Preliminary Engineering Report

Eastshore - Northshore Sewer Study

Turkey Creek Regional Sewer District

April 2020

Jones & Henry Engineers, Ltd.
2420 Coliseum Blvd. N., Suite 214
Fort Wayne, Indiana

Table of Contents

Appendices

Table VI & VII-Engineers Opinion of Probable Construction Cost - Conceptual

20 Year Present Worth Analysis

Summary Costs of Sewer Alternatives

Energy Efficiency

List of Tables

Table of Figures

1 - Project Location

The study area is in Kosciusko County, Indiana; Lake Wawasee USGS Quadrangle, Turkey Creek Township, Section 9; T34N, R7E, see Figure 1.1, County Location Map and Figure 1.2 District Location Map. The proposed area for this study is east of the Town of Syracuse Indiana, generally surrounding the north and east shorelines of Syracuse Lake and areas adjacent to Boner Lake. The future development (20-year) area includes Eastshore Drive from Cornelius Road, north to the County Line Road and Shore Lane, then east to North Warner Road, see Figure 1.3, Study Area Map.

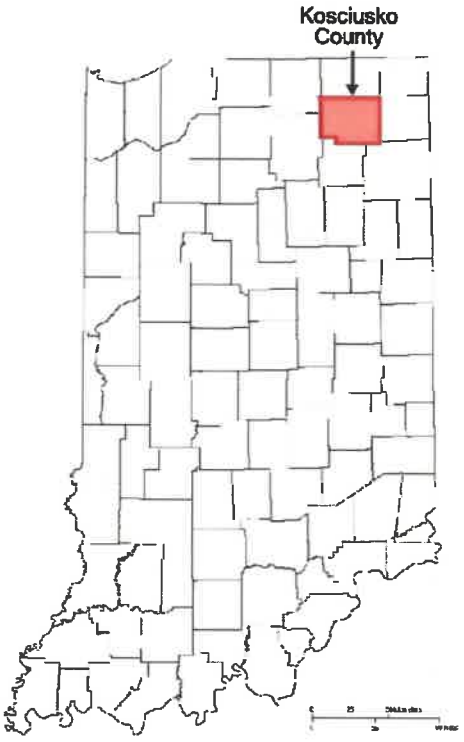


Figure 1.1 – County Location Map

The immediate area for this project is Eastshore Drive from Cornelius Road north to Northshore Drive, then west along Northshore Drive to Shore Drive, see Figure 1.3. A majority of the project will stay in right-of-way, except for potential pump station site(s). Easements may be required to connect the Shore Lane properties. Any properties or easements required for this project will be acquired prior to releasing this project for construction.

The 20-year service study area includes expanding north to County Line Road/1400N and east to East Road/Warner Rd. The area has the potential to be developed as residential in the foreseeable future, with ½ to 1 acre lots, similar to existing developments in the surrounding area. In addition to potential residential development, there exists a private camp and retreat facility adjacent to Boner Lake that may seek approval for an increase in allowable overnight guest capacity. However, the private camp and retreat facility is currently outside of the District's legally defined service area. See Figure 2.1.

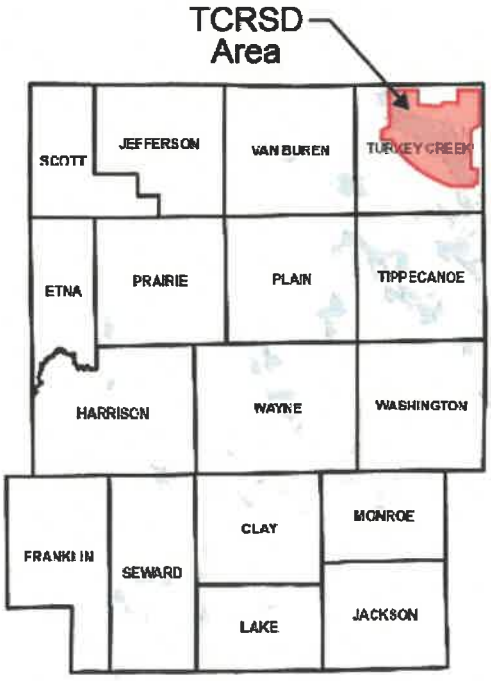


Figure 1.2 – District Location Map

Review of the wastewater treatment plant indicates the plant can accept the additional flows generated from this proposed expansion. The WWTP has undergone two significant improvement projects in the last five years that have provided improved treatment ability. In addition, the TCRSD is continually seeking out and reducing Infiltration & Inflow (I&I) to remove clear water from the collection system. The initial project will convert approximately 183 residential properties from septic systems to the treatment plant.

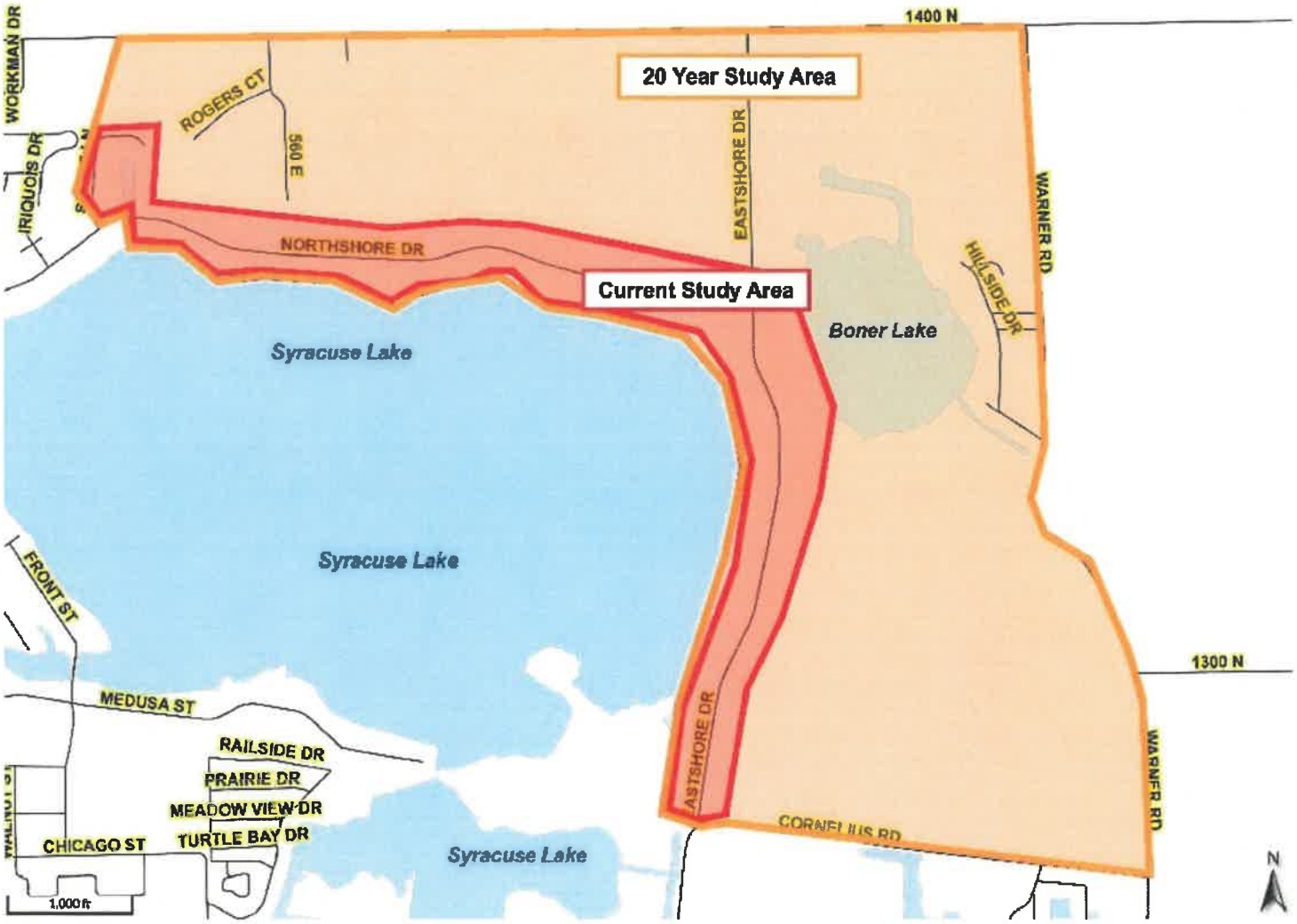


Figure 1.3 – Study Area Map

2 - Current Situation

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 Papakeechie Lake. The District received requests for service for the eastern and northern portion of Syracuse Lake, see Figure 4 District Boundary and Sewer Area Map.

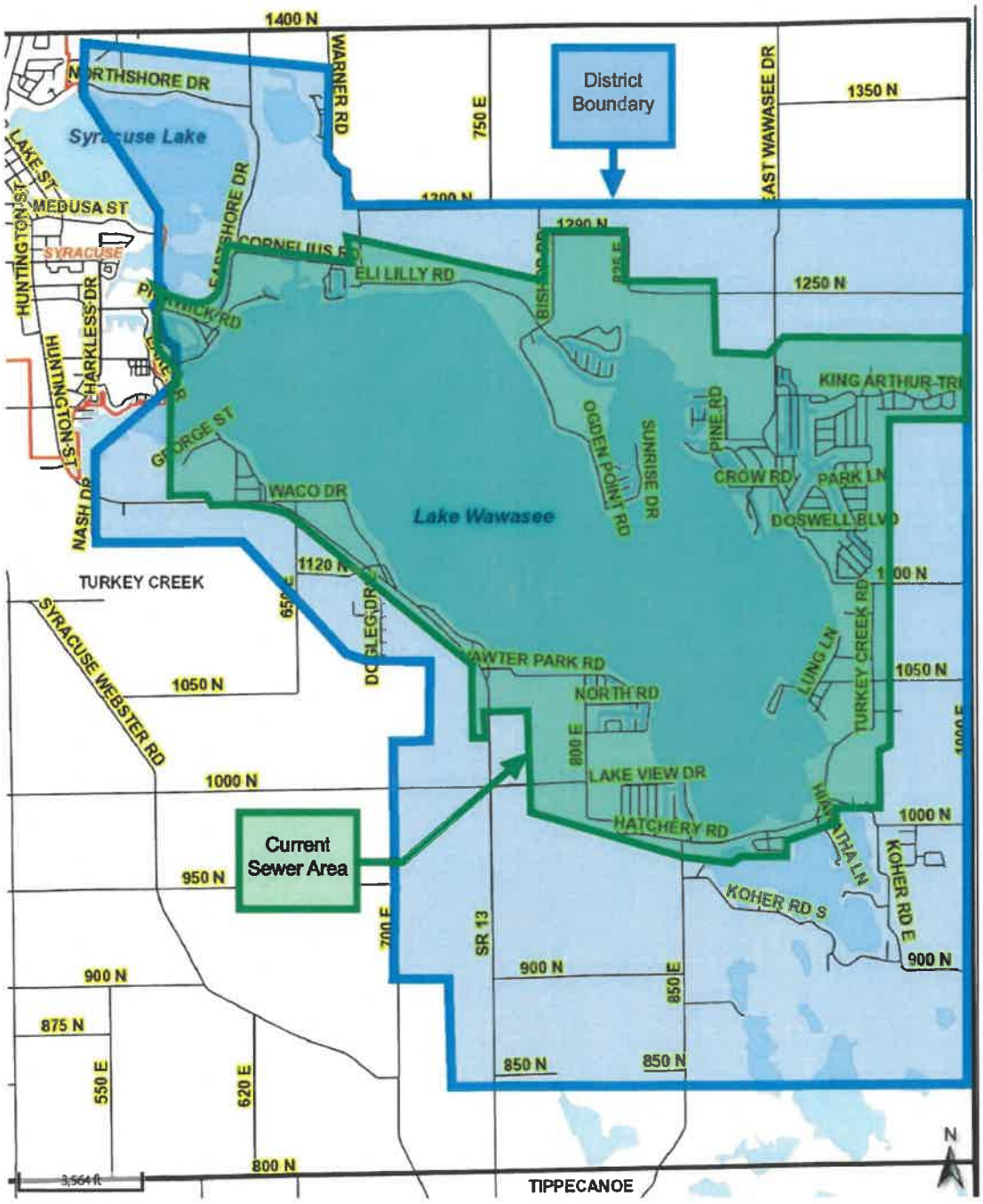


Figure 2.1 – District Boundary and Sewer

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 2,097 sewer use customers. The sewer use customers are predominantly residential, and a significant number are seasonal. The eastern and northern shores of Syracuse Lake has approximately 183 potential residential customers and do not presently have access to sewer service.

The current need for sewers is driven by a number of property owners requesting service to replace failing septic systems. A review of Kosciusko County Health Department Septic Permit records indicates that a majority of the septic systems have reached their service life expectancy and are likely failing.

The TCRSD reviewed septic records provided by the Kosciusko County Health Department. It should be noted that the Kosciusko County Health Department had a fire in the early 1980's that destroyed a significant number of records. In meetings and conversations with Robert C. Weaver, M.A. Administrator and Chief Scientist for the Health Department, he felt that the records and data were very consistent from at least 1984 to the present. As a result, we have 35 years of quality data.

The findings for the Syracuse Lake area are as follows:

Septic System age 10 years or newer: 27

Septic System age 10-20 years: 34

Septic System age 20-30 years: 34

Septic System age 30-35 years: 7

NO Septic System record / Pre 1984 / 35+ years: 102

Over 70%, or 143 of the 204 septic permits on file in this area are 20 years or older. An average expected life for a residential septic system is approximately 20 years. Many variables of design, site and soils, loading, installation and maintenance impact the lifespan of each individual treatment system. The Kosciusko County Health Department allows for residents with an existing septic system that is less than 10 years old, to make 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.

Only 27 of the systems could potentially qualify for the Health Department waiver. The industry accepted standards for septic life acknowledge that without regular maintenance and care, most, if not all systems, would be experiencing some degree of failure. The vast majority of systems would not meet current design and treatment standards. In addition, many systems are likely within 200 feet of Syracuse Lake or within 50 feet of their, or a neighboring well and would be disallowed.

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 Syracuse Lake area.

As a result of both recognized industry standards, and the requests of property owners within the affected area, the TCRSD has a responsibility to install sanitary sewers as mandated by the State of Indiana.

Collection System

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

- 24 pump stations
- Approximately 45,000 ft. of 4 to 10-inch sewers
- Approximately 44,000 ft of 4 to 8-inch force mains

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

If sewer service is requested within the defined district boundary and TCRSD has the ability to reasonably provide sewer service, the TCRSD intends to follow the State mandate to protect the waterways and public health. In the past, these projects have been constructed in phases.

Wastewater Treatment Plant

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 Tea Cup 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. The wastewater plant discharges treated effluent into the Cromwell Ditch. The current WWTP flows and loadings are presented in Section 3 of this report along with the projected flows and loadings.

Figure 2.2
Aerial Photograph of Wastewater Treatment Plant

3 - Future Situation

Collection System

The east and north shorelines of Syracuse Lake are in the District's defined sewer service area. We are proposing to install a sewer system in this area to meet the needs and request of residents. The District is looking at alternative methods of providing sewer service to the area. The alternatives include gravity sewers, low-pressure sewers requiring private grinder pumps, and a vacuum sewer system. Regardless of the selected alternative, a major public pump station will be needed in the general project area to discharge into an existing 6-in. force main. The pump station will pump the flow from the Syracuse Lake area into the existing 6-inch force main located north of the railroad track along Eastshore Drive. From there, the existing collection system will convey the flow to the District's wastewater treatment plant.

Recent projects completed in 2019 include the projected flow from the properties in the Syracuse Lake area. Therefore, no additional improvements in the existing collection system will be needed to serve the new customers in the Syracuse Lake area.

Areas adjacent to Syracuse Lake are, generally speaking, fully developed. The area east of Eastshore Drive has small parcels that could be developed. Areas east of Eastshore Drive to Warner Road and north of Northshore Drive to CR 1400N including Boner Lake have significant development potential. Currently the area has an 18-hole golf course, a lodge with campground for 200 +/- campers and farmland. In total there is approximately 200 acres of developable ground. There is a potential that this could become residential in character with the surrounding area. The existing lot sizes not on lake front are between ½ to 1 acre. In total the area could have an additional 270 EDUs. It should be noted that only a percentage of the golf course & campground property is currently located within the existing district boundary.

Wastewater Treatment Plant

The wastewater treatment plant has a design capacity of 0.37 mgd. Flow projections from the existing and proposed service areas are listed in the following table. The flow projections are based on the District's current ratios of average to maximum day and peak hour flows. We are including the flow and loading projections for the District's entire service area in the 20-year planning period for the wastewater plant.

We have added 10% to the overall projections to allow for growth. However, in reviewing the monthly operating reports for the past 10 years, there has been very little growth in the District's flow.

No table of figures entries found.				
	Average		Estimated Peak	EDU
Area	Avg. Day (mgd)	Max. Day (mgd)	Hourly Flow (mgd)	(2,097)
WWTP (MROs)	0.288	0.940	1.547	2097
NE Syracuse Lake	0.028	0.087	0.146	183
Subtotal =	0.317	1.027	1.693	2280
10% =	0.032	0.103	0.169	229
Total =	0.349	1.130	1.862	2523

The additional loading to the WWTP is used to evaluate the need for any necessary improvements at the WWTP. We have reviewed the District's past monthly reports of operation "MROs" and the laboratory test data for the District's discharge. As identified earlier, there has been very little growth of the Districts flows. We believe the District's ongoing Collections 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 3.2
Projected Loadings for the TCRSD WWTP

Note; Projected Flows & Loadings include 10% for Growth	**Projected Flows (MGD)**	**Concentration @ Flow Designated**			
		BOD5 (mg/L)	**TSS (mg/L)**	**NH3-N (mg/L)**	**P (mg/L)**
Annual Average	0.34	134.7	75.4	29.7	3.6
Maximum Month	0.64	143.4	53.8	22.4	2.6
Maximum Week	0.87	147.2	37.0	15.7	1.4
Maximum Day	1.13	126.5	39.7	16.6	2.9
Peak Hourly	1.90	---	---	---	---
Avg. Monthly Summer (4 mo.)	0.37	150.9	65.9	25.0	3.0

	Projected Flows (MGD)	**Loading @ Flow Designated**			
		BOD5 (lbs./day)	TSS (lbs./day)	NH3-N (lbs./day)	P (lbs./day)
Annual Average	0.34	380.1	212.8	83.8	10.1
Maximum Month	0.64	767.3	287.6	119.8	13.8
Maximum Week	0.87	1070.1	269.3	113.9	10.2
Maximum Day	1.13	1377.9	433.1	181.1	31.8
Peak Hourly	1.90	---	---	---	---
Avg. Monthly Summer (4 mo.)	0.37	387.4	169.1	64.1	9.5

The flow projections and the projected loadings to the wastewater plant are within the design parameters of the existing wastewater treatment plant. No additional improvements to the WWTP are anticipated due to the addition of new customers in the Syracuse Lake area.

4- Evaluation of Alternatives

The District wanted to evaluate three primary types of collection system alternatives for the study area. The alternative systems are gravity sewers, low-pressure sewers, and vacuum collection systems. 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 might have an additional cost to design and install such a system.

There are approximately 183 properties in the initial project area. The approximate length of the project is 10,000 linear feet, measured along the road right-of-way and easements, if required. Property owners are expected to bring their private sewers to road right-of-way or easement. No cost has been added to acquire easements or property for items, such as individual private grinder pump stations, vacuum pits or piping, associated with the private sewer laterals. All systems require a large public pump station to discharge into the District's existing 6-inch force main north of the railroad tracks along Eastshore Drive.

Each sewer alternative evaluated has different attributes that should be considered in the evaluation. For instance, the low-pressure sewer system has private grinder pumps that have a limited life expectancy, uses electricity and has periodic maintenance that must be considered. Whereas a gravity sewer system usually has a higher initial capital cost but has a longer life expectancy with less maintenance. A vacuum sewer system has vacuum pumps and valve pits that need to also be considered in the evaluation. The typical method of comparing and evaluating different alternatives is to determine the 20-year present worth of the alternative. The 20-year present worth of each alternative is part of this evaluation. The present worth includes the estimated property owners' cost to install each alternative. Normally the lowest present worth cost is the better alternative unless extenuating circumstances exist.

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 Northshore and Eastshore Drive, the District reviewed the formation documents as mandated by the State of Indiana, as well as Kosciusko County Health Department records.

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.
4) The District reviewed septic records provided by the County Health Department. Robert C. Weaver, M. A. Administrator and chief scientist for the health department said the county records and data were very consistent from at least 1984 to the present as a result, we have 35 years of quality data.

The findings, as of 2019, were as follows:

Septic systems age 10 years or newer: 33
Septic system age 10 to 20 years: 29
Septic systems age 20 to 30 years: 33
Septic systems age 30 to 35 years: 7
Septic with no existing septic record or prior to 1984: 70+

The majority of septic systems surrounding Syracuse Lake are quite old and do not meet current design requirements for an adequate and safe septic system.

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.

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

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 areas of Northshore and Eastshore Drive, of Syracuse Lake.

"No Action" is not a viable alternative.

Collection System 1 - Gravity Sewers

A gravity sewer system works off the earth's gravitational force and a downward slope to function. Piping for this system is typically larger diameter, to maintain minimum velocities of 2-feet second to keep solids in suspension. The smallest pipe size is 8-inch. The pipe elevation can get deep depending upon existing topography and the need to maintain a minimum slope. Eventually, when the pipe elevation becomes prohibitively deep, a pump station is required to lift the flow to a higher elevation. The process then begins again. A gravity sewer along Eastshore Drive can extend southward without a pump station. From the intersection of Northshore and Eastshore Drives there is an overall downward slope to the railroad tracks. The depth of the sewer is manageable, no more then 8-foot deep. However, Northshore to Shore Drive has several peaks and valleys which would create a sewer

Figure 4.1 – Gravity

prohibitively deep to be feasible. Therefore, small pump stations are needed to maintain the sewer at a reasonable depth. In addition to a main pump station required north of the railroad tracks along Eastshore to force flow into the District's existing 6-inch force main, four additional smaller pump stations will be required to make this possible.

With this sewer alternative, the property owner could potentially extend a gravity sewer lateral from the home to the gravity sewer in the road right of way. If the home has an existing grinder pump, the pump could also be used to pump into the gravity sewer in the road right of way.

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

Table 4.1 Gravity Costs	
Estimated Project Cost	$2,672,000
Estimated Homeowner's Cost	$10,200
Estimated 20 year Present Worth of this Alternative	$2,312,613

Collection System 2 - Low-Pressure Sewers

A low-pressure sewer system requires the mains to be under constant pressure. This system is not dependent on ground contours or gravity to work. The system is operated by individual grinder pumps. Every property owner will have a small grinder pump station for their property. The individual grinder pumps will force sewage into the collection system and ultimately to the treatment plant. Piping for this system is smaller, mains can be as small as 2-inch. The system depth should be below the known frost line and would typically be installed at a 60-inch depth. There is a limit to how far the individual grinder pumps can pump flow so a main pump station will be required for this option. The location of this pump station would best be near the intersection of Northshore and Eastshore Drive.

Figure 4.2 – Low-Pressure

The pressures required to discharge into the new low-pressure sewer system will be higher than most typical septic system grinder pumps can provide. Therefore, a new or additional private grinder pump station would be required for each property. The property owner will need to purchase and install the new grinder pump station on their property. This would be connected to their homeowners electrical service. In older properties the electrical panel may need to be upgraded to a larger service panel. The private grinder pump station must be extended to the public force main in the road right of way via lateral force main.

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

Table 4.2 Low Pressure Costs	
Estimated Project Costs	$1,838,000
Estimated Homeowner's Cost	$16,200
Estimated 20 year Present Worth of this Alternative	$3,223,138

Collection System 3 - Vacuum Sewers

A vacuum sewer system requires the mains to be under vacuum. This system is not dependent on ground contours or gravity to work. Small holding pits will be placed throughout the system to collect sewage from properties. When a predetermined level in the holding pit is achieved a valve will open and the sewage is drawn by vacuum into the main. The sewage is collected in a tank at a primary vacuum pump station. From the tank the sewage is pumped through a force main to the District's existing 6-inch force main. Piping for this system is smaller than for gravity sewers, it can be as small as 3-inches. Its depth should be maintained below the freezing depth of the area. There is a limit to how far and high a vacuum sewer system will draw the wastewater. Pumping equipment is then required to pump the sewage into the Districts collection system. The location of this station would best be centrally located near the intersection of Eastshore and Northshore Drive.

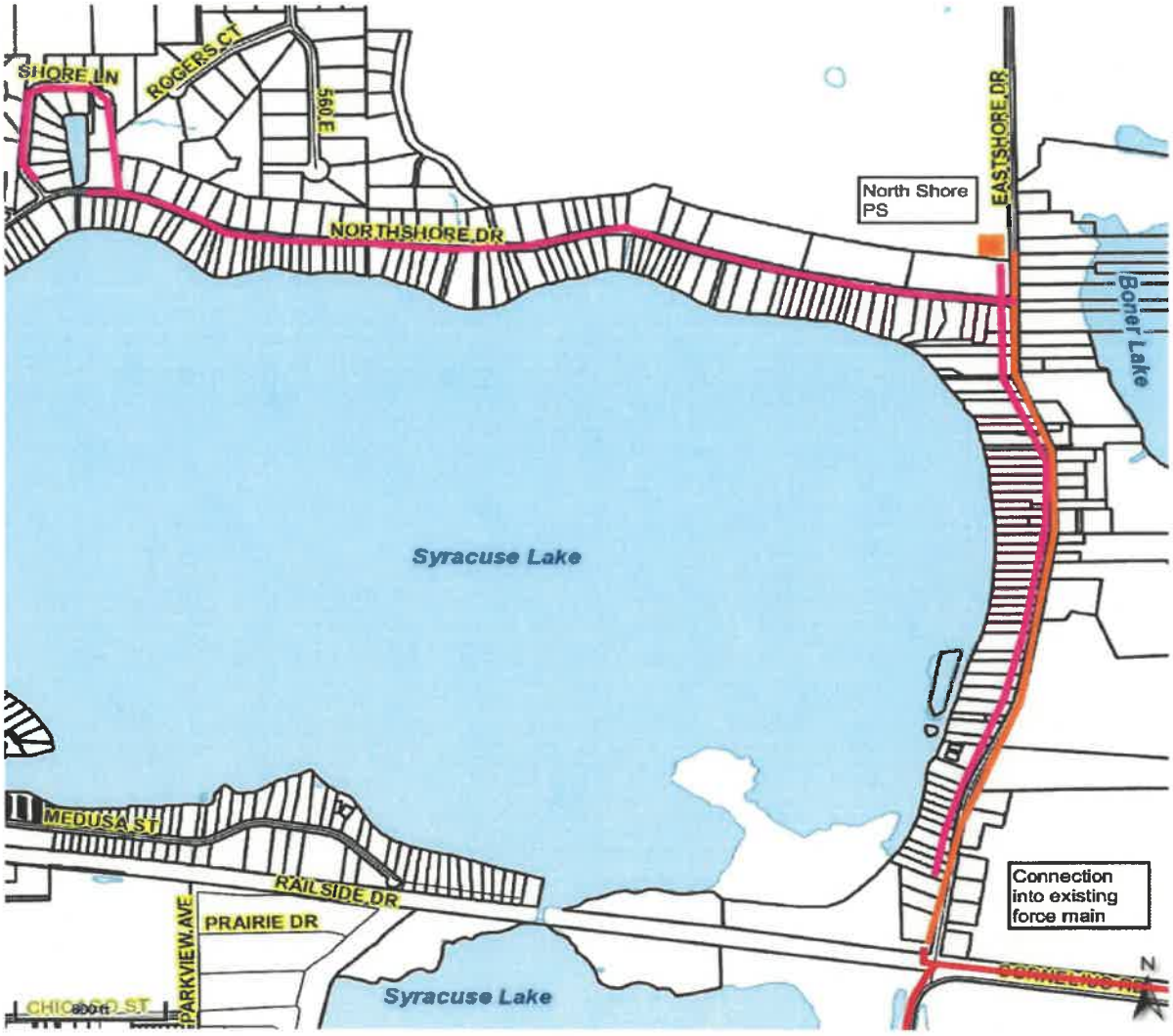


Figure 4.3 – Vacuum System

In this alternative, we assumed the vacuum valve manholes will be located in the road right of way and the property owner will discharge into the vacuum valve manholes either by gravity or with existing residential grinder pumps. We also assumed that 2-3 properties could discharge into a single vacuum valve manhole. The property owner would still have the cost of extending their sewer pipe to the vacuum valve manholes.

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

Table 4.3 Vacuum Costs	
Estimated Project Costs	$3,082,000
Estimated Homeowner's Cost	$10,200
Estimated 20 year Present Worth of this Alternative	$3,669,458

Summary of Alternatives

In conclusion the following table shows the total cost for each collection system. We are then showing the Districts & the property owner's cost for each system. The property owner's cost includes the District's availability charge of $2,500 & capital charge of $3,300 and any work required such as lateral piping, grinder pump (Low-pressure system), and restoration cost. Each system was then evaluated on a 20-year present worth basis.

Table 4.4
Summary Costs of Sewer Alternatives
Eastshore-Northshore Sewer System

	Gravity Sewers	LP Sewers	Vacuum Sewers
Project Costs, TCRSD	$2,672,000	$1,838,000	$3,082,000
Average Cost per Homeowner with Availability Charge	$10,200	$16,200	$10,200
20 Year Present Worth	$2,312,613	$3,223,138	$3,669,458

A cost and effectiveness analysis was completed and meets the minimum requirements of the Water Resources Reform and Development Act of 2014. The following is an estimate of power consumption including both the public and private power usage for each alternative.

Table 4.5
Energy Efficiency
Eastshore-Northshore Sewer System

Alternative	Est. Annual Power Consumption	Rank
Gravity Sewer System	$4,800	1
Low Pressure Sewer System	$8,900	3
Vacuum Sewer System	$5,600	2

Numerous factors are involved with the selection of the preferred alternative. These factors include criteria in addition to monetary considerations. The following Project Selection Matrix was developed as an aid in determining the selected alternative.

Table 4.6 Eastshore-Northshore Sewer System									
Project Alternatives (1= poor, 5= good)	Monetary	Technical	Reliability	Implementability	Environmental	Maintenance	Future Growth	Total Score	Comments
No Action	0	0	0	0	0	0	0	0	Does not meet State Mandate or the needs of the property owners.
Gravity Sewer System	4	5	5	3	3	4	5	29	Uses less power & is more reliable, greater I/I
Low Pressure Sewer System	3	4	3	5	4	2	3	24	Less impact from construction, least I/I
Vacuum Sewer System	2	2	2	4	2	3	3	18	Lower I/I

Matrix Criteria:

- Monetary; The alternatives are ranked in conformance with their 20 yr. present worth evaluation.
- Technical; The alternatives are ranked in conformance with their level of mechanical or hydraulic complexity. The more mechanical parts or hydraulic concerns, the lower the score.
- Reliability; The higher the potential for failure, the lower the score.
- Implementability; The higher the construction impacts the lower the score.
- Environmental; Score is based on combined impacts from an environmental viewpoint including water quality, air emissions, noise and issues in Section 5 of this report.
- Maintenance: The less maintenance or service calls the higher the score.
- Future Growth; The easier to add potential growth the higher the score.
- Total Score: The alternative with the highest score is perceived as the better alternative.

Based on the criteria presented in the preceding sections, gravity sewers appear to be the preferred alternative for providing sewer service to the Study Area.

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. There is a historic marker, item 003 in the report, in the area where work will be taking place. 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. There appears to be small pockets of wetlands along the Eastshore Drive right of way. Any necessary dewater 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

Syracuse Lake is 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 to 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 to Prime Farmlands or local geology.
An email was sent to this department for clarification.

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.

6 - Selected Plan

Gravity Sewer Alternative

The District has reviewed the following alternatives: gravity, low-pressure (grinder pumps) and vacuum sewer collection system for northeast area of Syracuse Lake. The topography, soil conditions and ground water table make all three viable options for the area. The District considered other factors to determine the best option for the District long term. Items to consider are 20-year present worth, hydraulic concerns, reliability, construction impacts, environmental, maintenance and growth. The gravity system is the best option from the matrix, followed closely by the low-pressure system.

The District has selected the gravity sewer alternative for this project. The District has also received feedback from stakeholders expressing concern over the cost, longevity and maintenance requirements for a grinder pump system. The total Project Cost for the selected alternative is $2,672,000. A detailed cost estimate for this alternative is presented in the Appendix of this report.

Figure 6.1 – Gravity System

Sustainable Infrastructure/ Green Project Reserve

Following is a brief summary of the Sustainable Infrastructure / Green Project Reserve Components of the proposed projects for the TCRSD.

.

The GPR Projects identified below all fall under Sec 212 projects and follow the guiding principles for SI / GI components and the principles guiding CWSRF funding eligibility.

The Projects to be addressed are in the following categories:

- Energy Efficiency
- Climate & Extreme Weather Resiliency

Energy Efficiency, Category III.

1. Premium Efficient Pump Motors
   a. We intend to specify that the motors used on all equipment shall be Premium Efficiency in accordance with IE3 levels and NEMA Standards. The total estimated cost of Premium Efficient Motors is $12,000. This project qualifies as a Category IV Energy Efficient Project.

   b. The following Table 6.1 indicates the Energy Efficient Motors that we anticipate for the proposed project. The Table illustrates how the approximate savings of $1,500. per year was calculated. This savings results in an NPV of $23,000 based on n=20 years & i= 2.6%.

Table 6.1
Motor Efficiencies

Item	Equipment	Qty	Calc. IE1 hp	Prop. IE3 hp	% Run Time	$/kWh	IE1 Power Costs	IE3 Power Costs	Annual Savings ($)
A	North Shore Pump Station Pump Motors	8	2.36	2	22%	$0.080	$2,171	$1,840	$331
B	Primary Pump Station Pump Motors	2	35.40	30	20%	$0.080	$7,400	$6,271	$1,129
								Total Annual Savings =	$1,460

2. SCADA System
   The project will have five remote pump stations. Each pump station will have a Supervisory Control and Data Acquisition (SCADA) system. We plan to daisy chain the pump stations along North Shore Drive to the primary pump station at the southern end of East Shore Drive. Our estimate of cost includes $60,000 for a SCADA system however, $20,000 of this amount is for telemetry and remote monitoring.

The SCADA system will start & stop the pumps in each station and allow remote monitoring of operations and alarm issues. Remote monitoring will allow the operator to be notified of alarm issues and enable them to make better response decisions. On average the District has 2-3 alarms per pump station per year. An average cost to respond to the alarms (not including repairs) is estimated at $400 per event. This project entails five pump stations and assuming the remote monitoring capabilities of SCADA saves the District one response per year per pump station, the District will have the ability to save $2,000 per. This savings results in a NPV of $31,000.

3. Variable Frequency Drives for Pump Motors
   The primary pump station will have two pumps with a individual variable frequency drive (VFD) units. We included a cost $5,000 for the two VFDs in the SCADA cost estimate. VFDs are used to reduce start/stop cycles of the pumps and therefore increase the life expectancy of the pumps.

   A typical life expectancy of submersible pumps is 15 to 20 years. We estimate VFDs will increase the life expectancy to 20 to 25 years. The submersible pumps (2) have an estimated cost of $7,500/each. The savings in annual depreciation costs for the extended life expectancy results in a NPV of approximately $1,000.

Climate Resiliency, Category V.

1. Fiberglass Wet Well Basins
   Submersible pump stations typically have precast concrete basins serving as wet wells. Wet wells normally have a bituminous coating on the interior surface to inhibit corrosion from hydrogen sulfide. All of the District's pump stations are constructed in this manner. The life expectancy of concrete wet wells is normally assumed to be 50 years. However, the District has concrete wet wells that have deteriorated in 30 years or less. The District has refurbished the concrete wet wells by pressure washing, replacing the cement lost and recoating the structure. Rehabilitation of a wet wells cost is approximately $10,000 to $20,000 and extends the life of the structure another 10-15 years with each application.

   The four pump stations along North Shore Drive are relatively small. We are planning to use prefabricated fiberglass wet wells for each of these four pump stations. Fiberglass is non-corrosive to hydrogen sulfides. The life expectancy in this environment is 100 years or more. The concrete basins (5-6 ft. dia.) versus a fiberglass basin for these pump stations are comparable and are estimated to be $11,300/each.

   The benefit of extending the life expectancy of the wet wells (4) from 50 years to 100 years has a NPV of $27,000 based on the reduced cost of annual depreciation.

2. Polyurethane Coating of Primary Pump Station Wet Well
   The primary pump station at the southern end of East Shore Drive will be a 10-ft. dia. Concrete wet well basin. Typically, a concrete pump station will have a bituminous coating on the interior

surface to inhibit corrosion by hydrogen sulfides. In lieu of a bituminous coating we plan to coat the interior surface with a polyurethane coating.

The District as had issues with the bituminous coating delaminating from the concrete surface thereby resulting in premature corrosion of the interior concrete surfaces. The cost to rehabilitate the interior concrete surface is estimated to be $20,000 and extends the life of the structure another 15 years with each application.

The cost of a polyurethane coating is estimated to be $15,000. The benefit of extending the life expectancy of the wet well from 50 years to 100 years has a NPV of $18,000 based on the reduced cost of annual depreciation

Green Project Reserve Summary

Table 6.1 Sustainable Infrastructure & Green Project Reserve, Turkey Creek Regional Sewer District Total Loan Amount = $2,672,000				
Category	**Project**	**NPV Estimated Savings**	**Savings/Total Loan**	**Comments**
III	Energy Efficiency, Premium Efficient Motors	$1,460	0.05%	NPVs are based on 2.6% interest and annual payments for the estimated life expectancies indicated in the narratives.
III	Energy Efficiency, SCADA System	$31,000	1.16%	
III	Energy Efficiency, VFDs	$1,000	0.04%	
V	Climate Resiliency, Fiberglass Basins	$27,000	1.01%	
V	Climate Resiliency, Polyurethane Coating	$18,000	0.67%	
	Total Savings	$78,460	2.94%	

Project Schedule

The Project Schedule is highly dependent on financing of the project. A user rate study is being prepared by the District's rate consultant. Assuming the financing is as anticipated the project, schedule is presented in the following.

Table 6.2
Anticipated Project Schedule

Work Element	Schedule Time
PER review & approval	April 2020 to November 2020
Design of project	August 2020 to December 2020
Permit Applications	January 2021 to April 2021
Bid	May 2021
Closing with IFA	June 2021
Construction	July 2021 to April 2022
Startup of system	May 2022

7 - Legal, Financial & Managerial Capabilities

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.

8- 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

ATTACHMENTS

ATTACHMENTS

A. Authorized Representative *Model*
B. PER Acceptance *Model*
C. WW GPR Checklist

Tables

I. EXISTING WW FLOWS OF SEWERED & UNSEWERED COMMUNITIES *MODEL*
II. CURRENT TREATMENT PLANT OPERATION *MODEL*
III. EST. INFLUENT STRENGTH & LOADINGS *MODEL*
IV. DESIGN TREATMENT PLANT FLOWS *MODEL*
V. DESIGN TREATMENT PLANT LOADINGS *MODEL*
VI. EST. CONSTRUCTION COSTS of the SELECTED ALTERNATIVE *MODEL*
VII. SELECTED PLAN COST SUMMARY *MODEL*
VIII. SRF PROJECT FINANCING INFORMATION *MODEL*

Certifications

1. Fiscal Sustainability Plan Self-Certification Form
2. Fiscal Sustainability Plan Certification Form
3. Cost & Effectiveness Certification Form
4. Asset Management Certification Form

A.

MODEL AUTHORIZED REPRESENTATIVE RESOLUTION

WHEREAS, the (PARTICIPANT) of Turkey Creek RSD **, Indiana, herein called** TCRSD **, has plans for a municipal water pollution control project to meet State and Federal regulations, such as the NPDES discharge limitations, and the community intends to proceed with the construction of such works:**

WHEREAS, the (PARTICIPANT) has adopted this Resolution dated _____.

NOW, THEREFORE, BE IT RESOLVED by the Council/Board, the governing body of said TCRSD **, that:**

1. _____ **be authorized to make application for an SRF Loan and provide the State Revolving Fund Loan Program such information, data and documents pertaining to the loan process, including but not limited to all loan closing documents such as the financial assistance agreement, bond specimen, etc. as may be required, and otherwise act as the authorized signatory of the community.**

2. **The community agrees to comply with all requirements of the Indiana Finance Authority, the State of Indiana and all Federal requirements as they pertain to the SRF Loan Program.**

3. **That two copies of the resolution be prepared and submitted as part of the community's Preliminary Engineering Report.**

ADOPTED this _____ **day of** _____**, 20**___.

THE (PARTICIPANT) OF TCRSD **, INDIANA**
BY AND THROUGH ITS COUNCIL/BOARD OF TRUSTEES

AUTHORIZED SIGNATORY

_____ **BY:** _____

_____ _____

ATTEST: _____

B.
MODEL PER ACCEPTANCE RESOLUTION

WHEREAS, the (PARTICIPANT) of TCRSD **County, Indiana, has caused a Preliminary Engineering Report, PER, dated** _____**, to be prepared by the consulting firm of** Jones & Henry Engrs. **; and**

WHEREAS, said PER has been presented to the public at a public hearing held _____**, for their comments; and**

WHEREAS, the (PARTICIPANT's) Board/Council finds that there was not sufficient evidence presented in objection to the recommended project in the Preliminary Engineering Report.

NOW, THEREFORE BE IT RESOLVED THAT:

The _____ **Preliminary Engineering Report dated** _____ **be approved and adopted by the (PARTICIPANT's)Board/Council; and**
That said PER be submitted to the State Revolving Fund Loan Program for review and approval.

Passed and adopted by the (PARTICIPANT's) Board/Council this _____ **day of** _____**, at their regularly scheduled meeting.**

_____
President/Mayor

_____
Member

_____
Member

_____
Member

Attest:_____

C.

Clean Water GPR Checklist, July 1, 2010, Revised October 23, 2015

STATE REVOLVING FUND LOAN PROGRAM
GREEN PROJECT RESERVE SUSTAINABILITY INCENTIVE
CLEAN WATER CHECKLIST

SRF Loan Program Participant Information

Participant Name: Turkey Creek Regional Sewer District

Project Name/Location: East Shore-North Shore Sewer Project

Date: April 10, 2020 Revision No. _____

Instructions

This checklist shall be completed by the SRF Loan Program participant and be updated as the project changes from concept to design through construction completion. For instance, a checklist should be submitted with:

1. The SRF Loan Program Application,
2. The Preliminary Engineering Report, along with GPR project description and cost estimates,
3. The Post-Bid Documents, including GPR construction costs, and
4. Construction completion.

Please see the *U.S. EPA Green Project Reserve Guidance* available at www.srf.in.gov for a detailed review of eligibility, definition of the GPR categories; examples of ineligible projects; categorical projects and those that require business cases. **All GPR projects, components and activities must be eligible for SRF funding.**

Check all that apply to the project:

I. GREEN INFRASTRUCTURE

1. Categorical Projects

- ☐ Implementation of green streets (combinations of green infrastructure practices in transportation rights-of-way), for either new development, redevelopment or retrofits including:
  - ☐ Permeable pavement,
  - ☐ Bioretention,
  - ☐ Trees,
  - ☐ Green roofs, and
  - ☐ Other practices such as constructed wetlands that can be designed to mimic natural hydrology and reduce effective imperviousness at one or more scales, and
  - ☐ Vactor trucks and other capital equipment necessary to maintain green infrastructure projects.
- ☐ Wet weather management systems for parking areas including:
  - ☐ Permeable pavement,
  - ☐ Bioretention,
  - ☐ Trees,
  - ☐ Green roofs, and
  - ☐ Other practices such as constructed wetlands that can be designed to mimic natural hydrology and reduce effective imperviousness at one or more scales.

- ☐ Vactor trucks and other capital equipment necessary to maintain green infrastructure projects.
- ☐ Implementation of comprehensive street tree or urban forestry programs, including expansion of tree boxes to manage additional stormwater and enhance tree health.
- ☐ Stormwater harvesting and reuse projects, such as cisterns and the systems that allow for utilization of harvested stormwater, including pipes to distribute stormwater for reuse.
- ☐ Downspout disconnection to remove stormwater from
  - ☐ Sanitary,
  - ☐ Combined sewers, and
  - ☐ Separate storm sewers and manage runoff onsite.
- ☐ Comprehensive retrofit programs designed to keep wet weather discharges out of all types of sewer systems using green infrastructure technologies and approaches such as:
  - ☐ Green roofs,
  - ☐ Green walls,
  - ☐ Trees and urban reforestation,
  - ☐ Permeable pavements
  - ☐ Bioretention cells, and
  - ☐ Turf removal and replacement with native vegetation or trees that improve permeability.
- ☐ Establishment or restoration of:
  - ☐ Permanent riparian buffers,
  - ☐ Floodplains,
  - ☐ Wetlands (federal rules prevent the SRF Loan Programs from providing financing assistance for a wetland required as a mitigation measure)
  - ☐ Vegetated buffers or soft bioengineered stream banks
  - ☐ Stream day lighting that removes natural streams from artificial pipes and restores a natural stream morphology that is capable of accommodating a range of hydrologic conditions while also providing biological integrity.
- ☐ Projects that involve the management of wetlands to improve water quality and/or support green infrastructure efforts (e.g., flood attenuation).
  - ☐ Includes constructed wetlands.
  - ☐ May include natural or restored wetlands if the wetland and its multiple functions are not degraded and all permit requirements are met.
- ☐ The water quality portion of projects that employ development and redevelopment practices that preserve or restore site hydrologic processes through sustainable landscaping and site design.
- ☐ Fee simple purchase of land or easements on land that has a direct benefit to water quality, such as riparian and wetland protection or restoration.

2. Decision Criteria for Business Cases
  - ☐ Green infrastructure projects that are designed to mimic the natural hydrologic conditions of the site or watershed.
  - ☐ Projects that capture, treat, infiltrate, or evapotranspire water on the parcels where it falls and does not result in interbasin transfers of water.
  - ☐ GPR project is in lieu of or to supplement municipal hard/gray infrastructure.
  - ☐ Other - Please provide an attachment explaining the scope of the project and brief explanation of the approach for the business case.

3. Example of Project Requiring a Business Case
  - ☐ Fencing to keep livestock out of streams and stream buffers. Fencing must allow buffer vegetation to grow undisturbed and be placed a sufficient distance from the riparian edge for the buffer to function as a filter for sediment, nutrients and other pollutants.

II. WATER EFFICIENCY

1. Categorical Projects
   - ☐ Installing or retrofitting water efficient devices, such as plumbing fixtures and appliances.
     - ☐ For example, shower heads, toilets, urinals and other plumbing devices.
     - ☐ Implementation of incentive programs to conserve water such as rebates.
     - ☐ Water sense labeled products.
   - ☐ Installing any type of water meter in previously unmetered areas, if rate structures are based on metered use
     - ☐ Can include backflow prevention devices if installed in conjunction with water meter.
   - ☐ Replacing existing broken/malfunctioning water meters, or upgrading existing meters, with:
     - ☐ Automatic meter reading systems (AMR), for example:
       - ☐ Advanced metering infrastructure (AMI),
       - ☐ Smart meters,
       - ☐ Meters with built in leak detection,
     - ☐ Can include backflow prevention devices if installed in conjunction with water meter replacement.
   - ☐ Retrofitting/adding AMR capabilities or leak detection equipment to existing meters (not replacing the meter itself).
   - ☐ Water audit and water conservation plans, which are reasonably expected to result in a capital project.
   - ☐ Recycling and water reuse projects that replace potable sources with non-potable sources:
     - ☐ Gray water, condensate and wastewater effluent reuse systems (where local codes allow the practice),
     - ☐ Extra treatment costs and distribution pipes associated with water reuse.
   - ☐ Retrofit or replacement of existing landscape irrigation systems to more efficient landscape irrigation systems, including moisture and rain sensing controllers.
   - ☐ Retrofit or replacement of existing agricultural irrigation systems to more efficient agricultural irrigation systems.

2. Decision Criteria for Business Cases
   - ☐ Water efficiency can be accomplished through water saving elements or reducing water consumption. This will reduce the amount of water taken out of rivers, lakes, streams, groundwater, or from other sources.
   - ☐ Water efficiency projects should deliver equal or better services with less net water use as compared to traditional or standard technologies and practices.
   - ☐ Efficient water use often has the added benefit of reducing the amount of energy required by a POTW, since less water would need to be collected and treated; therefore, there are also energy and financial savings.
   - ☐ Other - Please provide and attachment explaining the scope of the project and brief explanation of the approach for the business case.

3. Example Projects Requiring a Business Case
   - ☐ Water meter replacement with traditional water meters.
   - ☐ Projects that result from a water audit or water conservation plan.
   - ☐ Storage tank replacement/rehabilitation to reduce loss of reclaimed water.
   - ☐ New water efficient landscape irrigation system.
   - ☐ New water efficient agricultural irrigation system.

III. ENERGY EFFICIENCY

1. Categorical Projects
   - ☐ Renewable energy projects such as wind, solar, geothermal, micro-hydroelectric, and biogas combined heat and power systems that provide power to a POTW. Micro-hydroelectric projects involve capturing the energy from pipe flow.
     - ☐ POTW owned renewable energy projects can be located onsite or offsite.
     - ☐ Include the portion of a publicly owned renewable energy project that POTW's energy needs.
     - ☐ Must feed into grid system that the utility draws from and/or there is a direction connection.
   - ☐ POTW energy management planning, including energy assessments, energy audits, optimization studies, and sub-metering of individual processes to determine high energy use areas, which are reasonably expected to result in a capital project are eligible.
   - ☐ Projects that achieve a 20% reduction in energy consumption are categorically eligible for GPR. If a project achieves less than a 20% reduction in energy efficiency, then it may be justified using a business case.
   - ☐ Collection system Infiltration/Inflow detection equipment.

2. Decision Criteria for Business Cases
   - ☐ Project must be cost effective. An evaluation must identify energy savings and payback on capital and operation and maintenance costs that does not exceed the useful life of the asset.
   - ☒ The business case must describe how the project maximizes energy saving opportunities for the POTW or unit process.
   - ☐ Using existing tools such as Energy Star's Portfolio Manager (http://www.energystar.gov/index.cfm?c=evaluate_performance.bus_portfoliomanager) or Check Up Program for Small Systems (CUPSS) (http://www.epa/cupss) to document current energy usage and track anticipated savings.
   - ☐ Other - Please provide and attachment explaining the scope of the project and brief explanation of the approach for the business case.

3. Examples of Projects Requiring a Business Case
   - ☐ POTW projects or unit process projects that achieve less than a 20% energy efficiency improvement may be justified using a business case.
   - ☐ Projects implementing recommendations from an energy audit that are not otherwise designated as categorical.
   - ☐ Projects that cost effectively eliminate pumps or pumping stations.
   - ☐ Infiltration/Inflow (I/I) correction projects that save energy from pumping and reduced treatment costs and are cost effective.
     - ☐ Projects that count toward GPR cannot build new structural capacity. These projects may, however, recover existing capacity by reducing flow from I/I.
   - ☐ I/I correction projects where excessive groundwater infiltration is contaminating the influent requiring otherwise unnecessary treatment processes (i.e. arsenic laden groundwater) and I/I correction is cost effective.
   - ☐ Replacing pre-Energy Policy Act of 1992 motors with National Electric Manufacturers Association (NEMA) premium energy efficiency motors.
     - ☒ NEMA is a standards setting association for the electrical manufacturing industry (http://www.nema.org/gov/energy/efficiency/premium/).
   - ☐ Upgrade of POTW lighting to energy efficient sources (such as metal halide pulse start technologies, compact fluorescent, light emitting diode (LED)).
   - ☒ SCADA systems can be justified based upon substantial energy savings.
   - ☒ Variable Frequency Drive can be justified based upon substantial energy savings.

IV. ENVIRONMENTALLY INNOVATIVE

1. Categorical Projects
   - ☐ Total/integrated water resources management planning likely to result in a capital project.
   - ☐ Utility Sustainability Plan consistent with EPA's SRF sustainability policy.
   - ☐ Greenhouse gas (GHG) inventory or mitigation plan and submission of a GHG inventory to a registry (such as Climate Leaders or Climate Registry).
   - ☐ Planning activities by a POTW to prepare for adaptation to the long-term effects of climate change and/or extreme weather.
   - ☐ Construction of US Building Council LEED certified buildings or renovation of an existing building on POTW facilities.
   - ☐ Decentralized wastewater treatment solutions to existing deficient or failing onsite wastewater systems.

2. Decision Criteria for Business Cases
   - ☐ Technology or approach whose performance is expected to address water quality but the actual performance has not been demonstrated in the state;
   - ☐ Technology or approach that is not widely used in the state, but does perform as well or better than conventional technology/approaches at lower cost; or
   - ☐ Conventional technology or approaches that are used in a new application in the state.
   - ☐ Other - Please provide and attachment explaining the scope of the project and brief explanation of the approach for the business case.

3. Examples of Projects Requiring a Business Case
   - ☐ Constructed wetlands projects used for municipal wastewater treatment, polishing, and/or effluent disposal.
     - ☐ Natural wetlands.
     - ☐ Project may not further degrade.
   - ☐ Projects or components of projects that result from total/integrated water resource management planning consistent with the decision criteria for environmentally innovative projects and that are Clean Water SRF eligible.
   - ☐ Projects that facilitate adaptation of POTWs to climate change identified by a carbon footprint assessment or climate adaptation study.
   - ☐ POTW upgrades or retrofits that remove phosphorus for beneficial use, such as biofuel production with algae.
   - ☐ Application of innovative treatment technologies or systems that improve environmental conditions and are consistent with the Decision Criteria for environmentally innovative projects such as:
     - ☐ Projects that significantly reduce or eliminate the use of chemicals in wastewater treatment.
     - ☐ Treatment technologies or approaches that significantly reduce the volume of residuals, minimize the generation of residuals, or lower the amount of chemicals in the residuals.
       - ☐ Includes composting, Class A and other sustainable biosolids management approaches.
   - ☐ Educational activities and demonstration projects for water or energy efficiency.
   - ☐ Projects that achieve the goals/objectives of utility asset management plans.
   - ☐ Sub-surface land application of effluent and other means for ground water recharge, such as spray irrigation and overland flow.
     - ☐ Spray irrigation and overland flow of effluent is not eligible for GPR where there is no other cost effective alternative.

V. CLIMATE AND EXTREME WEATHER RESILIENCY

1. Categorical Projects – none at this time.

2. Decision Criteria for Business Cases

- ☐ Utility functions and performance can be disrupted by climate change/extreme weather events.
  - ☐ Flooding
  - ☐ Drought
  - ☐ Tornado
  - ☐ Lightning strikes
  - ☐ Earthquake
- ☐ Incorporate project elements that provide flexibility to adapt operations and functionality as external conditions change over time.
- ☒ Project components designed to perform beyond the minimum Building Code or Design Standards.
- ☐ Utilize climate resiliency and adaptation strategies when siting or routing key project structures or components.
- ☐ Ability to modify or expand proposed facilities based on future climate change issues.
- ☐ Other - Please provide and attachment explaining the scope of the project and brief explanation of any aspects in the planning, construction or operation phase that support the approach for the business case.

3. Examples of Projects Requiring a Business Case

- ☐ Utilizing natural, native and drought resistant planted elements that are economically replaced at project sites for storm water control or landscaping.
- ☐ Siting new structures away from flash flood areas or poor structural soils in former waterway areas.
- ☐ Consideration of finished floor elevation above the 100 year flood elevation or normal code requirements.
- ☐ Increasing structural, roof (snow) or wind loadings beyond code requirements for new structures.
- ☐ Incorporate passive cooling systems for instrumentation, control or power panel rooms subject to high heat conditions.

TABLE I

MODEL FOR EXISTING WASTEWATER FLOWS (in gallons per day) OF SEWERED AND UNSEWERED COMMUNITIES

Existing Treatment Facilities Design Flows (for Sewered Communities only)

Average Design Flow (gpd) 370,000 Peak Design Flow (gpd) 1,500,000 max. day

Domestic[1] (D)	250,000	Peak DCI (Total DCI X Peaking Factor)[4]	1,547,000
Commercial/ Institutional[1] (C)	18,000	Peak Hourly Inflow &/or Wet Weather Infiltration[5]	1,547,000
Industrial[1] (I)	0	**Peak Hourly Flow**	1,547,000
Total DCI	268,000		
Peak Sustained Infiltration[2]	20,000		
TOTAL EXISTING FLOW[3]	288,000		

1. DCI flows must be based upon actual water use records where possible. Flows may be estimated by one of the following methods:
   a) Billing records for the most recent 24 months (less 10-20 % consumption) are to be used whenever available;
   b) When billing records are unavailable, pumped water volumes (less 20-40 % consumption and losses) for the most recent 12 months are to be used;
   c) In communities (or portions thereof) without a water supply system, use 310 gpd/connection or 100 gpcpd.
2. Based on I/I analysis reviewing the most recent MRO's (24 months) during a high groundwater non-rainfall day period (preferably 7-14 consecutive days) and taking the average followed by subtracting the average DCI (sewered communities only). For unsewered communities, infiltration could be based on 200 gpidm (Conventional Gravity Sewers).
3. Total DCI + Peak Sustained Infiltration
4. System Peaking Factor (check which applies)
   a) Measured from hourly flow data X (the preferred method for existing conventional gravity sewers)
   b) i. Estimated from 10-States Standards ____ (Conventional Gravity Only)
      ii. Estimated from other source (list) _____
5. Sewered Communities only.

Yes or NA	
Yes	1. Flow meter calibrated
Yes	2. Flows appear accurate
N/A	3. Based on subtracting the dry weather peak flows from the influent peak flow including all bypassed flows. If this information is not available verify if the peak hourly flow can be determined based on flow data obtained from the influent pumping station(s).

The customer base for TCRSD is a predominately seasonal recreational community. Thereby the summer/holiday flows are significantly higher.

TABLE II

MODEL FOR CURRENT TREATMENT PLANT OPERATION

	Concentration mg/l	Daily Load lbs
INFLUENT		
CBOD5	117	281.0
TSS	95	228.2
NH3-N	37.7	90.6
P	3.7	8.9
Other		
EFFLUENT		
CBOD5	4.3	10.3
TSS	5.7	13.7
NH3-N	0.19	0.45
P	0.4	1.0
Total Residual Cl	N/A	
DO	8.9	
Other		

page # or NA

No — Above values are derived from the 24 most recent consecutive MROs &/or DMRs

dates of MROs: 2019

dates of DMRs:

Note; Prior to June 2019 approximately 610 customers discharged wastewater to the Town of Syracuse's wastewater collection system. TCRSD completed the improvements necessary to divert flow from these customers to the TCRSD wastewater treatment plant.

TABLE III Not Applicable

MODEL FOR ESTIMATED INFLUENT STRENGTH & LOADINGS
UNSEWERED COMMUNITIES

Conventional Gravity, Pressure, Vacuum Sewers

	Concentration (mg/l)			Daily Load (lb)		
	D	C	I	D	C	I
$CBOD_5$	_____/	_____/	_____/	_____/	_____/	_____/
TSS	_____/	_____/	_____/	_____/	_____/	_____/
NH_3-N	_____/	_____/	_____/	_____/	_____/	_____/
P	_____/	_____/	_____/	_____/	_____/	_____/

Source(s) of Data:

Domestic (**D**) _____

Commercial/Institutional (**C**) _____

Industrial (**I**) _____

TABLE IV

MODEL FOR DESIGN TREATMENT PLANT FLOWS (gpd or mgd)

Domestic (**D**)	305,000 gpd
Commercial/ Institutional (**C**)	20,000
Industrial (**I**)	0
Total DCI	325,000
+ Residual Infiltration	24,000
AVG. DESIGN FLOW	349,000
Peak DCI	1,838,000 (**peaking factor =** 5.3)
Residual Infiltration	24,000
Residual Peak Hourly Inflow &/or Wet Weather Infiltration	24,000
PEAK DESIGN FLOW	1,862,000 (peak hourly flow)

TABLE V

MODEL FOR DESIGN TREATMENT PLANT LOADINGS

	Concentration (mg/l)	Daily Load (lb)
INFLUENT		
CBOD5	117	340.5
TSS	95	276.5
NH3-N	37.7	109.7
P	3.7	10.8
Other		

TABLE VI

ESTIMATED CONSTRUCTION COSTS OF THE SELECTED ALTERNATIVE *MODEL*

Alternative: Gravity Sewers, (See Cost Estimate in Appendix)

Item	Quantity	Unit Cost	Total Cost
1)			
2)			
3)			
4)			
5)			
6)			
7)			
8)			
9)			
10)			

Total Construction Cost $1,972,000

TABLE VII

MODEL SELECTED PLAN COST SUMMARY

Item	Total Cost
Non-Construction Costs	
Administrative and Legal	$59,000
* Land & Rights-of-way Acquisition	40,000 (easements)
Relocation	0
Engineering Fees Design	197,000
Construction Services	99,000
Other	0
Project Inspection	108,000
Costs Related to Plant Start-up	0
Non-Construction Subtotal	503,000
Construction and Equipment Subtotal	1,972,000
Contingencies (not to exceed 10%)	197,000
TOTAL PROJECT COST	$2,672,000

* Ineligible for SRF unless it represents administrative costs to acquire easements and/or land. Land may be eligible if it is an integral part of the treatment process.

TABLE VIII

SRF PROJECT FINANCING INFORMATION

(Wastewater)

1. Project Cost Summary

a.	Collection/transport system cost	$1,972,000
b.	Treatment System cost	0
c.	Non-Point-Source (NPS) cost (septic tank removal)	0
	Subtotal Construction Cost	1,972,000
d.	Capacity Reservation Fees	0
e.	Contingencies (should not exceed 10% of construction cost)	197,000
f.	Non-construction Cost	503,000

e.g., engineering/design services, field exploration studies, project management & construction inspection, legal & administrative services, land costs (including capitalized costs of leased lands, ROWs, & easements), start-up costs (e.g., O&M manual, operator training).

g.	**Total Project Cost** (lines a+b+c+d+e+f)	2,672,000
h.	Total ineligible SRF costs* (see next page)	0

Total ineligible SRF costs will not be covered by the SRF loan.

i. Other funding sources (list other grant/loan sources & amounts)

(1) Local Funds (hook-on fees, connection fees, capacity fees, etc.) 0

(2) Cash on hand 0

(3) Community Development Block Grant - Community Focus Fund (CFF) 0

(4) US Dept. of Agriculture Rural Development (RD) 0

(5) Other 0

Total Other Funding Sources 0

2. **SRF Loan Amount** (line g minus line item h+i*) $2,672,000

* If there are adequate funds available under (i) to cover (h) then subtract (i) only.

3. Financial Advisor

a. Firm Baker Tilly

b. Name John Julien

c. Phone Number 574-935-5178

4. Bond Counsel

a. Firm unknown at this time

b. Name

c. Phone Number

The following costs are *not eligible* for SRF reimbursement:

1. Land cost (*unless it's for sludge application*) $ 0 (easements proposed)
   Only the actual cost of the land is **not eligible**; associated costs (such as attorney's fees, site title opinion and the like) **are eligible**.

2. Materials & work done on private property $ 0
   (*Installation/repair of laterals, including disconnection of inflow into laterals; abandonment of on-site systems [septic tank or mound systems]).* Grinder pumps, vacuum stations and other appurtenances/installations on private property to treat/transport ARE fundable IF owned and maintained by the participant.

3. Grant applications and income surveys done for other agencies (e.g., OCRA, RUS, etc.)
   $ 0

4. Any project solely designed to promote economic development and growth is ineligible.

5. Costs incurred for preparing NPDES permit applications and other tasks unrelated to the SRF project.
   $ 0

6. Cleaning of equipment, such as digesters, sand filters, grit tanks and settling tanks. These items should have been maintained through routine operation, maintenance and replacement by the political subdivision. Sewer cleaning is **ineligible** for SRF *unless* the cleaning is required for sewer rehabilitation such as sliplining and cured in place piping (CIPP)
   $ 0

PRELIMINARY ENGINEERING REPORT
Wastewater Treatment Plant Design Summary

I. GENERAL

1. Applicant's Name: Turkey Creek Regional Sewer District

2. Project Name: East Shore-North Shore Sewer Extension

3. Location: Kosciusko County, Turkey Creek Township

4. Engineer (Consultant): Jones & Henry Engineers, Ltd.

5. NPDES Permit Number: IN0045802

   A. Date of final Permit Issuance: June 1, 2018

   B. Expiration Date: May 31, 2023

6. Remarks: *

   A. Description of Present Situation:

   The residents around the northern and eastern side of Syracuse Lake do not presently have access to public sewers. Some of the residents in this area have requested sewer service of the Sewer District. This area of Syracuse Lake is within the District's sewer service area.

   B. Description of Proposed Facilities:

   The District is planning to install gravity sewers along East Shore & North Shore Drives to provide sewer service to these residents. The system will include 5 submersible pump stations.

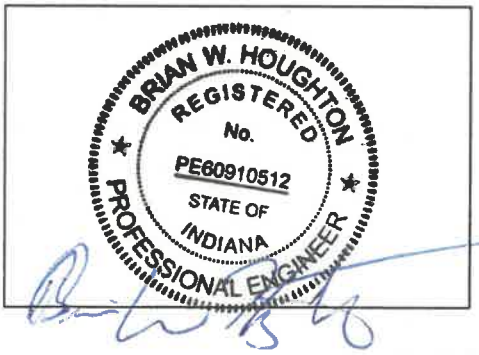
C. Inspection During Construction to be provided by:
The District & the Engineer as needed.

7. Estimated Project Cost: $2,672,000

   A. Source of Funding (Revenue Bond, State Grant,SRF, Etc.): SRF Funds

   B. Total Cost: $2,672,000

8. Certification Seal and Signature of Engineer:



II. DESIGN DATA: *

1. Current Population: 2,097 EDU (customers)
2. Design Year and Population: 2040, 2,600 EDU (customers)
3. Design Population Equivalent P.E.: 8,351 capita (based on WWTP capacity & 3.1 cap./EDU)
4. Design Flow: 370,000 gpd

   A. Domestic: 87%

   B. Industrial/Commercial: 6%

C. Infiltration/Inflow: Est. 7%

5. Average Design Peak Flow: 1.5 mgd max. day

6. Maximum Plant Flow Capacity: 1.86 peak hourly flow

7. Design Waste Strength:

   A. CBOD: 117 mg/L

   B. TSS: 95 mg/L

   C. NH_3-N: 37.7 mg/L

   D. P: 3.7 mg/L

   E. Other:*

8. NPDES Permit Limitation on Effluent Quality: *

   A. CBOD: 25 mg/L mo. avg., 40 mg/L weekly avg.

   B. TSS: 30 mg/L monthly, 45 mg/L weekly

   C. NH_3-N: 1.1 monthly, 2.5 max. day

   D. P: 1.0 mg/L

   E. E-coli: 125 mo. avg., 235 max. day

   F. Chlorine Residual: n/a

   G. pH: 6-9 s.U.

   H. D.O.: 5.0 min.

9. Receiving Stream:

   A. Name: Cromwell Ditch

   B. Tributary to: Meyer Ditch to Solomon Creek

   C. Stream Uses: full body contact, recreational use

D. 7-day, 1-in-10 year low flow: 0.0 cfs

III. TREATMENT UNITS

Plant Site Lift Station

1. Location: Headworks at WWTP
2. Type of pump: submersible
3. Number of pumps: six pumps
4. Constant or variable speed: variable speed
5. Capacity of pumps: 310 gpm individually, 1.8 mgd with 5 pumps
6. RPM and TDH: 1800 rpm, max. 66-ft TDH
7. Volume of the wet well: 25,000 gal.
8. Detention time in the wet well: 1.6 hrs @ Design Flow
9. A gate valve and a check valve in the discharge line: yes
10. A gate valve on suction line: n/a
11. Ventilation: n/a
12. Standby power: yes
13. Alarm: yes
14. Breakwater tank: n/a
15. Bypass or overflow: no

Flow Equalization

1. Number and size of units: n/a
2. Method of flow diversion to unit: *
3. Air and mixing provided: *

4. Method and control of flow return: *
5. Description of unit operation: *
6. Lagoon sealing: *
7. Method of sludge removal: *

Flow Meters

1. Type: parshall flume
2. Location: influent channel
3. Indicating, recording and totalizing: yes

Grit Chamber

1. Type of grit chamber: four foot dia. vortex teacup units
2. Number of units: two
3. Size of unit: 4-ft. dia
4. Method of velocity (aeration) control: n/a
5. Velocity (aeration) in the chamber: n/a
6. Drain provided: yes
7. Flow restrictions: no
8. Facilities to isolate: yes

Comminutors

1. Type: n/a
2. Location: *
3. Maximum capacity: *
4. By-pass (over flow) bar screen: *

Screens

1. Type: inclined rotary screen
2. Number and capacity: one @ 2.6 mgd
3. Bar spacing and slope: 0.25-in. perforated openings
4. Method of cleaning: automatic rake
5. Disposal of screenings: hopper then to landfill

Primary Settling

1. Type of clarifier: n/a
2. Number and size of units: *
3. Surface settling rate (gpd/sf)
   a. at the design flow: *
   b. at the influent pumping rate: *
   c. at the equalized flow rate: *
4. Detention time: (hrs): *
5. Type of sludge removal mechanism: *
6. Weir overflow rate: *
7. Disposition of scum: *
8. Location of overflow weir: *
9. Facilities to isolate: *

Activated Sludge

1. Type of activated sludge process: See Oxidation Ditch
2. Number and size of units: *
3. Detention time (hrs): *
4. Organic loading (lb BOD/1000 cf): *
5. Type of aeration equipment: *
6. Type and size of blowers: *
7. Air required (itemize, cfm): *
8. Provisions of speed adjustment: *
9. Air provided: *

10. Ventilation in the blower room: *
11. Number and capacity of return sludge pump: *
12. Method of return sludge rate control: *
13. Return sludge rate as % of design flow: *
14. Provisions for return rate metering: *
15. Location of return sludge discharge: *
16. Facilities to isolate units: *
17. Facilities for flow split control: *

Oxidation Ditch

1. Number and size of units: Two oval ditches @ 172,000 gal./each
2. Detention time (hrs): 22.3 hrs @ design flow
3. Organic loading (lb BOD /1000 cf): 7.9 lbs CBOD/1000 cf
4. Type and efficiency of aeration equipment (lb 0 /HP-hr): four brush aerators
5. Oxygen required: 91 lbs O_2/hr
6. Oxygen provided: 180 lbs O_2/hr
7. Flow velocity in ditch: 2 fps min.
8. Number and capacity of return sludge pump: four pumps @ total .6 mgd
9. Method of return sludge rate control: flow paced based on influent flow
10. Return sludge rate as % of design flow: 50 to 150% of design flow
11. Provisions for return sludge metering: yes, four individual mag meters
12. Location of return sludge discharge: influent of oxidation ditches
13. Facilities to isolate units: yes

14. Facilities for flow split control: yes

Trickling Filters

1. Number and size of units: n/a
2. Type of media: *
3. Hydraulic loading (gpm/cf): *
4. Organic loading (lb BOD /1000 cf): *
5. Recirculation: *
6. Ventilation: *

Rotating Biological Contactor

1. Size and number of units: n/a
2. Type of media: *
3. Detention time (min.): *
4. Organic loading (lb BOD /1000 sf): *
5. Hydraulic loading (gpd/sf): *
6. Method of shaft drive: *
7. Supplemental air: *
8. Facilities to isolate: *
9. Facilities for flow split control: *

Sequential Batch Reactors

1. Type of Activated Sludge Process: n/a
2. Number and Size of Units

3. Detention Time (Hours):

   a. Low water level:

   b. High water level:

   c. Total cycle:

4. Organic Loading (lb BOD/1000cf)

   a. At low water level

   b. At high water level

5. Type of aeration equipment: *

6. Type and size of blowers: *

7. Air required (itemize, cfm): *

8. Provisions of speed adjustment: *

9. Air provided: *

10. Ventilation in the blower room: *

11. Number and capacity of waste sludge pump: *

12. Decanter rated at average flow (GPM):
    at peak flow (GPM):

13. Facilities to isolate units: *

14. Facilities for flow split control: *

Lagoons

1. Type of lagoons n/a

2. Number and size of lagoons *

3. Organic loading *

4. Type of aeration equipment (if applicable): *

5. Type and size of blowers (if applicable): *

6. Air required (if applicable): *

7. Air provided (if applicable): *

8. Controlled discharge facilities: *

9. Maximum water level: *

10. Freeboard: *

11. Soil boring data and permeability date: *

12. Slope of embankment and top width: *

13. Fence: *

14. Detention time: *

15. Stream gage: *

16. Lagoon seal: *

17. Facilities for multi-level lagoon discharge: *

18. Scum control: *

Secondary Clarifier

1. Type of clarifiers: center feed, perimeter overflow

2. Number and size of units: two @ 25-ft. dia. & two @ 35-ft. dia.

3. Surface settling rate (gpd/sf):

   a. at the design flow: 127 gpdpsf

   b. at the influent pumping rate: 640 gpdpsf

   c. at the equalized flow rate: n/a

4. Detention time (hrs): 17 hrs @ .37 mgd & 4.2 hrs @ 1.5 mgd

5. Type of sludge removal mechanism: collector blades
6. Weir overflow rate: 981 gpdpf @ .37 mgd & 4,936 gpdpf @ 1.5 mgd
7. Disposal of scum: gravity to raw pump station
8. Facilities for unit isolation: yes
9. Facilities for flow split control: yes

Rapid Sand Filtration

1. Number and size of filters: n/a
2. Filtration rate: *
   a. at peak flow rate: *
   b. at average flow rate: *
3. Type, depth, and gram size of filter media: *
4. Backwash rate: *
5. Air scour
6. Capability to chlorinate ahead of the filter: *
7. Backwash pumps (number and capacity): *
8. Method of rate control: *
9. Source of capacity of backwash water:
10. Holding capacity or dirty water tank: *
11. Facilities for unit isolation: *

Micro-strainers

1. Number and size of strainers: n/a
2. Screen material: *
3. Filtration rate: *

4. Backwash rate: *

5. Number and capacity of backwash pumps: *

6. Facilities for unit isolation: *

7. Slime control provisions: *

Two-day Lagoon

1. Number and size of lagoon cells: n/a

2. Detention time (days): *

3. Type of chemical: *

4. Location of chemical injection: *

5. Number and size of chemical feed pumps: *

6. Rate adjustment capabilities: *

7. Capacity of chemical storage tank: *

8. Capacity of spill storage space: *

9. Expected daily use of chemical (dosage and solution): *

10. Lagoon seal: *

11. Parallel or series operation: *

12. Sludge removal facilities: *

13. Method of draining: *

14. Multi-level discharge: *

15. Scum control: *

Post-aeration

1. Type of aeration: cascade aeration
2. Number of units: one
3. Size of units: 2-ft. dia.
4. Aeration provided: unknown but sufficient
5. Expected effluent DO: 6.0 or more

Nitrification System

1. Type of nitrification system: n/a
2. Ammonia loading: *
3. Additional oxygen demand: *
4. Air supply system: *
5. Hydraulic detention time: *
6. Mean cell residence time (days): *

Phosphorus Removal Facilities

1. Type of chemical to be used: ferric chloride
2. Location of chemical injection: influent flow splitting chamber to oxidation ditches
3. Number and size of chemical feed pumps: Two PD pumps
4. Size of chemical; storage tank: two 3,000 gal. FRP tanks
5. Capacity of spill storage space: 10,000 gal.
6. Chemical dosage: 1.5 gph
7. Daily chemical consumption expected: 36 gpd
8. Rapid mix tank: n/a
9. Slow mixing equipment: n/a
10. Other facilities - describe: *

Disinfection

1. Type of disinfectant used: n/a
2. Size of contact tank: *
3. Contact time: *
4. Type of disinfectant feeders: *
5. Capacity of the feeders: *
6. Disinfectant dosage: *
7. Scum control baffle: *
8. Source of the disinfectant feed water: *
9. Breakwater tank for the feed water: *
10. Bypass: *
11. Drain for tank: *
12. Ventilation in chlorine room: *
13. Safety equipment: *

De-Chlorination

1. Chemical used: n/a
2. Type of feeders: *
3. Capacity of feeders: *
4. Dosage: *
5. Type of diffuser: *
6. Diffuser location: *
7. Equipment location: *

8. Ventilation provided: *
9. Safety equipment: *

UV Disinfection

1. Type: horizontal UV bulbs
2. Location: effluent channel
3. Size of channel: 22-in. wide
4. Contact time: 6.15 sec @1.5 mgd
5. Dosage: 38,717 μW sec/cm2
6. Bypass: yes
7. Safety Equipment: yes
8. Cleaning Equipment: automatic
9. Intensity Monitoring: yes

Sludge Thickening

1. Number and size of thickeners: n/a, decanting from digesters
2. Type of sludge thickeners: *
3. Hydraulic loading: *
4. Solids loading: *
5. Provisions to chlorinate: *

Anaerobic Digesters

1. Number and size of units: n/a
2. Total volume: *
3. Organic loading: *

4. Hydraulic detention time: *
5. Volume per capita: *
6. Type of mixing: *
7. Heating: internal or external

Aerobic Digesters

1. Number and size of units: two tanks @ 79,600 gal/each
2. Detention time: 16 days
3. Organic loading: *
4. Air supply: *
5. Decanting method: *

Wet-Oxidation

1. Number of units: n/a
2. Type of heat treatment: *
3. Temperature and pressure to be used: *
4. Capacity of the unit: *
5. Daily sludge production for heat treatment: *

Sludge Drying Beds

1. Number and size of drying beds: five beds @ 55-ft x 20-ft./each
2. Filter area per capita: 0.6 sf/capita
3. Under-drain system: yes
4. Discharge location of filtrate: raw pump station
5. Accessibility of dry sludge removal equipment: yes, equipment owned by District

Mechanical Dewatering

1. Type of dewatering units: n/a
2. Number and size of dewatering units: *
3. Capacity of dewatering units: *
4. Daily solids production for dewatering: *
5. Type of chemicals to be used: *

Sludge Disposal

1. Ultimate disposal method of sludge: land applied
2. Expected solids content of sludge (by the principal method of disposal): ~25-30 ppm
3. Location of disposal site: multiple farm sites
4. Ownership of the disposal site: District & private farm land
5. Availability of sludge transport equipment: District owned equipment

IV. SEWER COLLECTION SYSTEM

Lift Stations; The District owns & operates 24 submersible pump stations within their collection system.

1. Location: *
2. Type of pump: submersible
3. Number of pumps: two pumps per pump station
4. Constant or variable speed: the larger pumps are variabvle speed and the smaller pumps are constant speed.
5. Capacity of pumps: varies
6. RPM and TDH: varies
7. Volume of the wet well: varies
8. Detention time in the wet well: varies

9. A gate valve and a check valve in the discharge line: yes
10. A gate valve on suction line: n/a
11. Ventilation: n/a
12. Standby power: yes
13. Alarm: yes
14. Breakwater tanks: n/a
15. Bypass or overflow: no
16. Type of force main: varies
17. Diameter and length of force main: varies

Sewer

1. Type of sewer material: varies
2. Diameter and length of sewer (indicate length for each size): varies
3. Stream, highway, and railroad crossing: multiple crossings
4. Separation of combined sewer or new sewer: n/a
5. Number of manholes: unknown
6. Water main protection: yes

Individual Grinder Pumps

1. Location: n/a
2. Number of pumps: n/a
3. Capacity of pumps: n/a
4. RPM and TDH: n/a
5. Volume of the wet well: n/a

6. A gate valve and a check valve in the discharge line: n/a

7. Ventilation: n/a

8. Alarm: n/a

V. MISCELLANEOUS

A. Laboratory equipment: as needed to perform typical lab analysis in house

B. Safety equipment: as required

C. Plant site fence: yes

D. Handrail for the tanks: yes

E. Units, unit operation, and plant bypasses: *

F. Flood elevation (10, 25, or 100 year flood): not detemined

G. Provisions to maintain the same degree of treatment during construction: yes

H. Standby power: yes

I. Site inspection: yes

J. Statement in the specifications as to the protection against any adverse environmental effect (e.g., dust, noise, soil erosion) during construction: yes

K. Hoists for removing heavy equipment: yes

L. Adequate sampling facilities: yes

M. Hydraulic Gradient: yes

N. Septage receiving facilities

1. Screening: yes

2. Location of discharge: manhole up stream of WWTP

Fiscal Sustainability Plan Self –Certification Form

(Pursuant to Section 603(d)(1)(E)(ii) of the Federal Water Pollution Control Act)
(To be submitted prior to Participant's Wastewater Loan Closing)

Participant Name		
Turkey Creek Regional Sewer District		
Street Address 4852 N. 1200 W		P. O. Box Number
City Cromwell	State Indiana	Zip Code 46732

Section 603(d)(1)(E) of the Federal Water Pollution Control Act (FWPCA) requires a recipient of a loan for a project that involves the repair, replacement or expansion of a publically owned treatment works to develop and implement a Fiscal Sustainability Plan (FSP). The requirement pertains to those portions of the treatment works paid for with Clean Water SRF Loan Funds. The FSP must include the following minimum requirements as set forth in Section 603(d)(1)(E)(i): (I) an inventory of critical assets that are a part of the treatment works; (II) an evaluation of the condition and performance of inventoried assets or asset groupings; (III) a certification that the recipient has evaluated and will be implementing water and energy conservation efforts as part of the plan; and (IV) a plan for maintaining, repairing, and as necessary, replacing the treatment works and a plan for funding such activities; or per Section 603(d)(1)(E)(ii) certify that the recipient has developed and implemented a plan that meets the requirements above.

I certify that I am an authorized representative for the above listed Participant. I hereby certify pursuant to Section 603(d)(1)(E)(ii) that the Participant has developed an FSP that meets the above minimum requirements and the FSP is being implemented and will be updated as necessary. I further certify that the Participant has evaluated and will be implementing water and energy conservation efforts as part of the FSP. Upon the request of the Environmental Protection Agency (EPA) or the Indiana State Revolving Fund Loan Program (SRF), the Participant agrees to make the FSP available for inspection and/or review.

Signature of Authorized Representative	Date
Jim Boone	
Printed Name	Phone Number

Fiscal Sustainability Plan Certification Form

(Pursuant to Section 603(d)(1)(E)(i) of the Federal Water Pollution Control Act)
(To be submitted prior to final disbursement of Participant's loan proceeds related to the project)

Participant Name		
Turkey Creek Regional Sewer District		
Street Address		P. O. Box Number
4852 N. 1200 W		
City	State	Zip Code
Cromwell	Indiana	46732

Section 603(d)(1)(E) of the Federal Water Pollution Control Act (FWPCA) requires a recipient of a loan for a project that involves the repair, replacement or expansion of a publically owned treatment works to develop and implement a Fiscal Sustainability Plan (FSP). The requirement pertains to those portions of the treatment works paid for with Clean Water SRF Loan Funds. The FSP must include the following minimum requirements as set forth in Section 603(d)(1)(E)(i): (I) an inventory of critical assets that are a part of the treatment works; (II) an evaluation of the condition and performance of inventoried assets or asset groupings; (III) a certification that the recipient has evaluated and will be implementing water and energy conservation efforts as part of the plan; and (IV) a plan for maintaining, repairing, and as necessary, replacing the treatment works and a plan for funding such activities; or per Section 603(d)(1)(E)(ii) certify that the recipient has developed and implemented a plan that meets the requirements above.

I certify that I am an authorized representative for the above listed Participant. I hereby certify pursuant to Section 603(d)(1)(E)(i) that the Participant has developed an FSP that meets the above minimum requirements and the FSP is being implemented and will be updated as necessary. I further certify that the Participant has evaluated and will be implementing water and energy conservation efforts as part of the FSP. Upon the request of the Environmental Protection Agency (EPA) or the Indiana State Revolving Fund Loan Program (SRF), the Participant agrees to make the FSP available for inspection and/or review.

Signature of Authorized Representative	Date
Jim Boone	
Printed Name	Phone Number

Cost & Effectiveness Certification Form

(Pursuant to Section 602(B)(13) of the Federal Water Pollution Control Act)
(Applies to all assistance recipients submitting an application on or after October 1, 2015)
(To be submitted prior to Participant's Wastewater Loan Closing)

Participant Name TURKEY CREEK REGIONAL SEWER DISTRICT		
Street Address 4852 NORTH 1200 WEST		P. O. Box Number
City CROMWELL	State IN	Zip Code 46732-9794

Section 602(B)(13) of the Federal Water Pollution Control Act (FWPCA) requires a recipient of a loan to certify that the recipient:

1) has studied and evaluated the cost and effectiveness of the processes, materials, techniques, and technologies for carrying out the proposed project or activity for which assistance is sought under the Clean Water State Revolving Fund Loan Program; and
2) has selected, to the maximum extent practicable, a project or activity that maximizes the potential for efficient water use, reuse, recapture, and conservation, and energy conservation, taking into account –
   (i) the cost of constructing the project or activity;
   (ii) the cost of operating and maintaining the project or activity over the life of the project or activity; and
   (iii) the cost of replacing the project or activity

Certification

We hereby certify pursuant to Section 602(B)(13) that the Participant has completed the requirements of Section 602(B)(13) as set forth in items (1) and (2) above.

Signature of the Authorized Representative

Printed Name: James R. Boone

Signature: James R Boone

Date: April 30, 2020

Signature of Consulting Engineer

Printed Name: Jeff Hersha

Signature: Jeff Hersha

Date: April 30, 2020

State Revolving Fund Loan Program
Asset Management Program Certification Form

(To be submitted either at the time of loan closing or no later than the final disbursement of a Participant's loan proceeds)

Participant Name		
Turkey Creek Regional Sewer District		
Street Address 4852 N. 1200 W		P. O. Box Number
City Cromwell	State Indiana	Zip Code 46732

Effective July 1, 2018, Indiana Code 5-1.2-10-16 requires a Participant that receives a loan or other financial assistance from the State Revolving Fund Loan Program certify that the Participant has documentation demonstrating it has the financial, managerial, technical and legal capability to operate and maintain its water or wastewater collection and treatment system. A Participant must demonstrate that it has developed an asset management program as defined in the Indiana Finance Authority's (Authority) Asset Management Program Guidelines. The Asset Management Program (AMP), shall include at a minimum the following: (1) A system map (2) An inventory and assessment of system assets (3) development of an infrastructure inspection, repair, and maintenance plan, including a plan for funding such activities (4) An analysis of the customer rates necessary to support the AMP (5) Audit performed at least every two years (6) Demonstration of the technical, managerial, legal and financial capability to operate and maintain the system, per the guidelines established by the Authority.

I hereby certify that I am an authorized representative for the above listed Participant and pursuant to IC 5-1.2-10-16, the Participant has developed and is implementing an AMP that meets the requirements established by the Authority.

Signature of Authorized Representative	Date
Jim Boone	
Printed Name	Phone Number/Email Address

APPENDIX

Table VI & VII- Engineers Opinion of Probable Construction Cost - Conceptual

Project	East Shore-North Shore Sewer Study	Date:	25-Feb-20
Location	TCRSD	Estimator:	jpm

Gravity Sewer Alternative

Item	Item Description	Unit	Qty	Unit Cost	Cost
1	Audio-Video Recording	1	lf	$2,500.00	$2,500.00
2	Survey & Staking	1	ls	$8,000.00	$8,000.00
3	Erosion Control	1	ls	$5,000.00	$5,000.00
4	6" laterals tap	179	ea	$350.00	$62,650.00
5	6" lateral main	5,310	lf	$40.00	$212,400.00
6	8" PVC sewer	9,760	lf	$35.00	$341,600.00
7	48" Dia MH	32	ea	$5,500.00	$176,000.00
8	2" DIP Force Main	1,600	lf	$30.00	$48,000.00
9	6" DIP Force Main	750	lf	$40.00	$30,000.00
10	Special Backfill	4,126	cy	$30.00	$123,780.00
11	#53 Aggregate	10	sy	$40.00	$400.00
12	#8 Aggregate Base	3,783	sy	$40.00	$151,320.00
13	3.5" Base Course	728	ton	$180.00	$131,040.00
14	1.5" Wearing Course	312	ton	$210.00	$65,520.00
15	6-inch Concrete Sidewalk / Drive	883	sy	$65.00	$57,395.00
16	Seed & Mulch	11,278	sy	$2.00	$22,556.00
17	East Shore Pump Station	1	ls	$140,000.00	$140,000.00
18	Duplex Grinder Pump Sta., Piping, Control Panel & Restoration	4	ea	$25,000.00	$100,000.00
19	East Shore PS; Backup Generator	1	ls	$40,000.00	$40,000.00
20	PS; Backup Generator	4	ea	$20,000.00	$80,000.00
21	Polyurethane Coating of Wet Well	1	ea	$15,000.00	$15,000.00
22	SCADA	1	ls	$60,000.00	$60,000.00
23	Record Documents	1	ls	$5,000.00	$5,000.00
24	Mobilization, Bonding, Insurance & General Requirements (5%)				$93,908
				Subtotal Construction =	$1,972,000
				Admin and Legal =	$59,000
				Property Acquisition =	$40,000
				Engineering Design =	$197,000
				Engineering Construction Services =	$99,000
				Resident Project Representative =	$108,000
				Contingencies (10%) =	$197,000
				Total Estimated Capital Costs =	$2,672,000

Home Owners Estimated Cost					
Item	Item Description	Unit	Qty	Unit Cost	Cost
A	Availability & Capital Charge ($2,500 + $3,300)	ea	183	$5,800.00	$1,061,400
B	Private Lateral (avg. 130-ft per home @ $30/ft.)	ea	183	$3,900.00	$713,700
C	Landscaping & Surface Restoration	ea	183	$500.00	$91,500
	Total Estimated Home Owners Cost			$10,200.00	$1,866,600
				Total Estimated Costs for the District and the Homeowner =	$4,538,600

Table VI & VII- Engineers Opinion of Probable Construction Cost - Conceptual

Project	East Shore-North Shore Sewer Study	Date:	25-Feb-20
Location	TCRSD	Estimator:	jpm

Low Pressure Sewer Alternative

Item	Item Description	Unit	Qty	Unit Cost	Cost
1	Audio-Video Recording	1	lf	$2,500.00	$2,500.00
2	Survey & Staking	1	ls	$12,000.00	$12,000.00
3	Erosion Control	1	ls	$2,000.00	$2,000.00
4	Air Release / Cleanout	15	ea	$6,500.00	$97,500.00
5	1-1/2-inch Tap into Force main	183	ea	$750.00	$137,250.00
6	1-1/2-inch, lateral connection, (Check & Ball Valve)	183	ea	$950.00	$173,850.00
7	1-1/2-inch, HDPE Lateral	5,500	lf	$20.00	$110,000.00
8	2-inch FM, HDPE	400	lf	$21.00	$8,400.00
9	3-inch FM, HDPE	500	lf	$22.00	$11,000.00
10	4-inch FM, HDPE	2,425	lf	$25.00	$60,625.00
11	6-inch FM, HDPE	3,300	lf	$30.00	$99,000.00
12	8-inch FM, HDPE	4,070	lf	$35.00	$142,450.00
13	2-Inch HDPE Ball Valve	2	ea	$700.00	$1,400.00
14	3-Inch HDPE Ball Valve	1	ea	$850.00	$850.00
15	4-Inch HDPE Ball Valve	6	ea	$925.00	$5,550.00
16	6-Inch HDPE Ball Valve	8	ea	$1,400.00	$11,200.00
17	8-inch HDPE Ball Valve	10	ea	$2,500.00	$25,000.00
18	Special Backfill	333	cy	$25.00	$8,325.00
19	#53 Aggregate	100	sy	$40.00	$4,000.00
20	#8 Aggregate Base	200	sy	$40.00	$8,000.00
21	3.5" Base Course	39	ton	$120.00	$4,680.00
22	1.5" Wearing Course	17	ton	$180.00	$3,060.00
23	6-inch Concrete Sidewalk/ Drive	872	sy	$50.00	$43,600.00
24	Seed & Mulch	611	sy	$2.00	$1,222.00
25	Northshore PS; Wet Well; Valve Pit & Site Work, Pumps (2) & Control Panel	1	ls	$150,000.00	$150,000.00
26	North Shore PS; Backup Generator	1	ls	$40,000.00	$40,000.00
27	North Shore PS; SCADA	1	ls	$15,000.00	$15,000.00
28	Polyurethane Coating of Wet Well	1	ea	$15,000.00	$140,000.00
29	Record Documents	1	ls	$5,000.00	$5,000.00
30	Mobilization, Bonding, Insurance & General Requirements (5%)				$66,173
				Subtotal Construction =	$1,376,000
				Admin and Legal =	$41,000
				Property Acquisition =	$20,000
				Engineering Design =	$138,000
				Engineering Construction Services =	$69,000
				Resident Project Representative =	$56,000
				Contingencies (10%) =	$138,000
				Total Estimated Capital Costs =	$1,838,000

Home Owners Estimated Cost					
Item	Item Description	Unit	Qty	Unit Cost	Cost
A	Availability & Capital Charge ($2,500 + $3,300)	ea	183	$5,800.00	$1,061,400
B	Private Lateral (avg. 130-ft per home @ $20/ft.)	ea	183	$2,600.00	$475,800
C	Residential Grinder Pump Station	ea	183	$6,000.00	$1,098,000
D	Electrical to Grinder Pump Station	ea	183	$1,300.00	$237,900
E	Landscaping & Surface Restoration	ea	183	$500.00	$91,500
	Total Estimated Home Owners Cost			$16,200.00	$2,964,600
	Total Estimated Costs for the District and the Homeowner =				$4,802,600

Table VI & VII- Engineers Opinion of Probable Construction Cost - Conceptual

Project	East Shore-North Shore Sewer Study	Date:	25-Feb-20
Location	TCRSD	Estimator:	jpm

Vacuum Sewer Alternative

Item	Item Description	Unit	Qty	Unit Cost	Cost
1	Audio-Video Recording	1	lf	$2,500.00	$2,500.00
2	Survey & Staking	1	ls	$12,000.00	$12,000.00
3	Erosion Control	1	ls	$2,000.00	$2,000.00
4	Air Release / Cleanout	5	ea	$6,500.00	$32,500.00
5	3-inch service lateral	2,730	lf	$18.00	$49,140.00
6	4-inch vacuum main	4,810	lf	$26.00	$125,060.00
7	6-inch vacuum main	5,250	lf	$30.00	$157,500.00
8	8-inch FM, HDPE	4,070	lf	$35.00	$142,450.00
9	4-Inch Isolation Valve	5	ea	$1,200.00	$6,000.00
10	6-Inch Isolation Valve	4	ea	$1,500.00	$6,000.00
11	6-inch HDPE Ball Valve	10	ea	$2,500.00	$25,000.00
12	Special Backfill	4,126	cy	$25.00	$103,150.00
13	#8 Aggregate Base	3,783	sy	$40.00	$151,320.00
14	3.5" Base Course	728	ton	$120.00	$87,360.00
15	1.5" Wearing Course	312	ton	$180.00	$56,160.00
16	6-inch Concrete Sidewalk/ Drive	883	sy	$50.00	$44,150.00
17	Seed & Mulch	11,278	sy	$2.00	$22,556.00
18	Northshore Pre-fab building	1	ls	$130,000.00	$130,000.00
19	Northshore F&I Mech/Elect	1	ls	$30,000.00	$30,000.00
20	Vac Sta Site Work	1	ls	$30,000.00	$30,000.00
21	Vac Sta Lower level	1	ls	$100,000.00	$100,000.00
22	Northshore Airvac PacVac	1	ls	$192,000.00	$192,000.00
23	Northshore PS; Backup Generator	1	ls	$40,000.00	$40,000.00
24	Northshore PS; Odor Control	1	ls	$20,000.00	$20,000.00
25	North Shore PS; SCADA	1	ls	$15,000.00	$15,000.00
26	Record Documents	1	ls	$5,000.00	$5,000.00
27	Valve Pit (2 pc)	94	ea	$5,420.00	$509,480.00
28	Valve Pit Wireless Monitoring	94	ea	$1,500.00	$141,000.00
29	Mobilization, Bonding, Insurance & General Requirements (5%)				$111,866
				Subtotal Construction =	$2,349,000
				Admin and Legal =	$70,000
				Property Acquisition =	$20,000
				Engineering Design =	$235,000
				Engineering Construction Services =	$117,000
				Resident Project Representative =	$56,000
				Contingencies (10%) =	$235,000
				Total Estimated Capital Costs =	$3,082,000

Home Owners Estimated Cost					
Item	Item Description	Unit	Qty	Unit Cost	Cost
A	Availability & Capital Charge ($2,500 + $3,300)	ea	183	$5,800.00	$1,061,400
B	Private Lateral (avg. 130-ft per home @ $30/ft.)	ea	183	$3,900.00	$713,700
C	Landscaping & Surface Restoration	ea	183	$500.00	$91,500
	Total Estimated Home Owners Cost			$10,200.00	$1,866,600
				Total Estimated Costs for the District and the Homeowner =	$4,948,600

20 Year Present Worth Analysis

Project	East Shore-North Shore Sewer Study	Date:	25-Feb-20
Location	TCRSD	Estimator:	bwh
Project	***Gravity Sewer Alternative***		
	n=20 yr., i=1.2%, Planning Period 20		

Item	Item Description	Capital Cost	Life Exp.	Salvage Value in 20 Years	Annual Cost	20 year Present Worth
	Capital Cost for the District & Homeowners					
1	Equipment	$36,000	15	-$12,000		$47,530
2	Stuctures	$204,000	50	$122,400		$86,395
3	Piping	$2,357,200	50	$1,414,320		$998,282
4	Electrical & Instrumentation	$180,000	20	$0		$180,000
5	Non Construction Costs	$700,000	50	$420,000		$296,452
	Operation & Maintenance for the District & Homeowners					
1	Labor		20		$34,000	$601,368
2	Power		20		$4,800	$84,899
3	Consumables		20		$1,000	$17,687
					Total Present Worth	$2,312,613

20 Year Present Worth Analysis

Project	East Shore-North Shore Sewer Study	Date:	25-Feb-20
Location	TCRSD	Estimator:	bwh
Project	***Low Pressure Sewer Alternative***		
	n=20 yr., i=1.2%, Planning Period 20		

Item	Item Description	Capital Cost	Life Exp.	Salvage Value in 20 Years	Annual Cost	20 year Present Worth
	Capital Cost for the District & Homeowners					
1	Equipment	$469,200	15	-$156,400		$619,473
2	Stuctures	$778,800	50	$467,280		$329,824
3	Piping	$2,799,700	50	$1,679,820		$1,185,682
4	Electrical & Instrumentation	$292,900	20	$0		$292,900
5	Non Construction Costs	$462,000	50	$277,200		$195,659
	Operation & Maintenance for the District & Homeowners					
1	Labor		20		$24,000	$424,495
2	Power		20		$8,900	$157,417
3	Consumables		20		$1,000	$17,687
					Total Present Worth	$3,223,138

20 Year Present Worth Analysis

Project	East Shore-North Shore Sewer Study	Date:	25-Feb-20
Location	TCRSD	Estimator:	bwh
Project	***Vacuum Sewer Alternative***		
	n=20 yr., i=1.2%, Planning Period 20 yrs.,		

Item	Item Description	Capital Cost	Life Exp.	Salvage Value in 20 Years	Annual Cost	20 year Present Worth
	Capital Cost for the District & Homeowners					
1	Equipment	$606,280	11	-$496,047		$1,082,896
2	Stuctures	$375,200	50	$225,120		$158,898
3	Piping	$3,008,120	50	$1,804,872		$1,273,949
4	Electrical & Instrumentation	$226,000	20	$0		$226,000
5	Non Construction Costs	$733,000	50	$439,800		$310,428
	Operation & Maintenance for the District & Homeowners					
1	Labor		20		$28,300	$500,551
2	Power		20		$5,600	$99,049
3	Consumables		20		$1,000	$17,687
					Total Present Worth	$3,669,458

Jones & Henry

N

1" = 752'

Figure 5.1
Soil Map
Kosciusko County GIS

Turkey Creek Regional Sewer District
Eastshore – Northshore Sewer Study
April 2020

Turkey Creek Township (00001-056)

In 1832 when the first white settlers came to what is now known as Turkey Creek Township, the region was densely wooded with flat marshy ground in the northeast and gently rolling hills to the west and south. The largest natural body of water in Indiana, Lake Wawasee (formerly Nine-Mile Lake), and two adjacent lakes, Syracuse Lake and Papakeechie Lake, stretched from the northwest corner of the township to the southeast. The area's heavy growth of timber provided ample building material for early construction although it was mostly gone by the late nineteenth century leaving farmland surrounding the central lakes.

During the 1830s, Henry Ward and Samuel Crosson built a dam which powered their gristmill on Turkey Creek, the outlet from Lake Syracuse. Crosson constructed the township's first cabin near this site in 1833 and others soon followed. William Cassidy erected a small frame store and house. These early entrepreneurs contributed to the growth of what was to become the village of Syracuse, founded and platted in 1837.

Organized in 1836, Turkey Creek Township's economy was based primarily on farming. Early settlers shared the land with Native Americans. These pioneers found an open-air burial place on the north side of Syracuse Lake. "Indian Hill" (00003) was a sacred spot where the dead were wrapped and hung in trees. Thirty-six square miles of land (00011) were set aside by the U.S. government for the Miami Chief Papakeechie (whites dubbed him "Flat Belly") and his people. The group occupied this land from 1828 until they were removed in 1834.

Turkey Creek Township has retained several buildings from its formative years. One of the township's earliest remaining structures is the John Strieby House (00053) which was built about 1850. This single-pen, hewn-log structure is still occupied by the descendants of John Strieby. A house (00010)

on Eli Lilly Road served as an early inn and house. The Sloan-Morris House (00015) is one of the township's earliest hall-and-parlor houses.

A noteworthy example of a turn-of-the-century farmstead is the Niles Farm (00026) located on 650 E. The Grady Farm's (00040) American four-square house and collection of outbuildings are fine representatives of the township's agricultural life into the present century.

Although no significant churches remain in the township, six small, nineteenth-century cemeteries remain scattered throughout the township, recalling the area's religious life. Three rural township schoolhouses (00038, 00045, 00051) can also still be found.

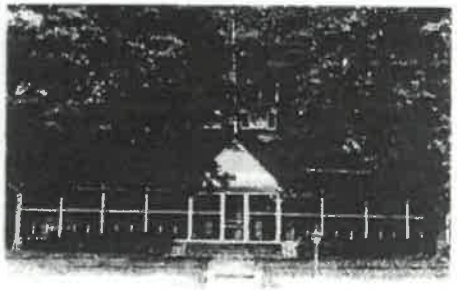
The township's large number of lakes made the area a popular recreation spot during the early twentieth century. A number of resort hotels and summer cottages were built along the lakeshore. The Neoclassical style Oakwood Hotel (00029) in Oakwood Park and the Crow's Nest Inn (00017) recall the early days when visitors would ride excursion trains into the township to enjoy the area's vacation facilities.

The township's most impressive lake cottages were constructed along Lake Wawasee. Eli Lilly, founder of Lilly Pharmaceuticals, owned a large family compound which included his summer home (00014) and his son's cottage (00013). Other more modest cottages include two houses (00021, 00022) on 1060 N and a house (00023) on South Shore Drive.

No.	Rtg.	Description
001	C	Farm, 1350 N; House: Bungalow, c.1930; Outbuildings: English barn, drive-in corncrib; Agriculture, Architecture, Vernacular/Construction (340)
002	C	Weybright Cemetery, 1400 N; c.1850-c.1880; Exploration/Settlement, Religion (340)
003	C	Indian Hill Marker, N. Shore Drive; Marker denotes Indian burial ground; Indian (340)
004	C	House, 1300 N; American four-square, c.1925 (John Neff, builder); Vernacular/Construction (411)
005	C	Kern House, Kern Road; Gabled-ell, c.1910; Vernacular/Construction (411)
006	C	Farm, Syracuse-Webster Road; House: T-plan, c.1890; Outbuildings: summer kitchen, smokehouse, privy; Vernacular/Construction (411)
007	O	Egbert House, Pickwick Road; Craftsman, 1916; Architecture (340)

James Egbert House (00007) The house was built for James Egbert, a Goshen lumber mill owner. The structure was moved from its lakeside location during the 1930s. It currently serves as a caretaker's residence for Pickwick Park.

008	C	Wawasee Boat Company, Pickwick Road; Twentieth Century Functional, 1929; Commerce, Entertainment/Recreation, Vernacular/Construction (340)
009	C	Farm, 675 E; House: gabled-ell/Queen Anne, c.1890; Outbuildings: transverse-frame barn, windmill, milk house, tool shed; Agriculture, Architecture, Vernacular/Construction (340)
010	N	House, Eli Lilly Road; Double-pile/Greek Revival, c.1855; Architecture, Vernacular/Construction (340)
011	C	Papakeechie's Reserve Historical Marker, Eli Lilly Road; Marker states that Miami Chief Flat Belly held this land from 1828 to 1834; Indian (340)
012	N	House, Eli Lilly Road; Classical Revival, 1938; Architecture, Entertainment/ Recreation, Landscape Architecture (340)
013	N	J. K. Lilly Cottage, Eli Lilly Road; Colonial Revival, c.1937; Architecture (340)
014	O	Lilly Cottage, Eli Lilly Road; Queen Anne, 1886; Architecture (340)



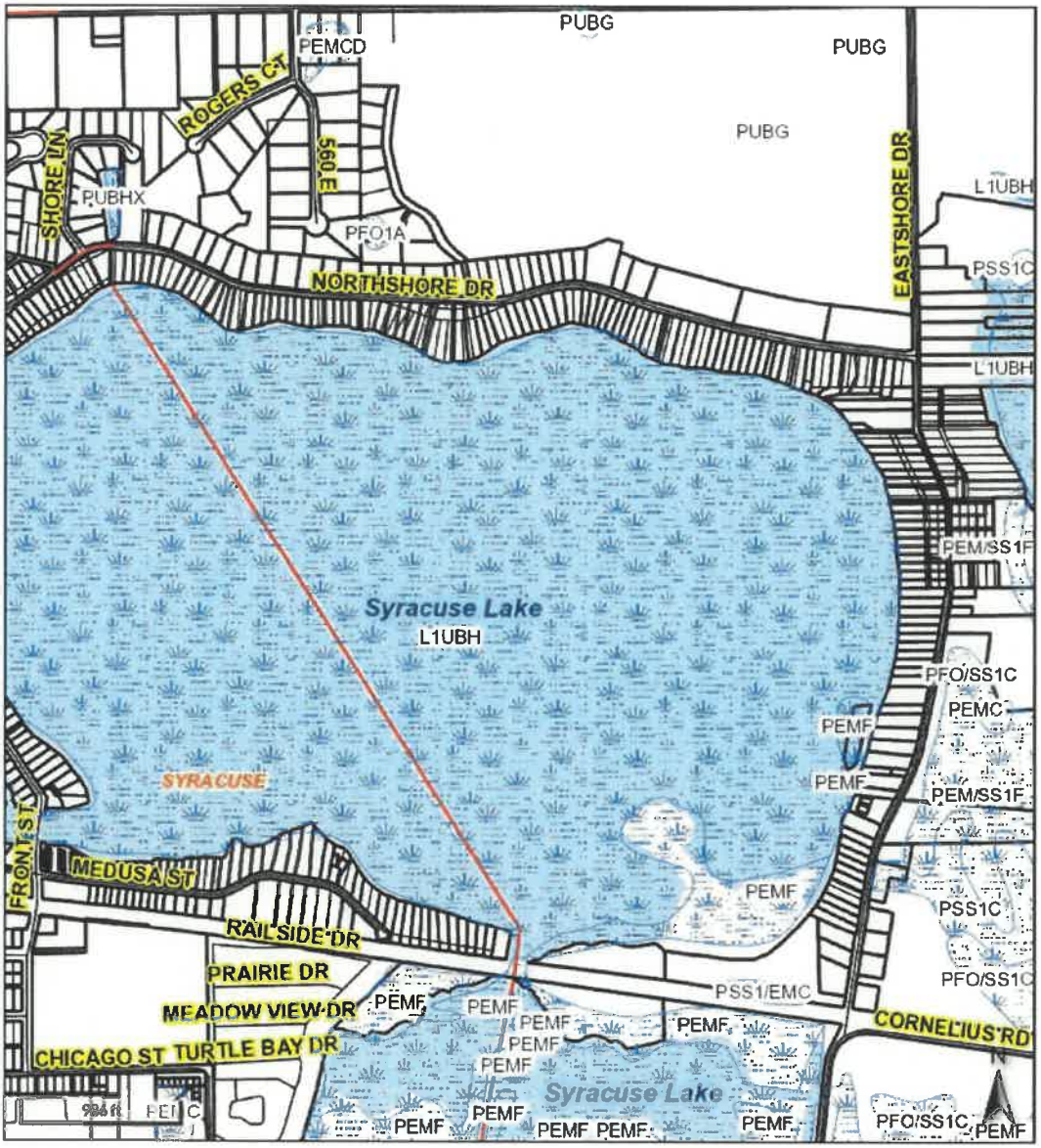
Eli Lilly Cottage (00014) Eli Lilly, founder of Lilly Pharmaceuticals had this house built in 1886. It was the first house completed on Lake Wawasee. Lilly was particularly interested in the area's history and published two books on the Lake Wawasee region.

015	N	Sloan-Morris House, 1250 N; Hall-and-parlor, c.1865; Vernacular/Construction (340)
016	C	Byers Cemetery, 1250 N; c.1870-c.1940; Religion (340)
017	N	Crow House/Crow's Nest Inn; 1100 N; House: Craftsman, c.1860/1911 (Nathaniel Crow, builder); Outbuildings: livestock barn; Architecture, Commerce, Entertainment/Recreation, Vernacular/Construction (340)
018	C	Lake Bethel Cemetery, 1100 N; c.1870-c.1940; Religion (340)

Beacon™ Kosciusko County, IN

TCRSD

Eastshore - Northshore



Date created: 3/16/2020
Last Data Uploaded: 3/16/2020 3:05:42 AM

Developed by Schneider GEOSPATIAL

Jones & Henry

N

1" = 986'

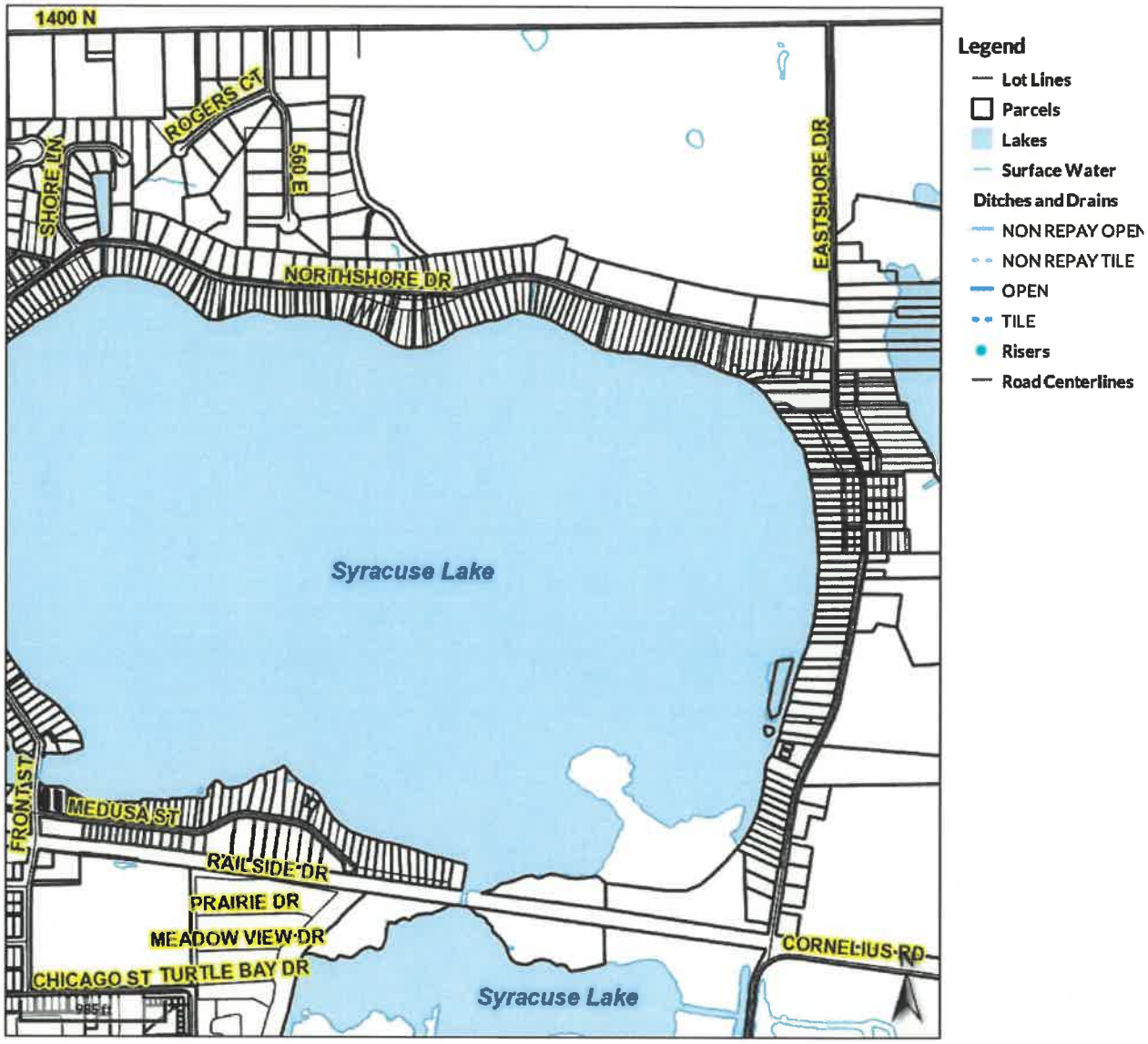
Figure 5.3
Wetland Map
Kosciusko County GIS

Turkey Creek Regional Sewer District
Eastshore – Northshore Sewer Study
April 2020

Beacon™ Kosciusko County, IN

TCRSD

Eastshore - Northshore



Date created: 3/16/2020
Last Data Uploaded: 3/16/2020 3:05:42 AM

Developed by Schneider GEOSPATIAL

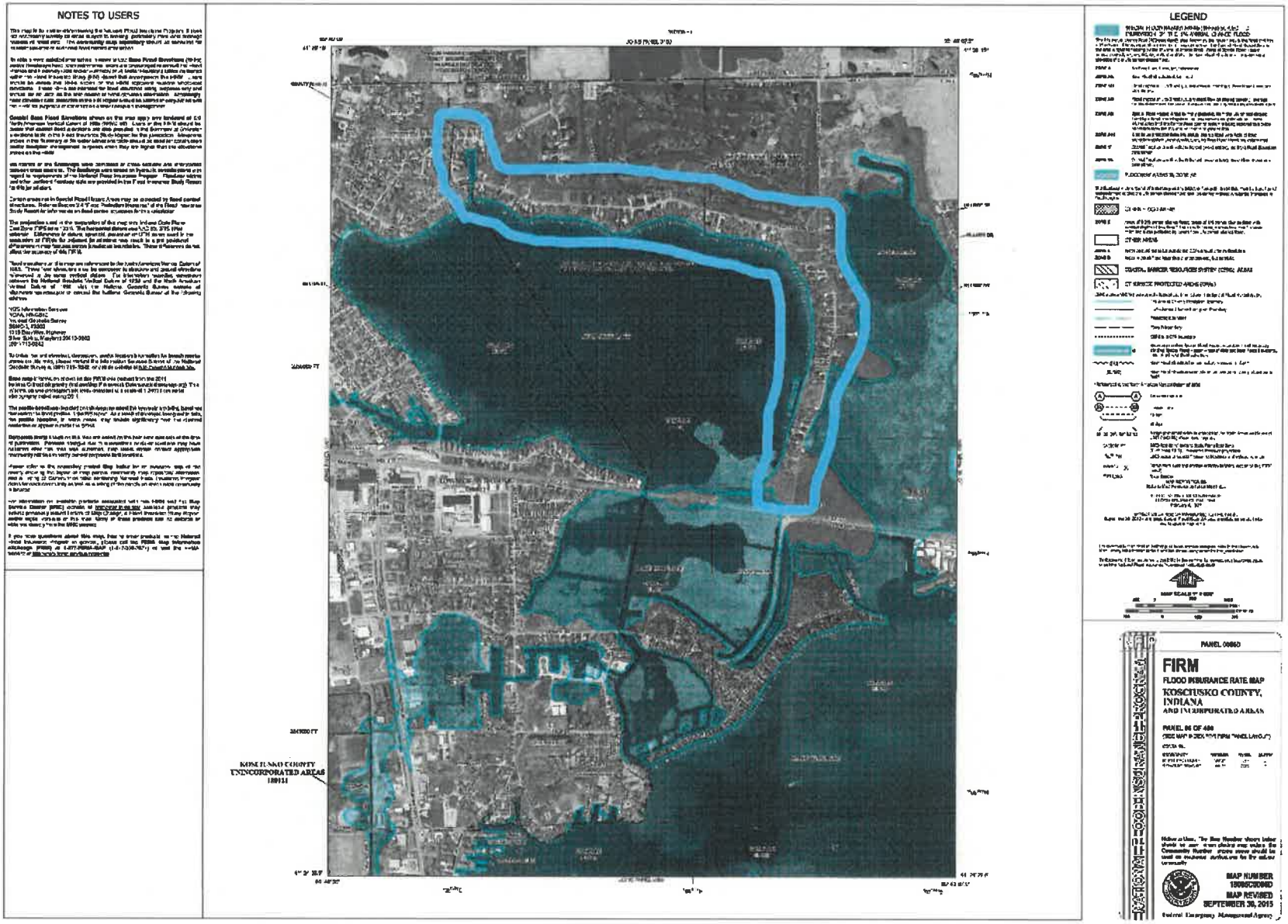
Jones & Henry

N

1" = 986'

Figure 5.4
Scenic Waters Map
Kosciusko County GIS

Turkey Creek Regional Sewer District
Eastshore – Northshore Sewer Study
April 2020



Jones & Henry

N

1" = 752'

Figure 5.6
Flood Map
FIRM Panel 0086D

Turkey Creek Regional Sewer District
Eastshore – Northshore Sewer Study
April 2020