

## 3.0 EVALUATION OF EXISTING WASTEWATER FACILITIES

### 3.1 EXISTING MUNICIPAL WASTEWATER TREATMENT SYSTEMS

The Municipal Authority of Westfall Township's (MATW) sewage collection and conveyance systems conveys wastewater from approximately 993 EDUs in Westfall Township (Refer to Map. No. 11 in Appendix C), to MATW's Wastewater Treatment Plant (WWTP), where the wastewater is treated and is discharged into the Delaware River.

The plant discharges to the Delaware River via an outfall structure comprised of twin 12-inch diameter pipes that convey the effluent flow into the midstream of the river. The facility is permitted for an average daily flow of 374,000 GPD.

#### 3.1.1 Permitting

The MATW's WWTP operates under National Pollutant Discharge Elimination System (NPDES) permit number PA0061611. The existing NPDES permit is valid from September 1, 2019 through August 31, 2024. The DRBC docket renewal was submitted in June 2018, and The WWTP's current annual permitted discharge flow is 0.374 million gallons per day (mgd). Table No. 3-1.1 presents the current NPDES discharge limits for the MATW's WWTP.

**Table 3-1 NPDES Effluent Limits and Discharge Characteristics for MATW's WWTP**

Parameter	NPDES Effluent Limits <sup>(1)</sup>	Average Discharge Characteristics <sup>(2)</sup>
Flow, mgd	0.374	0.0823
pH (standard units)	6.0 (minimum) 8.5 (maximum)	6.97 7.48
CBOD, mg/L	10.0 <sup>(1)</sup>	<3.02
TSS, mg/L	10.0 <sup>(1)</sup>	<2.58
Fecal Coliform, CFU/100 ml (Geometric Mean) <sup>(3)</sup>	50	1
Total Phosphorus, mg/L	2.0 (monthly) <sup>(1)</sup>	0.273

**Notes:**

<sup>(1)</sup> NPDES Permit Discharge Limits, average monthly values.

<sup>(2)</sup> 12-month average discharge characteristics from the period from January through December 2018.

#### 3.1.2 WWTP Process

In 2000 the MATW secured ownership of the Delaware Valley Utilities, Inc. Wastewater Treatment Plant, and renamed it the Westfall Township Regional Wastewater Treatment Facility (Westfall Regional Facility). The location of the WWTP is shown on Map 11 in Appendix C. This extended aeration WWTP had a treatment capacity of 0.374 mgd.

Primary treatment of influent from the collection system is provided via a manual bar screen. After primary screening, two (2) pre-cast tanks provide approximately 70,000 gallons of equalization. Positive displacement blowers supply air to the equalization tanks.

The equalization tanks are connected to the wet well of the Sequencing Batch Reactor (SBR) Influent Pump Station (hereinafter referred to as the SBR PS). Two (2) Flygt submersible pumps are installed in the wet well to lift and pump the wastewater to SBR tanks. Each pump is sized for 450 gpm at a 27 ft. Total Dynamic Head (TDH). Valves are installed in a separate vault downstream of the wet well.

The WWTP's biological process is centered on a two (2) tank Jet Tech, Inc. SBR. The SBR treatment process contains two (2) reactors which alternate in receiving and treating wastewater. The SBR cycles including anoxic fill, aerated react, settle, decant and idle are automatically controlled by a programmable logic controller (PLC). Each reactor is equipped with a motive pump to mix and help aerate the reactor volume. Three (3) blowers are installed and two (2) of them are normally in operation for air supply to the reactors. Alum is fed into the SBR for the phosphorus removal process and also provides enhanced settling.

Biologically treated wastewater is decanted by a floating decanter in each reactor. The decant flows by gravity to a decant equalization tank that helps mitigate the peak flow rate into downstream processes. Two (2) submersible pumps are installed in the decant equalization tank to convey the wastewater to the downstream traveling bridge filter.

A traveling bridge filtration system is installed for further suspended solids and phosphorous removal. The traveling bridge filter is normally operated and controlled by a PLC. It is designed so that there is always one cell in backwash mode. The backwash waste flows by gravity to the backwash waste pump station where it is pumped to the influent equalization tank for further treatment. The filtered water flows by gravity to the disinfection process.

The backwash waste from the traveling bridge filter and decanted supernatant from the aerobic digester is collected in the wet well of the backwash waste pump station. Two (2) submersible pumps convey the waste to the influent equalization tank and then back into wastewater treatment process for further treatment.

An open channel ultraviolet (UV) light system is installed for treatment plant effluent disinfection. The system consists of two (2) banks of UV lights installed in series in the channel. The two (2) banks of UV lights together are sized for a peak flow of 0.8 mgd. One (1) bank is normally in use for disinfection during normal flow.

The WWTP effluent flow volume is measured by use of an ultrasonic flow metering device with a 45° V-notch weir in the metering chamber. After disinfection, the flow enters a post aeration tank with fine bubble diffusers to increase the dissolved oxygen in the plant effluent.

Normally, the plant effluent flows by gravity to the Delaware River via the submerged Outfall Structure. When the River is under high stage conditions, the flow must be pumped into the river. Two (2) submersible pumps are installed in the post aeration tanks and used to pump treated wastewater to the plant discharge to the Delaware River when necessary.

The outfall structure is comprised of twin 12-inch diameter pipes that convey the effluent flow into the midstream of the river. The outfall structure is constructed and permitted for an average daily flow of 0.820 mgd to the Delaware River.

The waste sludge from the SBR process is pumped by the SBR motive pumps to the aerobic digester. Two (2) blowers are used to provide the required air flow to coarse bubble diffusers in the digester. The supernatant is decanted periodically from the digester to the backwash waste pump station. When the digester is full, the sludge is removed by a contracted hauler and transported to a permitted facility for disposal.

Alum and soda ash are used in the wastewater treatment process at the plant. Alum is fed into the SBRs as a backup to the biological removal of phosphorous. Soda ash is used for pH adjustment as needed. Each chemical feed system consists of a metering pump rated at 26 gph and a 500-gallon storage tank. Both alum and soda ash are designed to have two (2) feeding points – equalization tank and SBR tanks.

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### 3.1.3 Collection and Conveyance Facilities

The original collection system for MATW was constructed in the 1990's and consists of approximately 5 miles of gravity sewer and force mains ranging in sizes from 4 inches through 8 inches in diameter. Map No. 11 in Appendix C shows the location of the existing Westfall Township collection and conveyance mains, pump stations, and WWTP.

There are a total of 6 pump stations within the MATW system. Hourly readings are not recorded at West Fall Pump Station No. 2. Katz and Rosetown Pump Stations have been offline since they were constructed in 2011 and 2007 respectively. None of the pump stations are at capacity or considered to be hydraulically overloaded. Table No. 3-2 presents the calculated 2018 average daily flows and facility capacities for the Borough pumping stations provided in the 2019 Chapter 94 Wasteload Management Report (included in Appendix D).

**Table 3-2 Average Daily Flows and Rated Capacities of the Municipal Authority of Westfall Township Pumping Stations - 2018**

Pumping Station	Location	Rated Capacity (gpd)	2018 Conditions	
			Average Daily Flow (gpd) <sup>(1)</sup>	Remaining Facility Capacity (gpd)
1	Westfall No.1	777,600	79,944	697,656
2	Westfall No. 2	302,400	N/A	N/A
3	River's Edge	141,120	7,272	133,848
4	Rosetown	1,083,888	N/A	N/A
5	Katz	432,000	N/A	N/A
6	Westfall Sr. Apartments	60,480	5,617	54,863

Notes:

- <sup>(1)</sup> Average Daily Flows are calculated based on the monthly pump run-times and the rated capacity of the pumps as supplied by the pump manufacturers. Peaking Factor of 4.0 was assumed.

### 3.1.4 Existing Operating Conditions

#### A. Condition of Wastewater Facilities

Preventative maintenance activities are routinely performed by the MATW staff to optimize the operation of the system and to minimize the occurrence of blockages. The pump stations throughout the Westfall Township service area are visited regularly to monitor the operation of these facilities and to maintain the equipment in good condition.

#### B. Projected Overload

Based on the 2019 Chapter 94 Wasteload Management Report, MATW did not project a hydraulic overload for the five-year planning period (2020 through 2024). The projected average flow for 2024 is 0.1157 MGD. The projected average for the peak flows over three months in 2024 is 0.1283 MGD. Both flows are under the facilities hydraulic capacity of 0.374 MGD. The projected average organic loading for 2024 is 405 pounds per day and projected maximum monthly peak organic loading for 2024 is 591 pounds per day. Both organic projections mentioned above are under the facility's organic capacity of 1,081 pounds per day. For the years 2019 through 2024, MATW is anticipating

growth from 993 EDU's to 1,133 EDUS.

### **C. Industrial Waste**

There are no significant industrial waste discharges to the Authority's system. Any new industrial waste applications would be reviewed on a case-by-case basis and pretreatment standards set accordingly.

### **D. Permit Violations**

EPA's ECHO website was searched to determine any permit violations incurred by the Authority. No violations were found. According to the US EPA's Enforcement and Compliance History Online (ECHO) program, no violations have been reported for the past 5 years.

### **3.1.5 Scheduled or In-Process Upgrading of Collection Facilities**

No scheduled upgrades to the existing collection and conveyance facilities are being considered as they are currently adequately sized and operating effectively. Projects for upgrades may occur as a result of recommendations or suggestions made in this Act 537 Plan. There is conservatively approximately 250,000 GPD in excess capacity.

### **3.1.6 Operation and Maintenance Requirements**

In all of the Study Area, homeowners and business owners contract with private haulers for the collection and disposal of seepage.

MATW is responsible for the operation and maintenance of the municipal sewage collection system. The Municipal Authority of the Township of Westfall has contracted Camo Pollution Control to perform all routine monitoring, maintenance, and repair of the WWTP. M&S Septic performs operation and maintenance of the pump stations.

Routine monitoring includes flow recording and influent and effluent sampling. Preventive maintenance includes miscellaneous cleaning tasks and making repairs to the facilities before major problems occur. Emergency maintenance is handled by Camo Pollution Control or outside contractors depending on the nature of the problem. Camo Pollution Control or an MATW employee is available by telephone 24 hours a day. Complaints are investigated and corrected.

## **3.2 EXISTING PACKAGE WASTEWATER TREATMENT FACILITIES**

The Milford Senior Care and Rehabilitation Center (15,000 GPD) and Delaware Valley School District Wastewater Treatment Facilities (18,000 GPD) both have package wastewater treatment plants. Each of the NPDES permits for these respective facilities indicates the following within Paragraph D, under "Other Requirements," *"If, after the issuance of this permit, DEP approves a municipal sewage facilities official plan or an amendment to an official plan under Act 537 (Pennsylvania Sewage Facilities Act, the Act of January 24, 1966, P.L. 1535 as amended) in which sewage from the herein approved facilities will be treated and disposed of at other planned facilities, the permittee shall, upon notification from the municipality or DEP, provide for the conveyance of its sewage to the planned facilities, abandon use and decommission the herein approved facilities including the proper disposal of solids, and notify DEP accordingly."*

## **3.3 EXISTING INDIVIDUAL ON-LOT SYSTEMS**

There are approximately 1,943 existing on-lot systems located in the Planning Area (Refer to Map No. 12 in Appendix C). The remainder of the Planning Area is serviced by Westfall Township's sanitary sewer system. Because of their location and non-failing statuses, the existing on-lots systems will

continue to be used while permissible.

There are many types of on-lot systems, but are generally classified as one of the following:

- **In-Ground** – Systems consisting of absorption areas, trenches and other disposal systems that rely solely on the surrounding soil for treatment.
- **Above-Ground** – Systems utilizing a bed or trenches of sand, elevated above the existing surface, to enhance the treatment provided by the underlying soil.
- **Holding Tanks** – Holding tanks and privies that require periodic pumping for removal of waste and residual solids

Types of systems found in the area include:

- Standard in-ground systems (septic tank with below-grade seepage bed).
- Elevated Sand Mounds (septic tank with above-grade seepage bed or trench)
- Cesspools
- Drywell
- Holding tank
- Seepage Pit
- Aerobic Treatment Tanks

Current regulations regarding on-lot disposal systems began in 1966, and most systems that were created before 1972 did not use best available technologies or methods that would be acceptable today.

### 3.3.1 Residential Complaints and Requests for Service

While performing the sanitary surveys, several residents indicated that surrounding properties had apparent problems associated with their OLDS including green lush grass, odors, ponding water/sewage, sluggish drains and system overflow. Businesses in the four municipalities have expressed a need for central sewage in commercial zoning areas during public meetings.

Records of OLDS system repairs and permits for each municipality were reviewed for the previous 5 years (2014-2019). In Matamoras Borough, there were 36 permits issued for repairs and installations. In the portion of Westfall Township in the planning area, there were 7 repair permits. In Milford Borough, there were 14 repair permits. In Milford Township, there were 20 repair permits issued.

### 3.3.2 Sanitary Survey

As part of the work for this Act 537 Plan, sanitary surveys were conducted throughout the Study Area. The Act 537 Sewage Disposal Needs Identification Guidance (SDNIG) document published by the DEP (latest edition) was utilized as the basis for performing the Sanitary Surveys.

#### A. Public Health Needs

The DEP has designated “public health needs” as a general needs category relating to sewage disposal that must be considered. The definitions and requirements stated in this section are taken from the DEP’s SDNIG document. Public health needs are considered to be those health hazards and water pollution problems that involve discharging untreated or inadequately treated sewage to the surface of the ground or waters of the Commonwealth, including groundwater. Most commonly, these needs are found to be malfunctioning OLDS and malfunctioning community on-lot disposal systems (COLDS). On-lot disposal system malfunctions are classified into three categories: confirmed, suspected, and potential. When identifying the public health needs of an area using OLDS/COLDS, all systems inventoried, mapped, and analyzed must be placed into one of four categories:

1. Confirmed Malfunctions are malfunctions documented by dye testing, laboratory test results, and observation by a Sewage Enforcement Officer (SEO) or a professional with experience in OLDS, "Best Technical Guidance" repair permits, and seasonally wet absorption areas. Also included are piped discharges from a single structure with direct evidence of sewage (i.e. direct observation of soap suds, food residue, solids, odors, etc.), reported system backups, malfunctions with photographic documentation, or other similar evidence.
2. Suspected Malfunctions are systems exhibiting some malfunction characteristics such as abnormally green grass in the vicinity of an absorption area, piped discharges from a dwelling without direct evidence of sewage (i.e. no observation of soap suds, food residue, solids, odors, etc.), absorption areas located in known unsuitable soils (observed wetlands, rock outcropping, etc.), cesspools in high-density development areas, and pit privies.
3. Potential Malfunctions are systems that appear to be operating satisfactorily but were constructed prior to system permitting requirements, systems located in areas extremely unlikely to receive permitting by current standards, systems constructed in areas having soils mapped as unsuitable or with severe limitations for OLDS and systems located on exceptionally steep slopes greater than 25 percent. Included as potential malfunctions are permits issued for OLDS repairs that meet Chapter 73 standards. While this needs category does not represent "stand alone" existing needs, the information may be utilized in a needs analysis to locate areas affected by poorly defined adverse circumstances. For example, clusters of legitimate repairs will often indicate areas requiring closer scrutiny.
4. No Malfunction are those systems that appear to be operating satisfactorily, were constructed since the implementation of system permitting requirements, and appear to have been constructed in accordance with the permitting requirements in effect at the time of construction. For the purpose of needs identification, OLDS permitting under Act 537 became effective on May 15, 1972.

Several other situations exist that must be inventoried, mapped, and analyzed when identifying public health needs for an Act 537 Official Plan or Plan Update Revision. These include wildcat sewers, borehole disposal, holding tanks, public complaints, and sanitation-related illnesses.

5. Wildcat Sewers are collection systems (community sewers) serving more than one equivalent dwelling unit (EDU) and discharging untreated or partially treated sewage to the surface of the ground, storm sewers, or other waters of the Commonwealth.
6. Borehole Disposal is an individual or community system that discharges to a borehole, abandoned water well, dry well, ventilation shaft, or other subterranean structure.
7. Holding Tanks are watertight receptacles designed to retain sewage for disposal at another location. All holding tanks installed as repairs are counted as "needs." Specifically excluded are holding tanks installed to serve new land development or low flow commercial facilities. While not actually discharging sewage into the environment, properly maintained holding tanks, when used in OLDS repair situations, are included in the confirmed malfunction category.
8. Public Complaints are legitimate complaints received by the DEP or the municipality concerning improper sewage disposal. The number, nature, and location of public complaints concerning improper sewage disposal are important, yet often overlooked indicators of sewage disposal problem areas.



9. Sanitation Related Illness is any reported illness, either resulting from or suspected to be resulting from improper sewage disposal. Records and incidents in which polluted water supplies have been suspected or confirmed as the cause of disease is documentation establishing a community's wastewater treatment needs. Confirmed or suspected vectorborne disease that may be attributed to surface ponding of sewage should also be considered.

#### **B. Sanitary Sewage Survey**

In order to determine the extent of the conditions as stated above in the planning area that could endanger public health, a sanitary sewage survey was completed in the areas utilizing OLDS systems. There are approximately 1,987 residences within the Planning Area served by OLDS. A total of 477 surveys were collected from random property owners throughout the Study Area. The survey inquired about the age, type and condition of the OLDS and water systems on the property. A summary of the surveys is included in Appendix F.

Follow-up field verifications ("door-to-door surveys") were performed for a percentage of the properties based on guidelines set forth in the SDNIG document. According to the SDNIG document, a recommended minimum number of properties with OLDS within each Study Area should be surveyed in order to conduct a "representative", or "valid" door-to-door sanitary sewage survey of the Study Area. The minimum percentage of the properties that should be surveyed varies with the total number of properties in the Study Area in accordance with the requirements published in the SDNIG (Table 3-2).

**Table 3-3 Minimum OLDS Requirements for Door-To-Door Sanitary Survey – Tier 2**

OLDS in the MATW	Minimum Percentage of OLDS to Survey
Up to 50	50%
51 to 100	35%
101 to 500	25%
501 to 1,000	20%
Greater than 1,000	15%

In accordance with the SDNID, a Tier 2 survey was conducted for the entire Planning area and more than the minimum percentages of the OLDS were surveyed for each Planning area. In total, approximately 24% of the OLDS (477 properties) in all of the planning area were surveyed. At each home where the sewage survey was completed, the field inspectors made general observations of the properties and performed closer investigations of sites that demonstrated evidence of sewage malfunctions including direct observation of sewage, soapsuds, food residues, solids, or odors. Other environmental conditions including abnormally green grass, piped discharges and swampy or wet areas in the vicinity of the on-lot systems were also noted.

The number and percentage of the properties in the planning area that were determined to have confirmed, suspected, potential, and no suspected malfunctions are summarized in Table 3-3.

**Table 3-4 Summary of Tier 2 Survey Malfunction Categories**

Planning Area	OLDS Surveyed	Malfunction (% of OLDS Surveyed)							
		Confirmed		Suspected		Potential		None	
		No.	Percent	No.	Percent	No.	Percent	No.	Percent
Milford Borough	123	5	4%	72	59%	2	2%	44	36%
Milford Township East	21	1	5%	9	43%	0	0%	11	52%
Milford Township West	19	1	5%	6	32%	0	0%	12	63%
Westfall Township-Northeast	42	3	7%	15	36%	0	0%	24	57%
Westfall Township-Southwest	52	6	12%	13	25%	0	0%	33	63%
Matamoras Borough	220	11	5%	100	45%	5	2%	104	47%

**3.3.3. Well Water Survey**

The Matamoras Municipal Authority supplies water to all of the Borough of Matamoras and an adjacent portion of Westfall Township (Westfall Township Northeast). The Milford Municipal Authority supplies water to all of the Borough of Milford and parts of Milford and Westfall Township in the planning area. In the Study Areas of Milford Township East and Westfall Township Southwest, there are a number of wells in the Study Areas.

According to the guidelines for well water surveys published in the SDNIG document, well water surveys may be completed in two tiers (or steps). In tier one, a minimum of 15 percent of the wells in the study area must be sampled. For the second tier, representative sampling must be completed with percentages the same as for the Door-to-Door Survey. Each well water sample was analyzed for total coliform bacteria, fecal coliform bacteria and nitrate-nitrogen concentration.

The Sewage Disposal Needs Identification Guidance requires representative sampling, or second tier sampling in any Study Area, if:

1. The total coliform bacteria contamination rate is 10 percent or greater in the first tier well water samples; and
2. The fecal coliform bacteria contamination rate is 20 percent or greater in the first tier well water samples that had total coliform bacteria contamination.

A total of 37 wells were sampled during the Tier 1 and 2 analysis of Westfall Township and Milford Township and the results are summarized in Table 3-5. No well water samples in either Study Area indicated elevated levels of Nitrate or any detectable amounts of Fecal Coliform.

**Table 3-5 Summary of Tier 2 Well Water Sampling Results**

Planning Area	Approximate # of Wells	# of Water Samples needed		# of Water Samples Completed	Nitrate Test Results				Total Coliform	Fecal Coliform
					Non-Detectable (<0.05 mg/l)	0-5 mg/L	5-10 mg/L	10+ mg/l	Detectable >1	Detectable >1
Milford Township East	10	50%	5	5	0	5	0	0	0	0
Westfall Township-Southwest	128	25%	32	32	8	24	0	0	7	0

### 3.3.4 Summary and Conclusions

Table No. 3-3 displays the results of the sanitary surveys completed for the planning area. Map No. 1 in Appendix G "OLDS Malfunction Exhibit" displays the locations where the sanitary surveys were completed and the corresponding malfunction category. The Tier 2 survey indicated a 5.7% confirmed malfunction rate based on field observations.

It is recommended that an On-lot Sewage Management Program be implemented by each municipality to assist homeowners in developing a regular maintenance schedule to help maintain the functionality of the existing OLDS. The implementation of a Sewage Management Program for each Municipality and construction of public sanitary sewer to areas of the Study Area currently served by OLDS is further discussed and evaluated in Chapter 5.

## 3.4 WASTEWATER SLUDGE AND SEPTAGE GENERATION

Upon treatment of domestic and industrial wastewater, if present, the entrained solids are removed and require special consideration for ultimate disposal. Solids from wastewater are created in two forms, sewage sludge and septage. Sludge is generated at wastewater treatment facilities and is generally disposed by landfilling or hauling it to another WWTP for further treatment. The remaining homes not served by public sewers generate septage. Septage is the decomposed remains of the separated solids from domestic wastewater. As this sludge ages within a septic tank or similar treatment system, partial treatment is provided.

### 3.4.1 Sources of Sludge or Septage in the Planning Area

The MATW WWTP generates wastewater sludge. Septage is generated by the on-lot systems but is presently not accepted at the MATW WWTP. Private companies treat the septage that is generated by OLDS. Sludge from WWTP is removed by using private haulers.

### 3.4.2 Quantities of Sludge and Septage Generated

The MATW disposed of 527,000 gallons of liquid sludge in 2019. The sludge is removed and hauled from the facility by M&S Septic in Matamoras PA and transported to their sludge drying facility on Delaware Drive, Matamoras PA for further treatment and disposal.