

Maryland Department of Environment

Water and Science Administration Compliance Program 1800 Washington Blvd, Suite 420 Baltimore, MD 21230-1719 410- 537-3510, 1-800-633-6101

Inspector:	Christopher Lepadatu
AI ID:	8449
Site Name:	Back River WWTP
Facility Address:	8201 Eastern Ave, Baltimore, MD 21224
County:	Baltimore County
Start Date/Time:	March 18, 2024 09:30 AM
End Date /Time:	March 18, 2024 12:00 PM
Media Type(s):	NPDES Municipal Major Surface Water
Contact(s):	Andrea Buie-Branam – Chief of ERCS, Baltimore City DPW
	Scott Moffatt – Policy Analyst, ERCS, Baltimore City DPW
	Chris Aiken – Back River WWTP, Baltimore City DPW
	Rayford McEachern - Back River WWTP, Baltimore City DPW
	Timothy Simmons – Back River WWTP, Baltimore City DPW

NPDES Municipal Major Surface Water

Permit / Approval Numbers: 15DP0581 NPDES Numbers: MD0021555 Inspection Reason: Follow-up Site Status: Active Compliance Status: Compliance Site Condition: Satisfactory/Compliance Recommended Action: Continue Routine Inspection Evidence Collected: Photos or Videos Taken, Record Review, Visual Observation Delivery Method: Email Weather: Clear, Breezy, Good

Inspection Findings:

Introduction:

Back River Wastewater Treatment Plant (WWTP) is operated by Baltimore City DPW. Some areas of the WWTP are subcontracted and operated by ProStart. These areas include the Headworks, Denitrification Building, and Centrifuges. The facility is authorized to discharge treated effluent through Outfalls 001 and 002. Outfall 001 discharges to Back River, a designated Use II waterway. Use II waterways support estuarine and aquatic life and shellfish harvesting. Outfall 002 discharges to Tradepoint Atlantic who then discharge via three (3) outfalls under their industrial discharge permit (#05DP0064) to Bear Creek and the Patapsco River which is also designated as a Use II waterway. Final effluent discharge is split at a junction box and a large portion of the flow (up to 130.0 MGD) goes to Outfall 001 via a step cascading aeration system and the remaining portion (up to 50.0 MGD) goes to Outfall 002.

Inspection Date:	March 18, 2024
Site Name:	Back River WWTP
Facility Address:	8201 Eastern Ave, Baltimore, MD 21224

The current permit has been administratively extended since it expired on April 30, 2023. A revised permit renewal application (#22DP0581) was received by MDE on May 26, 2023.

Back River WWTP is an activated sludge process sewage treatment plant with biological nutrient removal by Modified Ludzack-Ettinger process, ferric chloride for phosphorous removal, denitrification filters for enhanced nutrient removal (ENR), polishing sand filters, chlorination, and dichlorination.

On this day, I met with the individuals listed above for an opening conference followed by a site walk and closing conference.

Consent Decree:

As of November 2023, Baltimore City and the Department signed a Consent Decree, Case No. 24-C-22-00386, which establishes specific goals and objectives related to the operation and maintenance of the Patapsco WWTP. As a result, maintenance items observed during the site inspection will be notated in the relevant areas of the inspection report and not itemized in the Violation(s) section as in previous inspection reports. The goals and objectives in the Consent Decree are noted below for monitoring and tracking progress. My updates during this inspection are indicated in red text. The table below has been updated with the information included in the Consent Decree Report provided on February 14, 2024.

Back River WWTP Consent Decree (CD) Overall Progress Tracking Summary				
CD Paragraph Reference	Activity	CD Deadline	Actual Date Completed	Compliance Status (11/25/23)
132-BR	Replace H2S Sensors	12/15/2023	5/16/2023	Complete
133(a)-BR	Clean and complete repairs on at least 8 PSTs to ensure they are fully functional and capable to operate as designed. * 6 units in service	1/1/2024	FM Letter Sent 12/20/23 Requested extension: 3/31/24	88%
133(b)-BR	Clean and complete repairs to all 11 PSTs to ensure they are fully functional and available for use.	12/31/2025		63%
134-BR	Baltimore City to have and maintain an adequate supply of Dissolved Oxygen ("D.O.") probes.	12/1/2023	11/7/2023	Complete
135-BR	Baltimore City shall maintain Activated Sludge Plants No. 2 & 3 as well as their associated clarifiers.	Ongoing		Compliant
135(a)-BR	Submit for review and Department approval the standard operating procedure (SOP) for removal of vegetative growth in the final clarifiers.	1/15/2024	12/15/2023	Complete
135(b)-BR	Implement vegetative growth plan.	Upon approval of 135(a)-BR		Awaiting Approval
135(c)-BR	Maintain average sludge blanket depth of 2 to 4 feet in final clarifiers.	Ongoing		Compliant
135(d)-BR	Maintain manual operations until Activated Sludge PLCs are updated and set up for automatic operation.	Ongoing		Compliant
136(a)-BR	Complete evaluation of sand filters. Within 10 days of sand filter evaluation, request approval for change of use of the approved sand filter, OR	4/30/2024		20%
136(b)-BR	Submit plan and schedule for implementation of sand filter improvements (Sand Filter Improvement Plan). Immediately upon approval City shall implement the approved Sand Filter Improvement Plan.	5/10/2024		20%
137-BR	Repair all Gravity Belt Thickeners (GBTs) to operate as designed.	6/30/2024		50%
138-BR	Repair and install one of the three non-operational Dissolved Air Flotation (DAF) systems and thickened sludge pumps.	12/31/2023	12/5/2023	Complete
139-BR	Issue Notice to Proceed (NTP) with contract for rehabilitation of the egg- shaped digesters. Complete rehabilitation of egg-shaped digesters.	8/16/2023 (NTP) 9/16/2027 (Rehab)		Issued
140-BR	Create and submit a Centrifuge Maintenance Plan to the Plaintiffs for review and the Department's approval.	12/15/2023	12/15/2023	Complete
141-BR	Complete repairs and installation of Centrifuge #4 to operate as designed. * some parts received, waiting on installation.	12/31/2023	FM Letter Sent: 12/20/2023 and 2/14/2024	55%

			Requested extension:	
142-BR	Submit Staffing Plan	12/31/2023	12/22/2023	Complete
143-BR	City to have, maintain, and make available to the Department the formal written operation and maintenance procedures (Back River WWTP SOP)	6/30/2024		20%
144-BR	City to submit a report that identifies what processes are currently automated and conduct a feasibility study for automation of additional processes, with a plan and schedule for future automation.	5/13/2024		80%
145-BR	Baltimore City shall have, maintain, and update a Computerized Maintenance Management System (CMMS) as a functional work order system to ensure that the plant and its equipment operate as designed.	Ongoing		Compliant
146-BR	Complete a condition assessment and inventory of existing assets in order to develop an asset management program. Complete development and begin implementation of asset management program within 90 days of assessment and inventory.	11/15/2024 (Assessment) 2/12/2025 (Commence Implementation)		75% Not Started

The table above will be updated during future facility inspections.

Site Walkthrough:

Headworks

Raw sewage enters the plant at the mechanical screen building where there are four (4) coarse screening units. Each unit is rated for flows up to 200 million gallons per day (MGD). During normal flows, one coarse screening unit is sufficient to treat the average daily flow. In general, they rotate which coarse screening unit is in operation every week.

Effluent from coarse screening flows into two (2) deep wet wells that are over 50 feet deep. The headworks influent pumping station has eight (8) lift pumps installed to pump the screened wastewater from the wet wells to the Fine Screening System. During periods of high flow, screened wastewater can be pumped to two (2) above ground storage tanks each with a capacity of 18 million gallons. The two tanks are connected by two 14- to 16-inch pipes near the top of the tanks to allow one to overflow into the other as needed.

The Fine Screening System features six (6) fine screening units rated for flows up to 100 MGD each. No issues were reported with the fine screening units.

Effluent from the fine screening system travels to the Grit Removal System. Eight (8) grit channels equipped with traveling bridges remove grit from the fine-screened wastewater. Each grit channel and traveling bridge has an 80 MGD capacity. Under normal flow conditions, two grit channels are necessary for satisfactory grit removal. The traveling bridges move back and forth along the grit channel using a submersible pump / suction plate system to remove settled grit from the channels and transfer the grit to classifiers for further dewatering. The classified grit is then dried and transported off-site for disposal. No issues were reported with the grit removal system.

Odor control systems A, B, and C were reported to be in service with no issues.

Primary Settling

Effluent from the Grit Removal System flows to a junction box then to the Primary Settling Tanks (PSTs). Primary Settling is the first stage of treatment where solids and sludge are allowed to settle by gravity and any floating scum or fats, oils, and grease (FOG) is removed. Generally, PSTs are designed to remove a large percentage of the total suspended solids (TSS) and reduce the biochemical oxygen demand (BOD) of the wastewater.

There are eleven (11) PSTs at the facility. During the site inspection, the following observations were made:

- Units 3 & 4 are in service.
- Unit 5 is being used as a holding tank while adjustments to Unit 1 are being completed.
- Unit 6 is being dug out / cleaned out, estimated 60% complete.

Inspection Date:March 18, 2024Site Name:Back River WWTPFacility Address:8201 Eastern Ave, Baltimore, MD 21224

- Unit 8 is down for repairs.
- Unit 1 is drained for weir adjustments / maintenance.
- Unit 2 is operating as flow-thru.
- Units 7, 9, 10 and 11 are in service.



Image 01: PST #3.

Sludge Handling / Processing

The GSTs were inspected during this site visit. GST's 5 & 7 were in service at the time of the site inspection. GST's 2 & 4 are being used as sludge holding tanks. GST #3 is down waiting for an arm repair. GST #1 is down due to pump issues. GSTs #6 and #8 are out of service long-term in need of an overhaul.

GBTs use gravity and a porous drainage belt to dewater and thicken sludge. The WWTP has 8 GBTs in total. Five (5) GBTs were reported to be in service.

The WWTP has four (4) Dissolved Air Flotation Units (DAFs) installed. A DAF unit is designed to remove TSS, FOG, and BOD from wastewater. DAFs are ideal for processing particles and floc that are of neutral density, slow-settling, or buoyant. DAF 1 was in service. A crew was onsite and in the process of cleaning out DAF 2 – removing floating cake from the top. DAF 3 and 4 are drawn down and out of service for repairs / refurbishment.

From the GSTs, GBTs, and DAF units, sludge is transferred to sludge holding tanks #1 or #26 which are located near the centrifuge building and drying facility. The facility has four (4) centrifuges in total, three (3) of which are operational. Unit #4 is still in the process of scheduling repairs and waiting on additional parts.

It was reported that sludge processing depends on the volume of sludge available as well as the dry storage capacity. Sludge Production and Disposal reported for the month of February 2024 is provided in the table below.

Sludge Production and Disposal, February 2024				
Date	Total Sludge Production (dry tons)	Centrifuge Sludge Disposal (to compost) (dry tons)	Pelletech Pellets Disposal (dry tons)	Total Sludge Disposal (dry tons)
2/1	73.7	16.0	N/A	16.0
2/2	54.2	21.2	N/A	21.2
2/3	78.3	N/A	N/A	N/A
2/4	69.4	N/A	N/A	N/A
2/5	78.8	21.45	N/A	21.5
2/6	64.2	24.73	N/A	24.7
2/7	103.6	12.11	N/A	12.1
2/8	123.1	N/A	N/A	N/A
2/9	78.9	23.27	N/A	23.3
2/10	67.8	N/A	N/A	N/A

Inspection Date:	March 18, 2024
Site Name:	Back River WWTP
Facility Address:	8201 Eastern Ave, Baltimore, MD 21224

2/11	83.2	N/A	N/A	N/A
2/12	88.0	36.05	N/A	36.0
2/13	86.0	21.71	N/A	21.7
2/14	215.1	16.24	N/A	16.2
2/15	118.3	32.55	N/A	32.5
2/16	101.5	29.75	N/A	29.7
2/17	82.7	N/A	N/A	N/A
2/18	74.0	N/A	N/A	N/A
2/19	83.0	N/A	N/A	N/A
2/20	55.7	19.10	N/A	19.1
2/21	72.7	29.49	N/A	29.5
2/22	75.6	12.02	N/A	12.0
2/23	83.8	N/A	N/A	N/A
2/24	52.4	N/A	N/A	N/A
2/25	123.6	N/A	N/A	N/A
2/26	81.5	36.54	N/A	36.5
2/27	53.4	40.85	N/A	40.8
2/28	67.8	38.24	N/A	38.2
2/29	77.3	N/A	N/A	N/A
Total	2,467.8	431.24	N/A	431

Activated Sludge Plants (ASPs)

Effluent from Primary Settling flows to a flow distribution building to one (1) of three (3) Activated Sludge Plants (ASPs) numbered 2, 3, and 4. The ASPs each contain six (6) biological reactors for nitrogen removal. ASPs 2 and 3 have a three-pass train designated A, B, and C for each reactor while ASP 4 is a two-pass system. There are twelve (12) secondary clarifiers associated with each ASP for a total of thirty-six (36) secondary clarifiers at the facility.

The ASPs were not observed during this inspection. No issues were reported with their operation. It was reported during a previous site inspection that efforts were focused on maintaining ASPs 2 and 4. A capital improvement project is planned in the near future for ASP 3 which will take ASP 3 off-line for repairs. Chris Aiken shared the ASP Process Control Sheet which indicates the status of the different ASP facilities – whether the reactor is online, standby, or out of service.

ASP Process Control Sheet			
Reactor	Pass B		
	ASP 2		
5	Online	Online	
6	Online	Online	
7	Online	Online	
8	Online	Online	
9	Standby	Standby	
10	Online	Out of Service	
ASP 3			
11	Out of Service	Online	
12	Out of Service	Out of Service	
13	Out of Service	Standby	
14	Standby	Standby	
15	Online	Online	
16	Out of Service	Standby	
	ASP 4		
17	Online	Online	
18	Online	Online	
19	Online	Online	
20	Online	Online	
21	Online	Online	
22	Online	Online	

Denitrification Filters (DNFs)

Inspection Date:	March 18, 2024
Site Name:	Back River WWTP
Facility Address:	8201 Eastern Ave, Baltimore, MD 21224

At the DNF building, there are four filter quads with each quad containing 13 Tetra Denitrification Filters with a total of 52 filters. It was reported that all 52 filters were functional and in operation at the time of the site inspection. It was reported that the filters are coming due to refresh the filter media and this may begin in the coming months. No issues were reported.

Sand Filters

The sand filters at the facility are used to polish the wastewater coming from the DNF building. There are 48 total filters. No issues were reported with the Sand Filter system.

Chlorination / De-chlorination Facility and Final Outfalls

The final effluent at the step aeration system was observed to be clear and without any noticeable foam, solids, or odor. No visible floating scum or solids were observed in the chlorine contact chambers at the facility. The temperature of the composite sampler for Outfall 001 was observed to be 4.0° C. The temperature of the composite sampler for Outfall 002 was observed to be 3.0° C.



Image 02: Step Aeration system, final effluent.

I reviewed the lab located at the Chlorination / De-chlorination Facility. All pH buffers were current. No violations were observed with the logbooks. Copies of the pH and DO calibration records were provided to me for review.

Closing Conference:

After the Chlorination / Dichlorination Facility, we returned to the administration building for an exit conference.

Records Review:

Following the site inspection, laboratory reports and calibration records were reviewed. DMRs for February 2024 were reviewed. No violations were observed in the pH and DO calibration records or the laboratory analysis reports. No violations were observed in the DMR submissions.

Non-Compliance Report(s) / Bypass Events

On March 1, 2024, the Department was notified of a spill event at Back River WWTP that occurred at 11:00am. It was reported that a contractor was pumping out PST #5 and a pump was clogged. While clearing the clog, the contractors disconnected a line from the discharge side of the pump and the charged line released sludge onto the ground. It was reported that approximately 250 gallons of sludge had been released and the spill was contained to a grassy area. The area was cleaned and limed. To prevent this from recurring, the follow-up report indicated that contractors will ensure hoses are empty and de-energized before disconnecting from the pump. Additionally, to prevent future pump clogging

Inspection Date:	March 18, 2024
Site Name:	Back River WWTP
Facility Address:	8201 Eastern Ave, Baltimore, MD 21224

incidents, they will advise contractors to use a diaphragm trash pump which is more effective in handling sludge and entrained solids.

On March 4, 2024, the Department was notified of a bypass event at Back River WWTP that occurred on Saturday, March 2, 2024. It was reported that the operators of the denitrification facility (DNF) made the decision to engage in a partial bypass of the treated activated effluent in response to high flows that entered the facility. The high plan influent flow was a result of heavy rainfall in the Baltimore area on the same day. The duration of the bypass event was 8 hours. It was estimated that 4,670,000 gallons bypassed the DNF facility and continued through the sand filters for further treatment.

On March 7, 2024, the Department was notified of a bypass event at Back River WWTP the night before on March 6, 2024. It was reported that the operators of the denitrification facility (DNF) made the decision to engage in a partial bypass of the treated activated effluent in response to high flows that entered the process. The bypass started at 11:00 pm and ended at 11:45 pm. The DNF contractor operating the facility notified the activated area supervisor that they engaged bypass flow procedures because the filter levels were high. During the 45-minute period, the plant influent was averaging around 170 MGD. Trending charts at the activated facility indicated the DNF was taking 168 MGD. The 2,000,000 gallon difference over the 45-minute period suggested that 62,500 gallons bypassed the DNF to the sand filters. Efforts are constantly being adjusted to prevent this event from happening.

On March 11, 2024, the Department was notified of a bypass event at Back River WWTP that occurred on the evening of March 9, 2024, and ended in the morning of March 10, 2024. It was reported that the operators of the denitrification facility (DNF) made the decision to engage in a partial bypass of the treated activated effluent in response to high flows that entered the process. The bypass started at 11:00 pm and ended at 6:00 am on March 10, 2024. The DNF contractor operating the facility notified the activated area supervisor that they engaged bypass flow procedures because the filter levels were high. During the 7-hour period, the plant influent flow averaged 239.7 MGD. The DNF facility is capable of handling 234 MGD before the system must be bypassed. The 5,700,000 gallon difference over the period of the bypass suggests that 1,662,500 gallons was bypassed to the sand filters. Efforts are constantly being adjusted to prevent this event from happening.

On March 14, 2024, the Department was notified of a spill event at Back River WWTP that occurred at 2:30 pm on Tuesday, March 12, 2024. It was reported that contractors making repairs at the sludge thickening area of the facility noticed sludge coming out of the ground near one of the buildings when they were sending sludge from Dissolved Air Flotation Tank #1 to a nearby holding tank. During this activity, it was noticed that a valve that should have been open was closed. This caused pressure to build up and break the line. The contractors stopped their operations and began cleanup. A vactor truck was onsite within the hour to remove the sludge that escaped from the ground to the immediate grassy and adjacent impervious surface. It is estimated that 377 gallons of thickened sludge escaped from the broken line. No sludge from the event reached any sewer or manholes. Another contractors will be on site next week to begin exploratory excavation for repair. To help prevent this from recurring, contractors will review line valves for proper positioning when engaging in sludge removal from one process to another.

While onsite, on this day, I reviewed the area associated with the spill reported above. I asked about the area that had been affected and was directed to a dry grassy area adjacent to the roadway – see Image 03 below. While reviewing this area, I observed an area nearby that was wet and muddy – see Image 04 below. It did not appear to me that any excavation work had been completed for the repair and the contacts onsite were not sure if this had been completed. The muddy area should be investigated to ensure that the repair of the underground sludge pipe has been completed and the pipe is sound and functional. If the repair was not yet completed as of the date of this report, the repair should be completed immediately and the area treated to prevent any impact to Waters of the State.

Inspection Date: Site Name: Facility Address: March 18, 2024 Back River WWTP 8201 Eastern Ave, Baltimore, MD 21224



Image 03: Grassy area adjacent to DAF building.



Image 04: Muddy area observed adjacent to grassy area pictured above.

On March 14, 2024, the Department was notified of a spill event at Back River WWTP that occurred at 2:30 pm on Tuesday, March 13, 2024. It was reported that operations was in the process of placing Reactor #9 in service. One of the clarifiers was being filled. Operations had been monitoring the process throughout the day. When a supervisor went to check on progress, the overflowing manhole was discovered. A broken line was being backfilled with mixed liquor which caused the line to leak into the manhole. Once the line filled up with mixed liquor, a downstream manhole began to overflow. Sandbags were already around the storm drain, but the mixed liquor still breached and went into the storm drain inlet which discharges to Back River via Outfall #4. The influent gate to the reactor was closed. The return activated sludge (RAS) pump flow was diverted to Reactor 10 to start draining the reactor. Sump pumps were placed in 2 manholes and pump into clarifiers to stop the overflow. Operations continued draining Reactor #9 and associated clarifiers. They also monitored both sump pumps every few hours until the sump pumps are no longer needed. Reactor #9 would not be placed back in service until there is a viable solution. The estimated amount of mixed liquor that escaped the manhole is 22,500 gallons.

It should be noted that the event described above occurred at the same manhole as an event which occurred on February 20, 2024, described below.

On February 20, 2024, the Department was notified of an active Sewage Sludge Overflow (SSO) event at the Back River WWTP being discovered at 12:45 pm. A large volume of flushing water was overflowing Manhole 12A (MH-12A) in the vicinity of 10B final clarifier. Back River WWTP reported in the 5-day follow-up letter that the event caused MH-12A to fill with flushing water and ferric chloride (FeCl₃) residual and overflow onto a grassy swale. The discharge then entered a nearby "at grade" storm drain inlet which discharges to Back River via Outfall #4. By 3:00 pm, a berm was created to isolate the stormwater drain from receiving further discharge. Back River reports that an

Inspection Date:	March 18, 2024
Site Name:	Back River WWTP
Facility Address:	8201 Eastern Ave, Baltimore, MD 21224

estimated 11,700 gallons of flushing water discharged during this event. The cause of the discharge was reported to be a failure in a valve or pipe. To improve efforts to prevent this from re-occurring, Back River has instructed their staff to conduct more visual checks of manholes throughout the facility.

I reviewed the area of the sludge overflow described above on this day during the inspection. No standing water was observed near the storm drain inlet; however, I observed an accumulation of solids that appeared to be dried sludge rather than bare soil (see Image 03 below). The dried solids should be removed, and the area restored to its condition prior to the overflow. It was reported that the solids observed would be removed immediately.



Image 05: Dried sludge near storm drain.

On this day, March 18, 2024, while onsite, a potable water leak at the facility was reported to me. In the 5-day report provided on March 21, 2024, it was reported that the leak was discovered on Saturday, March 16, 2024, at 7:30 pm. A supervisor observed water bubbling out of the ground near 8A clarifier. After making sure a nearby basement wasn't flooded or that the well wasn't backed up, he made a call and texted the area supervisor Steven Harris who instructed him to call the valve crew in. When the valve crew arrived on the scene about an hour later, they were not able to completely close the source of the discharge. It was determined that a 4-inch underground potable water line broke and allowed potable water to escape to the grassy area which sloped to a nearby storm drain.



Image 06: Potable water leak. Location of leak circled in red.

While onsite, Back River staff were working to arrange for the repair of the leak. In the 5-day letter provided on March 21, 2024, it was reported that, on Tuesday, March 19, 2024, a private contractor excavated and repaired the potable water line before 4:00 pm. It was estimated that, from the time of the discovery of the leak to the time of the repair completion, 41,100 gallons of potable water was released.

Inspection Date: March 18, 2024 Site Name: Back River WWTP Facility Address: 8201 Eastern Ave, Baltimore, MD 21224

Some of the events listed above as non-compliance events were not reported within 24 hours of the event. This is the result of some confusion as to how to report these particular events, being unable to reach someone at the Department's number, or, in the case of the potable water release, whether it was necessary to report. For these reasons, the failure to report within 24 hours of a non-compliance event is not identified as a violation at this time. I discussed reporting noncompliance events at length with the contacts listed above and continued this discussion following the site visit. I believe we have reached a point of clarity and I have shared that I can be contacted directly at any time that there is any issue or confusion during any event.

As of November 2023, Baltimore City and the Department have signed a Consent Decree - Case No. 24-C-22-00386 which establishes specific goals and objectives related to the operations and maintenance of the Back River WWTP. As a result, maintenance items observed during the site inspection will be notated in the relevant areas above and not itemized in the Violation(s) section as in previous inspection reports.

Regular inspections will continue.

Inspector: 1/3/2024	Received by:	
Christopher Lepadatu /Date		Signature/Date

christopher.lepadatu@maryland.gov 410-537-3521

Print Name