DRAFT

Regional Facilities Plan
Grant County Sanitary Sewer District

Grant County Sanitary Sewer District

Sewer Collection System Improvement Alternatives

RFI #17/#18

KY 491 Pump Station Upgrade

Alternative No. 1 - $2,591,000

- Construct an Equalization Pump Station and Storage Tank at PS Site

Alternative No. 2 - $2,273,000

- Construct a parallel 8-inch PVC Force Main from PS to WWTP

Alternative No. 3 - $606,400

- Upgrade Pump Station and Maximize Existing 6-inch Force Main Capacity

Wastewater Treatment Plant Upgrade and Expansion Alternatives

Alternative No. 1 - $8,051,000

- Rehab./Reuse (2) Existing PTP's (0.15 MGD Capacity)
- Rehab/Repurpose (2) Existing PTP's by Converting to EQ/Sludge Holding Tanks
- Add a New SBR Treatment System (0.30 MGD Capacity)
- Add a New Sludge Dewatering System and Building

Alternative No. 2 - $8,477,000

- Rehab/Reuse (2) Existing PTP's (0.15 MGD Capacity)
- Demo (2) Existing PTP's and Construct a Sludge Dewatering System and Building
- Add a New SBR Treatment System (0.30 MGD Capacity)
- Add a New EQ and Sludge Holding Tanks

Alternative No. 3 - $7,247,000

- Rehab/Repurpose (2) Existing PTP's to EQ and Sludge Holding Tanks
- Demo (2) Existing PTP's and Construct a Sludge Dewatering System and Building
- Add a New SBR Treatment System (0.45 MGD Capacity)

Alternative No. 4 - $7,823,000

- Rehab/Repurpose (2) Existing PTP's to EQ and Sludge Holding Tanks
- Demo (2) Existing PTP's and Construct a Sludge Dewatering System and Building
- Add a New Membrane (MBR) Treatment System (0.45 MGD Capacity

Alternative No. 5 - $6,139,000

- Rehab/Repurpose (2) Existing PTP's to EQ and Sludge Holding Tanks
- Construct a Sludge Dewatering Box System
- Add a New SBR Treatment System (0.45 MGD Capacity)

Alternative No. 6 - $19,231,000

- Construct two (2) pump stations
- Construct 61,000 LF of 14-inch force main to the Williamstown WWTP

Sewer Collection System Improvements

Alternative No. 1
Upgrade KY 491 Pump Station, New Equalization Pump Station and Storage Tank

Upgrade to KY 491 Pump Station an Increase Reliability

New Equalization Pump Station

New Storage Tank

The alternative includes upgrades to the existing KY 491 Pump Station to 350 gallons per minute (gpm) providing reliable service. Flows that exceed the pump station capacity during high rainfall periods would be diverted to an Equalization Pump Station (250 gpm) which would then lift flow into a 175,000 gallon Storage Tank. When flows return to normal conditions at the KY 491 Pump Station, flows from the Storage Tank would be discharged back into the pump station for pumping to the GCSSD WWTP. A description of the KY 491 Pump Station improvements are listed as follows:

- Upgrade pumps, controls, and misc. materials to improve the reliability of the KY 491 Pump Station.
- Construct a new Equalization Pump Station having a capacity of 250 gpm.
- Construct a new Storage Tank with a capacity of 175,000 gallons to store flows that exceed the capacity of the KY 491 Pump Station.
- Provide an emergency standby generator to run both pump stations when power is disrupted.

Table 1
Alternative No. 1
KY 491 Pump Station,
Equalization Pump Station, and Storage Tank

Opinion of Probable Cost
Sewer Collection System

Item No.	Description	Quantity	Unit	Unit Price	Total
1	Mobilization/Demobilization	1	LS	$17,000	$17,000
2	Bonds and Insurance	1	LS	$34,000	$34,000
3	General Conditions	1	LS	$51,000	$51,000
4	Equalization Pump Station (250 GPM)	1	LS	$350,000	$350,000
5	Equalization Storage Tank (175,000 Gal)	1	LS	$800,000	$800,000
6	Upgrade KY 491 Pump Station (350 GPM)	1	LS	$100,000	$100,000
7	Rehab / Replace Internal Components at PS	1	LS	$50,000	$50,000
8	Pavement Replacement	300	LF	$100	$30,000
9	Equalization Tank Site Work	1	LS	$170,000	$170,000
10	Temporary Bypass Pumping	1	LS	$30,000	$30,000
11	Emergency Standby Generator	1	LS	$150,000	$150,000
12	Erosion Control/Site Restoration	1	LS	$25,000	$25,000
13	Connect to Existing	2	EA	$2,500	$5,000

Construction Cost Subtotal	**$1,812,000**
Contingencies @ 10%	**$181,000**
Total Opinion of Probable Construction Cost	**$1,993,000**
Project Development Cost* @ 30%	**$598,000**
Total Opinion of Probable Project Cost	**$2,591,000**

*Development Cost Includes Project Administration, Planning, Legal, Engineering, Resident Inspection, and Project Contingencies at 10%

Sewer Collection System Improvements

Alternative No. 2
Upgrade KY 491 Pump Station, Construct a New 8-Inch Force Main

Upgrade to KY 491 Pump Station an Increase Capacity and Reliability

New Parallel 8-inch Force Main

The alternative includes upgrades to the existing KY 491 Pump Station to 600 (gpm) increasing capacity and providing reliable service. Construction of approximately 13,500 linear feet of parallel 8-inch force main extending to the WWTP. Equalization of flows or treatment processes able to handle the new peak flow would be required at the WWTP. A description of the KY 491 Pump Station and force mains improvements are listed as follows:

- Upgrade pumps, controls, and misc. materials to improve the reliability of the KY 491 Pump Station an increase pumping capacity to 600 gpm.
- Construct a new 8-inch PVC force main that would extend from the KY 491 Pump Station to the GCSSD WWTP.
- Provide an emergency standby generator to run the pump station when power is disrupted.

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Table 2

Alternative No. 2
KY 491 Pump Station Upgrade
and ~~New~~ Parallel 8-inch Force Main

Opinion of Probable Project Cost
Sewer Collection System

Item No.	Description	Quantity	Unit	Unit Price	Total
1	Mobilization/Demobilization	1	LS	$16,000	$16,000
2	Bonds and Insurance	1	LS	$32,000	$32,000
3	General Conditions	1	LS	$48,000	$48,000
4	8-Inch PVC Force Main	13,500	LF	$70	$945,000
5	Combination Air Valve and Vault	3	EA	$10,000	$30,000
6	4-foot Dia. Standard Manhole	2	EA	$6,000	$12,000
7	16-inch Steel Casing Pipe (B&J)	80	LF	$600	$48,000
8	Pavement Replacement	500	LF	$60	$30,000
9	Upgrade KY 491 Pump Station (600 GPM)	1	LS	$165,000	$165,000
10	Rehab / Replace Internal Components at PS	1	LS	$50,000	$50,000
11	Temporary Bypass Pumping	1	LS	$30,000	$30,000
12	Emergency Standby Generator	1	LS	$100,000	$100,000
13	Erosion Control/Site Restoration	13,500	LS	$6	$81,000
14	Connect to Existing	1	EA	$2,500	$2,500

Construction Cost Subtotal	**$1,589,500**
Contingencies @ 10%	**$159,000**
Total Opinion of Probable Construction Cost	**$1,748,500**
Project Development Cost* @ 30%	**$524,500**
Total Opinion of Probable Project Cost	**$2,273,000**

*Development Cost Includes Project Administration, Planning, Legal, Engineering, Resident Inspection, and Project Contingencies at 10%

Sewer Collection System Improvements

Alternative No. 3
KY 491 Pump Station Improvements

Improve KY 491 Pump Station Increasing Capacity and Reliability

The alternative includes upgrades to the existing KY 491 Pump Station to 420 (gpm) increasing capacity, maximizing capacity of the existing 6-inch force main, and providing reliable service. Equalization of flows or treatment processes able to handle the new peak flow would be required at the WWTP. A description of the KY 491 Pump Station improvements is listed as follows:

- **Upgrade pumps, controls, and misc. materials to improve the reliability of the KY 491 Pump Station an increase pumping capacity to 420 gpm.**
- **Provide an emergency standby generator to run the pump station when power is disrupted.**

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Table 3
Alternative No. 3
KY 491 Pump Station Improvements

Opinion of Probable Project Cost
Sewer Collection System

Item No.	Description	Quantity	Unit	Unit Price	Total
1	Mobilization/Demobilization	1	LS	$4,000	$4,000
2	Bonds and Insurance	1	LS	$8,000	$8,000
3	General Conditions	1	LS	$12,000	$12,000
4	KY 491 Pump Station Improvements (420 GPM)	1	LS	$200,000	$200,000
5	Rehab / Replace Internal Components at PS	1	LS	$50,000	$50,000
6	Emergency Standby Generator	1	LS	$100,000	$100,000
7	Site Improvements	1	EA	$50,000	$50,000

Construction Cost Subtotal	**$424,000**
Contingencies @ 10%	**$42,400**
Total Opinion of Probable Construction Cost	**$466,400**
Project Development Cost* @ 30%	**$140,000**
Total Opinion of Probable Project Cost	**$606,400**

*Development Cost Includes Project Administration, Planning, Legal, Engineering, Resident Inspection, and Project Contingencies at 10%

Wastewater Treatment Plant Upgrade and Expansion

Alternative No. 1
Repurpose and Upgrade All Four (4) Existing Treatment Systems (0.15 MGD) Sequencing Batch Reactor (0.30 MGD)

Rehabilitate/Reuse Existing Treatment Components (0.15 MGD Capacity)

New SBR Treatment System (0.30 MGD Capacity)

Repurpose Existing Treatment Components to Influent and Effluent Equalization (IEQ and EEQ) Basins and Sludge Holding Tanks

New Sludge Dewatering System and Building

The alternative includes upgrades to the current treatment system, rehabilitation of two (2) existing 75,000 gallon per day (gpd) treatment capacity package treatment plants (PTP's), for a treatment capacity of 0.15 MGD, and constructing a new SBR treatment system (0.30 treatment capacity) for a combined treatment capacity at the wastewater treatment Plant (WWTP) of 0.45 million gallons per day (MGD). A description of the WWTP upgrades and expansion are listed as follows:

- **Construct new Screening System consisting of a mechanical bar screen with 1/4"-inch bar spacing and a backup manual bar rack in a bypass channel with 1-inch bar spacing. The mechanical bar screen will have a peak flow capacity of 1.48 MGD. All required components would be heat traced and insulated.**
- **The existing screen and attached splitter box would be abandoned and removed.**
- **One (1) existing PTP would be repurposed and split into an Influent Equalization Basin (IEQ) and an Effluent Equalization Basin (EEQ). Influent flows in the IEQ will be pumped to the treatment PTP's and the SBR system for biological treatment. Three (3) IEQ submersible pumps with variable frequency drives (VFD's) would be included each with a capacity of 520 gallons per minute (gpm). Aeration will be provided to prevent setting of organic materials and to help with odor minimization prior to pumping into biological treatment systems.**
- **Two (2) existing PTP's would be rehabilitated and reused for biological treatment having a treatment capacity of 0.15 MGD. The equalization and sludge holding compartments would be converted to additional aeration and clarification compartments, and a splitter box would be added to equally split flow between the two PTP's.**
- **A new two (2) basin Sequencing Batch Reactor (SBR) treatment system would be constructed for biological treatment with a treatment capacity of 0.30 MGD. Flows would be cycled between the two basins. Automated control of flow, mixing, aeration, settling, and decanting would be provided. The SBR would be able to handle he peak flow of 1.48 MGD at an accelerated cycle rate. Retrievable fine bubble diffusers, surface mixers, blowers, and decanters would be provided for each basin.**
- **One (1) existing PTP would be repurposed into an IEQ and EEQ Basin. Effluent flows into the EEQ will include effluent flow from the two (2) PTP's and the SBR's. All of these flows would**

flow by gravity into and out of the EEQ Basin. The flow rate leaving the EEQ would be controlled by a flow control valve and a flow meter thus lowering the peak flow rate to the Disinfection Basin.

- A new Post Aeration/Disinfection Basin would be constructed to handle a peak flow rate of 2.22 MGD with a detention time of 15 minutes for disinfection and 7 minutes for post aeration. A 6-inch Parshall Flume or a 45-degree v-notch weir would be provided for Effluent Flow Monitoring.
- The existing Post Aeration/Disinfection Basin would be abandoned and removed.
- A new Sludge Dewatering System and Building would be constructed for dewatering waste sludge. The building would include a separate electrical room and space for a polymer feed system, sludge pumps, dewatering system, and a discharge conveyor. An area would be provided for future Alum and pH adjustment feed system. A water system would be included throughout the building.
- One (1) existing PTP would be repurposed and split into two (2) sludge holding tanks. The tanks would be provided with aeration for complete mixing. Telescoping valves would be provided to decant clear liquid off each tan to thickened waste sludge prior to dewatering.
- An emergency standby generator would be provided to run the treatment system during power outages.

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Table 4

Alternative No. 1
Wastewater Treatment Plant Upgrade and Expansion
Opinion of Probable Project Cost

Repurpose and Upgrade All Four Existing Treatment Systems (0.15 MGD)
Sequencing Batch Reactor (0.30 MGD)

Item No.	Description	Total Cost
1	Mob/ Demobilization	$49,000
2	Bonds and Insurance	$98,000
3	General Conditions	$147,000
4	Influent Screening System	$206,000
5	Repurpose Existing Structures	$350,000
6	Rehab. Existing Structures (0.15 MGD Capacity)	$220,000
7	SBR Treatment System (0.30 MGD Capacity)	$1,050,000
8	Sludge Dewatering System and Building	$1,550,000
9	Disinfection / Post Aeration / Effluent Flow Measurements	$168,000
10	Piping / Valves / Gates / Manholes	$450,000
11	Electrical Expansion	$540,000
12	Instrumentation Upgrades	$180,000
13	Painting and Coating System	$80,000
14	Sludge and Grit Disposal	$50,000
15	Bypass Pumping	$40,000
16	Site Restoration	$30,000
17	Emergency Standby Generator	$250,000

Subtotal Construction Cost	$5,458,000
Contractor Overhead & Profit @ 18%	$982,500
Total Opinion of Probable Construction Cost	**$6,440,500**

Project Development Cost* @ 25%	$1,610,500
Total Opinion of Probable Project Cost	**$8,051,000**

*Development Cost Includes Project Administration, Planning, Legal, Engineering, Resident Inspection, and Project Contingencies

Wastewater Treatment Plant Upgrade and Expansion

Alternative No. 2
Upgrade Two (2) and Remove Two (2) Existing Treatment Systems (0.15 MGD) Sequencing Batch Reactor (0.30 MGD)

Rehabilitate/Reuse Existing Treatment Components (0.15 MGD Capacity)

New SBR Treatment System (0.30 MGD Capacity)

Demolish two (2) Existing Treatment Basins and Construct New Influent and Effluent Equalization (IEQ and EEQ) Basins and Sludge Holding Tanks

New Sludge Dewatering System and Building

The alternative includes upgrades to the current treatment system, rehabilitation of two (2) existing 75,000 gallon per day (gpd) treatment capacity package treatment plants (PTP's), for a treatment capacity of 0.15 MGD, and constructing a new SBR treatment system (0.30 treatment capacity) for a combined treatment capacity at the wastewater treatment Plant (WWTP) of 0.45 million gallons per day (MGD). A description of the WWTP upgrades and expansion are listed as follows:

- Construct new Screening System consisting of a mechanical bar screen with 1/4"-inch bar spacing and a backup manual bar rack in a bypass channel with 1-inch bar spacing. The mechanical bar screen will have a peak flow capacity of 1.48 MGD. All required components would be heat traced and insulated.
- The existing screen and attached splitter box would be abandoned and removed.
- Two existing PTP's will be demolished and new IEQ and EEQ basins, along with two (2) new sludge holding tanks will be constructed on this area. Influent flows to the IEQ will be pumped to the treatment PTP's and the SBR system for biological treatment. Three (3) IEQ submersible pumps with VFD's would be included each with a capacity of 520 gpm. Aeration would be provided to prevent setting of organic materials and to help with odor minimization prior to pumping into the biological treatment systems.
- Two (2) existing PTP's would be rehabilitated and reused for biological treatment having a treatment capacity of 0.15 MGD. The equalization and sludge holding compartments would be converted to additional aeration and clarification compartments, and a splitter box would be added to equally split flow between the two PTP's.
- A new two (2) basin SBR treatment system would be constructed for biological treatment with a treatment capacity of 0.30 MGD. Flows would be cycled between the two basins. Automated control of flow, mixing, aeration, settling, and decanting would be provided. The SBR would be able to handle a peak flow of 1.48 MGD at an accelerated cycle rate. Retrievable fine bubble diffusers, surface mixers, blowers, and decanters would be provided for each basin.

- Effluent flows into the EEQ will include effluent flow from the two (2) PTP's and the SBR's. All these flows would flow by gravity into and out of the EEQ Basin. The flow rate leaving the EEQ would be controlled by a flow control valve and a flow meter thus lowering the peak flow rate to the Disinfection Basin.
- A new Post Aeration/Disinfection Basin would be constructed to handle a peak flow rate of 2.22 MGD with a detention time of 15 minutes for disinfection and 7 minutes for post aeration. A 6-inch Parshall Flume or a 45-degree v-notch weir would be provided for Effluent Flow Monitoring.
- The existing Post Aeration/Disinfection Basin would be abandoned and removed.
- A new Sludge Dewatering System and Building would be constructed for dewatering waste sludge. The building would include a separate electrical room and space for a polymer feed system, sludge pumps, dewatering system, and a discharge conveyor. An area would be provided for future Alum and pH adjustment feed system. A water system would be included throughout the building.
- Two (2) new sludge holding tanks would be constructed. The tanks would be provided with aeration for complete mixing. Telescoping valves would be provided to decant clear liquid off each tank to thickened waste sludge prior to dewatering.
- An emergency standby generator would be provided to run the treatment system during power outages.

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Table 5

Alternative No. 2
Wastewater Treatment Plant Upgrade and Expansion
Opinion of Probable Project Cost

Upgrade Two (2) and Remove Two (2) Existing Treatment Systems (0.15 MGD)
Sequencing Batch Reactor (0.30 MGD)

Item No.	Description	Total Cost
1	Mob/ Demobilization	$52,000
2	Bonds and Insurance	$104,000
3	General Conditions	$156,000
4	Influent Screening System	$206,000
5	Demolition of Existing Structures	$190,000
6	EQ and Sludge Holding Structures	$431,000
7	Rehab. Existing Structures (0.15 MGD Capacity)	$220,000
8	SBR Treatment System (0.30 MGD Capacity)	$1,050,000
9	Sludge Dewatering System and Building	$1,550,000
10	Disinfection / Post Aeration / Effluent Flow Measurements	$168,000
11	Piping / Valves / Gates / Manholes	$450,000
12	Electrical Expansion	$540,000
13	Instrumentation Upgrades	$180,000
14	Painting and Coating System	$80,000
15	Sludge and Grit Disposal	$50,000
16	Bypass Pumping	$40,000
17	Site Restoration	$30,000
18	Emergency Standby Generator	$250,000

Subtotal Construction Cost	$5,747,000
Contractor Overhead & Profit @ 18%	$1,034,500
Total Opinion of Probable Construction Cost	**$6,781,500**

Project Development Cost* @ 25%	$1,695,500
Total Opinion of Probable Project Cost	**$8,477,000**

*Development Cost Includes Project Administration, Planning, Legal, Engineering, Resident Inspection, and Project Contingencies

Wastewater Treatment Plant Upgrade and Expansion

Alternative No. 3
Repurpose Two (2) and Remove Two (2) Existing Treatment Systems
Sequencing Batch Reactor (0.45 MGD)

New SBR Treatment System (0.45 MGD Capacity)

Repurpose Existing Treatment Components to Influent and Effluent Equalization (IEQ and EEQ) Basins and Sludge Holding Tanks

Demolish two (2) Existing Treatment Basins and Construct New Sludge Dewatering System and Building

The alternative includes upgrades to the current treatment system, repurpose of two (2) existing package treatment plants (PTP's) to IEQ and EEQ Basins. Constructing a new SBR treatment system at the wastewater treatment Plant (WWTP) of 0.45 million gallons per day (MGD). A description of the WWTP upgrades and expansion are listed as follows:

- Construct new Screening System consisting of a mechanical bar screen with 1/4"-inch bar spacing and a backup manual bar rack in a bypass channel with 1-inch bar spacing. The mechanical bar screen would have a peak flow capacity of 1.48 MGD. All required components would be heat traced and insulated.
- The existing screen and attached splitter box would be abandoned and removed.
- One (1) existing PTP would be repurposed and split into an Influent Equalization Basin (IEQ) and an Effluent Equalization Basin (EEQ). Influent flows in the IEQ will be pumped to the SBR system for biological treatment. Three (3) IEQ submersible pumps with variable frequency drives (VFD's) would be included each with a capacity of 520 gallons per minute (gpm). Aeration will be provided to prevent setting of organic materials and to help with odor minimization prior to pumping into biological treatment systems.
- A new two (2) basin SBR treatment system would be constructed for biological treatment with a treatment capacity of 0.45 MGD. Flows would be cycled between the two basins. Automated control of flow, mixing, aeration, settling, and decanting would be provided. The SBR would be able to handle a peak flow of 1.48 MGD at an accelerated cycle rate. A jet aeration header system with blowers and submersible pumps for mixing, and decanters would be provided for each basin. Three (3) positive displacement blowers would be included to provide air to the aeration header system.
- One (1) existing PTP would be repurposed into an IEQ and EEQ Basin. Effluent flows into the EEQ will include effluent flow from the two (2) SBR's. All these flows would flow by gravity into and out of the EEQ Basin. The flow rate leaving the EEQ would be controlled by a flow control valve and a flow meter thus lowering the peak flow rate to the Disinfection Basin.

- A new Post Aeration/Disinfection Basin would be constructed to handle a peak flow rate of 2.22 MGD with a detention time of 15 minutes for disinfection and 7 minutes for post aeration. A 6-inch Parshall Flume or a 45-degree v-notch weir would be provided for Effluent Flow Monitoring.
- The existing Post Aeration/Disinfection Basin would be abandoned and removed.
- A new Sludge Dewatering System and Building would be constructed for dewatering waste sludge. The building would include a separate electrical room and space for a polymer feed system, sludge pumps, dewatering system, and a discharge conveyor. An area would be provided for future Alum and pH adjustment feed systems. A water system would be included throughout the building.
- One (1) existing PTP would be repurposed and split into two (2) sludge holding tanks. The tanks would be provided with aeration for complete mixing. Telescoping valves would be provided to decant clear liquid off each tank to thickened waste sludge prior to dewatering.
- An emergency standby generator would be provided to run the treatment system during power outages.

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Table 6

Alternative No. 3

Wastewater Treatment Plant Upgrade and Expansion

Opinion of Probable Project Cost

Repurpose Two (2) and Remove Two (2) Existing Treatment Systems
Sequencing Batch Reactor (0.45 MGD)

Item No.	Description	Total Cost
1	Mob/ Demobilization	$43,000
2	Bonds and Insurance	$72,000
3	General Conditions	$108,000
4	Influent Screening System	$206,000
5	Demolition of Existing Structures	$190,000
6	EQ and Sludge Holding Structures	$195,000
7	SBR Treatment System (0.30 MGD Capacity)	$1,210,000
8	Sludge Dewatering System and Building	$1,258,000
9	Disinfection / Post Aeration / Effluent Flow Measurements	$168,000
10	Piping / Valves / Gates / Manholes	$373,000
11	Electrical Expansion	$540,000
12	Instrumentation Upgrades	$180,000
13	Painting and Coating System	$40,000
14	Sludge and Grit Disposal	$30,000
15	Bypass Pumping	$20,000
16	Site Restoration	$30,000
17	Emergency Standby Generator	$250,000

Subtotal Construction Cost	$4,913,000
Contractor Overhead & Profit @ 18%	$884,500
Total Opinion of Probable Construction Cost	**$5,797,500**
Project Development Cost* @ 25%	$1,449,500
Total Opinion of Probable Project Cost	**$7,247,000**

*Development Cost Includes Project Administration, Planning, Legal, Engineering, Resident Inspection, and Project Contingencies

Wastewater Treatment Plant Upgrade and Expansion

Alternative No. 4
Repurpose Two (2) and Remove Two (2) Existing Treatment Systems
Membrane (MBR) Reactor (0.45 MGD)

New Membrane Reactor (MBR) Treatment System (0.45 MGD Capacity)

Repurpose Existing Treatment Components to Influent and Effluent Equalization (IEQ and EEQ) Basins and Sludge Holding Tanks

Demolish two (2) Existing Treatment Basins and Construct New Sludge Dewatering System and Building

The alternative includes upgrades to the current treatment system, repurpose of two (2) existing package treatment plants (PTP's) to IEQ and EEQ Basins. Constructing a new Membrane Reactor (MBR) treatment system at the wastewater treatment Plant (WWTP) of 0.45 million gallons per day (MGD). A description of the WWTP upgrades and expansion are listed as follows:

- Construct new Screening System consisting of a mechanical bar screen with 1/4"-inch bar spacing and a backup manual bar rack in a bypass channel with 1-inch bar spacing. The mechanical bar screen would have a peak flow capacity of 1.48 MGD. All required components would be heat traced and insulated.
- The existing screen and attached splitter box would be abandoned and removed.
- One (1) existing PTP would be repurposed and split into an Influent Equalization Basin (IEQ) and an Effluent Equalization Basin (EEQ). Influent flows in the IEQ will be pumped to the MBR system for biological treatment. Three (3) IEQ submersible pumps with variable frequency drives (VFD's) would be included each with a capacity of 520 gallons per minute (gpm). Aeration will be provided to prevent setting of organic materials and to help with odor minimization prior to pumping into biological treatment systems.
- A new two (2) basin MBR treatment system would be constructed for biological treatment with a treatment capacity of 0.45 MGD. Flows would be cycled between the two basins. Automated control of flow, mixing, aeration, settling, and decanting would be provided. The MBR would be able to handle a peak flow of 1.48 MGD. Fine bubble diffusers, blowers, and membranes would be provided for each basin.
- One (1) existing PTP would be repurposed into an IEQ and EEQ Basin. Effluent flows into the EEQ will include effluent flow from the two (2) MBR's. All these flows would flow by gravity into and out of the EEQ Basin. The flow rate leaving the EEQ would be controlled by a flow control valve and a flow meter thus lowering the peak flow rate to the Disinfection Basin.

- A new Post Aeration/Disinfection Basin would be constructed to handle a peak flow rate of 2.22 MGD with a detention time of 15 minutes for disinfection and 7 minutes for post aeration. A 6-inch Parshall Flume or a 45-degree v-notch weir would be provided for Effluent Flow Monitoring.
- The existing Post Aeration/Disinfection Basin would be abandoned and removed.
- A new Sludge Dewatering System and Building would be constructed for dewatering waste sludge. The building would include a separate electrical room and space for a polymer feed system, sludge pumps, dewatering system, and a discharge conveyor. An area would be provided for future Alum and pH adjustment feed systems. A water system would be included throughout the building.
- One (1) existing PTP would be repurposed and split into two (2) sludge holding tanks. The tanks would be provided with aeration for complete mixing. Telescoping valves would be provided to decant clear liquid off each tank to thickened waste sludge prior to dewatering.
- An emergency standby generator would be provided to run the treatment system during power outages.

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Table 7

Alternative No. 4
Wastewater Treatment Plant Upgrade and Expansion
Opinion of Probable Project Cost

Repurpose Two (2) and Remove Two (2) Existing Treatment Systems
Membrane Reactor (0.45 MGD)

Item No.	Description	Total Cost
1	Mob/ Demobilization	$48,000
2	Bonds and Insurance	$96,000
3	General Conditions	$144,000
4	Influent Screening System	$206,000
5	Demolition of Existing Structures	$190,000
6	EQ and Sludge Holding Structures	$195,000
7	Membrane (MBR) System (0.45 MGD Capacity)	$1,536,000
8	Sludge Dewatering System and Building	$1,258,000
9	Disinfection / Post Aeration / Effluent Flow Measurements	$168,000
10	Piping / Valves / Gates / Manholes	$373,000
11	Electrical Expansion	$540,000
12	Instrumentation Upgrades	$180,000
13	Painting and Coating System	$40,000
14	Sludge and Grit Disposal	$30,000
15	Bypass Pumping	$20,000
16	Site Restoration	$30,000
17	Emergency Standby Generator	$250,000

Subtotal Construction Cost	$5,304,000
Contractor Overhead & Profit @ 18%	$954,500
Total Opinion of Probable Construction Cost	**$6,258,500**

Project Development Cost* @ 25%	$1,564,500
Total Opinion of Probable Project Cost	**$7,823,000**

*Development Cost Includes Project Administration, Planning, Legal, Engineering, Resident Inspection, and Project Contingencies

Wastewater Treatment Plant Upgrade and Expansion

Alternative No. 5
Repurpose Two (2) and Add a Sequencing Batch Reactor (0.45 MGD)

New SBR Treatment System (0.45 MGD Capacity)

Repurpose Existing Treatment Components to Influent and Effluent Equalization (IEQ and EEQ) Basins and Sludge Holding Tanks

Add a Sludge Dewatering Box System

The alternative includes upgrades to the current treatment system, repurpose of two (2) existing package treatment plants (PTP's) to IEQ, EEQ, and Sludge Holding Basins. Constructing a new SBR treatment system at the wastewater treatment Plant (WWTP) of 0.45 million gallons per day (MGD). A description of the WWTP upgrades and expansion are listed as follows:

- Construct new Screening System consisting of a mechanical bar screen with 1/4"-inch bar spacing and a backup manual bar rack in a bypass channel with 1-inch bar spacing. The mechanical bar screen would have a peak flow capacity of 1.48 MGD. All required components would be heat traced and insulated.
- The existing screen and attached splitter box would be abandoned and removed.
- One (1) existing PTP would be repurposed and split into an Influent Equalization Basin (IEQ) and an Effluent Equalization Basin (EEQ). Influent flows in the IEQ will be pumped to the SBR system for biological treatment. Three (3) IEQ submersible pumps with variable frequency drives (VFD's) would be included each with a capacity of 520 gallons per minute (gpm). Aeration will be provided to prevent setting of organic materials and to help with odor minimization prior to pumping into biological treatment systems.
- A new two (2) basin SBR treatment system would be constructed for biological treatment with a treatment capacity of 0.45 MGD. Flows would be cycled between the two basins. Automated control of flow, mixing, aeration, settling, and decanting would be provided. The SBR would be able to handle a peak flow of 1.48 MGD at an accelerated cycle rate. A jet aeration header system, submersible pumps for mixing, and decanters would be provided for each basin. Three (3) positive displacement blowers would be included to provide air to the jet header system.
- One (1) existing PTP would be repurposed into an IEQ and EEQ Basin. Effluent flows into the EEQ will include effluent flow from the two (2) SBR's. All these flows would flow by gravity into and out of the EEQ Basin. The flow rate leaving the EEQ would be controlled by a flow control valve and a flow meter thus lowering the peak flow rate to the Disinfection Basin.
- A new Post Aeration/Disinfection Basin would be constructed to handle a peak flow rate of 2.22 MGD with a detention time of 15 minutes for disinfection and 7 minutes for post aeration. A 6-inch Parshall Flume or a 45-degree v-notch weir would be provided for Effluent Flow Monitoring.

- The existing Post Aeration/Disinfection Basin would be abandoned and removed.
- Two (2) new Sludge Dewatering Boxes with concrete slab and canopy would be provided to dewater sludge and allow pickup to haul dewatered sludge to the landfill. A polymer tank and mixer with sludge pump would be provided located in a prefabricated building.
- One (1) existing PTP would be repurposed and split into two (2) sludge holding tanks. The tanks would be provided with aeration for complete mixing. Telescoping valves would be provided to decant clear liquid off each tank to thickened waste sludge prior to dewatering.
- An emergency standby generator would be provided to run the treatment system during power outages.

Table 8
Alternative No. 5
Wastewater Treatment Plant Upgrade and Expansion
Opinion of Probable Project Cost

Repurpose Two (2) Existing Treatment Systems and Add Two (2) Sequencing Batach Reactors (0.45 MGD)		
Item No.	Description	Total Cost
1	Mob/ Demobilization	40,000
2	Bonds and Insurance	70,000
3	General Conditions	100,000
4	Influent Screening System	206,000
5	Demolition of Existing Structures	190,000
6	EQ and Sludge Holding Structures	195,000
7	SBR Treatment System (0.45 MGD Capacity)	1,210,000
8	Sludge Dewatering Box System	500,000
9	Disinfection / Post Aeration / Effluent Flow Measurements	168,000
10	Piping / Valves / Gates / Manholes	373,000
11	Electrical Expansion	540,000
12	Instrumentation Upgrades	180,000
13	Painting and Coating System	60,000
14	Sludge and Grit Disposal	30,000
15	Bypass Pumping	20,000
16	Site Restoration	30,000
17	Emergency Standby Generator	250,000

Subtotal Construction Cost	4,162,000
Contractor Overhead & Profit @ 18%	749,000
Total Opinion of Probable Construction Cost	4,911,000

Project Development Cost* @ 25%	1,228,000
Total Opinion of Probable Project Cost	6,139,000

*Development Cost Includes Project Administration, Planning, Legal, Engineering, Resident Inspection, and Project Contingencies

Regionalization of Treatment

Alternative No. 6
PS's/FM to Williamstown Wastewater Treatment Plant

New Screen System

Two (2) New Regionalization Pump Station's

New 14-inch PVC Force Main (61,000 linear feet)

Demolition of Existing Treatment Plant

Upgrades at Williamstown Wastewater Treatment Plant

The alternative includes taking the existing wastewater treatment plant offline and constructing a pump station and force main system to transport all flows to the Williamstown Wastewater Treatment Plant for treatment and disposal. The existing Grant County Sanitary Sewer District Wastewater Treatment Plant (GCSSD WWTP) would mostly be demolished. A description of regionalization of treatment components are listed as follows:

- Construct a new Screening System consisting of a mechanical bar screen with ¼-inch bar spacing and a backup manual bar rack in a bypass channel with 1-inch bar spacing. The mechanical bar screen will have a peak flow capacity of 1.48 MGD. All required components would be heat traced and insulated.
- Construct a new Regionalized Pump Station (RPS #1) with a capacity of 1,100 gallons per minute (gpm) or 1.58 million gallons per day (MGD) at the WWTP site.
- Construction approximately 61,000 linear feet of 14-inch PVC force main that would transport all flows from the GCSSD WWTP site to a 24-inch interceptor owned by Williamstown.
- Demolish all treatment components which would include removing and backfilling each structure. Existing buildings would remain.
- Provide an emergency standby generator to run RPS #1 when power is disrupted.
- Modify the existing chemical feed system at the GCSSD WWTP to operate with the new pump station to help minimize odor issues downstream of the RPS #1.
- Construction a second Regionalized Pump Station (RPS #2) with a capacity of 1,200 gpm or 1.73 MGD along the force main to get all flows to the Williamstown interceptor.
- Provide an emergency standby generator to run RPS #2 when power is disrupted.
- Add a chemical feed system to operate with RPS #2 and force main to help minimize odor issues downstream of the pump station.

Table 9
Alternative No. 6
Regionalization of Treatment
Opinion Of Probable Project Cost

Opinion of Probable Project Cost
(PS / FM to Williamstown WWTP)

Item No.	Description	Quantity	Unit	Unit Price	Total
1	Mobilization/Demobilization	1	LS	$130,000	$130,000
2	Bonds and Insurance	1	LS	$260,000	$260,000
3	General Conditions	1	LS	$390,000	$390,000
4	Upgrade Williamstown Influent Pump Station (7.5 MGD)	1	LS	$500,000	$500,000
5	Upgrade Williamstown WWTP (0.5 MGD Increased Cap.)	1	LS	$4,000,000	$4,000,000
6	14-inch PVC Force Main	61,000	LF	$100	$6,100,000
7	Combination Air Valve and Vault	18	EA	$10,000	$180,000
8	4-foot Dia. Standard Manhole	4	EA	$6,000	$24,000
9	30-inch Steel Casing Pipe (B&J)	200	LF	$800	$160,000
10	Pavement Replacement	2,000	LF	$60	$120,000
11	Concrete Replacement	100	LF	$100	$10,000
12	Regionlized Pump Stations (1,200 GPM Each)	2	EA	$800,000	$1,600,000
13	Creek Crossings	800	LF	$100	$80,000
14	Emergency Standby Generator	2	EA	$150,000	$300,000
15	Erosion Control/Site Restoration	61,000	LF	$2	$122,000
16	Connect to Existing	4	EA	$2,500	$10,000
				Construction Cost Subtotal	$13,986,000
				Contingencies @ 10%	$1,398,600
				Total Opinion of Probable Construction Cost	**$15,384,600**
				Project Development Cost* @ 25%	$3,846,150
				Total Opinion of Probable Project Cost	**$19,230,750**

*Development Cost Includes Project Administration, Planning, Legal, Engineering, Resident Inspection, and Project Contingencies at 10%

Table 1
Funding Options & Projected Operation,
Maintenance, Management, & Debt Retirement
(FY 2025)

Description	Funding Options[1]				
	A (KIA Loan)	B (KIA Loan)	C (RD Loan)	D (RD Loan)	E (KIA Loan)
Project Cost	**$6,745,400**	**$6,745,400**	**$6,745,400**	**$6,745,400**	**$7,853,400**
• WWTP Upgrade / Expansion	$6,139,000	$6,139,000	$6,139,000	$6,139,000	$7,247,000
• KY 491 Pump Station	$606,400	$606,400	$606,400	$606,400	$606,400
Loan Amount	$6,745,400	$5,745,400	$6,745,400	$5,745,400	$7,853,400
Grant Amount	$0	$1,000,000	$0	$1,000,000	$0
Financed Amount	**$6,745,400**	**$5,745,400**	**$6,745,400**	**$5,745,400**	**$7,853,400**
Existing Debt Retirement[2]	$76,910	$76,910	$76,910	$76,910	$76,910
New Debt Retirement	$442,970[3]	$377,300	$340,640[4]	$290,140	$515,730[5]
Service Fee / Reserve Allowance[6]	$13,490	$11,490	$34,060	$29,010	$15,710
Operation, Maintenance, & Management (Exist)[7]	$590,140	$590,140	$590,140	$590,140	$590,140
Additional Operation & Maintenance[8]	$24,000	$24,000	$24,000	$24,000	$24,000
Replacement Reserve[9]	$16,860	$16,860	$16,860	$16,860	$19,630
Total Operation, Maintenance, Management, & Debt Retirement	**$ 1,164,370**	**$ 1,096,700**	**$ 1,082,610**	**$ 1,027,060**	**$ 1,242,120**

Notes:

[1] Funding options will be based on either obtaining a Kentucky Infrastructure Authority (KIA) Fund A loan or USDA - Rural Development (RD) loan. Two funding options also include an assumption that $1,000,000 in grant monies could be obtained. The grants would be from other sources since Grant County Sanitary Sewer District (GCSSD) does not qualify for a grant from either KIA Fund A or RD agency programs. Funding Options A through D are based on the selection of Alternative 5 for the WWTP and Alternative 3 for KY 491 Pump Station.

[2] Based on the GCSSD FY 2021 audit, the existing debt retirement consists of a BB & T Bank lease which will be retired in February 2023, and long term debts consisting of two KIA loans that will mature December 1, 2031 and December 1, 2034. The total yearly principal and interest is $76,910.

[3] The current Market Rate for a KIA Fund A loan is 2.25%, however, this is expected to increase next year up to as much as 3.0%. Therefore, for this study it is assumed that a KIA Fund A loan will have an interest rate of 2.75% over a 20-year term (0.06567) and calculates as $6,745,400 x 0.06567 = $442,970.

[4] The current Market Rate for a USDA - Rural Development (RD) loan is 3.5%, however, this is expected to increase next year up to 4.0%. Therefore, for this study, an RD loan will have an interest rate of 4.0% over a 40-year term (0.0505) and calculates as $6,745,400 x 0.0505 = $340,643.

[5] Funding Option E is based on Alternative No. 3 for the WWTP and KY 491 Pump Station as the selected option. The Financed Amount would be as follows: Assuming a KIA loan at an interest rate of 2.75% the debt retirement calculates as $7,853,400 x 0.06567 = $515,733.

[6] KIA requires a yearly Service Fee of 0.2% based on the outstanding loan amount. RD requires a Reserve Allowance of 10% of the yearly debt payment until one year's payment is reserved.

[7] Yearly increase in Operations, Maintenance, and Management cost based on FY 2021 audited amount of $524,336 and assuming an increase of 3% annually to FY 2025.

[8] Yearly Additional Operational & Maintenance cost associated with the new expanded treatment system.

[9] Replacement reserve is based on 2.5% of the Total Project Cost funded over a 10 year period.

Table 2
Projected User Rate Calculations
(FY 2025)

Description	Funding Options				
	A (KIA Loan)	B (KIA Loan)	C (RD Loan)	D (RD Loan)	E (KIA Loan)
Total Operation, Maintenance, Management & Debt Retirement[1]	$1,164,370	$1,096,700	$1,082,610	$1,027,060	$1,242,120
Projected Revenue[2]	$886,370	$886,370	$886,370	$886,370	$886,370
Required Additional Revenue[3]	**$278,000**	**$210,330**	**$196,240**	**$140,690**	**$355,750**
Average Sewer Bill Based on 3,830 gal. per month usage[4] (FY 2023)	$44.70	$44.70	$44.70	$44.70	$44.70
Required User Rate Increase per Thousand Gallons[5]	$3.67	$2.77	$2.59	$1.86	$4.69
Required User Rate Percent Increase[6]	**31.4%**	**23.7%**	**22.2%**	**15.9%**	**40.2%**
Average Sewer Bill Based on 3,830 gal. per month usage[7] (FY 2025)	$58.75	$55.31	$54.62	$51.82	$62.66
Average Sewer Bill Based on 4,000 gal. per month usage[8] (FY 2025)	$61.11	$57.51	$56.79	$53.87	$65.19

Notes:

[1] See Table 1 for Total Operation, Maintenance, Management & Debt Retirement yearly cost based on funding options.

[2] The Projected Revenue in FY 2025 is calculated by taking FY 2021 audited revenue of $791,400 times a projected rate increase of 12% or $791,400 x 1.12 = $886,370. It is anticipated that the rate increase would take effect in FY 2023.

[3] Required Additional Revenue is based on subtracting the Total Operation, Maintenance, Management, & Debt Retirement yearly cost from Projected Revenues or $1,164,370 - $886,370 = $278,000.

[4] The average sewer bill is based on water usage by sewer customers for FY 2021 of 75,877,000 gallons divided by 1,650 sewer customers and 12 months per year, or 75,877,000 / 1,650 / 12 = 3,830 gallons usage per month. The average sewer bill is based on the current user rate times 12% based on an expected user rate increase in FY 2023. See Table 3 for Projected Sewer Rates in FY 2023 and for 3,830 gallon usage the sewer bill would be calculated as $26.03 +$10.20 (1.83) = $44.70.

[5] The Required User Rate Increase per thousand gallons of usage is calculated by dividing the Required Additional Revenue by yearly water usage from sewer customers: $278,000 / 75,877,000 x 1,000 = $3.67 per thousand gallons.

[6] The Required User Rate Increase is calculated as follows: $44.70 / 3,830 x 1,000 = $11.67 projected average user rate per thousand gallons. The required percent increase would be $3.67/$11.67 = 31.4%.

[7] The Average Sewer Bill based on 3,830 gallons is calculated as follows: See Table 3 for Projected Rates for Funding Option A - $33.37 + $13.87 (1.83) = $58.75. All other calculations are based on the User Rate Increase per thousand gallons for alternte funding sources as $26.03 + $2.77 (2) + ($10.20 + 2.77) (1.83) = $55.31.

[8] The Average Sewer Bill based on 4,000 gallons is calculated as shown in Note 7 by replacing 1.83 with 2.0.

Table 3
Sewer User Rates

Usage	Current Sewer Rate	Projected Sewer Rates[1] (FY 2023)	Required Sewer Rates[2] (FY 2025)
Flat Rate - First 2,000 Gallons (Min. Bill)	$23.24	$26.03	$33.37
Next 3,000 Gallons per 1,000 Gallons	$9.11	$10.20	$13.87
Next 5,000 Gallons per 1,000 Gallons	$7.46	$8.36	$12.03
Over 10,000 Gallons per 1,000 Gallons	$5.86	$6.56	$10.23

Notes:

[1] Based on assumption that a 12% rate increase is approved by PSC in FY 2023.

[2] Assumes project is fully funded based on Option A, KIA Fund A loan of $6,745,400.