



Maryland Department of Environment
Water and Science Administration
Compliance Program
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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: September 10, 2024 09:30 AM
End Date /Time: September 10, 2024 12:00 PM
Media Type(s): NPDES Municipal Major Surface Water

Contact(s): Timothy Simmons – Operations Engineer, Back River WWTP
Ndifreke Williams – Operations Engineer, Back River WWTP
Chris Aiken – Plant Manager, Back River WWTP
Mpoyo George Mulenda – Operations, Back River WWTP
Scott Moffat – Policy Analyst, ERCS, Baltimore City DPW
DeSean Hunter – RCE 1, MDE
Mohammed Umoru – RCE 1, MDE

NPDES Municipal Major Surface Water

Permit / Approval Numbers: 15DP0581

NPDES Numbers: MD0021555

Inspection Reason: Follow-up

Site Status: Active

Compliance Status: Compliance

Site Condition: Additional Investigation Required

Recommended Action: Continue Routine Inspection

Evidence Collected: Photos or Videos Taken, Record Review, Visual Observation

Delivery Method: Email

Weather: Calm, Clear, Good

Inspection Findings:

Introduction:

Back River Wastewater Treatment Plant (WWTP) is operated by Baltimore City DPW. Some areas/systems of the WWTP are operated by subcontractors including 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

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discharge at Back River WWTP 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.

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 individual(s) 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 noted 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 August 15, 2024. Requests for deadline extensions have been received. Deadlines in the table will be updated if and when extensions are granted.

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.	1/1/2024	3/1/2024	Complete
133(b)-BR	Clean and complete repairs to all 11 PSTs to ensure they are fully functional and available for use. * In progress	12/31/2025		81%
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	4/30/2024	Complete
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	5/10/2024	Complete
137-BR	Repair all Gravity Belt Thickeners (GBTs) to operate as designed.	6/30/2024	7/2/2024	Complete
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 15%
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. *expected to be repaired by October 2024	7/31/2024	Submitted Extension Request	55% Complete
142-BR	Submit Staffing Plan	12/31/2023	12/22/2023	Complete

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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	6/28/2024	Complete
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	5/13/2024	Complete
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)		92% Not Started

The table above will be updated during future 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.

No issues were reported with the odor control system.

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 2, 3, 4, 7, 10, and 11 are in service.
- Units 5, 6, and 8 are operational and will be coming online soon.
- Unit 1 is offline working on draining, had plugged drain line which caused delays.
- Unit 9 is offline for concrete / grout work to interior wall.

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Image 01: PST #8, coming online shortly.



Image 02: PST # 1, drain line clogged.

It was reported that grout / concrete work to the interior wall will be completed on Units 2, 7, 9, and 10, as the construction schedule and flow conditions allow.

Sludge Handling / Processing

Four (4) GSTs were reported to be in service at the time of the site inspection – GST's 1, 3, 6, and 7. GST's 2 & 4 are being used as sludge holding / mixing tanks. GST #8 is out of service long-term in need of an overhaul. GST #5 is offline for repairs.

GBTs use gravity and a porous drainage belt to dewater and thicken sludge. The WWTP has 8 GBTs in total. All eight (8) GBTs are operational; five (5) units are needed for average daily flows. It was reported that technicians are working on setting the maintenance routine for the GBTs.

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. Maintenance work on DAF 2 is in the process of being completed – changing out pumps. DAF 3 and 4 are drawn down and out of service for repairs / refurbishment. The work on DAF 3 and 4 is expected to be a major overhaul of the units.

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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 was reported to be almost online, near the end of the month or next month (October 2024).

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 July 2024 is provided in the table(s) below.

Sludge Production and Disposal, July 2024				
Date	Total Sludge Production (dry tons)	Centrifuge Sludge Disposal (to compost) (dry tons)	Pelletech Pellets Disposal (dry tons)	Total Sludge Disposal (dry tons)
7/1	59.9	22.3	0.00	40.4
7/2	72.4	33.6	0.00	50.3
7/3	103.4	30.8	0.00	48.6
7/4	113.8	NA	0.00	17.9
7/5	90.3	22.74	0.00	40.9
7/6	83.1	NA	0.00	18.6
7/7	68.9	NA	0.00	17.7
7/8	51.9	34.39	0.00	34.4
7/9	63.4	31.79	0.00	45.5
7/10	84.6	32.45	0.00	32.4
7/11	61.0	16.39	0.00	16.4
7/12	82.2	NA	0.00	14.7
7/13	89.1	NA	0.00	20.4
7/14	63.6	NA	0.00	21.3
7/15	6.3	18.87	0.00	36.0
7/16	96.1	20.58	0.00	40.1
7/17	138.6	7.76	0.00	27.0
7/18	93.7	32.57	0.00	51.4
7/19	93.6	34.51	0.00	58.7
7/20	89.9	NA	0.00	18.7
7/21	70.6	NA	0.00	18.0
7/22	88.9	22.59	0.00	40.7
7/23	98.2	8.24	0.00	28.0
7/24	85.7	40.37	0.00	61.2
7/25	90.1	33.89	0.00	51.6
7/26	117.7	32.93	0.00	49.3
7/27	88.9	NA	0.00	19.7
7/28	85.2	NA	0.00	15.9
7/29	37.9	36.91	0.00	51.3
7/30	58.4	35.71	0.00	51.0
7/31	68.3	35.56	0.00	57.2
Total	2,495.6	584.96	0.00	1,095

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.

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. Timothy Simmons reported the status of the different ASP facilities at the time of the site inspection.

Process	ASP 2 Reactors		ASP 3 Reactors		ASP 4 Reactors	
	Reactors	Secondary Clarifiers	Reactors	Secondary Clarifiers	Reactors	Secondary Clarifiers
Total	6	12	6	12	6	12
Fully operational	6	12	3	4	6	12
Partially operational	0	0	0	0	0	0

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Currently online	6	11	1	2	5	10
Out of service	0	0	0	0	0	0
In maintenance	0	0	1	8	0	2
Standby	0	1	4	2	1	0
Failed	0	0	0	0	0	0

Reactors:

Standby – 11, 13, 14, 16
 In Maintenance – 12

Clarifiers:

Standby – 10B, 11A, 11B
 In Maintenance – 12 A&B, 13 A&B, 14 A&B, 16 A&B, 22A, 22B

Denitrification Filters (DNFs)

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.

Sand Filters

The sand filters at the facility are used to polish the wastewater coming from the DNF building. There are 48 total filters. A capital improvement project is underway for replacing the media in 14 filters with a new media, “Diamon Cloth”. The project is in the design phase. Another project is underway for sand filters #2 thru #6 to replace the media and the undertray. 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 samplers in service for Outfall 001 was observed to be 1.0°C and 1.0°C. The temperature of the composite sampler for Outfall 002 was observed to be 4.0°C.



Image 03: Step Aeration system, final effluent.

I reviewed the lab located at the Chlorination / De-chlorination Facility. 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:

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Following the site inspection, laboratory reports and calibration records were reviewed. DMRs for July 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 NetDMR submissions.

Non-Compliance Report(s) / Bypass Events

Since the last inspection, the following non-compliance reports were received:

- July 23, 2024 – shutdown Outfall 002 at the request of Tradepoint Atlantic (TPA).
- August 2, 2024 – shutdown Outfall 002 at the request of TPA.
- August 9 – 13, 2024 – shutdown Outfall 002 at the request of TPA.
- August 23 – 27, 2024 – shutdown Outfall 002 at the request of TPA.
- August 30 – September 3, 2024 – shutdown Outfall 002 at the request of TPA.

The shutdowns listed above were reportedly due to pump maintenance at Tradepoint Atlantic.

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.

A follow-up inspection will be conducted.

Inspector:  9/30/2024

Christopher Lepadatu /Date
christopher.lepadatu@maryland.gov
410-537-3521

Received by: _____

Signature/Date

Print Name