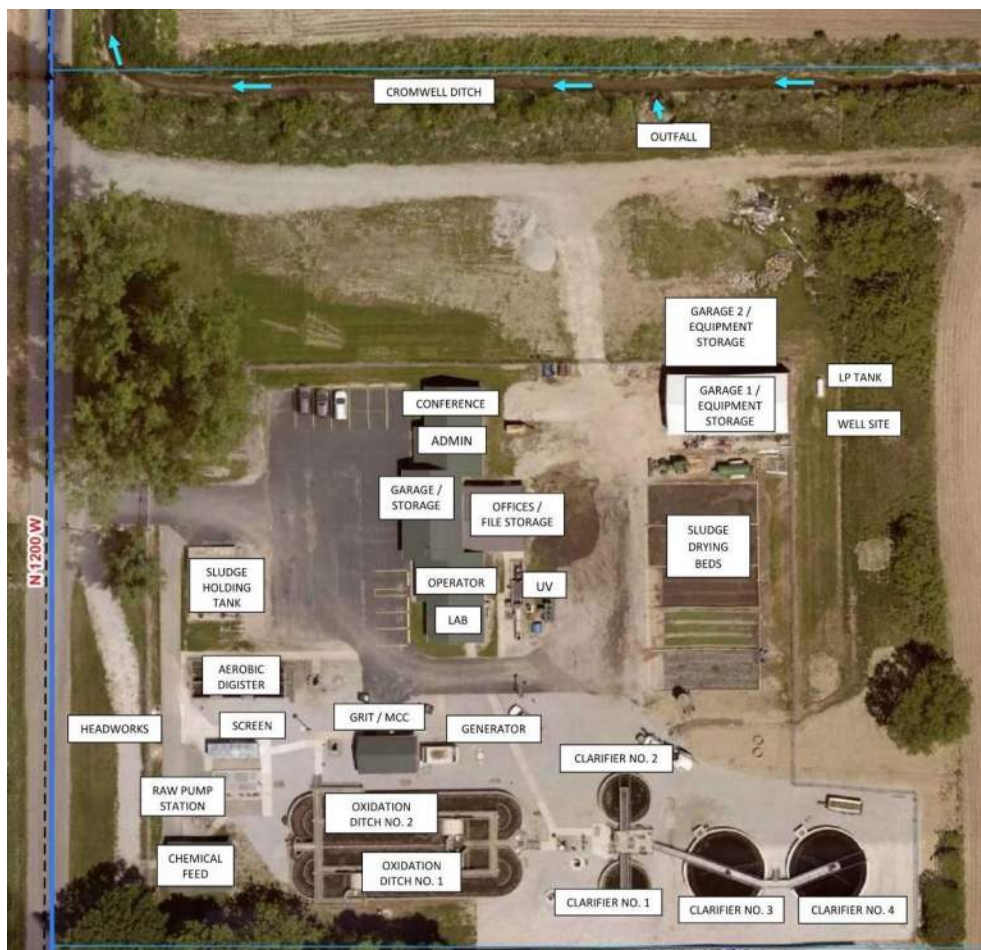


Figure 1.1 - Aerial Photograph of Wastewater Treatment Plant

The current review of the plant includes the following: flow capacity upgrades, bio-solids handling, and administration building improvements. The plant is near the design capacity of 0.37 mgd. The district currently has a construction permit for increasing the plant design capacity from 0.37 mgd to 0.50 mgd. The district sludge handling consists of land applying either in liquid or dry form. This report will look at alternative ways for sludge handling if regulations change. The district has expanded its employee base and is expected to continue expanding employees per the Asset Management Plan, Appendix X. This report will review the existing administration building for more office spaces.

Wastewater Capacity Issues

The District has received a Waste Load Allocation from IDEM for a revised discharge of 0.50 mgd. Subsequently, the District has received a construction permit for additional aeration in the oxidation ditches that would allow the increase in design capacity from 0.37 mgd to 0.50 mgd with a peak hourly design flow of 1.5 mgd. The capacity of each unit process is presented in the following table.

Table 1 Rated Capacity		
Process Description	Rated Capacity	Comments
Headworks (1) ¼" Rotary Screen & Parshall Flume with Bypass Manual Screen	2.3 mgd	
Raw Pump Station (6) Submersible Pumps	2.3 mgd with 5 submersible pumps operating.	Each pump has a VFD
Grit Removal Two Tea Cup grit removal systems in parallel	1.8 mgd with one tea cup operating, 2.3 mgd operating in parallel	System has a manual bypass valve
Oxidation Ditches Two ditches operating in parallel with (4) 15 hp rotor aerators (2 per ditch)	Vol: 0.167 MG each ditch	Additional aeration is needed to meet the new design capacity of 0.50 mgd
Final Clarifiers (2) 25-ft. dia. Circular clarifiers & (2) 35-ft. dia. Circular clarifiers	SOR 516 gpd/sf @ peak hourly flow of 1.5 mgd	
RAS Pumps (4) submersible pumps	175 gpm/pump	Each pump is VFD driven and interchangeable
Disinfection Ultraviolet Disinfection	1.5 mgd	
Cascade post aeration	1.5 (+) mgd	
Sludge Thickeners	40,600 gal total volume	Has ability to decant

(1) Gravity sludge thickening tank		
Digesters (2) Aerobic digesters	94,325 gal total volume	Has ability to decant
Sludge Holding Tank	35 day avg. retention	
Sludge Drying Beds	(5) basins, 20'x48'/ea.	
Sludge Disposal Land application	(5) active sites available	District owns their own equipment

Additional aeration in the oxidation ditches is necessary to increase the design capacity of the WWTP to 0.50 mgd. All other unit processes are capable of processing the increased flow and loading.

Biosolid Handling

The two aerobic digesters and sludge storage are sufficient for the current design flow of 0.37 mgd. Operational changes maybe needed for the future design flow of 0.50 mgd. These changes entail the following:

- Raise the weirs in the two digester tanks to increase volume.
- The septage Holding Tank is divided into two tanks. The western tank has five valves with an overflow for decanting the sludge. This tank can be used as a gravity thickener tank and the sludge periodically decanted to achieve approximately 2% solids prior to digestion. The eastern tank can remain for sludge storage.

Aerobic digestion, sludge holding and drying beds will be near capacity at the increased design flow of 0.50 mgd. Consideration should be given to increasing the capacity of these unit processes as the WWTP approaches the revised design capacity of 0.50 mgd. Alternatives to consider are:

- A third Aerobic Digester located north of the existing digesters
- Additional sludge drying beds
- The use of Geotube Bags for Sludge Dewatering

Administration Building

The existing Turkey Creek Regional Sewer District administration building is a Brick and block structure constructed at the time of the original plant in the 1980's.

The structure itself is in a good state of repair and remains generally serviceable and requires no significant modifications or improvements. The building has a small front office for administration and public interaction containing workspace for two office personnel. The facility has a small meeting room to the north where the monthly district public meetings are held and is generally adequate for the needs of the district. The structure has a large centrally located garage space with two large overhead doors, providing the ability to bring trucks and smaller equipment inside out of the weather. These bays also serve as a receiving area for parts and deliveries of larger size. The laboratory and superintendent's office is at the south end of the building. Within the last five years the district has re-roofed and

improved the structure by adding additional office space to the rear (east) of the building to provide workspace and storage for the employees leading the collection system service, as well as plant maintenance and repair. The district has also constructed a second insulated metal building to the north and east of the administration building to provide sheltered equipment storage, future workspace and repair facilities, and cold storage for long-term record maintenance. The laboratory is considered to be adequate to meet their testing requirements with no significant needs or equipment purchases. The only identified needs or upgrades to the administration building would be fully revamping overhead lighting with high-efficiency LEDs to provide both energy savings and a better, brighter workspace. Replacement of existing office, equipment, and furniture which is dilapidated, along with the mismatch existing equipment would create a more ergonomic and efficient environment. The district has been very frugal with the repair and replacement monies and as a result, some furniture and office equipment replacements are warranted.

Green Alternatives

The Turkey Creek Regional Sewer District is continually working to improve and safeguard their workplace and environment through the implementation of improved efficiencies and green projects.

In the areas of energy efficiency, the district is reviewing the viability of solar generation, as well as the implementation of electric vehicles for callout and system inspections. These energy efficiency projects are beneficial to both the TCRSD Water and Wastewater Utilities since they are consolidated to a single Admin / Supt / Lab Building with shared efficiencies. Preliminary work related to solar photovoltaic panels estimates cost to be approximately \$300,000 with an 8 - 9 year payback. The solar array would require approximately 2 acres and will be a considerable component of future planning.

In addition to solar generation, the implementation of an electric vehicle for routine system callouts and inspections is being considered. Best case conditions for implementation of an electric vehicle are present with known distances and daily usage that would be within the functional range of current electric vehicles. Significant challenges are a limited amount of electric truck and utility vehicles which comes at a high cost and a relatively unknown service life and long term maintenance cost. The district intends to watch improvements in the electric vehicle arena and will they be considered a component of future planning.

Collection System

The District has several areas within their system that need to be reviewed for upgrades or replacement due to increased demand for service requests. There are some subdivisions that were not sewered in the past. The properties either had septic systems in good order or were not developed. These areas are the remaining portions of Enchanted Hills and Papakeeche No 5. To sewer Enchanted Hills, TCRSD needs to review its A1A force main. This force main was constructed in the late 1960's. It is an asbestos cement (AC) pipe and is nearing its expected lifespan. TCRSD has two lift stations Buttermilk & Sunset that are also nearing their useful lifespan. The current locations of these stations present concern during power outages or pump failures. They are both close to water sources that could affect Lake Wawasee. Figure 1.4 shows the project site within the District's boundaries.

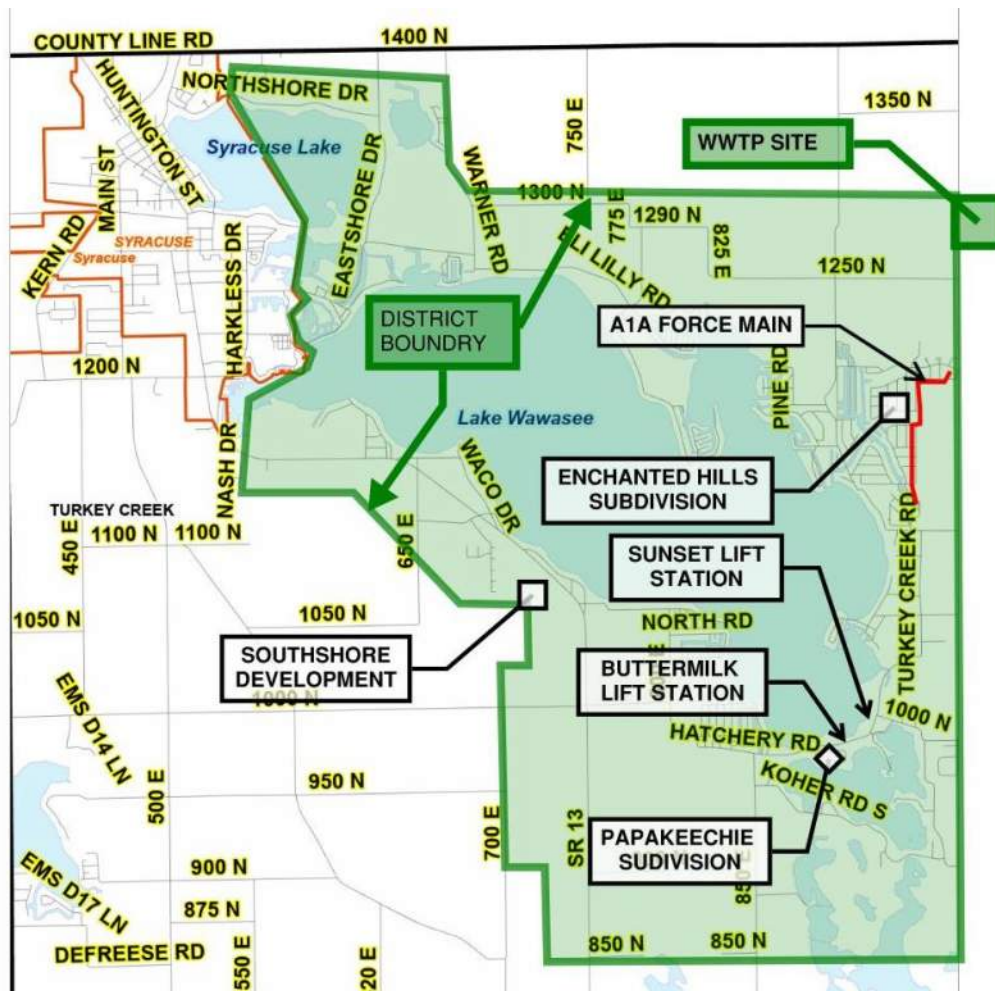


Figure 1.2a, Collection System Project Map

The existing collection system is a 100% separate sanitary sewer with no permitted overflow points. The system is composed of septic tank effluent gravity sewers, conventional gravity sewers and low-pressure sewers with grinder pumps. The collection system is currently composed of:

- 30 pump stations
- Approximately 55,000 ft. of 4 to 12-inch sewers
- Approximately 46,000 ft of 3 to 10-inch low-pressure pipes & force mains

TCRSD intends to incrementally construct sewers in the remaining areas of the District as the State mandate requires. When development occurs, or the need for sewer service arises, projects are reviewed for financial feasibility.

If sewer service is requested within the district boundaries and TCRSD can reasonably provide sewer service, the TCRSD will follow the State mandate to protect the waterways and public health. In the past, these projects have been constructed in phases. To meet requests for needed service in areas of failing septic, the district has undertaken a number of collection system expansion projects over the last decade. These projects include:

1. Improvements to the Buttermilk Force Main 2015
2. Northwest flow diversion and collection system improvements 2018
3. Northshore - Eastshore septic elimination project 2022
4. Vawter Park septic elimination project 2023

Concerning septic systems, many variables of the design, site and soils, loading, installation, and maintenance impact the lifespan of each individual treatment system. The Kosciusko County Health Department allows residents with an existing septic system that is inspected and approved, to make an application for a waiver to connect through the health department. The waiver will initially provide a 10-year deferral with the potential to renew for 2 additional 5-year periods based upon a recognized professional review and approval. Thus, the waiver system can provide a theoretical 20-year delay in the requirement to connect.

The industry accepted standards for septic system lifespan acknowledge that without regular maintenance and care, most, if not all systems, would be experiencing some degree of failure 20 years after installation. Further, the vast majority of the systems would not meet current design and treatment standards. In addition, many systems are likely within 200 feet of Lake Wawasee or Papakeechee Lake or within 100 feet of their, or a neighboring property's well and would be disallowed. Per Section 410 IAC 6-10.1-61 - Minimum separation distances, septic systems shall be 100 ft from any private well; 200 ft from any public drinking supply well, lake, or reservoir; and 50 ft from any other type of pond, lake, or reservoir. Though no specific testing has been done, it is highly likely that a significant number of the existing septic systems are to some degree failing or discharge pollutants to the environment and waterways of the Lake Wawasee and Papakeechee Lake area. As a result of both recognized industry standards and the requests of property owners within the affected areas, the TCRSD has a responsibility to install sanitary sewers as mandated by the State of Indiana.

The North Shore/East Shore project was completed in 2023, and service connections continue to be made throughout the first half of 2024. The next project to be undertaken by the district will likely involve septic elimination in the Enchanted Hills area and service preparation to serve the area of Papakeechee Lake. Preliminary review identifies approximately 450 lots with 180 existing homes. The district also expects to make needed improvements to Buttermilk and Sunset Lift Stations. Buttermilk is a major station for the District; all the flow from the southwest system goes through Buttermilk. It was originally constructed in the 1960s, and it has been upgraded several times over the years, but it needs a larger wet well and valve pit. Sunset Lift Station is a minor station but needs several improvements. It needs new pumps, a control panel with modern alarms, and a backup generator. Buttermilk & Sunset are close enough to be able to combine Sunset with a relocated Buttermilk station. A new Buttermilk station would provide for future flows from the west if the rest of Papakeechee Lake needed sewer service.

The district has received requests for development in the area of the old South Shore golf course. Current needs and review are based on an estimate of 300 equivalent EDU. Ultimately, the district will be able to serve and handle their flows, but the updates and upgrades as discussed throughout this report are needed.

Chapter 2 - Utility Needs

The District’s oxidation ditch needs increased oxygen supply capacity to meet future loadings.

Wastewater Treatment Plant, 1977/1988/2015

The Wastewater Treatment Plant has received multiple upgrades over the last several decades. Currently, the district oxidation ditch needs increased oxygen supply capacity to meet seasonal and future loading.

Biosolids Handling

The plant has current needs for flexibility for timing of biosolids handling and land application. This could be addressed through construction of a third digester, additional drying bed space, or the use of Geo bags for dewatering.

Administration Building

The administration building and facilities have received multiple upgrades over the last decade. Currently the building needs improved, high-efficiency lighting, improved office equipment and review of the existing HVAC system.

Collection System

The District is reviewing several areas in the collection system, including: Enchanted Hills & Papakeeche No.5 subdivisions for septic eliminations, determining the best solution for the A1A Forcemain, combining two lift stations (Buttermilk & Sunset), and determining future improvements required for the proposed development on the southwest side of the district. A hydraulic model of the central portion of District’s collection system was developed to assist in determining the effects of the future flows to the system. This model will allow TCRSD to evaluate and determine what improvements are needed as these areas develop.

The District is receiving requests for sewer service in areas within their boundaries, mainly in the Enchanted Hills & Papakeeche No 5 subdivisions.

Enchanted Hills (Figure 2.1) is located on the southeast side of the district and is about half-sewered since the original sewers were installed at a time when the other half of the subdivision wasn’t developed enough to justify extending the sewers. With the condition of the existing septic systems and the potential for



Figure 2.1 – Enchanted Hills Figure 10.5 -

growth, TCRSD is evaluating providing sewer services to this area. There are approximately 110 homes out of a potential maximum of 430 homes in the subdivision.

Papakeeche No.5 (Figure 2.2) is in the southern part of the District and has approximately 50 homes currently serviced by septic systems. It is not known why this area was not sewered during construction of the original project back in the 1960s. A resident on Hatchery Road is requesting sewer service.



Figure 2.2 – Papakeeche No.5
A1A Current System
Curve(10-inch)



Lift Station A1A (Figure 2.3) is located south of Enchanted Hills. and while the lift station has been upgraded over the years its force main requires evaluation and potential upgrades. The force main is a 6-inch asbestos cement pipe that is nearing the end of its useful life. It was installed in the late 1960s without tracer wire. In some areas it has become difficult to locate or identify the location of the force main's route. It has recently experienced a break and evidence of significant wear was discovered during repairs.

Figure 2.3 - A1A Lift Station & Force Main

Buttermilk and Sunset Lift Stations are located near the southeast corner of Lake Wawasee. Buttermilk Lift Station conveys flows from the southwest portion of the TCRSD, via a 10-inch HDPE force main to a gravity line south of the WWTP. Over the years the Buttermilk Lift Station has experienced a number of issues and is due for a replacement. Additionally, projected growth in the southwest portion of the region may require additional capacity. Both Sunset and Buttermilk Lift Stations are located within approximately 30 feet of the Lake and any overflows would discharge directly into the lake.

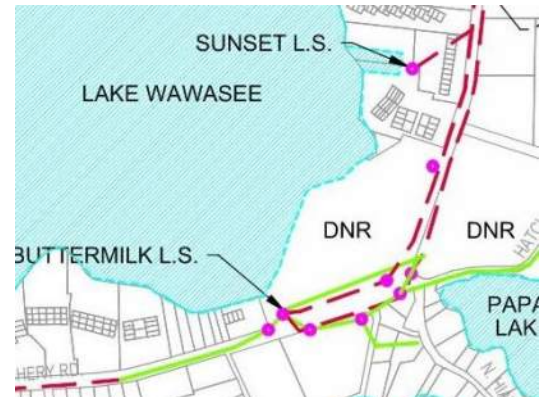


Figure 2.4 – Buttermilk & Sunset LS

1. Enchanted Hills Alternatives:
 - a. Gravity Sewer was considered, but due to challenging topography that would have required three lift stations in the area, and was therefore discarded.
 - b. Low pressure small diameter sewer does require more and more expensive pumps than gravity sewer but doesn't suffer from problems caused by topography and requires less surface disturbance and repair. This alternative also allows for tapping into the A1A lift station force main once it has been replaced with a suitable material, allowing for a less convoluted sewer system than if it had to flow to a single point.
 - c. Taking no action was not considered a solution due to adverse effects on the environment and public health and safety.

2. Papakeechee SD No. 5 Alternatives
 - a. Gravity Sewer was considered, but due to right-of-way challenges that would have required road reconstruction it was discarded. Further, due to the lower elevations of most residences, pumps would still be required to transport sewage to the gravity sewer.
 - b. Low pressure small diameter sewer requires all services to have pumps but comes with the advantages of: less surface disturbance/repair, not needing to be deep in some areas to avoid being too shallow in others as based on topography and the terminal sewer elevations, and not requiring greatly varying slopes in the lines which would cause some sewers to always flow fuller than others which could surcharge manholes. Further, the grinder pumps required for low pressure forcemains handle trash and debris better than small centrifugal pumps and should have a longer useful service life.
 - c. Taking no action is not a solution, since sewer service to this area has been requested; only providing service to the residents making the requests was not considered cost effective.

3. Lift Station A1A Forcemain
 - a. Replacing the force main and abandoning the existing force main in place should prevent more force main breaks and would also allow the main to be tapped to provide service to the Enchanted Hills subdivision. HDPE, PVC, and ductile iron are materials

that could be used. Replacement is likely to be more expensive than lining but will also provide an additional increase in capacity in the force main.

- b. Lining the force main would likewise prevent force main breaks but might not allow for the force main to be tapped and would reduce capacity.
 - c. Taking no action is not a solution because it would not reduce the force main breaks and would require operators to continue exposing themselves to asbestos.
4. Buttermilk & Sunset Lift Station.
- a. The District has two lift stations nearing their useful life, Buttermilk and Sunset. They are located along the south between Lake Wawasee and Lake Papakeechee. Buttermilk is a major lift station. All the flow from the southeast part of the system goes through it. It was constructed in the 1960's, and it has had upgrades to the control panel, pumps, and backup generator, but the wet well is too small and too close to the water. Sunset LS is near the Buttermilk LS. It serves approximately 36 units, condos, and campground areas. This lift station needs to be upgraded to meet the district's current standards. It needs new pumps, a backup generator and is also too close to the water. The District is looking to replace both lift stations with one station. This would save power, equipment, maintenance, etc.

Chapter 3 Evaluation of Alternatives

Wastewater Treatment Plant

The wastewater treatment plant has a design capacity of 0.37 mgd. Reasonably anticipated flow projections from the existing and proposed service areas are listed in the following table. The flow projections are based on the District’s MROs for the past three years.

We have added 10% of the overall projections to allow for growth. In reviewing the District records for the past 10 years, there has been very little demographic growth in the district user base. However, the increasing year-round residents and septic elimination projects continue to grow the user base.

The past flows and loadings to the WWTP are used to evaluate the need for any necessary improvements at the WWTP. We have reviewed the District's past monthly reports of operation (MRO) and the laboratory test data for the District’s discharge. As identified earlier, there has been very little growth of the District’s flows. We believe the District’s ongoing Collection System I & I (Infiltration and Inflow) reduction program has been successful in removing significant flow generated by I & I and that it has offset the system’s flow per user growth.

Table 3.1 Wastewater Treatment Plant 20 Year Projections												
Turkey Creek RSD												
Annual Flows & Concentrations												
	WWTP	Flow (mgd)		CBOD5 (mg/L)		TSS (mg/L)		NH3-N (mg/L)		P (mg/L)		
		Avg.	MaxDay	Avg.	MaxDay	Avg.	MaxDay	Avg.	MaxDay	Avg.	MaxDay	
	2021	0.29	0.85	105	378	131	368	35.1	96.0	4.5	7.4	
	2022	0.31	0.73	96	326	145	354	25.7	46.0	4.0	10.8	
	2023	0.34	1.02	95	314	123	376	25.1	48.0	3.7	8.2	
3 Year Average		0.31		99		133		28.6		4.1		
Projected Flow to WWTP												
	Existing Flow @ (2097 EDU) =	0.31		99		133		28.6		4.1		
	NE Syracuse Lake Flow @ (183 EDU) =	0.03		99		133		28.6		4.1		
	South Shore Development Flow @ (183 EDU) =	0.03		99		133		28.6		4.1		
	Papakeechee Lake Area Flow @ (177 EDU) =	0.03		99		133		28.6		4.1		
	Enchanted Hills Flow @ (430 EDU) =	0.06		99		133		28.6		4.1		
	Total to WWTP	0.46		99		133		28.6		4.1		
	10%	0.05										
Projected Total to WWTP		0.50		99		133		28.6		4.1		
Proposed Design Criteria		0.50		150		170		50.0		4.5		

The Proposed Design Criteria for CBOD5, TSS, and NH3-N shown above are quite a bit higher than the annual average for each parameter. The proposed parameters are based on select periods of dry weather as requested by IDEM review personnel. Consequently, additional aeration in the oxidation ditches is required for the proposed loadings from CBOD5 & NH3-N.

Four methods of increasing aeration were evaluated. Three of the methods include rebuilding portions of the existing (4) rotors and adding additional aeration. Whereas the fourth alternative considered

replacement of the existing rotors with diffused aeration and mixers. All alternatives required the expansion of the existing MCC and plant electrical feed. The estimated cost for each alternative is included in the Appendix of this report. A summary of each alternative is presented in the following.

Alternative 1 No Action: No action is not a viable alternative.

The plant will not be able to meet discharge permit requirements.

Alternative 2

Replace Rotors along with Two Triton Aerators

Alternative 3

Replace Rotors with Two New 11-ft. Rotors.

Alternative 4

Replace Rotors along with Four OxyLift Diffuser Racks & Blowers

Alternative 5

Remove Rotors & Install 8 OxyLift Diffuser Racks with Blowers

Table 2 WWTP Improvements		
Replace Rotors along with Two Triton Aerators		\$700,000
Replace Rotors with Two New 11-ft. Rotors.		\$740,000
Replace Rotors along with Four OxyLift Diffuser Racks & Blowers		\$990,000
Remove Rotors & Install 8 OxyLift Diffuser Racks with Blowers		\$1,450,000

Collection System

Collection System 1 & 2 – Septic elimination areas - Enchanted Hills/Papakeechee Septic Elimination

The Enchanted Hills & Papakeechee SD No.5 areas septic elimination is being proposed because homeowners are requesting sewer service.

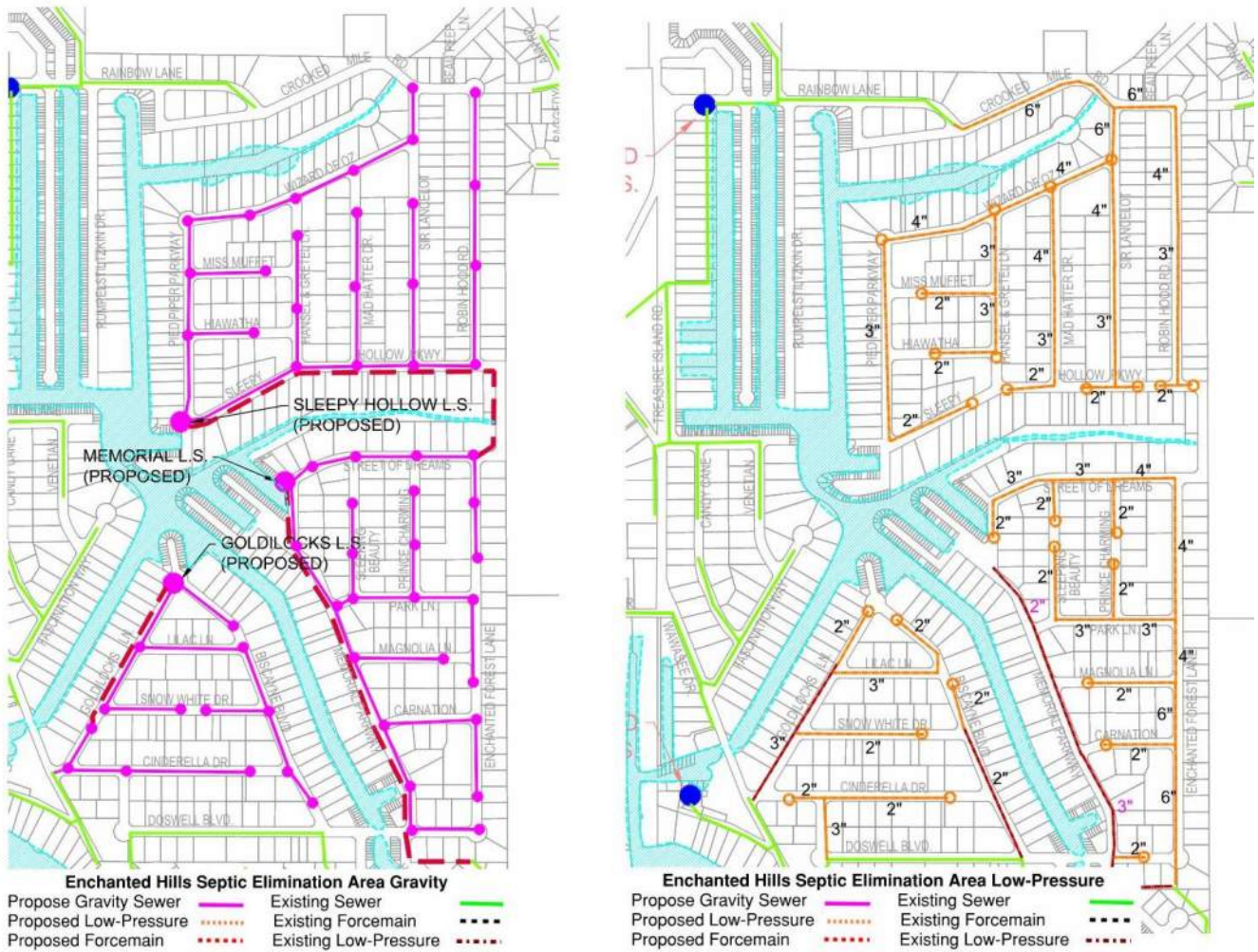


Figure 3.1 Enchanted Hills Alternatives

A gravity sewer system uses the earth’s gravitational force and a downward slope to convey flows. Piping for this system is typically larger in diameter with varying slopes that maintain a minimum velocity of 2-feet per second to keep solids in suspension and prevent build-up. The smallest sewer pipe size is 8-inch. Invert elevations can become deep depending upon existing topography and the need to

maintain a minimum slope; the longer the run of gravity sewer, the deeper the sewer pipe will become. Eventually, when the pipe elevation becomes prohibitively deep, a pump station is required to lift the flow to a more manageable elevation. The process then begins again. Both Enchanted Hills and Papakeeche No. 5 have topography and road right-of-way issues that would make a gravity sewer an infeasible alternative.

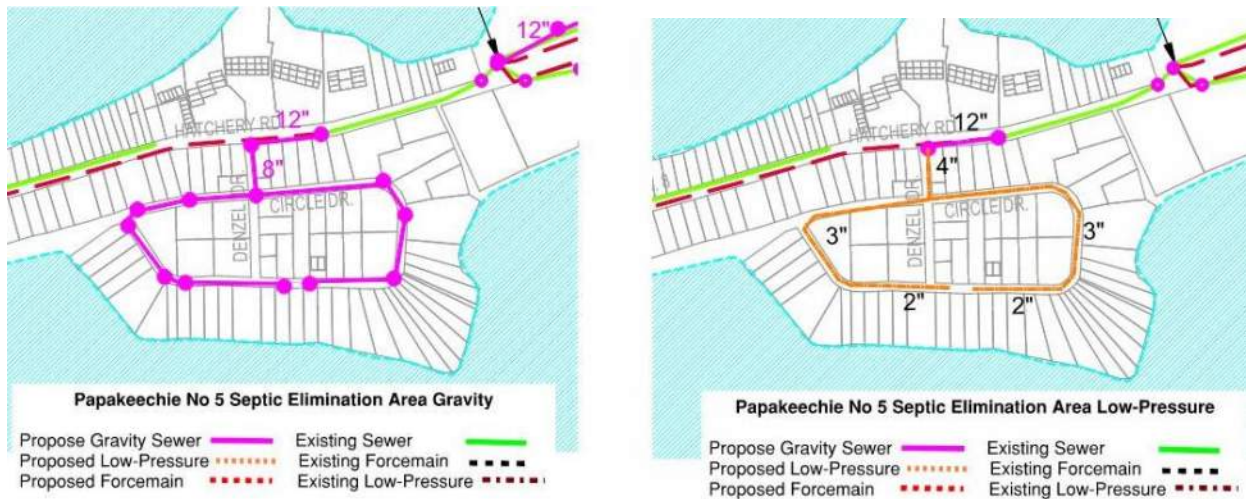


Figure 3.2 Papakeeche Alternatives

Low-pressure small diameter force main sewer was selected to overcome the challenges of gravity sewer. Low pressure systems are not as dependent on ground contours as gravity to operate because the individual grinder pumps have the ability to pump sewage uphill. Each property owner will require a small grinder pump station; these individual grinder stations will pump sewage into the collection system. The piping for this system is smaller in diameter, and mains can be as small as 2-inches. The system depth should be below the known frost line, at approximately 60 inches. There is a limit to how far the individual grinder pumps can pump sewage, so both the Enchanted Hills and Papakeeche SD No. 5 systems will pump through a combined force main to a downstream gravity sewer.

Existing septic tank pumps will likely need replaced since they will not be able to pump wastewater at the pressure required to transport it through a small diameter force main. Further, existing septic tanks will need to be either abandoned or removed according to all applicable laws and regulations. Property owners will need to isolate their septic tank and purchase and install a new grinder pump station on their property. The grinder pump would be connected to the homeowner’s electrical service, which may also necessitate upgrading the electrical service panel. Each property would be required to connect its existing plumbing, that currently leads to septic tanks, to the new grinder pump station. The private grinder pump station would be extended to the public force main in the right-of-way via a lateral force main.

The estimated costs associated with this alternative are listed in the following. A detailed breakdown is presented in the Appendix of this report.

Enchanted Hills Low Pressure Grinder System Model Result

The Enchanted Hills area was modeled in two ways; first, all current existing residences would have a grinder pump station and secondly, each reasonable parcel would have a residence developed at some point in the future. These scenarios were evaluated based on current projected average and future maximum day demands.

Each residency was assumed to produce approximately 900 gpd (equivalent to 3 people using 300 gpdpc at each existing or projected parcel). A variety of separate usage patterns were developed and utilized to reasonably project how residencies grinder pump stations may introduce flows into the low pressure collection system. These different usage patterns created a more realistic usage pattern in the system and mimicked the maximum statistical concurrent users on any given system.

It was assumed that a Liberty two horsepower Two Stage Grinder Pump Station would be installed at each residency. These pumps have a large operating range and can deliver flows from 38 gpm at 60 feet of head (26 psi) all the way up to 5 gpm at 170 ft of head (73 psi). These grinder pump stations have a 2 foot diameter tank that is 5-foot deep, equating to approximately 120 gallons of storage.

The Proposed Enchanted Hills area was divided into three sections, north, southeast and southwest. These three systems are divided by existing canals that are natural barriers. Additionally, these sections all have a local gravity sewer system to convey flows. By dividing the system into these sections smaller force mains can be utilized to convey flows.

The force mains that will convey flows from the residency to the gravity system will vary in size from a 2- up to a 6-inch. The branches will support small clusters of residencies but as more branches are combined, larger diameters are required to handle additional flows.

The model utilized known information and data and made conservative assumptions to develop and evaluate the model. Due to minimal elevation change, pumps high operating ranges, and limited houses on each sub system, the low-pressure grinder pump system, it was determined that even at future day maximum flows the low-pressure system will be sufficient convey flows from residencies to District's gravity system. See Figure 3.3 for an overview of maximum velocities experienced by the low-pressure system during a future maximum day demand scenario. Per the Wastewater Ten State Standards, velocities should be between 2 to 8 ft/sec. While there are instances where flows exceed 8 ft/s, the force mains generally operate within the recommended flows and velocities.

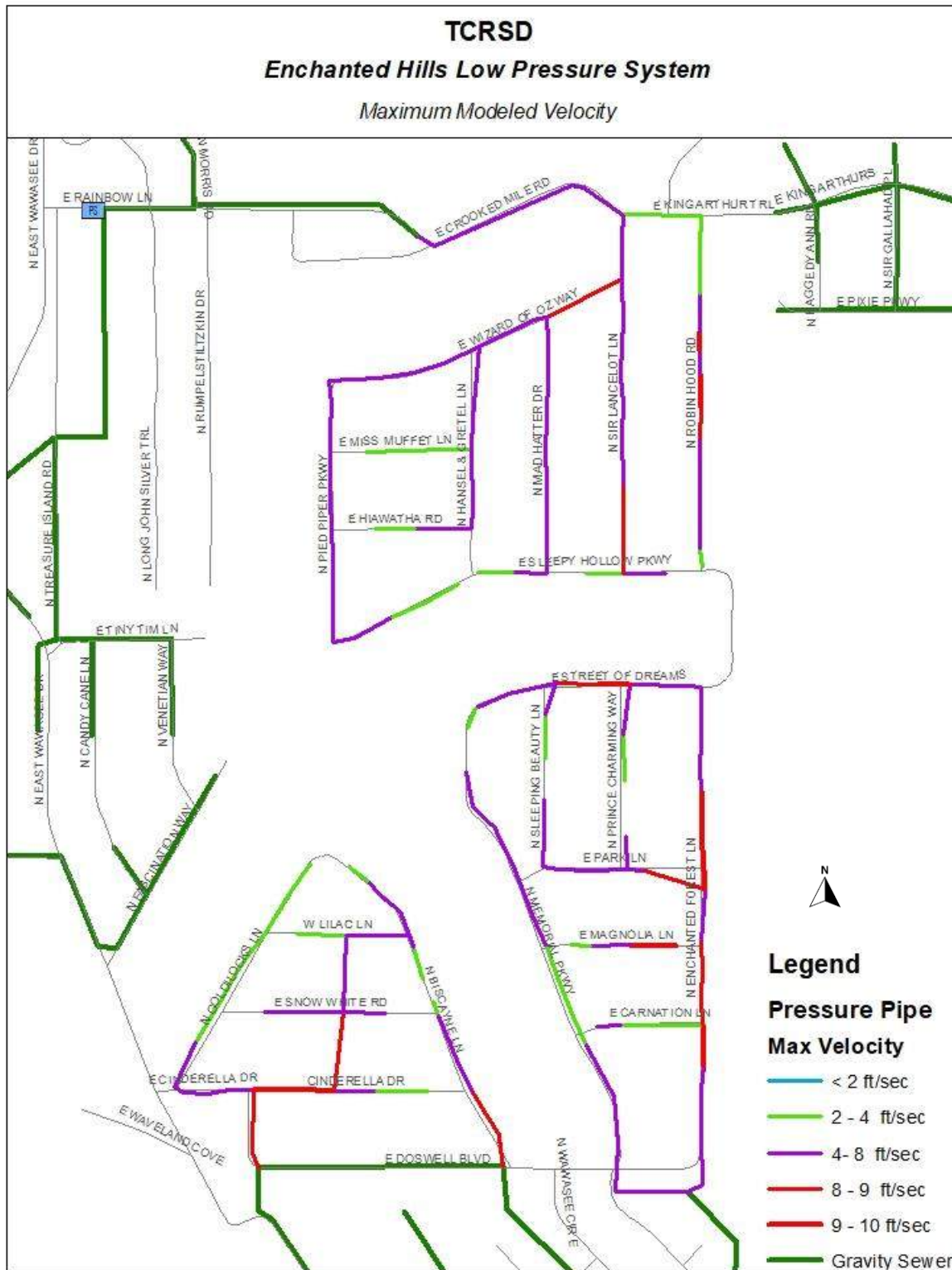


Figure 3.3 - Enchanted Hills Low Pressure System

The District could consider directly pumping flows from the north and southeast sub system directly into the A1A force main without impacting the A1A's ability to pump flows.

The estimated costs associated with this alternative are listed in the following. A detailed breakdown is presented in the Appendix of this report.

The District wanted to evaluate two primary types of collection system alternatives for the study area. The alternative systems are gravity sewers & low-pressure sewers. We have developed a preliminary layout for each alternative illustrating a route with pipe sizes, manholes, pump stations, etc. We have listed the pros and cons along with an estimated cost of each alternative. Costs include an estimate of average capital expenses that may be incurred by a property owner for any system particular items for each sewer alternative.

Some assumptions have been made on the existing septic systems currently in operation. It is presumed most properties use a small pump to move their sewage from the house or septic tank to a leach field. This pump would likely remain for all the alternatives. However, a new private grinder pump would be required for the low-pressure sewer alternative. If a property does not have an existing pump in place the owner will have an additional cost to design and install such a system.

In each alternative, we have estimated the Homeowner's Cost to connect into the public sewer system. The Homeowner's Cost includes an average estimate for the homeowner to connect into the public sewer and associated fees. The District charges a Capital and Availability charge for each new customer connecting into the District's sewer system. The Availability charge (\$2,500) and the Capital charge (\$3,300) pays for a portion of the current and prior improvements in the Wastewater Utility. We have included the Capital and Availability charges in the Homeowner's Costs presented in the following cost estimates.

No Action Alternative - Optimization of Existing Septic Systems

After receiving requests for sewers in the areas of Enchanted Hills & Papakeechee No. 5, the District reviewed the formation documents as mandated by the State of Indiana, as well as Kosciusko County Health Department records.

Optimization of the existing septic systems can only be done by owners at the discretion and approval of the local health department.

The following are the findings of the District:

- 1) The Turkey Creek Regional Sewer District was created by order of the Indiana Stream Pollution Control Board on October 18, 1977, with the purpose to provide sewer service to the defined service territory. The political entity known as Turkey Creek Regional Sewer District was created as a direct response to stream and waterway pollution in the defined territory of the District.
- 2) The purpose of the District shall be to provide for sewage collection and disposal so as to promote the public health, safety, and welfare of the residents of the proposed district.
- 3) The District has the responsibility, the means, and the ability to provide sewer service as requested by residents, and as required by the state.

The majority of existing septic systems in the District boundaries are old and do not meet current design requirements for an adequate and safe septic system. Some areas are not able or viable to install new septic treatment.

The industry expected life for residential septic system is approximately 20 years. The state has mandated that the Turkey Creek Regional Sewer District provide sewer service as needed and as requested. Residents with existing septic systems that are less than 10 years old can make use of a waiver process and program that is at the discretion and determination of the Kosciusko County Health Department.

Alternatives

No action

“No Action” is not a viable alternative. Based upon the information gathered, the requested need, the financial ability, and the State of Indiana Mandate, the Turkey Creek Regional Sewer District has a statutory responsibility to provide sewers to the requested area.

Alternative 1

Gravity sewer system

Alternative 2

Low-pressure sewer system

Summary of Alternatives

In conclusion, the following table shows the total cost for both types of collection system. We are then showing the District’s & the property owner’s cost for each system. Each system was then evaluated on a 20-year present worth basis.

Table 3 Septic Elimination Costs		
Gravity System	Enchanted Hills	Papakeechee
Estimated Project Cost	\$5,201,000	\$1,237,000
Estimated 20-year Present Worth of this Alternative	\$3,415,000	\$1,297,000
Low-Pressure System	Enchanted Hills	Papakeechee
Estimated Project Costs	\$5,130,000	\$1,481,000
Estimated 20-year Present Worth of this Alternative	\$2,930,000	\$1,495,000

Collections System 3 - A1A Lift Station & Force Main Evaluation

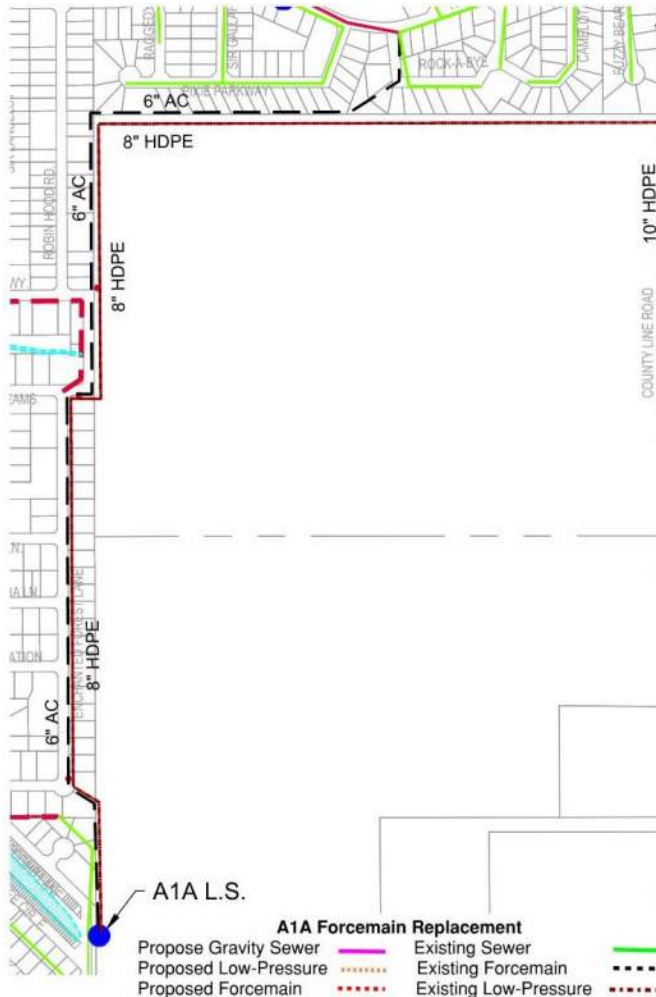


Figure 3.4 - A1A Forcemain Alternative

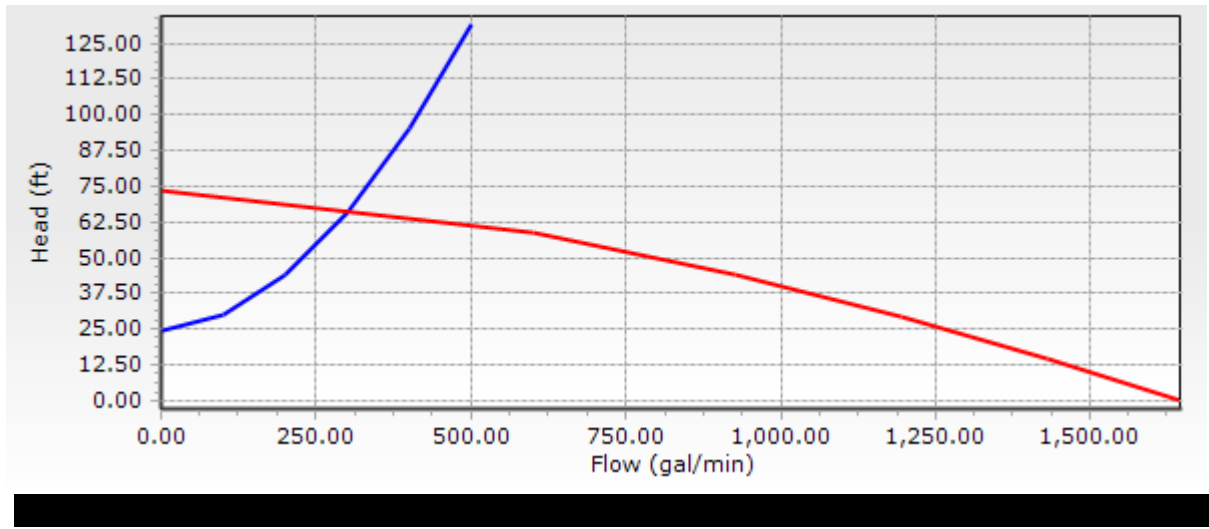
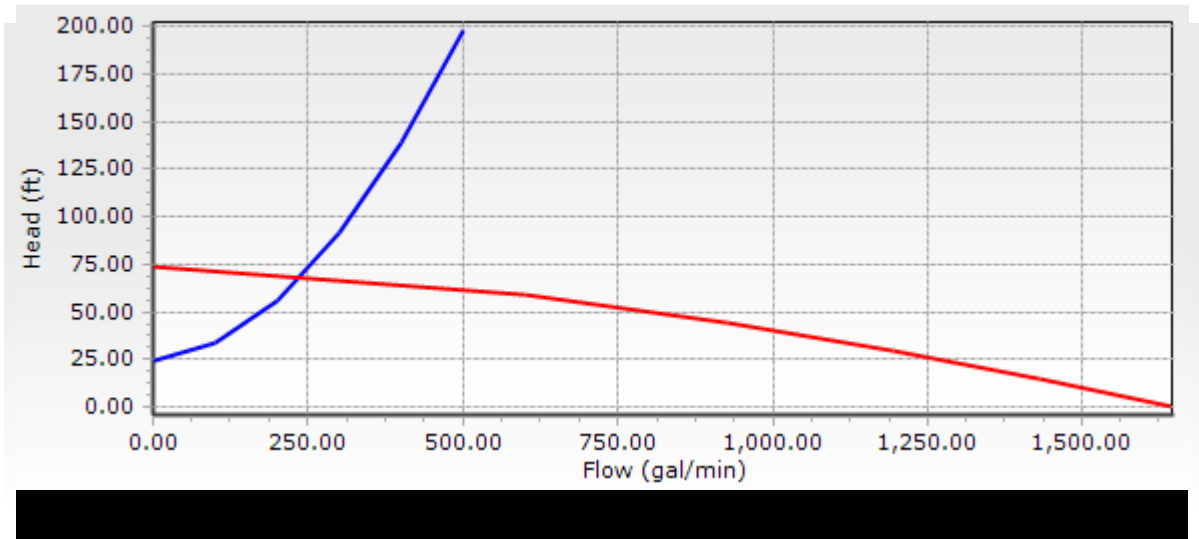
The District has reviewed improvements for the A1A Lift Station & force main. The Station’s generator and control panel are reaching their service life and need replaced. The force main has also reached its service life and has recently experienced a break. Options reviewed are as follows: relining or replacing the main. Both options are presented below.

A1A Lift Station and force main were built around 1962 for the Puritan Utility and Sewage Utility of Indiana according to the plans the District has on file, before the District was formed. It was constructed to serve the southern part of the system, part of Enchanted Hills, Runaway Bay Condos, and Buttermilk Lift Station areas. A1A lift station is located on Wawasee Drive between Honeycomb Lane & Wawasee Circle East. The force main for A1A is a 6-inch diameter asbestos cement pipe. It is approximately 5,800 lineal feet in length with 2 air release manholes and no cleanouts or other access points. The force main begins at A1A Lift Station and discharges to the manhole in Fascination Place at the intersection of King Authur Trail and Rock-a-bye Lane. While A1A Lift Station has had some upgrades over the years, the upgrades are reaching their service life. The force main has not needed any attention until recently. There was a break in the force main on December 13, 2023, directly

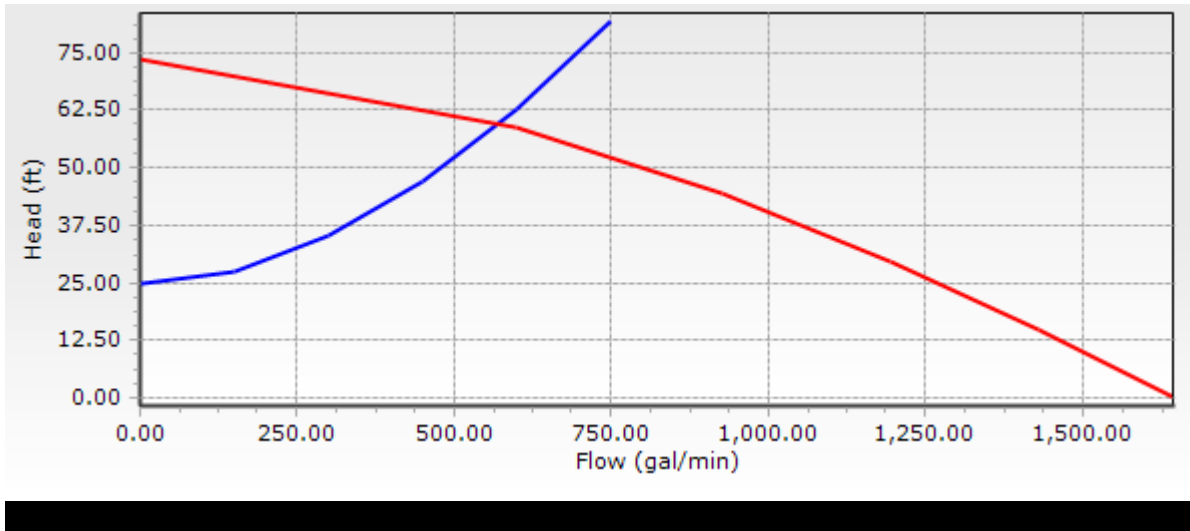
downstream of a 90-degree fitting. The pipe was worn thin along its top. The District has a difficult time finding the main in places. Tracer wire was not installed on the force main during the installation and record drawings are vague as to its location.

A1A LS Force Main Model Results

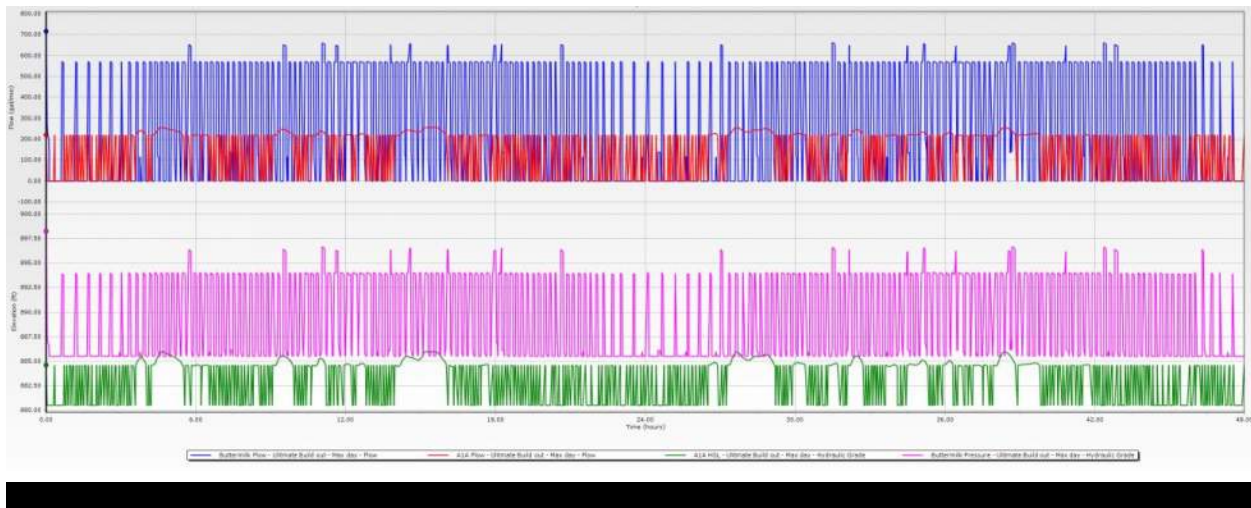
Limited hydraulic information was available for the A1A force main beyond that the pump’s normal operating point was 350 gpm at 81 ft (35 psi) but pumping tests show actual flows under 250 gpm, meaning increased head is being experienced through the force main. Results indicate that it takes two pumps running to deliver 350 gpm through the existing force main. See Figure 3.5a below to see for an improved system curve with an HDPE 6-inch force main. By replacing it with a new 6-inch force main, along essentially the same path, it is estimated that the force mains system curve would increase by approximately 40 percent (220 gpm up to 315 gpm). See Figure 3.5b system curve for the modeled impact on the system and pump curve.

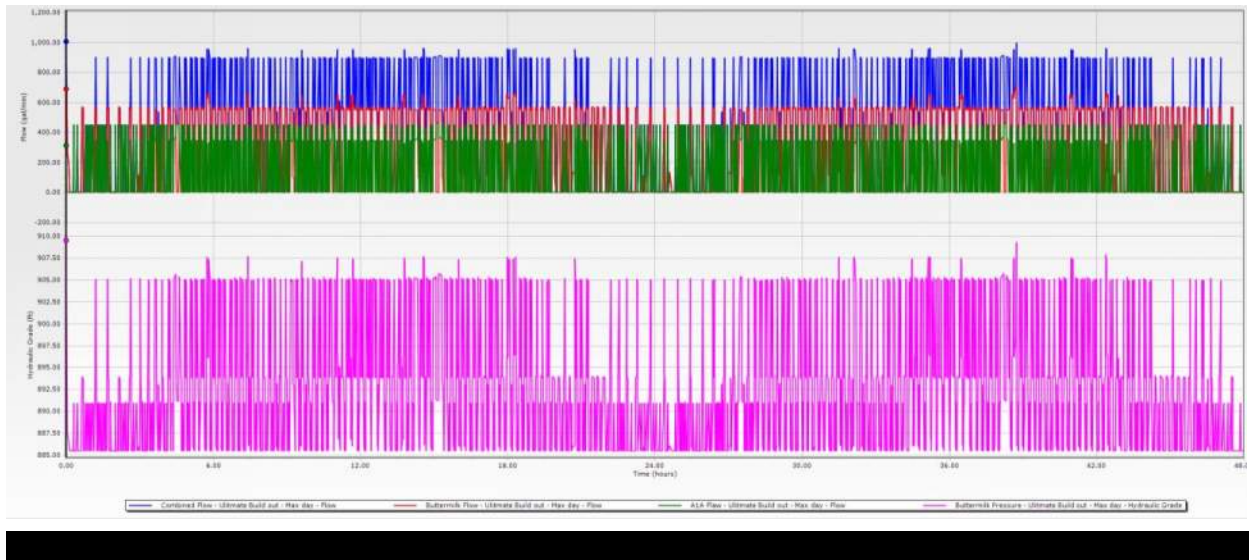


The District could install an 8-inch HDPE force main for a minimal increase in capital cost and increase system capacity by approximately 157 percent (220 up to 565 gpm). Figure 3.6 below shows the system curve and pump curve of the 8-inch HDPE force main.



The District is also interested in connecting the A1A force main to the 10-inch HDPE force main from Buttermilk along 1000 E. This connection would be made just south of the mobile home park, along the same path the current force main runs down. Figure 3.7 and Figure 3.8 compare how combining these two force mains will impact the two system curves.





By combining these force mains, the system will experience increased pressures by approximately 5 psi. Flows through the force main are not significantly impacted. Flows through these systems are increased, mostly due to the increased force main size and condition; it was assumed the force main would be an 8-inch HDPE.

Summary of Alternatives

Alternative 1 – No Action
Not acceptable by state mandate.

Alternative 2 – Relining
Relining a force main is difficult and costly. The A1A Lift Station will have to stay in operation. Pumping and hauling of flow would be a 24-hour job until the main is back in service. The main has limited access points to install the liner. Additional points of access will have to be created.

Alternative 3 - Replacement force main could be 6-inch or 8-inch PVC or HDPE.

A new main would allow taps to be made in the line for other lift stations to add flow as needed. The District has been receiving requests to provide sewers in the area of the existing force main. This would eliminate several septic sewers within the District's area. The installation of an 8-inch force main would sufficiently provide capacity to incorporate flows from the Enchanted Hills Sub Systems.

Table 4 A1A Forcemain Costs		
	Reline	Replace
Estimated Project Cost	Could not get a cost	\$667,000
Estimated 20-year Present Worth of this Alternative		\$179,000

Collections System 5 – Buttermilk & Sunset PS Relocation

The Buttermilk Lift Station is located on DNR property along Hatchery Road near the channel between Lake Wawasee & Lake Papakeeche. It was built around 1962 for the Puritan Utility and Sewage Utility of Indiana to serve the residents along the lakes. The TCRSD took it over during its formation. It has been upgraded with new pumps, control panels, backup generator and force mains over the years, but it is still the same wet well in the same location. The wet well is too small, too shallow, and too close to the channel.

The Sunset Lift Station is located on private property along Turkey Creek Road near the Buttermilk Lift Station. The station needs new pumps, a control panel, and a backup generator. It is located is too close to Lake Wawasee and needs to be relocated. It serves 3 different properties (2 condo units and a campground) in the area, totaling 36 users.

The District has two options of relocating the Pump Station to a different location, either on the same parcel just on the northern most side, or across the street near the DNR boat parking lot. Each option will have challenges associated with it, if the new Buttermilk Pump Station is constructed on the northern part of the same parcel, the construction will likely encounter abandoned and buried hatchery tanks during the construction. If the new pump station is moved to the DNR boat parking lot parcel, the gravity sewer will have to cross Hatchery Road in two or three locations.

The Buttermilk Pump Station pumps wastewater over 16,650 feet (3.15 miles) to the gravity sewer along N 1200 W, just south of E 1250 N. The ground elevation between the proposed Buttermilk Pump Station sites to the gravity sewer increases from around 865 to 900.

The Buttermilk Pump Station currently experiences average day flows of approximately 50,400 gpm.

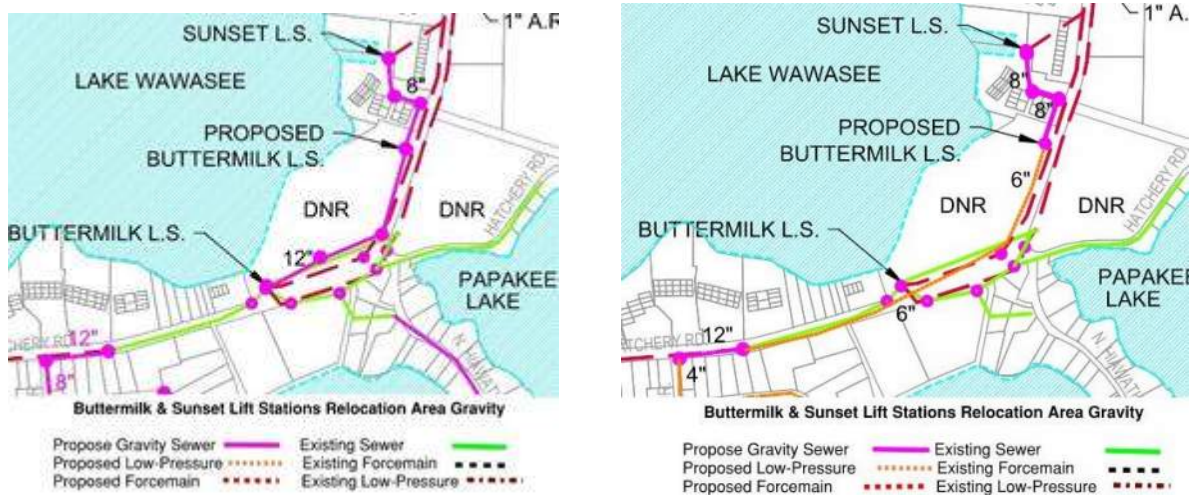


Figure 3.9 – Buttermilk & Sunset Relocation Area Gravity

Buttermilk and Sunset Pump Station Relocation Model Evaluation.

The District has a couple of options when it comes to replacing Buttermilk and the hydraulics between the two alternatives are very similar and will be more dependent on the size of the wet well and pumps. It is recommended that the new Buttermilk Pump Station is located as close to the Sunset Pump Station as possible. The existing depth of the 12-inch sewer water main is not prohibitively deep and can be extended to either of the new proposed locations. Based on the distance and size of the pipe, the sewer will drop approximately 1.65 feet.

The model utilized a new pump that operated at a similar head but could pump an additional 100 gpm. Additionally, the wet well size was increased while the current operating range was maintained. These changes allowed the Buttermilk Station to operate sufficiently provided the assumed demands. The District could select larger pumps that could provide increased flows and pressure, but the model would have to be reviewed on how the proposed pump would affect the smaller 6-inch force main's ability to introduce flows into collection system.

The Sunset Pump Station provided minimal flows to the Buttermilk Pump Station and can be handled by the proposed Buttermilk Pump Station.

The actual size of the wet well and submersible pump should be confirmed with a final design based on projected demands, field conditions and other proposed changes in the system.

Alternative 1 – No Action.

Alternative 2 – Gravity extension

This option extends the existing 12-inch gravity main 860' from the existing wet well to the proposed wet well.

Alternative 3 – Force main extension

This option extends the existing 6-inch force main 1,680' from the existing force main to the proposed wet well.

Table 5 Buttermilk & Sunset Lift Station Relocations Costs		
	Gravity	Force main
Estimated Project Cost	\$1,230,000	\$1,243,000
Estimated 20-year Present Worth of this Alternative	\$1,437,000	\$1,473,000

Collections System 6 – Southshore Development

Southshore Development Model Results

The model update did not extend to the proposed Southshore Development area to fully evaluate the sewer system and thus the entire route was not able to be evaluated. Downstream effects on the system at and downstream of Buttermilk Pump Station, were considered. Current projections have the proposed development at approximately 30,000 gpd in the next 5 years, and up to 60,000 gpd in the next 10 to 20 years. These demands were loaded to the model at the Buttermilk Pump Station using a similar usage pattern. Buttermilk Pump Station was able to sufficiently convey these additional flows during average and max day demands without the sewer system backing up. Additionally, model evaluations will have to be completed to determine how the collection system between the Southshore development and the Buttermilk Pump Station would be impacted and determine if the system has sufficient capacity to support.

Chapter 4- Proposed Project

Wastewater Treatment Plant Improvements

WWTP Aeration

Of the alternatives considered, the two 11-ft rotors is estimated to have the lowest capital cost. This equipment is familiar with the District and has proven to be effective. It is recommended that TCRSD strongly consider this style of equipment. A preliminary sketch of proposed locations is shown in Figure 4.1.

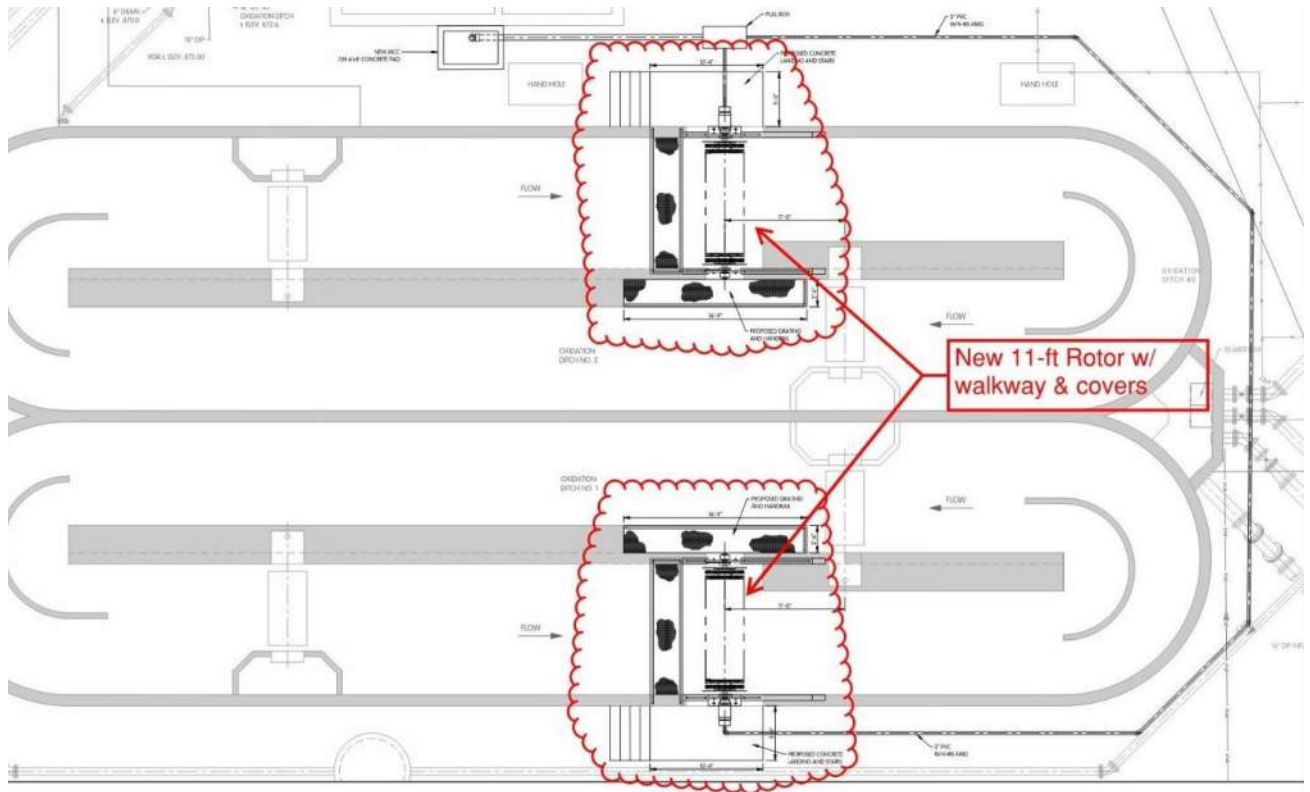


Figure 4.1 - Aeration Improvements

The cost for this improvement is estimated to be \$739,902.

WWTP Biosolids Handling

Currently, the district has a very efficient, very cost-effective solution to biosolid handling and land application. They have ample available acreage to meet current needs. The proposed projects at this time would implement Geo-bags for dewatering. Changes can be made operationally and through existing O&M budgets. Additional capital project needs identified at this time are related to Green projects discussed later in this report

Administration Building

Projects at this time revolve around improvements for high-efficiency lighting replacements and potential HVAC upgrades. Additional replacements of office equipment and ergonomic improvements should also be addressed.

The district has been very frugal in these matters and much of the equipment is at the end of its functional life.

Green project reserve components

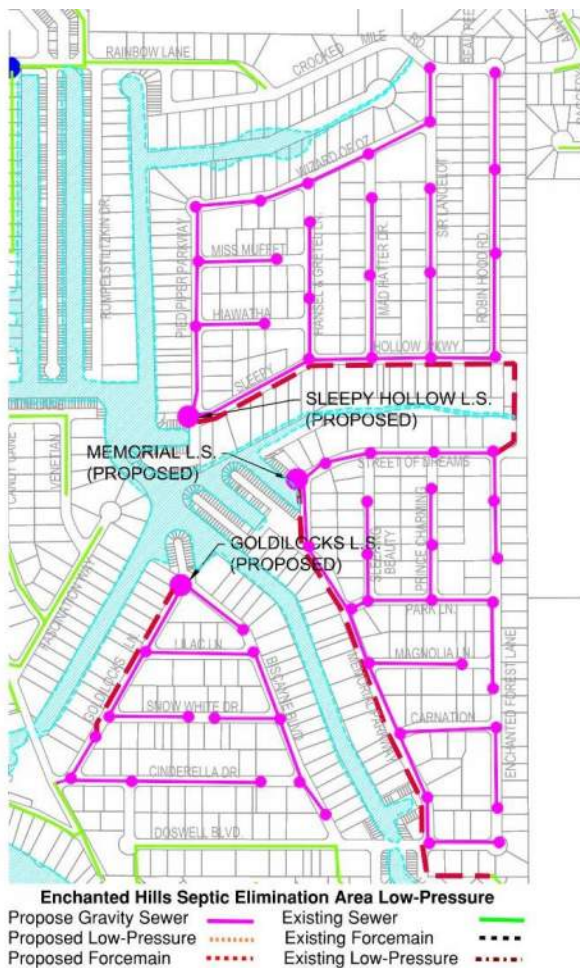
The district strives to improve efficiency in their treatment process in all aspects. Currently the operations of the plant incorporates SCADA systems and controls, VFD's, and high-efficiency pump.

The district will continue with the application and use of ska, VFD and HE pumps. In addition, the district is considering the implementation of a solo photovoltaic array to the cost of operations and electric energy use.

Collection Systems

Collection System 1 – Septic elimination areas - Enchanted Hills

Low-pressure small diameter force main sewer was selected as the system for Enchanted Hills because of the topography, construction restoration, and the existing utilities in the area. A preliminary layout of the low-pressure systems for Enchanted Hills is shown in Figure 4.2.



The estimated cost for the Enchanted Hills septic elimination improvements is \$6,540,000.

Figure 4.2 – Enchanted Hills Improvements

Collection System 2 – Septic elimination areas Papakeeche No. 5

Low-pressure small diameter force main sewer was selected as the system for Papakeeche No.5 because of the topography, construction restoration, and the existing utilities in the area. A preliminary layout of the low-pressure systems for Papakeeche No. 5 is shown in Figure 4.3.

The estimated cost for the Papakeeche No. 5 improvements is \$900,000.



Figure 4.3 – Papakeeche No. 5 Improvements

Collections System 3 – AIA Lift Station & Force Main

Replacement of the control panel and force main is the only option for the District. Relining the pressure pipe is not feasible at this time. The force main is beyond its useful life and the pipe is made with an asbestos cement product. Asbestos cement requires special procedures when repairing or servicing. A preliminary layout of the proposed force main is shown in Figure 4.4.

The estimated cost for this improvement is \$\$898,800.

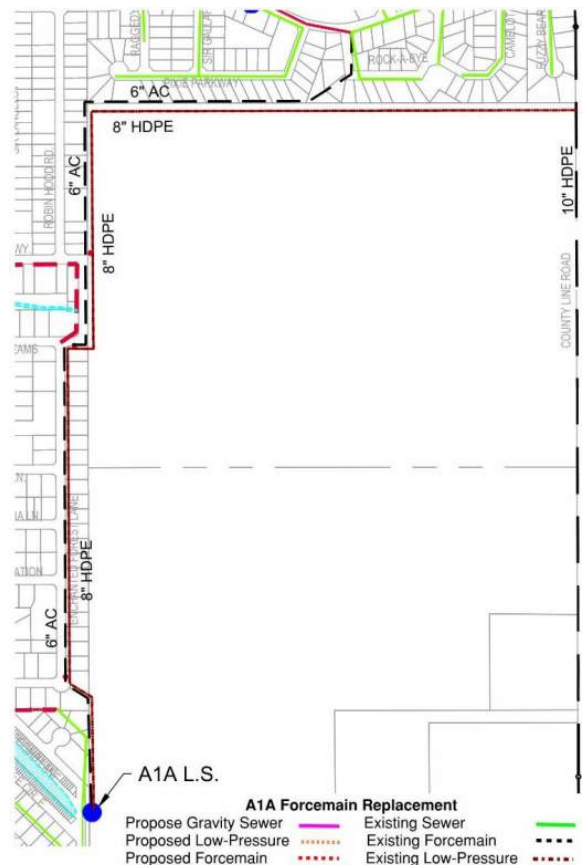
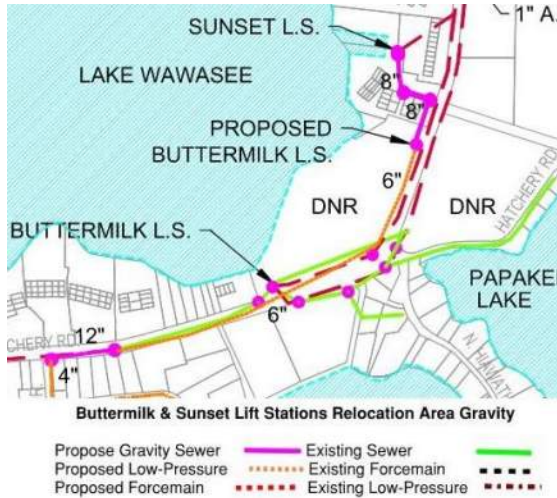


Figure 4.4 – A1A Improvements

Collections System 4 – Buttermilk & Sunset PS Relocation



A gravity extension for the relocation will provide additional storage.

The combining of the Buttermilk & Sunset Lift Stations eliminates several issues with both stations. The Stations are near water sources that would impact Lake Wawasee; both are in need of major improvements. The relocation eliminates one station and will be designed to handle future flows from the west and south. A preliminary layout of the gravity extension is shown in figures 4.x.

The estimated cost for this project is \$1,230,000.

Figure 4.5 – Buttermilk & Sunset Improvements

Collections System 5 – Southshore Development

There are no improvements for this review. Currently being considered based upon modeling results.

Project Cost Summary

Table 7 shows all project costs.

Table 6 Project Selection Matrix Turkey Creek Regional Sewer District						
	WWTP Aeration Upgrade	Buttermilk Lift Station Relocation	A1A Forcemain Replacement	Enchanted Hills Septic Elimination	Papakeeche No 5 Septic Elimination	Totals
Aeration Improvements	\$740,000					
Gravity Sewer System				\$4,986,000	\$1,485,000	
Low Pressure Sewer System				\$3,070,000	\$905,000	
Gravity Extension		\$1,226,000				
Force main Extension / Replacement		\$1,243,000	\$898,800			
Relining Force main			No Option			
Selected Project	\$740,000	\$1,226,000	\$898,800	\$3,070,000	\$905,000	\$

Chapter 5 - Evaluation of Environmental Impacts

1. Disturbed & Undisturbed Land

All work proposed in this report will be on previously disturbed ground, see Appendix 5, Figure 5.1 Soil Map

2. Historic /Architectural Resources

The project will not impact any known historical or architectural resources, see Appendix 5, Figure 5a & b. Interim Report Map and Report. All care will be taken to identify the marker and to protect it. This project will be no closer than 20 feet to the marker.

3. Wetlands

No wetlands will be impacted by this project. Any necessary dewatering or construction run-off would need to be controlled and filtered during construction and stormwater BMP solutions, see Appendix 5, Figure 5.3 Firm Map

4. Surface Waters

Lake Wawasee & Papakeechee Lake are not considered Waters of High Quality, an Exceptional Use Lake, or a Natural Scenic and Recreational water body, see Appendix 5, Figure 5.4 Water and Stream Map

5. Groundwater

There should be only temporary impacts on groundwater. Dewatering may be needed for installing the sewer mains and laterals. Any dewatering would be short term, no more than 6-10 feet in depth and limited to the area of pipe installation. No wells should be affected.

There is no sole source aquifer in Region V that is impacted by this project.

6. Floodplain

The project will not impact floodplains in the area, see Appendix 5, Figure 5.6 Firm Map.

7. Plants & Animals

The project has no known negative impact on federally or state listed endangered and non-endangered plant and animal species and their habitats.

No tree removal is expected during this project so potential species or habitat disturbance would be near zero.

The project will be implemented to minimize impact to non-endangered species and their habitat as well. Mitigation Measures that may be cited in comment letters from the Indiana Department of Natural Resources and the US Fish & Wildlife Services should be Implemented.

8. Prime Farmland Impacts & Influence of Local Geology

The project will have no impact on Prime Farmlands or local geology.

9. Air Quality

There is no direct or long-term impact to air quality. Any issues that could arise from construction equipment can be addressed with ICE mufflers and silencers as a requirement to mitigate impacts. The vacuum sewer alternative would have air emission that the other alternatives do not have. If selected, the vacuum sewer pump station would have odor control equipment installed.

10. Open Space & Recreational Opportunities

The project will neither create nor destroy open space and recreational opportunities.

11. Lake Michigan Coastal Management

The project is located in the Great Lakes Water Shed, however, it is not located in the Lake Michigan Coastal Zone. The proposed projects will not negatively impact the Lake Michigan Coastal Zone.

12. National Natural Landmarks Impact

The construction and operation of the proposed projects will not affect national natural landmarks.

13. Secondary Impacts

Growth and future development is a potential negative secondary impact from the proposed project. Growth and development can impact our natural resources and environment. To reduce the negative impacts of growth and development the TCRSD will implement the following:

The TCRSD, through the authority of its Trustees, intends to ensure that future collection system or treatment works projects connecting to SRF-funded facilities will not adversely affect wetlands, wooded areas, steep slopes, archaeological/historical/structural resources or other sensitive environmental resources. The TCRSD intends to require new treatment works projects to be constructed within the guidelines of the U.S. Fish and Wildlife Service, IDNR, IDEM, and other environmental review authorities."

14. Mitigation Measures

In order to maintain compliance with all applicable laws regarding contamination and/or proper waste disposal, the TCRSD agrees that:

- If a project site is found to contain any areas used to dispose of solid or hazardous waste. The Office of Land Quality (OLQ) will be contacted at 317-308-3103.
- All solid wastes generated by the project, or removed from the project site, will be taken to a properly permitted solid waste processing or disposal facility.
- If any contaminated soils are discovered during this project, they may be subject to disposal as hazardous waste. The OLQ will be contacted at 317-308-3103.
- If PCB's are found on the project site, the Industrial Waste Section of OWQ will be contacted at 317-308-3103 for information regarding management of any PCB wastes.
- If there are any asbestos disposal issues related to this project, the Industrial Waste Section of OLQ will be contacted at 317-308-3103 for information regarding the management of asbestos wastes.
- If the project involves installation or removal of an underground storage tank, or involves contamination from an underground storage tank, the IDEM Underground Storage Tank program will be contacted at 317-308-3039.
- Access for emergency vehicles must be provided at all times.
- If during the course of construction, evidence of deposits of historical and/or archaeological interest are found, the operator will cease operations and notify the TCRSD. The District will then notify the Indiana DNR. No further disturbance of the deposits will occur until an official from ISHPO has surveyed the find, made a determination of the value of the find and effect of continued construction disturbances, and submitted the results of the determination to the District.
- Any site preparation that will involve earth moving (such as clearing and grubbing) will not begin more than two weeks in advance of the start of excavation. The purpose of this restriction is to prevent the existence of large areas of exposed soils for an extended period of time when construction is not proceeding.
- All motorized construction equipment will be equipped with proper emission control equipment, mufflers, and intake silencers, as appropriate to minimize noise pollution.
- All construction will take place during normal weekday, daylight working hours, and not on weekend or holidays, unless necessary to resolve an emergency situation.
- Only water or calcium chloride will be used as dust palliative.
- Stockpiled topsoil and fill material shall be protected with erosion control barriers or temporary seeding.
- No fill, topsoil, or heavy equipment shall be stored within 200 feet of a stream bank or within the drip-line of a treed area.
- If, due to weather, final grading cannot be accomplished immediately, mulching and temporary seeding, if feasible, or some type of temporary erosion control measures, must be used within 30 days until long-term restoration can occur.
Excess soil that is stockpiled must be either removed or regraded within 15 days of the completion of construction.

Chapter 6 – Public Participation and Legal, Financial, Managerial Capability

The following forms will be submitted after appropriate signatures are obtained.

- Resolution for Authorized Representative
- PER Acceptance

The Turkey Creek Regional Sewer District is currently developing and implementing a Fiscal Sustainability Plan (FSP). The Self Certification form for the FSP will be provided after the plans are implemented and appropriate signatures are obtained.

Chapter 7 - Public Participation


To be provided at a later date:


Publishers Affidavit
Notification to Contract Customers
Public Meeting Sign In Sheet
Public Meeting Minutes
All Written Comments Received
Mailing Labels for all Interested Parties
County Drainage Board comments
County Health Department comments
Local Media coverage


APPENDIX


APPENDIX A


Alternate Cost


Engineers Opinion of Probable Construction Cost - Conceptual					
Project WWTP Comprehensive PER			Date: 19-Mar-24		
Location A1A Forcemain Replacement			Estimator: JPM		
	Replacement Alternative				
Item	Item Description	Unit	Qty	Unit Cost	Cost
1	Audio-Video Recording	1	ls	\$2,000	\$2,000
2	Survey & Staking	1	ls	\$3,000	\$3,000
3	Stormwater Pollution Prevention	1	ls	\$1,500	\$1,500
4	Maintenance of Traffic	1	ls	\$1,000	\$1,000
5	8" HDPE, IPS -DR-11	6,650	lf	\$50	\$332,500
6	48" A/R manhole	2	ea	\$12,000	\$24,000
7	48" Cleanout Manholes	2	ea	\$8,000	\$16,000
8	4" HDPE valve	6	ea	\$3,500	\$21,000
9	8" HDPE valve	8	ea	\$4,000	\$32,000
10	8"x 4"x 8" Tee	5	ea	\$3,500	\$17,500
11	Control Panel with SCADA / Telemetry	1	ls	\$120,000	\$120,000
12	Generator for Lift Station	1	ls	\$45,000	\$45,000
13	Special Backfill	19	cy	\$60	\$1,111
14	#8 Aggregate Base	6	sy	\$60	\$333
15	Gravel	6	sy	\$60	\$333
16	2.5" Base Course	3	ton	\$300	\$917
17	1.5" Wearing Course	2	ton	\$330	\$605
18	Seed & Mulch	22	sy	\$5	\$111
19	Record Documents	1	ls	\$2,000	\$2,000
20	Mobilization, Bonding, Insurance & General Requirements (5%)				\$30,946
Subtotal Construction =					\$652,000
Admin and Legal =					\$32,000
Property Acquisition =					\$20,000
Engineering Design =					\$78,000
Engineering Construction Services =					\$32,000
Resident Project Representative =					\$64,000
Contingencies (10%) =					\$98,000
Total Estimated Capital Costs =					\$976,000


Engineers Opinion of Probable Construction Cost - Conceptual						
		A1A Forcemain Replacement			Date: 19-Mar-24	
		Location TCRSD			Estimator: JPM	
Project		A1A Forcemain Replacement				
n=20 yr., i=4.0%, Planning Period 20 yrs.,						
Item		Capital Cost	Life Exp.	Salvage Value in 20 Years	Annual Cost	20 year Present Worth
1	Equipment	\$ 165,000	15	\$ (55,000)		\$ 217,846
2	Structures	\$ 93,000	50	\$ 55,800		\$ 39,386
3	Piping	\$ 332,500	50	\$ 199,500		\$ 140,815
4	Non Construction Costs	\$ 61,356	50	\$ 36,814		\$ 25,985
Total Present Worth						\$ 424,031


Engineers Opinion of Probable Construction Cost - Conceptual					
Project	WWTP & Collection Comprehensive PER			Date: 19-Mar-24	
Location	Buttermilk Lift Station Relocation			Estimator: JPM	
	Gravity Extension Alternative				
Item	Item Description	Unit	Qty	Unit Cost	Cost
1	Audio-Video Recording	1	ls	\$3,500	\$3,500
2	Survey & Staking	1	ls	\$3,500	\$3,500
3	Stormwater Pollution Prevention	1	ls	\$3,000	\$3,000
4	Maintenance of Traffic	1	ls	\$5,000	\$5,000
5	8" Sewer Main	450	lf	\$100	\$45,000
6	12" Sewer Main	860	lf	\$150	\$129,000
7	48" Dia MH, Type I	6	ls	\$7,000	\$42,000
8	Lift Station	1	ls	\$400,000	\$400,000
9	Generator for Lift Station	1	ls	\$50,000	\$50,000
10	6" Force main, HDPE, HDD	0	lf	\$50	\$0
11	10" Force main, HDPE, HDD	30	lf	\$80	\$2,400
12	Special Backfill	100	cy	\$60	\$6,000
13	#8 Aggregate Base	50	sy	\$60	\$3,000
14	Gravel	0	sy	\$40	\$0
15	3" Base Course	10	ton	\$300	\$3,000
16	1.5" Wearing Course	8	ton	\$330	\$2,640
17	Post-CCTV Inspection of Sewers	1,310	lf	\$3	\$3,930
18	Coating the Wet Well	1	LS	\$20,000	\$20,000
19	Allowance for Electric Power Connection	1	LS	\$18,000	\$18,000
20	Allowance for Natural Gas Connection	1	LS	\$15,000	\$15,000
21	Allowance for SCADA/Telemetry	1	LS	\$25,000	\$25,000
22	Seed & Mulch	2,189	sy	\$3	\$6,567
23	Record Documents	1	ls	\$2,500	\$2,500
24	Mobilization, Bonding, Insurance & General Requirements (5%)				\$39,452
Subtotal Construction =					\$828,000
Admin and Legal =					\$41,000
Property Acquisition =					\$20,000
Engineering Design =					\$100,000
Engineering Construction Services =					\$41,000
Resident Project Representative =					\$108,000
Contingencies (10%) =					\$124,000
Total Estimated Capital Costs =					\$1,262,000


Engineers Opinion of Probable Construction Cost - Conceptual					
Project	WWTP & Collection Comprehensive PER			Date: 19-Mar-24	
Location	Buttermilk Lift Station Relocation			Estimator: JPM	
	Force main Extension Alternative				
Item	Item Description	Unit	Qty	Unit Cost	Cost
1	Audio-Video Recording	1	ls	\$3,500.00	\$3,500.00
2	Survey & Staking	1	ls	\$3,500.00	\$3,500.00
3	Stormwater Pollution Prevention	1	ls	\$3,000.00	\$3,000.00
4	Maintenance of Traffic	1	ls	\$5,000.00	\$5,000.00
5	8" Sewer Main	450	lf	\$100.00	\$45,000.00
6	12" Sewer Main	10	lf	\$150.00	\$1,500.00
7	48" Dia MH, Type I	6	ls	\$7,000.00	\$42,000.00
8	Lift Station	1	ls	\$400,000.00	\$400,000.00
9	Generator for Lift Station	1	ls	\$50,000.00	\$50,000.00
10	8" Force main, HDPE, HDD	50	lf	\$80.00	\$4,000.00
11	10" Force main, HDPE, HDD	1,680	lf	\$90.00	\$151,200.00
	Duplex Grinder Station	1	ea	\$20,000.00	\$20,000.00
12	Special Backfill	100	cy	\$60.00	\$6,000.00
13	#8 Aggregate Base	50	sy	\$60.00	\$3,000.00
14	Gravel	0	sy	\$40.00	\$0.00
15	3" Base Course	10	ton	\$300.00	\$3,000.00
16	1.5" Wearing Course	8	ton	\$330.00	\$2,640.00
17	Post-CCTV Inspection of Sewers	450	lf	\$3.00	\$1,350.00
18	Coating the Wet Well	1	LS	\$20,000.00	\$20,000.00
19	Allowance for Electric Power Connection	1	LS	\$18,000.00	\$18,000.00
20	Allowance for Natural Gas Connection	1	LS	\$15,000.00	\$15,000.00
21	Allowance for SCADA/Telemetry	1	LS	\$30,000.00	\$30,000.00
22	Seed & Mulch	278	sy	\$3.00	\$833.33
23	Record Documents	1	ls	\$2,500.00	\$2,500.00
24	Mobilization, Bonding, Insurance & General Requirements (5%)				\$41,551
Subtotal Construction =					\$873,000
Admin and Legal =					\$44,000
Property Acquisition =					\$20,000
Engineering Design =					\$105,000
Engineering Construction Services =					\$44,000
Resident Project Representative =					\$108,000
Contingencies (10%) =					\$131,000
Total Estimated Capital Costs =					\$1,325,000


20 Year Present Worth Analysis						
	Project	Buttermilk Lift Station Relocation Gravity			Date:	19-Mar-24
	Location	TCRSD			Estimator:	
Project Gravity Sewer Alternative						
n=20 yr., i=4%, Planning Period 20 yrs.,						
Item		Capital Cost	Life Exp.	Salvage Value in 20 Years	Annual Cost	20 year Present Worth
1	Equipment	\$ 450,000	15	\$ (150,000)		\$ 594,124
2	Structures	\$ 42,000	50	\$ 25,200		\$ 17,787
3	Piping	\$174,000	50	\$ 104,400		\$ 73,690
4	Electrical & Instrumentation	\$ 43,000	20	\$ -		\$ 43,000
5	Non Construction Costs	\$ 434,000	50	\$ 260,400		\$ 183,800
These items will be the same as before just replacing an existing station						
1	Labor		20		\$ 24,000	\$ 326,168
2	Power		20		\$ 4,800	\$ 65,234
3	Consumables		20		\$ 1,000	\$ 13,590
Total Present Worth						\$ 1,317,393


20 Year Present Worth Analysis							
	Project	Buttermilk Lift Station Relocation Force main				Date:	19-Mar-24
	Location	TCRSD				Estimator:	
Project <u>Low Pressure Sewer Alternative</u>							
n=20 yr., i=1.2%, Planning Period 20 yrs.,							
Item		Capital Cost	Life Exp.	Salvage Value in 20 Years	Annual Cost	20 year Present Worth	
1	Equipment	\$470,000	15	-\$156,667		\$620,530	
2	Stuctures	\$42,000	50	\$25,200		\$17,787	
3	Piping	\$46,500	50	\$27,900		\$19,693	
4	Electrical & Instrumentation	\$48,000	20	\$0		\$48,000	
5	Non Construction Costs	\$452,000	50	\$271,200		\$191,423	
These items will be the same as before just replacing an existing station							
1	Labor		20		\$24,000	\$424,495	
2	Power		20		\$4,800	\$84,899	
3	Consumables		20		\$1,000	\$17,687	
Total Present Worth						\$1,424,515	


Engineers Opinion of Probable Construction Cost - Conceptual					
Project	WWTP Comprehensive PER			Date: 19-Mar-24	
Location	Enchanted Hills Septic Elimination Gravity			Estimator: JPM	
	Gravity Sewer Alternative				
Item	Item Description	Unit	Qty	Unit Cost	Cost
1	Audio-Video Recording	1	ls	\$7,000	\$7,000
2	Survey & Staking	1	ls	\$7,000	\$7,000
3	Stormwater Pollution Prevention	1	ls	\$6,000	\$6,000
4	Maintenance of Traffic	1	ls	\$10,000	\$10,000
5	6" laterals taps	175	ea	\$550	\$96,250
6	6" lateral main,	3,020	lf	\$65	\$196,300
7	8" Sewer Main	17,761	lf	\$100	\$1,776,113
8	48" Dia MH, Type I	53	ls	\$7,000	\$371,000
9	Lift Station	3	ls	\$200,000	\$600,000
10	Generator for Lift Station	3	ls	\$40,000	\$120,000
11	4" Force main, HDPE, HDD	5,177	lf	\$30	\$155,306
12	Air Release MH	2	ea	\$12,000	\$24,000
13	Special Backfill	1,053	cy	\$60	\$63,151
14	#8 Aggregate Base	1,184	sy	\$60	\$71,045
15	Gravel	161	sy	\$60	\$9,667
16	3" Base Course	61	ton	\$300	\$18,271
17	1.5" Wearing Course	30	ton	\$330	\$10,049
19	Post-CCTV Inspection of Sewers	17,761	lf	\$3	\$53,283
20	Allowance for Electric Power Connection	1	LS	\$36,000	\$36,000
21	Allowance for Natural Gas Connection	1	LS	\$30,000	\$30,000
22	Allowance for SCADA/Telemetry	1	LS	\$45,000	\$45,000
23	Seed & Mulch	19,735	sy	\$3	\$59,204
24	Record Documents	1	ls	\$5,000	\$5,000
25	Mobilization, Bonding, Insurance & General Requirements (5%)				\$188,482
Subtotal Construction =					\$3,770,000
Admin and Legal =					\$188,000
Property Acquisition =					\$40,000
Engineering Design =					\$452,000
Engineering Construction Services =					\$188,000
Resident Project Representative =					\$1,670,000
Contingencies (10%) =					\$565,000
Total Estimated Capital Costs =					\$6,873,000


Engineers Opinion of Probable Construction Cost - Conceptual					
Project	WWTP Comprehensive PER			Date: 19-Mar-24	
Location	Enchanted Hills Septic Elimination Low-pressure			Estimator: JPM	
	Low Pressure Sewer Alternative				
Item	Item Description	Unit	Qty	Unit Cost	Cost
1	Audio-Video Recording	1	ls	\$7,000.00	\$7,000.00
2	Survey & Staking	1	ls	\$7,000.00	\$7,000.00
3	Stormwater Pollution Prevention	1	ls	\$7,000.00	\$7,000.00
4	Maintenance of Traffic	1	ls	\$10,000.00	\$10,000.00
5	Cleanout / Air Release Manhole	13	ea	\$12,000.00	\$156,000.00
6	Cleanout Manhole	22	ea	\$8,000.00	\$176,000.00
7	2-Inch Tap Into Force Main	175	ea	\$1,500.00	\$262,500.00
8	2-Inch, Laterals HDPE, DR-11, IPS, HDD	596	lf	\$35.00	\$20,860.00
9	2-Inch, Force Main HDPE, DR-11, IPS, HDD	6864	lf	\$35.00	\$240,240.00
10	3-Inch, Force Main HDPE, DR-11, IPS, HDD	6,445	lf	\$35.00	\$225,575.00
11	4-Inch, Force Main HDPE, DR-11, IPS, HDD	4,118	lf	\$40.00	\$164,726.40
12	6-Inch, Force Main HDPE, DR-11, IPS, HDD	2,410	lf	\$50.00	\$120,500.00
13	2-Inch Ball Valve	28	ea	\$3,000.00	\$84,000.00
14	3-Inch Ball Valve	13	ea	\$3,500.00	\$45,500.00
15	4-Inch Ball Valve	9	ea	\$4,000.00	\$36,000.00
16	6-Inch Ball Valve	2	ea	\$4,500.00	\$9,000.00
17	2-Inch Curb Stop & Swing Check Assembly	175	ea	\$3,500.00	\$612,500.00
18	Simplex Grinder Station	175	ea	\$7,500.00	\$1,312,500.00
19	Special Backfill	253	cy	\$60.00	\$15,200.00
20	#8 Aggregate Base	428	sy	\$60.00	\$25,650.00
21	Gravel	191	sy	\$40.00	\$7,644.44
24	3" Base Course	71	ton	\$300.00	\$21,161.25
25	1.5" Wearing Course	35	ton	\$330.00	\$11,638.69
26	Seed & Mulch	382	sy	\$3.00	\$1,146.67
27	Record Documents	1	ls	\$5,000.00	\$5,000.00
30	Mobilization, Bonding, Insurance & General Requirements (5%)				\$179,217
Subtotal Construction =					\$3,763,000
Admin and Legal =					\$188,000
Property Acquisition =					\$40,000
Engineering Design =					\$451,000
Engineering Construction Services =					\$188,000
Resident Project Representative =					\$167,000
Contingencies (15%) =					\$564,000
Total Estimated Capital Costs =					\$5,361,000


20 Year Present Worth Analysis							
		Project	WWTP Comprehensive PER			Date:	19-Mar-24
		Location	Enchanted Hills Septic Elimination			Estimator:	
		Project	Gravity Sewer Alternative				
<u>n=20 yr., i=4.0%, Planning Period 20 yrs.,</u>							
Item		Capital Cost	Life Exp.	Salvage Value in 20 Years	Annual Cost	20 year Present Worth	
1	Equipment	\$ 720,000	15	\$ (240,000)		\$ 950,599	
2	Structures	\$ 395,000	50	\$ 237,000		\$ 167,284	
3	Piping	\$ 2,127,719	50	\$ 1,276,631		\$ 901,096	
4	Electrical & Instrumentation	\$ 111,000	20	\$ -		\$ 111,000	
5	Non Construction Costs	\$ 3,103,000	50	\$ 1,861,800		\$ 1,314,131	
1	Labor		20		\$ 34,000	\$ 462,071	
2	Power		20		\$ 8,900	\$ 120,954	
3	Consumables		20		\$ 1,000	\$ 13,590	
Total Present Worth						\$ 4,040,725	

20 Year Present Worth Analysis						
	Project	WWTP Comprehensive PER			Date:	19-Mar-24
	Location	Enchanted Hills Septic Elimination			Estimator:	
Project		Low Pressure Sewer Alternative				
n=20 yr., i=4.0%, Planning Period 20 yrs.,						
Item		Capital Cost	Life Exp.	Salvage Value in 20 Years	Annual Cost	20 year Present Worth
1	Equipment	\$1,312,500	15	-\$437,500		\$1,732,862
2	Stuctures	\$332,000	50	\$199,200		\$140,603
3	Piping	\$1,208,901	50	\$725,341		\$511,974
4	Electrical & Instrumentation	\$0	20	\$0		\$0
5	Non Construction Costs	\$25,650	50	\$15,390		\$10,863
1	Labor		20		\$24,000	\$326,168
2	Power		20		\$4,800	\$65,234
3	Consumables		20		\$1,000	\$13,590
Total Present Worth						\$2,801,294

Engineers Opinion of Probable Construction Cost - Conceptual					
Project	WWTP Comprehensive PER			Date: 19-Mar-24	
Location	Papakeeche No 5 Septic Elimination - Gravity			Estimator: JPM	
	Gravity Sewer Alternative				
Item	Item Description	Unit	Qty	Unit Cost	Cost
1	Audio-Video Recording	1	ls	\$1,000	\$1,000
2	Survey & Staking	1	ls	\$2,000	\$2,000
3	Stormwater Pollution Prevention	1	ls	\$1,000	\$1,000
4	Maintenance of Traffic	1	ls	\$1,500	\$1,500
5	6" laterals taps	50	ea	\$550	\$27,500
6	6" lateral main,	1,020	lf	\$70	\$71,400
7	8" Sewer Main	2,425	lf	\$100	\$242,500
8	12" Sewer Main	260	lf	\$120	\$31,200
9	48" Dia MH, Type I	13	ls	\$7,000	\$91,000
10	Special Backfill	1,481	cy	\$60	\$88,889
11	#8 Aggregate Base	1,778	sy	\$60	\$106,667
12	Gravel	222	sy	\$40	\$8,889
13	3.5" Base Course	220	ton	\$300	\$66,000
14	1.5" Wearing Course	110	ton	\$330	\$36,300
15	6-inch Concrete Sidewalk / Drive	222	sy	\$85	\$18,889
16	Post-CCTV Inspection of Sewers	2,425	lf	\$3	\$7,275
17	Seed & Mulch	2,222	sy	\$3	\$6,667
19	Record Documents	1	ls	\$1,000	\$1,000
20	Mobilization, Bonding, Insurance & General Requirements (5%)				\$40,484
				Subtotal Construction =	\$845,000
				Admin and Legal =	\$42,000
				Property Acquisition =	\$20,000
				Engineering Design =	\$101,000
				Engineering Construction Services =	\$42,000
				Resident Project Representative =	\$90,000
				Contingencies (10%) =	\$126,000
				Total Estimated Capital Costs =	\$1,266,000

Engineers Opinion of Probable Construction Cost - Conceptual					
Project	WWTP Comprehensive PER			Date: 19-Mar-24	
Location	Papakeeche No 5 Septic Elimination - Low-pressure			Estimator: JPM	
	Low Pressure Sewer Alternative				
Item	Item Description	Unit	Qty	Unit Cost	Cost
1	Audio-Video Recording	1	ls	\$1,000	\$1,000
2	Survey & Staking	1	ls	\$1,500	\$1,500
3	Stormwater Pollution Prevention	1	ls	\$800	\$800
4	Maintenance of Traffic	1	ls	\$1,000	\$1,000
5	6" laterals taps	2	ea	\$550	\$1,100
6	6" lateral main,	40	lf	\$50	\$2,000
7	8" Sewer Main	0	lf	\$100	\$0
8	12" Sewer Main	250	lf	\$120	\$30,000
9	48" Dia MH, Type I	2	lf	\$7,000	\$14,000
10	Cleanout / Air Release Manhole	3	ea	\$12,000	\$36,000
11	Cleanout Manhole	3	ea	\$8,000	\$24,000
12	2-Inch Tap Into Force Main	48	ea	\$1,500	\$72,000
13	2-Inch, Laterals HDPE, DR-11, IPS, HDD	980	lf	\$25	\$24,500
14	2-Inch, Force Main HDPE, DR-11, IPS, HDD	660	lf	\$25	\$16,500
15	3-Inch, Force Main HDPE, DR-11, IPS, HDD	1,580	lf	\$30	\$47,400
16	4-Inch, Force Main HDPE, DR-11, IPS, HDD	1,000	lf	\$35	\$35,000
17	2-Inch Ball Valve	2	ea	\$3,000	\$6,000
19	3-Inch Ball Valve	2	ea	\$3,500	\$7,000
20	4-Inch Ball Valve	1	ea	\$4,000	\$4,000
21	2-Inch Curb Stop & Swing Check Assembly	48	ea	\$3,500	\$168,000
	Simplex Grinder Station	48	ea	\$7,500	\$360,000
22	Special Backfill	278	cy	\$60	\$16,667
23	#8 Aggregate Base	333	sy	\$60	\$20,000
24	Gravel	222	sy	\$40	\$8,889
25	2.5" Base Course	18	ton	\$300	\$5,500
26	1.5" Wearing Course	11	ton	\$330	\$3,630
27	6-inch Concrete Sidewalk / Drive	222	sy	\$85	\$18,889
28	Seed & Mulch	556	sy	\$3	\$1,667
29	Record Documents	1	ls	\$1,500	\$1,500
30	Mobilization, Bonding, Insurance & General Requirements (5%)				\$46,427
Subtotal Construction =					\$975,000
Admin and Legal =					\$48,000
Property Acquisition =					\$20,000
Engineering Design =					\$117,000
Engineering Construction Services =					\$48,000
Resident Project Representative =					\$90,000
Contingencies (15%) =					\$146,000
Total Estimated Capital Costs =					\$1,444,000

20 Year Present Worth Analysis						
	Project	WWTP Comprehensive PER			Date:	19-Mar-24
	Location	Papakeechee No 5 Septic Elimination - Gravity			Estimator:	
Project		Gravity Sewer Alternative				
n=20 yr., i=4.0%, Planning Period 20 yrs.,						
Item		Capital Cost	Life Exp.	Salvage Value in 20 Years	Annual Cost	20 year Present Worth
1	Equipment	\$ -	15	\$ -		\$ -
2	Structures	\$ 31,200	50	\$ 18,720		\$ 13,213
3	Piping	\$ 193,600	50	\$ 116,160		\$ 81,990
4	Electrical & Instrumentation	\$ -	20	\$ -		\$ -
5	Non Construction Costs	\$ 1,208,500	50	\$ 725,100		\$ 511,804
1	Labor		20		\$ 5,000	\$ 67,952
2	Power		20		\$ 500	\$ 6,795
3	Consumables		20		\$ 100	\$ 1,359
Total Present Worth						\$ 683,113

20 Year Present Worth Analysis						
	Project	WWTP Comprehensive PER			Date:	19-Mar-24
	Location	Papakeechee No 5 Septic Elimination - Low-pressure			Estimator:	
Project <u>Low Pressure Sewer Alternative</u>						
n=20 yr., i=4.0%, Planning Period 20 yrs.,						
Item		Capital Cost	Life Exp.	Salvage Value in 20 Years	Annual Cost	20 year Present Worth
1	Equipment	\$360,000	15	-\$120,000		\$475,299
2	Stuctures	\$74,000	50	\$44,400		\$31,339
3	Piping	\$380,400	50	\$228,240		\$161,101
4	Electrical & Instrumentation	\$0	20	\$0		\$0
5	Non Construction Costs	\$469,000	50	\$281,400		\$198,623
1	Labor		20		\$5,000	\$67,952
2	Power		20		\$500	\$6,795
3	Consumables		20		\$100	\$1,359
Total Present Worth						\$942,468

Engineers Opinion of Probable Construction Cost - Conceptual

Project WWTP Comprehensive PER

Date: 18-May-23

Location WWTP Improvements Triton Option

Estimator:




Rebuild the Existing Four 15 hp Rotors

Item	Description	Unit	Qty	Unit Cost	Cost
1	Materials (direct purchase by District)	ls	1	\$ 135,180	\$ 135,180
2	Crane	hr	100	\$ 245	\$ 24,500
3	Labor	mhr	500	\$ 80	\$ 40,000
4	Project Coordination	mhr	40	\$ 120	\$ 4,800
5	Misc. Materials (bolts, plates, gaskets, etc.)	ls	1	\$ 8,000	\$ 8,000
	10% Contingencies				\$ 21,248
	Est. total Cost of Construction =				\$ 233,728

Two 40 hp Triton Aerators & keep the 4 existing rotors

Item	Description	Unit	Qty	Unit Cost	Cost
1	Two Triton Aerators with Universal Mounts	ls	1	\$ 200,000	\$ 200,000
2	Electrical cable, 4 No.6 AWG, MCC to Disconnect	lf	200	\$ 11	\$ 2,160
3	Elec. Conduit to Disconnect, 2" PVC	lf	200	\$ 20	\$ 4,000
4	MCC, two section with disconnect	ls	1	\$ 70,000	\$ 70,000
5	Elec. Wire to MCC, 8-600 MCM	lf	30	\$ 300	\$ 9,000
6	Elec. Conduit to MCC, 3" Ridgid	lf	30	\$ 70	\$ 2,100
7	Pull Box	ea	1	\$ 3,000	\$ 3,000
8	Concrete	ea	2	\$ 3,800	\$ 7,600
9	40 hp VFDs	ea	2	\$ 10,000	\$ 20,000
10	10 hp VFDs	ea	2	\$ 4,500	\$ 9,000
11	Installation	mhr	160	\$ 85	\$ 13,600
15	Plumbing and Small Piping	ls	1	\$ 1,702	\$ 1,702
16	Painting	ls	1	\$ 2,043	\$ 2,043
17	Electrical Installation	ls	1	\$ 3,405	\$ 3,405
18	Mobilization, General Requirements	ls	1	\$ 13,904	\$ 13,904
	Total Construction				\$ 361,514
	Admin and Legal				\$ 7,230
	Engineering Design				\$ 32,536
	Construction Services				\$ 14,461
	Inspection				\$ 14,461
	Contingencies				\$ 36,151
	Total Estimated Capital Costs =				\$ 466,353

Engineers Opinion of Probable Construction Cost - Conceptual					
Project WWTP Comprehensive PER			Date: 18-May-23		
Location WWTP Improvements add 11' rotors Option			Estimator:		
					
Rebuild the Existing Four 15 hp Rotors					
Item	Description	Unit	Qty	Unit Cost	Cost
1	Materials (direct purchase by District)	ls	1	\$ 135,180	\$ 135,180
2	Crane	hr	100	\$ 245	\$ 24,500
3	Labor	mhr	500	\$ 80	\$ 40,000
4	Project Coordination	mhr	40	\$ 120	\$ 4,800
5	Misc. Materials (bolts, plates, gaskets, etc.)	ls	1	\$ 8,000	\$ 8,000
10% Contingencies					\$ 21,248
Est. total Cost of Construction =					\$ 233,728
Install Two 25 hp 11-ft. Rotors & Keep the 4 Existing Rotors					
Item	Description	Unit	Qty	Unit Cost	Cost
1	New 11-ft. Rotors, Drives & Acc.	ea	2	\$ 90,000	\$ 180,000
2	Crane	hr	80	\$ 245	\$ 19,600
3	Labor	mhr	600	\$ 80	\$ 48,000
4	Project Coordination	mhr	40	\$ 120	\$ 4,800
5	Misc. Materials (bolts, plates, gaskets, etc.)	ls	1	\$ 8,000	\$ 8,000
6	Concrete Removal	lf	72	\$ 65	\$ 4,680
7	Walkway with Handrail (@ bearing ends)	ea	2	\$ 3,000	\$ 6,000
8	Electrical cable, 4 No.6 AWG, MCC to Disconnect	lf	500	\$ 11	\$ 5,400
9	Elec. Conduit to Disconnect, 2" PVC	lf	200	\$ 20	\$ 4,000
10	MCC, two section with disconnect	ls	1	\$ 70,000	\$ 70,000
11	Elec. Wire to MCC, 4-250 kCmil	lf	30	\$ 300	\$ 9,000
12	Elec. Conduit to MCC, 3" Rigid	lf	30	\$ 70	\$ 2,100
13	VFD's	ea	2	\$ 3,500	\$ 7,000
14	MCC Enclosure	ea	1	\$ 2,500	\$ 2,500
15	Plumbing and Small Piping	ls	1	\$ 1,855	\$ 1,855
16	Painting	ls	1	\$ 2,226	\$ 2,226
17	Electrical Installation	ls	1	\$ 3,711	\$ 3,711
18	Mobilization, General Requirements	ls	1	\$ 15,155	\$ 15,155
Total Construction					\$ 394,028
Admin and Legal					\$ 7,881
Engineering Design					\$ 35,462
Construction Services					\$ 15,761
Inspection					\$ 15,761
Contingencies					\$ 39,403
Total Estimated Capital Costs =					\$ 508,296

Engineers Opinion of Probable Construction Cost - Conceptual

Project WWTP Comprehensive PER

Date: 18-May-23

Location WWTP Improvements Jaeger Option

Estimator:



Rebuild the Existing Four 15 hp Rotors

Item	Description	Unit	Qty	Unit Cost	Cost
1	Materials (direct purchase by District)	ls	1	\$ 135,180	\$ 135,180
2	Crane	hr	100	\$ 245	\$ 24,500
3	Labor (4 people for 2 weeks each ditch)	mhr	500	\$ 80	\$ 40,000
4	Project Coordination	mhr	40	\$ 120	\$ 4,800
5	Misc. Materials (bolts, plates, gaskets, etc.)	ls	1	\$ 8,000	\$ 8,000
	10% Contingencies				\$ 21,248
	Est. total Cost of Construction =				\$ 233,728

Three Blowers, Four Diffusers Racks & Keep the Four Existing Rotors

Item	Description	Unit	Qty	Unit Cost	Cost
1	Jaegar Material Costs	ls	1	\$ 300,000	\$ 300,000
2	Diffuser Installation	mhr	40	\$ 80	\$ 3,200
3	Misc Materials (bolts, plates, grout, etc.)	ls	1	\$ 1,000	\$ 1,000
4	Concrete Slab & Foundation (8'x8')	cy	5	\$ 800	\$ 4,000
5	Blower Building (FRP)	sf	80	\$ 300	\$ 24,000
6	HVAC	ls	1	\$ 3,000	\$ 3,000
7	Electrical cable, 4 No.6 AWG, MCC to Disconnect	lf	80	\$ 11	\$ 864
8	Elec. Conduit to Disconnect, 2" PVC	lf	80	\$ 20	\$ 1,600
9	MCC, two section with disconnect	ls	1	\$ 70,000	\$ 70,000
10	Elec. Wire to MCC, 8-600 MCM	lf	30	\$ 300	\$ 9,000
11	Elec. Conduit to MCC, 3" Ridgid	lf	30	\$ 70	\$ 2,100
12	Pull Box	ea	1	\$ 1,000	\$ 1,000
15	Plumbing and Small Piping	ls	1	\$ 2,099	\$ 2,099
16	Painting	ls	1	\$ 2,519	\$ 2,519
17	Electrical Installation	ls	1	\$ 4,198	\$ 4,198
18	Mobilization, General Requirements	ls	1	\$ 17,143	\$ 17,143
	Total Construction				\$ 445,722
	Admin and Legal				\$ 21,735
	Engineering Design				\$ 97,808
	Construction Services				\$ 43,470
	Inspection				\$ 43,470
	Contingencies				\$ 108,676
	Total Estimated Capital Costs =				\$ 760,883

Engineers Opinion of Probable Construction Cost - Conceptual

Project WWTP Comprehensive PER

Date: 18-May-23

Location WWTP Improvements Three Blowers & 8 Diffuser Option

Estimator:



Remove the Existing Four 15 hp Rotors

Item	Description	Unit	Qty	Unit Cost	Cost
1	Crane	hr	48	\$ 245	\$ 11,760
2	Trucking & Disposal	ls	1	\$ 15,000	\$ 15,000
3	Labor (4 people for 3 days each ditch)	mhr	192	\$ 80	\$ 15,360
	10% Contingencies				\$ 4,212
	Est. total Cost of Construction =				\$ 46,332

Three Blowers, 8 Diffuser Racks & @ Mixers

Item	Description	Unit	Qty	Unit Cost	Cost
1	Jaegar Material Costs	ls	1	865,000	\$ 865,000
2	Diffuser & Mixer Installation	mhr	100	120	\$ 12,000
3	Misc Materials (bolts, plates, grout, etc.)	ls	1	8,000	\$ 8,000
4	Concrete Slab & Foundation (8'x8')	cy	10	800	\$ 8,000
5	Blower Building (FRP)	sf	100	300	\$ 30,000
6	HVAC	ls	1	6,000	\$ 6,000
7	Electrical cable, 4 No.6 AWG, MCC to Disconnect	lf	200	11	\$ 2,160
8	Elec. Conduit to Disconnect, 2" PVC	lf	200	20	\$ 4,000
9	MCC, two section with disconnect	ls	1	70,000	\$ 70,000
10	Elec. Wire to MCC, 8-600 MCM	lf	30	300	\$ 9,000
11	Elec. Conduit to MCC, 3" Ridgid	lf	30	70	\$ 2,100
12	Pull Box	ea	1	2,000	\$ 2,000
14	MCC Enclosure	ea	1	2,500	\$ 2,500
15	Plumbing and Small Piping	ls	1	5,104	\$ 5,104
16	Painting	ls	1	6,125	\$ 6,125
17	Electrical Installation	ls	1	10,208	\$ 10,208
18	Mobilization, General Requirements	ls	1	41,688	\$ 41,688
	Total Construction				\$ 1,083,884
	Admin and Legal				\$ 21,678
	Engineering Design				\$ 97,550
	Construction Services				\$ 43,355
	Inspection				\$ 43,355
	Contingencies				\$ 108,388
	Total Estimated Capital Costs =				\$ 1,398,210

20 Year Present Worth Analysis



Project Aeration Evaluation of Alternatives
 Location TCRSD
 n=20 yr., i= -4.0%, Planning Period 20 yrs.,

Date: 10-Oct-23
 Estimator: BWH

Rebuild Rotors along with Two Triton Aerators

Item	Item Description	Capital Cost	Life Exp.	Salvage Value in 20 Years	Annual Cost	20 year Present Worth
Capital Costs						
1	Equipment, Triton Aerators	\$250,200	20	\$0		\$250,200
2	Equipment, Rotors	\$292,000	30	\$97,333		\$198,479
3	Stuctures	\$10,000	50	\$6,000		\$4,235
4	Piping	\$0	50	\$0		\$0
5	Electrical & Instrumentation	\$90,260	20	\$0		\$90,260
6	Non Construction Costs	\$104,839	50	\$62,903		\$44,400
Operation & Maintenance Costs						
1	Labor		20		\$11,700	\$159,007
2	Power		20		\$78,653	\$1,068,920
Total Present Worth						\$1,815,501

Rebuild Rotors with Two New 25hp 11-ft. Rotors

Item	Item Description	Capital Cost	Life Exp.	Salvage Value in 20 Years	Annual Cost	20 year Present Worth
Capital Costs						
1	Equipment	\$459,580	30	\$153,193		\$312,388
2	Stuctures	\$8,000	50	\$4,800		\$3,388
3	Piping	\$0	50	\$0		\$0
4	Electrical & Instrumentation	\$97,500	20	\$0		\$97,500
5	Non Construction Costs	\$114,268	50	\$68,561		\$48,393
Operation & Maintenance Costs						
1	Labor		20		\$11,700	\$159,007
2	Power		20		\$61,645	\$837,776
Total Present Worth						\$1,458,451

Rebuild Rotors along with Four OxyLift Diffuser Racks & Blowers

Item	Item Description	Capital Cost	Life Exp.	Salvage Value in 20 Years	Annual Cost	20 year Present Worth
Capital Costs						
1	Equipment, Diffusers & Blowers	\$189,636	15	-\$63,212		\$250,372
	Equipment, Rotors	\$292,000	30	\$97,333		\$198,479
2	Stuctures	\$28,000	50	\$16,800		\$11,858
3	Piping	\$5,000	50	\$3,000		\$2,118
4	Electrical & Instrumentation	\$84,564	20	\$0		\$84,564
5	Non Construction Costs	\$315,161	50	\$189,096		\$133,472
Operation & Maintenance Costs						
1	Labor		20		\$15,600	\$212,009
2	Power		20		\$60,114	\$816,969
Total Present Worth						\$1,709,840

Remove Rotors & Install 8 OxyLift Diffuser Racks with Blowers

Item	Item Description	Capital Cost	Life Exp.	Salvage Value in 20 Years	Annual Cost	20 year Present Worth
Capital Costs						
1	Equipment	\$883,000	15	-\$294,333		\$1,165,804
2	Stuctures	\$38,000	50	\$22,800		\$16,093
3	Piping	\$8,000	50	\$4,800		\$3,388
4	Electrical & Instrumentation	\$89,260	20	\$0		\$89,260
5	Non Construction Costs	\$314,326	50	\$188,596		\$133,118
Operation & Maintenance Costs						
1	Labor		20		\$15,600	\$212,009
2	Power		20		\$74,375	\$1,010,781
Total Present Worth						\$2,630,453

APPENDIX B

Summary Cost

Project Selection Matrix						
Turkey Creek Regional Sewer District						
	WWTP Aeration Upgrade	Buttermilk Lift Station Relocation	A1A Forcemain Replacement	Enchanted Hills Septic Elimination	Papakeechee No 5 Septic Elimination	Totals
Aeration Improvements	\$740,000					
Gravity Sewer System				\$6,873,000	\$1,266,000	
Low Pressure Sewer System				\$5,361,000	\$1,444,000	
Gravity Extension		\$1,262,000				
Force main Extension / Replacement		\$1,325,000	\$976,000			
Relining Force main			No Option			
Selected Project	\$740,000	\$1,262,000	\$976,000	\$5,361,000	\$1,266,000	\$9,605,000

Appendix C

Environmental

TCRSD soil Enchanted Hills Area



Jones & Henry



NTS

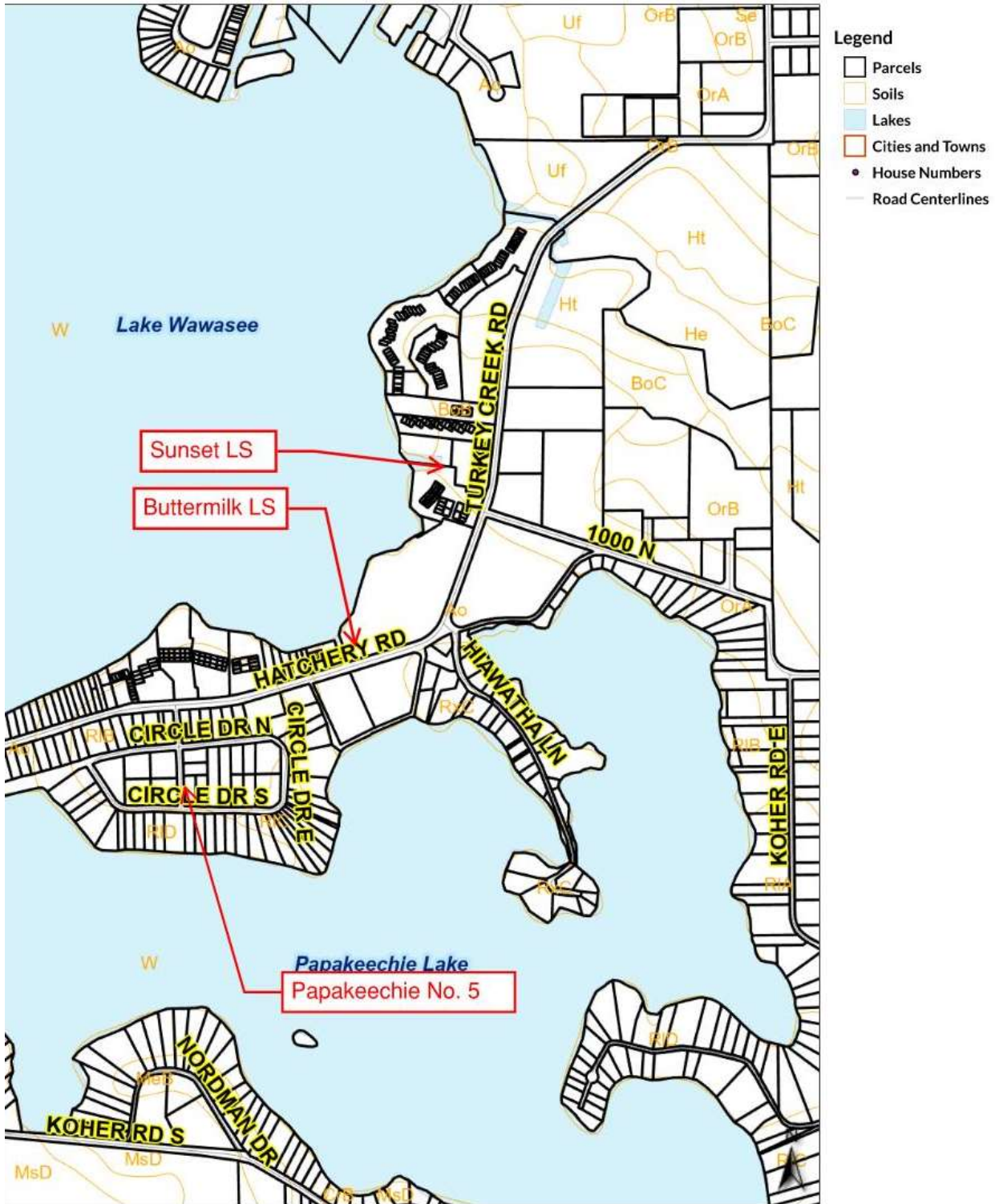
Figure 5.1a
Soils Map

Kosciusko County
GIS

Turkey Creek Regional Sewer District
Comprehensive PER

February 2024

TCRSD soil Papakeeche No 5 & LSs Areas



Jones & Henry



NTS

Figure 5.1b
Soils Map
Kosciusko County
GIS

Turkey Creek Regional Sewer District
Comprehensive PER
February 2024

Turkey Creek Township (00001-056)

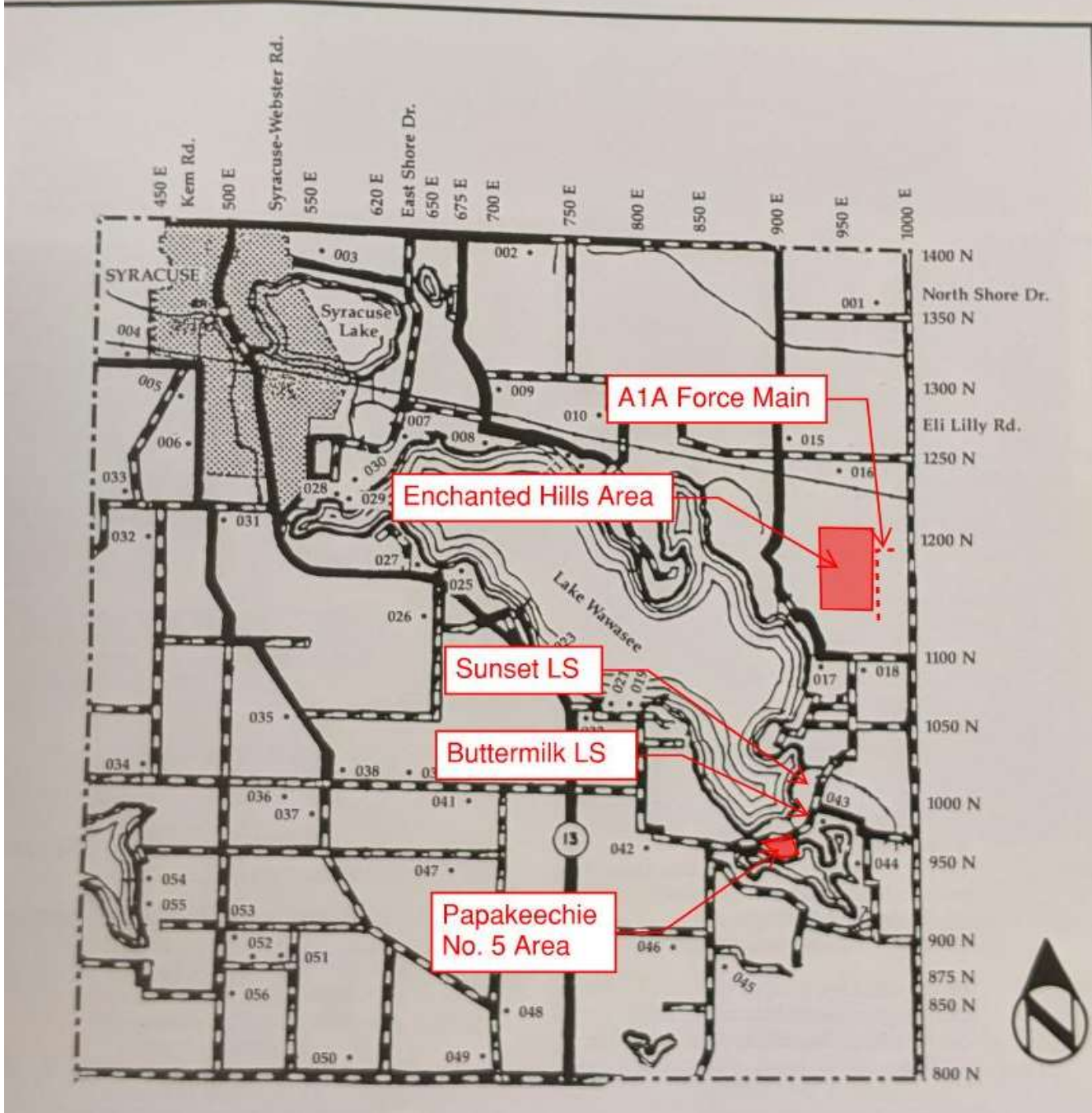


Figure 5.2a
Interim Map & Report
 Kosciusko County
 Interim Report

040 N **Grady Farm, 1000 N;** House: American four-square, 1924 (Charlie Lynch, builder); Outbuildings: livestock barn, pump house, hog house, windmill; Agriculture, Vernacular/Construction (340)

041 C **House, 1000 N;** Gabled-ell, c.1890; Vernacular/Construction (340)

042 C **McClintic Cemetery, Hatchery Road;** c.1850-present; Exploration/Settlement, Religion (340)

043 N **Fish Hatchery Caretaker Building, Old Hatchery Road;** Colonial Revival, c.1935 (Civilian Conservation Corps, builder); Architecture, Politics/Government (340)



043

048 N **Baughner-Cox Farm, 700 E;** House: American four-square, c.1910 (W.F. Baughner, builder); Outbuildings: basement barn, drive-in corncrib; chicken house, milk house, pump house, silo; Agriculture, Vernacular/Construction (473)

049 C **Farm, Syracuse-Webster Road;** House: hall-and-parlor, c.1870; Outbuildings: basement barn, machine shop, pumphouse; Agriculture, Vernacular/Construction (473)

050 C **House, 800 N;** Italianate, c.1870; Architecture (473)

051 N **Turkey Creek Township District School No. 5, 875 N;** T-plan, c.1910; Education, Vernacular/Construction (473)



0

044 C **Benty Cottage, Promontory Point;** Gable-front, c.1920; Entertainment/Recreation, Vernacular/Construction (473)

045 C **Turkey Creek Township District School No. 7, 850 E;** Gable-front, c.1870; Education, Vernacular/Construction (473)

046 C **House, 900 N;** Gabled-ell, c.1890; Vernacular/Construction (473)

047 C **Barn, 950 N;** Basement, c.1870; Agriculture, Vernacular/Construction (473)

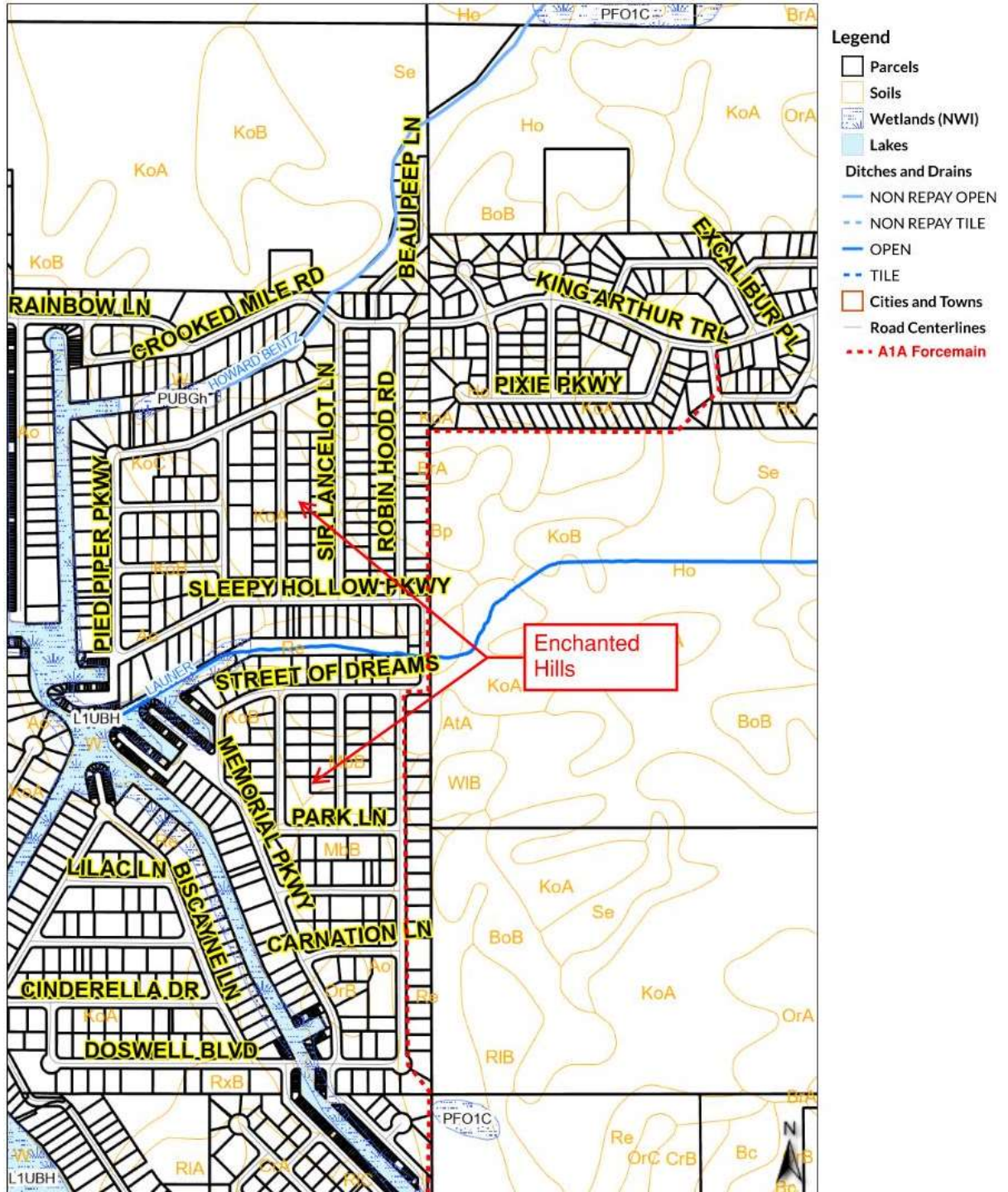
052 C **Mock Cemetery, 875 N;** c.1840-1890; Exploration/Settlement, Religion (473)

053 O **John Strieby Farm, 500 E;** House: log single-pen, c.1850 (John Strieby, builder); Outbuilding: English barn; Agriculture, Exploration/Settlement, Vernacular/Construction (473)

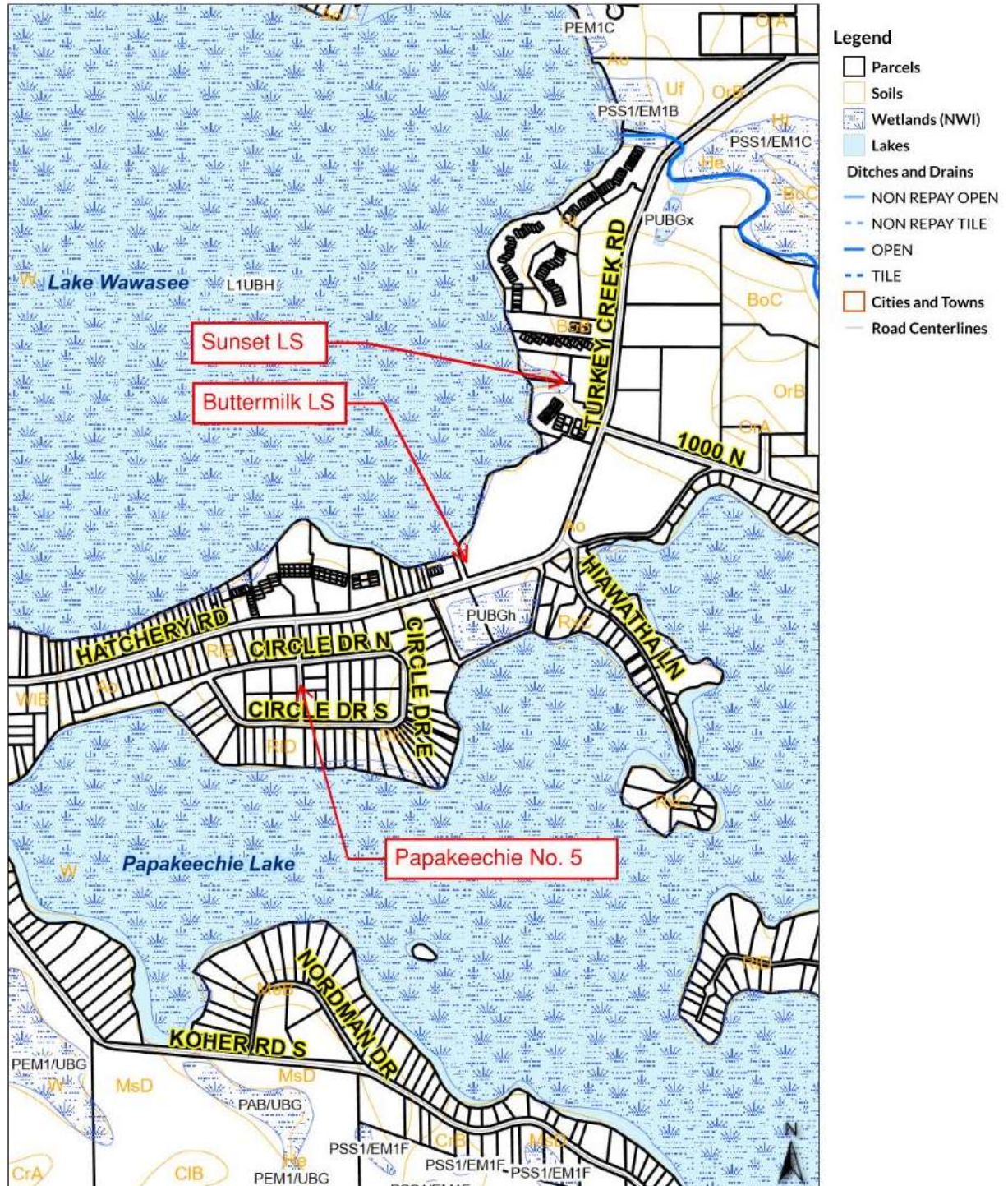
054 C **Jones House, 950 N;** Cottage, 1929 (Ray D. Jones, builder); Entertainment/Recreation, Vernacular/Construction (350)



TCRSD Wetland Enchanted Hills Area



TCRSD Wetland Papakeeche No 5 & LSs Areas



National Flood Hazard Layer FIRMette



85°40'23"W 41°24'34"N



Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS		Without Base Flood Elevation (BFE) Zone A, V, A99
		With BFE or Depth Zone AE, AO, AH, VE, AR
		Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD		0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
		Future Conditions 1% Annual Chance Flood Hazard Zone X
		Area with Reduced Flood Risk due to Levee. See Notes. Zone X
		Area with Flood Risk due to Levee Zone D
OTHER AREAS		NO SCREEN Area of Minimal Flood Hazard Zone X
		Effective LOMRs
		Area of Undetermined Flood Hazard Zone D
GENERAL STRUCTURES		Channel, Culvert, or Storm Sewer
		Levee, Dike, or Floodwall
OTHER FEATURES		20.2 Cross Sections with 1% Annual Chance Water Surface Elevation
		17.5 Coastal Transect
		Base Flood Elevation Line (BFE)
		Limit of Study
		Jurisdiction Boundary
MAP PANELS		Digital Data Available
		No Digital Data Available
		Unmapped

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards.

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 3/4/2024 at 10:26 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmoderized areas cannot be used for regulatory purposes.



Enchanted Hills -North
As Shown

Figure 5.6a
Flood Plain Map

Turkey Creek Regional Sewer District
Comprehensive PER
February 2024

National Flood Hazard Layer FIRMette



85°40'19"W 41°24'19"N



0 250 500 1,000 1,500 2,000 Feet

1:6,000

85°39'42"W 41°23'52"N

Basemap Imagery Source: USGS National Map 2023

Legend

- SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT
- SPECIAL FLOOD HAZARD AREAS**
 - Without Base Flood Elevation (BFE) Zone A, V, A99
 - With BFE or Depth Zone AE, AO, AH, VE, AR
 - Regulatory Floodway
 - OTHER AREAS OF FLOOD HAZARD**
 - 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
 - Future Conditions 1% Annual Chance Flood Hazard Zone X
 - Area with Reduced Flood Risk due to Levee. See Notes, Zone X
 - Area with Flood Risk due to Levee Zone D
 - OTHER AREAS**
 - NO SCREEN Area of Minimal Flood Hazard Zone X
 - Effective LOMRs
 - Area of Undetermined Flood Hazard Zone D
 - GENERAL STRUCTURES**
 - Channel, Culvert, or Storm Sewer
 - Levee, Dike, or Floodwall
 - OTHER FEATURES**
 - Cross Sections with 1% Annual Chance Water Surface Elevation: 20.2, 17.0
 - Coastal Transect
 - Base Flood Elevation Line (BFE)
 - Limit of Study
 - Jurisdiction Boundary
 - Coastal Transect Baseline
 - Profile Baseline
 - Hydrographic Feature
 - MAP PANELS**
 - Digital Data Available
 - No Digital Data Available
 - Unmapped
- The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards.

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Enchanted Hills -South
As Shown

Figure 5.6b
Flood Plain Map

Turkey Creek Regional Sewer District
Comprehensive PER
February 2024

National Flood Hazard Layer FIRMette



85°40'40"W 41°22'44"N



Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

- SPECIAL FLOOD HAZARD AREAS**
 - Without Base Flood Elevation (BFE) Zone A, V, A99
 - With BFE or Depth Zone AE, AO, AH, VE, AR
 - Regulatory Floodway
 - OTHER AREAS OF FLOOD HAZARD**
 - 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
 - Future Conditions 1% Annual Chance Flood Hazard Zone X
 - Area with Reduced Flood Risk due to Levee. See Notes. Zone X
 - Area with Flood Risk due to Levee Zone D
 - OTHER AREAS**
 - NO SCREEN Area of Minimal Flood Hazard Zone X
 - Effective LOMRs
 - Area of Undetermined Flood Hazard Zone D
 - GENERAL STRUCTURES**
 - Channel, Culvert, or Storm Sewer
 - Levee, Dike, or Floodwall
 - OTHER FEATURES**
 - 20.2 Cross Sections with 1% Annual Chance Water Surface Elevation
 - 17.5 Coastal Transect
 - Base Flood Elevation Line (BFE)
 - Limit of Study
 - Jurisdiction Boundary
 - Coastal Transect Baseline
 - Profile Baseline
 - Hydrographic Feature
 - MAP PANELS**
 - Digital Data Available
 - No Digital Data Available
 - Unmapped
- The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

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Papakeechee No 5
& Buttermilk LS Relocation
As Shown

Figure 5.6c
Flood Plain Map

Turkey Creek Regional Sewer District
Comprehensive PER
February 2024