



Maryland

Department of the Environment

Larry Hogan, Governor
Boyd K. Rutherford, Lt. Governor

Horacio Tablada, Secretary
Suzanne E. Dorsey, Deputy Secretary

June 8, 2022

The Honorable Guy Guzzone, Chair
Senate Budget and Taxation Committee
Miller Senate Office Building, 3 West
11 Bladen Street
Annapolis, MD 21401-1991

The Honorable Maggie McIntosh, Chair
House Appropriations Committee
Lowe House Office Building, Room 121
6 Bladen Street
Annapolis MD 21401-1991

Dear Chair Guzzone and Chair McIntosh:

The 2022 Joint Chairmen's Report (JCR) required the Maryland Department of the Environment (MDE) to submit a report on the status of the Back River and Patapsco Wastewater Treatment Plants. The requested report is attached.

Also attached, in response to the JCR, is a comprehensive assessment report completed by the Maryland Environmental Service based on their findings at the Back River Wastewater Treatment Plant. Please note that there is not a comparable assessment report for the Patapsco Wastewater Treatment Plant.

MDE greatly appreciates the two-week extension for submission of these reports.

If you have questions or need additional information, please contact me or have a member of your staff contact Terri Wilson, MDE, at 410-537-4155 or terria.wilson@maryland.gov.

Sincerely,

Horacio Tablada
Secretary

Attachments

cc: David Brinkley, DBM Secretary
Andrew Gray, Department of Legislative Services
Tyler Abbott, MDE Chief of Staff
Terri Wilson, Director, MDE Office of Budget and Infrastructure Financing



Larry Hogan GOVERNOR

Boyd K. Rutherford LT. GOVERNOR

Charles Glass, Ph.D., P.E. EXECUTIVE DIRECTOR

June 6, 2022

The Honorable Horacio Tablada, Secretary
Maryland Department of the Environment
1800 Washington Boulevard
Baltimore, Maryland 21401

Re: Back River Wastewater Treatment Plant
Maryland Environmental Service Assessment Report

Dear Secretary Tablada:

In accordance with Section 16 of the directive issued to MES dated March 27, 2022, we are pleased to present this comprehensive assessment report of our findings at the Back River Wastewater Treatment Plant (WWTP). Our employees have been at Back River since March 28, 2022, diligently working with the City's staff at improving the operations of the facility. While there remains much work to be done, we feel that we have made progress towards solving the many problems we have encountered at the plant and improving effluent quality. Our report not only addresses the work completed thus far, it also offers substantive recommendations for future improvements.

We envision this Assessment Report will serve as a blueprint for future operational improvements at the Back River WWTP. Our goal is improved water quality for Back River and the citizens of Maryland.

Please feel free to contact me at 410-729-8200 if you have any questions or comments regarding this report.

Regards,

A handwritten signature in blue ink that reads "Charles Glass". The signature is written in a cursive, flowing style.

Charles C. Glass, PhD., P.E.
Executive Director

cc: Lee Curry, MDE

M A Y 2 0 2 2

**BACK RIVER
WASTEWATER
TREATMENT
PLANT**

A S S E S S M E N T R E P O R T



**MARYLAND
ENVIRONMENTAL
SERVICE**

BACK RIVER WASTEWATER TREATMENT PLANT ASSESSMENT REPORT

June 2022

Executive Summary

On March 27, 2022 the Secretary of the Environment, on behalf of the Maryland Department of the Environment (MDE) [directed](#) (Appendix A) the Maryland Environmental Service (MES) to oversee and operate the Back River Wastewater Treatment Plant (WWTP) in Baltimore City to achieve the following objectives:

- Protect public health and the environment by addressing the numerous discharge permit violations that were leading to poor water quality in Back River.
- Assess staffing levels and the competency of staff at Back River. Furnish trained MES operations staff to augment the Back River WWTP facility's staff.
- Evaluate treatment plant processes. Initiate repair or replacement of defective equipment to achieve compliance with the plant's National Pollutant Discharge Elimination System (NPDES) permit (Appendix B).
- Assess the city's maintenance program.

MES was directed by MDE to undertake a comprehensive evaluation and assessment of the Back River WWTP's operation, maintenance, staffing, and equipment. This report is a comprehensive evaluation of our findings and recommendations for improving operations at the Back River WWTP.

MES immediately assembled a team of operations specialists, engineers, maintenance, environmental compliance, and safety staff for this project. MES assigned one supervisor and 11 MES operators to conduct operations tasks at the plant and assist Baltimore City Department of Public Works (DPW) staff. With our teams in place, MES met with and collected information from DPW staff to assess the existing situation at the plant.

MES reviewed biosolids management at the Back River WWTP, since solids processing failures are a significant factor in the inability of the facility to meet its discharge permit requirements. After conducting an extensive review of the data and interviewing DPW staff and contractors, MES identified several solids processing bottlenecks and deficiencies at the plant. These issues are addressed in our report.

Maintenance is another major focus of our efforts. **MES maintenance staff diligently worked with Back River WWTP facility employees to identify and repair many critical pieces of equipment.** While we made progress in this area, there still is much more equipment repair, replacement, and rehabilitation that needs to be done at the facility.

Additionally, MES currently has two major rehabilitation projects in progress at the plant – repair of two primary clarifiers and the cleaning of two high-rate anaerobic digesters that have been out of service for years.

MES has identified other process-related problems at the plant. MES operations specialists and engineers have recommended improvements to the nutrient reduction treatment processes at the facility.

As directed by MDE, MES evaluated the facility from an organizational standpoint. We assessed staffing, training, safety, and certification needs for the facility's operations staff. These issues are all noted in this report.

Finally, MES presents a detailed set of recommendations to improve operations at the Back River WWTP. We divide our recommendations into two sections. The first section provides recommendations, ranked in order of importance, that would get the facility in compliance with the State-issued NPDES permits. This includes:

- Improve Centrifuge Operations (Repair all Centrifuges, Optimize Dewatering, and Procure a Centrifuge Maintenance Contract)
- Install Potable Water Line to Synagro's Pelletizer, Meet Contractor's Specifications for Feed Sludge
- Place More Primary Settling Tanks In-Service, Make Changes to Primary Settling Tank Operations
- Repair All Pumps in the Hi-Rate Digestion Area - equipment is in dire need of being repaired or replaced. This needs to happen as quickly as possible.
- Safety - there are some fairly basic items that need to be addressed, which could be classified as "low hanging fruit" and can happen immediately.
- Denitrification Filters - These are critical for removing nitrogen and allow the facility to stay in compliance with the nutrient limits of its NPDES permits.
- Sludge Thickening Equipment is badly in need of repair.
- Activated Sludge (AS) Areas are also badly in need of repair. This is critical to the solids removal process.
- Sand Filters - of the 48 sand filters at the facility, only 12 are currently online. The sand filters are needed to capture solids and allow the facility to meet its phosphorus discharge limits.

The second set of recommendations outline additional changes that need to be made in the immediate, short, and long-term planning horizons, and are necessary to keep the facility in compliance going forward. **These recommendations are based on observations and data collection that show a system-wide catastrophic failure to operate and maintain this facility at every level. These include personnel, morale, licensing, and certification, hiring of competent personnel, firing of incompetent personnel, accountability and more.** After investing a significant amount of state resources getting the facility back into compliance with its permits, it would be equally as disastrous to allow the facility to fall back on the same level of disrepair.

Side note: In assembling a team of wastewater professionals to respond to this emergency, we pulled MES staff away from their current assignments at other locations. MES would like to thank our clients from across the state for their patience and understanding as we worked to immediately address these serious environmental and public health issues.

Table of Contents

Facility Design	1
Preliminary Treatment (Headworks)	1
Primary Treatment	1
Secondary Treatment.....	1
Denitrification Filter Facility.....	2
Sand Filtration Facility	2
Final Treatment	2
Solids Treatment Processes	3
Stabilization	3
Dewatering.....	4
Biosolids Management – End Use	4
Operations, Maintenance, and Improvement Activities	5
Operations Team	5
Maintenance Team	5
Safety and Environmental Compliance Team.....	5
Critical Factors Required for Successful Treatment Plant Operation	6
Operations Assessment and Findings	6
Solids Management	6
Discussion of Solids Processing Failures	8
Primary Clarification - Process Evaluation and Impact on Solids Management	11
Anaerobic Digestion - Process Evaluation and Impact on Solids Management	14
Anaerobic Digestion – Condition Assessment of Equipment.....	16
Solids Thickening – Condition Assessment	16
City Dewatering Operations Process Evaluation and Impact on Solids Management	20
Septage Receiving Station- Evaluation and Condition Assessment	21
Nutrient Removal	22
Unnecessary Work Arounds	23
Process Laboratory Operations	23
Maintenance Assessment and Findings	23
Asset Management / Inventory Control.....	23
Workload.....	24
Preventive Maintenance Management.....	24
Procurement	25
Planning.....	25
Staffing Assessment and Findings.....	26
Operations Supervision/Accountability/Culture	26
Vacancies/Workload.....	27

Hiring Practices	28
Operator Certification Process	28
Training/Cross Training Ops	28
Succession Planning	29
Challenges of Working in the Back River WWTP Environment.....	29
Comprehensive List of Process Equipment and Operational Status	29
Environmental Compliance	29
Biosolids Management	30
Overflows and Ponding.....	31
Laboratory Procedures for In-House Process Sampling	31
Universal Waste	32
Safety	32
Improper Lock-out of Energized Equipment.....	33
Inadequate Access to Emergency Response Equipment	33
Exposure to Biohazards and Bloodborne Pathogens.....	33
Areas with Hydrogen Sulfide (H ₂ S) Buildup.....	33
Unstable Working Surface Areas.....	34
Insufficient Lighting	34
Operating Equipment in Manual Mode	34
Cranes and Overhead Hoists	35
Emergency Response Procedures.....	35
Confined Space Entry	35
Lock-Out/Tag-Out	36
Respiratory Protection.....	37
Chemical Handling Procedures	37
General Housekeeping.....	38
Organizational Management.....	38
Communication	38
Responsiveness.....	39
Recommendations	40
I. Back River WWTP – List of Recommended Improvements to Achieve NPDES Compliance, Ranked in Order of Importance.	40
II. Recommendations for Short-, Medium-, and Long-term Issues.	42
III. Staffing Recommendations	47
Conclusion.....	49
Appendices	50
Appendix A – MDE Directive	50
Appendix B – NPDES Discharge Permit.....	59

Appendix C - Comprehensive Repair, Replacement, and Priority Lists..... 99

Appendix D - Daily Reports..... 114

BACK RIVER WASTEWATER TREATMENT PLANT ASSESSMENT REPORT

Facility Design

The Back River WWTP occupies a 466-acre site. It is designed to treat 180 million gallons per day (MGD) of wastewater and serves an estimated 1.3 million residents in a 140 square-mile area of Baltimore City and Baltimore County. It is the largest WWTP in the state. The plant is designed so that wastewater receives four levels of treatment: preliminary, primary, secondary, and tertiary. A process flow diagram of the facility is depicted in Figure 1.

Preliminary Treatment (Headworks)

The preliminary treatment process includes four coarse screens that remove large debris and six fine screen units. The fine screens remove smaller objects, which may clog or damage downstream pipes, pumps, or collection mechanisms. After fine screening, the flow enters the grit removal facility where eight grit classifiers remove heavier material like sand and grit. Screenings and grit are removed and transported for disposal to the Quarantine Road Sanitary Landfill.

Primary Treatment

Following preliminary treatment, the wastewater is distributed among 11 primary sedimentation tanks (nine are 170 ft. in diameter and two are 200 ft. in diameter) where large and denser suspended organic solids settle. These solids (primary sludge) are removed continuously by rotating scraper mechanisms. While the primary sludge removed from the tanks goes to solids processing, the clarified effluent proceeds to secondary treatment.

Secondary Treatment

Effluent from the primary treatment process, which still contains some dissolved and fine suspended solids, flows to the activated sludge process (secondary treatment). At the Back River WWTP, flow from primary treatment enters three fine-bubble-activated sludge facilities where a culture of microorganisms is maintained to absorb and metabolize organic pollutants. Air is continuously added to the aeration basins to meet the oxygen demand of the bacteria and other organisms that comprise activated sludge. After treatment, the activated sludge is then separated from the wastewater by sedimentation in secondary clarifiers, similar to those used in primary treatment.

After sedimentation, a portion of the settled solids are then recycled back to the aeration basins in a form commonly referred to as return activated sludge. This maintains the required biomass concentration, while the excess sludge commonly referred to as waste activated sludge is pumped to additional solids handling processes and removed from the treatment system.

All activated sludge facilities operate as biological nutrient removal facilities. This means that nutrients (nitrogen and phosphorus) are removed from the waste stream or converted to a less toxic form. Ammonia (NH_3) is converted through nitrification into nitrate (NO_3^-) where the bacteria can remove it.

To reduce the phosphorus loading to the Back River, the chemicals ferric chloride and polymer are added separately to the aeration tanks prior to secondary clarification. As an option, polymer can also be added to the effluent after secondary clarification. Together, these chemicals cause a precipitate to form that can be removed by sedimentation or during filtration.

Denitrification Filter Facility

Secondary effluent then flows to the denitrification filter facility (DNF) for further nitrogen removal. The DNF facility consists of four “quads” of 13 filters each, for a total of 52 filters. The filters provide an anoxic environment for the bacteria to remove nitrogen through a process called denitrification. Methanol is fed to the filters as a carbon source to help the bacteria thrive and enhance the process. Through the denitrification process, nitrate (NO_3) is converted into nitrogen gas (N_2) and is released into the atmosphere, thus removing it from the wastewater stream.

Sand Filtration Facility

Flow then enters the sand filtration facility. This facility consists of 48 16 ft. x 16 ft. sand beds with a total filter surface area of slightly over two acres. The fine sand filtration process entraps any remaining solids particles on the filter bed to remove most of the suspended solids (and any remaining phosphorus) from the wastewater. The suspended solids are then automatically backwashed from the bed and recycled back to the influent of the activated sludge process.

Final Treatment

The final steps in the treatment process are disinfection using sodium hypochlorite (bleach), dechlorination by sodium bisulfite, and post-aeration. After filtration, the effluent passes through four separate three-pass chlorine contact tanks. Each chlorine contact tank provides a total volume of over three million gallons and provides additional chlorine contact/disinfection time.

After chlorination, sodium bisulfite solution is added to neutralize the chlorine residual, thus minimizing the potential effects that chlorine, and compounds that form because of its addition, could have on aquatic life.

Finally, the effluent spills down a step-dam cascade system where it is re-aerated. This treated effluent then passes through a 1,200 ft. long outfall pipe where it is discharged into Back River. Up to 50 MGD of the effluent is diverted to Outfall 002, located at the Tradepoint Atlantic property, where it had been used for cooling water when the property had an active steel mill.

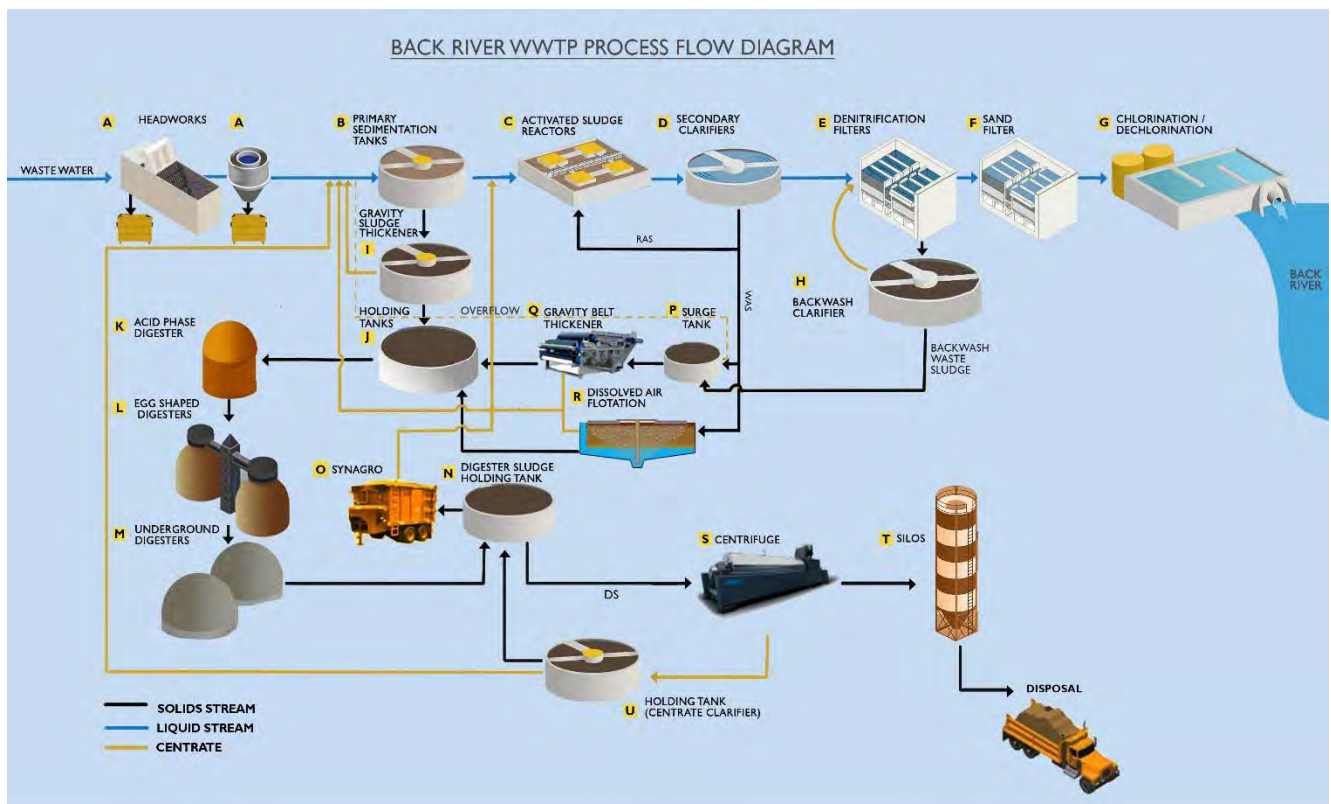


Figure 1 – Process Flow Diagram, Back River WWTP

Solids Treatment Processes

Equally as important as the treatment of liquid wastewater is the handling of its by-product, sludge. At the Back River WWTP, solids receive three stages of handling prior to end use: thickening, stabilization, and dewatering. During normal operating protocols some of the treated, stabilized solids are sent to a privatized, onsite facility operated by a contractor (Synagro) to produce a dried, pelleted product that is sold as a slow-release fertilizer. As a second option, solids are also dewatered by the facility staff and sent to an off-site composting facility to produce a soil conditioner product.

Thickening

At the Back River WWTP, primary sludge is thickened by gravity sludge thickeners while waste-activated sludge from the secondary clarifiers is thickened by gravity belt thickeners and/or the dissolved air flotation process. Up to eight gravity sludge thickeners are used to thicken primary sludge from a dilute liquid content to a thickened sludge concentration.

Similarly, solids from secondary treatment, which are lighter and more readily floatable than primary solids, are processed through eight gravity belt thickeners and up to four air flotation thickeners. During the sludge thickening process, waste activated sludge, at a dilute liquid of 0.8%, is thickened to a sludge solids concentration between 3-7% solids.

Stabilization

At the Back River WWTP, thickened sludge stabilization is currently achieved by first being pumped to an innovative, 2-million-gallon (MG) acid phase reactor vessel, then to two, 3 MG egg shaped anaerobic digesters and finally six 1.3 MG conventional high-rate anaerobic sludge digesters.

Anaerobic digestion (AD) is a microbiological treatment process where anaerobic bacteria decompose and stabilize the organic matter in the thickened sludge at an elevated temperature of 95°F. The goal of the AD stabilization process is to reduce pathogens in the incoming sludge to safe levels prior to reuse as a low-grade fertilizer. Consequently, this sludge stabilization process reduces the volume of the sludge by metabolizing volatile solid material while producing combustible gas as a by-product. Most of the biogas generated from the digesters is used to heat the digesters to its process temperature and produce heat for use in other areas in the WWTP. Reduction of sludge volume greatly reduces costs for handling of plant sludge. Once digested, the sludge that is treated to reduce pathogens by digestion is called biosolids.

Dewatering

After digestion, the biosolids are conditioned with polymer and dewatered in the facility's centrifuges. These centrifuges use a large solid walled bowl with horizontal axis-rotation. Centrifugal forces developed by the rotation causes the denser solids to adhere to the bowl wall, which are then continuously scraped off by a helical screw conveyor.

The solid bowl centrifuges concentrate the digested biosolids from a thick liquid slurry of approximately 3-5% solids content to a cake of 20-25% total solids content. Centrifugation also has the added benefit of reducing the tonnage of biosolids, thus reducing trucking and other handling costs for end use of the biosolids.

Biosolids Management – End Use

The digested biosolids from the plant are currently recycled using three methods. These include land application onto farmland, composting for marketing as a soil amendment and fertilizer, and heat drying to produce a dry pelletized product, which is also marketed as a fertilizer. A detailed flow diagram depicting the biosolids management processes is shown in Figure 2 below.

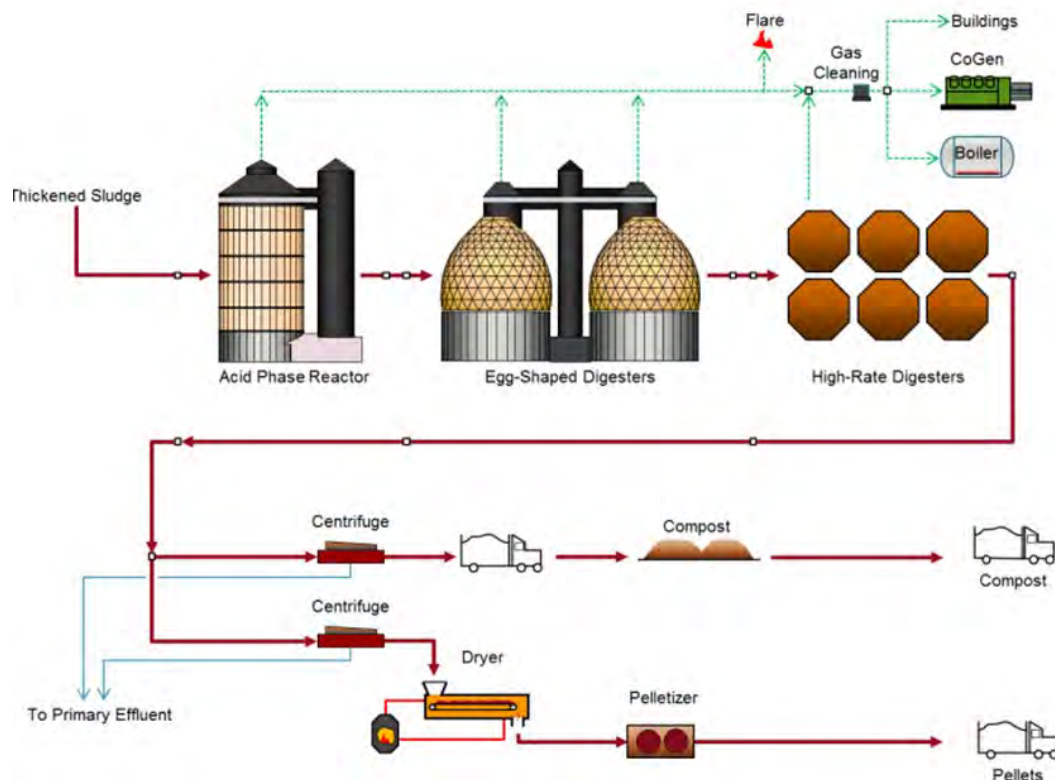


Figure 2 – Process Flow Diagram, Back River WWTP Biosolids Management Process Flow Diagram (Courtesy, HDR Inc., “Baltimore City Comprehensive Biosolids Plan, 1/17”)

Operations, Maintenance, and Improvement Activities

On March 27, 2022, the Secretary of the Environment, on behalf of MDE, issued a directive to MES. The directive stated:

“The Secretary hereby directs that [MES] take charge of the Back River WWTP, including its operations, maintenance and improvement [of] functions in order to work with Baltimore City to ensure that Baltimore City meets the following objectives: protecting public and environmental health; abating any further nuisance; providing appropriate levels of qualified staff; conducting appropriate maintenance, improvements, and modifications; operating the Back River WWTP in compliance with all terms of the Back River Discharge Permit; and ceasing all unpermitted discharges from the Back River WWTP.”

In response to this directive and to quickly resolve the most urgent problems at the Back River WWTP, MES immediately formed three teams of employees: an Operations Team, a Maintenance Team and a Safety and Environmental Compliance Team. These teams were supported by staff from MES' Finance Group, Procurement Section, and from the Office of the Attorney General.

Operations Team

MES assembled an Operations Team of seasoned operators, led by an Environmental Systems supervisor, to begin working with the Back River WWTP operations staff. The team assessed the current operations staff's capabilities, staffing levels, and reviewed all plant operations, to determine how they could immediately improve plant operations. The Operations Team is focused on operating procedures, supervision, and cross-training of operations staff.

Maintenance Team

The MES Maintenance Team immediately began working with the Back River WWTP maintenance supervisors to address the current maintenance staffing capabilities and the level of out-of-service equipment at the facility. **The Maintenance Team used MES' emergency procurement procedures authorized under state law to immediately begin repairing essential equipment.** The MES Maintenance Team was supplemented with members of the Back River WWTP maintenance team, in addition to outside contractors specializing in wastewater equipment repair. The Maintenance Team continues to be focused on repairing out-of-service equipment, supervision, and preventive maintenance.

Safety and Environmental Compliance Team

The MES Safety and Environmental Compliance Team (Compliance Team) immediately began identifying any safety issues that would expose staff to hazards, and issues regarding the data collection and reporting of NPDES permit data for the Back River WWTP. The Compliance Team focused on improving lab procedures, lock out/tag out procedures (a protection system against unintentional exposure to hazardous energy from equipment and machinery), and insufficient lighting for nighttime operations, among other things.

Assessment and Critical Success Factors

With these three specialized teams in place, MES began meeting with and collecting information from the following groups between March 28 to June 1, 2022, to complete this assessment.

- DPW Leadership

- The Back River WWTP Facility Manager
- Senior Supervisory Operation Staff at the Back River WWTP
- Senior Supervisory Maintenance Staff at the Back River WWTP

Critical Factors Required for Successful Treatment Plant Operation

After working on the site for more than two months, the MES Team has concluded that basic areas of need would greatly help in moving toward the facility's successful operation:

- **Accountability** - Management must be able to hold staff accountable for issues and problems that arise because of lack of communication or lack of proper management and supervision.
- **Teamwork** - The entire staff, including management and employees, must work together as a team to keep the facility functioning at a high level, meeting all regulatory requirements, and maintaining a safe working environment. This is essential in any work environment. **Based on what MES has observed, there appears to be a significant breakdown in communication between management and facility staff, and between the facility's operations and maintenance staff, and even within the different shops (mechanics, electricians, instrumentation techs) at this one facility.**
- **Leadership** - A facility of this size must have effective leadership to set expectations and communicate a cohesive vision for the plant and staff. The leadership at the facility should have the ability to coordinate all operations and maintenance activities as well as asset management and capital programming.

Operations Assessment and Findings

Solids Management

Back River WWTP utilizes AD to stabilize sludge solids. There are nine digesters at the plant. Thickened sludge solids from the holding tanks are first introduced to a 2 MG anaerobic acid phase reactor, which is designated as Digester 9. Sludge from the reactor is pumped to two egg-shaped digesters (digesters 7 and 8). Each digester has a 3 MG volume, for a total of 6 MG of volume. Digested sludge from the egg-shaped digesters is sent to six, in-ground, conventional high-rate digesters, which have a 1.3 MG volume capacity each, for a total capacity of 7.8 MG.

The digestion system operates at mesophilic temperatures (95°F). A summary of some of the design criteria for the digestion and solids dewatering systems is shown in Table 1.

BACK RIVER WWTP - SELECTED DESIGN DATA

DESIGN CRITERIA	VALUE
EDSs - VOLATILE SOLIDS (VS) LOADING	0.17 LB VS/ft3/day
EDSs - HYDRAULIC RETENTION TIME (HRT)	11.1 days
OPERATING TEMPERATURE (ALL DIGESTERS)	95°F
HRDs - VOLATILE SOLIDS (VS) LOADING	0.14 LB VS/ft3/day
CENTRIFUGES, 4 EACH, TOTAL CAPACITY	288 dry tons per day (DT/d)
CENTRIFUGE FEED % TOTAL SOLIDS (%TS)	2.90%
CENTRIFUGE FEED, DT/d ACTUAL (AVERAGE)	180,000 GAL/DAY, 22.2 DT/d
SYNAGRO, DRYER AND PELLETIZING FACILITY	200 GALLONS PER MINUTE, 35 DT/d

Table 1 – Solids Processing Design Criteria at the Back River WWTP

Back River WWTP's normal, prescribed solids management processing plan is to distribute the digested, liquid sludge to two outlets. The first option involves pumping sludge to city-operated centrifuges. The digested, dewatered biosolids from the city-operated centrifuges is then transported under contract to Veolia's Baltimore City Composting Facility located on Quarantine Road. There, the biosolids are further processed to meet the U.S. Environmental Protection Agency's (EPA) Class A pathogen treatment and exceptional quality (EQ) standards using in-vessel composting. Veolia markets the finished compost as a branded product called Orgro. Veolia's tonnage acceptance obligation is 2,167 wet tons (WT) per month (or approximately 500 WT/week). This has been a reliable, successful program in place for over 30 years.

The second management method encompasses pumping sludge to a privatized drying and pelletizing facility located at the Back River WWTP, but owned and operated under contract to Synagro. The heat dryer is an indirect, vertical, multiple tray drying system. Pellets generated by this system are also marketed as a Class A, EQ trademarked biosolids product called Granulite. The pellets are sold as a slow-release fertilizer in bulk and bagged form. During normal operations, Synagro produces approximately 1,000 dry tons (DT) of pelletized product per month. This is an important part of the facility's solids processing since it represents about 70% of the solids load.

It is important to note that Synagro's pelletizing facility requires the use of plant non-potable (NPW) flushing water to satisfy the demands of its fire suppression system. For reasons described below, this became an important issue starting in 2021.

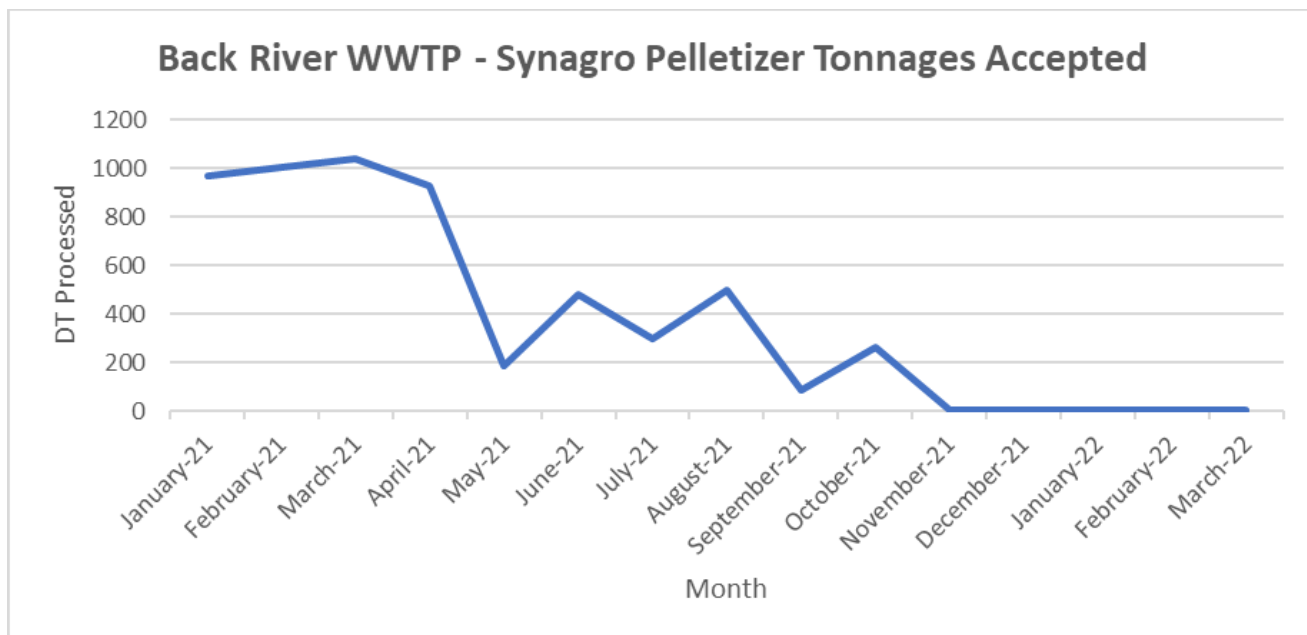
In this report, MES describes our efforts to perform a root cause failure analysis to ascertain the events that led up to the solids processing failures at the facility. It is widely accepted that the inability to process solids was a significant factor in the inability of the facility to meet its discharge permit requirements.

MES has determined that there are at least three main issues that are currently contributing to the solids processing failures at the Back River WWTP. These are:

- In May 2021, the quality of the NPW supplied to Synagro's fire suppression system showed an increase in total suspended solids (TSS) content. According to Synagro, the TSS of the supplied NPW exceeded its specifications for their system, clogging their equipment. The amount of sludge solids accepted by Synagro's dryers began to steadily decrease eventually falling to 0 DT (i.e., not in operation) starting the month of November 2021 through March 2022 (see Figure 3). This had a significant adverse effect on the ability of the facility to meet its discharge permit.
- The loss of 70% of Back River WWTP's solids processing load, due to the lack of Synagro's capacity, contributed to a buildup of solids in the primary settling tanks (PSTs). The PSTs filled with solids (see Figure 4), which resulted in nine of the 11 clarifiers being taken offline. When MES initiated its involvement at the plant on March 28, 2022, the plant had put another online, but only three of the 11 primary clarifiers at the plant were in use (PSTs numbers 8, 9, and 11). The other PSTs were either filled with solids, had mechanical problems, or both. Most recently, PST 9 experienced a failure of its skimmer arm falling off. As of May 10, 2022, only two PSTs were in operation. The status of the PSTs is given in Table 2 below.
- The centrifuge dewatering equipment has not functioned properly. At some point in 2020 the facility started experiencing diminished dewatering performance. This was most likely due to centrifuge equipment problems and operator process control issues. Plant data shows the centrifuge solids capture rate, which was previously acceptable at greater than 90% (September 2021), now averages approximately 47% (October 2021 to date). At one point, the average centrate solids concentration was 30,312 mg/L TSS in September 2021. (This is, at minimum, an order of magnitude higher than it should be. An elevated centrate TSS means that the centrifuges are not being operated efficiently. The centrate is rerouted back to the head of the plant and exerts a solids load that must be treated all over again.) In March and April 2021, the centrifuges were out of service and operated for only a total of 8 days (out of 61 days). A summary of select centrifuge data is depicted in Table 3 below.

Discussion of Solids Processing Failures

Inspecting the data in Figure 3 (Synagro pelletizer tonnages accepted) and the record of centrifuge data, (Table 2) MES notes that the timeframe when Synagro experienced the elevated TSS in their NPW flushing water, leading to decreased pellet production, and coincided with the centrifuges being out of service for two months in March and April 2021. Not having any dewatering capacity at a facility the size of Back River WWTP was a major failure. This led to solids accumulating in the facility process tanks and in the effluent NPW flushing water. The elevated TSS in Synagro's fire suppression system water resulted in decreased operation times at the pelletizer facility, thus exacerbating the problem. For example, the amount of sludge solids processed by Synagro dropped from 928 DT in the month of April 2021 to 183 DTs during May 2021, an 80% decrease in solids processing capacity.



*Figure 3 - Back River WWTP - Synagro Pelletizer Tonnages Accepted
(Data from Back River, DPW Records)*



*Figure 4 - Back River WWTP – Example of a Primary Clarifier (PST)
Filled with Accumulated Solids, March 2022*

**BACK RIVER CENTRIFUGE DATA
CALENDAR YEAR 2020 TO MARCH 2022**

MONTH	AVERAGE CENTRIFUGE FEED FLOW (MGD)	% TS, DEWATERED CAKE	% SOLIDS CAPTURE
JANUARY 2020	0.182	20.04	99.20
FEBRUARY 2020	0.187	20.06	97.00
MARCH 2020	0.197	21.05	89.00
APRIL 2020	0.215	20.95	99.40
MAY 2020	0.242	21.53	96.90
JUNE 2020	0.226	21.56	98.87
JULY 2020	0.234	21.03	97.20
AUGUST 2020	0.183	21.77	96.40
SEPTEMBER 2020	0.195	23.15	91.60
OCTOBER 2020	0.180	22.6	76.30
NOVEMBER 2020	0.239	21.1	77.10
DECEMBER 2020	0.207	21.79	69.20
JANUARY 2021	0.220	21.95	68.50
FEBRUARY 2021	0.180	20.28	63.50
MARCH 2021	0.023	18.3	95.10
APRIL 2021	0.191	19.46	92.70
MAY 2021	0.218	20.22	84.90
JUNE 2021	0.262	20.87	74.40
JULY 2021	0.313	21.94	66.00
AUGUST 2021	0.410	21.62	54.40
SEPTEMBER 2021	0.317	23.32	24.20
OCTOBER 2021	0.379	22.75	47.30
NOVEMBER 2021	0.320	21.25	57.10
DECEMBER 2021	0.355	23.51	41.80
JANUARY 2022	0.330	21.7	34.50
FEBRUARY 2022	0.303	22.39	47.80
MARCH 2022	0.367	21.71	68.20
AVERAGE =	0.247	21.40	74.39

Table 2 – DPW Centrifuge Performance -January 2020 Through March 2022

Primary Clarification - Process Evaluation and Impact on Solids Management

A summary of the status of the PSTs is given in Table 3. This discussion details the impacts of the current operational practices on solids management at the plant.

Select data for tank performance from January 2020 through March 2022 is noted in Table 4.

MES' conclusion based on empirical evidence is that the current operating protocols for the tanks do not follow established practices. There are very little to no sludge blankets in the online tanks, which results in two problems. First, the primary sludge total solids are very low, ranging from 0.07% to 0.80% total solids. Typical contents should be in the range of 2.5% to 5%.

Primary sludge with a low percentage of total solids will result in difficulty thickening sludge. Low percentage solids content requires more volume to be pumped to remove the same amount of solids load as a sludge with higher solids content. This also affects digestion, since poorly thickened sludges results in greater volumes fed to the digesters, and hence lowered hydraulic retention times.

Also examining the data in Table 4 shows that the PST TSS effluent concentrations are elevated, in the range of 144 to 474 mg/L. These values approach those for raw sewage (WWTP) influent. This suggests poor solids capture for the PSTs, which leads to excessive solids introduced into the downstream activated sludge basins, resulting in high mixed liquors (Mixed Liquor Suspended Solids (MLSS) concentrations.

Remedies to these problems will be addressed in the recommendations section of this report.

STATUS OF PSTs (Primary Settling Tanks)

PST #	ON LINE?	STATUS
1	NO	Needs to have excess solids removed and disposed
2	NO	Needs to have excess solids removed and disposed. MES executed contract to repair clarifier.
3	NO	Awaiting delivery of mechanical parts ordered by the city
4	NO	Awaiting delivery of mechanical parts ordered by the city
5	NO	Needs to have excess solids removed and disposed
6	NO	Needs to have excess solids removed and disposed
7	NO	MES executed contract to repair clarifier.
8	YES	
9	NO	Skimmer arm fell off
10	NO	Awaiting delivery of mechanical parts ordered by the city
11	YES	

Table 3 - Back River WWTP Current Operational Status of primary settling tanks as of May 10, 2022

SUMMARY OF SELECT PST DATA

JANUARY 2020 TO MARCH 2022

MONTH	AVERAGE % TOTAL SOLIDS PSTs 1 THROUGH 7	AVERAGE % TOTAL SOLIDS PSTs 8 THROUGH 11	AVERAGE TSS - PST INFLUENT (mg/l)	AVERAGE TSS - PST EFFLUENT (mg/l)
JANUARY 2020	0.56	0.30	186	147
FEBRUARY 2020	0.34	0.62	187	148
MARCH 2020	0.33	0.31	174	164
APRIL 2020	0.53	0.69	148	191
MAY 2020	0.58	0.45	197	175
JUNE 2020	0.75	0.61	179	198
JULY 2020	0.49	0.37	184	170
AUGUST 2020	0.45	0.42	196	153
SEPTEMBER 2020	0.45	0.45	215	173
OCTOBER 2020	0.33	0.28	216	169
NOVEMBER 2020	0.62	0.80	222	187
DECEMBER 2020	0.32	0.29	167	144
JANUARY 2021	0.41	0.28	177	194
FEBRUARY 2021	N/A	0.30	N/A	177
MARCH 2021	0.07	0.26	N/A	164
APRIL 2021	N/A	0.35	N/A	188
MAY 2021	0.69	0.54	210	232
JUNE 2021	N/A	N/A	236	190
JULY 2021	N/A	N/A	N/A	215
AUGUST 2021	N/A	N/A	N/A	210
SEPTEMBER 2021	N/A	N/A	N/A	209
OCTOBER 2021	N/A	N/A	N/A	268
NOVEMBER 2021	N/A	0.29	N/A	337
DECEMBER 2021	N/A	0.47	N/A	451
JANUARY 2022	N/A	0.32	N/A	454
FEBRUARY 2022	N/A	0.20	N/A	474
MARCH 2022	N/A	0.15	N/A	245

Table 4 - Summary of Select PST Data, January 2020 Through March 2022

Anaerobic Digestion - Process Evaluation and Impact on Solids Management

The Back River WWTP uses AD to treat a blend of thickened solids generated from the primary clarifiers and secondary (activated) unit operations. This section will evaluate the plant's process data to determine if the nine digesters at the plant are performing satisfactorily.

A summary of select AD performance data obtained from DPW staff for the period of January 2020 through March 2022 is presented in Table 5. City staff analyzes process data for volatile fatty acids (VFA), alkalinity, pH, total and volatile solids, and digester temperature for all units. Data in Table 4 is shown as a combined tabulation for all digesters (1–8) except for the acid phase reactor (Digester 9).

A properly operating AD system should maintain a VFA/alkalinity ratio not greater than 0.10. Inspection of the data in Table 5 shows this consistently to be the case. In addition, to meet the federal and state regulations for vector attraction reduction (VAR), the volatile solids (VS) reduction should be greater than 38% for land application (note: VS reduction was calculated using the Van Kleeck formula, which is standard practice for AD systems). Except for the period from June through December 2021, this condition was met. Since digested material was further treated by the two contracted Class A processing options (heat drying and composting), this period is not concerning. However, any material generated during the period of June through December 2021, should not have been allowed to be land applied because they did not meet the requirements for Class B biosolids.

Note that MES included the average percentage VS data of the digested biosolids generated by the plant. Synagro's drying/pelletizing operation contractually requires a digested biosolids VS content of less than 60% (Personal Communication, Joe Hurt, Synagro, May 2022). While the facility comes close to meeting this condition, we recommend that some adjustments to operating protocols be made to achieve the 60% condition.

Finally, MES did a cursory evaluation of the data to assess additional performance metrics, including gas production per lb. VS destroyed (ft^3 biogas/lb. VS destroyed). A properly operating AD system should produce between 13 and 18 ft^3 /lb. VS destroyed. The actual average value for the period of January 2020 through March 2022, was 57.6 ft^3 biogas/lb. VS destroyed, which seems unlikely. Some investigation into why this value was achieved, and the measurements taken including inspection or repair of the gas meters at the plant, need to be further examined.

Time constraints did not allow us to evaluate organic loading (lb. VS/ ft^3 digester volume /day). MES suggests that this parameter should be routinely monitored by staff to ensure that design organic loadings are not being exceeded.

AD SYSTEM PERFORMANCE JANUARY 2020 TO MARCH 2022

MONTH	AVERAGE OF VOL ACID/ALK RATIO	AVERAGE OF DIGESTED SOLIDS (% VS)	AVERAGE OF % VS REDUCTION	AVERAGE OF MEAN CELL RETENTION TIME (DAYS)	AVERAGE OF TEMP (OF)
JANUARY 2020	0.03	65.71	52.86	30.6	97
FEBRUARY 2020	0.03	65.86	48.02	32.4	97
MARCH 2020	0.03	65.95	50.82	33.2	N/A
APRIL 2020	0.03	65.47	42.30	37.6	94
MAY 2020	0.02	63.96	46.08	32.3	94
JUNE 2020	0.03	64.82	50.13	31.0	95
JULY 2020	0.02	64.51	45.56	31.1	95
AUGUST 2020	0.02	61.79	39.32	34.0	95
SEPTEMBER 2020	0.02	59.38	43.54	33.3	94
OCTOBER 2020	0.02	61.38	44.35	N/A	94
NOVEMBER 2020	0.03	64.69	36.58	28.5	94
DECEMBER 2020	0.03	64.47	38.99	34.7	94
JANUARY 2021	0.04	64.61	43.87	47.3	94
FEBRUARY 2021	0.05	66.48	46.15	N/A	95
MARCH 2021	0.04	68.63	43.40	N/A	94
APRIL 2021	0.05	67.19	47.91	38.0	94
MAY 2021	0.05	66.62	37.47	59.6	94
JUNE 2021	0.07	64.85	31.52	30.8	N/A
JULY 2021	0.06	62.73	32.85	35.7	94
AUGUST 2021	0.03	62.11	34.70	23.2	95
SEPTEMBER 2021	0.09	61.28	34.38	N/A	95
OCTOBER 2021	0.04	62.55	29.13	N/A	95
NOVEMBER 2021	0.04	61.70	31.11	28.6	94
DECEMBER 2021	0.07	63.04	32.21	29.1	94
JANUARY 2022	0.06	63.93	39.41	38.3	94
FEBRUARY 2022	0.08	61.24	48.90	34.1	94
MARCH 2022	0.05	63.64	47.64	28.6	95

Table 5 – AD System Performance January 2020 Through March 2022 (Data furnished by DPW staff)

MES notes that like many of the other solids processing tanks at this facility, all digesters suffer from excessive debris accumulation. This negatively influences AD performance. For example, accumulated debris (rags, grit, screenings, etc.) effectively reduces the active volume of the digesters available for microbiologically treating solids. This debris also clogs pumps and affects other critical process equipment. The temperature of the acid phase reactor is routinely 74°F, far below the required mesophilic temperature of 95°F. This is likely because debris has partially clogged the steam feed line into the acid phase reactor that heats that digester.

Another example of the consequences of accumulated debris is the fact that the inlet feed lines to high-rate digesters 1 and 4 are clogged. Due to this clogging these two digestion units have not been fed sludge solids in what looks like a period of several years; accordingly, this lack of maintenance has rendered them inactive.

MES currently has initiated a project to clean high-rate digesters 1 and 4. Also, the facility has a CIP (contract SC 992), which includes the cleaning, inspection, and repair of all digesters within the next four years.

Anaerobic Digestion – Condition Assessment of Equipment

A list of equipment problems associated with the AD units is given in the status update in Table 6. Particularly, the condition of most of the pumps in this section of the plant have either become inoperable or are on the verge of failing. This has led to critical throughput bottlenecks in the system. For example, all the acid phase reactor recirculation pumps 1, 2, and 3 are inoperable. The sludge at the bottom of the acid phase reactor has not been mixed for years and is very thick. Sludge feed does not flow though the acid phase reactor when transferred from the tanks that feed the AD system, thus reducing the amounts that flow to the egg-shaped digesters and high-rate digesters, and eventually to the centrifuge area.

The high-rate digesters' mixing system uses biogas compressors and a manifold of lances to inject and recirculate biogas in each of the six in-ground high-rate digesters. However, none of the gas compressors are functional, and thus no mixing has been happening for years. All gas compressors are scheduled to be replaced. DPW tasked MES with replacing the gas compressors in digesters 1 and 4.

Solids Thickening – Condition Assessment

Primary sludge and waste activated sludge are first thickened separately, then blended in two holding tanks prior to being fed to the AD system. MES has documented multiple equipment problems with the sludge thickening systems at the facility.

The status of the sludge thickening equipment is summarized in Table 7. Upon arrival to the facility, MES found many of the gravity sludge thickeners had extensive amounts of phragmites vegetation growing in the tanks. A picture of one of the tanks is shown in Figure 5. Some of the tanks were also found to have problems with their mechanical components (rake arms, center drives). There is a contractor onsite who is removing the vegetation and is rehabbing these units.

Currently three of the four dissolved air floatation units at Back River WWTP are out of service. Many of the problems associated with these units can be attributed to nonfunctioning pumps. In fact, the problems with the pumping equipment are a common issue found with all the solids processing unit operations at Back River WWTP.

The gravity belt thickeners are in somewhat better condition. While only two of the eight are fully out of service, several are rated as “partially functional,” due to pump problems, which based on our observations are due to poor maintenance.

STATUS OF DIGESTER EQUIPMENT

EQUIPMENT	STATUS	COMMENTS
ACID PHASE REACTOR (APR)		
GAS COMPRESSORS	OUT OF SERVICE	Sludge backed up into piping rendering the gas mixing system inoperable - needs to be replaced
RECIRC PUMP #1	PARTIALLY FUNCTIONAL	Mechanical seals need to be replaced
RECIRC PUMP #2	PARTIALLY FUNCTIONAL	Mechanical seals need to be replaced
APR EFFLUENT PUMP #1	PARTIALLY FUNCTIONAL	Bearings to be replaced
APR EFFLUENT PUMP #2	OUT OF SERVICE	No motor for pump (currently in shop); pump needs to be replaced
APR EFFLUENT PUMP #3	PARTIALLY FUNCTIONAL	Issues with check valve
APR RECIRCULATION PUMP #1	OUT OF SERVICE	Mechanical seal leaks badly; hasn't been used in months
APR RECIRCULATION PUMP #2	OUT OF SERVICE	Mechanical seal leaks badly; hasn't been used in months
APR RECIRCULATION PUMP #3	PARTIALLY FUNCTIONAL	Mechanical seal leaks badly
ISOLATION VALVE - FEED FROM APR TO ESDS	OUT OF SERVICE	Valve does not close
STEAM INJECTOR #1	OUT OF SERVICE	Probably clogged; digester temperature is only 74 deg F
STEAM INJECTOR #2	OUT OF SERVICE	Probably clogged; digester temperature is only 74 deg F
EGG SHAPED DIGESTERS (ESDs)		
RECIRCULATION PUMP #7 (FOR ESD 7)	OUT OF SERVICE	Mechanical seals need to be replaced
RECIRCULATION PUMP #8 (FOR ESD 7)	FULLY FUNCTIONAL	
RECIRCULATION PUMP #9 (FOR ESD 7)	OUT OF SERVICE	Mechanical seals need to be replaced
RECIRCULATION PUMP #10 (FOR ESD 8)	OUT OF SERVICE	Mechanical seals need to be replaced
RECIRCULATION PUMP #11 (FOR ESD 8)	OUT OF SERVICE	Mechanical seals need to be replaced
RECIRCULATION PUMP #12 (FOR ESD 8)	FULLY FUNCTIONAL	
ISOLATION VALVE EDS #7	PARTIALLY FUNCTIONAL	Valve does not close
ESD 7 AND 8 GAS MIXING	PARTIALLY FUNCTIONAL	Draft tubes have become detached
ESDs 7 and 8	PARTIALLY FUNCTIONAL	Cleaning is scheduled in the City's CIP
ROOT GAS METER - ESD #7	OUT OF SERVICE	This meter measures gas flow from the ESD. Operator reports that it runs backward. This fouls up the foam separator. Meter needs to be repaired or replaced.

Table 6 - Status of Select AD Equipment

STATUS OF DIGESTER EQUIPMENT

EQUIPMENT	STATUS	COMMENTS
HI-RATE DIGESTERS		
IN-GROUND HI RATE ANAEROBIC DIGESTER #1	NOT OPERATIONAL	This digester hasn't been used in some time because the feed pipe is clogged; MES has been tasked with cleaning this digester; cleanout should be completed in 6 months (sometime by November 2022). MES is also tasked with purchasing and installing a new gas mixing compressor.
IN-GROUND HI RATE ANAEROBIC DIGESTER #2	OPERATIONAL	Cleaning is scheduled in the City's CIP; Needs to have gas mixing compressor examined, as operator reports that none of the gas mixers are operational.
IN-GROUND HI RATE ANAEROBIC DIGESTER #3	OPERATIONAL	Cleaning is scheduled in the City's CIP; Needs to have gas mixing compressor examined, as operator reports that none of the gas mixers are operational.
IN-GROUND HI RATE ANAEROBIC DIGESTER #4	NOT OPERATIONAL	This digester hasn't been used in some time because the feed pipe is clogged; MES has been tasked with cleaning this digester; cleanout should be completed in 6 months (sometime by November 2022). MES is also tasked with purchasing and installing a new gas mixing compressor.
IN-GROUND HI RATE ANAEROBIC DIGESTER #5	OPERATIONAL	Cleaning is scheduled in the City's CIP; Needs to have gas mixing compressor examined, as operator reports that none of the gas mixers are operational.
IN-GROUND HI RATE ANAEROBIC DIGESTER #6	OPERATIONAL	Cleaning is scheduled in the City's CIP; Needs to have gas mixing compressor examined, as operator reports that none of the gas mixers are operational.

Table 6 - Status of Select AD Equipment (continued)

One set of equipment problems that has not been addressed by the facility personnel has been the Huber, "Sludge Cleaner" Strain Presses. These presses screen coarse material such as rags and other screenings from the sludge prior to sending it to other processes. Back River WWTP operations staff anecdotally reported to MES that these units have not worked in at least six years. **Given the excessive amounts of debris that are in all the process tanks at Back River WWTP, particularly in the digestion system, replacing this screening equipment needs to be given a high priority.** These are slated to be replaced in an upcoming capital improvement plan (CIP) project (City contract SC 992). MES recommends that these be replaced sooner to alleviate the screenings problems in the facility.

STATUS OF SLUDGE THICKENING & SCREENING SYSTEMS

UNIT PROCESS	ID NUMBER	STATUS
GRAVITY BELT THICKENERS (GBTs)	GBT-1	IN SERVICE
	GBT-2	OUT OF SERVICE
	GBT-3	OUT OF SERVICE
	GBT-4	OUT OF SERVICE
	GBT-5	IN SERVICE
	GBT-6	IN SERVICE
	GBT-7	OUT OF SERVICE
	GBT-8	IN SERVICE
GRAVITY SLUDGE THICKENERS (GSTs)	GST-1	PARTIALLY FUNCTIONAL
	GST-2	IN SERVICE
	GST-3	OUT OF SERVICE
	GST-4	IN SERVICE
	GST-5	OUT OF SERVICE
	GST-6	PARTIALLY FUNCTIONAL
	GST-7	PARTIALLY FUNCTIONAL
	GST-8	PARTIALLY FUNCTIONAL
DISSOLVED AIR FLOTATION (DAF)	DAF-1	IN SERVICE
	DAF-2	OUT OF SERVICE
	DAF-3	OUT OF SERVICE
	DAF-4	OUT OF SERVICE
SLUDGE SCREENERS		ALL OUT OF SERVICE

Table 7 - Status of Sludge Thickening and Screening Systems



Figure 5– Vegetation Growing in GST-6 Tank

City Dewatering Operations Process Evaluation and Impact on Solids Management

Digested biosolids are pumped through a recirculating “loop” line to several buildings located at the southern end of the plant. Facility staff can withdraw biosolids from this line to feed to the centrifuges. This area is where the city-operated dewatering operations and truck loading occur.

The facility includes four Flottweg decanter centrifuges that accept the dewatered biosolids from the digesters. **However, currently only two of these centrifuges are in operation.** The other two units have mechanical problems. The centrifuges have a total capacity of 216 DT/day. Dewatering operations are scattered amongst three separate buildings.

Centrifuge feed pumps are in the old vacuum filter building nearby. Polymer storage consists of emulsion polymer stored in numerous totes in another building. The polymer metering feed pumps are on the ground floor of this building. Polymer is pumped to the third floor of this building where the four centrifuges are located and is mixed with the incoming sludge.

Dewatered sludge is deposited on a series of conveyors that eventually transfer to another rubber belted inclined conveyor. This inclined conveyor transfers dewatered treated biosolids to several truck loading silos in yet another separate building. Trucks are loaded here, and the material is taken to Veolia’s compost site.

Several problems have been identified with this part of the operation.

- **Since** there is no centralized electronic control system, facility operations are scattered amongst three buildings, forcing operators to physically go from one building to another to manually adjust settings (such as polymer feed rates or sludge feed pump flowrates). This results in poor process control, and, as previously mentioned, unacceptable solids capture rates.
- Centrifuge periodic maintenance is essentially nonexistent. Two of the centrifuges are not in operation. One centrifuge (number 4) has been at Flottweg’s factory in Germany for several months, waiting to be rebuilt. Centrifuge number 3 needs a new motor and

controls installed. Based on our observations, only one centrifuge is operating at any given time.

- The feed pumps in the old vacuum filter building are in poor shape. MES Maintenance staff is currently rebuilding some of these pumps.
- Polymer feed dosages need to be optimized, as the percentage of total solids in the dewater biosolids is lower than it should be (from what we have observed, it only averages approximately 21%). This will be explained further in the Recommendations section of this Assessment Report.

The status of some of the facility's centrifuge equipment is provided in Table 8 below.

STATUS OF CITY CENTRIFUGES

EQUIPMENT	STATUS	COMMENTS
Centrifuge 1	Operational	Dewatering needs to be optimized; polymer feed systems need new pumps in some cases; also polymer dosages need to be adjusted
Centrifuge 2	Operational	Dewatering needs to be optimized; polymer feed systems need new pumps in some cases; also polymerages need to be adjusted
Centrifuge 3	Not Operational	Parts scavaged to make Centrifuges 1 and 2 operational. This needs a motor installed
Centrifuge 4	Not Operational	This centrifuge is at the factory being rehabbed
Centrifuge Feed Pump 4A	Not Operational	Contractor is preparing quote to rebuild and replace
Centrifuge Feed Pump 4B	Not Operational	Contractor is preparing quote to rebuild and replace

Table 8– Status of Back River WWTP Dewatering Equipment

Septage Receiving Station- Evaluation and Condition Assessment

A septage receiving facility (SRF) is located at Back River WWTP. At one time, the plant accepted both septage and grease at this facility. **The facility no longer accepts septage and grease because the equipment is not functional.** Pictures of the SRF setup are in Figure 6.

MES suggests that DPW implement a CIP for this part of the facility to be replaced.

Currently septage and grease are being taken elsewhere, including to out-of-state WWTPs. Grease receiving, if handled properly, can be used to feed the AD system, and increase gas production due to the good biodegradability of grease. Thus, this can be considered a resource recovery project. It would also allow businesses located in city that rely on grease trap pump

outs, such as restaurants and food service establishments, a convenient place to take their material. This helps to keep grease out of the collection system, as well as lower the businesses' costs.



Figure 6 – Back River WWTW, Septage Receiving Station

Nutrient Removal

When MES first arrived onsite, many of the tanks contained excessive levels of vegetation, which have since been removed. Due to the high solids inventory, the denitrification filters were overloaded and not functioning as designed. Operators were not operating the denitrification facility very efficiently and an outside contractor was brought in, in place of facility staff, to operate the denitrification facility.

Without properly functioning process equipment, optimal nutrient removal cannot be achieved. An initial review of the activated sludge process resulted in the discovery of an excessive amount

of sludge throughout the process as well as numerous return-activated sludge pumps and process mixers in a state of disrepair. **Nearly half of the pumps are offline or leaking sludge and over 30 process mixers are offline.** There are issues with the blowers, valves that will not function, and lines that are plugged. Due to the high solids inventory, various clarifier skimmer/rake mechanisms are in a state of high torque alarm and overworking the motors and gear boxes, which are resulting in premature failures of the equipment.

Unnecessary Work Arounds

The plant's automation does not work, and most equipment must be run in manual mode. **Most of the facility's valves, pumps, blowers, mixers, and controls are not functional.** Pumps are plugged with trash, drains are clogged, and floors are covered with water or sludge. The lack of maintenance activities or funding for repairs has caused the staff to find many unnecessary workarounds to keep the plant operating. **Controls are rigged to keep them from "tripping out," clarifiers are valved off to be used as sludge storage tanks, and tanks are bypassed for extended lengths of time due to inoperable equipment.** Much of the equipment is run manually to maintain automation from halting operations due process faults.

Process Laboratory Operations

MES has noted that staff are not properly trained in routine laboratory practices. Much of the equipment and supplies in the Activated Sludge lab, for example, are outdated. **Sample analyses take a considerable amount of time to run, which causes the operators to take shortcuts.** For example, the microscope in the lab had so much dust on it that you could not see through the lenses. This results in inconsistent lab results, which makes it difficult to determine the process adjustments that need to be made. **One of MES' operators was assigned to the lab because the area supervisor wanted consistent lab results and could not achieve this with the facility's operators.**

Supplies need to be updated and staff need to be trained in the proper technique to collect samples, run tests on the samples collected, prep and clean lab supplies and the cleaning and maintenance of testing equipment.

Maintenance Assessment and Findings

Asset Management / Inventory Control

The Back River WWTP maintenance team does not maintain an asset management system to maximize the performance and longevity of its assets. Further, the facility does not have an inventory control program to ensure efficient, cost-effective support for its maintenance operation. There is no centralized database where information can be easily stored, managed, and distributed. **Information pertaining to an asset's life cycle, from acquisition to decommissioning, is largely unaccounted for. This has led to critical repair/replacement parts not being ordered or conversely, sitting unused in the facility's warehouse for years.** It also significantly reduces the quality of data that could be utilized in other essential processes; cost analysis and budgeting, procurement, risk analysis, reporting, and maintenance management.

DPW staff have indicated they will be implementing a new asset management program, but it will not be fully functional for several years.

Workload

There are a considerable number of failing (in-service) and damaged (out-of-service) assets that require immediate attention at the Back River WWTP. The state of disrepair is the result of years of neglect that will take time and dedication to correct. The facility's maintenance staff does not appear to have the resources to repair all the affected pieces of equipment and will require:

- Hiring additional staff to fill vacancies
- Employee training and development
- Development and implementation of a preventive maintenance strategy
- Implementation and administration of asset management, inventory control, and work order programs

Preventive Maintenance Management

Maintenance management is a key component of an asset management system that focuses on the performance of maintenance activities and the coordination of resources within a chosen maintenance strategy. Its purpose is to extend the life of assets, reduce risk of failures, minimize downtime, schedule/allocate resources efficiently, ensure worker safety, ensure regulatory compliance, and control costs. Typically, a work order program is utilized to help facilitate all involved processes, thus increasing efficiency, accuracy, and productivity.

The Back River WWTP team does not utilize one of the four traditional maintenance strategies (reactive, preventive, predictive, and reliability-based). Instead, they employ a distinct form of corrective maintenance known as run-to-failure (RTF), where maintenance is only performed when a failure occurs. There is no consideration for maximizing an asset's performance or longevity. **No preventive or predictive maintenance efforts are applied.** A large-scale facility with a high number of assets and multiple sequential processes should utilize a proper preventative maintenance program. The RTF method should only be utilized for assets/systems that pose no safety risk, where negative impacts to associated systems/processes will be at a minimum, or for assets that are of little to no critical importance (e.g., it is the common method applied to, say, light bulb maintenance). At the Back River WWTP, the RTF strategy requires a higher volume of inventory to be stored on site as failing assets must be repaired or replaced immediately. It also requires staff to be readily available and respond quickly. The lack of an inventory control program and poor communication between the individual maintenance departments leave both requirements unsatisfied. Moreover, the RTF method in this application grows more ineffective and costly as assets age. The volume and failure rate of assets will inevitably increase beyond a maintenance team's ability to correct, which will inevitably result in catastrophic failure of the facility. In our opinion and experience, the current state of disrepair at the Back River WWTP can be attributed, in part, to an improper understanding and application of maintenance strategies. The most effective programs are customized to incorporate multiple strategies and are adapted, as necessary, throughout a facility's lifespan.

The management of maintenance activities for the day-to-day operation is equally ineffective. Despite the facility's size, the Back River WWTP maintenance team does not utilize a work order program to help manage and track its workload. This prevents the effective planning, prioritization, and scheduling of corrective actions resulting in a significant number of assets failing or being placed out-of-service. Our observation is that the preferred method to direct work tasks is word-of-mouth, with minimum effort applied to documentation. Generated work requests from operators are bounced between maintenance shops and are often left unaddressed. Real-time data for the operational condition of assets is not available. Specifications and work histories for assets are not readily available. Labor and material costs

for completed tasks are not readily available. The competency and productivity of maintenance personnel is not monitored. Safety issues are not properly documented and reported. Every key piece of information a maintenance team needs to run an efficient, productive, and safe operation is not being captured, analyzed, or improved.

In short, the Back River WWTP maintenance operation is disorganized, unfocused, and appears to lack any sense of urgency or accountability.

Procurement

Baltimore City follows a process that guides all procurement. The emergency procurement process provides some relief from the full process, as it does not require the procurement to move through the Board of Estimates prior to execution. This provides for a shorter purchase timeframe. The Water & Wastewater Bureau Head informed MES and MDE on May 16, 2022, that DPW is working toward developing an abbreviated process to aid in getting the facility into compliance. Expedited procurement certainly would aid in the compliant operation of the facility.

Even with that relief, procurement is likely to remain a major issue at the plant. In response to getting equipment back online, the team often hears the Maintenance Supervisor say, “it is on order” or “we are awaiting delivery.” We are all aware that the pandemic has created supply chain issues and delays in getting equipment/parts.

MES wanted to take a deeper dive into where these orders are in the process to see if there are apparent bottlenecks. MES have made multiple requests of the Bureau Head and Special Projects Lead to provide a listing of all backlogged orders by: Item Name, Date of Quote, Date of Request, Date Approved, Date Ordered, Quantity, Cost, Expected Delivery Date, and if processed as an Emergency. **As of the date of this report, MES has not received that information.** Analyzing this data can certainly help pinpoint bottle necks to determine viable solutions in getting parts needed to get critical processes back online. The fix might be simply adding an expeditor in procurement to track these orders or looking for alternate suppliers to get the equipment needed.

Planning

MES participated with DPW and Greely and Hanson, an engineering consulting firm, to review the capital projects and prioritize them using compliance as a primary determinant. The priorities were to remove the solids and fix the processing capacities by removing sludge from the facility. **MES requested the final document from Greely and Hanson, but we were informed that it could not be provided until it was “reviewed by the city.”** Getting a handle on asset management should enable DPW leadership to properly plan out the course of the facility for the future.

One of the most impactful issues with regards to planning, as presented earlier, is the lack of reliable and user-friendly asset management. The effort is underway to catalog all the assets at the facility as a precursor to bringing Cityworks Maintenance Management and Permitting software online at the facility. **As that process moves forward, the Chief of Asset Management is working to see what he can salvage from the current, non-functioning, work order system and incorporate it into a preconfigured Cityworks package as a short-term measure.** Upon completion of the asset inventory, that inventory and the data gathered in the preconfigured system is expected to be migrated to the final Cityworks package developed for Back River.

The lack of an asset management system at this facility makes any short-term maintenance scheduling and budgeting difficult. This also creates difficulties for the long-term planners in justifying replacement without the asset's history. The installation of Cityworks is underway and is expected to provide a great tool for planning at the facility. The phased-in approach by the Chief of Asset Management will provide some immediate relief to short term planning efforts and start to gather much needed information for long-term planning as well.

Staffing Assessment and Findings

Operations Supervision/Accountability/Culture

Multiple factors have negatively affected staffing at Back River WWTP, which has undoubtedly contributed to the facility's dilapidated conditions. **MES has witnessed and documented many unprofessional acts and we present a few in this section.** Given the high vacancy rate, high turnover rate, and poor ability to attract mid-level managers, there appears to have been a high loss of institutional knowledge. This has led to a lack of management control. Most managers at the facility have only been in their current positions a few years due to turnover. MES has observed several operators exert only minimal effort in accomplishing tasks, and most tasks are poorly executed. **On multiple occasions, MES staff have observed staff sitting at desks on their cell phones or sleeping in their cars.** Staff have been relocated to assist with shortages in other areas, but because they have not been cross-trained, this usually results in a "free day" for them, as they are not familiar with the work to be done and tend to do almost nothing for their entire shift.

The maintenance team at Back River is divided into four sections (shops): electrical, mechanical, instrumentation, and building and grounds. **The overall level of supervision that currently exists within the maintenance division at the Back River WWTP is also questionable. There appears to be a lack of accountability, organization, planning, communication, and teamwork, like that seen with the operations team.** Employees receive little to no training toward improving their knowledge base and skill sets. Malfunctioning equipment and system failures that require attention are continually deferred or passed between sections and are rarely corrected. **Interdepartmental relations have moved beyond a general lack of team cohesion and into an open unwillingness to cooperate, including animosity that currently exists between the maintenance and operation groups.**

Negative behaviors ranging from sleeping on the job to verbal/physical altercations between employees have been observed on both the supervisory and subordinate level. MES has witnessed city staff washing personal vehicles during the workday and they have admitted to receiving payment or free lunch for services provided, see Figure 7.



Figure 7: Car wash photo

Of greatest concern, however, is the lack of attention toward site and employee safety. A significant number of deficiencies were observed in this regard, such as improper lockout-tagout, failing electrical and mechanical assets left in service, poor housekeeping, and no documentation which creates a hazardous work environment. **Overall, the current maintenance operation at the Back River WWTP is inadequate, ineffective, and dangerous.**

MES has initiated housekeeping tasks such as picking up trash outside, removing unused gear from walkways, and throwing away unserviceable or out of date supplies/equipment, because these simple tasks were not being performed by maintenance staff. Facility staff sometimes question the need for this work, and this attitude affects the morale of the more dedicated operators. Discussions with managers about discipline of poorly performing staff have resulted in conversations about the disciplinary process taking too long, employees filing grievances that result in no action being taken, and employees subsequently being reassigned, which further exasperates the staffing issues. **Visible animosity between area managers and supervisors has been witnessed and the lack of teamwork and communication between the various area supervisors has resulted in process upsets and disruption to planned activities.**

Vacancies/Workload

There are approximately 50 vacancies (roughly half) in operations at Back River WWTP, as well as staff who are out on leave for various reasons. The remaining staff has been stretched so thin that full coverage is nearly impossible, and staff are frequently required to work multiple shifts. This creates quality of life issues, resulting in low morale and unproductive performance from operators that would otherwise be productive employees. **The working conditions, negative attitudes, low morale, and lack of incentive for success are the key contributors to**

staff leaving Back River WWTP. Experienced operators do not enjoy working at a facility that is not being maintained properly. The vacancies must be addressed as a properly staffed facility will go a long way to addressing many of these issues.

In addition to the operations vacancies, there are approximately 44 vacancies throughout the different maintenance shops ranging from entry level to Supervisor. All shops are understaffed and operating at the following capacities, based on an organizational chart provided to MES:

- Mechanical – 50% capacity
- Electrical – 75% capacity
- Instrumentation – 58% capacity
- Buildings & Grounds – 69% capacity

Hiring Practices

There appears to be a “no interview” hiring process at the facility, which does not lend itself to a productive process for hiring qualified staff. MES has observed minimal communications with the hiring managers, and new employees have been sent to work without ever stepping foot into the facility and not fully understanding the full scope of their job responsibilities. **In some cases, new hires have their employment rescinded due to driving restrictions that were not flagged by the hiring staff.** A training program for new managers needs to be established so hiring staff understand the role and responsibilities for the positions they are filling. **New managers are hired into positions with little to no mentoring or guidance.**

Operator Certification Process

There are only 28 fully licensed W5A operators, three of which have their Superintendent’s certification. In our judgment, there should be at least 100 fully licensed W5A operators, not including supervisors. **Turnover due to low morale, frustrations due to poorly trained staff and plant operating conditions have caused experienced operators to leave the plant for other opportunities.**

Thirty-two operators have a Maryland Temporary W5A certification, while six operators and apprentices have allowed their licenses to expire. The causes for expiration range from inaccurate paperwork, missing exams, or not enough continuing education credits for renewal. **These are basic issues that can easily be resolved.**

Apprentices struggle to pass the Board of Waterworks Wastewater 5A certification exam. A major contributor to this deficiency is vacancies that have stretched staff thin and do not allow time for managers to effectively mentor staff. This is a vital component in the apprentice, journeyman, master progression. A facility this large must have a training manager position to monitor the apprenticeship program and assist struggling apprentices receive the instruction and guidance they need to properly perform their jobs so that they pass the board’s certification exam.

Training/Cross Training Ops

The lack of formal training programs for the apprentices and new hires restricts learning to on-the-job, on-the-fly training. Apprentices are not learning the theoretical aspects of wastewater treatment technology necessary to successfully sit for and pass the certification exam. **In some cases, MES found that apprentices are being trained by other apprentices. We consider this a recipe for failure.** A formal apprenticeship training program must be developed, implemented, and maintained. Apprentices must also be rotated throughout the different treatment areas to better understand wastewater treatment throughout the process,

from the headworks to the disinfection areas. Baltimore City does not offer any incentives to successfully complete the apprentice program and become fully certified operators, and there are no repercussions when apprentices fail.

Back River WWTP maintenance staff also do not receive sufficient training to perform their work tasks accurately and efficiently, which has had a negative effect on productivity. Supervisors fail to provide the necessary support in developing their employees' job skills. There does not appear to be any semblance of a uniform set of expectations established for the maintenance team collectively or within the individual shops. New personnel, it seems, are trained by co-workers. This has led to inconsistencies regarding their knowledge base and the adoption of improper work habits. This issue will continue to perpetuate unless addressed.

Succession Planning

Development of staff to fill critical positions is needed at the Back River WWTP. However, a progression program does not exist and must be developed. Staff must understand the importance of their jobs, the importance of wastewater treatment on the environment and the community and have a strong professional work ethic and strong leadership traits. There also needs to be a training program for new managers to help them understand the role and responsibilities for the position they are filling. New managers are hired into positions with little to no mentoring or guidance. Strong leadership will result in a positive working environment, improving plant operations and morale.

Challenges of Working in the Back River WWTP Environment

The Back River WWTP management team seems to have trouble disciplining employees when necessary; the thought of firing someone appears nonexistent.

Due to this, productivity suffers. When teaming with the city's maintenance staff, MES learned the apprentices were not permitted to complete tasks assigned by MES; a rigid system ensures that apprentices only receive direction from a third level supervisor, even though some of the apprentices appeared eager to learn and help MES staff.

Comprehensive List of Process Equipment and Operational Status

A comprehensive list detailing the operational status of all process equipment with repair priority identified thus far has been included in Appendix C. This list was compiled during MES' numerous site visits to the plant and conversations with city staff. The critical out of service operations that impact compliance are noted as such. Daily reports from all three MES teams are in Appendix D.

Environmental Compliance

The Back River WWTP effluent has been in non-compliance status for failure to consistently meet permit limits for TSS, total phosphorus and total nitrogen.

Biochemical oxygen demand violations have also occurred periodically. Bringing the facility back into consistent permit compliance will require primary and secondary clarifiers functioning and operating properly.

MES does not receive and is not included on laboratory results or reports to compare with process results, in-house laboratory effluent test results, and laboratory results reported on the facility monthly operating reports and daily monitoring reports reported to MDE. DPW only has insufficient staff (three to four staff total, based on our observations) who are responsible for directing operations such as when and how to make process changes during the day-to-day operations of the facility. **It is unclear who directs DPW operations to make treatment**

process adjustments and changes when needed, and if there is any verification that operations staff make those process changes. All operations staff could benefit from frequently meeting with laboratory and reporting staff to review laboratory and monitoring results, plant performance deficiencies, and goals for achieving permit compliance.

Biosolids Management

Compliance with Maryland and federal (EPA) biosolids management regulations is essentially comprised of three separate standards:

1. Heavy metals concentration limits
2. Pathogen treatment
3. VAR performance

Of those three, only heavy metals concentrations are typically within the city's control. The other two parameters are met by the two contractors that convert the city's biosolids into a Class A product. The city only has to be concerned with the pathogen treatment and VAR standards when they generate a Class B cake for land application. The city land applied in 2021, and continues to do so today as they work towards reducing their solids inventory in the plant.

The city takes samples of dewatered, digested biosolids from their centrifuges on a weekly basis and submits them to their contract lab for analysis. This far exceeds the prescribed frequency in the regulations to sample monthly (for a facility the size of Back River WWTP). Data provided by DPW staff is noted in Table 9 below. Annual average heavy metals concentrations for the nine EPA parameters noted in the regulations, including Polychlorinated Biphenyls (PCBs) were calculated based on the furnished data. Those annual averages were compared to the regulatory limits for an EQ biosolids (there is no EPA EQ limit for PCBs, as this is a standard imposed in MDE's regulations).

HEAVY METALS ANALYTICAL DATA SUMMARY JANUARY 2020 TO MARCH 2022

ANNUAL AVERAGE CONCENTRATION (mg/kg DRY WEIGHT)

YEAR	As	Cd	Cu	Pb	Hg	Mo	Ni	Zn	Se	PCBs
2020	<9.5	4.6	473	58.3	0.62	12.8	66.8	925	<23.8	<0.4
2021	<9	3.9	449	55.4	0.68	12.5	29.4	847	<22.5	<0.2
2022	<8.5	3.2	467	50.9	0.47	11.2	30.2	778	<21.2	<0.3
ANNUAL AVERAGE=	<9	3.9	463	54.9	0.59	12.2	42.1	850	<22.5	<0.3
REGULATORY LIMITS *=	41	39	1500	300	17	75	420	2800	100	10

*= Regulatory limits as per State and Federal standards for an Exceptional Quality (EQ) biosolids

Table 9 – Heavy Metals Concentrations

As can be seen from the table above, Back River WWTP easily meets the heavy metals limits for Class A, EQ biosolids as set in federal regulations (40 CFR 503.14, Table 3). Furthermore, to satisfy our review during the period of January 2020 through March 2022, MES looked at each analytical result to ensure that none of the metals concentrations exceeded the monthly limits set in the regulations. No monthly exceedances were noted. This outcome is typical of most municipal WWTPs in the country.

It should be noted that the facility samples many more metal parameters than just those required by the regulations. **This is a good practice and should be continued.**

The facilities EPA classified biosolid preparers, Veolia and Synagro, use Class A pathogen and vector reduction treatment methods prescribed in the Federal regulations. Veolia uses in-vessel composting technology to achieve Class A standards. Synagro utilizes heat drying to meet the regulations. MES did not review those contractors' data, but we assumed based on their past performance and lack of known enforcement actions by MDE that they both treat the dewatered cake to Class A standards. These two technologies (in-vessel composting and heat drying) are well established and should be easily met by both companies.

During 2021 and 2022 (to-date) some of the facilities material was land applied as a Class B cake by Synagro to sites in Maryland and Virginia. In this case, the facility has the responsibility to meet the Class B pathogen and VAR/VSR treatment standards for their anaerobically digested biosolids. This requires the facility to meet two standards:

- The standard to meet a process to significantly reduce pathogens, or the Class B requirement as stated in federal regulations (40 CFR 503, Appendix A, Section A.3) for AD, which requires a mean cell residence time (MCRT) of greater than 15 days at 95°F (mesophilic digestion).
- Vector attraction reduction (VAR/VSR) method noted in federal regulation (40 CFR 503.33(b)(1)) to reduce VS content by a minimum of 38%.

As noted previously in this report in "Table 5 – AD System Performance January 2020 Through March 2022," the MCRT easily exceeds the minimum 15-day requirement. **Inspection of data from that same table showed that the monthly average VS reduction exceeded the regulatory requirement (38%) except for the period of June through December 2021.** The average monthly VS reduction achieved during that period was less than the 38% VSR requirement, with a value of 32.31% (range = 29.13% to 34.70% VSR). The cause for this exceedance is not known, but could be related to the excessive solids inventory accumulated at the facility.

Overflows and Ponding

During heavy rainfall events, areas of the plant are overwhelmed with water intrusion and areas with puddled, standing water accumulation and sludge bubbling up from the ground has been observed and reported by MES Operations. DPW staff have reported sludge often bubbles up from the ground in different areas throughout the facility. It is unclear if site drainage is the cause of ponding areas, underground pipe breaks, or leaking equipment are contributing to overflows and ponding areas occurring throughout the facility.

MES Operations reported and assisted with the repair of underground line breaks causing a sewage overflow.

Laboratory Procedures for In-House Process Sampling

When MES began assisting with Operations at the facility, MES observed the following:

- use of improper labware,
- dirty and contaminated sample container and labware,
- unmaintained and incorrectly working sample and testing equipment (See Figure 8),
- incorrect testing of samples was occurring,
- operators failing to replace equipment when needed, such as tubing for auto sampler collection.

Some improvements have been made to clean sampling and lab equipment, train operators, and run tests correctly. MES recommends frequent refresher training for all

operators, working all shifts, reminding them of lab basics, sample collection procedures, and utilizing equipment to analyze sample results for in-house monitoring data. Quarterly refreshers on sampling and monitoring basics should also be offered to operators who collect samples.



Figure 8 – Composite Autosampler Collecting NPDES Samples

Verification that temperature requirements during sample storage retention is not occurring, particularly when refrigerating composite samples. DPW Operators were not consistently reflecting sample collection times to demonstrate that permit requirements were met for composite samples.

Universal Waste

MES found non-compliance with Maryland Universal Waste handling, storage, and disposal requirements throughout the facility.

Safety

MES recommends that employees should not be permitted to work alone in any of the treatment and building areas of the facility. MES Maintenance has implemented a standard requirement that all employees always work in teams of at least two due to the unknown status of equipment (operable or inoperable), the potential for walking surfaces to give way, the threat of overhead danger in several buildings that could collapse and injure employees, and the potential for employees to be injured by encountering biohazards and bloodborne pathogens.

A Maryland Occupational Safety and Health (MOSH) Investigation commenced September 9, 2020, due to an anonymous employee complaint about arc flash and equipment. **The investigation closed February 11, 2021, and citations were issued by MOSH on March 4, 2021. As of the date of this MES report, these citation items have not been**

abated. DPW did not provide MES with information regarding items that were corrected since the onsite inspection date or items that remain out of compliance with regulatory requirements.

Improper Lock-out of Energized Equipment

Two of the MOSH citations issued on March 4, 2021, were for (1) failure of employees to wear ARC protective clothing and protective gear when working with high voltage equipment, and (2) electrical equipment located in potentially hazardous atmospheric areas are not intrinsically safe or properly installed. **Furthermore, MES Maintenance staff have observed electrical panels left open and exposed to employees working or accessing areas throughout many of the campus buildings. MES Maintenance and Operations staff also observed numerous instances of electrically charged equipment and panels that are improperly locked out with no indication of who performed the lock out or for what purpose, as well as uncertainty as to whether the equipment still has live electric current connected to the equipment.**

Inadequate Access to Emergency Response Equipment

- **Eye Wash Stations** - MOSH cited the facility for failure to locate eye wash stations in areas where employees work with hazardous chemicals. A few emergency shower and rinse stations have been observed; however, most are in areas where employee access is blocked and are not maintained and lines not frequently flushed.
- **Fire Extinguishers** - Many of the fire extinguishers located throughout the facility are hard to access and are not routinely inspected or serviced.
- **Hand Washing Access** - Most buildings and workstations do not have adequate access to running water to allow employees to wash their hands.

Exposure to Biohazards and Bloodborne Pathogens

Sludge spills, sewage overflows and leaking equipment, including pumps located indoors and outdoors are attracting wildlife, rodents, insects, and birds inside buildings and throughout the facility campus grounds.

Visible raw sewage, sludge material and used hygiene products are visible throughout areas of the treatment process, primarily in the primary sludge thickener tanks. Employers have a duty to prevent employee exposure to biohazards and bloodborne pathogens associated with animals and insects, and byproducts of human waste.

Unmaintained and uncontrolled vegetation exists throughout the facility, and employees are exposed to poisonous vegetation such as poison ivy and poison oak. Warmer weather will increase employee exposure to ticks and tick-borne illnesses when accessing pathways throughout the facility grounds.

Areas with Hydrogen Sulfide (H₂S) Buildup

- **The high-rate digester** - This area contains the most potentially harmful hazards posed to employees. Untreated biological sewage by-product accumulation and buildup is so excessive that it has degraded all equipment function, as well as completely corroded employee access structures and working surface platform areas in the digester egg system.
- **Denitrification Filter Area** - MDE repeatedly found strong odors of H₂S in the outside area surrounding the denitrification filters.
- **Grit Removal Buildings** - For the odor control system to work and run properly, the flushing water must remain at or below 10 ppm TSS. The flushing water does not meet the 10 ppm or less target, therefore the odor control system for the grit removal portion of the treatment plant is inoperable. DPW is running the fans for the odor control system

with the intent of expelling the H₂S that accumulates in the buildings outside into the environment. When H₂S is expelled outside of the buildings, it re-enters the building through the HVAC system, leading to expedited deterioration of equipment and the buildup of H₂S gas to which employees are exposed. **There are H₂S sensors and alarms located near the grit removal rotating screens, however employees have covered up the controls and sensors with plastic sheeting to prevent corrosion of the control panels from H₂S.** Without direct exposure to the atmosphere in the building, the H₂S sensor may not detect when the H₂S has accumulated above the permissible exposure level and alarming to alert those employees working in the area.

Unstable Working Surface Areas

- **Rusting catwalks at clarifiers**
 - High-rate Digester catwalks are corroding, with visible chemical build up compromising the structural integrity of the walkways. **MES recommends that, until the digester process area catwalks are upgraded, all employees should be prohibited from utilizing those walking surfaces.**
 - Open floor drains, pits, and vaults throughout the facility expose employees to falling into pitted areas.

Insufficient Lighting

Operators are required to collect samples in unlit or underlit areas throughout the facility during daylight and non-daylight shifts. Operators are expected to manually operate many areas of the facility by accessing areas of buildings throughout the complex that are severely underlit.

Working in dark areas of the facility alone to collect samples from unstable working surface areas increases the risk that an operator could be seriously injured or killed.

Operating Equipment in Manual Mode

- **Impact on Employees – Centrifuge Manual Operations.** The new Supervisory Control and Data Acquisition (SCADA) system has not been installed to automatically operate the centrifuge equipment. In order to turn on centrifuges, employees must access the third floor of the centrifuge building to start up, then they go back downstairs, outside and into the basement of the pump building to turn on the sludge pumps. Centrifuge 2 is leaking sludge and there is inadequate polymer/sludge mixing occurring in Unit 2B. In addition, operators must climb an unstable ladder outside at Tank 26 during daylight and non-daylight hours, reaching into the tank area to measure the level of the tank. The tank is surrounded by high vegetation (Figure 9) and lacks a maintained pathway to the ladder. Lighting does not work surrounding the tank, it is difficult to see during the non-daylight hours.



Figure 9 – Sludge Storage Tank 26 with Overgrown Vegetation and Inadequate Lighting

Cranes and Overhead Hoists

The DAF building crane overhead hoist is inoperable, which means staff are unable to move heavy equipment and parts to work on repair of parts.

Emergency Response Procedures

MES received the facility Emergency Action Plan on May 16, 2022. The Security Guard on duty is responsible for accounting for all personnel located onsite in the event of an emergency. MES recommends all employees receive training to administer first aid and on evacuation procedures and routes to respond in the event of an emergency.

Confined Space Entry

Since the MDE directive took effect, MES has observed DPW staff draining and cleaning out the chlorine contact chambers (Figure 11). DPW reports the typical amount of sludge accumulated in the bottom of the chambers is 1 to 1 ½ feet. While there is a written confined space program for the facility, many confined spaces located throughout the different treatment areas are marked as non-permitted confined spaces even though a hazard is present if employees were to enter that space (indicating the space should be deemed a permitted confined space). MES recommends a thorough reassessment of all confined spaces to determine the hazards associated with those spaces and require employees to follow the proper permit and entry procedures when working in permitted confined spaces. **To MES' knowledge, DPW has not completed an assessment of the hazards employees can be exposed to prior to directing employees to clean out the chlorine contact chamber.** MES has been unable

to determine whether respiratory protection was required for employees entering the contact chamber.

In Figure 10 below, the confined space is labeled a non-permitted confined space and labeled with “Caution: Large Vertical Drop.” A fall hazard present when entering dictates a space is permitted since a hazard to the employee is present during the entry.



Figure 10 – Apparent Confined Space (Vault)

Lock-Out/Tag-Out

MES requested, but has not yet received, a written lock-out/tag-out program for the control of hazardous energy when working on equipment at the facility.

Procedures for locking out equipment must be written for each piece of equipment that has energy connected and employees are responsible for working on. Authorized employees need to be identified and need training on lock-out procedures for all equipment.



Figure 11 – Drained and cleaned chlorine contact chamber. DPW employees completed entry, unclear if permitted confined space entry procedures were followed.

Respiratory Protection

MES requested, but as of the date of this report has not received, the respiratory protection program for the facility. The March 4, 2021, MOSH citations included lack of a written respiratory protection program for the facility and failure to fit test employees prior to requiring they wear respiratory protection, specifically for welding operations. A third citation was for failure to provide Appendix D information to employees that voluntarily wear respiratory protection. Without fit testing clearance, including medical clearance, there is a high potential that employees who are not physically able to wear respiratory protection may be directed to wear it and a high likelihood that employees are not properly fitted with the correct respiratory protection to prevent exposure to hazardous atmospheric conditions.

Chemical Handling Procedures

Several of the March 4, 2021, MOSH citations pertained to employees working with hazardous chemicals. MES Safety and Environmental Compliance is concerned DPW employees are not properly trained on procedures to handle and work with hazardous chemicals, including wearing Personal Protective Equipment and responding to alarms when concentration levels are high in areas of the facility. The MOSH citations in this space included:

- the lack of eye protection provided to employees when working with hazardous chemicals;
- eye wash stations were not located in work areas where employees work with hazardous chemicals;

- chemical containers were unlabeled throughout the facility;
- Safety Data Sheets (SDS) were not available to employees;
- employees were not trained prior to working with hazardous chemicals; and
- the facility does not maintain a hazardous chemical list.

MES Operations working at the facility have not been briefed on how to respond in the event of a major chemical release at the facility. Some of the chemicals used at the facility include:

- Ferric Chloride
- Methanol
- Phosphoric Acid
- Chlorine
- Hydrochloric Acid
- Nitric Acid
- Sodium Hydroxide

General Housekeeping

Overall, all areas of the facility are generally unmaintained and unkept. Debris, tools, supplies and trash are often left piled throughout buildings, in walkways, and near equipment. Broken equipment is located throughout every area and the outdoor treatment sections of the plant. Leaks from equipment, particularly sludge leaks, have pooled and accumulated in many buildings, in multiple treatment sections of the facility. Slips, trips, and fall hazards are prevalent and pose a risk of employees contacting biohazards or experiencing a serious injury when working in most locations of the plant. The disrepair and unkept state of most of the buildings and grounds creates an atmosphere that is undesirable to work in and deters employees from accessing most of these areas.

Doors are broken to many buildings, rendering it impossible to lock many of the buildings throughout the facility campus. This has led to wildlife, birds, and insect populations taking up residency, and to rainwater accumulation occurring during and after rain events. Rainwater accumulation has short circuited electrical units, clogged floor drains and led to pooling of water inside building areas where standing water is unintended.

MES recommends implementing routine housekeeping into the daily job duties of all operators and maintenance staff working at the facility. In addition, routine industrial janitorial services would greatly improve the condition of the facility and help foster site conditions that operations and maintenance would then be responsible for maintaining by cleaning up after working on equipment, post spills and leaks, and after themselves.

Organizational Management

Communication

Communication at the Back River WWTP needs improvement. Process upsets and productivity interruptions are commonplace due to communication shortfalls. Communication between the various sections must be improved to ensure successful uninterrupted operations throughout the plant. Changes to any part of the process have an impact on the rest of the plant and if an area supervisor is not aware of changes being made in another area, process upsets and interruptions can occur. To promote efficiency and to increase morale, managers should inform their team of happenings around the plant and explain why things need to be done. This is

accomplished by opening the lines of communication and ensuring that information is being distributed among staff.

Responsiveness

In a government organization, set guidelines are normally the rule and are seldom deviated from, unless there is a catastrophic event such as flooding or a major snowstorm. **The violations occurring at the Back River WWTP have evolved into a situation where this is now equivalent to an extreme event, and these issues need to be addressed on an emergency basis.** The impacts on the environment are harmful to our public waters and certainly elevate responsiveness to a level that demands immediate attention and actions to remedy.

Based on what MES has seen in the roughly two months at this facility, the gravity of this issue does not seem to resonate with DPW staff as their response to the MDE order seems to have been met with a “business as usual” approach. When “business as usual” includes all the issues mentioned throughout this report, that is simply not acceptable. The tone was set at the first weekly meeting, April 1, 2022, during a discussion relating to bringing potable water to the plant for the headworks and to the pelletizer. The Synagro line was most important as it would provide potable water that would eliminate interruptions to the solids removal process. As this discussion intensified, the DPW Director defended the city’s position on moving forward with the water lines saying, “it has only been 7days” (since the order was issued.) The MDE representative at the meeting reminded DPW that it had actually been 7 months of non-compliance. At the May 16, 2022 meeting, the water line to both the headworks and Synagro was a topic of discussion. The City Engineer reported that the headworks line had been tapped and brought across Eastern Avenue, and there was another 2,000 feet of pipe to be placed inside the plant fence. When asked about the Synagro line, MES was told DPW would get something started soon.

In subsequent discussion at the May 16, 2022, meeting, the Bureau Head of Water and Wastewater discussed the differences between regular procurement versus emergency procurement. The main difference is that emergency procurements do not have to go through the Board of Estimates. The Bureau Head informed the meeting attendees that DPW was working on an abbreviated procurement method to shorten the timeframe for the Back River WWTP procurement needs. **After seven weeks, they are still looking at how to streamline this process. In our judgment, this indicates there may be a lack of understanding regarding the urgency of the issues at Back River WWTP.**

The lack of responsiveness in addressing critical issues that need to be addressed to get the plant back in compliance keeps frustration high and is having an impact throughout the facility. There are many examples of this as listed below:

- MES staff has a contract from the specialty piping company TEAM to insert two stop valves into the lines in preparation for cleaning egg digesters. On May 9, 2022, MES let the city know that the contractor had outstanding invoices the city needs to pay, and they would not do the work until it was paid. The Special Projects Lead directed MES to tell TEAM what they needed to submit to get paid. The Bureau Head told the Special Projects Lead to take care of that, which was one of the first calls for a response by the leadership at Back River WWTP. There was no update at the May 16, 2022, meeting to report if TEAM was paid.

- Preventative maintenance (PM) is a regular topic at the weekly meetings and always met with the same response. The maintenance people are doing reactive maintenance and do not have time to do PM. PM is critical to keep the equipment operating.

DPW's responsiveness to the MDE Directive has been limited. **The fact that the same ideas and issues keep being rehashed - week after week - in the weekly meetings speaks volumes.** This was best expressed by the MDE representative at the May 16, 2022, meeting when the sense of urgency by DPW was questioned during the discussions on the water line for the Synagro facility. The silence in response was a testament to the lack of responsiveness to this issue and to the MDE Directive in general.

The lack of leadership is a major contributor to this lack of responsiveness to the issues. There are many dedicated employees who want to see changes and bring the Back River facility back to being a world class facility, but they see no reason to jeopardize their livelihood and retirements in fighting the management team. **The lack of attendance by DPW Director and the defensive attitude by the Bureau Head does not bode well in expecting workers to be responsible and accountable.**

Recommendations

MES has chosen to divide our recommendations into two different sections. The initial section addresses, as the MDE Directive requires, recommended improvements in order to bring the facility back into compliance with the NPDES permits. **These are ranked in order of importance. However, in the two months MES has been at the facility, it is clear there are substantial systemic problems that go well beyond the facility's structure that are crucial for the facility's long-term viability and operation.** We would be remiss to gloss over those issues, which are inherently difficult to rank in terms of compliance with permits.

I. Back River WWTP – List of Recommended Improvements to Achieve NPDES Compliance, Ranked in Order of Importance.

The list below details needed improvements that should be made at the Back River WWTP in order to achieve compliance with its NPDES permit. This compilation focuses on improvements that should be completed immediately (within 6 months).

1. Improve Centrifuge Operations (Repair all Centrifuges, Optimize Dewatering, and Procure a Centrifuge Maintenance Contract)

The main reason for the solids accumulation, and subsequent permit non-compliances, was because of the failure of the facilities centrifuge dewatering operations in March and April of 2021. Currently, only two of the four facility centrifuges are online. **MES recommends that all four centrifuges be brought online as soon as possible to re-establish the needed redundancy in dewatering operations. Also, repair or replace at least one set of centrifuge feed pumps.** Centrifuge maintenance is critical as well. MES recommends that the city procure the services of a competent firm to do contractual maintenance on the centrifuges, including both periodic, planned maintenance, and repair services as needed. Finally, the WWTP should undertake an effort to optimize dewatering performance, as the solids capture is poor.

2. Install Potable Water Line to Synagro's Pelletizer, Meet Contractor's Specifications for Feed Sludge

Synagro's drying/pelletizing operations are responsible for processing 70% of the WWTP's solids load. As such, it is important that Synagro always has clean fire suppression water supplied to their unit to maintain processing capacity. **The city should install the planned potable water line to Synagro immediately.** Synagro also has other contractual specifications for the feed sludge sent to its unit (i.e., total solids content, volatile solids content limits). The city should focus on these contract specifications as well.

3. Place More PSTs In-Service, Make Changes to PST Operations

Currently, there are only two primary settling tanks (PSTs) in service. This is not sufficient to treat the plant's average daily flow of 130 MGD. The lack of primary sludge solids capture due to out-of-service PSTs impacts downstream processes (activated sludge, denite filters, etc.). **Priority needs to be given to repairing three more PSTs in the short term (next six months) that can be accessed right now without waiting for them to be cleaned – PSTs 7, 9, and 10.** This will bring the total of PSTs in service to five.

4. Repair All Pumps in the Hi-Rate Digestion Area

This area of the WWTP has many pieces of equipment either partially functional, or completely out-of-service. **Below is a list of equipment in the digestion area that needs to be repaired or replaced.** MES has found that the pumping capacity in the hi-rate area is a critical bottleneck that must be addressed:

- Thickened Sludge Holding Tanks 2 and 4 - Variable Frequency Drives (VFDs).
- Acid Phase Reactor (APR) Recirculation Pumps 1, 2 and 3 - mechanical seals
- APR Effluent Pumps 1 and 2 – replace bearings and seals install motor for pump no. 2
- Egg Shaped Digesters (ESDs), Recirculation Pumps 7, 9, 10, and 11 replace mechanical seals
- Strain Presses- all are out-of-service. Replace or repair at least two of the six units.

5. Safety

Elevate safety tasks to ensure that all can work in a safe secure environment.

Immediate safety improvements include:

- Install better lighting wherever needed so that those working at night can safely navigate the facility.
- Institute a lock-out-tag out (LOTO) program.
- Hire an industrial janitorial firm under contract to maintain housekeeping at the facility.

6. Denitrification Filters (DNFs)

These are critical for removing nitrogen and allow the facility to stay in compliance with the nutrient limits of its NPDES permits. **Repair DNF set 3, as this portion of the facility is totally off-line.**

7. Sludge Thickening Equipment

There are three sets of sludge thickening equipment that badly need repair. The list of equipment includes:

- Gravity Belt Thickeners (GBTs) 2, 3 4 and 7 are offline. Repair so that they are all operational.
- Repair GBT WAS pumps 1, 2, 4 and 5, which are currently out of service.
- Only two of the six Gravity Sludge Thickeners (GSTs) are online. Many of them have vegetation growing in them which needs to be removed. Once this is done, they can be inspected to determine what mechanical repairs need to be completed.
- Only one of the four Dissolved Air Flotation (DAF) units is online. Thickened sludge pumps for DAF Units 2, 3 and 4 need to be repaired.

8. Activated Sludge (AS) Areas

Two of the AS units, numbers AS2 and AS3, have been online for some time now. Unit AS 4 was recently constructed and is currently being brought online. Even though AS2 and AS3 are online, many of the mixers in AS2 and 3 are out-of-service. Either repair or replace these mixers. Some of the RAS pumps are either off-line, or only partially functional (e.g., need mechanical seals). However, the waste activated sludge (WAS) pumps are crucial to the solids removal process. **These need to be repaired immediately so that sludge can always be pumped to the hi-rate digestion area.** If the WAS pumps all go offline, then this will create a critical bottleneck at the plant.

9. Sand Filters

Of the 48 sand filters at the facility, only 12 are currently online. The other 36 have issues ranging from the traveling bridges to filters clogged with solids. **While rehabilitation of these filters is part of a future DPW CIP project, MES suggests that at least some of the filters be brought back online within the next 6 months.** The sand filters are needed to capture solids and allow the WWTP to meet its phosphorus discharge limits.

II. Recommendations for Short-, Medium-, and Long-term Issues.

The following recommendations are the result of MES' assessment of the Back River WWTP from March 28 through June 1, 2022. MES' assessment is ongoing and additional recommendations may follow. MES has broken down our non-ranked recommendations into separate phases: Immediate (items that should garner immediate attention and must be completed in 6 months or less); short term (items should be completed between 6 months and 1 year); and long term (items that can start to be addressed in 1 year or as soon as the items in the immediate and short term are completed).

Immediate Recommendations (six months or less)

Solids Handling

The primary reason for the occurrence of noncompliance at the Back River WWTP is the accumulation of solids throughout the plant. **Recognizing that DPW needed the ability to transport and dispose of sludge without the assistance of a contractor, MES took**

the initiative to acquire four Sewage Sludge Utilization (SSU) Permits from MDE on a fast-track basis. This removes any regulatory issues should DPW need to transport and dispose of sludge without relying on a contractor. The four SSU permits listed below were issued to the city:

- SSU Permit Number, 2022-STR-6169, issued to the Bureau of Water and Wastewater for the transport of sludge from the Patapsco WWTP and Back River WWTP to Virginia.
- SSU Permit Number, 2022-STR-6170, issued to the Bureau of Water and Wastewater for the transport of sludge from the Patapsco WWTP and Back River WWTP to Pennsylvania.
- SSU Permit Number, 2022-STR-6171, issued to the Bureau of Water and Wastewater for the transport of sludge from the Patapsco WWTP and Back River WWTP to the Quarantine Road Sanitary Landfill.
- SSU Permit Number, 2022-SLD-6065, issued to the Bureau of Solid Waste to allow for the acceptance and disposal of sludge from the Patapsco WWTP and Back River WWTP at the Quarantine Road Sanitary Landfill.

In addition, MES staff provided guidance to the city's DPW Bureau of Solid Waste on how to accept sludge at their Quarantine Road Sanitary Landfill. This included suggestions on how to incorporate the sludge stream with the landfill's daily solid waste load once it arrives at the site and recordkeeping duties. MES made staff available from our Mid-Shore II Regional Landfill facility to answer operational questions from city staff.

MES also recommends the following tasks be immediately implemented.

- Institute a new process control and testing routine to obtain better solids capture in the city's centrifuges. Perform polymer dosage testing with different polymers.
- Eliminate the use of totes for polymer storage. Investigate the installation of larger tanks for polymer deliveries and storage. There could be a cost savings associated with this change.
- Have MES oversee the fast-track cleaning and rehabilitation of three more PSTs; Numbers 6, 9 and 10.
- Procure a contract for all centrifuge maintenance, including routine periodic maintenance tasks.
- Institute a process for high-rate staff to do daily calculations on volatile solids loading to the digesters. This will ensure that process failures (stuck or sour digesters) do not occur.
- Avoid generating unstabilized sludge as a routine practice.

Operations

- Continue daily meetings with MES and plant staff to coordinate activities throughout the plant.
- Channels of communication between the various area supervisors must be kept open. Regular meetings between area supervisors need to continue.
- Staff must understand their job duties and must be held accountable for poor performance of their duties.
- Begin cross-training Operations staff so that they are knowledgeable about all plant operations.
- Have Back River WWTP participate in formal team building sessions to improve communications and teamwork.
- Continue to improve housekeeping efforts by removing unnecessary or unusable equipment and supplies around the facility.

- Managers above the area supervisor must routinely tour the facility to identify problematic areas. Identify housekeeping issues, personnel issues, equipment issues, and structural issues. Speak to apprentices and staff to identify potential problems early.
- Ensure staff have the proper equipment to complete job tasks. Replace old and outdated lab supplies, sampling gear, and cleaning supplies.

Maintenance

- Continue to use the city's and MES' emergency procurement process to make purchases of critical items needed to bring the plant to compliance.
- Have MES staff identify and work with the Back River maintenance staff on high priority repairs necessary to bring the plant into compliance.
- Reactivate the work order system that is currently down.
- Improve plant appearance by cutting grass and removing loose items.

Staffing

- Revise hiring practices to bring applicants to the plant to be interviewed and selected by plant supervisors.
- Continue to have MES provide management support and operating staff for the Back River WWTP.
- Provide training and tools for operators to succeed.
- DPW needs to keep staff informed and give them the information needed to do their job intelligently and to inspire their initiative, enthusiasm, and loyalty. Treat them with respect.
- Expedite the filling of vacancies to normalize the workload being placed on staff.

Environmental Compliance

- From a solids management perspective, implement monthly compliance review meetings to ensure that all biosolids management functions, including reporting, are being satisfied. This includes reviewing data to ensure the digesters are meeting Class B, VAR, and heavy metals concentration standards. Develop a checklist so that management can use this to track compliance.
- Designate a staff member to review new or proposed regulations as needed and report these to senior management.
- Improve daily communication to operations staff of process changes that need to manually be completed and confirm desired outcome.

Safety

- Immediately replace light fixtures that are not illuminating.
- Repair all service elevators to move heavy equipment for repairs and replacement.
- Prohibit employees from working on unstable or corroding surfaces with the potential to give way or give out from underneath the employees footing.
- Schedule routine pesticide services to reduce or eradicate the insect population employees are exposed to in work locations throughout the facility. Increase landscaping and mowing efforts throughout the facility grounds to reduce exposure to pests (bees, ticks, poisonous vegetation).
- Create clear pathways for employees to access sample locations throughout the facility and maintain those pathways with a routine landscaping schedule.
- Reassess all confined spaces to determine if they are permitted or non-permitted spaces.

Short-Term Recommendations (Between Six Months and One Year)

Solids Handling

- Procure a contractor to clean debris from two digesters.
- Arrange for all the GSTs to be free of vegetation and with functioning equipment.
- Replace or repair EVERY pump at the high-rate area.
- Rehabilitate the facility's Septage Receiving Facility so that it can accept grease. Reconfigure the installation to feed grease directly to the digestion system to increase gas production.
- Repair at least half of the Strainpress units at the plant to reduce debris accumulation in the system.

Operations

- Continue cross training operations staff so that they are knowledgeable about all plant operations.
- Establish a series of daily, weekly, and monthly checklists to track and ensure routine area housekeeping, safety checks, equipment checks, and preventive maintenance activities are being performed.
- Review progress with apprentices and schedule them for classes to help them in the areas they appear to be struggling in.
- Develop Key Performance Indicators (KPIs) for the maintenance of the Back River WWTP.
- Meet biweekly with DPW Director to report on the status of the KPIs.

Maintenance

- Continue to have MES staff identify and work with the Back River maintenance staff on high priority repairs and upgrading old inadequate equipment.
- Implement the Cityworks work order the asset management system for the Back River WWTP.
- Assist in the integration of Cityworks (MES maintenance staff).

Staffing

- Hire a Training/Certification Manager to monitor the apprenticeship program as well as oversee the certification application and renewal process to ensure paperwork and requirements are met prior to submitting to MDE.
- Hire a Biosolids Manager that serves both Patapsco and Back River.
- Hire a SCADA Manager.

Environmental Compliance

- Establish routine audits of laboratory data, compared to monitoring reports; frequent review of operations completing sampling procedures correctly.
- Schedule preventative maintenance for all treatment processes and equipment to prevent the degradation of equipment and inefficient removal of pollutants.

Safety

- Institute industrial janitorial services in all working areas – needed to establish a baseline for operators to maintain housekeeping in all buildings and working areas.

- Establish routine maintenance and housekeeping performed by all employees working at the facility daily.

Long-term Recommendations

Solids Handling

- The Back River WWTP is a prime candidate for implementing a Biosolids Environmental Management System (EMS). The EMS is loosely based on ISO 14001 programs for ensuring compliance and quality in environmental systems. Key aspects of the EMS are that it allows for a teams-based approach to environmental management and uses outside auditors to verify compliance. Eventually, organizations with Biosolids EMS move beyond compliance to improving their performance to cutting edge programs.
- Diversify Back River's biosolids management by developing another outlet for a portion of the plant's solids generation. We suggest that the option be Class A-based and operated by DPW staff (not contractual operations). Perform a screening process to choose candidate technologies to investigate for pilot testing and eventually full-scale operations.
- Clean the remaining digesters of debris.

Operations

- Implement facility-wide automation to allow for remote monitoring and improved process control.
- Increase attendance at training courses for staff. This will improve operations by having a well-trained operations team. Implement and maintain an operator apprenticeship program. The apprenticeship program will need to be monitored to keep apprentices on track and to assist them in areas they may be struggling with. A successful apprenticeship program will increase the MDE certification exam passing rate. Provide training for new managers and refresher classes for senior managers on effective leadership.

Maintenance

- Complete the implementation of Cityworks for work order and asset management.
- Continue to have MES staff identify and work with the Back River maintenance staff on high priority repairs and upgrading old inadequate equipment for at least one year.
- Assist Back River WWTP maintenance staff in the training of junior staff.

Safety

- Designate Site-Specific Safety personnel responsible for:
 - Conducting employee training
 - Implementing standard operating procedures
 - Conduct inspections of the buildings, grounds, and equipment

Oversee and implement a standardized lock-out/tag-out program. Employees should not be using a shared lock system. Employees should remain in control of their own locks identified with individual names.

- Certify employees in First Aid Administration.

III. Staffing Recommendations

Biosolids Manager

This Assessment Report establishes the fact that many of the compliance problems at the Back River WWTP were attributed to failures in biosolids management at the facility. **Remedial actions to correct the problems were not recognized by staff who were not well-versed with solids management.** This was particularly true when it came to identifying the problems associated with in-plant processing failures and end use options. One remedy to this problem would be to employ a biosolids professional who is well-versed with not only solids treatment technology, but also understands the implications that improper solids treatment can have on solids end use “outside the gates” of the deteriorated WWTP culture and staffing structure. Many large utilities across the country employ a dedicated biosolids manager position to ensure satisfactory performance.

MES recommends that the city hire a dedicated Biosolids Manager and two technical staff to support that person. This new staff member should have a technical background and documented experience with biosolids technologies, end-use practices, and regulatory reporting. At a minimum, this staff member would be responsible for the following functions:

- Tracking solids production and end use tonnages.
- Following contractor performance and compliance with contract conditions.
- Arranging for process control testing of the solids processes at both WWTPs; review daily test results and report any irregularities or performance deficiencies to management; foster proactive responses to problems.
- Be responsible for regulatory compliance, permitting and reporting; track analytical results for compliance with the regulatory standards (i.e., heavy metals concentrations for example, or pathogen treatment).
- Act as the city’s DPW biosolids representative in professional associations.
- Update DPW staff on new technical advances in the profession.
- Participate in CIP and execution of projects.
- Track equipment status throughout plants’ solids processing trains.
- Finally, the Biosolids Manager would keep management updated on the latest regulatory developments and trends. For example, attention has been focused in recent years on resource recovery at WWTPs, in areas such as energy recovery, sustainability, emerging technologies and carbon sequestration.

On-Site Safety Manager

DPW Safety and Training department currently has two safety officers and one operations officer employed with the Bureau of Water and Wastewater. It is our understanding that DPW is to increase the number of safety officers working for the Department to a total of eight. Safety and Training staff complete periodic inspections of all DPW facilities on an annual basis and provide a written report to DPW Maintenance assigned to each facility, listing the deficiencies discovered. Safety Officers typically follow up on inspection items three months after the date of the initial inspection to document what has been corrected and what is still outstanding. The Safety and Training department is currently responsible for training all DPW employees in confined space entry, trenching and excavation, hazardous communication, and general safety. However, with only two safety officers currently, most of their time is spent working on reports of vehicle accidents and employee injuries that occur daily.

An On-Site Safety Manager would be responsible for maintaining written regulatory programs including confined space entry, lock-out / tag-out, and heavy equipment operation. Ensure

employees obtain the proper medical clearances prior to completing job tasks requiring DOT certification and respiratory protection clearance. Train all employees working at the facility in emergency response procedures, evacuation and exit routes, responding to alarms throughout the facility, confined space entry, lock-out/tag-out procedures for all energized equipment, respiratory protection, required PPE, and chemical handling procedures. And maintain records for employee training, certifications, and clearances.

Dedicated SCADA Manager

SCADA in wastewater allows wastewater treatment plants to be automated and provides for the management and organization of data automatically. SCADA monitoring provides operators instant access to information to make key operational decisions and provides up-to-date process monitoring to aid operation in maintaining compliance. During our May 1, 2022, weekly Back River Coordination meeting the subject of the SCADA system was raised. Many of the operations throughout the plant are not being monitored/automated due to several issues with the SCADA.

The current system is operating on Windows 7 that is no longer supported. The SCADA Tech Elwood Klump described numerous issues that dealt with maintenance, communication, compatibility, obsolete equipment, and integration. There is a contract in place with ABB to update the SCADA system and migrate it to Windows 10. At this time, it is unclear if the current contract will integrate the entire plant and bring operations to full automation.

A SCADA manager would be a beneficial addition to Back River WWTP. This Supervisor would manage electricians and technicians, approve timesheet information, inspect work performance, assign work orders, evaluate performance; and resolve issues. They would also plan and manage a budget by inspecting systems; maintaining a five-year capital improvement budget for the SCADA System, review the previous year budget expenses, submit budget forms, obtain quotes, input requisitions and invoices in the Financial Information System, and oversee projects and tasks. They would also troubleshoot programs and network computer applications and software, direct employees to repair bad equipment, manage the utilization of various types of meters and analyzers and respond to emergency situations.

Training/Certification Manager

A training manager must be established to monitor the apprenticeship program as well as monitor apprentice status and ensure the apprentices are meeting goals that must also be established. The training manager will ensure struggling apprentices are given the attention required to help them understand the intricacies of wastewater treatment plant operations and further help them with subjects to help pass the MDE certification exam. The training manager can also oversee the certification application and renewal process to ensure paperwork and requirements are met prior to submitting to MDE. This process does not exist at the plant and there are currently six operators with expired licenses due to paperwork errors and not meeting the requirements for renewal.

Conclusion

The Back River WWTP has fallen into disrepair over the last several years and has experienced failures at nearly every level.

MES was directed by MDE to immediately assist Back River WWTP staff and evaluate the facility for all major deficiencies. We were further directed to write a report and provide a set of achievable actions and recommendations to get the facility into compliance with federal and state regulations and laws. **While we have accomplished these initial tasks, much more work lies ahead.** The issues at Back River are immense and are years in the making, but they are not insurmountable. With a renewed sense of urgency, a focus from city leadership, we can quickly bring the Back River WWTP back into compliance, and - together - do our part to protect the waters of our city, county, and state.

We need willing partners to embrace a cultural and structural change with a renewed commitment to this critical environmental mission.

Appendices

Appendix A – MDE Directive

IN THE MATTER OF *

BACK RIVER WASTEWATER *

TREATMENT PLANT *

8201 Eastern Avenue *

Baltimore, Maryland *

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*

SECRETARY OF THE *

ENVIRONMENT

SERVE ON: *

MARYLAND ENVIRONMENTAL *

SERVICE *

259 Najoles Road *

Millersville, Maryland 21108 *

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DIRECTIVE TO THE MARYLAND ENVIRONMENTAL SERVICE

BY THE SECRETARY OF THE ENVIRONMENT

The Secretary of the Environment (“Secretary”), on behalf of the Maryland Department of the Environment (“Department”), pursuant to the powers, duties, and responsibilities set forth in the Maryland Annotated Code, Environment Article, § 9-252(a) and (b), and Natural Resources Article, § 3-109(c) and (d), issues this Directive to the Maryland Environmental Service (“Service”) in order to ensure protection of public and environmental health, as follows.

APPLICABLE LAW

1. The General Assembly has empowered the Secretary with the duty and powers to protect public health and the environment. Among other powers and duties enumerated in the Environment Article, § 9-252(a) authorizes the Secretary to take action to address pollution of waters of the State; specifically:

(a)(1) To prevent or correct pollution of the waters of this State, the Secretary may:

(i) Adopt and enforce regulations; and

(ii) Order works to be executed.

(2) The Secretary may:

(i) Require any public water supply system, public sewerage system, or refuse disposal system to be operated in a manner that will protect public health and comfort; and

(ii) Order the alteration, extension, or replacement of any public water supply system, public sewerage system, or refuse disposal system.

2. Section 9-252(b) of the Environment Article grants the Secretary the power to require that any public sewage system be operated in a manner that will protect public health and comfort; specifically:

(b) The Secretary:

(1) Has supervision and control over the sanitary and physical condition of the waters of this State to protect public health and comfort;

(2) Shall investigate:

(i) All sources of water and ice; and

(ii) All points of sewage discharge;

(3) Shall examine all public water supply systems, public sewerage systems, and refuse disposal systems; and

(4) Shall approve or disapprove the design and construction of any public water supply system, public sewerage system, or refuse disposal system that is to be built in this State.

3. In addition, § 3-109(c) of the Natural Resource Article provides that:

(1) Upon the failure of a municipality or person to comply with an order of the Secretary of the Environment to correct deficiencies on the operation of sewerage systems or refuse disposal works as provided in Title 9 of the Environment Article, the Secretary of the Environment shall direct the Service to take charge of and operate the systems or works to secure the results demanded by the Secretary of the Environment.

(2) Except as provided in subsection (e) of this section, upon the receipt of the directive from the Secretary of the Environment, the Service immediately shall take charge of and operate the systems or works to secure the results set forth in the directive of the Secretary of the Environment. All costs for maintenance, operation, and other services including legal fees incidental to taking possession of the sewerage system or refuse disposal works shall be charged to the municipality or person against which or whom the original order of the Secretary of the Environment was served.

(3) (i) Funds to pay the Service for services rendered under this subsection shall be raised in the case of a municipality under Title 9 of the Environment Article.

(ii) If the order is issued against a person, the Service shall bill the person for the full cost of services rendered.

(iii) If payment is not made within 60 days, the costs become a lien against the sewerage system or refuse disposal works if it is recorded and indexed as provided in this subtitle, and the Director shall refer the matter to the Attorney General for collection.

4. Section 3-109(d) of the Natural Resource Article also provides that:

(1) Upon failure of a municipality or person to comply with an order of the Secretary of the Environment to extend or alter a sewerage system or refuse disposal works as provided in Title 9 of the Environment Article, the Secretary of the Environment shall direct the Service to make alterations or extensions to the systems or works, or install a new system or works as the Secretary of the Environment deems necessary to correct the improper conditions.

(2) Except as provided in subsection (e) of this section, upon receipt of the directive from the Secretary of the Environment, the Service shall assume jurisdiction over the

systems or works and make the alterations, extensions, or new construction required to comply with the directive of the Secretary of the Environment. All costs, including legal fees incidental to assuming jurisdiction over the system or works, shall be charged to the municipality or person against which or whom the order of the Secretary of the Environment was issued.

(3) Funds to pay the Service for costs incurred as a result of actions taken under this subsection may be raised as provided in Title 9 of the Environment Article. If the order was against a person, the Service shall charge the person with the cost of making the necessary improvements to comply with the directive of the Secretary of the Environment. If the person fails to pay within 60 days, the cost becomes a lien against the property served if it is recorded and indexed as provided in this subtitle, and the matter shall be referred to the Attorney General for collection.

5. Finally, § 3-109(e) of the Natural Resources Article provides:

(1) In the event the Service determines, at any time, that it will be unable to recoup all or a portion of its costs from the municipality or persons subject to the order of the Secretary of the Environment, the Service shall provide to the Secretary a full accounting of all costs incurred or anticipated to be incurred by it in complying with the Secretary's directive.

(2) Within 30 days of receipt of the accounting, the Secretary may request that the Service provide additional information.

(3) Within 90 days of receipt of the accounting or, when applicable, the additional information, the State shall pay to the Service the full amount of the Service's costs that are not paid or reasonably expected to be paid by the municipality or persons.

(4) (i) The State's payment of any amount to the Service does not preclude the State from seeking or obtaining reimbursement from the municipality or persons subject to the order of the Secretary.

(ii) The Service shall cooperate fully with the Secretary in seeking reimbursement from the municipality or persons.

FACTUAL BACKGROUND

6. The Mayor and City Council of Baltimore (“Baltimore City”) applied for, and the Department established conditions and requirements and authorized Baltimore City, pursuant to Title 9, subtitle 3 of the Environment Article and NPDES Discharge Permit Number MD0021555, State Discharge Permit Number 15-DP-0581A (effective May 1, 2018; modified January 1, 2020; expires April 30, 2023) (“Back River Discharge Permit”), to discharge from the Back River Wastewater Treatment Plant (“Back River WWTP” or the “Plant”), located at 8201 Eastern Avenue, Baltimore, Maryland.

7. The Back River Discharge Permit (a) details the actions that Baltimore City is required to take to operate the Back River WWTP, and (b) limits Baltimore City’s discharges of pollutants to (i) Outfall 001A in the Back River, and (ii) Outfall 002A at Bear Creek. The Back River, which is designated as Use II waters protected for estuarine and marine aquatic life, then flows to the Chesapeake Bay.

8. On or about June 16, 2021, September 20, 2021, and December 29, 2021, the Department conducted inspections at the Back River WWTP. During these inspections, and as a result of reviewing information and materials submitted by Baltimore City before and after these inspections in accordance with the terms of the Permit, the Department observed extensive violations of General and Special Conditions contained in the Back River Discharge Permit.¹

9. On March 22, 2022, the Department conducted an additional inspection of the Back River WWTP. This inspection revealed a precipitous decline of the functioning of several critical processes at the Plant in comparison with prior Department inspections. The March 22, 2022, inspection revealed significantly increased noncompliance with the Back River Discharge Permit that is causing new or increased unpermitted discharges to Back River. Additional data from Discharge Monitoring Reports submitted by Baltimore City indicate monthly violations of total suspended solids (“TSSs”), total nitrogen, and total phosphorus.

10. Specifically, the March 22, 2022, inspection report revealed that:

¹ As a result of the extensive violations of General and Special Conditions contained in the Back River Discharge Permit observed by the Department, on January 21, 2022, the Department filed an action against Baltimore City under Title 9, subtitle 3 of the Environment Article in the Circuit Court for Baltimore City, Case No. 24-C-22-000386.

a. Only 2 of the 11 primary settling tanks (“PSTs”) were in service, and 1 of the 2 operating PSTs requires maintenance to function properly. The Back River WWTP does not have sufficient PST capacity to treat its primary waste stream;

b. Denitrification filters (“DN Filters”) were not functioning as designed because of the presence of a high solids concentration in the DN Filter influent. The Plant has 52 DN Filters arranged in 4 quads of 13 DN Filters each. Quads 1, 2 and 4 are not functioning properly because they are underwater. Additionally, the 13 DN Filters in Quad 4 are not functioning properly because they require various mechanical maintenance. These improperly functioning DN Filters are causing DN Filter influent to bypass permit required Enhanced Nutrient Reduction (“ENR”) treatment. In addition, the Department observed the presence of hydrogen sulfite (sewer gas) at the DN Filters which indicates operational or treatment process deficiencies; this is possibly related to incorrect methanol dosing;

c. January 2022 concentrations of TSS in DN Filter influent ranged between 31 and 292 mg/L. This indicates that the solids settling processes are failing. These high concentrations are causing intermittent and chronic clogging of the DN Filter system;

d. Significant algal and vegetation have grown on the weirs of the secondary clarifiers. This has caused the short circuiting of the system and likely negatively impacts TSS concentration in the Plant’s treatment train wastewater;

e. Significant amounts of solids have accumulated in the secondary clarifiers. This accumulation is decreasing the quality of the Plant’s final effluent.

f. Significant amounts of vegetation (*e.g.*, reed grasses) have grown and are established in the secondary clarifiers. This is preventing the proper functioning of these clarifiers; and

g. Significant amounts of vegetation (*e.g.*, reed grasses) have grown and are established in the biological reactors. This is preventing the proper functioning of these reactors.

11. The Department has determined that the decline in the proper maintenance and operation of the Plant risks catastrophic failures at the Plant that may result in environmental harm as well as adverse public health and comfort effects.

12. Therefore, pursuant to § 9-252(a) of the Environment Article, to prevent or correct pollution of the waters of the State and to ensure the Back River WWTP is operated in a manner that will protect public health and comfort, the Secretary Grumbles ordered Baltimore City on March 24, 2022, to operate the Back River WWTP in compliance with all terms of the Back River Discharge Permit, including, but not limited to, providing an adequate number of operating staff that are qualified to carry out the operations, maintenance, and testing functions required to ensure compliance with the Back River Discharge Permit, and to cease all unpermitted discharges from the Back River WWTP. The Secretary further ordered Baltimore City to make all necessary and appropriate alterations to the Back River WWTP and its operations in order to comply with the March 24, 2022, order, and within 48 hours of service of the order, to submit to the Department sufficient documentary evidence that the Back River WWTP is operating in compliance with all terms of the Back River Discharge Permit and that it has ceased all unpermitted discharges.

13. On March 26, 2022, more than 48 hours after service of the March 24, 2022, order, the Department conducted a follow-up inspection of the Back River WWTP. The Department documented that the corrective actions identified in the March 22, 2022, inspection have not been completed, and extensive violations of General and Special Conditions contained in the Back River Discharge Permit continue unabated.

14. As of the date of this Directive, Baltimore City has failed to comply with the March 24, 2022, order and to operate the Back River WWTP in compliance with all terms of the Back River Discharge Permit and cease all unpermitted discharges from the Back River WWTP.

DIRECTIVE TO THE SERVICE

15. Pursuant to § 3-109(c) and § 3-109(d) of the Natural Resource Article, the Secretary hereby DIRECTS that the Service take charge of the Back River WWTP, including its operations, maintenance,

and improvements functions, in order to work with Baltimore City to ensure that Baltimore City meets the following objectives: protecting public and environmental health; abating any further nuisance; providing appropriate levels of qualified staff; conducting appropriate maintenance, improvements, and modifications; operating the Back River WWTP in compliance with all terms of the Back River Discharge Permit; and ceasing all unpermitted discharges from the Back River WWTP.² The Service shall work with Baltimore City to the extent it deems practicable, but in any event, shall achieve the aforementioned objectives with the means and methods the Service, in its discretion, deems most effective and efficient. Specifically, the Service shall take actions to ensure that the Back River WWTP is operated in compliance with all terms of the Back River Discharge Permit and cease all unpermitted discharges from the Back River WWTP, which shall include:

- a. Immediately commencing action to correct the deficiencies identified in Paragraph 10.a. through g. of this Directive;
- b. Immediately begin assessing the adequacy of both the number and qualifications of Plant staff in order to provide a recommendation to Baltimore City and the Department on the adequate number of qualified operating staff that are necessary to carry out the operations, maintenance, and testing functions required to ensure compliance with the Back River Discharge Permit; and
- c. Identifying and implementing all necessary and appropriate alterations to the Back River WWTP and its operations and maintenance, including, if necessary, the retaining of additional workers to temporarily supplement staffing at the Back River WWTP.

16. The Secretary further DIRECTS the Service to undertake a comprehensive evaluation and assessment of the Back River WWTP's operation, maintenance, staffing, and equipment and, by June 6, 2022, to submit a report to the Department of the Service's findings and recommendations, including a

² Nothing in this Directive imposes liability on the Service under Title 9, subtitle 3 for violations of the Back River Discharge Permit.

comprehensive list of needed improvements, ranked by their impact on compliance with discharge permit effluent limitations.

17. The Secretary further DIRECTS the Service to abide by any amendments or modifications to this Directive issued by the Secretary of Environment if the Secretary believes any such amendment or modification is necessary to protect human and environmental health.

18. The Secretary further DIRECTS the Service to seek recoupment as referenced in § 3-109 of the Natural Resources Article and may record and index one or more liens against Baltimore City, and any other responsible parties, assigns, owners, or operators.

19. The Secretary further DIRECTS the Service to complete all tasks in this Directive until the Secretary notifies the Service that this Directive is terminated.

STATE OF MARYLAND,
DEPARTMENT OF THE ENVIRONMENT

Benjamin Grumbles, Secretary

Date _____

Appendix B – NPDES Discharge Permit



Maryland
Department of
the Environment

Larry Hogan, Governor
Boyd K. Rutherford, Lt. Governor
Ben Grumbles, Secretary
Horacio Tablada, Deputy Secretary

December 5, 2019

Mr. Paul N. De Santis
Chief of Legal & Regulatory Affairs
Baltimore City, Department of Public Works
Abel Wolman Municipal Building, 6th Floor
Baltimore, Maryland 21202

Re: Request for Permit Modification of the Back River Wastewater Treatment Plant (WWTP)
Discharge Permit, State No. 15-DP-0581, NPDES No. MD0021555

Dear Mr. De Santis:

In response to your letter dated November 27, 2019 requesting elimination of the footnote 8, as it applies to discharges from Outfall 002A, the Maryland Department of the Environment has revised footnote 8 on page 9 of 37 of the discharge permit to clarify that the dechlorination requirement is not applicable to effluent sent through Outfall 002A to be used for reclamation usage at Trade Point Atlantic.

Modified copy of the Page 9 of the discharge permit is attached with this letter. The effective date of this modification is also indicated on enclosed cover Page 1 of the discharge permit.

If you have any questions concerning this modification, please contact me at (410)-537-3363 or Mahendra Chawla of my staff at (410) 537-3679.

Sincerely,

A handwritten signature in blue ink, appearing to read "Yen-Der Cheng".

Yen-Der Cheng, Chief
Municipal NPDES Permits Division
Water and Science Administration
Maryland Department of the Environment

cc: Sharon Talley, MDE
Matthew Zimmerman, MDE
Yosef Kebede, DPW
Michael Gallagher, DPW

1800 Washington Boulevard | Baltimore, MD 21230 | 1-800-633-6101 | 410-537-3000 | TTY Users 1-800-735-2258

www.mde.maryland.gov



Maryland
Department of
the Environment

Larry Hogan, Governor
Boyd K. Rutherford, Lt. Governor

Ben Crumbles, Secretary
Horacio Tablada, Deputy Secretary

APR 11 2018

CERTIFIED MAIL

Mr. Marshall Phillips, Plant Manager
Wastewater Facilities Division
City of Baltimore, Department of Public Works
Bureau of Water and Wastewater
Back River Wastewater Treatment Plant
8201 Eastern Boulevard
Baltimore, Maryland 21224

RE: Discharge Permit for the Back River WWTP
State Discharge Permit 15-DP-0581, NPDES Permit MD0021555

Dear Mr. Phillips:

Enclosed is the above discharge permit with the effective date indicated on the cover page. The permittee is responsible for complying with all permit conditions. You are therefore advised to read the permit carefully and become thoroughly familiar with the requirements in order to maintain compliance with the permit.

The Enhanced Nutrient Removal (ENR) upgrade schedule listed in the permit includes deadlines for the construction completion and the corresponding effective date of the nutrients limits. The annual maximum loading rate limits for Total Nitrogen, Total Phosphorus and Total Suspended Solids (TSS) are included in the permit. Attached please find a copy of blank and sample forms for your use to calculate monthly load, year-to-date cumulative load and annual maximum load for these parameters. At the end of each calendar year, the permittee will be required to fill out and submit this form along with the Discharge Monitoring Report (DMR) for the month of December. You may contact the Project Manager to obtain this form in an electronic version (EXCEL SPREADSHEET).

Your facility has been approved by MDE to electronically submit Discharge Monitoring Report (DMR) through NetDMR. Therefore you are required to submit monthly DMRs by the 28th of the following month and all other documents as listed in the discharge permit electronically through NetDMR. Should you encounter problems in electronic submission for any month, please consult the MDE's Compliance Program by calling at (410) 537-3510 to avoid missing the deadline for submission of the above stated documents.

1800 Washington Boulevard | Baltimore, MD 21230 | 1-800-633-6101 | 410-537-3000 | TTY Users 1-800-735-2258

www.mde.maryland.gov

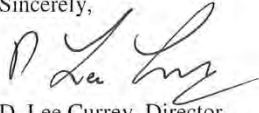
Mr. Marshall Phillips, Plant Manager
Page 2

You will also find enclosed a copy of the Federal Register published on August 28, 2017 with final rule to update the Code of Federal Regulations (CFR), Title 40, Part 136 - "Guidelines Establishing Test Procedures for Analysis of Pollutants" which is in effect from September 27, 2017. For future reference, please be advised to visit the U.S Government Publishing Office (USGPO) website (http://bit.ly/40CFR_Part136, this link is case-sensitive) regularly to obtain updated guidelines. Unless otherwise specified, the most updated guidelines in 40 CFR Part 136 are required to be used for the analyses of pollutants specified in this permit.

In addition, we have also enclosed a copy of the table of the Minimum Monitoring Requirements, a copy of Department's "Toxic Pollutant Monitoring Protocol and Reporting Requirements for Toxic Chemical Testing Analytical Data (amended on 05/18/2011)" a copy of Effluent Biotoxicity Testing Protocol for Industrial and Municipal Effluents, and a copy of the WWTP Effluent Toxic Chemical Monitoring Data Transmittal Cover Sheet.

If you have any questions, please contact Mahendra Chawla, Project Manager, Surface Discharge Permits Division, at (410) 537-3679.

Sincerely,



D. Lee Currey, Director
Water and Science Administration

Enclosures

cc: Mr. Mark Smith, U.S. Environmental Protection Agency (through electronic copy)
Ms. Leana S. Wen, Commissioner, Baltimore City Health Department, 1001 E. Fayette Street, Baltimore, Maryland 21202
Compliance Program's Central Division Chief
Ms. Chantelle Watkins (Permit cover page only)
Mr. Bill Lee (through electronic copy)
Mr. Matt Rowe, WSA
Mr. Dennis Rasmussen



DISCHARGE PERMIT

NPDES Discharge Permit Number: MD0021555	State Discharge Permit Number: 15-DP-0581A
Effective Date: 05/01/2018	Expiration Date: 04/30/2023
Modification Date: 01/01/2020	Reapplication Due Date: 10/31/2021

Pursuant to the provisions of Title 9 of the Environment Article, Annotated Code of Maryland, and regulations promulgated thereunder, and the provisions of the Clean Water Act, 33 U.S.C. Section 1251 et seq., and implementing regulations 40 CFR Parts 122, 123, 124 and 125, the Department of the Environment hereby establishes conditions and requirements pertinent to the wastewater treatment plant and collection system and authorizes:

Mayor and City Council of Baltimore
City Hall, 100 North Holiday Street
Baltimore, Maryland 21202

TO DISCHARGE FROM: Back River Wastewater Treatment Plant

LOCATED AT: 8201 Eastern Boulevard, Baltimore County
Baltimore, Maryland 21224

THROUGH OUTFALL: 001A -- Facility Effluent to Back River
002A -- Facility Effluent discharge to High Head Lake at the Sparrows Point, Trade Point Property, and from there, is pumped to the existing outfalls to Bear Creek

TO: the Back River and Baltimore Harbor, designated as Use II waters protected for Estuarine and Marine Aquatic Life; in accordance with the following special and general conditions and a map incorporated herein and made a part hereof.

I. DEFINITIONS

- A. "Ambient temperature" of the effluent receiving stream means the water temperature that is not impacted by a point source discharge, and it shall be measured in areas of the stream representative of typical or average conditions of the stream segment in question.
- B. "Bypass" means the intentional diversion of pollutants from any portion of a treatment or collection facility.
- C. "BOD₅ (Biochemical Oxygen Demand)" means the amount of oxygen consumed in a standard BOD₅ test without the use of a nitrification inhibitor at 20 degree centigrade on an unfiltered sample.
- D. "Clean Water Act" means the Federal Water Pollution Control Act, as amended, 33 U.S.C. Section 1251 *et seq.*
- E. "CFR" means the Code of Federal Regulations.
- F. "COMAR" means the Code of Maryland Regulations.
- G. "Department" means the Maryland Department of the Environment (MDE).
- H. Discharge Limits
 - 1. "Daily *maximum* (or *minimum*)" limitation means the *highest* (or *lowest*) allowable the daily averages in a calendar month. The daily discharge expressed as concentration (in mg/l) shall be calculated by dividing total of measurement readings by number of sample collected during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. The daily discharge expressed as loading rate (in pounds/day) is calculated by using this formula {daily average concentration (mg/l) x the same day total flow (in million gallons) x 8.34}.
 - 2. "Weekly average (*maximum* or *minimum*)" limitation means the *highest* or *lowest* allowable average of "daily discharges" over a calendar week, calculated as the sum of all "daily discharges" measured during a calendar week divided by the number of "daily discharges" measured during that week. Each of the following 7-day periods is defined as a calendar week: Week 1 is Days 1 - 7 of the month; Week 2 is Days 8 - 14; Week 3 is Days 15 - 21; and Week 4 is Days 22 - 28. *For weekly average maximum*, if the "daily discharge" on days 29, 30 or 31 exceeds the "weekly average" discharge limitation, MDE may elect to evaluate the last 7 days of the month as Week 4 instead of Days 22 - 28. *For weekly average minimum*, if the "daily discharge" on days 29, 30 or 31 is lower than the "weekly average" discharge limitation, MDE may elect to evaluate the last 7 days of the month as Week 4 instead of Days 22 - 28.

I. DEFINITIONS

3. "Monthly average *maximum* (or *minimum*)" limitation means the *highest* (or *lowest*) allowable monthly average concentration or waste load of a parameter over a calendar month. The monthly average is calculated as the sum of all daily discharges for a parameter sampled and/or measured in that calendar month divided by the number of days on which monitoring was performed.
 4. "Minimum or maximum" limit means the lowest or highest allowable value measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling.
 5. "Monthly loading rate (in pounds/month)" means the total load of a parameter calculated for that calendar month. It is calculated using this formula $\{(\text{monthly average concentration in mg/l}) \times (\text{Total monthly flow in Million Gallons}) \times 8.34\}$.
 6. "Year-to-date cumulative load (pounds)" value means cumulative load of a pollutant in the effluent through each reporting month in a calendar year. It is calculated as a sum of the individual total monthly loads from January through the reporting month in a calendar year.
 7. "Annual Maximum Loading Rate (in pounds/year)" limit means the maximum load allowed for a pollutant in the effluent to be discharged in a calendar year. The Year-to-date cumulative load (as defined above in Definition I.H.6) shall be used to determine the compliance status of this requirement.
 8. "Monthly log mean (Monthly geometric mean)" limit means the highest allowable value calculated as the logarithmic or geometric mean of all samples taken in the calendar month. The geometric mean is the antilogarithm of the mean of the logarithms.
- I. Discharge Monitoring
1. "Composite sample" means a combination of individual samples obtained at hourly or smaller intervals over a time period. Either the volume of each individual sample is proportional to discharge flow rates or the sampling interval (for constant volume samples) is proportional to the flow rates over the time period used to produce the composite.
 2. "Grab sample" means an individual sample collected over a period of time not exceeding 15 minutes.
 3. "Estimated flow" value means a calculated volume or discharge rate which is based on a technical evaluation of the sources contributing to the discharge including, but not limited to, pump capabilities, water meters, and batch discharge volumes.

I. DEFINITIONS

4. "Measured flow" value means any method of liquid volume measurement, the accuracy of which has been previously demonstrated in engineering practice, or for which a relationship to absolute volume has been obtained.
 5. "Recorded flow" means any method of providing a permanent, continuous record of flow including, but not limited to, circular and strip charts.
 6. "Monthly average flow" means the total flow for a calendar month divided by the number of days in the same month.
- J. "i-s (immersion stabilization)" means a calibrated device immersed in the effluent or stream, as applicable, until the temperature reading is stabilized.
- K. "NetDMR" means a nationally-available electronic reporting tool, initially designed by states and later adapted for national use by EPA, which can be used by NPDES-regulated facilities to submit discharge monitoring reports (DMRs) electronically to EPA through a secure Internet application over the National Environmental Information Exchange Network (NEIEN). EPA can then share this information with authorized states, tribes, and territories.
- L. "NPDES (National Pollutant Discharge Elimination System)" means the national system for issuing permits as designated by the Clean Water Act.
- M. "Nondetectable Level" for total residual chlorine means a residual concentration of less than 0.10 mg/l as determined using either the DPD titrimetric or chlorimetric method or an alternative method approved by the Department.
- N. "Outfall" means the location where the effluent is discharged into the receiving waters.
- O. "Overflow" means any loss of wastewater or discharge from a sanitary sewer system, combined sewer system or wastewater treatment plant bypass (as defined in I.B) which results in the direct or potential discharge of raw, partially treated wastewater into the waters of the State.
- P. "Permittee" means an individual or organization holding the discharge permit issued by the Department.
- Q. "POTW" means a publicly owned treatment works.
- R. "Sampling Point" means the effluent sampling location in the outfall line(s) downstream from the last addition point or as otherwise specified.
- S. "Sanitary Sewer Overflow (SSO)" means a discharge of untreated or partially treated sewage from a separate sewer system before the sanitary wastewater reaches the headworks of a wastewater treatment facility, pursuant to COMAR 26.08.10.01.

I. DEFINITIONS

- T. "Significant Industrial User (SIU)" is defined as any industrial user (IU) that:
1. is subject to national categorical standards; and
 2. any other IU that:
 - a. discharges an average of 25,000 gallons per day or more of process wastewater (excluding sanitary, non-contact cooling and boiler blowdown wastewater); or
 - b. contributes a process wastestream that makes up 5% or more of the average dry weather hydraulic or organic capacity of the POTW; or
 - c. is designated as such by the POTW on the basis that the IU has a reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement; or
 - d. is found by the POTW, the Department, or the Environmental Protection Agency (EPA) to have significant impact either individually or in combination with other contributing industries to the POTW, on the quality of the sludge, the POTW's effluent quality, or air emissions generated by the system.
- U. "TKN (Total Kjeldahl Nitrogen)" means organic nitrogen plus ammonia nitrogen.
- V. "TSS (Total Suspended Solids)" means the residue retained on the filter by an analysis done in accordance with Standard Methods or other approved methods.
- W. "Upset" means the exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

II. SPECIAL CONDITIONS

A.1 Effluent Limitations, Outfall 001A ^{(1) (2) (3)}

The quality of the effluent discharged by the facility at a discharge point location- 001A shall be limited at all times as shown below:

Maximum Effluent Limits						
Effluent Characteristics	Monthly Average Loading Rate, Pounds/day	Weekly Average Loading Rate, Pounds/day	Daily Average Loading Rate, Pounds/day	Monthly Average Concentration, mg/l	Weekly Average Concentration, mg/l	Daily Average Concentration, mg/l
BOD ₅	11,000	16,000	N/A	10	15	N/A
TSS	11,000	16,000	N/A	10	15	N/A
Total Ammonia Nitrogen as N (5/1 - 10/31)	2,200	3,300	N/A	2.0	3.0	N/A
(11/ - 4/30)	5,529	N/A	N/A	5.1	N/A	N/A
Total Phosphorus	220	330	N/A	0.20	0.30	N/A

Maximum Effluent Limits			
Effluent Characteristics	Total Monthly Loading Rate, Pounds/Month	Annual Maximum Loading Rate, Pounds/Year	Monthly Average Concentration, mg/l
TSS ⁽⁴⁾ _a	REPORT	3,959,228 lbs/year	REPORT
Total Phosphorus-P ^{(4) (6) (7)} _a (5/1- 10/31)	REPORT	6,652 lbs/month	REPORT
Total Phosphorus-P ^{(4) (5) (6) (7)} _a	REPORT	79,277 lbs/year	REPORT
Total Nitrogen-N ^{(4) (6) (7)} _a (5/1- 10/31)	REPORT	99,782 lbs/month	REPORT
Total Nitrogen-N ^{(4) (5) (6) (7)} _a	REPORT	1,582,055 lbs/year	REPORT
Total Polychlorinated Biphenyls (tPCBs) ⁽⁴⁾ _b	REPORT Grams/Quarter (Quarterly Average) REPORT Grams/Year (Annual Maximum)		REPORT ng/l (Quarterly Average) REPORT ng/l (Annual Average)

Effluent Limits		
Effluent Characteristics	Maximum	Minimum
E. coli	126 MPN/ 100 ml monthly geometric mean	N/A
Total Residual Chlorine ⁽⁸⁾	0.011 mg/l	N/A
pH	8.5	6.5
Dissolved Oxygen (All Year) (2/1 - 5/31)	N/A N/A	5.0 mg/l at anytime 6.0 mg/l weekly average
WET Acute Toxicity ⁽⁹⁾	TUa < 1.00	N/A
WET Chronic Toxicity ⁽⁹⁾	TUc < 1.02	N/A

An annual average flow of 130.0 million gallons per day (mgd) was used in waste allocation calculations (expressed as waste loading rate limit), and this unit shall be used when reporting on the Discharge Monitoring Report (DMR) as required by General Condition III.A.2. Notification is to be provided to the Department at least 180 days before the annual average flow is expected to exceed this flow level or when the sum of flows from outfall 001A and 002A is expected to exceed 180.0 mgd. The facility shall meet an annual load limit of 2,192,800 lbs/yr for total nitrogen, 109,600 lbs/yr for total phosphorus and 8,548,254 lbs/yr for total suspended solids for flows from outfall 001A and 002A combined together. The ENR limits into effect on the effective date of this permit.

II. SPECIAL CONDITIONS

A.2 Effluent Limitations, Outfall 002A ⁽¹⁾⁽²⁾⁽³⁾

The quality of the effluent discharged by the facility at a discharge point location- 002A shall be limited at all times as shown below:

Effluent Characteristics	Maximum Effluent Limits					
	Monthly Average Loading Rate, Pounds/day	Weekly Average Loading Rate, Pounds/day	Daily Average Loading Rate, Pounds/day	Monthly Average Concentration, mg/l	Weekly Average Concentration, mg/l	Daily Average Concentration, mg/l
BOD ₅ (5/1-10/31)	8,340	12,520	N/A	20	30	N/A
BOD ₅ (11/1- 4/30)	12,520	18,770	N/A	30	45	N/A
TSS	12,520	18,770	N/A	30	45	N/A
Total Ammonia Nitrogen as N (5/1 - 10/31)	830	1,250	N/A	2.0	3.0	N/A
(11/1- 4/30)	2,130	N/A	N/A	5.1	N/A	N/A
Total Phosphorus	83	125	N/A	0.20	0.30	N/A

Effluent Characteristics	Maximum Effluent Limits		
	Total Monthly Loading Rate, Pounds/Month	Annual Maximum Loading Rate, Pounds/Year	Monthly Average Concentration, mg/l
TSS ⁽⁴⁾ _a	REPORT	4,589,026 See footnote 4 _(a) [*]	REPORT
Total Phosphorus-P ⁽⁴⁾ _a ⁽⁶⁾ ₍₇₎ (5/1-10/31)	REPORT	15,353 lbs total (5/1- 10/31)	REPORT
Total Phosphorus-P ⁽⁴⁾ _a ⁽⁵⁾ ₍₆₎ ⁽⁷⁾	REPORT	30,363 lbs/year	REPORT
Total Nitrogen-N ⁽⁴⁾ _a ^{(6) ^{(7) (5/1-10/31)}}	REPORT	230,294 lbs total (5/1-10/31)	REPORT
Total Nitrogen-N ⁽⁴⁾ _a ⁽⁵⁾ ₍₆₎ ⁽⁷⁾	REPORT	610,748 lbs/year	REPORT
Total Polychlorinated Biphenyls (tPCBs) ⁽⁴⁾ _c	REPORT Grams/Quarter (Quarterly Average)		REPORT ng/l (Quarterly Average)
	REPORT Grams/Year (Annual Maximum)		REPORT ng/l (Annual Average)

Effluent Characteristics	Effluent Limits	
	Maximum	Minimum
E. coli	126 MPN/ 100 ml monthly geometric mean	N/A
Total Residual Chlorine ⁽⁸⁾	N/A	N/A
pH	8.5	6.5
Dissolved Oxygen (All Year) (2/1 – 5/31)	N/A	5.0 mg/l at anytime 6.0 mg/l weekly average

An annual average flow of 50.0 million gallons per day (mgd) was used in waste allocation calculations (expressed as waste loading rate limit), and this unit shall be used when reporting on the Discharge Monitoring Report (DMR) as required by General Condition III.A.2. Notification is to be provided to the Department at least 180 days before the annual average flow is expected to exceed this flow level or when the sum of flows from outfall 001A and 002A is expected to exceed 180.0 mgd. The facility shall meet an annual load limit of 2,192,800 lbs/yr for total nitrogen, 109,600 lbs/yr for total phosphorus and 8,548,254 lbs/yr for total suspended solids for flows from outfall 001A and 002A combined together. The ENR limits go into effect on the effective date of this permit.

II. SPECIAL CONDITIONS

Footnotes for limitations:

- ⁽¹⁾ When this permit is renewed, the new limitations may not be equal to the above limitations.
- ⁽²⁾ There shall be no discharge of floating solids or visible foam other than trace amounts. See Special Condition ILM.
- ⁽³⁾ The permit may also be reopened in accordance with the requirements of MDE's Watershed Permitting Plan under which all discharge permits in a watershed are issued the same year.
- ⁽⁴⁾ ^(a) The Back River (basin number 02130901) has been identified on the 303(d) list as impaired by PCBs in both, sediment (1998) and fish tissue (2008), sediments (1996), chlordane (1996), nitrogen and phosphorus (1996), chlorides (2012), and sulfates (2012).
Following Waste Load Allocations (WLAs) have been assigned:

For Outfall 001A to Back River, per Back River TMDL for 130.0 mgd flow*:

Total Nitrogen = 99,782 lbs/month (5/1-10/31) and 1,582,055 lbs/year*
Total Phosphorus = 6,652 lbs/month (5/1-10/31) and 79,277 lbs/year*
tPCB = 48.5 g/year

For 50.0 mgd flow thru Outfall 002A to Baltimore Harbor per Chesapeake Bay TMDL*:

Total Nitrogen = 230,294 lbs/ season (5/1-10/31) and 610,748 lbs/year*
Total Phosphorus = 15,353 lbs/season (5/1-10/31) and 30,363 lbs/year*
tPCB = 18.66 g/year

- * The facility shall meet an annual load limit of 2,192,800 lbs/yr for total nitrogen, 109,600 lbs/yr for total phosphorus and 8,548,254 lbs/yr for total suspended solids for flows from outfall 001A and 002A combined together. The ENR limits go into effect on the effective date of this permit.

This permit is in conformance with the "Chesapeake Bay TMDL for Nitrogen, Phosphorus and Sediment" established on December 29, 2010. When TMDLs for other remaining parameters are completed, limits may be imposed, after the public participation process, to incorporate any TMDL requirements. Until the facility's ENR upgrade to the treatment is complete and fully operational, the permittee is to operate the Biological Nutrient Removal (BNR) process on a year round basis. Total Nitrogen is the sum of ammonia-N, organic-N and (nitrite + nitrate)-N based on samples collected on the same day.

- ⁽⁴⁾ ^(b) The TMDL for PCBs for Back River approved by the EPA on 10/1/2012, has included a tPCBs annual waste load allocation (WLA) of 48.5 grams/year (0.107 pounds/year) for Outfall 001A (that is based on the design flow of 130.0 mgd and the water column TMDL endpoint tPCBs concentration of 0.27 nanograms per liter (ng/l)).

- ⁽⁴⁾ ^(c) The TMDL for the Baltimore Harbor approved by the EPA on 10/1/2012, included a tPCBs WLA of 18.66 g/year (0.0411 pound/year) for the Back River WWTP Outfall 002A (that is based on the design flow of 50.0 mgd and the water column TMDL endpoint tPCBs concentration of 0.27 nanograms per liter (ng/l)).

The above stated WLAs of tPCBs included in the TMDL does not impose effluent limits for tPCBs in the discharge permit until the effluent tPCBs data collected after the completion of the ENR upgrade are evaluated by the Department. Upon completion of the ENR upgrade, if the facility's annual tPCBs load exceeds the WLA, the permittee shall submit a plan to the Department for approval to track the sources and Best Management Practice (BMP) implementation within 180 days of exceedence of the above stated annual load for tPCBs.

II. SPECIAL CONDITIONS

Footnotes for limitations, Continued:

- (5) The permittee shall operate the ENR facility in a manner that optimizes the nutrient removal capability of the facility as stipulated in the Grant Agreement for ENR upgrade. The first exceedence of the permit limit shall be counted and reported as daily exceedences beginning from the first exceedence, determined to the nearest day, through December 31. In addition, after any such exceedence, the permittee shall demonstrate to the Department's satisfaction that the facility is optimizing its nutrient removal capability, and neither the arrival of the next calendar year nor the issuance of a permit renewal during a period of noncompliance shall obviate continuance of any noncompliance status related to treatment optimization requirements.
- (6) At the end of each calendar year, the permittee shall comply with the *concentration-based* limitations for the Annual Maximum Loading Rate defined below or the *Tributary Strategy-based* loading rate limitation listed in above in the effluent limitations table, whichever is lower:
- (a) TN Limitation (lbs/year): $4.0 \text{ mg/l} \times \text{annual total flow (calendar year based in million gallons per year)} \times 8.34$. To the extent that the permittee alleges that temperature levels of 12 degrees C or lower have diminished the treatment system's capability of complying with this *concentration-based* loading rate limitation for Total Nitrogen, the permittee shall provide notification beginning with the calendar year report under the "Upset" provision in Section III.B.6 of this permit. In any enforcement proceeding, the permittee seeking to establish the occurrence of an upset has the burden of proof.
 - (b) TP Limitation (lbs/year): $0.20 \text{ mg/l} \times \text{annual total flow (calendar year based in million gallons per year)} \times 8.34$.
- The details and results of all required annual calculations shall be submitted to the Department with the Discharge Monitoring Report for December. See Special Condition II.K for further details.
- The *concentration-based* loading requirements may be revised if the limits are determined to be impracticable based on actual performance and the Department re-opens the permit as a major modification (which requires public participation) to impose (an) alternate effluent limitation(s) or revised schedule.
- (7) The permittee may request that the permit be reopened and modified to include nutrient trading consistent with the most current "Maryland Policy for Nutrient Cap Management and Trading in Maryland's Chesapeake Bay Watershed" in effect at that time.
- (8) When chlorine or any chlorine containing compound is used in the treatment work, the effluent directly discharged from the Back River WWTP into the receiving water shall be de-chlorinated to reduce effluent total residual chlorine concentration to the non-detectable level (see definition I.M.). This requirement for non-detectable chlorine does not apply to effluent sent to Tradeport Atlantic (TPA) for reclamation usage through Outfall 002A.
- (9) TU_a is defined as 100 divided by the LC₅₀ value resulting from the first 48 hours of a valid acute or chronic toxicity test. Compliance with the LC₅₀ requirements shall be determined through testing performed in accordance with Special Condition II.D. TU_c is defined as 100 divided by the IC₂₅ value resulting from a valid chronic toxicity test. Compliance with the IC₂₅ requirements shall be determined through testing performed in accordance with Special Condition II.D.

II. SPECIAL CONDITIONS

B.(1) Minimum Monitoring Requirements:

The effluent characteristics listed below in Table B(1) shall be monitored at the sampling point (Definition I.R). If the sampling point is other than the outfalls- 001A and 002A, the permittee shall ensure that the effluent samples are representative of the effluent quality being discharged at the outfalls 001A and 002A.

<u>Effluent Characteristics</u>	<u>Monitoring Period</u>	<u>Measurement Frequency</u>	<u>Sample Type</u>
BOD ₅ ⁽¹⁰⁾	All Year	One/day	24-hour composite
Total Suspended Solids ⁽¹⁰⁾	All Year	One/day	24-hour composite
Total Ammonia Nitrogen as N ⁽¹⁰⁾⁽¹²⁾	All Year	One/day	24-hour composite
Total Phosphorus as P ⁽¹⁰⁾⁽¹³⁾	All Year	One/day	24-hour composite
Total Nitrogen as N ⁽¹⁰⁾⁽¹²⁾⁽¹³⁾	All Year	One/day	Calculated
(Nitrite + Nitrate) as N ⁽¹⁰⁾⁽¹¹⁾⁽¹²⁾	All Year	One/day	24-hour composite
Organic Nitrogen as N ⁽¹⁰⁾⁽¹¹⁾⁽¹²⁾	All Year	One/day	24-hour composite
Orthophosphate as P ⁽¹⁰⁾⁽¹¹⁾	All Year	One/week	24-hour composite
E. coli ⁽¹⁰⁾	All Year	One/day	Grab
Total Residual Chlorine ⁽¹⁰⁾⁽¹⁴⁾⁽¹⁵⁾	All Year	Three per day, One per shift	Grab
Dissolved Oxygen ⁽¹⁰⁾⁽¹⁵⁾	All Year	Three per day, One per shift	Grab
pH ⁽¹⁰⁾⁽¹⁵⁾	All Year	Three per day, One per shift	Grab
Cyanide, Free ⁽¹⁰⁾⁽¹⁶⁾	All Year	One/month	Grab
Chromium (Hex) ⁽¹⁰⁾⁽¹⁶⁾	All Year	One/month	Grab
Total Polychlorinated Biphenyls (tPCBs) ⁽¹⁰⁾⁽¹⁶⁾	All Year	One/quarter	24-hour composite
Whole Effluent Toxicity ⁽¹⁰⁾⁽¹⁷⁾ Acute and Chronic	All Year	One/Quarter	24-hour composite
Flow ⁽¹⁰⁾⁽¹⁸⁾⁽¹⁹⁾	All Year	Continuous	Recorded ⁽¹⁹⁾
Total Monthly Flow ⁽¹⁰⁾⁽²⁰⁾	All Year	Monthly	Calculated ⁽²⁰⁾

II. SPECIAL CONDITIONS

B (1) Minimum Monitoring Requirements:

Footnotes for the monitoring requirements, continued:

- (10) "STORET" (short for STOrage and RETrieval) is a widely-used repository for water quality data reporting and monitoring. The STORET codes for the effluent characteristics described as limitations and/or monitoring requirements are: BOD₅ (00310), Total Suspended Solids (00530), Total Ammonia Nitrogen as N (00610), Total Phosphorus as P (00665), Total Nitrogen as N (00600), (Nitrite + Nitrate) as N (00630), Organic Nitrogen as N (00605), Orthophosphate as P (04175), E. coli (51040), Total Residual Chlorine (50060), Dissolved Oxygen (00300), pH (00400), Cyanide (Free) (00722), Chromium (Hex) (78247), tPCBs (79819), WET Acute Toxicity (TS000), WET Chronic Toxicity (TT000), Flow (50050), and Total monthly flow (82220).
- (11) This parameter (without effluent limitations) must be monitored, and it shall be reported on the Monthly Operating Report (MOR) as individual results and on the Discharge Monitoring Report (DMR) as monthly average concentrations.
- (12) Total nitrogen as N (in mg/l) is a calculated parameter as the sum of individual results for total ammonia nitrogen as N, organic nitrogen as N and (nitrite + nitrate) as N. All the nitrogen species must be sampled on the same day.
- (13) The permittee shall also calculate and report on the DMR the TN and TP total monthly loads (Definition I.H.5) plus year-to-date cumulative loads (Definition I.H.6) for the calendar year in question for the outfalls- 001A and 002A.
- For each calendar year, the year-to-date cumulative loads of TN and TP for the month of December shall represent the total annual loads, and they must be incorporated toward complying with the respective annual maximum load limits. Refer to Special Condition II.K for "Reporting TN and TP total annual loads for compliance to the Concentration-based maximum annual loading rate limits".
- (14) The Minimum monitoring requirements of three per day (one per shift) grab samplings for total residual chlorine shall be applicable, when chlorine or any chlorine compound is used in any treatment process(es), including but not limited to disinfection, that could become a potential constituent of the effluent discharged from the Back River WWTP. The minimum level (quantification level) for total residual chlorine is 0.10 mg/l. The permittee may report all results below the minimum level as <0.10 mg/l. All results reported below the minimum level shall be considered in compliance.
- (15) The monitoring of parameters (total residual chlorine, pH and dissolved oxygen) by three per day – grab samplings shall be distributed on a daily basis during the entire the staffed period in accordance with the representative sampling requirements as stated in the General Condition III.A1.

II. SPECIAL CONDITIONS

Footnotes for the monitoring requirements, continued:

- (16) All toxic chemical monitoring required by this permit shall be performed in accordance with MDE's Water Management Administration Toxic Substance Analytical Protocol. This includes analytical methodology, detection levels, holding times, preservation methods, sample types and reporting.

The permittee shall measure and report tPCBs in picograms/L (pg/L). To incorporate the TMDL of PCBs for Back River approved by the EPA on 10/1/2012, the effluent tPCBs monitoring and annual totals PCBs reporting shall be initiated upon completion and beginning operation of the ENR upgrades at Back River WWTP. The permittee shall use the approved EPA testing Methods in accordance with MDE's protocol titled "Reporting Requirements for Total PCBs (PCB Congeners) by EPA Method 1668 C or A". The tPCBs monitoring shall be once per quarter for at least one year beginning the ENR operation. The quarter shall end on March, June, September and December. The annual average concentration for tPCBs shall be calculated using the following formula:

$$\text{Average Concentration (pg/l)} = 264172 \times \frac{\text{Total Annual Cumulative load discharged (Grams)}}{\text{Total Annual Flow (MG) at 001A and 001B}}$$

Based on the tPCBs monitoring results, the Department will determine whether to continue tPCBs monitoring or change the tPCBs monitoring frequency after the tPCBs sources are identified and eliminated through BMP as stated in footnote 4(b). Any changes to the effluent tPCBs limits and/or monitoring requirements shall be addressed through the permit modification process.

- (17) Whole Effluent Toxicity (WET) samples shall be collected quarterly , analyzed, and reported in accordance with the MDE Water Management Administration's "Effluent Biototoxicity Testing Protocol for Industrial and Municipal Effluents" and Special Condition II.D.
- (18) Flows shall be reported in millions gallons per day (mgd) to at least the nearest 10,000 gallons per day. (Example: A flow of 1,524,699 gallons per day shall be reported as 1.53 mgd.). For each calendar month, flows shall be reported on the MOR as daily individual results and on the DMR as monthly average (mgd) and daily maximum (mgd)).
- (19) Continuous electronic flow measurement and recording which can produce a permanent record are acceptable to the Department.
- (20) "Total monthly flow" is a calculated parameter equal to sum of the daily flow results in a calendar month. It shall be reported on the monthly DMR as Total monthly flow in millions gallons (MG) to at least the nearest 10,000 gallons. (Example: A flow of 1,524,699 gallons shall be reported as 1.53 MG).

II. SPECIAL CONDITIONS

B(2) Report Submittal Requirements

Report Description	Reporting Frequency	Report Submittal Deadline
Effluent Biomonitoring Study Plan and Toxic Chemical Testing Plan ⁽²¹⁾⁽²²⁾	See footnote - 22	See footnote - 22
Effluent Biomonitoring Study Report ⁽²¹⁾⁽²³⁾	See footnotes- 23 & 25	See footnote- 25
Effluent Toxic Chemical Testing Report ⁽²¹⁾⁽²³⁾⁽²⁵⁾	See footnotes – 24 & 25	See footnote- 25
Wastewater Capacity Management Plan (WCMP) ⁽²¹⁾⁽²⁶⁾	See footnote – 26	See footnote- 26
Flow Capacity Report (FCR) ⁽²¹⁾⁽²⁷⁾	See footnote - 27	See footnote- 27

⁽²¹⁾ If the permittee has selected a third party for submitting reports to the Department, the permittee must provide to the third party with a document of authorization for report submission which is required with the report.

⁽²²⁾ Within three months from the effective date of this permit, the permittee shall submit the Study Plans for effluent biomonitoring as well as toxic chemical testing and obtain approval from the Department. For further details, refer to Special Condition II.D.1 for Effluent Biomonitoring Study Plan and Special Condition II.F.1 for Effluent Toxic Chemical Testing Study Plan.

⁽²³⁾ After MDE's approval of the Effluent Biomonitoring Study Plan, the permittee shall perform the effluent biomonitoring study and submit the results in a comprehensive report to the Department as per requirements of the Special Condition II.D.

⁽²⁴⁾ After MDE's approval of the Effluent Toxic Chemical Testing Plan, the permittee shall perform the effluent toxic chemical testing and submit the results in a comprehensive report to the Department as per requirements of the Special Condition II.F.

⁽²⁵⁾ The reports (a) for each biomonitoring study test performed as per the Special Condition II.D.2 and (b) for each analytical testing for toxic chemicals performed as per Special Condition II.F.3 shall be submitted to the Department by a mail or attached and submitted to the Department along with DMR for the month during which the test was completed, using NetDMR tool no later than 28th of the month following the test completion month. (Example: If the test is completed in March, the comprehensive report shall be submitted with the March DMR no later than 28th April).

⁽²⁶⁾ Unless the permittee has previously submitted the WCMP to the Department; the permittee shall submit the WCMP one time within 90 (Ninety) days of the effective days of this permit.

⁽²⁷⁾ The permittee shall submit the FCR to the Department as per the Special Condition II.C. This report shall be submitted once per year along with the DMR for the month of December.

II. SPECIAL CONDITIONS

C. Wastewater Capacity Management

The permittee shall report the total cumulative flow for the each calendar year for the above referenced facility. The total cumulative flow shall be reported in million gallons for the entire calendar year to the nearest ten thousand gallons. The annual total cumulative flow determination shall be provided to the Department using NetDMR no later than January 28th of the following year.

Because the most recent three-year average flow for this facility is over 80% of its design capacity, unless it has already been submitted, a Wastewater Capacity Management Plan (WCMP) must be submitted to the Department using NetDMR no later than 90 days of the issuance date of this discharge permit.

In addition, the permittee shall also submit a "Wastewater Flow Capacity Report (WFCR)" and "worksheet for WFCR" for the previous calendar year to the Department using NetDMR tool no later than January 28th of each year. If the permittee has not previously submitted the WCMP or the annual WFCR, the first WFCR and "worksheet for WFCR" shall be submitted within 90 days from the effective date of this permit. The permittee can obtain the WCMP guidance document and forms from the Department's web site links listed below: (a) <http://9nl.at/MD-CMPGuidance> for WCMP guidance document, (b) <http://9nl.at/MD-CMPFlowCapReport> for WFCR, (c) <http://9nl.at/MD-CMPWorksheet1> for WFCR's Worksheet # 1, and (d) <http://9nl.at/MD-CMPWorksheet2> for WFCR's Worksheet # 2 (these links are case-sensitive).

If the permittee prefers to provide the above documents in hard copies, they shall be provided to the Department postmarked by January 28th of the following year to the address below:

Attention: Calendar Year Total Cumulative Flow
WSA – Wastewater Discharge Permits Program
Maryland Department of the Environment
1800 Washington Boulevard, STE-455
Baltimore, MD 21230-1708

The permittee is advised to notify the Department at the above address immediately upon electronic submission of reports through NetDMR tool.

II. SPECIAL CONDITIONS

D. Biomonitoring Program

1. Within three months of the effective date of the permit, the permittee shall submit to the Department for approval a study plan to evaluate wastewater toxicity at Outfall 001A by using biomonitoring. Flow from Outfall-002A is used by Tradepoint Atlantic, LLC (formerly known as Sparrows Point Terminal, LLC) as process water and then discharged under the terms and conditions in NPDES No. MD0001201. Since Tradepoint Atlantic, LLC is required to monitor at their outfalls and since wastewater at Outfall-002A has received same treatment as Outfall-001A at Back River WWTP, no biomonitoring requirements are set for Outfall-002A in the Back River WWTP discharge permit. Testing for Outfall-001A shall be initiated no later than three months following the Department's acceptance of the study plan or according to an approved schedule in the study plan. The study plan should include a discussion of:
 - a. wastewater and production variability
 - b. sampling & sample handling
 - c. source & age of test organisms
 - d. source of dilution water
 - e. testing procedures/experimental design
 - f. data analysis
 - g. quality assurance/quality control
 - h. report preparation
 - i. testing schedule
2. The testing program shall consist of quarterly definitive chronic testing. This testing shall be initiated within the first quarter following the Department's acceptance of the study plan.

Testing shall include the sheepshead minnow (*Cyprinodon variegatus*) or inland silverside (*Menidia beryllina*) larval survival and growth tests and mysid shrimp (*Americamysis bahia* AKA *Mysidopsis bahia*) survival, growth, and fecundity tests. Testing must include one vertebrate species and one invertebrate species. Test results shall be expressed as NOEC, LOEC, ChV, and IC₂₅.
3. The samples used for biomonitoring shall be collected at the same time and location as the samples analyzed for the effluent limitations and monitoring requirements for this outfall. For chlorinated effluents, samples shall be collected after dechlorination. The permittee shall collect 24-hour flow-proportioned composite samples unless the Department has given prior approval of an alternative sampling type.

II. SPECIAL CONDITIONS

4. The following EPA document discusses the appropriate methods:

For Estuarine Receiving Stream: Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Marine and Estuarine Organisms
Third Edition, EPA-821-R-02-014, October 2002
5. Test results shall be submitted to the Department within one month of completion of each set of tests.
6. Test results shall be reported in accordance with the Department's "Effluent Biototoxicity Testing Protocol for Industrial and Municipal Effluents, Appendix E, Reporting Requirements for Effluent Biomonitoring Data," 12/4/12.
7. As a minimum, the reported chronic results shall be expressed as NOEC, LOEC, ChV, and IC₂₅.
8. If a 50% mortality or greater occurs in one or more effluent concentrations during the first 48 hours of the chronic tests, 48-hour LC₅₀s shall be calculated and reported along with the chronic results
9. If testing is not performed in accordance with MDE-approved study plan, additional testing may be required by the Department.
10. If the test results of any two consecutive valid toxicity tests show acute or chronic toxicity (LC₅₀ equal to or less than 100% for acute tests and an IC₂₅ equal to or less than the in-stream waste concentration for chronic tests), the permittee shall repeat the test within 30 days to confirm the findings of acute or chronic toxicity. Intermittent toxicity or other concerns may require additional testing or limits. If acute and/or chronic toxicity is confirmed, the permittee shall:
 - a. Eliminate the source of toxicity through operational changes as soon as possible but in any case not longer than within three months, or
 - b. Perform a TRE. If the permittee repeats the toxicity testing as stated above and the results of the repeat test do not confirm the acute or chronic toxicity, the Department will require the permittee to repeat the toxicity testing as stated above to reconfirm a finding of no acute or chronic toxicity. After reconfirmation, the permittee shall complete any remaining quarterly testing required.

II. SPECIAL CONDITIONS

11. If the permittee completes a TRE in accordance with II.D.10.b and unacceptable toxicity is confirmed, the Whole Effluent Toxicity (WET) permit limit shall continue, and a compliance schedule will be required which shall become discharge permit conditions through a Department initiated permit modification or through a permit renewal.
12. When a WET test result shows reasonable potential for toxicity, unless it can be demonstrated that the source of toxicity has been eliminated, inappropriate test procedures were utilized, or the source has been controlled via a chemical specific permit limitation, WET limits shall continue. The permit may be modified to remove the WET limit if the six follow-up quarterly tests show no toxicity.
13. If plant processes or operations change so that there is a significant change in the nature of the wastewater, the Department may require the permittee to conduct a new set of tests.
14. If a significant industrial user locates within the service area so that significant change in the nature of the wastewater might be anticipated, MDE may require the permittee to conduct a new set of tests.
15. The biomonitoring program study plan, WET test results and related materials shall be submitted electronically to the Department if the permittee has already been approved for the NetDMR process. Otherwise, the permittee shall submit all pertinent physical documents to:

Attention: Whole Effluent Toxicity Coordinator
Compliance Program
Water and Science Administration
Maryland Department of the Environment
1800 Washington Blvd., Suite 420
Baltimore, MD 21230-1708

The permittee is advised to notify the Department at the above address immediately upon electronic submission of reports through NetDMR tool.

II. SPECIAL CONDITIONS

E. Toxicity Reduction Evaluation

The permittee shall conduct a Toxicity Reduction Evaluation (TRE) when a review of toxicity test data by the Department indicates unacceptable acute or chronic effluent toxicity. A TRE is an investigation conducted to identify the causative agents of effluent toxicity, isolate the source(s), determine the effectiveness of control options, implement the necessary control measures and then confirm the reduction in toxicity.

1. Within 90 days of notification by the Department that a TRE is required, the permittee shall submit for approval by the Department a plan of study, schedule and completion date for conducting a TRE. The permittee shall conduct the TRE study consistent with the submitted plan and schedule.
2. This plan shall follow the framework presented in Toxicity Reduction Evaluation Guidance for Municipal Wastewater Treatment Plants (EPA/833B-99/002) August 1999.

Additional Guidance documents on the TRE process are shown below:

- Methods for Aquatic Toxicity Identification Evaluations Phase I Toxicity Characterization Procedures Second Edition United States Environmental Protection Agency Office of Research and Development, Washington, DC 20460, EPA/600/6-91/003 February 1991
- Methods for Aquatic Toxicity Identification Evaluations Phase II Toxicity Identification Procedures for Samples Exhibiting Acute and Chronic Toxicity, United States Environmental Protection Agency Office of Research and Development, Washington DC 20460, EPA/600/R-92/080 September 1993
- Methods for Aquatic Toxicity Identification Evaluations Phase III Toxicity Confirmation Procedures for Samples Exhibiting Acute and Chronic Toxicity, United States Environmental Protection Agency Office of Research and Development, Washington DC 20460, EPA /600/R-92/081 September 1993
- Clarifications Regarding Toxicity Reduction and Identification Evaluations in the National Pollutant Discharge Elimination System Program, March 27, 2001, U.S. Environmental Protection Agency, Office of Wastewater Management, Office of Regulatory Enforcement, Washington, DC 20460

II. SPECIAL CONDITIONS

3. Beginning 60 days from the date of the Department's acceptance of the TRE study plan and every 60 days thereafter, the permittee shall submit progress reports including all relevant test data to the Department. This shall continue until completion of the toxicity reduction confirmation.
4. Within 60 days of completion of the toxicity identification or the source identification phase of the TRE, the permittee shall submit to the Department a plan, schedule and completion date for implementing those measures necessary to eliminate acute toxicity, an LC₅₀ greater than 100%, and/or eliminate chronic toxicity, an IC₂₅ greater than the in-stream waste concentration (IWC). The implementation of these measures shall begin immediately upon submission of this plan.
5. Within 60 days of completing the implementation of the control measures to eliminate or reduce toxicity, the permittee shall submit to the Department for approval a study plan to confirm the elimination or reduction of toxicity by using biomonitoring.
6. If, for any reason, the implemented measures do not result in compliance with the Department's toxicity limitations, the permittee shall continue the TRE and a Whole Effluent Toxicity (WET) permit limit and a compliance schedule will be required.
7. All the TRE-related materials shall be submitted electronically to the Department if the permittee has already been approved for the NetDMR tool. Otherwise, the permittee shall submit all pertinent physical documents to:

Attention: Whole Effluent Toxicity Coordinator
Compliance Program
Water and Science Administration
Maryland Department of the Environment
1800 Washington Blvd., Suite 420
Baltimore, MD 21230-1708

The permittee is advised to notify the Department at the above address or via email at mde.biomonitoring@maryland.gov immediately upon electronic submission of reports through NetDMR tool.

II. SPECIAL CONDITIONS

F. Toxic Chemical Testing

1. Concurrent with the biomonitoring study plan, the permittee shall submit to the Department for approval, a study plan to perform analytical testing for toxic chemicals.
2. The toxic chemical testing study plan shall include a description of:
 - a. sampling methods;
 - b. analytical methods;
 - c. practical detection levels; and
 - d. quality control procedures.
3. Concurrently with the first biomonitoring toxicity test (Special Condition II.D.2), during the first four years of the permit cycle, the permittee shall perform analytical testing for the toxic chemicals identified in the Department's "Toxic Pollutant Monitoring Protocol and Reporting Requirements for Toxic Chemical Testing Analytical Data" (05/18/2011).
4. Toxic chemical testing shall be performed in accordance with 40 CFR Part 136 and the Department-approved toxic chemical testing plan. Also after completion and beginning operation of the ENR upgrades at the Back River WWTP, when analyzing effluent samples for Total Polychlorinated Biphenyls (total PCBs) using Method 1668 A or C, the total PCBs concentration is the summation of all individually measured congeners; and both the individual congeners and the total PCBs concentrations shall be reported. Grab samples must be used for cyanide, phenols, and volatile organic compounds. All other pollutants shall be collected using 24-hour flow-proportioned composite samples unless the Department has given prior approval of an alternative sampling type.
5. Substances other than those identified in Section 3 above may be detected in the effluent. If so, the permittee shall identify and quantify the ten present in highest concentration for those compounds for which standards are available.
6. Results of each toxic chemical test performed as per Sections II.F.3 and II.F.4 shall be submitted to the Department with results of the concurrent biomonitoring toxicity test.
7. Toxic chemical testing results shall be reported in accordance with the Department's "Toxic Pollutant Monitoring Protocol and Reporting Requirements for Toxic Chemical Testing Analytical Data" (05/18/2011).

II. SPECIAL CONDITIONS

8. If testing is not performed in accordance with the Department's approved study plan, additional testing may be required by the Department.
9. All the toxic chemical testing results and related materials shall be submitted electronically to the Department if the permittee has already been approved for the NetDMR tool. Otherwise, the permittee shall submit all pertinent physical documents to:

Attention: Toxic Chemical Testing Coordinator
Compliance Program
Water and Science Administration
Maryland Department of the Environment
Montgomery Park Business Center
1800 Washington Boulevard, STE 420
Baltimore, MD. 21230-1708

The permittee is advised to notify the Department at the above address or via email at mde.biomonitoring@maryland.gov immediately upon electronic submission of reports through NetDMR tool.

G. Pretreatment Program

The permittee shall operate and maintain the pretreatment program in accordance with COMAR 26.08.08, the General Pretreatment Regulations for Existing and New Sources of Pollution (40 CFR Part 403) and the approved pretreatment program submission as approved on August 7, 1985 by the Department. The program must be updated if needed to comply with COMAR 26.08.08 or 40 CFR Part 403 or modifications to the State of Maryland Publicly Owned Treatment Works (POTW) Pretreatment Delegation Agreement signed on March 18, 2002. The terms of the POTW Pretreatment Delegation Agreement are expressly incorporated herein as if set forth in full.

H. Protection of Water Quality

It is a violation of this permit to discharge any substance not otherwise listed under the permit's "Effluent Limitations and Monitoring Requirements" special conditions at a level which would cause or contribute to any exceedance of the numerical water quality standards in COMAR 26.08.02.03 unless the level and the substance were disclosed in writing in the permit application prior to the issuance of the permit. If a discharge regulated by this permit causes or contributes to an exceedance of the water quality standards in COMAR 26.08.02.03, including but not limited to the general water quality standards, or if the discharge includes a pollutant that was not disclosed or addressed in the public record for the permit determination, the Department is authorized to modify, suspend or revoke this permit or take enforcement action to address unlawful discharges of pollutants.

II. SPECIAL CONDITIONS

I. Reapplication for a Permit

No later than 18 months before the expiration date of this permit, unless permission for a later date has been granted by the Department, the permittee shall submit a new application for a permit or notify the Department of the intent to cease discharging by the expiration date. In the event that a timely and complete reapplication has been submitted and the Department is unable, through no fault of the permittee, to issue a new permit before the expiration date of this permit, the terms and conditions of this permit continue and remain fully effective and enforceable. The renewal application is required by that date in accordance with the requirements of MDE's Watershed Permitting Plan under which all discharge permits in a watershed should be issued in the same year.

J. Wastewater Discharges to Groundwater

This permit does not authorize the permittee to discharge any type or quantity of the wastewater to the groundwater of the State. The permittee must make every effort to prevent any type of leakage or discharges to the groundwater system from the wastewater treatment lagoon(s) and/or other conveyance system.

K. Reporting Nutrient Total Annual Loads to Comply with Concentration-based Annual Loading Rate Limits

The Permittee shall report the concentration-based (also known as Floating Cap) annual loading requirements for TN and TP on the December DMR designated "001-Z". The permittee shall submit to the Department the Discharge Monitoring Report for the month of December with this designation. For each calendar year, the permittee shall calculate the annual concentration-based loads for TN and TP as per the footnote- 6 of the Special Condition II.A, and report these loadings along with the total annual cumulative flow on the December month DMR in accordance with the General Condition III.A.2.a of this discharge permit. If the Back River WWTP discharges effluent at more than a single outfall, the total annual loads for TN, TP and total annual discharge flow shall be reported as a sum of the individual results from each outfall.

L. Combined Sewer Overflows (CSOs)

There are no known combined sewer overflows in the Back River wastewater collection system service areas at the time of issuance of this permit (last CSO Point Source # 013P, Forest Park area in Baltimore City area was eliminated on June 20, 2006). However, since parts of the Baltimore City's collection system are old and the system serves an urban area, there may be secluded and hidden CSOs, which are not known at this time. In order to address this potential, the following CSO reopener clause will apply to any CSO that subsequently comes to the knowledge of the Department. If a CSO is identified in the collection system contributing to this facility, this permit may be reopened to incorporate the CSO requirements developed in accordance with the National Combined Sewer Overflow Strategy promulgated in October 8, 2001 by the EPA.

III. GENERAL CONDITIONS

A. Monitoring and Reporting

1. Representative Sampling

Samples and measurements shall be taken at times that are representative of the quantity and quality of the discharge, and at evenly spaced intervals.

2. Monthly Monitoring Results

a. Discharge Monitoring Reports

Monitoring results obtained during each calendar month shall be summarized and submitted electronically using the NetDMR tool. Results shall be submitted to the Department via NetDMR no later than the 28th of the month following the end of the reporting month.

b. Monthly Operating Reports (MORs)

The permittee shall submit monthly operating reports on a form acceptable to the Compliance Program. For each calendar month, the permittee shall submit to the Department a signed original of the MOR as an attachment to Copy of Record (COR) via NetDMR in electronic format concurrently with the Discharge Monitoring Report submission postmarked no later than the 28th day of the month following the reporting month.

c. Toxic Chemical Reporting

Any data collected according to the Department's "Toxic Pollutant Monitoring Protocol and Reporting Requirements for Toxic Chemical Testing Analytical Data" (05/18/2011) being submitted to the Department, either in fulfillment of Special Conditions II.B or pursuant to the toxic chemical testing requirement, pretreatment requirements or toxic metals or organic data collected on a voluntary basis, must be accompanied by laboratory data reports. At a minimum, these reports shall include, the name of the facility, the date(s) of sampling, beginning and ending sample time,

III. GENERAL CONDITIONS

c. Toxic Chemical Reporting, continued

place of sampling collection, the sample type (grab, composite, etc.), the sample description (influent or effluent), the preservation method, the analytical method used for each parameter, the analytical method detection limit, the date of analysis, the name of person performing the analysis, the analytical result, and the name and address of the laboratory performing the analyses. Chain-of-custody forms shall also be submitted.

If the permittee prefers to submit hard copy of this information along with the supporting documentations instead of the electronic submission using NetDMR tool, they shall be submitted to:

Attention: Toxic Chemical Data
WSA – Compliance Program
Maryland Department of the Environment
1800 Washington Boulevard, STE 420
Baltimore, Maryland 21230-1708

3. Sampling and Analysis Methods

Analytical and sampling methods shall conform to test procedures for the analysis of pollutants as identified in 40 CFR Part 136 - "Guidelines Establishing Test Procedures for the Analysis of Pollutants."

4. Analytical Laboratory

Within 30 days after the effective date of this permit, the permittee shall submit to the Department the name and address of the analytical laboratory (including the permittee's own laboratory) which is used to perform the monitoring required by this permit.

If the laboratory changes during the effective period of this permit, the permittee shall notify the Department of the new laboratory within 30 days after the change.

III. GENERAL CONDITIONS

5. Monitoring Equipment Maintenance

- a. The permittee shall calibrate and maintain all monitoring and analytical instrumentation to ensure accuracy of measurements.
- b. Environment Article, Section 9-343 provides that any person who falsifies, tampers with, or knowingly renders inaccurate, any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than \$10,000 per violation, or by imprisonment for not more than six months per violation, or by both.

6. Recording of Results

For each measurement or sample taken pursuant to the requirements of the permit, the permittee shall record the following information:

- a. the date, exact place and time of sampling or measurement;
- b. the person(s) who performed the sampling or measurement;
- c. the dates analyses were performed;
- d. the person(s) who performed each analysis;
- e. the analytical techniques or methods used; and
- f. the results of such analyses.

7. Additional Monitoring by Permittee

If the permittee monitors any pollutant at the location(s) designated herein more frequently than required by this permit, using approved analytical methods as specified above, the results of such monitoring shall be included in the calculation and reporting of the values required in the Discharge Monitoring Report. The increased frequency shall also be reported. The results of any other monitoring performed by the permittee shall be made available to the Department upon request.

8. Record Retention

All data used to complete the permit application and all records and information resulting from the monitoring activities required by this permit, including all records of sampling and analyses performed, calibration and maintenance of instrumentation, and recordings from continuous monitoring instruments, shall be retained for a minimum of three years. This period shall be extended automatically during the course of litigation or when requested by the Department.

III. GENERAL CONDITIONS

B. General Requirements

1. Permit Noncompliance - Notification Requirements

All discharges authorized herein shall be consistent with the terms and conditions of this permit. If, for any reason, the permittee does not comply with or will be unable to comply with any permit condition, the permittee shall, within 24 hours, notify the Department by telephone at (410) 537-3510 during work hours or at (866) 633-4686 during evenings, weekends, and holidays. The permittee shall provide the Department with the following information in writing within five days of such oral notification.

- a. a description of the noncomplying discharge including the name of the stream and the impact upon the receiving waters;
- b. cause of noncompliance;
- c. the duration of the period of noncompliance and the anticipated time the condition of noncompliance is expected to continue;
- d. steps taken by the permittee to reduce and eliminate the noncomplying discharge;
- e. steps to be taken by the permittee to prevent recurrence of the condition of noncompliance;
- f. a description of the accelerated or additional monitoring to determine the nature and impact of the noncomplying discharge; and
- g. the results of the monitoring described in f. above.

2. Change in Discharge

The permittee shall report any anticipated facility expansions, production increases, or process modifications which will result in new, different or an increased discharge of pollutants by submitting a new application at least 180 days prior to the commencement of the changed discharge except that if the change only affects a listed pollutant and will not violate the effluent limitations specified in this permit, by providing written notice to the Department. Following such notice, the permit may be modified by the Department to include new effluent limitations on those pollutants.

III. GENERAL CONDITIONS

3. Facility Operation and Quality Control

All waste collection, control, treatment and disposal facilities shall be operated in a manner consistent with the following:

- a. Facilities shall be operated efficiently to minimize upsets and discharges of excessive pollutants.
- b. The permittee shall provide an adequate operating staff qualified to carry out operation, maintenance and testing functions required to ensure compliance with this permit. Superintendents and operators must be certified by the Board of Waterworks and Waste Systems Operators located at Montgomery Park Business Center, 1800 Washington Boulevard, STE- 410, Baltimore, Maryland 21230 in accordance with Title 12 of Environmental Article, Annotated Code of Maryland, and Section 26.06.01 of the COMAR.
- c. Facility maintenance work, which adversely affects or may adversely affect the discharge quality, shall be scheduled during non-critical water quality periods.

4. Adverse Impact

The permittee shall take all reasonable steps to minimize any adverse impact to waters of this State, human health or the environment resulting from noncompliance with any effluent limitations specified in this permit, and must perform accelerated or additional monitoring as necessary to determine the nature and impact of the noncomplying discharge.

5. Bypassing

Any bypass of treatment facilities is prohibited unless the bypass does not cause any violations of the effluent limitations specified in Special Condition II.A, and is for essential maintenance to assure efficient operation, or unless the permittee can prove that:

- a. the bypass is unavoidable to prevent loss of life, personal injury, or substantial physical damage to property, damage to the treatment facilities which would cause them to become inoperable, or substantial and permanent loss of natural resources; and
- b. there are no feasible alternatives to the bypass; and

III. GENERAL CONDITIONS

- c. the Department receives notification pursuant to General Condition III.B.1 above. Where the need for a bypass is known (or should have been known) in advance, this notification shall be submitted to the Department for approval at least ten days before the date of the bypass or at the earliest possible date if the period of advance knowledge is less than ten days; and
- d. the bypass is allowed under conditions approved by the Department to be necessary to minimize adverse effects.

6. Conditions Necessary for Demonstration of Upset

An upset shall constitute an affirmative defense to an action brought for noncompliance with technology-based effluent limitations only if the permittee demonstrates, through properly signed, contemporaneous operating logs, or other relevant evidence, that:

- a. an upset occurred and that the permittee can identify the specific cause(s) of the upset;
- b. the permitted facility was at the time being operated in a prudent and workman-like manner and in compliance with proper operation and maintenance procedures;
- c. the permittee submitted a 24-hour notification of upset in accordance with the reporting requirements of General Condition III.B.1 above;
- d. the permittee submitted, within five calendar days of becoming aware of the upset, documentation to support and justify the upset; and
- e. the permittee complied with any remedial measures required to minimize adverse impact.

In any enforcement proceeding, the permittee seeking to establish the occurrence of an upset has the burden of proof.

7. Sewage Sludge Requirements

The permittee shall comply with all State and federal laws and regulations regarding Sewage Sludge Management, and with any regulations promulgated pursuant to Environment Article, Section 9-230 et seq. or to the Clean Water Act, Section 405 (d). A Sewage Sludge Utilization Permit is required for the collection, handling, burning, storage, treatment, land application, disposal, or transportation of sewage sludge, processed sewage sludge, or any product containing these materials in Maryland. If the sludge is hauled out of the State for disposal, a transportation permit must be obtained from the Department.

III. GENERAL CONDITIONS

8. Power Failure

The permittee shall maintain compliance with the effluent limitations and all other terms and conditions of this permit in the event of a reduction, loss or failure of the primary source of power to the wastewater collection and treatment facilities.

9. Right of Entry

In accordance with 40 CFR §122.41(i), the permittee shall allow the Secretary of the Department, the Regional Administrator of the Environmental Protection Agency, and their authorized representatives (including an authorized contractor acting as a representative), upon presentation of credentials and other documents as required by the law, to:

- a. Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;
- b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;
- c. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and
- d. Sample or monitor at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the Clean Water Act, any substances or parameters at any location.

10. Property Rights/Compliance with Other Requirements

The issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property, invasion of personal rights, or any infringement of federal, State or local laws or regulations.

11. Reports and Information

- a. Upon request, the permittee shall provide to the Department, within a reasonable time, copies of records required to be kept by this permit. The permittee shall also furnish to the Department, within a reasonable time, any information which the Department may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit; or to determine compliance with this permit.
- b. All applications, reports or information submitted to the Department shall be signed and certified as required by COMAR 26.08.04.01 and 40 CFR 122.22.

III. GENERAL CONDITIONS

- c. Except for data determined to be confidential under COMAR 26.08.04.01, all data shall be available for public inspection at the Department and the Office of the Regional Administrator of the Environmental Protection Agency. Effluent data shall not be considered confidential.
- d. Environment Article, Section 9-343 provides that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or noncompliance, shall upon conviction be punished by a fine of not more than \$10,000 or by imprisonment for not more than six months or by both.

12. Transfer of Ownership or Control

In the event of any change in ownership or control of facilities from which the authorized discharge emanates, the permit may be transferred automatically to another person only if:

- a. the current permittee notify the Department, in writing, of the proposed transfer at least 30 days prior to the proposed transfer date;
- b. the notice includes a written agreement between the existing permittee and a new permittee containing the specific date of proposed transfer of permit coverage, and of responsibilities and liabilities under the permit; and
- c. neither the current permittee nor the new permittee receive notification from the Department, within 30 days of the Department's receipt of the agreement, of its intent to modify, revoke, reissue or terminate the existing permit. If this notice is not received, the transfer is effective on the date specified in the agreement mentioned in paragraph 12(b) above.

13. New Effluent Standards

This permit shall be revoked and reissued or modified to meet any effluent standard, water quality standard or prohibition established under the Environment Article, the Clean Water Act, or regulations promulgated thereto, and the permittee shall be so notified.

III. GENERAL CONDITIONS

14. Industrial Users

The permittee shall require all industrial users of the wastewater treatment facility to comply with user charges as established by the permittee, pursuant to Section 9-326(a)(i) of the Environment Article.

15. Noncompliance

Nothing in this permit shall be construed to preclude the institution of any legal action for noncompliance with State, federal or local laws and regulations.

16. Oil and Hazardous Substance Liability

Nothing in this permit shall be construed to preclude the institution of any legal action against the permittee or to relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under Section 311 of the Clean Water Act or under the Environment Article.

17. Waterway Construction and Obstruction

The permit does not authorize the construction or placing of physical structures, facilities, debris, or the undertaking of related activities in any waters of this State including the 100 year flood plain.

18. Construction Permit

This permit is not a permit to construct. For a new facility, in order to make this permit valid, a construction permit shall be obtained to meet the requirements of COMAR 26.03.12.03(A) and Environment Article, Section 9-204(d).

19. Storm Water Pollution Prevention

- (a) The permittee shall maintain coverage under the "General Permit for Discharges from Storm Water Associated with Industrial Activities" in accordance with Part II A of the State NPDES Permit No. MDR0000, and
- (b) Industrial storm water is not authorized under this individual permit.

20. Severability

If any provision of this permit shall be held invalid for any reason, the remaining provisions shall remain in full force and effect, and such invalid provisions shall be considered severed and deleted from this permit.

III. GENERAL CONDITIONS

C. Wastewater Collection System

This permit shall not authorize discharges from the wastewater collection system for this facility.

1. Reporting Requirements

Pursuant to Environment Article Sub title 9-331.1, the permittee must report sanitary sewer overflows (SSOs) which result in the direct or potential discharge of raw or diluted sewage into the surface waters or ground waters of the State to the Water and Science Administration's Compliance Program. Concurrently, the permittee shall also notify the local health department. Such reports must be made via telephone as soon as practicable, but no later than 24 hours after the time that the permittee became aware of the event. Reportable SSOs include, but are not limited to, overflows into the surface of the ground, into waterways, storm drains, ditches or other manmade or natural drainage conveyances to surface or ground waters which are reasonably likely to reach waters of the State. Overflows that are wholly contained within buildings and not likely to discharge to waterways need not be reported. Treatment plant bypasses shall be reported under General Condition III.B.1. Telephone reports shall be made to (410) 537-3510 on weekdays between 8:00 a. m. and 5:00 p.m. After hours telephone notification shall be made to emergency response number at (866) 633-4686.

III. GENERAL CONDITIONS

C. 1. Reporting Requirements, Continued

When the incident is reported to the Department, the following information needs to be included:

- a. the location of the overflow, including city or county;
- b. the name of the receiving water, if applicable;
- c. an estimate of the volume of sewage discharged;
- d. a description of the sewer system or treatment plant component from which the overflow was released (such as manhole, crack in pipe, pumping station wet well or constructed overflow pipe);
- e. an estimate of the overflow's impact upon public health and to waters of the State;
- f. the cause or suspected cause of the overflow;
- g. the estimated date and time when the overflow began and stopped or the anticipated time the overflow is expected to continue;
- h. if known at the time of reporting, the steps taken or planned to reduce, eliminate and prevent reoccurrence of the overflow and a schedule of major milestones for those steps; (if unknown at the time the telephone report is made, the steps must be included in the written reports submitted under general conditions III.C.2).
- i. if known at the time of reporting, measures taken or planned to mitigate the adverse impact of the overflow and a schedule of major milestones for those steps (if unknown at the time the telephone report is made, the steps must be included in the written reports submitted under general conditions III.C.2); and
- j. whether there has already been a notification to the public and other City or County Agencies or Departments and how notification was done.

III. GENERAL CONDITIONS

C. 2. Written Reports

Within 5 calendar days following telephone notification of the event, the permittee shall provide MDE with a written report regarding the incident that includes, at a minimum, the information cited above. The permittee shall maintain copies of all overflow records and reports, work orders associated with investigation of overflows, a list and description of complaints from customers or others related to overflows (including backups of sewage in to houses or businesses), and documentation of performance and implementation measures for minimum period of three years and shall make this information available to MDE for review upon written request.

This wastewater collection system provision may be superseded by a general permit for collection systems, when such a permit is issued by MDE and the permittee have been accepted for registration under the permit.

3. Other Requirements

The permittee, as directed by the State or local health department, shall also be responsible for posting notification in close proximity to the affected area/stream and for conducting appropriate water quality sampling as deemed necessary.

D. Permit Expiration, Modification, or Revocation

1. Expiration of Permit

This permit and the authorization to discharge shall expire at midnight on the expiration date of the permit unless the permittee has submitted a timely and complete reapplication pursuant to Section III.I.

2. [Reserved.]

3. Permit Modification - Request of Responsible Permittee

A permit may be modified by the Department upon the written request of the permittee and after notice and opportunity for a public hearing in accordance with the provisions set forth in COMAR 26.08.04.10.

4. Permit Modification, Suspension, Revocation - Violation of Laws

A permit may also be modified, suspended or revoked by the Department, in the event of a violation of the terms or conditions of the permit, or of State or federal laws and regulations and in accordance with the provisions set forth in COMAR 26.08.04.10. This permit may be suspended or revoked upon a final, unreviewable determination that the permittee lacks, or is in violation of, any federal, state, or local approval necessary to conduct the activities authorized by this permit.

IV. CIVIL AND CRIMINAL PENALTIES

A. Civil Penalties for Violations of Permit Conditions

In addition to civil penalties for violations of State water pollution control laws set forth in Section 9-342 of the Environment Article, Annotated Code of Maryland, the Permittee shall be subject to civil penalty set forth in 33 U.S.C. § 1319 (d) of the Clean Water Act as adjusted for inflation according to 40 CFR, §19.4.

B. Criminal Penalties for Violations of Permit Conditions

In addition to criminal penalties for violations of State water pollution control laws set forth in Section 9-343 of the Environment Article, Annotated Code of Maryland, the Permittee shall be subject to criminal penalty set forth in 33 U.S.C. § 1319 (c).

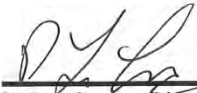
V. MAP SHOWING DISCHARGE POINT LOCATION



VI. NPDES PROGRAM

On September 5, 1974, the Administrator of the U.S. Environmental Protection Agency approved the proposal submitted by the State of Maryland for the operation of a permit program for wastewater discharges pursuant to Section 402 of the Clean Water Act.

Pursuant to the aforementioned approval, this discharge permit is both a State of Maryland discharge permit and an NPDES permit.



D. Lee Currey, Director
Water and Science Administration

Appendix C - Comprehensive Repair, Replacement, and Priority Lists

Comprehensive List of Repairs, Replacements, and Rehabilitations Needed at the Back River WWTP			
Process	Item to Repair/Replace/Rehab or known Capital Project currently in the CIP (include all ancillary components ie. motors, controls, pumps etc. in the next column) Note: When entering a capital project, skip the next column and note the planned year in the remarks column)	Description of the known items or component that need Repaired/Replaced/Rehabbed (Add as many lines as necessary	Remarks
CMMS	Installation of Cityworks	Asset management system	The asset inventory is being collected with City works expected sometime toward the end of FY 23. CIP
SCADA System			
	Computer System Upgrade		Contracted by the City
	SCADA integration throughout the plant	Replace all communication components that are not working, obsolete, and noncompatible.	
		Install a fiber backbone throughout the plant to provide reliable communication for the SCADA	
Headworks			
	Hydrogen Sulfide Scrubber 1 thru 4	Connect potable water to the scrubbers and start up	Potable Water Line is being installed by the City to make potable water available to the site. The potable water will need to be plumbed to the scrubbers.
	Grit Blower 3 and 4	Need to be repaired.	Potential warranty items.
Primary Settling Tanks			
	Primary Settling Tanks 1	Rehab entire unit	City has this contracted
	Primary Settling Tanks 2	Center Drive, rake and skimmer	Valves, pumps, electrical upgrades, communication 20 % contingency MES Contract City to clean out digester
		Repair Rakes	
		Repair Scum Trough	
		Repair drain valve	
	Primary Settling Tanks 3	Rehab entire unit	SC 954 City Contract
	Primary Settling Tanks 4	Rehab entire unit	SC 954 City Contract
	Primary Settling Tanks 5	Rehab entire unit	City has this contracted
	Primary Settling Tanks 6	Rehab entire unit	
	Primary Settling Tanks 7	Center Drive, rake and skimmer	Valves, pumps, electrical upgrades, communication 20 % contingency MES Contract
		Rakes	
		Scum Trough	
		Repair drain valve	
	Primary Settling Tanks 9	Rehab entire unit	being cleaned by the City to assess damages
	Primary Settling Tanks 10	Rehab entire unit	being cleaned by the City to assess damages

Activated Sludge 2			
	All DO probes on all reactors	All probes need to be repaired or overhauled. Wiring may need to be replaced also.	MES obtained quote for repairs/replacements from Kershner Env. Technologies.
Activated Sludge Reactor 5			
	Mixer 2	Replace or Rehab Entire Unit	
Activated Sludge Reactor 6			
	Mixer 6	Replace or Rehab Entire Unit	
	Mixer 7	Replace or Rehab Entire Unit	
Activated Sludge Reactor 7			
	Mixer 2	Replace or Rehab Entire Unit	
	Mixer 3	Replace or Rehab Entire Unit	
Activated Sludge Reactor 8			
	Mixer 3	Replace or Rehab Entire Unit	
	Mixer 4	Replace or Rehab Entire Unit	
	Mixer 5	Replace or Rehab Entire Unit	
Activated Sludge Reactor 9			
	Mixer 1	Replace or Rehab Entire Unit	
	Mixer 2	Replace or Rehab Entire Unit	
	Mixer 3	Replace or Rehab Entire Unit	
	Mixer 4	Replace or Rehab Entire Unit	
	Mixer 5	Replace or Rehab Entire Unit	
	Mixer 6	Replace or Rehab Entire Unit	
	Mixer 7	Replace or Rehab Entire Unit	
Activated Sludge Reactor 10			
	Mixer 4	Replace or Rehab Entire Unit	
	Mixer 5	Replace or Rehab Entire Unit	
	Mixer 6	Replace or Rehab Entire Unit	
	Centrifugal Blower 1	Replace or Rehab Entire Unit	
	Centrifugal Blower 2	Replace or Rehab Entire Unit	
	Secondary Clarifier 10B	Replace or Rehab Entire Unit	
Pump Station #1			
	RAS Pump 5 A/B	Replace or Rehab Entire Unit	
	RAS Pump 5 A/B	Replace or Rehab Entire Unit	
	RAS Pump 5 B	Replace or Rehab Entire Unit	
	RAS Pump 6 A	Replace or Rehab Entire Unit	
	RAS Pump 6 A/B	Replace or Rehab Entire Unit	
	RAS Pump 6 B	Replace or Rehab Entire Unit	
	RAS Pump 7 A	Replace or Rehab Entire Unit	
Pump Station #2			
	RAS Pump 8 A	Repair Unit	
	RAS Pump 8 A/B	Repair Unit	
	RAS Pump 8 B	Repair Unit	
	RAS Pump 9 A	Repair Unit	
	RAS Pump 9 A/B	Repair Unit	
	RAS Pump 9 B	Repair Unit	
	RAS Pump 10 A	Repair Unit	
	RAS Pump 10 A/B	Repair Unit	
	RAS Pump 10 B	Repair Unit	
	WAS Pump 8	Repair Unit	
	WAS Pump 8/9	Repair Unit	
	WAS Pump 9/10	Repair Unit	
	WAS Pump 10	Repair Unit	

Activated Sludge 3			
	All DO probes on all reactors	All probes need to be repaired or overhauled. Wiring may need to be replaced also.	MES obtained quote for repairs/replacements from Kershner Env. Technologies.
	City to remove AS3 from service for Rehab	Total Rehab of the process	CIP
Denitrification Filters			
Filter Set 3	Controls	Replace Controls wiring	
		Repair Controls	
Sand Filters	All sand filters	Rehab of entire system is needed- This rehab will make all sand filters fully functional.	CIP being further evaluated by the City to determine need in the treatment train

Disinfection			
	Flushing Water Pump 1	Repair or replace unit	
	Outfall 002 Pump 5	Repair or replace unit	
Gravity Belt Thickener			
	Gravity Belt Thickener 2	Total Rehab	
	Gravity Belt Thickener 3	Total Rehab	
	Gravity Belt Thickener 4	Total Rehab	
	Gravity Belt Thickener 7	Total Rehab	
	WAS pump 1	Mechanical Seals to be installed	Seals on order by MES
	WAS pump 2	Mechanical Seals to be installed	Seals on order by MES
	WAS pump 4	Mechanical Seals to be installed	Seals on order by MES
	WAS pump 5	Mechanical Seals to be installed	Seals on order by MES
	Polymer Pump 2 A	Repair or replace unit	
	Polymer Pump 2 B	Repair or replace unit	
	Polymer Pump 7 B	Repair or replace unit	
	Polymer Pump 8 A	Repair or replace unit	
	Polymer Pump 8 B	Repair or replace unit	
	Velodyne Poly Recirc Pump 1	Repair or replace unit	
	Velodyne Poly Recirc Pump 2	Repair or replace unit	
	Velodyne Poly Recirc Pump 3	Repair or replace unit	
	Updated Controllers / GBT Building	Repair or replace unit	
	Sludge Thickener Pump 6B	Repair or replace unit	
Gravity Sludge Thickeners (GSTs)			
	GST # 1	Rehab entire unit	
	GST # 3	Rehab entire unit	
	GST # 5	Rehab entire unit	
	GST # 6	Rehab entire unit	
	GST # 7	Rehab entire unit	
	GST # 8	Rehab entire unit	
	Holding Tank #2 (Blend Tank) Pump	VFD need rehab or replacement	
	Holding Tank #4 (Blend Tank) Pump	VFD need rehab or replacement	
Sludge Cleaners (Strain Presses)			
	Sludge Cleaners (Strain Presses)	Original installation was inadequate. Review application with the manufacturer and upgrade as necessary	
Dissolved Air Floatation (DAF)			
	DAF 2	Repair Unit	
	Thickening Sludge Pump 2	Repair or replace unit	
	DAF 3	Rehab entire process to include storage	CIP
	DAF 4	Rehab entire process to include storage	CIP
Sludge Cleaners (Strain Presses)	Sludge Cleaners (Strain Presses)	Replace All Units	
Anaerobic Digester			
	In-ground Hi Rate Anaerobic Digester #1	Clean and Rehab	MES contract
		Mixing Compressor replacement	MES Contract
	In-ground Hi Rate Anaerobic Digester #2	Clean and Rehab	CIP
	In-ground Hi Rate Anaerobic Digester #3	Clean and Rehab	CIP
	In-ground Hi Rate Anaerobic Digester #4	Clean and Rehab	MES contract
		Mixing Compressor replacement	MES Contract
	In-ground Hi Rate Anaerobic Digester #5	Clean and Rehab	CIP
	In-ground Hi Rate Anaerobic Digester #6	Clean and Rehab	CIP
	Sludge Thickener Pump 7	Repair Unit	
	Sludge Holding Tank #2 Pump	Repair Unit	
	Sludge Holding Tank #4 Pump	Repair Unit	

Acid Phase Reactor (APR)		Complete Rehab of Acid Phas Digesters 7 & 8	
	Gas Compressors	Repair Unit	
	Recirc Pump # 1	Repair Unit	
	Recirc Pump # 2	Repair Unit	
	APR Effluent Pump # 1	Repair Unit	
	APR Effluent Pump # 2	Repair Unit	
	APR Effluent Pump # 3	Repair Unit	
	APR Recirculation Pump # 1	Repair Unit	
	APR Recirculation Pump # 2	Repair Unit	
	APR Recirculation Pump # 3	Repair Unit	
	Isolation valve - feed from APR to ESDs	Repair Unit	
	Steam injector #1	Repair Unit	
	Steam injector #2	Repair Unit	
Egg Shaped Digesters (ESDs)		Complete Rehab of Egg Shape Digesters 7 & 8	Bid for rehab due in June 22 under CIP
Sludge Dewatering			
	Centrifuge 3	Controls need replaced	Motor was delivered waiting on control company to come in and install controls and provide start up.
	Centrifuge 4	Manufacturer is repairing this centrifuge	Scheduled return is August 2022
	Centrifuge Feed Pump 4A	Repair Unit	
	Centrifuge Feed Pump 4B	Repair Unit	
Synagro	Provide adequate clean water to run continuously at maximum capacity.	Install potable water line to provide water necessary to continue operations without interruptions	
	Provide feed sludge per specification	City needs to concentrate on meeting speciation for total solids and volatile solids content	

Priority List

Not Functional/Repairing
Partially functional
Fully Functional

Hand

Auto

OOS

Unknown at this time or Blank

Note: Repairs are underway and this document is a living document that will be updated regularly.

Process	Asset	Operational Status	Automation Status	Repair Status and Notes
SCADA System	SCADA	Partly Functional		Being upgraded/needs integrated/Communication issues
Headworks				
	Course Screen 1	Fully Functional	Auto	Pro Start/City O&M
	Course Screen 2	Fully Functional	Auto	Pro Start/City O&M
	Course Screen 3	Fully Functional	Auto	Pro Start/City O&M
	Course Screen 4	Fully Functional	Auto	Pro Start/City O&M
	Deep Wet Well 1	Fully Functional	Auto	Pro Start/City O&M
	Deep Wet Well 2	Fully Functional	Auto	Pro Start/City O&M
	Influent Pump 1 to Fine Screen	Fully Functional	Auto	Pro Start/City O&M
	Influent Pump 2 to Fine Screen	Fully Functional	Auto	Pro Start/City O&M
	Influent Pump 3 to Fine Screen	Fully Functional	Auto	Pro Start/City O&M
	Influent Pump 4 to Fine Screen	Fully Functional	Auto	Pro Start/City O&M
	Influent Pump 1 to EQ tank or Fine Screen	Fully Functional	Auto	Pro Start/City O&M
	Influent Pump 2 to EQ tank or Fine Screen	Fully Functional	Auto	Pro Start/City O&M
	Influent Pump 3 to EQ tank or Fine Screen	Fully Functional	Auto	Pro Start/City O&M
	Influent Pump 4 to EQ tank or Fine Screen	Fully Functional	Auto	Pro Start/City O&M
	Influent Pump Seal Water System	Fully Functional	Auto	Pro Start/City O&M
	Influent Pump Flushing Water System	Fully Functional	Auto	Pro Start/City O&M
	EQ tank 1	Fully Functional	Auto	Pro Start/City O&M
	EQ tank 2	Fully Functional	Auto	Pro Start/City O&M
	Fine Screen 1	Fully Functional	Auto	Pro Start/City O&M
	Fine Screen 2	Fully Functional	Auto	Pro Start/City O&M
	Fine Screen 3	Fully Functional	Auto	Pro Start/City O&M
	Fine Screen 4	Fully Functional	Auto	Pro Start/City O&M
	Fine Screen Flushing Water System	Fully Functional	Auto	Pro Start/City O&M
	Hydrogen Sulfide Scrubber 1	Not Functional	Auto	Only the fans are running there is not process or potable water to feed the scrubber
	Hydrogen Sulfide Scrubber 2	Not Functional	Auto	Only the fans are running there is not process or potable water to feed the scrubber
	Hydrogen Sulfide Scrubber 3	Not Functional	Auto	Only the fans are running there is not process or potable water to feed the scrubber
	Hydrogen Sulfide Scrubber 4	Not Functional	Auto	Only the fans are running there is not process or potable water to feed the scrubber
	South Grit Chamber 1	Fully Functional	Auto	Pro Start/City O&M
	Traveling Bridge (Vertical Pump) 1	Fully Functional	Auto	Pro Start/City O&M
	Vertical Pump 1	Fully Functional	Auto	Pro Start/City O&M
	Horizontal Pump 1	Fully Functional	Auto	Pro Start/City O&M
	Grit Classifier 1	Fully Functional	Auto	Pro Start/City O&M
	South Grit Chamber 2	Fully Functional	Auto	Pro Start/City O&M
	Traveling Bridge (Vertical Pump) 2	Fully Functional	Auto	Pro Start/City O&M
	Vertical Pump 2	Fully Functional	Auto	Pro Start/City O&M
	Horizontal Pump 2	Fully Functional	Auto	Pro Start/City O&M
	Grit Classifier 2	Fully Functional	Auto	Pro Start/City O&M
	South Grit Chamber 3	Fully Functional	Auto	Pro Start/City O&M
	Traveling Bridge (Vertical Pump) 3	Fully Functional	Auto	Pro Start/City O&M
	Vertical Pump 3	Fully Functional	Auto	Pro Start/City O&M
	Horizontal Pump 3	Fully Functional	Auto	Pro Start/City O&M
	Grit Classifier 3	Fully Functional	Auto	Pro Start/City O&M
	South Grit Chamber 4	Fully Functional	Auto	Pro Start/City O&M
	Traveling Bridge (Vertical Pump) 4	Fully Functional	Auto	Pro Start/City O&M
	Vertical Pump 4	Fully Functional	Auto	Pro Start/City O&M

	Horizontal Pump 4	Fully Functional	Auto	Pro Start/City O&M
	Grit Classifier 4	Fully Functional	Auto	Pro Start/City O&M
	North Grit Chamber 5	Fully Functional	Auto	Pro Start/City O&M
	Traveling Bridge (Vertical Pump) 5	Fully Functional	Auto	Pro Start/City O&M
	Vertical Pump 5	Fully Functional	Auto	Pro Start/City O&M
	Horizontal Pump 5	Fully Functional	Auto	Pro Start/City O&M
	Grit Classifier 5	Fully Functional	Auto	Pro Start/City O&M
	North Grit Chamber 6	Fully Functional	Auto	Pro Start/City O&M
	Traveling Bridge (Vertical Pump) 6	Fully Functional	Auto	Pro Start/City O&M
	Vertical Pump 6	Fully Functional	Auto	Pro Start/City O&M
	Horizontal Pump 6	Fully Functional	Auto	Pro Start/City O&M
	Grit Classifier 6	Fully Functional	Auto	Pro Start/City O&M
	North Grit Chamber 7	Fully Functional	Auto	Pro Start/City O&M
	Traveling Bridge (Vertical Pump) 7	Fully Functional	Auto	Pro Start/City O&M
	Vertical Pump 7	Fully Functional	Auto	Pro Start/City O&M
	Horizontal Pump 7	Fully Functional	Auto	Pro Start/City O&M
	Grit Classifier 7	Fully Functional	Auto	Pro Start/City O&M
	North Grit Chamber 8	Fully Functional	Auto	Pro Start/City O&M
	Traveling Bridge (Vertical Pump) 8	Fully Functional	Auto	Pro Start/City O&M
	Vertical Pump 8	Fully Functional	Auto	Pro Start/City O&M
	Horizontal Pump 8	Fully Functional	Auto	Pro Start/City O&M
	Grit Classifier 8	Fully Functional	Auto	Pro Start/City O&M
	Grit Blower 1	Fully Functional	Auto	Pro Start/City O&M
	Grit Blower 2	Fully Functional	Auto	Pro Start/City O&M
	Grit Blower 3	OOS	OOS	Pro Start/City O&M
	Grit Blower 4	OOS	OOS	Pro Start/City O&M
Primary Settling Tanks				
Critical to Compliance	Primary Settling Tanks 1	Not Functional		Ullman Schutte(City Contractor) to clean and assess.
	Primary Settling Tanks 2	Not Functional	OOS	MES to clean then Rehab. Rehab to be determined once tank has been cleaned. The repairs should take about 4-5 months.
	Primary Settling Tanks 3	Not Functional	OOS	Cleaned, rehab under way by the City
	Primary Settling Tanks 4	Not Functional	OOS	Cleaned, rehab under way by the City
	Primary Settling Tanks 5	Not Functional	OOS	Ullman Schutte(City Contractor) to clean and assess.
	Primary Settling Tanks 6	Not Functional	OOS	MES/Al obtaining quotes to clean, US access and rehab'
	Primary Settling Tanks 7	Not Functional	OOS	Heavy clean w/c to remove all solids executed week of 5/22; demo, measurements and engineering drawings will commence week of 5/9. The repairs are expected to take 4-5 months. One subcontractor, Roane, the MBE crane company.
	Primary Settling Tanks 8	Fully Functional		
	Primary Settling Tanks 9	OOS	OOS	Scraper arm broke 5-10-22 Betty Jacobs reported on 5-11 mid day meeting
	Primary Settling Tanks 10	Not Functional		Failed Drive and Mechanism (US perform rehab work - in progress); accumulating solids, clarifier needs to be drained. Being used as a flow through
	Primary Settling Tanks 11	Fully Functional		
Activated Sludge 2				
	Activated Sludge Reactor 5			Operated and Maintained by the City
	Mixer 1	Online		
	Mixer 2	Out of Service	OOS	
	Mixer 3	Online		
	Mixer 4	Online		
	Mixer 5	Online		
	Mixer 6	Online		
	Mixer 7	Online		
	Mixer 8	Online		
	Mixer 9	Online		

Activated Sludge Reactor 6				Operated and Maintained by the City
Mixer 1	Online			
Mixer 2	Online			
Mixer 3	Online			
Mixer 4	Online			
Mixer 5	Online			
Mixer 6	Out of Service	OOS		
Mixer 7	Out of Service	OOS		
Mixer 8	Online			
Mixer 9	Online			
Activated Sludge Reactor 7				Operated and Maintained by the City
Mixer 1	Online			
Mixer 2	Out of Service			
Mixer 3	Out of Service	OOS		
Mixer 4	Online			
Mixer 5	Online			
Mixer 6	Online			
Mixer 7	Online			
Mixer 8	Online			
Mixer 9	Online			
Activated Sludge Reactor 8				Operated and Maintained by the City
Mixer 1	Online			
Mixer 2	Online			
Mixer 3	Out of Service	OOS		
Mixer 4	Out of Service	OOS		
Mixer 5	Out of Service	OOS		
Mixer 6	Online			
Mixer 7	Online			
Mixer 8	Online			
Mixer 9	Online			
Activated Sludge Reactor 9				Operated and Maintained by the City
Mixer 2	Out of Service	OOS		
Mixer 3	Out of Service	OOS		
Mixer 4	Out of Service	OOS		
Mixer 5	Out of Service	OOS		
Mixer 6	Out of Service	OOS		
Mixer 7	Out of Service	OOS		
Mixer 8	Online			
Mixer 9	Online			
Activated Sludge Reactor 10				Operated and Maintained by the City
Mixer 1	Online			
Mixer 2	Online			
Mixer 3	Online			
Mixer 4	Out of Service	OOS		
Mixer 5	Out of Service	OOS		
Mixer 6	Out of Service	OOS		
Mixer 7	Online			
Mixer 8	Online			
Mixer 9	Online			
Centrifugal Blower 1	OOS	OOS		Operated and Maintained by the City
Centrifugal Blower 2	OOS	OOS		Operated and Maintained by the City

	Centrifugal Blower 3	Fully Functional	Hand	Operated and Maintained by the City
	Centrifugal Blower 4	Fully Functional	Hand	Operated and Maintained by the City
	Centrifugal Blower 5	Fully Functional	Hand	Operated and Maintained by the City
	Secondary Clarifier 5A			Operated and Maintained by the City
	Secondary Clarifier 5B			Operated and Maintained by the City
	Secondary Clarifier 6A			Operated and Maintained by the City
	Secondary Clarifier 6B			Operated and Maintained by the City
	Secondary Clarifier 7A			Operated and Maintained by the City
	Secondary Clarifier 7B			Operated and Maintained by the City
	Secondary Clarifier 8A			Operated and Maintained by the City
	Secondary Clarifier 8B			Operated and Maintained by the City
	Secondary Clarifier 9A			Operated and Maintained by the City
	Secondary Clarifier 9B			Operated and Maintained by the City
	Secondary Clarifier 10A			Operated and Maintained by the City
	Secondary Clarifier 10B	Out of Service		Operated and Maintained by the City - electrical issue
	Pump Station #1			Floor Drains Clogged
	RAS Pump 3 A/B	Offline - Not sure why	Unknown at this time	
	RAS Pump 3 A/B	Operational/with issues	Unknown at this time	Leaking water excessively
	RAS Pump 5 E	Offline - Not sure why	Unknown at this time	Leaking sludge from packing seal
	RAS Pump 6 A	Offline - Not sure why	Unknown at this time	
	RAS Pump 6 A/B	Operational/with issues	Unknown at this time	Leaking water excessively
	RAS Pump 6 B	Operational/with issues	Unknown at this time	Leaking water excessively
	RAS Pump 7 A	Offline - Not sure why	Unknown at this time	
	RAS Pump 7 A/B	Operating Normally	Unknown at this time	
	RAS Pump 7 B	Operating Normally	Unknown at this time	
	WAS Pump 5	Operating Normally	Unknown at this time	
	WAS Pump 5/6	Operating Normally	Unknown at this time	
	WAS Pump 6/7	Operating Normally	Unknown at this time	
	WAS Pump 7	Operating Normally - Off	Unknown at this time	
	Pump Station #2			Lighting issues and clogged floor drains
	RAS Pump 8 A	Operational/with issues	Unknown at this time	MES getting quote to convert from packing to mechanical seal. (STH) / Leaking sludge from packing seal - excessive vibration
	RAS Pump 8 A/B	Operational/with issues	Unknown at this time	MES getting quote to convert from packing to mechanical seal. (STH)
	RAS Pump 8 B	Operational/with issues	Unknown at this time	MES getting quote to convert from packing to mechanical seal. (STH)
	RAS Pump 9 A	Operational/with issues	Unknown at this time	MES getting quote to convert from packing to mechanical seal. (STH) / Leaking sludge from packing seal
	RAS Pump 9 A/B	Offline - Not sure why	Unknown at this time	MES getting quote to convert from packing to mechanical seal. (STH)
	RAS Pump 9 B	Operational/with issues	Unknown at this time	MES getting quote to convert from packing to mechanical seal. (STH)
	RAS Pump 10 A	Operational/with issues	Unknown at this time	MES getting quote to convert from packing to mechanical seal. (STH)
	RAS Pump 10 A/B	Offline - Not sure why	Unknown at this time	MES getting quote to convert from packing to mechanical seal. (STH)
	RAS Pump 10 B	Operational/with issues	Unknown at this time	MES getting quote to convert from packing to mechanical seal. (STH) / Offline - clarifier off line
	WAS Pump 8	Operating Normally		
	WAS Pump 8/9	Offline		
	WAS Pump 9/10	Offline		
	WAS Pump 10	Online		
Activated Sludge 3	Activated Sludge Reactor 11			Operated and Maintained by the City
	Mixer 1	Online		
	Mixer 2	Online		
	Mixer 3	Out of Service	OOS	
	Mixer 4	Online		
	Mixer 5	Out of Service	OOS	
	Mixer 6	Out of Service	OOS	

Mixer 7	Online		
Mixer 8	Online		
Mixer 9	Online		
Activated Sludge Reactor 12			Operated and Maintained by the City
Mixer 3	Online		
Mixer 2	Out of Service	OOS	
Mixer 3	Online		
Mixer 4	Out of Service	OOS	
Mixer 5	Online		
Mixer 6	Online		
Mixer 7	Out of Service	OOS	
Mixer 8	Out of Service	OOS	
Mixer 9	Online		
Activated Sludge Reactor 13			Operated and Maintained by the City
Mixer 1	Online		
Mixer 2	Online		
Mixer 3	Out of Service	OOS	
Mixer 4	Out of Service	OOS	
Mixer 5	Out of Service	OOS	
Mixer 6	Online		
Mixer 7	Online		
Mixer 8	Out of Service	OOS	
Mixer 9	Online		
Activated Sludge Reactor 14			Operated and Maintained by the City
Mixer 1	Online		
Mixer 2	Out of Service	OOS	
Mixer 3	Out of Service	OOS	
Mixer 4	Online		
Mixer 5	Online		
Mixer 6	Online		
Mixer 7	Online		
Mixer 8	Online		
Mixer 9	Online		
Activated Sludge Reactor 15			Operated and Maintained by the City
Mixer 1	Online		
Mixer 2	Online		
Mixer 3	Online		
Mixer 4	Online		
Mixer 5	Out of Service	OOS	
Mixer 6	Online		
Mixer 7	Out of Service	OOS	
Mixer 8	Out of Service	OOS	
Mixer 9	Online		
Activated Sludge Reactor 16			Operated and Maintained by the City
Mixer 1	Online		
Mixer 2	Online		
Mixer 3	Online		
Mixer 4	Online		
Mixer 5	Online		
Mixer 6	Online		
Mixer 7	Online		
Mixer 8	Online		

	Mixer 9	Online		
	Centrifugal Blower 1			Operated and Maintained by the City
	Centrifugal Blower 2			Operated and Maintained by the City
	Centrifugal Blower 3			Operated and Maintained by the City
	Centrifugal Blower 4			Operated and Maintained by the City
	Centrifugal Blower 5			Operated and Maintained by the City
	Centrifugal Blower 6			Operated and Maintained by the City
	Centrifugal Blower 7			Operated and Maintained by the City
	Pump Station #3			
	RAS Pump 11 A	Offline - Dont know why		
	RAS Pump 11 A/B	Online		
	RAS Pump 11 B	Online		Leaking Water Excessively
	RAS Pump 12 A	Online		Leaking Water
	RAS Pump 12 A/B	Online		
	RAS Pump 12 B	Out of Service	OOS	
	RAS Pump 13 A	Online		Leaking Water Excessively
	RAS Pump 13 A/B	Online		
	RAS Pump 13 B	Out of Service	OOS	
	WAS Pump 11-1	Online		
	WAS Pump 11-C	Offline		
	WAS Pump 12-1	Offline		
	WAS Pump 12-2	Offline		
	WAS Pump 13-1	Offline		
	WAS Pump 13-2	Online		
	Pump Station #4			
	RAS Pump 14 A	Online	OOS	
	RAS Pump 14 A, B	Offline	OOS	
	RAS Pump 14 B	Online	OOS	Leaking Water Excessively
	RAS Pump 15 A	Offline - Dont know why	OOS	
	RAS Pump 15 A/B	Online	OOS	
	RAS Pump 15 B	Online	OOS	Leaking Sludge from packing seal
	RAS Pump 16 A	Offline - Dont know why	OOS	
	RAS Pump 16 A/B	Online	OOS	Leaking Water Excessively
	RAS Pump 16 B	Offline	OOS	Clarifier is down
	WAS Pump 14-1	Online	OOS	Sounds like motor bearings may be bad
	WAS Pump 14-2	Offline	OOS	
	WAS Pump 15-1	Offline	OOS	
	WAS Pump 15-2	Offline	OOS	
	WAS Pump 16-1	Online	OOS	
	WAS Pump 16-2	Offline	OOS	
	Secondary Clarifier 11A			Operated and Maintained by the City
	Secondary Clarifier 11B			Operated and Maintained by the City
	Secondary Clarifier 12A			Operated and Maintained by the City
	Secondary Clarifier 12B			Operated and Maintained by the City
	Secondary Clarifier 13A			Operated and Maintained by the City
	Secondary Clarifier 13B			Operated and Maintained by the City
	Secondary Clarifier 14A			Operated and Maintained by the City
	Secondary Clarifier 14B			Operated and Maintained by the City
	Secondary Clarifier 15A			Operated and Maintained by the City
	Secondary Clarifier 15B			Operated and Maintained by the City
	Secondary Clarifier 16A			Operated and Maintained by the City
	Secondary Clarifier 16B	Out of Service	OOS	Operated and Maintained by the City - Valve issue with dewatering box

	Blower #3	Out of Service	OOS	
AS #4				Just came on line
Denitrification Filters				There are 52 filters are set up in 4 quads. BF provided info on the DF
Critical to Compliance	Denide Wet Well Influent Pump1	Online		Prostart and City
	Denide Wet Well Influent Pump2	Online		
	Denide Wet Well Influent Pump3	Online		
	Denide Wet Well Influent Pump4	Online		
	Denide Wet Well Influent Pump5	Online		
	Denide Wet Well Influent Pump6	Online		
	Denide Wet Well Influent Pump7	Online		
	Denide Wet Well Influent Pump8	Online		
	Denide Clarifier 1	Online		
	Denide Clarifier 2	Online		
	Denitrification Filter Set 1			
	Denide filter 1.1	Online		
	Denide filter 1.2	Online		
	Denide filter 1.3	Online		
	Denide filter 1.4	Online		
	Denide filter 1.5	Online		
	Denide filter 1.6	Online		
	Denide filter 1.7	Online		
	Denide filter 1.8	Online		
	Denide filter 1.9	Online		
	Denide filter 1.10	Online		
	Denide filter 1.11	Online		
	Denide filter 1.12	Online		
	Denide filter 1.13	Online		
	Blower	Online		
	Chemscan	Online		
	Backwash 1	Online		
	Chemical Feed 1	Online		
	Denitrification Filter Set 2			
	Denide filter 2.1	Online		
	Denide filter 2.2	Online		
	Denide filter 2.3	Online		
	Denide filter 2.4	Online		
	Denide filter 2.5	Online		
	Denide filter 2.6	Online		
	Denide filter 2.7	Online		
	Denide filter 2.8	Online		
	Denide filter 2.9	Online		
	Denide filter 2.10	Online		
	Denide filter 2.11	Online		
	Denide filter 2.12	Online		
	Denide filter 2.13	Online		
	ChemScan	Online		
	Backwash-2	Online		
	Chemical Feed 2	Online		
	Denitrification Filter Set 3			
	Denide Filter 3.1	Offline		Offline due to controls issues. ProStart to get repaired
	Denide Filter 3.2	Offline		
	Denide Filter 3.3	Offline		

	Denite Filter 3.4	Offline		
	Denite Filter 3.5	Offline		
	Denite Filter 3.6	Offline		
	Denite Filter 3.7	Offline		
	Denite Filter 3.8	Offline		
	Denite Filter 3.9	Offline		
	Denite Filter 3.10	Offline		
	Denite Filter 3.11	Offline		
	Denite Filter 3.12	Offline		
	Denite Filter 3.13	Offline		
	Blower	Offline		
	ChemScan	Offline		
	Backwash 3	Offline		
	Chemical Feed 3	Offline		
	Denitrification Set 4			
	Denite Filter 4.1	Online		
	Denite Filter 4.2	Online		
	Denite Filter 4.3	Online		
	Denite Filter 4.4	Online		
	Denite Filter 4.5	Online		
	Denite Filter 4.6	Online		
	Denite Filter 4.7	Online		
	Denite Filter 4.8	Online		
	Denite Filter 4.9	Online		
	Denite Filter 4.10	Online		
	Denite Filter 4.11	Online		
	Denite Filter 4.12	Online		
	Denite Filter 4.13	Online		
	Blower	Online		
	ChemScan	Online		
	Backwash 4	Online		
	Chemical Feed 4	Online		
Sand Filters				
	Filters 1-12	Partially Functional		Travelling Bridges are working. Filters are clogged. Rehabilitation of the filters is a part of a City CIP project.
	Filters 13-40	Not Functional	OOS	Travelling Bridges are not working. Filters are clogged. Rehabilitation of the filters is a part of a City CIP project.
Disinfection				
	Chlorine Contact Tank 1	In Service		Slimmers have been repaired and one tank has been cleaned by the City.
	Chlorine Contact Tank 2	In Service		
	Chlorine Contact Tank 3	In Service		
	Chlorine Contact Tank 4	In Service		
	Bleach Pump 1	In Service		
	Bleach Pump 2	In Service		
	Bleach Mixer 1	In Service		
	Bleach Mixer 2	In Service		
	Bleach Mixer 3	In Service		
	Bleach Mixer 4	In Service		
	Dechlorinator 1	In Service		
	Dechlorinator 2	In Service		
	Dechlorinator 3	In Service		
	Dechlorinator 1	In Service		Always On
	Dechlorinator 2	In Service		Always On

	Dechlor Mixer 3	In Service		Always On
	Dechlor Mixer 4	In Service		Always On
	Flushing Water Pump 1	OOS	OOS	
	Flushing Water Pump 2	In Service	Hand	
	Flushing Water Pump 3	In Service		Standby
	Flushing Water Pump 4	In Service	Auto	
	Flushing Water Pump 5	In Service	Auto	
	Outfall 002 Pump 1	In Service	Auto	
	Outfall 002 Pump 2	In Service		Standby
	Outfall 002 Pump 3	In Service		Standby
	Outfall 002 Pump 4	In Service	Hand	
	Outfall 002 Pump 5	OOS	OOS	
Gravity Belt Thickener	Gravity Belt Thickener 1	In Service	Automation Status	Operated and Maintained by the City
Critical to Compliance	Gravity Belt Thickener 2	OOS	OOS	Scavanged for parts
	Gravity Belt Thickener 3	OOS	OOS	Operated and Maintained by the City - Instrumentation Issue
	Gravity Belt Thickener 4	OOS		Operated and Maintained by the City- Belt being replaced
	Gravity Belt Thickener 5	In Service	Hand	Operated and Maintained by the City
	Gravity Belt Thickener 6	In Service	Auto	Operated and Maintained by the City
	Gravity Belt Thickener 7	OOS	OOS	Operated and Maintained by the City - Motor Issue
	Gravity Belt Thickener 8	In Service	Auto	Operated and Maintained by the City
	WAS pump 1	OOS	OOS	
	WAS pump 2	OOS	OOS	
	WAS pump 3	In Service	Hand	
	WAS pump 4	OOS	OOS	
	WAS pump 5	OOS	OOS	
	Polymer Pump 1 A	In Service		
	Polymer Pump 1 B	In Service		
	Polymer Pump 2 A	OOS	OOS	
	Polymer Pump 2 B	OOS	OOS	
	Polymer Pump 3 A	In Service		
	Polymer Pump 3 B	In Service		
	Polymer Pump 4 A	In Service		
	Polymer Pump 4 B	In Service		
	Polymer Pump 5 A	In Service		
	Polymer Pump 5 B	In Service		
	Polymer Pump 6 A	In Service		
	Polymer Pump 6 B	In Service		
	Polymer Pump 7 A	In Service		
	Polymer Pump 7 B	OOS	OOS	
	Polymer Pump 8 A	In Service		
	Polymer Pump 8 B	OOS		
	Velocityline Poly Recirc Pump 1	OOS	OOS	No Display
	Velocityline Poly Recirc Pump 2	OOS	OOS	Will not hold set point
	Velocityline Poly Recirc Pump 3	OOS	OOS	Will not Hold set point
	Velocityline Poly Recirc Pump 4	In Service	Auto	
Gravity Belt Thickener				
Critical to Compliance	Polymer Recirc #1	Operational	Unknown at this time	MES installed
	Polymer Recirc #2	Operational	Unknown at this time	MES installed
	Gravity Sludge Thickener Pump 2A	Operational	Unknown at this time	MES rebuild and installed
	GST Sludge Pump 2B	Operational	Unknown at this time	Complete rebuild and installed. Ran operational check and returned to service.
	Updated Controllers / GST Building	Operational/with issues		RLG Consultants - Provide evaluation for new updated Controllers at GST.
	Sludge Thickener Pump 6B	Inop	Unknown at this time	Rebuilding Carter Drive
	GST Thickener Pump 1/7	Operational		Found bad Flow Meter. Working to replace.

Gravity Sludge Thickeners (GSTs)				
Critical to Compliance	GST #1	Partially functional		Ulliman Schutte cleaning vegetation from tanks
	GST #2	Fully Functional		Covered thickener
	GST #3	Not Functional	OOS	Tank is empty. Ulliman Schutte cleaning sludge from tank; needs to evaluate mechanical status
	GST #4	Fully Functional		Covered thickener
	GST #5	Not Functional	OOS	Tank is empty. Thickening sludge pumps (TSP) OOS due to lack of parts
	GST #6	Partially functional		Ulliman Schutte cleaning vegetation from tanks. Now not completely covered with phragmites (but still some in tanks). Tar
	GST #7	Partially functional		Ulliman Schutte cleaning vegetation from tanks; Tank is empty. Thickening sludge pumps (TSP) OOS due to lack of parts
	GST #8	Partially functional		Ulliman Schutte cleaning vegetation from tanks; Tank is empty. Thickening sludge pumps (TSP) OOS due to lack of parts
	Holding Tank #2 (Blend Tank) Pump	Partially functional		Operator reports that pump VFD does not work
	Holding Tank #4 (Blend Tank) Pump	Partially functional		Operator reports that pump VFD does not work
Sludge Cleaners (Strain Presses)				
	Sludge Cleaners (Strain Presses)	Not Functional	OOS	None of the sludge strain presses are operational, and have not been for at least the past 6 years. These were scheduled to b
Dissolved Air Floatation (DAF)				
	DAF1	In Service		Operated and Maintained by the City
	Thickening Sludge Pump 1	In Service	Manual	
	DAF 2	OOS	OOS	
	Thickening Sludge Pump	OOS	OOS	MES rebuilding
	DAF 3	OOS	OOS	Not operational since at least 2019 Char
	Thickening Sludge Pump 3	OOS	OOS	Not operational since at least 2019 Char Pumps Scavanged
	DAF 4	OOS	OOS	Not operational since at least 2019 Char
	Thickening Sludge Pump 4	OOS	OOS	Not operational since at least 2019 Char Pumps Scavanged
	Blower 1	In Service	Auto	New installations
	Blower 2	In Service	Auto	New installations
Sludge Cleaners (Strain Presses)				
	Sludge Cleaners (Strain Presses)	None are operational	Unknown at this time	According to one of the operators none of these units have worked in at least 6 years
Anaerobic Digester				
Critical to Compliance	In-ground Hi Rate Anaerobic Digester #1	Not operational	Unknown at this time	This digester hasn't been used in some time because the feed pipe is clogged; MES has been tasked with cleaning this digester; cleanout should be completed in 6 months (sometime by November 2022). MES is also tasked with purchasing and installing a new gas mixing compressor
	In-ground Hi Rate Anaerobic Digester #2	Operational	Unknown at this time	Cleaning is scheduled in the City's CIP; Needs to have gas mixing compressor examined, as operator reports that none of the gas mixers are operational
	In-ground Hi Rate Anaerobic Digester #3	Operational	Unknown at this time	Cleaning is scheduled in the City's CIP; Needs to have gas mixing compressor examined, as operator reports that none of the gas mixers are operational
	In-ground Hi Rate Anaerobic Digester #4	Not operational	Unknown at this time	This digester hasn't been used in some time because the feed pipe is clogged; MES has been tasked with cleaning this digester; cleanout should be completed in 6 months (sometime by November 2022). MES is also tasked with purchasing and installing a new gas mixing compressor
	In-ground Hi Rate Anaerobic Digester #5	Operational	Unknown at this time	Cleaning is scheduled in the City's CIP; Needs to have gas mixing compressor examined, as operator reports that none of the gas mixers are operational
	In-ground Hi Rate Anaerobic Digester #6	Operational	Unknown at this time	Cleaning is scheduled in the City's CIP; Needs to have gas mixing compressor examined, as operator reports that none of the gas mixers are operational
	Acid Phase Reactor	Operational	Unknown at this time	Cleaning is scheduled in the City's CIP
	Digester Recirc Pump #4		Unknown at this time	MES rebuild & installed. Ordered new VFD from STH. Estimate ETA 1st week of June.
	Digester Multi-Purpose Pump #5	Operational	Unknown at this time	Repacked packing and returned to service.

	EGG Digesters			Working with contractor (TEAM) to get new quote addressed to MES for STOPS
	Cross-Connection Valve	Operational		Valve between Multi-Pump #2 & Recirculation Pump #6 - removed and replaced (MES)
	Sludge Holding Tank #1	Inop	OOS	Started breakdown of bearing housing. Bearing & Auger shafts seized together. Auger & Rotor/Stator may need replacement.
	Sludge Holding Tank #2 Pump	Partially Functional	VFD needs to be replaced	
	Sludge Holding Tank #4 Pump	Partially Functional	VFD needs to be replaced	
	Acid Phase Reactor (APR)			
	APR Recirculation Pump #1	Out of Service	OOS	Sludge backed up into piping rendering the gas mixing system inoperable - needs to be replaced
	Recirc Pump #1	Partially Functional		Mechanical seals need to be replaced
	Recirc Pump #2	Partially Functional		Mechanical seals need to be replaced
	APR Effluent Pump #1	Partially Functional		Bearings to be replaced
	APR Effluent Pump #2	Out of Service	OOS	No motor for pump (currently in shop); pump needs to be replaced
	APR Effluent Pump #3	Partially functional		Issues with check valve
	APR Recirculation Pump #1	Out of Service	OOS	Mechanical seal leaks badly; hasn't been used in months
	APR Recirculation Pump #2	Out of Service	OOS	Mechanical seal leaks badly; hasn't been used in months
	APR Recirculation Pump #3	Partially functional		Mechanical seal leaks badly
	APR Recirculation Valve #1	Out of Service	OOS	Valve does not close
	Sludge Inlet #1	Out of Service	OOS	Probably clogged; digester temperature is only 74 deg F
	Sludge Inlet #2	Out of Service	OOS	Probably clogged; digester temperature is only 74 deg F
	Egg Shaped Digesters (ESDs)			
Critical to Compliance	Recirculation pump # 7 (for ESD 7)	Out of Service	OOS	Mechanical Seals need to be replaced
	Isolation valve ESD # 7	Fully Functional		
	Recirculation pump # 8 (for ESD 7)	Out of Service	OOS	Mechanical Seals need to be replaced
	Recirculation pump # 9 (for ESD 7)	Out of Service	OOS	Mechanical Seals need to be replaced
	Recirculation pump # 10 (for ESD 7)	Out of Service	OOS	Mechanical Seals need to be replaced
	Isolation valve ESD # 7	Fully Functional		
	Isolation valve ESD # 7			Valve does not close
	ESD 7 and 8 gas mixing	Partially functional		draft tubes have become detached
	ESDs 7 and 8	Partially functional		cleaning is scheduled in the City's OIP
	Reflux system - ESD # 7	Out of Service	OOS	This meter measures gas flow from the ESD. Operator reports that it runs backward. This fouls up the foam separator. Meter needs to be repaired or replaced.
	Sludge Dewatering			
Critical to Compliance	Non-Potable Water (NPW) to Synagro for Pelletizing Facility	Partially Functional		NPW source is unreliable due to high solids content. Potable water from another source is being routed to the area. Estimated completion May 31, 2022.
	Centrifuge 1	Operational	Operating in Manual Mode	Dewatering needs to be optimized; polymer feed systems need new pumps in some cases; also polymer dosages need to be adjusted
	Centrifuge 2	Operational	Operating in Manual Mode	Dewatering needs to be optimized; polymer feed systems need new pumps in some cases; also polymer dosages need to be adjusted
	Centrifuge 3	Not operational	OOS	Parts scavaged to make Centrifuges 1 and 2 operational. This needs a motor installed and controls
	Centrifuge 4	Not operational	OOS	This centrifuge is at the factory being rehabbed
	Hydrant behind Dewatering Build	Operational		MES Exercised and flushed Hydrant behind Dewatering Building
	Centrifuge Feed Pump 4A	Not Functional	OOS	EESCO preparing quote to rebuild and replace/will complete after 4B is complete
	Centrifuge Feed Pump 4B	Not Functional	OOS	EESCO preparing quote to rebuild and replace plus report

Process	Asset	Operational Status	Automation Status	Repair Status and Notes
Headworks	Hydrogen Sulfide Scrubber	OOS		Potable water is not available to operate the system. MDE and contractor reports of hydrogen sulfide gas build up in the grit screening buildings.

Appendix D - Daily Reports

March 30, 2022

Operations: Joe Wright

- Assembled initial group of 12 employees to report on Monday, April 4th.
- Gathering hotel information and plant information to distribute to the operations team by Friday, April 1st.

Maintenance: Wayne Jackson

- Greg Stehli, Ryan Zacherl, Casey Hanna and Wayne Jackson met with Harry. (Maintenance Supervisor)
- Conducted site visit to look over troublesome areas of concern.

Once tour complete, Harry took us to meet with his boss Walt. Discussed what we noticed and once again asked if we could begin to provide aid. Walt said he would need to discuss with Prim.

At 1500, Greg Stehli did receive word that we can begin to have staff on-site to assist. Will begin to put together a schedule and discuss with staff.

Engineering/MBE: Al Razik

- Confirmed a 9:00AM walk through of the plant with Back River personnel to identify potential contracting opportunities for small and minority businesses.
- Set up a meeting with Chris Kroen, Back River WWTP Supervisor to tour the plant on 4/1. Tried to set up a meeting with Michael Hallmen for Friday but he was off. I will see him Monday 4/4 at City/MES meeting at Back River.

Safety/Compliance: Erin Lanagan

- Worked on reviewing records and reports and began outlining issues and areas of concern and the compliance history - will circulate with operations when they start next week.
- Planning on possible air monitoring with personal gas monitors and will be at the site Monday morning 4/4 when operations staff begin.

April 1, 2022

Operations: Joe Wright

- Visited the site today and toured with Todd Boulden, Trish Lyons, Skip Immler and Tim Barnes. (I have attached Joe's observations to this email as well.)
- Operations staff to report Monday morning and have been given instructions on hotel check-in and treatment plant address.

Maintenance: Wayne Jackson

- No maintenance performed today at Back River.
- Reviewed supplies request and sent to Pat Carling for review.

- Maintenance will need MES's input as to what we should focus on. After seeing multiple pieces of equipment LOTO, we want to make sure we are working in the areas that will make the best impact.
- Starting Monday, maintenance should have more detailed updates. Just need to get on-site and begin our assessment.

Solids Handling: Al Razik

- 3/31/22 - Virtual meeting with City, Synagro, Pro-Start, Hazen to discuss restarting Synagro's operations. Synagro is tentatively set to restart the pelletizer on April 11th assuming Pro Start can supply them with secondary effluent for their fire suppression system. They need 1.3 MGD.
- Virtual meeting with RK&K to discuss their scope for assisting us with performing the Assessment Report. Also set up a Monday April 4th site visit with Dana Garriss at Back River.

Back River WWTP Walk Through

Joe Wright

4/1/2022

Headworks

- Headworks is working fine outside of the odor control system. I was able to clarify comments made about the headworks screening issues. The coarse screening system is operating without issue. There is an intermittent issue with the fine screeners and the spray water due to the use of effluent water for spray water which clogs up due to elevated solids in the effluent. On occasion they must take a unit offline and clean the spray heads, but the unit is only offline for a brief period of time. There are six total fine screens and having the one offline briefly does not affect operations.
- Odor control on, but not filtering. Need clean spray water.
- Dumpster removal issues due to the need for truck to remove dumpster. Current truck not adequate and causing damage to dumpster, which they have a hard time getting repaired by maintenance. 14 dumpsters are unusable. Truck on order but lifting portion of the truck not available for several months.

Primary Settling Tanks (PST)

- There are only two fully operational PST's online as of today. Details are as follows:
 - PST 8 and 11 are online, and all mechanical components are functional.
 - PST 10 is clean and online, but none of the mechanical components are functional.
 - PST 1, 2, 5 and 6 are online but full of debris and flow is just passing through. None of the mechanical components are functional.
 - PST 3 and 4 are offline and being cleaned out by Ulliman Schutte. Mechanical components still need to be assessed, but structure will require repairs.
 - PST 7 is offline and being cleaned out by Synagro. Mechanical components still need to be assessed, but structure will require repairs.
 - PST 9 was cleaned out and a leak in the scum box was found when they were filling it, so it remains offline awaiting repairs to the scum box.

Pancake Digesters

- All six digesters are full of debris with restricted access.

Sludge Receiving Station

- Never consistently online. Repeated screening and pumping issues.

Dissolved Air Flotation Facility (DAF)

- The #1 DAF unit was the only one functional out of four available units.
- DAF units 3 and 4 have not worked for the past 5 years.
- Drive mechanisms aren't functional.
- One out of the three available recirculation pumps is working.
- Crane hoist not functional.
- Building staff recommended a Muffin Monster ahead of the building, which would help with the trash issues they have that clog pumps and pack up volutes.

Egg Shaped Digesters

- Rehab of the digesters is scheduled to begin in May. Expected to take two years.

Sludge Dewatering

- Solids processing appears to be increased. There is now a transfer pad full of sludge that was not at the site on Monday.
- Dewatering operations are Monday through Friday only.
- We saw a room on the backside of the old solids building that contained file cabinets and drawings. Room door was wide open to the elements and critters.
- Preston Trucking is the contract sludge hauler.

Activated Sludge Treatment

- There are three Activated sludge zones (2, 3 & 4). Activated 4 has not been released by the contractor yet and all tanks remain empty.
- Each zone has 12 clarifiers.
- Four of the 24 clarifiers are offline due to issues with pumps and drives.
- Return Activated Sludge (RAS) pumps that are offline are 26 weeks out for delivery.
- As fast as spare parts come in, they are installing them and awaiting more spare parts.
- MLSS 3500-6000 (goal is 2600-3000)

Denite Filters

- There are 52 Tetra Denite filters and all are blinded with sludge. Basically being bypassed due to blinding.
- They remain online, but backwash cycles have been reduced.

- Had issues with sand blowing out of them during backwash and the excess sand has made its way to the Denite clarifiers.
- One of the two Denite clarifiers is offline due to the sand wearing down the equipment.
- Kaylani Environmental onsite working on the offline clarifier. Evaluating it.
- They are setting up a contract with Tetra to come to site and evaluate the filters.

Sand Filters

- 48 are available and only 15 are in service.
- Issue with the traveling bridges and poor condition of the underdrains.

Disinfection Area

- Visible solids in contact chambers. Floating solids and trash visible.
- Effluent had a tea like appearance at the cascades.

General Observations:

- Numerous equipment locked out and tagged out.
- Outdated and unusable equipment, supplies, brooms, hoses, buckets strewn about inside of building and outside of buildings. Much of the items observed were broken and unusable, yet no one throws anything away. Poor housekeeping in general.
- Sludge and liquids on floors in various buildings with no indication that is cleaned regularly.
- City cannot hire operators under 21 due to driving restriction by the city.
- No Apprentice training program in place. No incentive for operators to pass exams.
- Vegetation removal appears to be hastened. More activity removing vegetation is evident.
- Never saw any mechanics working on equipment.

April 4, 2022

Operations: Joe Wright

- 11 operators and 1 supervisor reported to Back River WWTP this morning to begin training.
- Joe has requested a list of out-of-service equipment and an organizational chart showing the chain of command at the plant.
- Joe requests that daily process data also be shared with MES

Maintenance: Wayne Jackson

- Wayne pointed out that there seems to be a communications problem between electrical and mechanical groups.
- MES maintenance personnel need a designated space to store equipment and repair items.

Solids Handling: Al Razik

- Al will be calling in a contractor to remove the vegetation from the clarifiers and other tanks as soon as possible.

- Al also recommends several pumps be replaced along with centrifuges to enable increased sludge processing.

Immediate Action Items: Skip Immler

- Work directly with Tim Wolfe to get contactors in quickly to assist with repairs and capital improvement work.

Safety/Compliance: Erin Lanagan

- Erin to make site visits to all employee work areas (DPW and MES) to assess working conditions and recommend improvements.

April 5, 2022

Operations: Joe Wright

- Staff arrived this morning and the shift supervisor for the City was not aware what MES was there to do and staff had to wait for Dana Garriss (Supervisor II) for direction.
- This caused some irritation and confusion for MES staff. The day went much smoother as things moved along.
- ESS Demond Miller toured the operations area we are assisting with at this time to assess the areas that require our attention, and he assigned a few operators to areas that needed cleaning and others helped collect samples.
- Randy Gaver is working in the lab running samples for the activated sludge portion of the facility.
- Demond Miller is assessing available sampling and testing equipment and will be reporting to me on any needs for process testing. He mentioned they only have one portable Dissolved Oxygen meter, and it is outdated and there are not enough sludge judges (core samplers for measuring sludge blanket depths) for the many tanks located around the plant. A supply list is being created and Tiff and I will review.
- Demond mentioned that no one on day shift today for the City was familiar with operation at the Denitrification building and accompanying process. I will find out who is the lead person for operations of the denitrification process and will review the operations. I will bring MES operators up to speed on the operations on the system.
- MES staff are not allowed to operate City vehicles, so an MES vehicle or two are needed for operators to collect samples and move about the treatment plant.
- I will be working out of the Back River office all day tomorrow.
We received April 1st through April 5th process lab data from Dana Garriss.

Immediate Needs: Skip Immler

- Attended meeting with Al Razik and Back River staff regarding solids reduction in the plant. Made plans to go to Back River with Al on Thursday to look at sludge transfer pumps.
- Attended meeting with MES staff to go over what was discussed at the weekly meeting at Back River on Monday.

Solids Handling: Al Razik

- I requested, and received a status update (clarifier cleaning update, number of units in service, and status of clarifier repairs) on the PSTs from Mike Hallmen. Mr. Hallmen stated that they will take care of phragmites removal from the gravity thickeners.
- Had a telephone conversation with Yosef Kabede about their contract with Greely and Hansen to do an assessment of the plant, as per the MDE order given to the City dated March 4th. Mr. Kabede sent documents to me. We discussed other biosolids end use options that I would like to pursue. I also emailed Mr. Kabede and emphasized to him that we want to be an active participant in Greely and Hansen's assessment.
- Received a call from Matt Tabisz of Synagro, RE: they stand ready to do work for us (i.e., digester cleaning). Mr. Tabisz told me that the dryer has been down for an entire year, and not the 3-4 months that we were told by the City.
- Virtual Meeting with City staff (Betty Jacobs, Bill Sammons, Dana Garis) and MES staff (Skip Immler, Tim Barnes) to discuss solids removal from the secondary process. I will visit the plant on April 7th to select some pumps to start replacing.
- Attended in-house meeting to discuss various issues.

Safety/Compliance: Erin Lanagan

- Attended internal meeting to discuss Back River weekly coordination meeting.

Maintenance Team: Wayne Jackson

- Met with Harry Mitzel, MES assigned with pulling & rebuilding Gravity Sludge Thickener pump 2A.
- Pulled cavity pump GST 2A and moved to assigned shop area for rebuild. Tested motor which is functioning but notice control issues in the panel. Transported pump & gear housing to shop & began rebuild with provided repair parts.
Cleaned & setup shop area that was provided by DPW to have useable workspace.

Observations from staff

- Poor housekeeping
- Damaged & unusable pumps, valves, & other equipment laying on floor throughout lower level of High Rate Building.
Lack of DPW staff out working throughout site
- Received some help from DPW Maintenance Staff acquiring repair part & necessary tools & equipment for rebuild
- Provided shop area very dirty & unkept
- Communication between DPW employees/departments is nonexistent
Have not met anyone from the electrical department
- We did meet a maintenance mechanic John that was very helpful and informative (parts, tools, shop equipment)
- Elevator to lower section of High Rate Building is inoperable, had to use crane and physical strength to raise pump to first floor.
- Takes additional time to begin working, due to multiple trips bringing tools, supplies and materials to job site. No working elevator
- Scheduled tomorrow
- Greg Stehli and Wayne Jackson to meet with MES Maintenance at 0700. Discuss ongoing maintenance, upcoming assignments, and anything else we can do to assist their efforts.
- Greg Stehli and Wayne Jackson to meet with DPW Maintenance Supervisors. Want to split MES Team into three teams with DPW staff assigned to each of the three teams.

New Shop





April 6, 2022

Operations: Joe Wright

- Onsite all day and worked from the office area given to MES by the City.
- Visible solids in today's plant effluent due to last night heavy rain.
- Receiving details on MES witnessing City staff sleeping, sitting around, and watching television while various duties around the plant require attention. I am going to start walking through different buildings around the plant to observe what current staff does on a day-to-day basis.
- MES' onsite ESS Demond Miller has begun to take charge and assign MES staff to areas on his own. City managers have not been giving much guidance for what operators should be doing. The only solid duty that I have seen is sample collections, D.O. readings and sludge blanket readings. Once staff have completed collecting samples and readings, no other duties appear to be given.
- MES staff being told by City managers that they have 12 Apprentices coming onboard soon and that they wouldn't need our operators once they report to the facility. Joe will follow up on this with Betty.
- Attended meeting with Greeley & Hanson and other MES staff as part of the engineering assessment being completed for the facility.
- Walked through the activated sludge process with MES staff.
- Demond worked with the City supervisor to establish the schedule for MES staff beginning next week.

Solids Handling: Al Razik

- Had a virtual meeting with Greeley and Hansen in the morning to discuss their scope for producing an assessment report. City staff, and other MES personnel also attended.
- Attended another virtual meeting with Greeley and Hansen staff and Yosef Kebede later in the afternoon to focus on removing the excess solids in the plant. Greeley and Hansen had contacted

several biosolids management companies to inquire about their interest in removal of excess sludge from the plant. Two companies (Denali and Waste Management) will be onsite two days next week to visit the plant (I will be there as well)

- Heather and I will be at Back River tomorrow.

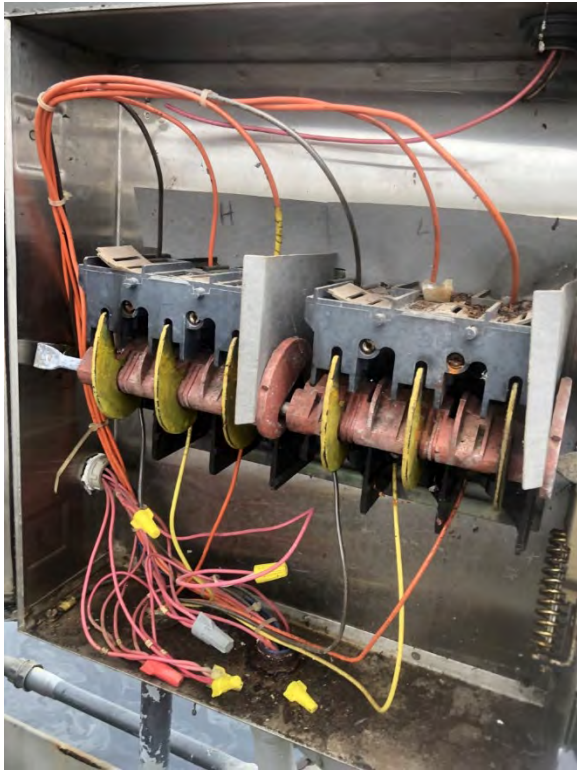
Maintenance: Wayne Jackson

- Morning meetings
 - Greg Stehli met with Prim and Walter to discuss having DPW staff begin to work with MES Maintenance. Both agreed this would be beneficial and Walt said he would get back to Greg in the next day or two.
 - Greg also discussed getting an electrician from DPW to work along side MES Maintenance. Walt instructed Greg that Casey can perform certain electrical tasks like wiring motors. Still no electrician.
 - Both Greg Stehli and myself (Wayne J) met with MES Maintenance on-site this morning to look over new work space.
 - It is the old vehicle maintenance shop and should workout fine after some basic housekeeping.
 - Does have small office space and also needs housekeeping.
- Today's Work
 - Continue with rebuild on GST 2A Gravity Sludge Thickener Pump
 - Pump housing, bearing housing, & worm gear. Some repair parts provided were incorrect & others are not in stock onsite.
 - Scoped out request to replace motors & gearboxes on Centrifuge (Clarifier) #10. While at location noticed that electrical controls & disconnects are in extremely bad shape or do not work & need to be replaced. Also noticed structural damage to skimmer arms, gearbox platform, catwalk. Contractor may be needed & possibly have MES Engineering investigate.
- Issues discussed with Staff
 - Need of tools
 - Need for vehicles
 - Still no location for shower, restroom or locker room. (Greg Stehli will be working with Walt to rectify).
 - My initial concerns
 - Resources depleted from BWI Maintenance Team
 - Resources depleted from WW Maintenance Team
 - Vehicles depleted from both WW & BWI.
 - Currently pulling tools from WW & BWI.
 - All these concerns have been shared with my management Luke Page and Pat Carling. They are working to assist our maintenance team with resolutions.
 - Once we receive the OUT of SERVICE list for equipment, additional staff will be required to make a positive difference.
 - No preventative maintenance being performed.
 - All maintenance is Reactive or Corrective
 - Staff Notes
 - Received some help from John with DPW Maintenance acquiring correct repair part & knowledge to continue GST 2A rebuild
 - DPW is unsure of what is in stockroom & there is a lack of repair parts

- Scheduled 4/7/22 Thursday
 - Greg Stehli will be attending daily morning meetings with Prim and Walt.
 - Greg is also scheduled to attend daily end of shift meeting with Prim and Walt if available.
 - Staff – Currently get assignments each morning from Harry. Will change soon as Greg becomes more involved with daily morning meetings.

Centrifuge Clarifier #10





April 7, 2022

Operations: Joe Wright

- MES operators continue to familiarize themselves with operations of the activated sludge area.
- Erin Lanagan onsite with Demond Miller.
- Lance Fierro and Gerret Scheller began working the evening shift today.
- Observed solids in the effluent again due to high flows through the plant caused by the rain.
- Dana Garris (City Supervisor) mentioned that they may utilize our staff at the sludge dewatering area to assist with unreliable staff.
- I walked the lab area with Randy Gaver. One positive take away was that Randy pointed out that when he started in the lab, they had boxes of lab reagents (powder pillows) piled up and unorganized. He showed me today that one of the city operators cleaned up the clutter and organized the reagents. I am hopeful that our operators presence and positive working attitude may be motivating the city operators to step it up a little. Randy also took it upon himself to thoroughly clean all of the lab wear. He said everything was stained and not to MES standards. The lab looked more organized than when I walked in there on Monday.

Immediate Needs: Skip Immler

- Al, Heather, Tim Barnes, Casey from MES maintenance and I toured the plant this morning and gathered information about which digester to clean and which pumps needed to replace
- Met with Matt, Ellen, Dr. Glass and Al about the plan to clean the PSTs and digester

Solids Handling: Al Razik

- Site visit with Skip Immler, Heather Fritz, and Casey Hanna

- Scoped out future digester cleaning project logistics for hi-rate digesters no's 1 and 4
- Identified two pumps (Recirculation Pump No 1 and 4) in the digester area to replace. We will need these pumps to be able to remove sludge from the hi-rate digesters when we clean them.
- Scoped phragmites removal from the gravity sludge thickeners
- Identified polymer feed pump (Polyblend Unit 2A) that needs to be replaced.
- Took dewatered sludge sample for TCLP lab analysis (we will use the results to gain landfill disposal approval)
- Maintenance staff will look up the pump nameplate data for the identified pumps in Water 360, so we can order the pumps.

Safety/Compliance: Erin Lanagan

Erin on-site with MES Operations today. Met with Randy Gaver, W/WW Sr. Operations, he briefed me on the state of the process lab in the activated sludge administrative building when he first arrived. The lab supplies and materials were discovered to be dirty with material built up in lots of items like glassware and sample containers due to not getting washed regularly and the lab itself is unorganized. He only knows of one female City employee that works in that lab area so far and in general City operators give him the impression that it is his area to manage now. He has been trying to work with City staff to start showing them the basics, like cleaning lab supplies and standardizing how samples tests are run. He has had to work with other MES operations to figure out how meters and equipment he is not familiar with works.

Walked a few of the areas MES operations is working in with Demond Miller, W/WW ESS. Demond started by reporting none of the MES operators have seen the entire facility, they have not been to the headworks, including grit removal, they have not seen the digesters and they have not seen the primary sludge thickeners. They have been told by City staff they are here to assist with the activated sludge areas and the denitrification areas. However, MES operations was also told they do not need to be in the denitrification buildings. Demond and I did go into a few of the denitrification buildings anyways today, where he was seeing some of those areas for the first time.

Currently, the wildlife that are residing in the buildings are of concern. There are buildings where snakes have been discovered in the basements, ducks are living inside another building, and although I did not think I would come across geese more aggressive than our resident geese at the Cambridge WWTP, they are no match for the ones residing at Back River... one actually ran to peck at my vehicle while it was in motion! Of immediate concern is operations and maintenance working in unlit areas (particularly during the second and third shift) and being injured by animals and insects that they cannot see to avoid. Improving lighting at the facility in general, outside along the grounds and inside many building areas, needs to be a priority.

Typically, MES operations collects process samples from the reactors, however it appears to Demond that is not currently happening at the reactor stations at Back River. We did identify areas where MES operators are collecting samples from, which includes the final outfall area. I also saw control panels that were locked out, they did have tags indicating who locked out the equipment on the few locks I saw, I did not have any major concerns with the few lock outs I saw today. The final effluent was visibly brown today. There were areas throughout the grounds and roadways that are puddled with excessive amounts of standing water. The areas we noticed today were around the first stage clarifiers. Most of the first

stage (final) clarifiers have parts where sediment has built up and collected, some have sludge visibly built up to high levels, some are inoperable, and some have problems with even flow distribution.

I apologize if I'm using the incorrect terminology, I'm not familiar with the different parts of the process yet and still trying to get a handle on the plant in its entirety. We really need a flow diagram of the entire plant to be able to refer to the different areas accurately. I do need to begin determining where chemical alarms are located and if they are working or not, as of now, I asked operations to avoid the major chemical storage buildings until we have the proper equipment to enter those areas and determine the work we would need to be doing in those buildings.

I plan on attending the walk through with some of the MES staff this coming Monday 4/11.

Maintenance: Wayne Jackson

- Today's Work
 - Finished prepping GST 2A pump housing. Transported rotor stator to High Rate lower level which took over two hours due stationary cranes lack of reach, inability to open one of the vault doors. DPW is still unable to supply a new drive collar for the pump which is needed to complete the install. DPW did however make modifications to the old & damaged drive collar for a second time. This is something that would not be recommended by the manufacturer. The collar is manufactured with two key slots but now has six after modifications. This weakens the collar & creates the potential for premature failure. We were also informed that even after the pump is reinstalled it cannot be put back in service due to the lines being clogged.
 - Evaluated & begin looking for needed repair parts to return High Rate Digester Recirculation Pump #4.
 - Received, offloaded & staged tools & equipment in provide shop area.
- Additional Notes from Staff
 - Poor housekeeping
 - DPW staff was very standoffish. There was a sudden & noticeable change in their demeanor towards MES Maintenance staff
 - Sludge all over floor & a few inches deep in areas around High Rate Digester pumps
 - Sludge spewing from valves and piping in High Rate lower level
 - Polymer & damaged/OOS equipment on floor & walk area of Dewatering Building
- Photos
 - GST 2A Pump Drive Collar
 - Lower Level High Rate Building 1 (Floor Sludge)
 - Lower Level High Rate Building 2 (Rags wrapped around to prevent from spraying)

GST 2A Pump Drive Collar



Lower-Level High Rate Building 1 (Floor Sludge)



Lower-Level High Rate Building #2



MBE: Tim Barnes

Today I continued my Walk-through tour of BRWWTP and identified MBE contracting opportunities. Both Al and Skip suggest Industrial Janitorial Services, Dewatered Sludge Hauling

and Metal Fabrication. I've requested a list of all potential Prime Contractor from Al Razik, Ron Turner & Betty Jacobs to pursue MBE subcontracting opportunities.

Finally, Skip noticed billowing plumes of sludge in the Chlorine Contact Tank - see attached photo.

Billowing Sludge



April 8, 2022

Operations: Joe Wright

- Spoke with Demond Miller about the MES truck that will be available for our staff on Monday as well as the laptops we are getting for the operators to use. Demond is still generating a list of items to procure (sludge judges, D.O. Meter, rain gear, lab equipment, trash cans, trash bags). He will be asking the city manager first for these items, but if the lead time is too far out than we will order the items ourselves.

Page | 129

- I walked Activated 4 to familiarize myself. They plan on bring it online soon.
- Spoke with Dan Latova about the current solids operation and areas that he thinks needs help. Centrifuge operations and high rate pumping of solids were his main concerns.
- Betty Jacobs came and advised me that she is no longer the Plant Superintendent. Ronald Turner is now the Acting Plant Superintendent.
- Demond spoke to the staff and Lance Fierro and Mike Addison will be working the evening and night shift operating the centrifuges.
- We have one of our operators not returning to Back River due to his doctor scheduling a medical procedure. We are in the process of bringing in two additional operators to make up for the lost operator and the operators going to the centrifuge operations.
- City operators in the activated area appear to be very appreciative of MES' assistance with operations. They have been working doubles to cover shifts and feel like they have a life again by working a normal schedule.

Immediate Needs: Skip Immler

- Worked with Al on organizing contractors for work at Back River. Al contacted GMH, a clarifier rehab contractor a set up a meeting for next Monday
- Worked with Wayne on getting equipment repairs prioritized. Al gave me a list which I passed on to Wayne listing some pumps on the solids side that needed to be repaired
- Spoke to Procurement about how to do emergency procurements. Got forms Billy.
- Spoke with Ron Turner about Cl2 contact tank cleaning procedures for Al. Ron said they pump out each tank every couple of months. They pump the contents to the filters as they're cleaning.

Solids Handling: Al Razik

- Contacted Gary Hochschild and GMH Associates. He will be at Back River on Monday, April 11th to look at PST equipment with me and Skip
- Set up site visit with Gerald Taylor Co for removing phragmites from GSTs
- Heather prepared two sludge permit applications in the City's name to transport sludge from Patapsco and Back River to Virginia and Pennsylvania
- Left a message for Veolia RE accepting more sludge to their compost facility from Back River
- Telephone call with Yosef Kabebe RE: weekly report preparation and distribution , sludge permits (info I need from him)

Maintenance: Wayne Jackson

- I (Wayne J) met with Walt head of maintenance.
 - Discussed who from his crew will be assigned to MES.
 - Didn't get name, but person assigned called out and is giving Walt & Harry pushback.
 - Discussed Walt's hurdles he needs to overcome due to Union.
 - Greg Stehli will try to work with Walt and Prim to get a copy of Union Contract.
 - Discussed that MES Maintenance will be focusing on areas our leadership has deemed essential.
 - I ensured Walt that we will have Greg Stehli meet with him each morning and let him know what and where we be working.
- I (Wayne J) also met with MES Maintenance this morning.
 - Discussed more detailed updates.
 - Label and date photos.
 - Communication protocols moving forward.
- Skip provided list from Al that will be teams focus starting Monday. (Priority List)
- Staff Update

- Set up & organized safely equipment & tools in provided shop area.
- Installed rotor stator GST Pump 2A/start on housing
- Receiving assistance from John DPW maintenance to acquire correct parts.
- DPW is unsure what is in Stockroom and lack of parts.

April 11, 2022





Photos:

- **GST thickened sludge pump 2A after completing rebuild.**
- **GST thickened sludge pump 2A before MES arrived.**

Operations: Joe Wright

- Joe Hott (Victor Cullen) and Matt Hammonds (Dorsey Run) are now assigned to the Back River WWTP to replace Wes VanGraafeiland and Russell Johnson. They both start on 4/12/22.
- Took Ellen Frketic and Erin Lanagan on a tour of the facility.
- Attended weekly Baltimore City/MES Management Meeting.

Immediate Needs: Skip Immler

- Met with Baltimore City team and GMH and Associates today at Back River. GMH is giving MES a proposal to repair two PSTs, #6 and #7. I also asked them to give a price for maintenance on the clarifiers for 2 years
- Attended the Baltimore City/MDE/MES/Back River staff meeting

Solids Handling: Al Razik

- Attended weekly coordination meeting

Maintenance: Wayne Jackson

- Completed GST Sludge Pump 2A install of bearing housing, gear box, and motor. Will need to grease and perform operational check with Operator tomorrow morning to confirm proper operation.
- Staff planned for Tuesday's tasks of rebuilding #4 Digester Pump.
- Unloaded and staged safety equipment and supplies.

- All Hands meeting at admin building.

Notes from Staff:

- Working to get proper tools.
- Restroom facilities need attention.
- No communication between DPW employees/departments.
- Need access to Supply Room. (Store/Stock Room)
- Notice DPW for the first time out in full force around site.

Goals:

- Stehli to meet with DPW Maintenance heads to streamline processes each morning.
 - Maintenance Shop
 - Motor Shop
 - Electrical Shop
- Begin to contact and bring in vendors for upgrades and hard to find parts/equipment and out of service equipment.
- Through meetings with DPW Maintenance, continue to try and push a joint effort of maintenance.

April 12, 2022

Operations: Joe Wright

- MES truck onsite now for operators to use around the facility.
- Took MES Training Manager - Greg Wilkinson on a facility tour and introduced him to Ramona Harry (Operations Officer I) with Baltimore City. She is working on a new operator training program, and we will be sharing details on our Apprenticeship Program with her. Even after she is done working on the new program, it will need to be presented to the union for approval. Most of the annual milestone incentives and mentor incentives cannot be included in their program due to union rules and anything they give to the Apprentice operators would need to be done with all apprentices in every field city wide. The hiring process cannot change either due to existing agreements between the union and the city that establishes how the city's hiring process works. They cannot deviate from the agreed upon hiring process. Ramona also mentioned that the union does not push for training that makes operators succeed because they would lose money when the operators moved from operator (AFSME) to supervisors (CUB). It's not in the best interest of the union for operators to move up the ladder.
- Demond Miller picked up lab supplies to help Randy Gaver run process samples more efficiently.
- Matt Hammonds and Joe Hott are now reporting to the Back River facility to replace two other operators.
- Ron Wicks with MDE onsite to look at effluent quality.

Immediate Needs: Skip Immler

- Provided GMH, the clarifier repair contractor, with drawings of the clarifier we got from Baltimore City. I also discussed what type of scum trough to quote. The said they'd have the proposal to me a couple days.
- I asked GMH to provide a separate quote for performing maintenance on the PSTs for a period of 2 years.

Solids Handling: Al Razik

- Started daily telephone calls on biosolids issues with Mike Hallmen (Baltimore City Wastewater Division Director) .
- Spoke to Lindsay D"Anna (Waste Management Organics) to prepare him for their visit tomorrow at Back River. We are thinking of using them for landfill disposal.
- Called Gerald Taylor Co. to set up site visit to the plant to remove the phragmites in the GSTs. Turns out the City is going to do this.
- Reviewed digester as-builts in preparation for cleaning digesters 1 and 4.
- Finalized increase in tonnages to be accepted by Veolia.

Maintenance: Wayne Jackson

- Completed install of GST pump 2A. Requested grease for grease points & oil to replace old in gearbox but was notified by Harry the DPW PM department would complete that task.
- Completed rebuild of Digester Recirculation pump #4 bearing housing & began install. After the install is completed, the pump will not be able to be returned to service because the VFD is missing from the control panel.
- Began to troubleshoot Dewatering Building polymer feed units. Found control issues such missing relays, unlabeled wiring, & blown fuses. We also found a zip-tie being utilized to hold in an alarm reset button on one of the units. This could potentially cause control failure & possible safety issues. There are multiple motors & mixing units that need to be replaced along with piping.

Staff Notes:

- Poor housekeeping
- Some DPW staff out working
- Polymer everywhere near feed units in Dewatering Building.
- MES Maintenance expressed the need for gantry crane.
 - Will get quotes and submit for approval.
- MES Maintenance needs to begin working with DPW Electrical and Instrumentation departments.
 - Greg Stehli met with both departments this morning. Some pushback from Electrical. Both Greg and I (Wayne) will meet with both Electrical and Instrumentation again tomorrow.
 - Instrumentation - Carroll Wells, Kim and James Dorsey
 - Electrical - Met with George/good meeting
 - Electrical - Met with Darrell head of electrical/not a good meeting/he walked away from conversation.
 - Greg met with Prim and was instructed if he encountered any issues to report back to Prim (DPW).
- Staff expressed a need to wash uniforms on-site or a cleaning service. Currently Stehli and I are working on solution.
- Still no access to Store/Stock Room. Greg and I (Wayne) will revisit tomorrow.

April 13, 2022

Operations: Joe Wright

- Picked up two laptops from HQ for MES staff and delivered today.
- Talked with Dana Garriss about the centrifuge operations. Two centrifuges share one collection belt and there is a control issue that will not allow the belt to move if one of the centrifuges are

down. One centrifuge goes down and they wind up with two out of service. We will need to resolve this for them.

- Spoke with Bill Ferrel about the tank 11 usage for use at the pelletizer. They need to empty the vault just after tank 11 which is interconnected with other vaults leading up to the denite filters and the water is surcharging in the line and not allowing the vault to be emptied for cleaning. The cleaning of the vault is required by Synagro before accepting water to the pelletizer. He said the control folks would be onsite tomorrow for the pumps that were installed, and he is coordinating with Mike Hallmen to take the entire activated 3 portion of the process offline overnight to get the level down in the vault to clean it and have it back online by 10:00 am on 4/14/22.
- Received a quote that Bill Ferrell obtained from Kershner to replace the D.O. Meters around the plant. I will reach out to Kershner to gather more info.
- Supplies are being ordered for MES staff (D.O. meter, Tyvek suits, Forehead flashlights, Rechargeable Flood light, 10ml pipette, Extension trash pickers). Todd Boulden will be placing the order for us. Asked the city for push brooms and trash cans.
- High NH₃ on activated 3 side from 3 reactors. (13,15 & 16) Reactor 15 just returned to service. All due to phragmite cleaning.
- Lance Fierro and Matt Hammonds have toured the centrifuge operations but have not been assigned to operations of them yet.
- Operations/Maintenance Coordination meeting scheduled for 4/14/22 at 8:00 am.

Safety/Compliance: Erin Lanagan

- Erin met w/ Brian Price, Operations Officer IV, Baltimore City DPW Office of Safety & Training
 - Mr. Price gave an overview of his office's role with oversight of all City DPW facilities and operations. They inspect Back River approximately twice per year and complete follow-up inspections three months after an initial inspection report is generated. Each facility is responsible for managing their different programs like lock-out / tag-out and emergency response procedures. Currently the office has two Safety Officers and one Operations Officer (Mr. Price). They have a request in and budgeted for to add eight more Safety Officers to their office staff. Mr. Price's day to day activities primarily are focused on vehicles accidents and injuries they receive for all of DPW.
 - Mr. Price will provide me copies of the Back River OSHA 300 log for 2021. (Lists all facility work related recordable injuries for 2021).
 - Mr. Price will provide me copies of their Office's recent inspection reports for Back River - he will need to receive approval from his chain of command prior to sending to me.
 - There is an open MOSH inspection that began in 2019 with many citations that have not been abated. Mr. Price said the facility managers meet weekly to discuss the remaining citations that still need to be abated. His understanding is all the requested plans and training documents have been provided but basically anything that was a maintenance fix has not been corrected. The inspection was triggered by an anonymous employee complaint regarding a lack of arc flash protection for welding operations.
 - Provided a contact for the DPW Department of Finance and Risk Management - Shonkaye Stanley. Mr. Price described their involvement with oversight of responses to MOSH and OSHA investigations. I will email Ms. Stanley to introduce myself and inquire about their oversight of the facility.
 - The DPW Office of Compliance and Research is responsible for oversight of laboratory services. I may be contacting their office point of contact Kim Grove regarding monitoring and reporting for the facility.
 - Mr. Price shared with me his frustration with the City for what he described as 90% of their inspection findings remain unresolved every time they inspect. Overall, he feels their office is working to implement a culture change to the mentality of most DPW workers. He admitted most of the facilities have the programs in place, but those programs are not implemented, employees are not aware of procedures and requirements

and there is in his opinion little to no maintaining of equipment or facilities, particularly at the Back River and Patapsco plants.

- Mr. Price did say that the Maintenance staff assigned to Back River also cover the pump stations and any problems on the city side of the collection system.

Mr. Price's office does not have direct control to demand the elevators be in operation, it sounds like the issues we are finding have been noted in their past inspection reports for the facility. His summary was it doesn't do any good to keep rehashing how did it get to the point it's at, the focus now needs to shift to digging out of the hole they are in so to speak and getting the facility operating as it was designed to.

Maintenance: Wayne Jackson

- Both Greg Stehli and I (Wayne J) meet with shop department heads.
 - Instrumentation - positive meeting and shop willing to work together with MES
 - Electrical - once again pushback from department head Darrell. After about 30-40 minutes of conversation, I believe we are moving in a positive direction.
 - Greg or I (Wayne J) will meet with Darrell each day and continue building a working relationship.
 - Store/Stock Room - Met with Julis and he was extremely helpful and eager to assist MES Maintenance. He provided us with a tour of Stock Room and two additional outside stockpiles. They have a program to pull inventory and Joe Wright is looking to see if we can gain access. This will eliminate several steps from the process and speed up production.
 - Additional Inventory we will have access to
 - Tools
 - Supplies - rags, gloves, cleaning supplies,
 - Cargo straps, oil, grease, nuts, bolts, gaskets
 - Julis is responsible for properly disposing of 50-gallon drums in the yard across from maintenance shop. He has no idea how to properly dispose of drums.
 - I (Wayne J) reached out to Don Ireland with MES and asked if he could talk with his supervisor and see if he could make a site visit and gather information. I did mention to Joe Wright to keep him informed. Once Don Ireland makes his assessment, I will notify group and get approval before moving forward.
 - Ellen's email from this morning:
 - **Please have the guys check to ensure pump GST 2A gets greased. If it's not done in the next day or two, purchase whatever is needed to get it back into service.**
 - **I checked with Head of Maintenance Walt, and he said this task was completed.**
 - **Also see about purchasing the missing VFD for the digester recirc pump. We don't want to have something not in service because we're waiting for the City to finish.**
 - **Contact vendor Rob Hayden with STH, he will be on-site next Wednesday at 9am.**
 - Greg Stehli spoke with Fastenal rep. Discussed ceramic coated valve repairs.
 - Greg Stehli is working with DPW Procurement team to assist with lead time on orders. DPW Procurement is also working with Greg by sharing some of their repair shops quotes to see if we can order with better lead time as well as assisting with purchasing inventory.
- Maintenance

- Completed tour of supply room.
- Completed repairs for Digester Recirculation Pump#4 in High Rate Lower Level.
 - Unable to test & run due to VFD & other control components missing.
- Replaced packing for bearing housing shaft on Digester Multi-Purpose pump #3 in High Rate lower level. Will work with DPW Operators tomorrow morning to test & return to service.
- Notes from staff
 - Received assistance from DPW Operators to shut down valves to work on Digester pumps.
 - Sent nomenclature to Hill's Electric to begin getting quotes for replacements.
 - Contact vendor Rob Hayden with STH, he will be on-site next Wednesday at 9am to look at any pumps, motors, and controls we may need replaced and what they may be able to assist with.
 - Spoke with Walt about mobile crane, and he informed staff that they do have a crane and other equipment that can assist with repairs. Walt will speak with the Grounds Department tomorrow and introduce our staff to their head of department. More details to follow tomorrow's introductions.

Digester Multi-Purpose Pump #3



High Rate Lower Level



Operations: Joe Wright

- Lance Fierro assisted city staff with clearing a jam on 4/13/22 at the centrifuge to keep the unit operational overnight.
- Wayne Jackson and I attended a meeting scheduled by Mike Hallmen (Division Chief). All Supervisor II's and above were in attendance. (Ron Turner, Betty Jacobs, Dana Garris, Charmayne Payton, Dan Latova, Bill Simmons, Chris Kroen, Prim Rambissoon). The meeting was primarily for City staff, but Mike wanted MES at the meeting since we are working together on straightening things out at the facility.
 - Mike scheduled the meeting due to concerns that Dan Latova had about communications between city staff. There are issues with the different sections communicating with each other over equipment needs, process changes, repairs etc... Mike wanted to clear things up.
 - After some comments by Dan Latova about no one communicating to each other and his concerns with taking portions of the process offline to clean out vault 11, Mike gave his directive that the clarifier 11 and cleaning of vault 11 was a top priority for pelletizer operations and that is to be the focus right now to get the operation back online to start removing more solids from the plant.
 - Additional comments were made about the vault 11 project and the need to coordinate activities to better manage flow throughout the plant and Mike Hallmen stopped the conversation and passionately broke it down to his staff that the plant is messed up and that they had messed the plant up and it has to be corrected. He reiterated that the clarifier 11 project was top priority to start removing solids from the process.
 - ProStart will be controlling all wasting and return sludge from clarifier 11 and will be coordinating with Dana Garris.
 - ProStart will assume Denite operations on April 15th at 10:00 pm. they will handle all sampling and chemical deliveries for Denite operations, but the city will continue to make chemical orders.
 - Mike made it clear to his staff that they would be using the new EQ tanks (storm EQ) as needed moving forward to control flow through the plant and minimize solids output to the effluent.
 - Bill Simmons expressed his concerns about all of the digesters being nearly full. I asked about the constant comment about the "bottleneck" between high rate (digester/gravity belt thickener area) and the dewatering area. I asked for someone to point these "bottlenecks" out to me next week. I also asked if MES could handle jetting the floor drains and all lines that may be plugged and slowing the flow of thickened sludge to the dewatering area and the city was ok with that.
 - We also spoke to them about the issue with the centrifuges being offline and the fact that the collections belt for centrifuges #1 and #3 would not run if either unit was taken out of service. They are down to one centrifuge since no one is addressing the control issue. I asked them to put in a work order and Prim will assign our maintenance team to correct the issue and get the centrifuge back online. Mike supported this as well.
 - Dan Latova attempted to dismiss all of the small conversation about tank levels and centrifuge and said this conversation should be happening in the field not during the team gathering. I interrupted Dan and made it very clear to Mike and Ron that these conversations should absolutely be happening with everyone together so that all of the information is being relayed clearly and everyone knows what is going on. Mike said Ron was to be scheduling these meetings ("Huddles") weekly and Ron said they would be daily for a while until things settle down. I asked to be included in the meetings.

- Mike pointed out that everyone in the room (except himself and maintenance) were certified operators and he tasked them with pointing out issues that may be made that will negatively impact operations. Work as a team.
- Mike said the Scada system was being upgraded plantwide and the procurement had been approved.
- Centrifuge programming and instrumentation is being looked at by an outside contractor currently onsite and this will occur immediately. I did not catch the name of the contractor.
- After the meeting we were discussing their struggles with dealing with disciplinary issues and the struggle with union rules when Ramona Harry (Operations Officer I) walked in and I called her over. She is part of their HR team. I told her what we were discussing, and it opened up some very interesting dialogue between her and the other city managers. She was clearing up some misconceptions they had about the disciplinary procedures for operators and was tutoring them on the steps allowed to address problem employees under the union agreement. Wayne and I removed ourselves at this point and I was happy to see this conversation occurring. It appears there needs to be an educational session for their managers to understand the steps for effectively managing and disciplining staff.

Solids Handling: Al Razik

- We submitted three MD E Sludge Permit Applications. These will allow the City's Back River and Patapsco WWTPs to transport sludge to Pennsylvania, Virginia and the Quarantine Landfill.
- I had my daily biosolids call with Mike Hallmen. He is going to get me in touch with Aaron Thomas of Hazen, so we can walk through the plant and identify solids processing bottlenecks. This way we can prioritize which equipment needs to be repaired or replaced first.
- Conducted two telephone calls with Denali to answer their questions. This is in regards to the price quotes I requested from them yesterday. We need to get an idea of the solids profile in PST 6 (all solid material, liquid?), sludge feed flowrate for temporary dewatering and capacity of the City's Quarantine Landfill to accept sludge. We also sent them copies of the primary clarifier plans.

Maintenance: Wayne Jackson

- Maintenance escorted Tim Barnes with MBE contractor to different locations.
- Contacted EESCO. Will be on-site 4/18/22 to scope out NETZCH pump for Centrifuge
- Mechanic showed crew additional pumps in High Rate to be serviced. Pumps 5B, 6A, 7B, 8B of lower-level High Rate. Waiting on parts to be dropped off from Patapsco Treatment Plant.
- Sourced control components for Dewatering Building polymer feed units. Met with Walt & stock room personnel to acquire pumps and motors for units (currently on order & should arrive within the next few weeks).
- Worked with operations to test, adjusting packing, & return Digester Multi-Purpose pump #3 to service.
- Worked with Walt & John from DPW Maintenance to review GST pump deficiency list. Acquired repair parts to change out seals & packing on GST pump 2B.

GST Pump 2A Inspected



GST Pump 2B



April 15, 2022

Operations: Joe Wright

- Quiet day today because a lot of the city staff were off for the holiday today. Administration building was locked.
- Ran into Mike Hallmen and Joe with Synagro and clean water is being sent to the pelletizer now. They will be flushing out the system and anticipate having the pelletizer online tonight or tomorrow.
- Helped Al Razik attempt to open a fire hydrant for testing, but it was seized.

Immediate Needs: Skip Immler

- I sent all of the emergency procurement paperwork to Ellen for the work in clarifiers 6 & 7. Ellen sent that paperwork to MES Contracts today. Linda Ruley is contacting GMH to get their FEIN # and make sure they are licensed to do work in the State of Maryland. I put in the procurement forms that the Notice to Proceed date should be 4/25/2022.

Solids Handling: Al Razik

- We met on-site with Waste Management to obtain a price quote for two tasks :
 - Cleaning PST-6
 - Temporary dewatering

- Joe Wright and I attempted to open the city water yard hydrant located behind the dewatering building. The valve is seized on the hydrant and will not open. We need this water in order to use as washwater for the temporary dewatering equipment to be set up by the contractor that we choose to do this work. **Until this hydrant is repaired, the temporary dewatering price quote process will be put on hold. We will work with our Maintenance people to get a contractor at Back River to either repair, or replace the hydrant.**
- Sludge judged PST-6 to determine the solids profile in that clarifier. It is mostly dense, solid material interspersed with pockets of water.
- Visited the hi-rate digesters in order to scope out the purchase and installation of new biogas mixing compressors for hi-rate, in ground digesters 1 and 4.

Maintenance: Wayne Jackson

- Greg is working with Instrumentation shop. (Carolyn Wells)
 - Working to order controllers from ABB
 - Investigating older style handheld interface
 - Email exchange with Carolyn to locate additional polymer dosing check valves
- Spoke with Ellen about hiring outside additional mechanics and electricians.
- Disassembled GST pump 2B (High Rate lower level) & replaced stator seals. Reinstalled pump housing, bearing housing, & new bearing drive collar seals. Reset motor & gearbox but they will have to be realigned on base mount before the drive coupling can be installed. The packing for the drive shaft will also have to be pulled to remove the debris wrapped around the shaft, then be repacked.
- Attempted to exercise yard hydrant behind the Dewatering Facility but hydrant valve is seized. Yard hydrant will more than likely need to be replaced. Reported findings to Al Razik.

Debris Around GST Pump 2B Shaft



GST Pump 2B Seal Replacement





April 18, 2022

Operations: Joe Wright

- Stopped down in the morning to discuss the current progress of the pelletizer operations with Joe from Synagro. The suspended solids were bouncing between 40ppm and 70 ppm at that time. They were waiting for consistent readings below 50 ppm.
- Met with Ron Turner to compare notes and discuss some of my observations as I make my rounds around the facility.
- MES operators have gotten themselves into a rhythm assisting with operations at the facility.
- Attended the weekly MDE-Baltimore City-MES meeting.

Immediate Needs: Skip Immler

- Spoke with Munroe Environmental to check on quote MES received from GMH and Associates. According to Munroe the GMH cost was very reasonable and the time frame to have the clarifier back online was very good. The person I spoke to also knew the owner of GMH and vouched for his integrity and work.
- Attended the weekly meeting at Back River
- Sent all MBE forms to GMH office manager since owner is on vacation. He said he'd fill them out and have them back to us as soon as possible
- Set up a meeting with Ron Turner to look at scum containment in the cL2 contact tank

Solids Handling: Al Razik

- Daily biosolids call with Mike Hallmen.
- Assisted MES Maintenance with selecting a centrifuge feed pump (No. 4) to repair.

- Visited Hi-Rate Digestion area with City staff to scope out digester cleaning project for digesters 1 and 4. Field verified installation details for gas recirculation compressors.
- Started writing specification for cleaning PST-6.
- Attended weekly coordination meeting.

Maintenance: Wayne Jackson

- GST Sludge Pump 2B High Rate - Installed replacement bearing packing. Made and installed replacement inspection plate gaskets. Set and realigned motor and gearbox. Opened valves and tested pump found the stator is corroded and not sealing properly. Parts should be available in the warehouse we will attempt to install and replace tomorrow 4/19/22.
- Met with vendor Will Soistman from EESCO pumps and valve. They will be preparing a quote for the rebuild or replacement of the centrifuge feed pumps 4A and 4B in the basement of the vacuum filter building. (Casey Hanna handling)
- Opened and exercised yard hydrant behind the Synagro building. The hydrant is operational.
- Asked by DPW Maintenance supervisor Walter Kelly to evaluate the replacement of the Silo #7 rubber containment flap. There are safety concerns about this repair, and we do not believe it to be a priority task currently. Contractors may be needed. (I will discuss safety concerns with staff)
- Continued working with ABB PLC representative Rick Gayo. Waiting for call back to schedule site visit.

Centrifuge Feed Pump 4A



Centrifuge Feed Pump 4A

Centrifuge Feed Pump 4B



Centrifuge Feed Pump 4B



Hydrant behind Synagro Bldg. – after exercise and flush



April 19, 2022

Operations: Joe Wright

- Wayne Jackson, Skip, and Joe attended a joint O&M "Huddle" with Back River Supervisors to discuss equipment status for each supervisor's area of responsibility. These "Huddles" ensure the lines of communications are open between the different sections at the plant. These will occur every Tuesday and Thursday.
- Heavy Rains overnight brought 300MGD to the plant due to heavy rains. The city utilized the EQ tanks and 200 MGD went through the plant and 100MGD went to the EQ tanks. Effluent this morning was much better after the rains than last week's post rain effluent conditions. (video attached)
- MES operations staff assisted Back River crew in clearing the floor in the pump station of sludge. Sludge is constantly pouring from the RAS pumps due to packing needing to be replaced. Demond Miller had MES maintenance look into this. Repacking these pumps is an ongoing issue; need a permanent solution.
- Lance Fierro is asking if the city can give him data on % of solids to the centrifuge and polymer usage from 2018, 2019, and 2020. He wants to see how it operated when it was things were automated. Joe will send this request on to Ron Turner.

Immediate Needs: Skip Immler

- Attended Huddle meeting with MES and Back River staff. Discussed several equipment issues
- Assisted with coordinating Back River staff and MES staff to get the cl2 contact tanks cleaned
- Assisted coordinating elevator evaluations with MES staff and elevator contractor. All o/s elevators were looked at
- Answered several questions from Sean regarding the contract with GMH for repairing 2 PSTs
- Forwarded info to GMH questioning their ability to do business in Maryland. GMH filed the appropriate application with the State.

Solids Handling: Al Razik

- Completed price quote specs for sludge removal and disposal from PST-6. Emailed specs to 3 contractors (Denali, Mobile Dredging and Waste Mgt). On a phone call with Denali they indicated that they probably will not give us a price quote for this work because they cannot find a landfill to accept this sludge due to lack of landfill capacity.
- Attended in-house meeting on documenting Back River failures.

Maintenance: Wayne Jackson

- GST Pump 2B – Continued troubleshooting leak. Removed stator from bearing housing and found shaft with significant wear. Removed bearing housing assembly and stator to begin rebuilding. Goal is to reinstall tomorrow 4/20/22.
- Met with Demond Miller and Lance at Dewatering Building to review polymer feed issues, SCADA program issues and Centrifuge operations. We have STH (Rob Hayden) schedule to be onsite tomorrow 4/20/22 to assist with troubleshooting and to provide quotes for replacements. (Pumps, Motors, Controls)
 - Evaluated pumps – 8A, 9A and 10A. Pumps leaking sludge onto station floor. Pumps with need at least the packing replace in not further repairs. Spoke with DPW staff they are looking into the issues at this time. MES will check back to ensure repairs are in progress.
- Attended DPW meeting with Supervisor II's and above to discuss IN and OUT OF SERVICE equipment. Future meetings will occur every Tuesday and Thursday moving forward.

- Casey Hanna escorted G.C. Jones Elevator Company to all Back River elevators for repair evaluations. They will supply an itemized list for each elevator and what repairs will be needed.
- RLG Consultants rep will be onsite Monday 4/25/22 at 0700 to assist with Instrumentation. Will help with PLC issues. (Rick Gayo)

April 20, 2022

Operations: Joe Wright

- Joe received a message from Ron Turner about a sludge spill at the sludge control station. Ron said the cause of the spill was from foaming in the digester. The sludge bubbled up from the ground and had stopped before I got there. The spill was contained via a sand berm. Joe was told by operators at the site of the spill that it happens regularly. Ron and team are looking at drawings to find the source of the leak so repairs can be made. Joe will follow up tomorrow for an update. MDE is to be notified and Joe will receive a copy of the 5-Day report to MDE. Badger was on site cleaning up the spill. (Pics on Share Point)
- Joe reached out to Tim Barnes about getting an MBE for drain clearing at many of the buildings. City was trying to procure a vendor to clear a floor drain, but they appeared to be having issues getting things done. There is 8 inches of standing water in the GBT building's basement.
- Joe instructed Demond Miller to purchase trash cans and push brooms for around the activated 2 & 3 area. We reached out to city staff for the supplies with no response.
- Demond Miller is preparing a list of return pumps that are out of service and building drains that require attention within the activated 2 & 3 areas.

Solids Handling: Al Razik

- We received a second decline to give us a price quote to remove solids from PST-6. This time from Waste Management. The reason given was a lack of landfill capacity to receive the sludge.
- Attended a workshop meeting given by Greeley and Hansen describing their efforts to date.

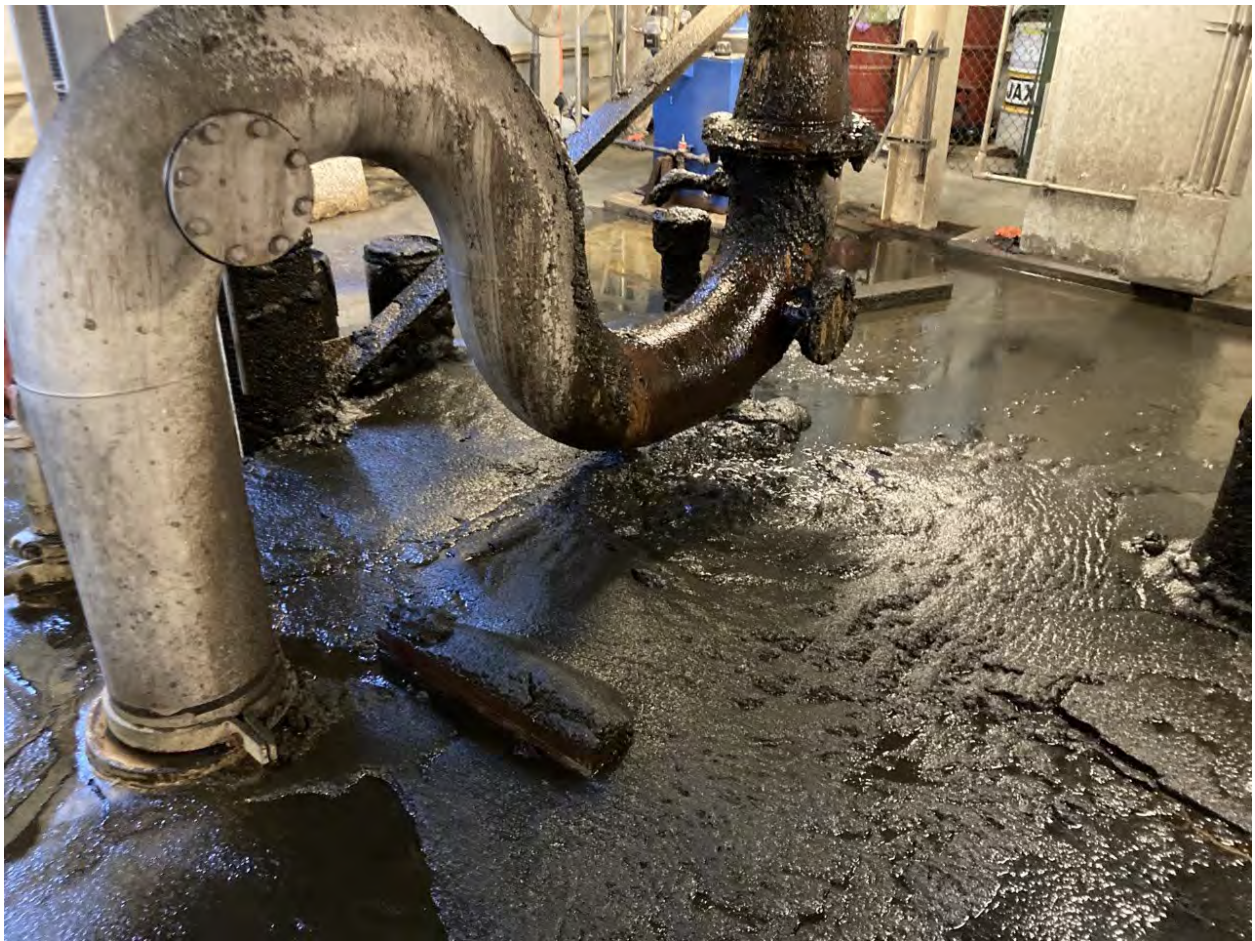
Maintenance: Wayne Jackson

- Completed rebuild bearing housing, rotor stator, & pump housing for GST pump 2B. Transported pump equipment to location. Installed rotor stator & began setting pump & bearing housings.
- Met with Rob from STH to go over needed control repairs & obtain quote for Digester Recirculation Pump #4 VFD & panel (High Rate). Rob was also shown the polymer feed units at the Dewatering Facility to aid with returning units to service.
- Sourced & placed order for control relays to begin making repairs to polymer feed unit controls at the Dewatering Facility.
- Greg Stehli will be making contact tomorrow with vendor (TEAM) for new quote addressed to MES for STOPS to EGG Digester.
- Greg Stehli will be working with Prim (DPW) to assist with purchasing lights. Not sure of location for lights, but will discuss with Prim.

GST Pump 2B Rebuild



Centrifuge #2 Leak









April 21, 2022

Page | 152

Operations: Joe Wright

- Demond Miller reported that there is a contractor onsite that is currently working on the lighting in some of the pump stations around the activated areas.
- Demond provided a list of out of service equipment around the activated area.
- Ron Turner called Joe and notified him that they had sludge bubbling from the ground again. They have a truck coming from the Patapsco plant to clean up the spill. They are having issues locating the source of the leak and cannot isolate the line until they know where it is coming from. Joe will be investigating the source of the leak with the city staff tomorrow.

Immediate Needs: Skip Immler

- Spoke to GMH about MBE participation. They believe they can get about 10%. I told them to forward the MBE documents to MES Contracts.

Solids Handling: Al Razik

- Conducted my daily call with Mike Hallmen (City DPW, Director of Wastewater). We discussed:
 - The problem of receiving no interest by Contractors in cleaning PST-6. In the process of this discussion, I learned that previous PSTs cleaned by Synagro and Ullman Schutte involved taking the clarifier contents to the City's Quarantine Road Landfill (hence the reason they had less problems removing PST material). **However, the Quarantine Road Landfill is not permitted by MDE to receive sludge.**
 - I am to contact the City's Landfill Manager to rectify this and get the proper permits and approvals (we will do this on the City's behalf). I have already talked with Ed Dexter at MDE and he is aware that this is coming his way for a quick turnaround.
- Toured the plant with Aaron Thomas of Hazen to gain some insight on solids processing bottlenecks at the plant.
- Sent EPA 503 Biosolids tonnage data from 2017-2021 for both Patapsco and Back River to Karthik Manchala at Greeley and Hansen

Maintenance: Wayne Jackson

- No maintenance performed. Staff on scheduled leave and CPR Training.
- Friday there is no scheduled maintenance. Staff on scheduled leave and Back Flow Certification training.
- Attended Back River/MES Joint O&M Huddle.
- Work on Budget.

April 22, 2022

Operations: Joe Wright

- MDE - Ron Wicks - onsite to collect sample from the disinfection contact chambers and from the secondary clarifiers.

Immediate Needs: Skip Immler

- I went to Back River this morning to check on the skimmers in the cl2 contact tank. It looks like the skimmers have been repaired. These are manually operated devices so they are activated

whenever the operator at the disinfection plant see scum accumulated behind them. The operator on duty was a trainee and didn't know any thing about the skimmers. The effluent looked much better than usual. I could see approximately 2' down, to the top of the baffles.

- I spoke to Ron Turner and Betty Jacobs about floating boom they were to install in the cl2 contact tank. The booms had been brought over from the Patapsco Plant but had not been installed yet.
- I asked about the sludge spill that happened the other day and they said they were waiting for the vac truck to be brought over from Patapsco so they could clean it up. I asked if a work order had been completed to have the line that broke fixed and was told that had not been done yet.

Solids Handling: Al Razik

- Conducted my daily call with Mike Hallmen (City DPW, Director of Wastewater). We discussed:
 - The problem of previous sludge from the PST's that were taken by Synagro and Ullman Schutte to the City's Quarantine Road Landfill even though it was not permitted by MDE to receive sludge. Answered questions from MES staff about this problem.
- We delivered the checks for the sludge permit application fees to MDE today. Hopefully they can rush two of the permits to us early next week.
- Made two calls regarding sludge removal from the PSTs. One was to Aries Clean Technologies, which just constructed a gasifier in Linden, NJ. All of their capacity is booked up. The second call was to Waste Management. I asked if they could accept the PST sludge if we stabilized it with an amendment, such as lime. They might be able to accept this at their landfills in Virginia.
- Received the TCLP results for the sample we took on April 7th.
- Started working on the digester cleaning specs for hi-rate digesters #1 and #4.

Maintenance: Wayne Jackson

- No maintenance activities today.

April 25, 2022

Operations: Joe Wright

- The effluent looked and smelled like normal effluent should today.
- Walked the effluent pier to inspect the outfall area since MES staff has never walked the pier area. Nothing out of the ordinary to note other than the floating solids under the end of the pier that we already know about.
- Baltimore City staff emptied and cleaned disinfection contact chamber #3 over the weekend.
- Attended the weekly MDE/Baltimore City/MES meeting at Back River.

Maintenance: Wayne Jackson

Maintenance was performed on GST Sludge Pump 2B.

We performed the following tasks:

- Installed replacement bearing packing
- Fabricated and installed replacement gaskets
- Set and realigned motor and gearbox
- Removed stator from bearing housing and found shaft with significant wear
- Removed bearing housing assembly and stator for rebuild
- Completed rebuild and installed. Ran operational checks and returned to service.

Cross connection valve lower-level high-rate GST building

- This task was canceled today. We are schedule to remove broken valve tomorrow.

- Valve works with the EGG Digesters and will allow you to transfer from High Rate to Centrifuge.

April 26, 2022

Operations: Joe Wright

- I was given access to the drawings for Back River. I will download the drawings, so MES has a copy separate from the City's files. As I download them, I will place them on the Share Point.
- Attended the Tuesday "Huddle" with Back River supervisors for each area. They discussed the various equipment that was out of service. A few items that were discussed:
 - The flow restriction from High Rate to the dewatering area. They discussed ways to increase the flow from 550 GPM to 800 GPM. They can gravity feed from the Egg digesters and will do so to allow MES maintenance to change out the cross-connection valve.
 - Staff are assessing the clarifiers to identify any that require skimmer and/or scrapper work. MDE hit them for floating solids in the clarifiers.
 - Staff will be generating a list of out of service pumps RAS, WAS, Scum pumps and mixers for the activated sludge area. Ron said he needed this info from them by Friday.
 - Maintenance is going to swap out pumps and get the second centrifuge online today.

Immediate Needs: Skip Immler

- Attended weekly meeting yesterday
- Worked with Tim Barnes and Ezgi to get MBE paperwork done for the GMH/Clarifier contract

Solids Handling: Al Razik

- Digester Cleaning
 - We started transferring sludge from hi-rate digester no. 1 to the centrifuges in preparation for digester cleaning. We will transfer as much liquid as there is in digester no. 1 then will do the same for digester no. 4
 - Continued writing specs to bid the digester cleaning project
- Attended Weekly Coordination Meeting at Back River
- Sludge Disposal Approvals from MDE at Quarantine Road Landfill
 - Spoke with James Rohrbach, Chief, Solid Waste, at the City about modifying their Refuse Disposal permit to allow for accepting sludge
 - Submitted a request to MDE's Solid Waste Program to allow for accepting sludge at Quarantine Road Landfill. They told me that because the City's landfill has a lot of compliance problems, **they are only going to approve accepting sludge for 6 months, and not on a permanent basis.**
 - We are also going to have to prepare an MDE Sewage sludge Utilization Disposal Permit for Quarantine Road Landfill (In progress)
- Synagro – Discussion with Matt Tabisz (their business development person) about additional things they can do for us. I said the best thing they can do right now is get their pelletizer on-line. I also told him that we will be bidding out cleaning of digesters 1 and 4.

Maintenance: Wayne Jackson

- Started to remove Cross-Connection Valve between Multi-Pump #2 and Pump #6 (Anaerobic Digester Lower Level). MES was requested to stop midway. DPW must first prepare system and

MES is scheduled to resume replacement of valve tomorrow morning 4/27/22. Maintenance will need to cut most of the bolts and system will need to shut down no more than 48 hours. Line must be drained. Goal is to be complete tomorrow and staff will remain until finished.

- Working on getting updated quote for mechanical seals for Pump Station #2 RAS Pumps. Need only 9 seals and not 16. Quote should be significantly less from 200k.
- Attended Back River DPW / MES O&M meeting. Discussed cross connection valve replacement and other maintenance needs for secondary buildings.
- RLG Consultants will provide quote for new updated ABB Controllers.
- Greg spoke with TEAM (Vernon Chila) to revise quote for STOPS at the EGGS. MES will need to confirm that DPW will provide rigging and equipment. Greg Stehli will touch base with Prim to verify. They could not provide a quote to install isolation valves.
- Received approval to purchase new VFD for Digester Recirculation Pump #4. Lead time 4-5 weeks. Cost \$10,960 and 180/hr to program PLC. (STH)

Cross Connection Valve GST



Pump Station #2 RAS – Pump seals to be replaced





April 27, 2022

Operations: Joe Wright

- Downloaded Back River WWTP drawings from a link that was shared with me and uploaded them into the MES SharePoint group.
- Updating the Back River WWTP priority list with equipment status.

Immediate Needs: Skip Immler

- Spoke with GMH about contract progress. Gary Hochschild stated he would get everything required by MES procurement back to the team this week. He stated that one sub had already been out to look at clarifier 7. Demo, measurements and drawings for start the week of May 8th.
- Updated the Back River priority list.

Solids Handling: Al Razik

Had my daily telephone call with Mike Hallmen.

- We decided to have Synagro clean PST-6 because their staff is already on-site and ready to start work. Material removed will be stored on site in the lagoons until we revise the Quarantine Road Landfill's permit to allow for sludge acceptance. The City will handle procurement using their existing contractual agreement.
- We discussed Synagro's pelletizer operation. Mike stated that he is waiting on a quote from United Rentals to tie into a 12" city water line near Synagro's operation. This will provide an above grade water line to Synagro and therefore there will no longer be any excuse for not drying.

- Our sludge disposal permit application is done. We will send it to the Solid Waste Bureau head tomorrow to sign.
- Attended weekly meeting with Greeley and Hansen, City staff.

Maintenance: Wayne Jackson

- Staff still on-site removing and replacing Cross Connection Valve. Few hiccups, but moving in the right direction. They will be working overtime to complete today.

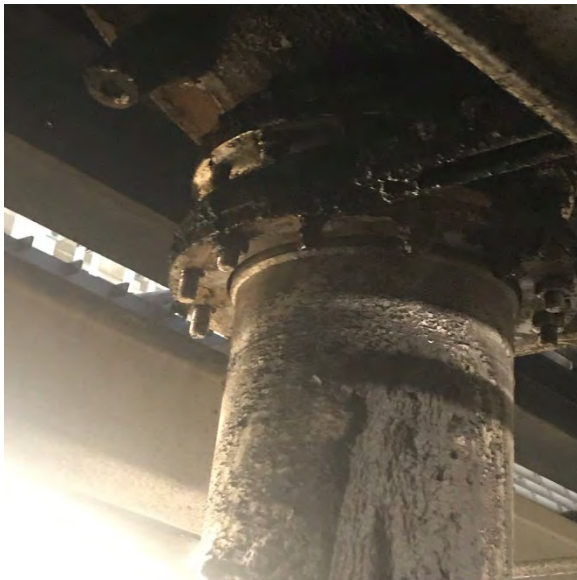
Cross Connection Valve – Before



Cross Connection Valve – After



Centrifuge #2 Leak



Low Pressure Switch Scum #3



Centrifuge #1



Centrifuge #2



Centrifuge #3



Centrifuge #4



April 28, 2022

Operations: Joe Wright

- Attended Thursday "Huddle" with Back River supervisors. They discussed various equipment that are down or that have been fixed. I will update our priority list as needed with the info from the meeting.
- The city discussed the need for PM's and repairs to their almost 200 mixers around the activated sludge area. After speaking with Ryan Zacherl and Casey Hanna, I reached out to Ron Turner and the City gave MES the go ahead to start tackling the mixers.
- Demond Miller is working to generate a checklist for each shift to ensure assigned tasks are completed each shift (Activated sludge area).
- There are issues brewing between city field managers. Ron Turner brought in a mediator yesterday to talk with them, and nothing appears to be resolved. There was still obvious

Page | 165

animosity between a few managers at today's 'Huddle'. One of which is the Plant Operations Supervisor.

- The pelletizer has been intermittently going down due to lack of water. During low flow periods, the level in vault 11 drops so low that they cannot pull water from it.

Solids Handling: Al Razik

- Sent the MDE sludge permit application that Heather prepared to the Chief of the City's Solid Waste Bureau for signature.
- Updated the CIP status spreadsheet for Mohamed Rahman (City DPW)
- Spoke to Delcora in PA to inquire if they could take material from Back River. Their Pre-Treatment person will get back to me with an answer.

Safety/Compliance: Erin Lanagan

- Received a set of process drawings from DPW.
- Toured plant with Amy Kline, new Asst. Chief of Safety and Env. Compliance.

Maintenance: Wayne Jackson

- Sludge Thickener Pump 6B
 - Dismantled carter drive to evaluate & determine repair parts needed. Begun acquiring parts & rebuild.
- MES Maintenance will begin performing Mixer PM's. Scheduled to meet DPW Walt in the next few days to get details and locations. MES will enter assets into our work order program and set up PM's.
- Performed walk through with DPW Operations Supervisor Bill Simmons of EDG & APR building to evaluate repair needs of recirculation & effluent pumps.
- Staff attended DPW/MES O&M meeting.
- Contacted STH for purchasing update for mechanical seals. Also, STH will be onsite tomorrow 4/29/22 @ 9am to evaluate repair parts for EGT and APR buildings.
- Met with DPW Harry for additional tasks. Will be replacing Mag-Meter at GST.
 - Parts received two years ago and trying to locate.
- Cross-Connection Valve - cut grate to fit around new valve.
- Greg Stehli is trying to meet/speak with DPW Prim in reference to TEAM and STOPS for EGG Digester. DPW will need to verify several items before we can begin to move forward.

Sludge Thickener Pump 6B Rebuild





Cross Connection Valve



April 29, 2022



Operations: Joe Wright

- Added equipment updates to the Back River WWTP priority list.

Solids Handling: Al Razik

- The MDE sludge permit application for using the Quarantine Road Landfill was signed by City's Solid Waste Bureau Chief and was sent to MDE today.
- Sludge judged PSTs 8, 9 and 11 to get an idea of the sludge blanker depths. Almost no sludge in two of the PSTs, and 1 ft in one them.
- Talked to Mohamed Rahman (City DPW) about the CIP status spreadsheet ; he needed clarifications.
- Dan Latova (City DPW) had me check on the status of the Ullman Schutte's job of removing phragmites from the GSTs (see attached pictures). They have made some progress, but still need to remove more phragmites.

Maintenance: Wayne Jackson

- Process (Gravity Belt Thickener)
 - Sludge Thickener Pump 6B - continued to rebuild Carter Drive. Time consuming task, hard to find parts; upgrading may be more cost effective.
- Evaluated PM tasks for over 200 Mixer/Aerators in Activated #2 & #3 & #4 areas. Evaluated procedures and necessary tools to complete task.
- Conducted walk through with vendor STH of EGT and APR buildings to evaluate repair needs. STH will provide quotes for a replacement pump and motor for effluent pump #2 and replacement mechanical seals for APR recirculation pumps 1, 2, and 3. STH will also provide PLC programming trouble shooting of APR Building DPC panel display screen during their programing of High-rate digester recirculation pump #4.
- Greg still trying to meet with Prim for contractor TEAM and installing STOPS at EGG Digester. Prim has been on leave.

Activated 2, 3 and 4 Mixer-Aerator



Anerobic Digester APR Building DPC Panel



May 2, 2022

Operations: Joe Wright

- Area supervisor Dana Garriss asked for statements from Matt Hammons, Joe Hott and Mike Addison about two (separate) incidents involving possible falsification by city staff and from Lance about an incident of a city employee refusing to assist with troubleshooting centrifuge operations.
- City staff drained and cleaned disinfection contact chamber #2 over the weekend.

Maintenance: Wayne Jackson

- Process (Gravity Belt Thickener)

- Sludge Thickener Pump 6B
 - Continued rebuilding CARTER Drive. Needed to have machine shop modify parts. Unit is almost ready to reassemble once machine shop is complete.
- Sludge Thickener Pump 7
 - Started disassembling for rebuild.
- GBT Thickener Pump 1/7 - Received call for low flow. Staff went to troubleshoot pump but found bad flow meter and pump is operational. Will investigate for replacement meter.
- Casey Hanna attended MES/DPW meeting on MES Maintenances behalf.

Sludge Thickener Pump 6B



Sludge Thickener Pump 7



Sludge Thickener Pump 7



May 3, 2022

Operations: Joe Wright

- Attended the Tuesday "Huddle" with Back River supervisors for each area. They discussed the various equipment that are out of service and equipment that is being fixed.

Immediate Needs: Skip Immler

- Received Certificate of Insurance from GMH. Should get Bond shortly.

Solids Handling: Al Razik

- We received the MDE Sludge Permit which allows us to transport sludge from Back River and Patapsco to the Quarantine Road Landfill.
- We completed a draft of the digester cleaning bid specs for HRDs 1 and 4. I will send this to Mike Hallmen for review, with a few questions that I need to have answered.

- See the attached photo of the discharged water from the yard hydrant that I opened up today the near digesters. It almost looks like sludge, and not non-potable plant water (effluent).

Discharged water from yard Hydrant



Maintenance: Wayne Jackson

- Process (Gravity Belt Thickener)
 - Sludge Thickener Pump 6B
 - Continued with rebuilding of CARTER Drive.
 - Still waiting for some parts to be fabricated. Looking into alternative type of pump to replace.
 - Sludge Thickener Pump 7
 - Started breakdown of bearing housing
 - Bearing & Auger shafts seized together
 - Auger & Rotor Stator may need replacement, due to pump being ran dry.
- Process (Anaerobic Digestion)
 - Digester Recirculation Pump 3
 - Began disassembling pump for bearing housing rebuild
- Process (EGG Shape Digesters)
 - Evaluated valves and piping for upcoming plug installation with DPW staff. Determined installation needs and locations.

- One of Three pumps is running.

Sludge Thickener Pump 7



Digester Recirculation Pump 3



May 4, 2022

Operations: Joe Wright

- Did not visit the site today.

- Received a memo from Lance Fierro on centrifuge operations, detailing a pattern of some DPW employees not wanting to run all available equipment to get the solids down. Mike Hallmen to address the DPW employees.

Immediate Needs: Skip Immler

- Attended weekly meeting with Greely Hanson.

Solids Handling: Al Razik

- A draft of the digester cleaning bid specs for HRDs 1 and 4 was sent to Mike Hallmen for review.

Maintenance: Wayne Jackson

- Process (Gravity Belt Thickener)
 - Sludge Thickener Pump 6B
 - Continued with rebuild of CARTER Drive. New parts had to be machined. Time consuming task.
 - Sludge Thickener Pump 7
 - Removed bearing housing, rotor stator and auger. Started rebuild.
 - Operates in manual.
- Process (Anaerobic Digestion)
 - Digester Recirculation Pump 3
 - Removed and disassembled bearing housing. Assembled new drive shaft and bearings. Rebuild will continue tomorrow.
 - Operates in manual

Sludge Thickener Pump 7



Sludge Thickener Pump 7



May 5, 2022

Operations: Joe Wright

- Attended the Thursday "Huddle" with Back River supervisors for each area. They discussed the various equipment that are out of service and equipment that is being fixed. They plan to install temporary lighting outdoors at the tanks until the lighting needed becomes available. City maintenance have been directed to begin fixing the traveling bridges that are offline at the filters.
- I have requested a copy of the equipment list that each area supervisor provided to Ron that indicates equipment status.
- Ron advised his staff that there will be repercussions for staff not cooperating or not working in general. He wants names, dates, and investigative reports on all personnel complaints.
- MLSS remains around 6,000 mg/l in the activated sludge process.

Solids Handling: Al Razik

- Digester Cleaning. I inspected digesters HRD-1 and -4 to determine the level of material in them. Despite having the pump on in HRD-4 for almost two weeks to transfer liquid to dewatering, there's still liquid sludge in that digester (and in HRD-1 as well). It looks like the pumps are either clogged or are not working for some other reason. Because we have to remove as much liquid as possible from the digesters before we clean them, I am going to arrange for one of our sludge haulers to do an interplant haul project to take liquid sludge from the digesters to Tank 26 (dewatering).
- I sampled HRD-4 for a TCLP analysis (and other parameters). This was a liquid sample.
- I called Merrill Bros. , a biosolids company in Indiana which does work on a National scale. They are interested in bidding on the digester cleaning project.
- I receive a call from a rather agitated James Rohrbach, who is the City's Chief of Solid Waste Disposal Services , in charge of the Quarantine Road Landfill. He was concerned about the MDE approved plan to accept sludge at the landfill. His concerns are about how to mix the sludge with the solid waste. I told him we do this at Mid-Shore II every day and that I would call Eric Frase (our supervisor at Mid-Shore II) and get back with him on the procedure to dispose of sludge at the City's Landfill. I spoke with Eric to get details. I will contact Mr. Rohrbach tomorrow with some guidance.
- I spent some time with Bill Sammons (Hi-Rate Supervisor) and took a tour noting some of the equipment that was inoperable (with pictures; I'll upload pictures to the SharePoint as soon as I get a chance). Bill is going to get me a written list of all the problem areas and broken equipment. I'll resume the "tour" next Monday.

Maintenance: Wayne Jackson

- No MES Maintenance staff onsite tomorrow, Friday 5/6/22.
- Over the past several weeks DPW has been reluctant to share work with MES Maintenance. *Today was the turning point and now Operators are coming to MES Maintenance, sharing problems areas, and pointing out inoperable equipment.* I believe that the Plant Operators trust MES Maintenance and are seeing results. They truly want their equipment fixed and now have frequent dialog with MES Maintenance.
- *DPW Maintenance Supervisor Walt gave MES Maintenance free range to fix whatever MES Maintenance or the Operators points out as inoperable.* Walt expressed that if we run into any problems while working, to come and speak to him directly and he will rectify the situation.
- Today we also had a vendor (Hills - Motors, Pumps, Controls, Power Transmission) onsite with the capability to purchase new equipment and install. They are working on several quotes to begin replacing pumps at the Sand Filters. They also have two (2) PLC Technicians able to assist and Greg Stehli will continue to work with Hills as we identify issues. They will be working on Sand Filter pumps due to the Operator speaking directly to MES Maintenance.
- Today, Scott Kearney and Patrick Carling were able to provide Back River with an additional work truck with tools. We will be bringing vehicle to Back River on Monday. This will be a huge help!!!

- Process (Gravity Belt Thickener)
 - Sludge Thickener Pump 6B
 - Continued with rebuild of CARTER Drive.
- Process (Anaerobic Digester)
 - Digester Recirculation Pump 3
 - Completed rebuild of housing
 - Transported to location and will complete install on Monday.
- Process (Gravity Belt Thickener)
 - Installed motors for Polymer Feed Pumps #1 and #2
- Process (EDG)
 - APR Effluent & Recirculation Pumps
 - Escorted Hill's Electric rep to begin supply quotes for replacement mechanical seals, pumps, & motors.
- Process (Gravity Belt Thickener)
 - Escorted Hill's Electric rep to begin supply quotes for replacement mechanical seals, pumps, & motors.
- Process (Activated II)
 - Escorted Hill's Electric rep to begin researching & quoting RAS pump mechanical seals & replacement motors & pumps with mechanical seals for all four WAS pumps.
- Process (Sludge Dewatering)
 - Escorted Hill's Electric rep to begin assessing SCADA/PLC communications issues & automation functions for centrifuges & polymer feed. Hill's will review information & quote for their Technicians T&R SCADA/PLC issues.
- Process (Sand Filters)
 - Escorted Hill's Electric rep & work DPW to create repair plan to begin Sand Filter repairs to return facility functionality.
- Process (DAF)
 - DAF Sludge Thicking #2, #3, #4
 - Locate & collect nomenclature on TSP pumps & control & create plan to return to service

Notes

- We have determined that the reason for high number of rebuilds is due to improper rebuilds. DPW is using TAPE to hold grease spacer plates together when assembling. The TAPE is never removed, thus blocking grease ports (see attached pics). When greased, the lubrication never reaches the bearing and is run dry and causes premature failure.
- EESCO will be onsite Monday to start Centrifuge Feed Pump repairs for 4A and 4B.
- DPW Walt is working with Stehli to begin troubleshooting failed PLC systems.
- Attended MES/DPW Huddle

Bearing Housing Grease Channel



Dry worn bearing removed Polymer Feed Pumps #1 and #2 motor installs



May 6, 2022

Operations: Joe Wright

- Did not visit the site today. Will be off all next week. Demond Miller to supply operations information for daily report in my absence.

Immediate Needs: Skip Immler

- Attended CIP Meeting
- Received notice that Bonds had been overnighted to Sean Coleman. Contract with GMH should be executed by Monday I would guess.

Solids Handling: Al Razik

- Digester Cleaning. I completed the specs. I will send them out to contractors on Monday to get quotes. I also contacted two sludge haulers, (Gerald Taylor Co. and Robert Beall) and invited them to Back River to scope out price quotes for hauling liquid sludge from HRDs 1 and 4 to Tank 26. Kevin Lindecamp of Gerald Taylor will be at Back River on 5/9/2022 at 11 AM.
- I called James Rohrbach (City Landfill Section head) and got back to him on the procedure to dispose of sludge at the City's Landfill.

Maintenance: Wayne Jackson

- No MES maintenance staff were on site today.

Engineering: Matt Lapinsky

- I participated in a call with G&H and the City regarding the capital project review and ranking.

May 9, 2022

Operations: Demond Miller

- Centrifuge- Lance is prepared to teach all he knows to the city folks at sludge dewatering facility. If they can motivate their folks to want to get it done.
- I want to begin housekeeping on clarifiers. Need skimmer nets to remove scum and stop the progression of vegetative growth.
- Sludge in reactors is becoming darker needs to be wasted. I'll update you tomorrow on who's asking liquid side to slow down on sludge wasting.

Immediate Needs: Skip Immler

- Checked on contract with GMH to work on clarifier 7. GMH said they were told by MES Contracts they should have it by 5/10/2022.

Solids Handling: Al Razik

- Met two sludge haulers at the plant to get quotes for hauling liquid sludge from hi - rate digesters 1 and 4.
- Sent digester cleaning specs for hi rate digesters 1 and 4 to six contractors to get price quotes
- Attended weekly coordination meeting.

Maintenance: Wayne Jackson

- Process (Anaerobic Digester)
 - Digester Recirculation Pump #3
 - Completed rebuild of Digester Recirculation Pump #3 bearing housing. Completed install of rebuilt bearings housing, tested all functions, and returned to service.
 - In service
 - Operates in manual

- Process (Anaerobic Digester)
 - Digester Recirculation Pump #1
 - Conducted troubleshooting of Digester Recirculation Pump #1 due to high pressure suction fault. Found faulty pressure switch on discharge line. Replaced pressure switch, tested pump and all functions and returned to service.
 - In service
 - Operates in manual
- Process (Sand Filters)
 - Sand Filter #1
 - Conducted replacement of non-functioning backwash pump, tested, and returned to service. Replaced malfunctioning proximity switch on carriage, tested all functions and returned to service. Cleaned, exercised, and greased discharge valve. Once vegetation and debris are removed from sand filter, the area can be filled and tested completely.
 - Out of service
 - Operates in manual

Digester Recirculation Pump #3





Sand Filters #1 Backwash Pump



May 10, 2022

Operations: Demond Miller

- Activated Influent looks a lot clearer today. Contact chamber #1 is back online, effluent looks great!
- Conducted a liquid side tour with Matthew Lapinsky. He also visited Headworks as well.
- MES maintenance were onsite to perform PM on mixers for reactor #5. And will continue until all mixers and aerators are completed for all plants. (144)
- Attended Tuesday's meeting. They've discussed many things that still need to be fixed. Here are a few:
 - GBT- WAS pumps out of service, only #5 is in-service. Need redundancy.
 - DNF- water issues corroding air valves
 - MES Maint.- Asked for all open MWO that have been closed.
 - **Solids- Yusef put priority on wasting/getting down the sludge inventory.**

Immediate Needs: Skip Immler

- MES Legal had an issue with the Bond for GMH. GMH stated that the problem could be worked out. Had to do with a clause about Covid. Haven't heard from MES Legal yet
- Asked for and received an assessment of PSTs from Back River staff. It was not accurate. I will check with Tim Wolfe later this week. He's gone for a couple days.
- Confirmed with Gurminder Singh that MES was rehabbing PST 2 and 7

Solids Handling: Al Razik

- Worked on assessment report
- Virtual meeting with Rayford McEachern (DPW Operations Engineer) to go over data for solids processes. This was a good meeting. Not only did he send me several years of sludge processing and biosolids compliance data, but also data for almost the entire plant.

Maintenance: Wayne Jackson

- Process (Activated II)
 - Mixer AS2-05-MA-4
 - Performed PM. Changed oil and installed new drain valve to streamline future oil changes. Tested and returned to service.
 - In Service
- Process (Sludge Dewatering)
 - Sludge Pump 4B
 - Contractor EESCO installed replacement motor and began troubleshooting for additional issues. Pump missing speed adjustment actuator and other parts EESCO will see what they are able to source.
 - Out of Service
 - Automation Status - Operates in manual
- Process (Sand Filters)
 - Sand Filter #1
 - Conducted oil change in gear box of carriage and greased all parts, tested, and returned to service.
 - In Service
 - Automation Status - Operates in manual
 - Sand Filter #5
 - Troubleshoot controls and replaced blown fuse, returned wash water pump back to service. Tested carriage functions. Greased and exercised valve to begin draining so repairs can be made.

- Out of Service
- Automation Status - Operates in manual
- Attended MES/DPW Huddle meeting
 - Requested once again for a list of open work orders.
 - DPW cannot provide list of open work orders due to work order program being shut down and offline.
 - Due to missing payment
 - According to staff work order program was offline for a two-year period. We are attempting to get date range of shutdown, no luck.
 - We did hear that Head Works has over 100 open work orders.
 - Walt (Maintenance Supervisor) does not want to give Greg Stehli the number of open work orders but did say the number is large. Believe he is just trying to protect himself, and not being difficult. Walt has worked very well with our MES Maintenance team.
 - While in the meeting, DPW staff would share out of service equipment within their areas. Betty would ask who is taking ownership of repairs. *DPW Maintenance would remain quiet and then Betty would ask the Operators who should take lead on repairs. Every time the Operators would say please have MES handle repairs.*

Mixer PM Activated 2







May 11, 2022

Operations: Demond Miller

- Dana Garriss requested one supervisor and two operators for Centrifuge ops. She said they needed someone to monitor as well as ensuring city folks do their job. Lance Fierro to provide additional training for DPW centrifuge operators.
- Dan Latova asks if we can run the mlss on plant #4 tomorrow. Flow is already going over the weir.
- I'll have word tomorrow on who wants to work nights to cover Mike Addison's shift (he resigned this morning) or we'll wait until Monday to look at who we can use from the list.

Solids Handling: Al Razik

- I completed my portion of the equipment status/priority list in SharePoint
- I attended the weekly (virtual) meeting with City, MES, and Greeley and Hansen staff today.
- I continued working on the Assessment Report (wrote cover letter)

Maintenance: Wayne Jackson

- Process (Activated 2)

- Mixer AS2-05-MA-3
 - Performed PM. Changed oil and installed new drain valve to streamline future oil changes. Tested and returned to service. Will need to place bulk order for oil to continue PM's. Two of the large mixers used 40 gallons of oil.
 - In Service
- Process (DAF Sludge Thickening)
 - Lower-Level Floor Drains
 - Conducted Jetting of lower-level floor drains until DPW Jetter line broke.
 - New hose will be installed tomorrow by DPW.
 - Worked with DPW Valve Crew to remove standing water in grates to locate line to be jetted.
 - Scheduled to circle back tomorrow when Jetter fixed.
- Process (Sand Filter)
 - Sand Filter #1
 - Installed replacement suction hose for wash water pump on Sand Filter #1 and returned to service.
 - In Service
 - Operates in manual
 - Sand Filter #5
 - Conducted replacement of Back Wash pump on Sand Filter #5. Completed oil change on carriage gearbox and greases all points, tested all functions, and returned to service.
 - In Service
 - Operates in manual

DAF - Jetter Head cut in floor drain from years ago



Sand Filter #5 Backwash Pump – Before



Sand Filter #5 Backwash Pump - After



May 12, 2022





Operations: Demond Miller

- Lance will be going over to centrifuge tonight to help them transfer sludge to tank 26 to keep it going.
- I think the city would like these operators for centrifuge now because they cannot rely on their folks to do anything.

Immediate Needs: Skip Immler

- Completed PST section for MDE letter

- Was directed by Matt Lapinsky to assist Al Razik with the purchase of 3 air compressors for the solids side.
- Spoke to Al. He will give me specs for the compressors next week

Solids Handling: Al Razik

I visited almost every area of the plant today. Here's my report (also see pictures, attached):

- The primary clarifiers are a mess. The arm on PST-9 broke two days ago (see picture). Thus, there are only two PSTs in service now (out of 11 total). PST-10, which is out-of-service and has been waiting for a fix to the clarifier drive for some time now, was used this weekend during the heavy rain events. There's a noticeable mat of solids buildup in the tank. Soon, it could resemble the other tanks that are full of solids. We need to bring this up at our meeting on Monday (i.e., who is going to fix PST-9, and when is PST-10 going to be repaired)..
- Aeration Plant No. 4 looked OK. Aeration basins 2 and 3 looked OK, but darker in color. Probably higher solids. I took pictures of the effluent from two of the final clarifiers - it looked OK as well.
- I visited the chlorine contact chambers / final effluent area. The effluent looked OK (slight greenish tint though).
- I visited the centrifuge building. Only Centrifuge No. 1 was running (out of 4 total). The brand new motor for Centrifuge No. 3 was just sitting there, not installed. No operators were at the centrifuge area.
- I went to talk to Casey Hanna and his crew doing work at the sand filter building. There is a question of whether or not we should be replacing sand media (see my earlier e-mail today).
- I had Heather Fritz call Veolia to get the compost facility to start reporting to us tonnages they receive on a weekly basis (yes, Veolia will do this).
- I visited the Hi-Rate Digestion area, to complete my listing of inoperable equipment. The Roots gas meter, which measures digester gas produced for ESD #7, runs backwards. It probably needs to be repaired or replaced.
- Hi-Rate Digestion - Cleaning digesters 1 and 4. I received a quote from Robert Beall Co. to transfer liquid sludge from these digesters to Tank 26. I am expecting one more quote.

Maintenance: Wayne Jackson

- Attend MES/DPW Huddle meeting.
 - Discussed Out of Service equipment
 - Yosef attempted to have MES and DPW discuss working together and the issues he believed MES and DPW were experiencing.
 - Chris Kroen directed the meeting and MES Maintenance stayed after meeting to discuss with Chris and Ramona.
 - MES explained that we believe that if both teams MES and DPW would combine forces, we believe we could have a greater impact on deficient equipment and a better turnaround on closing out work orders.
 - I (W Jackson) explained that we don't want to take control of the maintenance department but would like to split our team up with members of DPW Maintenance. This way we could both have 5-6 experienced crews working on deficient equipment.
 - MES could also provide training to any staff willing to learn.
 - Ramona said we have some hurdles to cross with the Union. No Apprentices can work for or take orders from someone outside DPW. I explained that if teams are broken out correctly, we shouldn't have an issue. If we take one DPW Technician III with their apprentice's and one MES Mechanic, we should be able to work

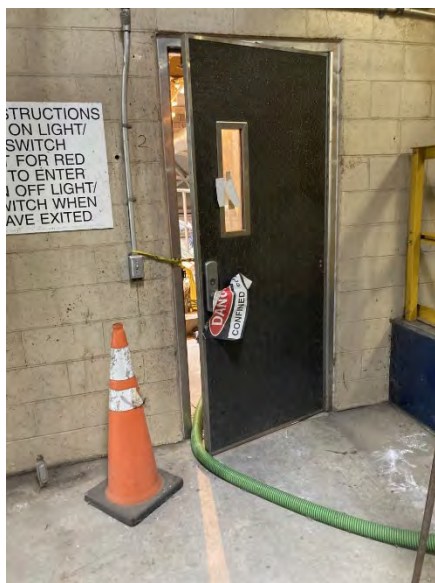
- within the Union guidelines. The Apprentice would report to the Technician III and we can all work together. Ramona will discuss with Yosef and the Union.
 - According to Walt (DPW Maintenance Supervisor) he has six (6) veteran mechanics.
 - MES has two (2) Maintenance Supervisors, one (1) extremely experienced Lead Mechanic and two (2) excellent mechanics able to break into multiple teams.
 - Combining both DPW and MES, we should be able to put together six (6) outstanding teams and decrease the turnaround time. This will also assist MES with navigating the DPW procedures and again decrease the turnaround time and begin to reduce the backlog of open work orders.
- Attended meeting with Prim and Walt to begin discussions on how we can combine staff and some of the issues everyone may encounter.
 - DPW concerns
 - MES embarrasses their staff
 - MES becomes frustrated with lack of performance from DPW maintenance
 - DPW staff expressing that if they work with and teach MES their jobs; MES will push them out of a job.
 - I assured Prim and Walt that we can handle and work through all these issues. This is not the first time we have been in this situation. MES Maintenance went through the exact scenario with the airport and learning to work with and navigating the Union with State employees working for the MAA.
 - The plan is for Walt to speak with his staff Monday and hopefully begin working together next Tuesday.
 - DPW work order program is back online. Both Greg and I met with Mike. Mike is working to provide MES with a report of all Open Work Orders.
 - Currently, no one knows how to pull reports from work order program. Program is called ELKE. The individual who performed this task, has retired.
 - I was able to view some open work orders in the system. There is a significant amount of open work orders in the program. **Some date back to 2001. 21-year-old open work orders.**

Work Performed

- Process (Activated II)
 - Mixer AS2-05-M-5
 - Performed PM on Mixer AS2-05-M-5. Changed oil and installed new drain valve to streamline future oil changes. Tested and returned to service. Will need to place bulk order for oil to continue PM's.
 - In Service
 - Mixer AS2-05-M-4
 - Performed PM on Mixer AS2-05-M-4. Changed oil and installed new drain valve to streamline future oil changes. Tested and returned to service.
 - In Service
 - Process (DAF Sludge Thickening)
 - TSP Pump #2
 - Conducted troubleshooting of TSP pump #2 in fault. Found discharge plug valve not operating in remote. Opened valve manually and tested pump and returned to service.
 - In Service
 - Operates in manual
 - Process (Sand Filter)
 - Sand Filter #9
 - Conducted shut down of Sand Filter #9. Closed effluent valves to drain, will begin repairs tomorrow 5/13 once draining is complete.
 - Out of Service

- Operates in manual
- Sand Filter #13
 - Evaluated Sand Filter #13 to diagnose backwash pump issues. Troubleshooting will begin tomorrow 5/13.
 - Out of Service
 - Operates in manual

DAF Building Tank 2





May 13, 2022

Immediate Needs: Skip Immler

- Spoke with GMH. The contract has been executed. GMH will start work Tuesday. First they will remove a pinion gear for Uliman Shulte in one of the o/s clarifiers then they will start verifying measurements in clarifier 7.
- Reviewed Wayne Jackson's section of the MDE letter.

Maintenance: Wayne Jackson

- Process (Gravity Belt Thickening)
 - Thickened Sludge Pump #2
 - Conducted removal of thickened sludge pump #2. Began to tear down and rebuild bearing housing. We plan to use the bearing housing and shaft from #2 to return GBT #7 into service. GBT #2 has been cannibalized beyond repairs and will need a full rebuild.

Notes

- The shop that DPW gave MES Maintenance is next to a wash bay for vehicles. Our staff have noticed many different personal vehicles being washed by several different DPW employees. For the most part this is done during lunch hours. DPW staff have had conversations with our maintenance team letting them know they receive payment or lunch is bought for them for

washing vehicles. It may be their lunch break, but don't believe this is an ethical practice using City resources to make a secondary income or receive lunch as payment for services provided.

- Sent all invoices to Ramona for her records. (Only MES Maintenance invoices)
- Received quote for replacement pumps at Sand Filter. Each pump is \$9,288 and want to purchase at least 12 to begin. DPW will let Greg Stehli know Monday if they have any on order. Pumps are 10–12-week lead time. Once we have confirmation whether DPW has any on order, I will send quote up the chain for approval.
- DPW still working to give MES a complete report of all open work orders. (I believe this to be crucial tool in accomplishing our goals)
 - No Back River employees seem to know how to run a report in their work order program (ELKE)
- Small crew onsite today

GBT Thickened Sludge Pump #2



May 16, 2022

Operations: Joe Wright

- Demond advised me that Dana Garriss has requested MES to supply an additional two operators each for evening and night shift as well as a supervisor for the centrifuge operation. The city managers cannot get their operators to perform their jobs as directed and maintain consistent dewatering operations. The centrifuges are down a lot between the hours of 6pm and 7am.

- Grass around the facility (inside of the gate) is waist high, with vines and poison ivy growing in many commonly used pathways. City maintenance has even reached out to MES maintenance to ask if they had staff to assist with cutting grass.

Immediate Needs: Skip Immler

- Attended Back River weekly meeting
- Met with Al Razik about purchasing new compressors for the digesters
- Met with Synagro regarding processing sludge issues
- Contacted Aerazon and Sherwood Logan about compressors for digestors. 6-8 month lead time but if we need them sooner we can rent.

Solids Handling: Al Razik

Spoke with City staff from Quarantine Landfill to go over procedures for accepting sludge.

- Met with Skip Immler this morning to hand off digester gas compressor project. Visited high rate digesters with Skip to scope out installation.
- Along with other MES staff met with Synagro at their pelletizer installation.
- Attended weekly MES/MDE/City coordination meeting at Back River.
- Continued to work on my sections of the Assessment Report.

Maintenance: Wayne Jackson

- MES Maintenance had small crew onsite today.
- MES Maintenance and DPW Maintenance are scheduled to begin working together tomorrow 5/17/22.
- Attended MES/DPW/MDE meeting
- MES's rep from Hill's Electric resigned. We will need to work with Hill's Electric to send new rep and provide the several quotes requested.
- Received approval to purchase ten replacement pumps for Sand Filters. 10-12-week lead time.
- Greg Stehli working with Native Sons to perform maintenance on Tower Lights.
 - Process (Gravity Belt Thickener)
 - Thickened Sludge Pump #2
 - Performed breakdown and rebuild of bearing housing. This will be used on Thickened Sludge Pump #7 and returned to service.
 - Pump #2 is beyond repair.
 - Out of Service

Thickening Sludge Pump #2 – Rebuild (before & after)



May 17, 2022

Operations: Joe Wright

- Attended the Tuesday "Huddle" with Back River supervisors for each area. They discussed the various equipment that are out of service and equipment that is being fixed.
- It was mentioned that there was only one centrifuge operating due to the sludge levels being low in the storage tanks and there wasn't enough sludge to supply both the pelletizer and the centrifuges. After some discussions about sending more sludge down to the dewatering area from GBT, the fact that the effluent pumps from the Acid Phase Reactors were not capable of sending any more sludge than they are currently sending due to pump issues. Out of three pumps, one was out of service, and one was only pumping 50 gpm. This only leaves one pump to move sludge from GBT. There are also three recirc pumps that need fixing and MES maintenance will be addressing all of these to allow more sludge to be pumped to dewatering and allowing more sludge to be removed for the plant.

Immediate Needs: Skip Immler

- Went to Back River to check on GMH 1st day of work. Had to arrange with Back River staff to pump out PST 7 so GMH could get in to take measurements. Spoke to Betty Jacobs about making sure PST 7 was completely dry tomorrow morning. She said she would pass that on to evening Supervisors and make sure the pump ran all night.
- Wrote a section on SCADA Manager for MDE report per direction from Tim Barr

Solids Handling: Al Razik

- We sent emergency procurement paperwork to Procurement this morning to start hauling liquid sludge for the cleaning of digesters HRD-1 and HRD-4.
- Continued working on my sections of the Assessment Report.
- Attended a virtual presentation for a dewatering technology (DryVac) that resembles a plate and frame press but produces a Class A biosolids.

Maintenance: Wayne Jackson

- Attended MES/DPW Huddle
- Staff took new Hill's Electric rep around site to provide quotes
- Received quote from Hill's Electric for new APR Effluent Motor and Recirculation Motor. Received approval to purchase. Should have one motor this week and the other within seven (7) days.
 - Waiting on quotes for new pumps at APR.
 - Installation of pump and motors will most likely be scheduled together.
 - Ryan Zacherl will investigate the APR tomorrow to determine if motors need to be installed ASAP or can wait until pumps arrive.
- MES staff paired up with DPW staff today.
 - Pro's
 - Greater number of requests being handled
 - Worked on seven (7) requests instead of normal 2-4 request
 - Will begin to extract information from staff at the ground level
 - Cut through some of the processes MES encountered before pairing up staff
 - Give DPW Maintenance a sense of accomplishment and hopefully encourage their staff to become part of the solution
 - Con's
 - Unmotivated staff
 - Unskilled, lack of knowledge and experience
 - DPW staff wanted to stop working for the day after 1st completed job. First job only lasted two hours.
 - DPW employee let MES employee know they were locked up for 28 years for manslaughter and was released on a technicality. This made MES employee uncomfortable to work alone with individual.
- Process (Gravity Belt Thickening)
 - Thickened Sludge Pump #2
 - Continued rebuild of thickened sludge pump #2. Attached new auger and shaft to rebuilt bearing housing, loaded onto vehicle and will being install tomorrow 5/18/22 on #7.
- Process (Primary Sludge Thickeners)
 - Building D Recirculation Sludge Pump #10
 - DPW Maintenance Supervisor Harry Mitzel requested MES pull belt tensioner, key stock, and adjustment handle from Recirculation Sludge pump #9 to make repairs to pump #10. Parts were removed from #9 and installed on Recirculation Sludge Pump #10. The pump was tested and returned to service.
 - In service
 - Operates in manual
- Process (Activated 4)
 - Blower Water Booster Pump #2
 - Conducted replacement of Blower building water booster pump #2. Removed nonfunctioning pump and installed replacement pump. Completed electrical connections tested pump and found supply valve was seized closed. Found old bent valve under steps that was stuck open and installed in place. Tested pump and returned to service.
 - In service
 - Operates in manual
- Process (Denite Filters)
 - Actuators 3-9, 4-6, 4-2, 4-5, 1-10, 2-3, 3-5

- Inspected actuator valve to ensure all opened and closed manually in local. The problem is on the control side and the task will be handed to the instrumentation department.
 - In service
 - Operates locally
- Process (Activated 3)
 - Sludge Pumping Station #3 RAS Pump 11B
 - Attempted to change bearing packing, loosened packing seal and could not get positive shut off on valves. Packing has been tightened back down so the pump can continue to operate. Another point of shut off will need to be located to replace packing.
 - In service
 - Operates in manual
- Process (Activated 3)
 - Clarifier 15B
 - Conducted repair of broken scum arm. Installed new bolts and arm back in place.
 - In service
- Process (DAF Sludge Thickening)
 - Thickener Sludge Pump 1
 - Had operator shut pump down and isolate valves to remove clog in pump feed line. Once removed had operator test pump and make sure level was going down.
 - In service

Building D Recirculation Sludge Pump #10



Blower Water Booster Pump #2



Blower Water Booster Pump #2 – seized potable supply valve



Clarifier 15B Scum Arm – Before



Clarifier 15B Scum Arm – After



May 18, 2022



Operations: Joe Wright

- We are receiving word that the City is terminating staff that are not doing their job. Anyone sitting in their vehicles, hiding and doing nothing or just hanging around are the apparent focus.

Immediate Needs: Skip Immler

- Checked on GMH. PST was empty when they got there this morning so they were able to accomplish taking measurements
- Processed GMH invoice

Solids Handling: Al Razik

- I sent in an MBE recommendation (no MBE goal) to Procurement for obtaining the services of a hauler to take liquid sludge from HRDs 1 and 4 to Tank 26. Emailed an Addendum to bidders for the HRD Cleaning portion of the project.
- Received notification from Synagro that the sludge feed to their temporary dewatering setup (centrifuge) stopped because they were told by City staff that there is not enough pumping capacity at the hi-rate digestion area. Joe Wright and I spent a considerable amount of time speaking with the hi-rate digestion area supervisor about this problem. Joe and I will be on-site tomorrow to review with staff the pump problems at the hi-rate area. Maintenance has been re-directed to this area to repair these pumps.
- Attended our weekly meeting with the City , MES, and Greeley and Hansen (G & H) staff. G & H is wrapping up their Assessment Report.
- Continued to work on my sections of our Assessment Report.

Maintenance: Wayne Jackson

On Order

- Ten pumps for Sand Filters

- APR Effluent Motor - received and will install once we have mechanical seals.
- APR Recirculation Motor
- APR Recirculation Pump Seals
- Activated II Pump Station #2 Mechanical Seals nine (9)
- Activated II Pump Station #2 Conversion Kits (9)
- VFD for Digester #4

Work Performed

- Process (Gravity Belt Thickening)
 - Thickened Sludge Pump #2
 - Continued rebuild of thickened sludge pump #2. Conducted installation of rebuilt bearing housing and auger box. Will complete install tomorrow 5/19.
- Process (Activated 3)
 - Sludge Pump House 4 RAS 16B actuator valve
 - Conducted troubleshooting of nonfunctioning actuator valve on RAS Pump 16B. Found main breakers for all actuators off, found broken feed wire in junction box repaired all broken and corroded wires. Got power back to the actuator and found blown fuse and burnt wires inside actuator, replaced blown fuse and repaired burnt wires. Tested all actuator functions, actuator operates in local properly but does not operate properly remotely.
 - In service
 - Operates locally
 - *DPW staff left after first task, said they had another call. No return for one team.*
 - Sludge Pump House 3 WAS pump 12A/B
 - Replaced broken drive coupling and shimmed motor. *Did not test motor DPW staff said he did his part and did not go find an operator to run pump.*
 - In service
- Process (DAF Sludge Thickening)
 - Thickener sludge pump 1 & 2
 - Troubleshoot pumps 1 & 2 due to low flow rates. Found pump 2 needs complete rebuild of bearing housing seals and screw pump. Pump 1 will need complete rebuild due to lack of performance. No parts are available in the warehouse.
 - *Senior DPW employee assisting MES sat on phone all day and did not assist with maintenance. Apprentice was engaged but not allowed to participate in repairs.*
 - Out of Service
- Process (Egg Digesters)
 - APR Recirculation Pump #2
 - Isolated pump and began disassembly of pump to evaluate repairs needed.
 - Out of Service

Notes

- Combined MES/DPW team, DPW employee said they had another call and left. Never returned.
- Combined MES/DPW team replaced a drive coupling and shimmed motor, then DPW employee said they completed their task and wouldn't find an Operator to run pump and check for operation.
- Combined MES/DPW team the Senior DPW employee assisting MES sat on phone all day and did not assist with maintenance. Apprentice was engaged but not allowed to participate in repairs.
- STH evaluated and will supply quotes for updated control panels and VFD's for TSP 2A/2B and 4A/4B.
- Received APR Effluent pump #2 motor.
- STH has been contacted to quote control panel replacement for 2A/2B and 4A/4B sludge pumps.
- Hills will provide a quote for WAS pumps for Sludge pumping Station 2.
- Casey and Dwayne attended Clarifier Maintenance & Rebuild Webinar.

Photos

- Car Washing on Back River Site (above)

Sludge Pump Building 4 RAS 16B Actuator



APR Recirculation Pump #2



Dangerous Open Electrical Trough- sludge pump bldg. 4



May 19, 2022

Operations: Joe Wright

- Met Al and Tim Wolfe at the site. (See Al's report below)

Solids Handling: Al Razik

- Met Joe Wright and Tim Wolfe onsite today to formulate a solution to yesterday's problem with the diminished pumping capacity at the APR. This was causing a bottleneck to sending enough sludge to the downstream dewatering units. We decided to first bypass the APR and feed sludge directly to the ESDs. Then we will refill the hi-rate digesters because they were low in volume. Finally we directed MES Maintenance to repair several APR pumps as a priority. We should have the City's centrifuges back online tomorrow and Synagro's temporary dewatering up and running on Monday.
- Synagro's pelletizer shut down one dryer train today due to elevated TSS in their fire suppression water supply. Tim Wolfe and I visited the pelletizer facility to scope out where the City water is supposed to go. Tim told me that United Rentals is supposed to be onsite Monday to start installing the potable water line.
- I completed all of my assigned sections of the Assessment Report. Only my portion of the Recommendation section remains.

Safety & Env. Compliance: Amy Kline

- High-Rate Areas (Aerobic Digestion/Sludge Thickening Areas) o DAF Building ▪ Large floor drains are not covered and not functioning. Large spills and areas of sludge on the floor increasing likelihood of slips and falls. Some floor grates are missing, and some open pits are not covered. ▪ Many examples of improper LOTO and exposed electrical ▪ Inadequate lighting with many indoor lights not functioning
- Egg Digestors ▪ Elevators are past due inspection and don't function well. On my trip the elevator didn't stop level with the floor on the way up. On the way down the elevator stopped on incorrect floors. ▪ Netting on top of the egg digestors is missing from some areas and torn in other areas. ▪ Slip, trip and falls from hoses on the ground, unlevel grates, and spills ▪ Air Sensor in the building is constantly alarming ▪ Fire Alarm in neighboring building constantly was going off so DPW unplugged it. It now no longer alarms but the light constantly is flashing.
- Sludge Thickening Areas ▪ Many examples of improper LOTO and exposed electrical ▪ Nonfunctioning floor drains, sludge spills and open pits ▪ Elevator does not work; maintenance must strap open the metal doors on the elevator so that they do not fall while using a crane to move equipment in and out of the area. The crane is plugged in with an electrical cord outside. Performing this task roughly weekly.
- Centrifuge Area o Blower Building ▪ Inadequate lighting ▪ Major spills on the floors with nonfunctioning drains ▪ Exposed Electrical and broken equipment

Maintenance: Wayne Jackson

Work Performed

- Process (Gravity Belt Thickening)
 - Thickened Sludge Pump #7
 - Completed install of Thickened sludge pump #7. Installed bearing housing, gear box, motor, and rotor/stator. Will conduct start up tomorrow 5/19 with operator.
- Process (EGG Shaped Digesters)
 - APR Recirculation Pump #2
 - Conducted removal of pump assembly and bearing housing. Began to collect repair parts from DPW. Will begin rebuilding on 5/20.
- Process (Activated 3)
 - Sludge Pump House 4 RAS 15A,15A/B, 15B actuator valve
 - 15B - Conducted trouble shooting of nonfunctioning actuator valve on RAS Pump 15B. Found main breakers for all actuators off, found broken feed wire in junction box repaired all broken and corroded wires. Tested function of actuator and returned to service.
 - 15 A/B - Conducted trouble shooting of nonfunctioning actuator valve on RAS Pump 15A/B. Found main breakers for all actuators off, found broken feed wire

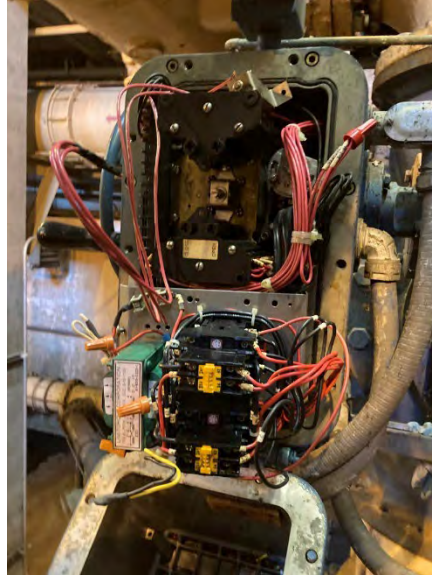
in junction box repaired all broken and corroded wires. Tested function of actuator and returned to service.

- 15A - Conducted trouble shooting of nonfunctioning actuator valve on RAS Pump 15A. Found main breakers for all actuators off, found broken feed wire in junction box repaired all broken and corroded wires. Power was returned to actuator, *but a faulty control board will not let the actuator function. Will work to find replacement control board.*
- Sludge Pump House 4 RAS 14A, 14A/B, 14B actuator valves
 - 14A - Troubleshoot no power to actuators. Found tripped breaker.
 - 14 A/B - Troubleshoot no power to actuator. Found tripped breaker. Reset breaker and flames came from junction box, found burnt and broken wires inside pipe. Wires will need to be replaced to return actuators back to service.
 - 14B - Troubleshoot no power to actuators. Found tripped breaker.

APR Recirculation Pump #2



Sludge Pump House 4 Actuator Connections



Sludge Pump House 4



Sludge Pump House 4 Actuator Connections



Sludge Pump House 4 Actuator Connections



May 20, 2022

Operations: Joe Wright

- Polymer pump mixer motor may have a capacitor issue at Centrifuge. Lance is asking for an MES electrician to come and look at it. Demond will get with Ryan, and Greg about.
- Activated side are actively performing housekeeping duties, and the city will be giving their light duty staff most of the cleaning duties.

Immediate Needs: Skip Immler

- I approved the shop drawing for PST 7 stilling well.
- I set up a meeting on 5/23 at 12pm with ACES to look at the digester compressors that they will be replacing. This is so they can give us a proposal to do the work.

Solids Handling: Al Razik

- Completed my sections of the Assessment Report. I will be reviewing the final draft before it is sent to Ellen Frketic.
- Completed and executed a contract with Robert F. Beall Co. for inter-plant hauling of liquid sludge from Hi Rate digesters 1 and 4.

Maintenance: Wayne Jackson

Work Performed

- Process (Gravity Belt Thickening)
 - Thickened Sludge Pump #7
 - Conducted startup & tested operations with operator.
 - In service
 - Only runs in bypass
- Process (EGG Shaped Digesters)
 - APR Recirculation Pump #2
 - Completed pump removal & transported to shop for rebuild. Acquired repair parts from DPW & began disassembly of impeller, mechanical seal, & bearing housing. Will continue disassembly & possibly begin rebuilding on 5/23.
 - Out of Service

Thickened Sludge Pump #7



APR Recirculation Pump #2



May 23, 2022

Operations: Joe Wright

- MES Operations met with MDE to set up samplers at outfalls 001 and 002. MDE will be collecting 24-hour composite samples and will pick up the samples and the sampler after collected samples from four locations in the Back River.

Immediate Needs: Skip Immler

- Attended weekly meeting
- Met with ACES (American Contracting and Environmental Services) to go over digester blower installation

Solids Handling: Al Razik

- Reviewed and edited our Assessment Report
- Conducted a Pre-bid meeting at the site for cleaning digesters HRD-1 and 4. Two contractors showed up to this meeting.
- Met with Skip and ACE rep to scope out installation of gas compressors on digesters HRD-1 and 4.
- Attended Weekly Coordination Meeting at Back River.

Maintenance: Wayne Jackson

Work Performed

- Process (Gravity Belt Thickening)
 - Thickened Sludge Pump #7
 - Conducted installation of trough drain line, replaced damaged gasket and tightened flange bolts, tested, and returned to service.
 - In service
 - Only runs in bypass
- Process (EGG Shaped Digesters)
 - APR Recirculation Pump #2
 - Continuing break down and rebuild of pump and bearing housing. We will need replacement mechanical seals to complete the rebuild.
 - Out of Service
- Process (Activated 3)
 - Sludge Pump Building 4 Actuators 14 A/B, 14A, 14B
 - Replaced broken and damaged wires, cleaned corrosion from terminals. Returned power to actuators, tested, and returned to service.
 - In service
 - Operates locally

Thickened Sludge Pump #7 – Valve installed



Sludge Pump Bldg. #4 Actuators 14AB, 14B – new wire installed



Sludge Pump Bldg. #4 Actuators 14AB, 14A, 14B – new wire installed



May 24, 2022

Operations: Joe Wright

- Attended the Tuesday "Huddle" with Back River supervisors for each area. They discussed the various equipment that are out of service and equipment that is being fixed.

Maintenance: Wayne Jackson

- Process (Gravity Belt Thickening)
 - Air Compressor #3

- Evaluated Air Compressor #3 for not operating. Turned on switch and returned power, tested, and returned to service.
 - In service
- Air Compressor #1
 - Conducted evaluation of Air compressor #1. Found compressor locked up due to no oil. DPW Supervisor Harry was informed and will order a replacement compressor.
 - Out of Service
- Thickened Sludge Pump #3B
 - Conducted evaluation of Thickened Sludge Pump 3B for not operating. Found broken belts, replaced belts, and attempted to test and found carter drive to be bad. Began to break down carter drive and bearing housing. Will continue rebuild tomorrow 5/24.
 - Out of Service
- Process (EGG Shaped Digesters)
 - APR Recirculation Pump #1
 - Continuing breakdown and removal of APR Recirculation Pump #1. Will begin rebuilding the pump once mechanical seals arrive.
 - Out of Service

Air Compressor #3



Air Compressor #1



Thickened Sludge Pump 3B – Control Panel & Junction Box with duct tape



Thickened Sludge Pump 3B – Sludge Judge found in pump



APR Recirculation Pump #1



May 25, 2022

Operations: Joe Wright

- MES operators were able to remove some of the vegetation from the stilling well in clarifier 13A, as well as provide flush water spray to keep it from growing again.
- Demond Miller spoke with Greg Stehli and maintenance wants more projects to work on while waiting on parts for pending tasks. Demond recommended the scum pumps and pits for the clarifiers that need to be fixed.
- Dana Garris (City supervisor) was able to find out that centrifuge operations are able to pull from the elutriation tanks without sending the sludge to Tank 26. This can cut down on time wasted removing sludge from inventory.

Immediate Needs: Skip Immler

- Requested Proposal for GMH for PST 10 repair
- Requested change order proposal from GMH for PST #7 to expedite repair

Solids Handling: Al Razik

- Attended weekly meeting with City. Greeley and Hansen, and MES
- Status update on solids processing flows:
 - Synagro pelletizer processing about 41 DT/d
 - City's centrifuges processing material to Veolia approximately 25 DT/d
 - Synagro temporary dewatering to resume this evening
- Worked on responses to bidder's questions for digester cleaning project (19 questions in all)
- Supplied report tables to Sharon Merkle

Maintenance: Wayne Jackson

- Process (Gravity Belt Thickener)
 - Thickened Sludge Pump #3B
 - Conducted break down of bearing housing and rotor/stator. Began reinstalling carter drive, bearing housing, rotor/stator, and motor. Reinstall should be complete tomorrow 5/26.
 - Out of Service
 - Operates in manual
- Process (Sand Filters)
 - Sand Filter 9
 - Conducted evaluation of Sand Filter 9, removed nonfunctioning wash pump, and will install replacement pump and check carriage drive and backwash pump tomorrow 5/25/22.
 - Out of Service
- Process (Denite Filters)
 - DNF Transducer and Control Unit
 - Conducted evaluation of malfunctioning level transducers and control units. Will continue more Indepth evaluations later once equipment needs are determined.
 - In service
 - Operates in Auto
- Process (Activated 2)
 - 8A and 10A Clarifier Scum Pumps
 - Conducted evaluation of scum pumps for both clarifiers will work with operations further to determine the issues.
 - Out of Service

Thickened Sludge Pump 3B Bearing Shaft



Thickened Sludge Pump 3B Install



DNF Level Transducers



May 26, 2022

Operations: Demond Miller

- Junction Boxes 1 & 5 need to be cleaned, due to sludge buildup at the bottom. I've spoken to Dana about it, she said the only way for this to happen is if one of the plants (2 or 3) will be offline.
- The city meeting entailed the usual updates about what's in service vs. out of service.
- Liquid side are actively grabbing samples from plant 4; which will be in the city's control in 2 weeks

Solids Handling: Al Razik

- Digesters HRDs 1 and 4 Cleaning project. We completed answers to bidders' questions and submitted them as Addendums 2 and 3.
- Started summarizing our daily reports with pictures for the Assessment Report.
- Started reviewing Greeley and Hansen's Draft Assessment Report that they did for the City

Maintenance: Wayne Jackson

- Process (Gravity Belt Thickener)
 - Thickened Sludge Pump #3B
 - Reinstalled carter drive, bearing housing, rotor/stator, and motor. Sch 80 intake line is cracked. Collected repair parts & will be replaced 5/27/22. Discharge valve may be broken in closed position & DPW Maintenance will investigate.
 - Out of Service
 - Operates in manual
 - Thickened Sludge Pump #2B
 - While working on #3B, MES Maintenance heard knocking noise from 2B. After investigating found drive collar snapped & detached from rotor. Bearing & pump housings were removed & transported to shop for repair.
 - Out of Service

Thickened Sludge Pump #3B



Thickened Sludge Pump #3B



May 27, 2022

Immediate Needs: Skip Immler

- Received the change order proposal to expedite the work on PST 7. I had to send it back for a few changes
- Spoke to GMH about the scum reduction system that will be installed on PST 7. I told them not to include it on the other PSTs until we see how it works.
- Attended a meeting with Al, Sherwood Logan and RKK regarding the digester compressors. We're going to trouble shoot the existing control panels before we purchase new ones. We're also going to reach out to Heyward about the possibility of repairing the rotary valves.

Solids Handling: Al Razik

- Had a virtual meeting with Skip Immler, Brett Sweeney (ACE), Maia Tatinclaux (RK&K), and Andrew Kreider (Sherwood Logan) to scope out the install of the biogas recirculation compressors for HRDs 1 and 4.
- Continued reviewing Greeley and Hansen's Assessment Report.

- Continued working on our Assessment Report. Was tasked with writing a recommended improvements section , and a section on how we obtained sludge permits.

Maintenance: Wayne Jackson

- Process (Gravity Belt Thickener)
 - Polymer Recirculation Pumps #1 & #2
 - Worked with DPW Electricians to T&R control fault for Polymer Recirculation Pump #1. Breaker was tripped & VFD needed to be reset. Flushed discharge line for Polymer Recirculation Pump #2 & tested.
 - In service.
 - Operates in manual.
 - Thickened Sludge Pump #3B
 - Assembled new 8" intake line & began install, will complete 6/2. Discharge valve is still broken in closed position.
 - Out of Service.

May 31, 2022

Immediate Needs: Skip Immler

- Spoke with Heyward Valves/Evoqua and requested an evaluation of all the Gas compressors, rotary valves and control panels associated with the high-rate digesters.

Solids Handling: Al Razik

- Was onsite this morning. There are many problems with transferring liquid sludge to the pelletizer (stopped last night). Also observed centrifuge no. 1 running but no dewatered biosolids being discharged to the conveyor belts. Veolia has not been getting their allocation of material. Spoke at length with Mike Hallmen about these problems. Will call him again tomorrow to discuss this further with Dana Garris.
- Spoke to James Woods at the City Landfill. I answered some questions for him.

