RILEY TOWNSHIP

The township is located in the northeast central area of Sandusky County and the 2010 census stated that 1,226 people live in the unincorporated portions of the Township. The total land area is 38.6 square miles at an elevation of 581 feet. There are no municipalities located in the township, but there are two (2) unincorporated areas, Erlin and Wightsman's Grove along with an Ohio Turnpike Plaza.

Additional demographic and population projections for Riley Township are as follows:

	2010 Census	Square Mile	Population/ Square Mile	MHI	LMI %
Riley Township	1,226	38.6	31.8	$56,250	32.1

	2010 Population	2010 Estimated Water Demand (100 gpcd)	2010 Estimated Water Demand/ Square Mile	2030 Population Estimate*	2030 Estimated Water Demand (100 gpcd)	2030 Estimated Water Demand/ Square Mile
Riley Township	1,226	122,600 gpd	3,176 gpd	1,154	115,400 gpd	2,990 gpd
* Ohio Department of Development - Sandusky County Projected Rate of Change - .059% to 2030						

Groundwater Resources - Riley Township is divided by two (2) different carbonate aquifers. The east half of the township has bedrock at 40 to 70 feet which would require wells to be drilled for municipal or industrial use down to 250 feet. The eastern area's water quality is high in hardness, dissolved solids, hydrogen sulfide, and sulfates.

Bedrock in the western half of the Township ranges between 80 to as deep as 180 feet. There is an ODNR test well located in the southeast section of the Township. The water quality parameters are listed as follows:

	Test Well 1
Depth (feet)	200
Bedrock (feet)	46
Yield (gpm)	75
Hardness (mg/l)	1,680
Iron (mg/l)	14.0
Dissolved Solids (mg/l)	2,582
Sulfates (mg/l)	672

Surface Water Resources - The only major stream in Riley Township is the Sandusky River. The river flows northeast to Muddy Creek Bay. Rice and Riley Townships are divided by the river. Riley Township's northwest border is on the east side of the Sandusky River.

Public Water Systems - There are no municipal public water systems in Riley Township. The Ohio Turnpike provides public water at the Erie Island Turnpike rest area. The Northern Ohio Rural Water Authority provides potable water to rural areas within the Township.

Wastewater Treatment Systems - There are no municipal wastewater treatment systems located in Riley Township. The Ohio Turnpike Commission owns and operates a 0.150 mgd secondary treatment facility at the Erie Island Turnpike rest area. The plant is located at 1012 North County Road 260 and the discharge is to Pickerel Creek.

Proposed Water Service

The majority of Riley Township is currently served by Northern Ohio Rural Water. There are two (2) elevated storage tanks and one booster pump station that provide water in Riley, Townsend, York, and Green Creek Township. Any future or proposed water service in Riley Township will be provided by the existing rural water system.

Critical Sewage Areas:

The Sandusky County Health Department, Ohio EPA, and TMACOG has identified Critical Sewage Areas which would include failed or failing onsite sewage systems. System failures could lead to surface and/or groundwater contamination or public health nuisances. These areas have been determined to be places where onsite sewage problems cannot be solved by conventional system upgrade or replacement. These areas became a priority for the Health Department and Ohio EPA to conduct sanitary surveys and general plans for providing public sanitary collection system and treatment alternatives.

Wightman's Grove (SA-10) and Barkshire Hills (SA-19) are listed as Critical Sewage Areas in Riley Township.

Proposed Sanitary Sewer Service

The Riley Township Trustees identified four (4) unincorporated areas that will need some consideration for improved sanitary conditions. Two of the areas are listed as Critical Sewage Areas – Wightman's Grove and Barkshire Hills. The other two (2) areas are Fisherville and Memory Marina. Wightman's Grove, Barkshire Hills, and Memory Marina are located in Wightman's Groves 208 Planning Area. Fisherville is adjacent to Fremont's 208 area. The Wightman's Grove Critical Sewage Area has been given Ohio EPA Findings and Orders. The Findings and Orders were issued on December 10, 2007 and the orders required the completion of a general plan for abating pollution and correcting the unsanitary conditions in the designated area. The general plan was completed and submitted to Ohio EPA as required by the orders.

Wightman's Grove[4]

The Sandusky County Commissioners contracted with Poggemeyer Design Group, Inc. to prepare a general wastewater plan to address the wastewater collection and treatment needs for an unincorporated area of Riley Township called Wightman's Grove (SA-10). Complaints over individual property owner's inefficient septic tank/leach field systems and contaminated storm sewers initiated Ohio EPA to issue findings and orders in 2007.

The planning area under consideration for this project has been established as the unincorporated subdivision of Wightman's Grove. The area is defined in the OEPA Findings and Orders. The area is located approximately six miles northeast of Fremont, Ohio and is located east of Carley Road, between Coonrod Road (CR 259) and the Sandusky River. The Wightman's Grove planning area encompasses approximately 30 to 40 acres which include 85 existing residential structures. Some of the residential structures are located on two lots while approximately 10 additional residential structures could be constructed. The majority of the structures are occupied year round.

A soil exploration was completed by Bowser-Morner indicates that the soils within the planning area are situated in a lacustrine deposit of laminated silts, clays, and sands that were formed as lake bottom sediments in ancient post-glacial lakes that covered Northwest Ohio when the glaciers melted. The soil profile consists mostly of silt and clay soil. These soils are relatively impermeable and high ground water levels should not be a problem. Groundwater was encountered in four boring locations. These wet areas will be more of a problem during construction and consideration will have to be given to dewatering by pumping. The soil exploration is attached in the Appendix of this document.

Land use within the study area is residential. Some of the residential structures are considered seasonal. The area around Wightman's Grove is agricultural. There are no large water/sewer users located in the planning area.

There are no public water or wastewater facilities in Wightman's Grove. Private residences and commercial establishments are generally served by individual septic tanks. The effluent from these tanks finds its way to the existing drainage tile and ditches and finally into the Sandusky River. The development of effective on-site wastewater systems within the Wightman's Grove is severely limited by restrictive soil conditions. Also, the lot sizes are generally small with little open space for the installation of additional on-site disposal system components.

This report provides a brief, general review of alternate solutions to wastewater collection and treatment for the unincorporated Wightman's Grove, Sandusky County, Ohio. Various sewage

collection systems and treatment facilities are considered within the report. Probable project cost, user costs and financing options are also included.

The study concludes that the most cost effective method of providing community wide wastewater collection and treatment based upon cost analysis of construction and operation and maintenance of the new system is to construct a gravity flow collection system and transport the wastewater to an unaerated, controlled discharge lagoon. Implementing this program, without grants, would result in a per resident cost in excess of $115.00 per month depending on the funding obtained. If a grant can be obtained from the Community Development Block Grant (CDBG) Competitive Water and Sewer Program in the amount of $500,000, an Ohio Public Works Commission (OPWC) grant in the amount of $300,000 each and the remainder of the debt be financed through a United States Department of Agriculture (USDA) grant and loan at the current hardship interest rate of 2.375%, the cost per resident could be reduced to approximately $50.00 per month. Sandusky County should actively pursue grant funding prior to beginning construction of a wastewater collection and treatment system to ensure affordable costs to all residents within the planning area.

Based on an evaluation of the data in this report and the 2000 census for Median Household Income (MHI), the project is currently not economically feasible. If the results of a new income survey indicate that USDA funding at a lower interest rate (poverty) is available, then the project could be considered affordable.

The plan reviews different alternatives for the collection and treatment of wastewater generated in Wightman's Grove. The alternatives evaluated include a local treatment plant and regional approach where the collected wastewater is conveyed to a neighboring wastewater treatment facility. In this case, the closest plant capable of handling the flows from this area is the City of Fremont system. Sandusky County has previously extended sewers from the City of Fremont to serve unincorporated areas within the County.

Various Collection Systems Considered

1. Conventional Gravity Sewer System
2. Vacuum Sanitary Sewer System

3. Low Pressure Sewer System

Various Treatment Systems Considered (30,000 gpd)

Developing a site location for a wastewater treatment facility requires that consideration be given to soil conditions, isolation distance from residents, reasonable proximity to the sewer collection system and receiving stream. Due to the fact that Wightman's Grove is located adjacent to the Sandusky River, additional consideration has to be given to floodplain elevations and possible wetland locations. Design standards used by Ohio EPA require that treatment plant structures and electrical along with mechanical equipment shall be protected from physical damage from a 100-year flood and that the treatment plant should remain fully operational and accessible during a 25 year flood.

During the development of a general plan, ground elevations are usually obtained from United States Geological Survey (USGS) maps and Flood Insurance Rate maps. Actual topographic surveying is completed during the preliminary design phase. Based on a review of this general plan, MS Consultants, Inc. provided approximate flood elevations (USGS 1929 datum) which are based on the Federal Emergency Management Agency (FEMA) Flood Insurance Study for Sandusky County. The Water Surface Elevations (WSE) for flooding are as follows:

25-year flood WSE - 578.8
100-year WSE - 580.1

In order to remain reasonably close to the proposed sanitary sewer collection system and receiving stream, a treatment location east of Main Street and north of Coonrod Road was shown on Plate F-1 as a possible site. There is approximately 5.97 acres that could be available for the construction of an Extended Aeration Packaged Treatment Plant. The proposed site, if selected, will require a topographic survey along with soils and a wetland investigation. The minimum property required to construct a 30,000 gpd packaged treatment facility is 0.5 acres. Consideration should be given to a one acre lot for future expansion. Plate F-1 illustrates the 5.97 acres which appears to be farmed at this time.

It would appear that the ground elevation on this site is level and slightly lower than the 25-year WSE at 578.8, but higher than 575 which is at the top of bank on Sandusky River. In order to overcome the 25-year flood event and remain fully operational and accessible, the site elevation could be raised and the installation of the Extended Package Treatment Plant could be installed above ground at the 25 and/or 100 year flood plain. The estimated construction cost for an Extended Aeration Plant (Alternative No. 1) will include additional site work for the construction of a facility that will meet Ohio EPA's requirements for accessibility and operations during flood events. The southwest corner of the proposed treatment site for Alternative No. 1 may be the best area within the 5.97 acres as identified on Plate F-1.

The draft study as earlier prepared suggested that the Waste Stabilization Non-Aerated Controlled Discharge Lagoon Alternative Nos. 2 and 3 could be located east of Wightman's Grove on approximately 16.4 acres. This site will not provide accessibility and operations during flood events without increasing the water operating level in the lagoon cells which would require fill material from another site that would increase the cost for the dike construction. To relocate the lagoon treatment systems would also require additional costs that would be associated with an increase in influent and effluent piping, easements for the piping, along with increased land cost per acre. In order to remain reasonably close to the sewer collection system and receiving stream and to construct in an area that would meet the 100-year WSE 580.1 elevation, the lagoons would need to be located south of the Coonrod Road. Plate F-1 shows a proposed site for such a treatment system.

Based on our review and understanding of Ohio EPA's Design and Treatment Standards, we propose the following wastewater treatment alternatives for consideration:

A. Extended Aeration Plant (Package Treatment System)
B. Waste Stabilization Non-Aerated Controlled Discharge Lagoon to Sandusky River
C. Waste Stabilization Non-Aerated Controlled Discharge Lagoon with Land Application *
D. Regional Treatment to Sandusky County System (2 options)

* Antidegradation requirements

Note: Due to the smaller size of the proposed treatment facility, the only mechanical treatment facility reviewed was the package treatment system.

Plate F-1 from the 2010 Wightman's Grove Wastewater Collection and Treatment General Plan shows a proposed site for the treatment alternatives.

Collection Systems

1. Conventional Gravity Sewer System - Alternative No. 1

In conventional gravity collection systems, the wastewater flows by gravity and, except where pumping stations are required, the system is devoid of moving parts. The system eliminates septic tanks and leeching systems and replaces them with a private building sewer which connects the building to the main sewer. Operation and maintenance demands generally increase with age, but in well constructed systems, this is minimal. Due to larger pipe diameters, blockages are rare and generally easily removed when they do occur. With their simplicity of design and many years of application, conventional gravity sewer systems are a most reliable and economical means of conveying wastewater. Table F-1 lists the estimated project costs; Plate F-2 shows a typical conventional gravity system; and Plate F-3 illustrates a proposed sanitary sewer system layout.

Advantages

- Design standards and procedures well established
- Reliable operation
- Handles grit and solids
- At minimum velocity lower production of hydrogen sulfide gas
- Higher excess capacity for future growth

Disadvantages

- Slope requirements can require deeper excavation
- Pumping and lift stations may be required to overcome slope requirements
- Deeper manholes (confined space entry)
- Higher inflow and infiltration
- High bedrock or poor soil conditions could increase construction cost

REFERENCE:
ACAD DWG
R. HEYMAN
8/11/2010

JOB #3185-029

FILE: PLATE2.DWG

WASTEWATER TREATMENT
PLANT LOCATIONS

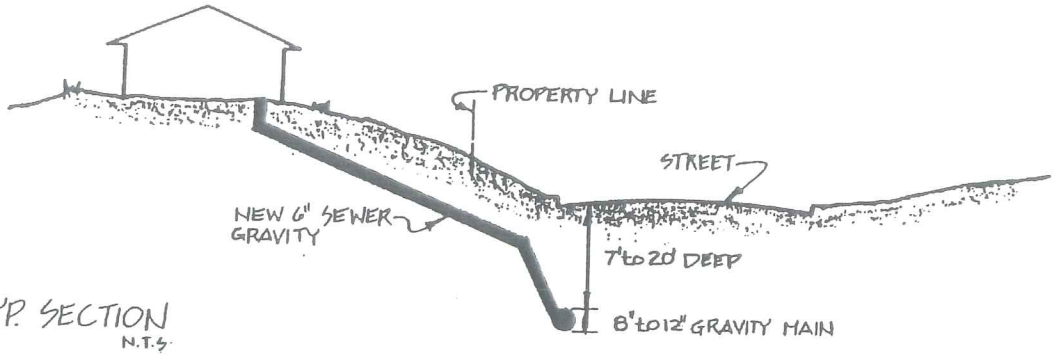
OHIO

PLATE F-1

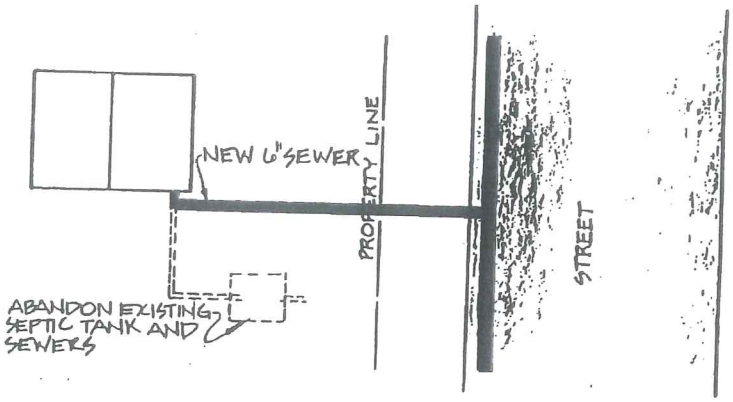
WIGHTMAN'S GROVE
WASTEWATER COLLECTION &
TREATMENT GENERAL PLAN

POGGEMEYER
DESIGN GROUP

CONVENTIONAL GRAVITY SEWER CONNECTION



TYP. SECTION
N.T.S.



TYP. PLAN VIEW
N.T.S.

REFERENCE: ACAD DWG R. HEYMAN 2/22/2010 JOB #3185-029 FILE:PLATE3.DWG	ALTERNATIVE NO. 1 CONVENTIONAL GRAVITY SEWER SYSTEM PLATE F2	WIGHTMAN'S GROVE WASTEWATER COLLECTION & TREATMENT GENERAL PLAN	POGGEMEYER DESIGN GROUP

REFERENCE: ACAD DWG R. HEYMAN 8/10/2010 JOB # 3185-039 FILE: PLATE26.DWG	ALTERNATIVE NO. 1 CONVENTIONAL GRAVITY SEWER SYSTEM TO WWTP PLATE F-3	WIGHTMAN'S GROVE WASTEWATER COLLECTION & TREATMENT GENERAL PLAN

POGGEMEYER
DESIGN GROUP

TABLE F-1
WIGHTMAN'S GROVE
ALTERNATIVE 1
ESTIMATE OF COST
CONVENTIONAL GRAVITY SEWER SYSTEM

Item No.	Description	Quantity	Unit	Unit Price	Total Price
1	8" PVC Sanitary Sewer	4,400	L.F.	$55	$242,000
2	Manholes	18	Each	$2,900	$52,200
4	Storm Sewer Replacement	500	L.F.	$20	$10,000
6	Residential Grinder Pump	3	Each	$7,500	$22,500
7	1-1/2" Force Main	300	L.F.	$10	$3,000
8	6" Laterals to Right-of-Way/Property Line	3,000	L.F.	$35	$105,000
9	Restoration (Sidewalks, Driveway, Street Paving, with Seeding and Mulching) Mobilization, Insurance, etc.	1	L.S.	$66,000	$66,000
	SUBTOTAL				$500,700
	Contingency (10%)				$50,070
	TOTAL ESTIMATED CONSTRUCTION COST				$550,770
	Other Fees: Legal, Design Engineering, Financing, Construction Observation, Testing, Interest During Construction, and Review Fees)				$125,175
	TOTAL COST				$675,945

Notes: Based on 75 connections with sanitary requirements.
The homeowner is responsible for the piping system from the house to the right-of-way/property line and abandonment of the existing septic tank system.
Estimate cost based on 2010 construction - annual O&M estimated at $4,200

Controlled Discharge Receiving Stream Evaluation

Wightman's Grove's septic system currently discharges into storm outlets that flow into the Sandusky River. The planning area is adjacent to the Sandusky River which will serve as a receiving stream for wastewater treatment.

An evaluation of the drainage basin was completed in order to verify if an adequate 5:1 dilution ratio was available. Since adequate dilution is available, a controlled discharge lagoon system can be constructed. This stream evaluation data will also be used in sizing lagoon storage. For example, if the Sandusky River has available flows measured in cfs on numerous days, then storage volume can be reduced.

Discharge flows are limited to not more than 90 gallons per minute for each cubic foot per second stream flow measured upstream of the discharge. No controlled discharge flows shall be allowed when the upstream flow is less than one cfs.

The Sandusky River upstream of the Wightman's Grove does have a USGS gauging station at latitude 41°18' 28" longitude 83°09' 32". The gauging station is located near Fremont, Ohio and at that location the contributing drainage area is 1,251 square miles. Wightman's Grove is approximately 4.5 miles downstream of the gauging station. Average daily flows from 1992 through 2008 and estimated available treatment discharge flows are listed as follows:

TABLE F-2
SANDUSKY RIVER
AVERAGE DAILY FLOWS (2000-2008)

Month	Stream CFS	Available GPM Discharge (90 gpm/cfs)	Available MGD Discharge
January	2,600	234,000	337
February	1,940	174,600	251
March	2,460	221,400	319
April	2,030	182,700	263

TABLE F-2 SANDUSKY RIVER AVERAGE DAILY FLOWS (2000-2008)			
Month	Stream CFS	Available GPM Discharge (90 gpm/cfs)	Available MGD Discharge
May	1,610	144,900	209
June	1,230	110,700	159
July	625	56,250	81
August	586	52,740	76
September	349	31,410	45
October	519	46,710	67
November	770	69,300	99
December	2,150	193,500	279
Note: The above-listed available discharge flows in gpm and mgd are based on 90 gallons per minute/cfs			

Upon further review of the historical flow data on the Sandusky River, there are no days where flows are less than 2 cfs and the lowest average recorded flow was at 183 cfs during August which would still allow for a controlled treatment discharge at 16,470 gpm or 23.7 mgd.

Based on the above stream flow and calculated available discharge to the Sandusky River, a 90 day controlled discharge treatment facility will be able to meet the water quality requirements as listed in an NPDES permit.

Non-Aerated, Controlled Discharge Lagoon - Alternative No. 2

A non-aerated lagoon is a pond system approximately 7 feet in depth, separated into three (3) distinct layers of treatment. The first zone is the surface area where aerobic bacteria and algae exist in a symbiotic relationship. The second, or intermediate zone, is partly aerobic and partly anaerobic and the decomposition of waste matter is carried out by facultative bacteria. The third and final zone is an anaerobic bottom zone in which accumulated solids are decomposed by anaerobic bacteria. This system relies on photosynthesis and wind action to maintain the upper

aerobic zone. Due to the extended wastewater detention period associated with this process, disinfection of the final effluent is normally not necessary. In addition, tertiary treatment is normally not needed since the system can be operated on a controlled discharge basis with discharges occurring during periods of high receiving stream flows. Recent federal regulations recognize that the final effluent from this type of system will at times have significant algae concentrations. The OEPA regulations for discharge concentrations are generally not as stringent as with continuous discharging. A 5:1 dilution ratio in the stream is required before a discharge can occur.

In regard to advantages and disadvantages associated with an aerated, controlled discharge lagoon, the following listing is provided:

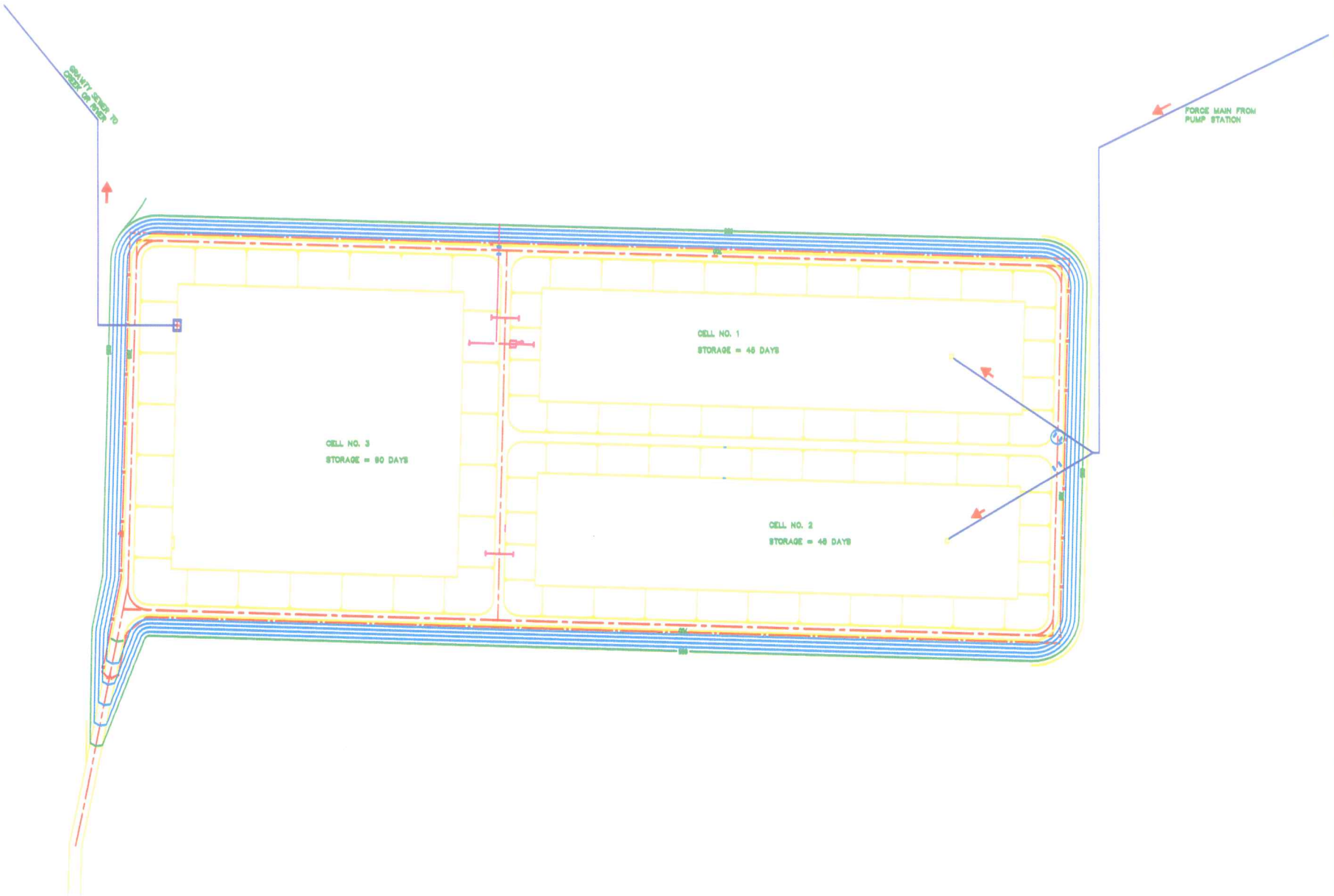
Advantages:

- Low operating costs - no electrical demand
- Reduced sludge generated.
- Limited testing to monitor operation and discharge
- Requires minimal operational skills.
- Requires 300 foot isolation from existing and future residential areas.
- No disinfection
- Ease of operation

Disadvantages:

- Land requirements (10 acres)
- Effluent to receiving stream - 5 to 1 dilution ratio
- Dependent on soil conditions (clay)
- Effluent receiving stream - 5 to 1 dilution ratio

Table F-3 list the estimated project costs; Table F-4 the O&M costs; and Plate F-4 shows a typical layout for an aerated, controlled discharge lagoon.



REFERENCE:
ACAD DWG
R. HEYMAN
2/22/2010

JOB #3185-29

FILE: PLATE11.DWG

TREATMENT ALTERNATIVE NO. 2 CONTROLLED DISCHARGE LAGOON

PLATE F-4

WIGHTMAN'S GROVE WASTEWATER COLLECTION & TREATMENT GENERAL PLAN

POGGEMEYER DESIGN GROUP

TABLE F-3 TREATMENT ALTERNATIVE 2 CONTROLLED DISCHARGE NON-AERATED 180-DAY STORAGE LAGOON DESIGN FLOW - 30,000 GPD	
Item	Estimated Cost
Pump Station and Force Main to Wastewater Treatment Plant Includes Electrical Service and easements	$155,000.00
Lagoon Structures (influent and effluent)	$80,000.00
Excavation, Embankment, and Rip Rap	380,000.00
Roadway	8,000.00
Outfall Sewer with Manholes, includes easements	87,000.00
Non-Component Costs (includes piping, etc.)	70,000.00
Site Work (including grading, seeding, etc.)	15,000.00
Fencing	20,000.00
Ground Water Monitoring	16,000.00
SUBTOTAL	$831,000.00
10% Contingencies	83,100.00
Land Purchase (10 acres)	100,000.00
TOTAL CONSTRUCTION COSTS	$1,014,100.00
Other Fees: Legal, Design, Engineering, Financing, Construction Observation, Testing, Interest During Construction, and Review Fees	$166,200.00
TOTAL ESTIMATED PROJECT COST	$1,180,300.00

TABLE F-4 TREATMENT ALTERNATIVE 2 DESIGN FLOW - 30,000 GPD OPERATION AND MAINTENANCE - NON-AERATED, CONTROLLED DISCHARGE LAGOON	
Item	Estimated Annual Cost
Labor *	$4,200.00
Administration and Billings	$4,800.00
Replacement	$500.00
Contract Lab	$1,700.00
Contractual Mowing Services	$2,500.00
Insurance and Miscellaneous Fees	$1,000.00
TOTAL	$14,700.00
* The treatment works at .030 mgd will require a Class 1 Operator of Record at a minimum. The minimum staffing requirement is 3 days/week for a minimum of 1.5 hour per week. The labor estimate is based on 1 hour/day or 5 hours/week.	

Conclusions

The most cost effective method of addressing Wightman's wastewater problems is to collect and treat the wastewater locally. Under this option, based on a cost analysis of the alternatives, the most cost effective scheme is the construction of a conventional gravity collection system and pumping the collected wastewater to a non-aerated, controlled discharge lagoon for treatment. To construct and operate this system, without grants, results in a projected monthly cost to a user of $115.00 to $120.00 depending on the source and terms of project funding. To implement the recommended program, the Wightman's Grove planning area must receive assistance in the form of grants and low interest loans. The sum of these grants must be of sufficient magnitude that the resulting monthly expense to the user is affordable. An income survey for MHI must be completed because based on the 2000 Census for Riley Township, the project will need to secure low interest loans from USDA along with grants from USDA, OPWC, and CDBG.

The primary source of grant funds at the present time is the U.S. Department of Agriculture via the Rural Development program. However, if the Rural Development program is used for a grant

award, the planning area will be required to use USDA loan funds with an interest rate at 2.375% for 40 years. If Wightman's Grove can qualify for other grant funding through OPWC and/or CDBG, and apply for the OEPA Water Pollution Control Loan Fund (WPCLF) loan program, the funding package may be more economical for the users. The planning area should qualify for a hardship rate of 0% for 20 years if applying to the OEPA WPCLF program using the current program guidelines. The planning area may also qualify for approximately $500,000 from the CDBG Competitive Water and Sewer Program if the income survey is at or below 51% LMI. If Wightman's Grove is awarded $500,000 from CDBG, $300,000 each from OPWC and finance the remainder with a USDA grant and loan, the resulting user fees could be approximately $50 per month.[4]

To address the Barkshire Hills (SA-19) Critical Sewage Area, there are a few options to consider since there is another Critical Sewage Area (East of Sandusky River (SA-08)) in Sandusky Township in close proximity. The East of Sandusky River Critical Sewage Area is divided by the Ohio Turnpike (Interstate 80/90). The southern part includes Muncie Hollow and the northern part includes Shannon Road.

Option No. 1

City of Fremont South of Ohio Turnpike:

The area south of the Ohio Turnpike includes Barkshire Hills and the southern part of the East of Sandusky River (Muncie Hollow) area. This option would include the construction of conventional gravity sewers. The collected sewage would be delivered to the City of Fremont for treatment by means of a pump station located in the area of River Road and County Road 245. This pump station would pump to a second pump station that would be constructed in the area south of Barkshire Hills on County Road 198. This pump station would then deliver the sewage to the City of Fremont for treatment via the General Sewer District's Fleming Lift Station on North Fifth Street. The sewer collection estimate of cost for this service area is as follows:

Muncie Hollow Gravity Sewers SA-08	$ 966,115
Muncie Hollow Force Main	$ 350,700
Barkshire Hills Gravity Sewers SA-19	$ 622,304
Barkshire Hills Force Main	$ 273,300
TOTAL OPINION OF CONSTRUCTION COST	$2,212,419

Wightman's Grove Treatment North of Ohio Turnpike:

The area north of the Ohio Turnpike includes Memory Marina, Wightman's Grove, and the northern part of East of Sandusky River (Shannon Road) area. This option for sewer collection would include the construction of conventional gravity sewers in all these areas.

The collected sewage would be delivered to a wastewater treatment lagoon system that was sited south of Wightman's Grove as illustrated in the 2010 General Plan. A pump station would be constructed south of Wightman's Grove and would pump into a main pump station east of Memory Marina on County Road 259 then to the treatment process. Another pump station could then be constructed near Shannon Road and County Road 211 to deliver sewage to the wastewater treatment system. This treatment facility would be a Sandusky County Regional Treatment plant. The sewer collection and treatment estimate of cost for this service area is as follows:

Shannon Road Gravity Sewers SA-08	$1,051,544
Shannon Road Force Main	$ 451,500
Memory Marina Gravity Sewers SA-10	$ 581,620
Memory Marina Force Main	$ 181,500
Wightman's Grove Gravity Sewers SA-10	$ 986,609
Wightman's Grove Force Main	$ 181,500
Controlled Discharge Lagoon Treatment	$1,180,300
TOTAL OPINION OF CONSTRUCTION COST	$4,614,573

Option No. 1B

For the Shannon Road area within East of Sandusky River (SA-08) Critical Sewage Area, another option to consider would be to install a pump station on Shannon Road and pump the sewage across to the Shorewood Lift Station to be treated by the City of Fremont. The force main would cross the underneath the Sandusky River. The sewer collection estimate of cost for this service area is as follows:

Shannon Road Gravity Sewers SA-08	$1,051,544
Shannon Road Force Main	$ 48,000
TOTAL OPINION OF CONSTRUCTION COST	$1,099,544

Option No. 2

Moving the wastewater treatment system to a centrally located area north of County Road 211 allows for gravity conventional systems to be constructed and the collected sewage pumped to this proposed location for treatment via force mains. The wastewater treatment system site will require additional investigation to verify availability of land, soil conditions, floodplain, wetlands, and outlet to the river. The Critical Sewage Areas to be considered are as follows:

Muncie Hollow (SA-08)
Barkshire Hills (SA-19)
Shannon Road (SA-08)
Memory Marina (SA-10)
Wightman's Grove (SA-10)

The sewer collection and treatment estimate of cost for these areas is listed as follows:

Muncie Hollow Gravity Sewers SA-08	$ 966,115
Muncie Hollow Force Main	$ 350,700
Barkshire Hills Gravity Sewer SA-19	$ 622,304
Barkshire Hills Force Main	$ 287,700
Shannon Road Gravity Sewers SA-08	$1,051,514

Shannon Road Force Main	$ 98,700
Memory Marina Gravity Sewers SA-10	$ 581,620
Memory Marina Force Main	$ 451,500
Wightman's Grove Gravity Sewers SA-10	$ 986,609
Wightman's Grove Force Main	$ 181,500
Regional Treatment-Controlled Discharge Lagoon	$1,180,300
TOTAL OPINION OF CONSTRUCTION COST	$6,758,562

Option No. 3

Under Option No. 2, all Critical Areas are addressed with the proposed wastewater treatment system site. With the rising costs for wastewater treatment via the City of Fremont, costs to add the existing General Sewer District in Rice Township by changing the outlet of the Rice Lift Station force main to the Shannon Road system to transport the sewage to the proposed wastewater treatment system. This would include crossing underneath the Sandusky River.

The estimate for Option No. 3A to change the outlet connection to the Rice Lift Station force main is listed as follows:

Rice Lift Station Force Main $997,594

Including the Sandusky Township Sewer District treatment from the proposed wastewater treatment system site would be done by changing the outlet of the Port Clinton Lift Station force main to the Muncie Hollow collection system to transport the sewage to the proposed wastewater treatment system. This would include crossing underneath the Sandusky River. Under this connection, Option No. 3A would not have to be completed and could be routed to the proposed wastewater treatment system.

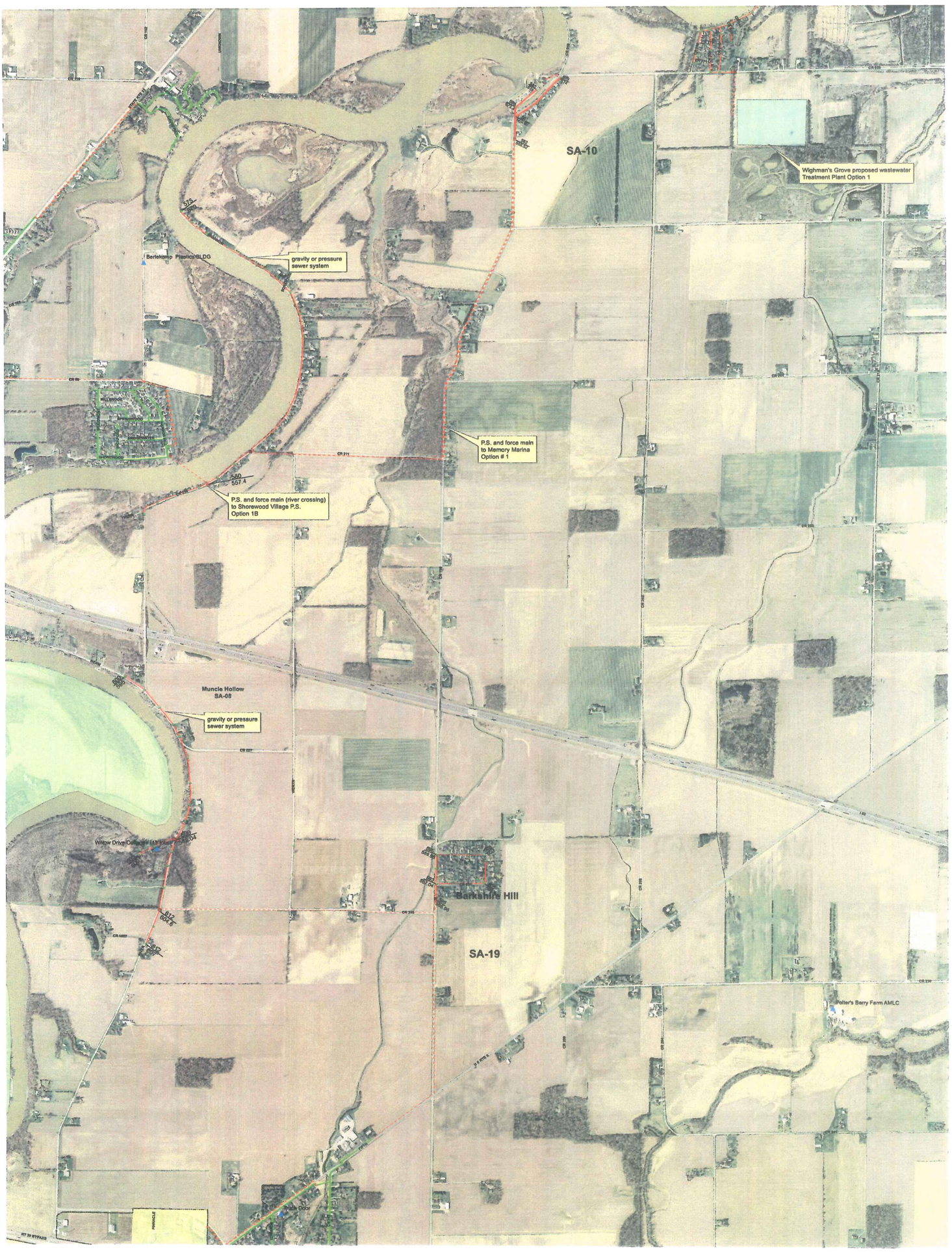
The estimate for Option No. 3B to change the outlet connection for the Port Clinton Lift Station force main is listed as follows:

Port Clinton Lift Station Force Main $1,142,804

Option No. 3B would also allow for the possible reconnection of the Fleming Lift Station to the proposed wastewater treatment system at North River Road.

The estimate for Option No. 3C to change the outlet connection for the Fleming Lift Station force main is listed as follows:

Fleming Lift Station Force Main $328,380



0 0.175 0.35 0.7 Miles

Option No. 1

- Proposed Manholes
- Proposed Pump Station
- Proposed Sanitary
- Proposed Forcemain
- District Gravity Sewers
- District Forcemain
- Proposed Treatment Site

N

D. HEYMAN 4/27/2014 PDG JOB# 3185-039 FILE: S:\3185\039\PLATE17.MXD	CRITICAL AREA- SA-08/SA-10/SA-19 RILEY AND SANDUSKY TOWNSHIP SANDUSKY COUNTY, OHIO PLATE F-5	SANDUSKY COUNTY COMPREHENSIVE WATER & SEWER GENERAL PLAN	POGGEMEYER DESIGN GROUP

0 0.175 0.35 0.7 Miles

Option No. 2

- Proposed Manholes
- Proposed Pump Station
- Proposed Sanitary
- Proposed Forcemain
- District Gravity Sewers
- District Forcemain
- Proposed Treatment Site

N

D. HEYMAN 4/27/2014 PDG JOB# 3185-039 FILE: S:\3185\039\PLATE18.MXD	CRITICAL AREA- SA-08/SA-10/SA-19 RILEY AND SANDUSKY TOWNSHIP SANDUSKY COUNTY, OHIO PLATE F-6	SANDUSKY COUNTY COMPREHENSIVE WATER & SEWER GENERAL PLAN	POGGEMEYER DESIGN GROUP

0 0.125 0.25 0.5 Miles

Option No. 3

- Proposed Manholes
- Proposed Pump Station
- Proposed Sanitary
- Proposed Forcemain
- District Gravity Sewers
- District Forcemain
- Proposed Treatment Site

N

D. HEYMAN 4/27/2014 PDG JOB# 3185-039 FILE: S:\3185\039\PLATE19.MXD	**CRITICAL AREA- SA-08/SA-10/SA-19 RILEY AND SANDUSKY TOWNSHIP SANDUSKY COUNTY, OHIO PLATE F-7**	**SANDUSKY COUNTY COMPREHENSIVE WATER & SEWER GENERAL PLAN**	POGGEMEYER DESIGN GROUP

Estimated construction costs for sanitary sewer service are listed as follows:

TABLE F-5
MUNCIE HOLLOW
CONVENTIONAL GRAVITY SEWERS
RIVER ROAD AND WILLOW DRIVE SA-08

Item No.	Description	Quantity	Unit	Unit Cost	Total Price
1	8" Gravity Sanitary Sewers	5,865	L.F.	$65	$381,225
2	6" Sanitary Laterals	29	Each	$1,300	$37,700
3	Manholes	17	Each	$3,500	$59,500
4	Asphalt Pavement Replacement	211	S.Y.	$40	$8,440
5	Driveway Replacement	150	S.Y.	$45	$6,750
6	Seeding, Mulching, & Rest.	1	L.S.	$25,000	$25,000
7	Storm Sewer Replacement	950	L.F.	$11	$10,450
8	Stone Pavement	778	S.Y.	$25	$19,450
9	1 ½" Service Line	1	Each	$450	$450
10	Grinder Pump	1	Each	$7,200	$7,200
11	Pump Station	1	Each	$150,000	$150,000
12	Preconstruction Video	1	L.S.	$2,500	$2,500
13	Traffic Maintenance	1	L.S.	$7,500	$7,500
14	Mobilization and Bonds	1	L.S.	$27,000	$27,000
	SUBTOTAL				$743,165
	Contingencies (10%)				$74,317
	TOTAL OPINION OF CONSTRUCTION COST				$817,482
	Other Fees (20%) Legal, Design, Engineering, Financing, Construction Observation, Testing, Interest During Construction, and Review Fees				$148,633
	TOTAL OPINION OF PROBABLE COSTS				$966,115
	Notes: Project estimate assumes no rock excavation required and abandonment of septic tanks is the responsibility of the homeowner				

TABLE F-6
BARKSHIRE HILLS AREA - SA-19
CONVENTIONAL GRAVITY SEWERS
STATE ROUTE 198 AND COUNTY ROAD 631

Item No.	Description	Quantity	Unit	Unit Cost	Total Cost
1	8" Gravity Sanitary Sewers	2,710	L.F.	$65	$176,150
2	6" Sanitary Laterals	37	Each	$1,300	$48,100
3	Manholes	8	Each	$3,500	$28,000
4	Asphalt Pavement Replacement	19	S.Y.	$40	$760
5	Driveway Replacement	243	S.Y.	$45	$10,935
6	Seeding, Mulching, & Rest.	1	L.S.	$25,000	$25,000
7	Storm Sewer Replacement	250	L.F.	$11	$2,750
8	Pump Station	1	Each	$150,000	$150,000
9	Preconstruction Video	1	L.S.	$2,500	$2,500
10	Traffic Maintenance	1	L.S.	$7,500	$7,500
11	Mobilization and Bonds	1	L.S.	$27,000	$27,000
	SUBTOTAL				$478,695
	Contingencies (10%)				$47,870
	TOTAL OPINION OF CONSTRUCTION COST				$526,565
	Other Fees (20%) Legal, Design, Engineering, Financing, Construction Observation, Testing, Interest During Construction, and Review Fees				$95,739
	TOTAL OPINION OF PROBABLE COSTS				$622,304
	Notes: Project estimate assumes no rock excavation required and abandonment of septic tanks is the responsibility of the homeowner				

TABLE F-7
SHANNON ROAD AREA SA-08
CONVENTIONAL GRAVITY SEWERS

Item No.	Description	Quantity	Unit	Unit Cost	Total Cost
1	8" Gravity Sanitary Sewers	4,400	L.F.	$65	$286,000
2	6" Sanitary Laterals	47	Each	$1,300	$61,100
3	Manholes	11	Each	$3,500	$38,500
4	Asphalt Pavement Replacement	1,112	S.Y.	$40	$44,480
5	Driveway Replacement	440	S.Y.	$45	$19,800
6	Seeding, Mulching, & Rest.	1	L.S.	$25,000	$25,000
7	Storm Sewer Replacement	1,200	L.F.	$11	$13,200
8	2" Low Pressure Sewer	1,600	L.F.	$21	$33,600
9	1 ½" Service Line	13	Each	$450	$5,850
10	Grinder Pump	13	Each	$7,200	$93,600
11	Flushing Connection	1	Each	$750	$750
12	Pump Station	1	Each	$150,000	$150,000
13	Preconstruction Video	1	L.S.	$2,500	$2,500
14	Traffic Maintenance	1	L.S.	$7,500	$7,500
15	Mobilization and Bonds	1	L.S.	$27,000	$27,000
	SUBTOTAL				$808,880
	Contingencies (10%)				$80,888
	TOTAL OPINION OF CONSTRUCTION COST				$889,768
	Other Fees (20%) Legal, Design, Engineering, Financing, Construction Observation, Testing, Interest During Construction, and Review Fees				$161,776
	TOTAL OPINION OF PROBABLE COSTS				$1,051,544
	Notes: Project estimate assumes no rock excavation required and abandonment of septic tanks is the responsibility of the homeowner				

TABLE F-8
MEMORY MARINA AREA SA-10
CONVENTIONAL GRAVITY SEWERS

Item No.	Description	Quantity	Unit	Unit Cost	Total Cost
1	8" Gravity Sanitary Sewers	1,920	L.F.	$65	$124,800
2	6" Sanitary Laterals	29	Each	$1,300	$37,700
3	Manholes	6	Each	$3,500	$21,000
4	Stone Pavement Replacement	670	S.Y.	$40	$26,800
5	Driveway Replacement	140	S.Y.	$45	$6,300
6	Seeding, Mulching, & Rest.	1	L.S.	$25,000	$25,000
7	Storm Sewer Replacement	250	L.F.	$11	$2,750
8	1 ½" Service Line	2	Each	$450	$900
9	Grinder Pump	2	Each	$7,200	$14,400
10	Flushing Connection	1	Each	$750	$750
11	Pump Station	1	Each	$150,000	$150,000
12	Preconstruction Video	1	L.S.	$2,500	$2,500
13	Traffic Maintenance	1	L.S.	$7,500	$7,500
14	Mobilization and Bonds	1	L.S.	$27,000	$27,000
	SUBTOTAL				$447,400
	Contingencies (10%)				$44,740
	TOTAL OPINION OF CONSTRUCTION COST				$492,140
	Other Fees (20%) Legal, Design, Engineering, Financing, Construction Observation, Testing, Interest During Construction, and Review Fees				$89,480
	TOTAL OPINION OF PROBABLE COSTS				$581,620
	Notes: Project estimate assumes no rock excavation required and abandonment of septic tanks is the responsibility of the homeowner				

TABLE F-9
WIGHTMAN'S GROVE SA-10
ESTIMATE OF COST
CONVENTIONAL GRAVITY SEWER SYSTEM

Item No.	Description	Quantity	Unit	Unit Cost	Total Cost
1	8" PVC Sanitary Sewer	4,400	L.F.	$65	$286,000
2	6" Sanitary Laterals	75	Each	$1,300	$97,500
3	Manholes	18	Each	$3,500	$63,000
4	Asphalt Pavement Replacement	1,112	S.Y.	$40	$44,480
5	Driveway Replacement	440	S.Y.	$45	$19,800
6	Seeding, Mulching, & Rest.	1	L.S.	$25,000	$25,000
7	Storm Sewer Replacement	1,200	L.F.	$11	$13,200
8	Residential Grinder Pumps	3	Each	$7,200	$21,600
9	1 ½" Service Lines	3	Each	$450	$1,350
10	Pump Station	1	Each	$150,000	$150,000
11	Preconstruction Video	1	L.S.	$2,500	$2,500
12	Traffic Maintenance	1	L.S.	$7,500	$7,500
13	Mobilization and Bonds	1	L.S.	$27,000	$27,000
	SUBTOTAL				$758,930
	Contingencies (10%)				$75,893
	TOTAL OPINION OF CONSTRUCTION COST				$834,823
	Other Fees (20%) Legal, Design, Engineering, Financing, Construction Observation, Testing, Interest During Construction, and Review Fees				$151,786
	TOTAL OPINION OF PROBABLE COSTS				$986,609
	Notes: Project estimate assumes no rock excavation required and abandonment of septic tanks is the responsibility of the homeowner				

TABLE F-10
OPTION 3A
RICE LIFT STATION AND FORCE MAIN

Item No.	Description	Quantity	Unit	Unit Cost	Total Cost
1	10" Force Main Includes River Crossing	7,100	L.F.	$75	$532,500
2	Grinder Pump	3	Each	$7,200	$21,600
3	1 ½" Service Line	3	Each	$450	$1,350
4	8" Gravity Sanitary Sewer	2,200	L.F.	$65	$143,000
5	6" Sanitary Laterals	21	Each	$1,300	$27,300
6	Manholes	6	Each	$3,500	$21,000
7	Asphalt Pavement Replacement	311	S.Y.	$40	$12,440
8	Driveway Replacement	182	S.Y.	$45	$8,190
9	Pump Station	1	Each	$150,000	$150,000
10	Seeding, Mulching, Restoration	1	L.S.	$25,000	$25,000
11	Preconstruction Video	1	L.S.	$2,500	$2,500
12	Traffic Maintenance	1	L.S.	$7,500	$7,500
13	Mobilization and Bonds	1	L.S.	$2,700	$2,700
	SUBTOTAL				$767,380
	Contingencies (10%)				$76,738
	TOTAL OPINION OF CONSTRUCTION COST				$844,118
	Other Fees (20%) Legal, Design, Engineering, Financing, Construction Observation, Testing, Interest During Construction, and Review Fees				$153,476
	TOTAL OPINION OF PROBABLE COSTS				$997,594
	Notes: Project estimate assumes no rock excavation required and abandonment of septic tanks is the responsibility of the homeowner				

TABLE F-11
OPTION 3B
PORT CLINTON LIFT STATION AND FORCE MAIN

Item No.	Description	Quantity	Unit	Unit Cost	Total Cost
1	12" Force Main Includes River Crossing	9,300	L.F.	$75	$697,500
2	Grinder Pump	12	Each	$7,200	$86,400
3	1 ½" Service Line	12	Each	$450	$5,400
4	Flushing Connection	1	Each	$750	$750
5	Drive Replacement	194	S.Y.	$45	$8,730
6	Asphalt Pavement Replacement	70	S.Y.	$40	$2,800
7	Pump Station Modification	1	Each	$50,000	$50,000
8	Seeding, Mulching, Restoration	1	L.S.	$25,000	$25,000
9	Preconstruction Video	1	L.S.	$2,500	$2,500
10	Traffic Maintenance	1	L.S.	$7,500	$7,500
11	Mobilization and Bonds	1	L.S.	$2,700	$2,700
	SUBTOTAL				$879,080
	Contingencies (10%)				$87,908
	TOTAL OPINION OF CONSTRUCTION COST				$966,988
	Other Fees (20%) Legal, Design, Engineering, Financing, Construction Observation, Testing, Interest During Construction, and Review Fees				$175,816
	TOTAL OPINION OF PROBABLE COSTS				$1,142,804
	Notes: Project estimate assumes no rock excavation required and abandonment of septic tanks is the responsibility of the homeowner				

TABLE F-12
OPTION 3C
FLEMING LIFT STATION FORCE MAIN

Item No.	Description	Quantity	Unit	Unit Cost	Total Cost
1	4" Force Main	3,100	L.F.	$40	$124,000
2	Grinder Pump	6	Each	$7,200	$43,200
3	1 ½" Service Line	6	Each	$450	$2,700
4	12" Bore and Jack Casing Pipe (US Route 6)	60	L.F.	$250	$15,000
5	Pump Station Modification	1	Each	$30,000	$30,000
6	Seeding, Mulching, Restoration	1	L.S.	$25,000	$25,000
7	Preconstruction Video	1	L.S.	$2,500	$2,500
8	Traffic Maintenance	1	L.S.	$7,500	$7,500
9	Mobilization and Bonds	1	L.S.	$2,700	$2,700
	SUBTOTAL				$252,600
	Contingencies (10%)				$25,260
	TOTAL OPINION OF CONSTRUCTION COST				$277,860
	Other Fees (20%) Legal, Design, Engineering, Financing, Construction Observation, Testing, Interest During Construction, and Review Fees				$50,520
	TOTAL OPINION OF PROBABLE COSTS				$328,380
	Notes: Project estimate assumes no rock excavation required and abandonment of septic tanks is the responsibility of the homeowner				

TABLE F-13 FORCE MAIN OPINION OF ESTIMATED COST			
Option No. 1			
Memory Marina SA-10	3,025	L.F.	$181,500
Shannon Road SA-08	7,525	L.F.	$451,500
Muncie Hollow SA-08	5,845	L.F.	$350,700
Barkshire Hills SA-19	4,555	L.F.	$273,300
Option No. 1B			
Shannon Road SA-08	800	L.F.	$48,000
Option No. 2			
Wightman's Grove SA-10	3,025	L.F.	$181,500
Memory Marina SA-10	7,525	L.F.	$451,500
Shannon Road 234 SA-08	1,645	L.F.	$98,700
Barkshire Hills SA-19	4,795	L.F.	$287,700
Muncie Hollow SA-08	4,200	L.F.	$252,000
Option No. No. 3			
Rice Lift Station/Force Main 3A	F-10		$844,118
Port Clinton Lift Station/Force Main 3B	F-11		$966,988
Fleming Lift Station/Force Main 3C	F-12		$277,860
Note: Above listed force mains are 6" diameter and estimated at $60/l.f. Cost includes restoration and project costs. See detailed estimate in the Appendix.			

TABLE F-14
PROJECTED SANITARY SEWER FLOWS
OPTION 1
SERVICE AREA ESTIMATED SANITARY FLOW TO FREMONT

- 2010 Census - 2.31 persons per household
- 100 gallon/day/capita residential
- Commercial and allowable I/I = 10%
- Adjusted gallons/day/capita - 110 gpcd
- 20 year projected growth = -.059

Muncie Hollow

- 30 service connections x 2.31 pph x 110 gpcd = 7,623 gpd

Barkshire Hills

- 37 service connections x 2.31 pph x 110 gpcd = 9,402 gpd

Total estimated sanitary flows = 17,025 gpd

Fremont Treatment Costs = $62.41/month (current)
$80.00/month (projected by city)

TABLE F-15
PROJECTED SANITARY SEWER FLOWS
OPTION 1
SERVICE AREA ESTIMATED SANITARY FLOW TO WIGHTMAN'S GROVE

- 2010 Census - 2.31 persons per household
- 100 gallon/day/capita residential
- Commercial and allowable I/I = 10%
- Adjusted gallons/day/capita - 110 gpcd
- 20 year projected growth = -.059

Shannon Road

- 60 service connections x 2.31 pph x 110 gpcd = 15,246 gpd

Memory Lane

- 31 service connections x 2.31 pph x 110 gpcd = 7,877 gpd

Wightman's Grove

- 75 service connections x 2.31 pph x 110 gpcd = 19,058 gpd

Total estimated sanitary flows = 42,181 gpd

Treatment Estimated O&M Costs = $37,700/year

Total estimated service connections = 166

Sandusky County Treatment Costs = $18.93/month

TABLE F-16
SHANNON ROAD, MEMORY LANE AND WIGHTMANS GROVE
EXTENDED AERATION
WITH TERTIARY SLOW SAND FILTERS
DESIGN FLOW - 45,000 GPD

Item No.	Item	Estimated Cost
1	Pretreatment Facilities (Trash Trap/Aerated Flow EQ) Extended Aeration Plant (Package) Alum Feed Dosing Tank with Submersible Pumps/Controls Distribution Box Fixed Media Clarifiers and Slow Sand Filters Chlorination/Dechlorination Tank/Post Aeration Flow Meter and Recorder Aerated Sludge Holding Tank	$295,000.00
2	Outfall Sewer to Receiving Stream with Manhole	94,000.00
3	Control and Storage Building	85,000.00
4	Standby Power	40,000.00
5	Non-Component Costs (Includes piping and electrical)	75,000.00
6	Site Work (including Grading, Seeding, Walks, Etc.)	85,000.00
7	Drives and Fences	50,000.00
	SUBTOTAL	$724,000.00
	10% Contingencies	72,400.00
	Land Purchase (1 acre)	10,000.00
	TOTAL OPINION OF CONSTRUCTION COSTS	$806,400.00
	Other Fees (20%) Legal, Design, Engineering, Financing, Construction Observation, Testing, Interest During Construction, and Review Fees	$144,800.00
	TOTAL OPINION OF PROBABLE COSTS	$951,200.00
	Note: Pump station and force main to WWTP is included in the collection system opinion of construction costs.	

TABLE F-17
SHANNON ROAD, MEMORY LANE AND WIGHTMANS GROVE
45,000 GPD
ESTIMATED COST OF OPERATION AND MAINTENANCE -
EXTENDED AERATION PLANT WITH TERTIARY TREATMENT

Item	Estimated Annual Cost
Labor *	$14,600.00
Administration and Billings	$5,200.00
Utilities	$8,700.00
Chemicals	$600.00
Replacement	$1,700.00
Contract Sludge Hauling	$3,000.00
Contract Lab	$2,800.00
Insurance and Miscellaneous Fees	$1,100.00
TOTAL	$37,700.00

* The treatment works at .030 mgd will require a Class 1 Operator of Record at a minimum. The minimum staffing requirement is 3 days/week for a minimum of 1.5 hour per week. The labor estimate is based on 8 hours/week. The above estimate is only intended to be used as a comparison to different treatment technologies and processes. Actual annual costs will be based on Sandusky County's operations and maintenance.

TABLE F-18
PROJECTED SANITARY SEWER FLOWS
OPTION 1B
SERVICE AREA ESTIMATED SANITARY FLOW TO FREMONT

- 2010 Census - 2.31 persons per household
- 100 gallon/day/capita residential
- Commercial and allowable I/I = 10%
- Adjusted gallons/day/capita - 110 gpcd
- 20 year projected growth = -.059

Shannon Road

- 60 service connections x 2.31 pph x 110 gpcd = 15,246 gpd

Total estimated sanitary flows = 15,246 gpd

Fremont Treatment Costs = $52.32/month (current)
$80.00/month (projected by city)

TABLE F-19
PROJECTED SANITARY SEWER FLOWS
OPTION 2
SERVICE AREA ESTIMATED SANITARY FLOW

- 2010 Census - 2.31 persons per household
- 100 gallon/day/capita residential
- Commercial and allowable I/I = 10%
- Adjusted gallons/day/capita - 110 gpcd
- 20 year projected growth = -.059

Muncie Hollow

- 30 service connections x 2.31 pph x 110 gpcd = 7,623 gpd

Barkshire Hills

- 37 service connections x 2.31 pph x 110 gpcd = 9,402 gpd

Shannon Road

- 60 service connections x 2.31 pph x 110 gpcd = 15,246 gpd

Memory Lane

- 31 service connections x 2.31 pph x 110 gpcd = 7,877 gpd

Wightman's Grove

- 75 service connections x 2.31 pph x 110 gpcd = 19,058 gpd

Total estimated sanitary flows = 59,206 gpd

Treatment Estimated O&M Cost = $41,000/year

Total Estimated Service Connections = 233

Sandusky County Treatment Costs = $14.66/month

TABLE F-20 OPTION 2 EXTENDED AERATION WITH TERTIARY SLOW SAND FILTERS DESIGN FLOW - 60,000 GPD		
Item No.	Item	Estimated Cost
1	Pretreatment Facilities (Trash Trap/Aerated Flow EQ) Extended Aeration Plant (Package) Alum Feed Dosing Tank with Submersible Pumps/Controls Distribution Box Fixed Media Clarifiers and Slow Sand Filters Chlorination/Dechlorination Tank/Post Aeration Flow Meter and Recorder Aerated Sludge Holding Tank	$450,000.00
2	Outfall Sewer to Receiving Stream with Manhole	94,000.00
3	Control and Storage Building	85,000.00
4	Standby Power	50,000.00
5	Non-Component Costs (Includes piping and electrical)	80,000.00
6	Site Work (including Grading, Seeding, Walks, Etc.)	85,000.00
7	Drives and Fences	50,000.00
	SUBTOTAL	$894,000.00
	10% Contingencies	89,400.00
	Land Purchase (1 acre)	10,000.00
	TOTAL OPINION OF CONSTRUCTION COSTS	$993,400.00
	Other Fees (20%) Legal, Design, Engineering, Financing, Construction Observation, Testing, Interest During Construction, and Review Fees	$178,800.00
	TOTAL OPINION OF PROBABLE COSTS	$1,172,200.00
	Note: Pump station and force main to WWTP is included in the collection system opinion of construction costs.	

TABLE F-21
OPTION 2
60,000 GPD
ESTIMATED COST OF OPERATION AND MAINTENANCE -
EXTENDED AERATION PLANT WITH TERTIARY TREATMENT

Item	Estimated Annual Cost
Labor *	$14,600.00
Administration and Billings	$5,200.00
Utilities	$10,700.00
Chemicals	$800.00
Replacement	$2,000.00
Contract Sludge Hauling	$3,800.00
Contract Lab	$2,800.00
Insurance and Miscellaneous Fees	$1,100.00
TOTAL	$41,000.00

* The treatment works at .030 mgd will require a Class 1 Operator of Record at a minimum. The minimum staffing requirement is 3 days/week for a minimum of 1.5 hour per week. The labor estimate is based on 8 Hours/week. The above estimate is only intended to be used as a comparison to different treatment technologies and processes. Actual annual costs will be based on Sandusky County's operations and maintenance.

TABLE F-22
PROJECTED SANITARY SEWER FLOWS
OPTION 3
SERVICE AREA ESTIMATED SANITARY FLOW

- 2010 Census - 2.31 persons per household
- 100 gallon/day/capita residential
- Commercial and allowable I/I = 10%
- Adjusted gallons/day/capita - 110 gpcd
- 20 year projected growth = -.059

Muncie Hollow

- 30 service connections x 2.31 pph x 110 gpcd = 7,623 gpd

Barkshire Hills

- 37 service connections x 2.31 pph x 110 gpcd = 9,402 gpd

County Road 234

- 60 service connections x 2.31 pph x 110 gpcd = 15,246 gpd

Memory Lane

- 31 service connections x 2.31 pph x 110 gpcd = 7,877 gpd

Wightman's Grove

- 75 service connections x 2.31 pph x 110 gpcd = 19,058 gpd

Sandusky County General Sewer District

- 267 service connections x 2.31 pph x 110 gpcd = 67,845 gpd

Sandusky Township Sewer District

- 419 service connections x 2.31 pph x 110 gpcd = 106,468 gpd

Total estimated sanitary flows = 233,519 gpd

Treatment Estimated O&M Cost = $165,300/year

Total estimated service connections = 919

Sandusky County Treatment Cost = $14.99/month

TABLE F-23
TREATMENT PLANT ALTERNATIVE NO. 1
OXIDATION DITCH WITH FINAL SETTLING .250 MGD

Description: Alternative No. 1 will include a mechanical screen, raw sewage pumps, oxidation ditch, final settling tanks, RAS/WAS pump station, UV disinfection, post aeration, aerobic sludge digestion, and sludge dewatering.

Item No.	Description	Quantity	Unit	Unit Cost	Total Cost
1	Raw Water Pump and Mechanical Screen Building Complete with Flow Meter, Recorders, VFD Controls, and Sampler	1	L.S.	$700,000	$700,000
2	Oxidation Ditch - 2 Channel Looped Reactor System with Controls	1	L.S.	$725,000	$725,000
3	Two Final Settling Tanks	1	L.S.	$475,000	$475,000
4	RAW/WAS Pump Station Complete with Wet Well, Flow Metering, and Building	1	L.S.	$260,000	$260,000
5	UV Disinfection Complete with Post Aeration, Flow Meter, and Sample	1	L.S.	$200,000	$200,000
6	Chemical Feed and Storage For Phosphorous Removal	1	L.S.	$100,000	$100,000
7	Aerobic Sludge Digestion 2 Tanks for 180 day Storage and Treatment, Includes Building, Blowers, Mixers, Diffusers, and Piping	1	L.S.	$375,000	$375,000
8	Sludge Dewatering Includes Building, Polymer Feed System, and Storage	1	L.S.	$500,000	$500,000
9	Laboratory Building to Include Office and Restrooms	1	L.S.	$240,000	$240,000
10	Auxiliary Power Complete with Fuel Storage, Controls, and Outside Housing	1	L.S.	$100,000	$100,000
11	Non-Potable Water System	1	L.S.	$65,000	$65,000
12	Piping, Electrical, Site Work, Driveway, Fence, and Outfall to River	1	L.S.	$650,000	$650,000
	SUBTOTAL				$4,390,000
	Contingencies (10%)				$439,000
	Land Purchase				$30,000
	TOTAL OPINION OF CONSTRUCTION COST				$4,859,000
	Other Fees (20%) Legal, Design, Engineering, Financing, Construction Observation, Testing, Interest During Construction, and Review Fees				$878,000
	TOTAL OPINION OF PROBABLE COSTS				$5,737,000

TABLE F-24
TREATMENT PLANT ALTERNATIVE NO. 2
SEQUENCING BATCH REACTOR (SBR) .250 MGD

Description: Alternative No. 2 will include a mechanical screen, raw sewage pumps, Sequencing Batch Reactor (SBR), UV disinfection, post aeration, aerobic sludge digestion, and sludge dewatering.

Item No.	Description	Quantity	Unit	Unit Cost	Total Cost
1	Raw Water Pump and Mechanical Screen Building Complete with Flow Meter, Recorders, VFD Controls, and Sampler	1	L.S.	$700,000	$700,000
2	Sequencing Batch Reactor (SBR) Includes Blowers, Diffusers, Decant, Equipment, Valves, Controls, Tanks, and Blower Building	1	L.S.	$1,300,000	$1,300,000
3	UV Disinfection Complete with Post Aeration, Flow Meter, and Sampler	1	L.S.	$250,000	$250,000
4	Chemical Feed and Storage For Phosphorous Removal	1	L.S.	$100,000	$100,000
5	Aerobic Sludge Digestion 2 Tanks for 180 day Storage and Treatment, Includes Building, Blowers, Mixers, Diffusers, and Piping	1	L.S.	$375,000	$375,000
6	Sludge Dewatering Includes Building, Polymer Feed System, and Storage	1	L.S.	$500,000	$500,000
7	Laboratory Building to Include Office and Restrooms	1	L.S.	$240,000	$240,000
8	Auxiliary Power Complete with Fuel Storage, Controls, and Outside Housing	1	L.S.	$100,000	$100,000
9	Non-Potable Water System	1	L.S.	$65,000	$65,000
10	Piping, Electrical, Site Work, Driveway, Fence, and Outfall to River	1	L.S.	$650,000	$650,000
	SUBTOTAL				$4,280,000
	Contingencies (10%)				$428,000
	Land Purchase				$30,000
	TOTAL OPINION OF CONSTRUCTION COST				$4,738,000
	Other Fees (20%) Legal, Design, Engineering, Financing, Construction Observation, Testing, Interest During Construction, and Review Fees				$856,000
	TOTAL OPINION OF PROBABLE COSTS				$5,594,000

TABLE F-25 ESTIMATED ANNUAL REGIONAL TREATMENT COSTS	
Description	Estimated Costs
Personnel Services *	$80,000
Ohio Public Employees Retirement System	$11,200
Medicare	$1,200
Medical/Hospitalization	$6,900
Worker's Compensation	$3,000
Uniforms and Clothing	$2,000
Telephone	$2,400
Training Services	$1,200
Professional and Technical Services - Labs	$5,600
Insurance and Bonding	$3,000
Utility - Wastewater Treatment	$30,000
Operating Supplies and Materials	$2,600
Operating Supplies and Materials - Chemicals	$4,700
Repairs and Maintenance of Building and Land	$1,000
Sludge Disposal	$5,500
Capital Improvement Fund	$5,000
ESTIMATED OPERATING COSTS	$165,300
* Based on one full-time Ohio EPA certified operator and one part-time staff member Note: The above estimate only includes treatment plant operations and does not include administration or billing which is already provided by the Sandusky County Sanitary Engineer's office.	

Estimated monthly operation and maintenance cost:

- Estimated operating and maintenance - $165,300
- 919 service connections = $14.99/month