



February 13, 2024

[REDACTED]

RE: DJ# 90-5-1-1-10157 - Civil Action No. 1:15-cv-00291-CCC: CSO Outfall Repair Early Action Project Schedule

To Plaintiffs, Civil Action No. 1:15-cv-00291-CCC:

Capital Region Water (CRW) is required to investigate CSO outfalls and define remedial work under Paragraph V(F)(28)(b) of the Modified Partial Consent Decree (MPCD) lodged February 13, 2023:

- c. *CSO Outfall Repair. Within one (1) year of the Date of Lodging of this Consent Decree CRW shall investigate each CSO outfall structure for defects, define all priority remedial work necessary for CSO outfall repairs, and develop a schedule for completion of the priority remedial work. The investigation shall include, at a minimum, a surface evaluation of the outfall pipe from the regulator chamber to the outfall, the condition of the outfall and the condition and effectiveness of any intrusion gates and duck bill flaps. CRW shall perform all priority remedial work to address identified defects that would lead to intrusion into the CSS or leaks of combined sewage that may occur between the regulator chamber and designated outfall that are causing the erosion of soil into the receiving water or pose a threat to human health via increased risk of exposure.*

To support meeting requirement, CRW is implementing the following requirements of Nine Minimum Control (NMC) No. 2 under Paragraph V(B)(10)(b) of the MPCD:

- b. *Maximize Use of Storage in Collection System. CRW shall, as part of its O&M Program described in Paragraph 11(a), above:*
  - i. *Investigate the condition and effectiveness of currently installed measures to prevent river intrusion into the Combined Sewer System (e.g., gaskets on river gates and duckbill valves attached to outfalls). Utilizing the results of the investigation and taking into account previous documentation of observed intrusion occurrences, CRW shall perform necessary repairs, replacements, and maintenance to prevent river intrusion into the Combined Sewer System; and*

- iv. Identify locations where river intrusion occurs through cracked and damaged CSO Outfall pipes (i.e., pipes that lead from regulators to the Susquehanna River or Paxton Creek and associated river gates), and develop a priority list and repair schedule for any necessary monitoring, repair, or replacement of any such cracked or damaged pipes.*

This letter report is CRW's CSO Outfall Repair schedule in fulfillment of Paragraph V(F)(28)(b).

## Background

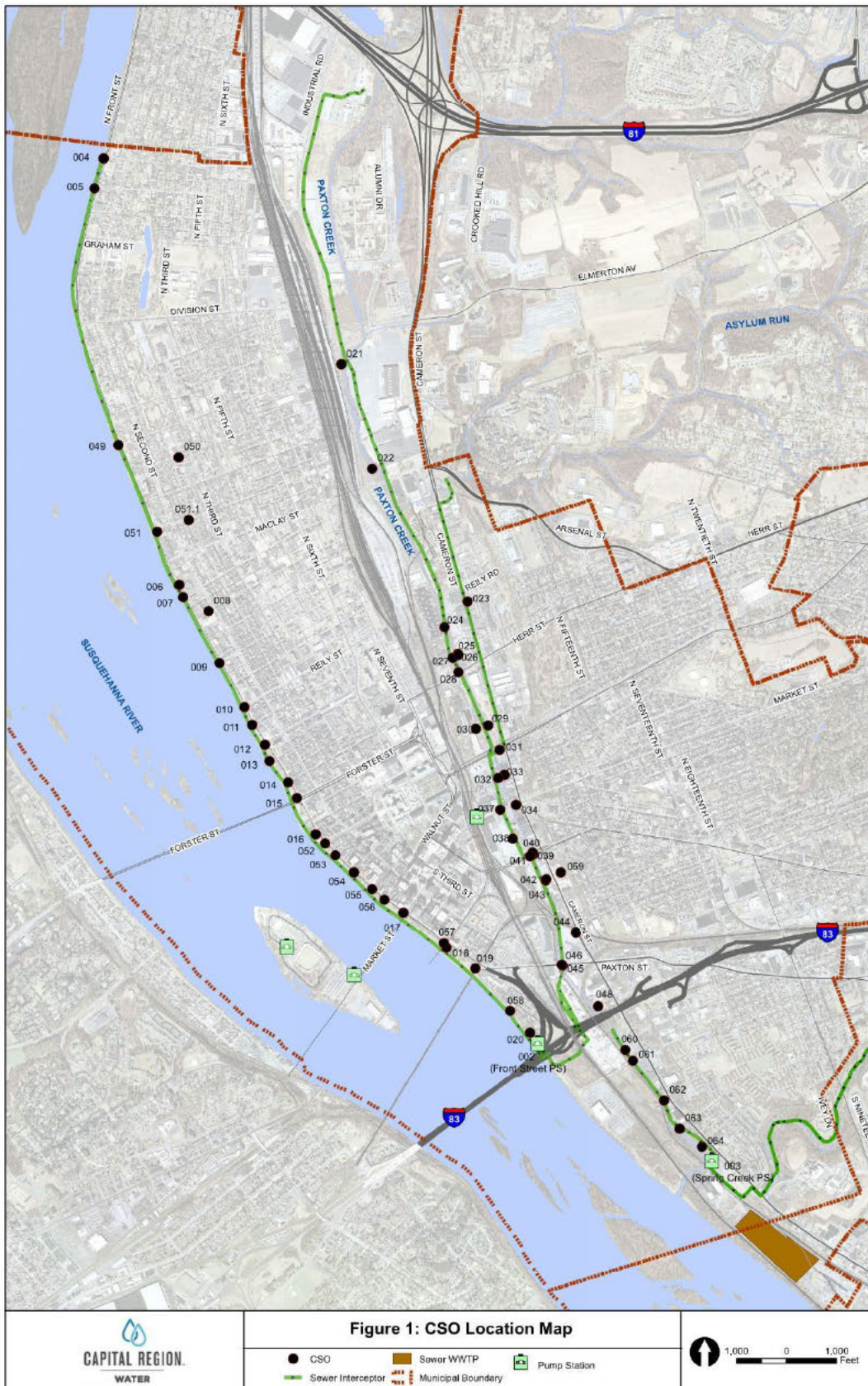
CRW, a Pennsylvania municipal authority, owns and operates the municipal sanitary and stormwater conveyance and collection systems within the City of Harrisburg, PA. **Figure 1** shows the location of CRW's CSO regulator structures. CRW's combined sewer system consists of 28 CSO structures which discharge to the Susquehanna River and 32 CSO structures which discharge to Paxton Creek during wet weather overflows.

**2013-2015 Regulator & Outfall Inspections:** In 2013 CRW performed comprehensive regulator and diversion chamber inspections shortly after taking ownership of the combined sewer system. In 2015 the flood chambers, gates, and outfall pipes were also inspected.

**2016-2017 CSO Outfall Repair Early Action Project Schedule:** The findings from the 2013 and 2015 inspections were utilized to perform condition assessments in conjunction with a river intrusion analysis. The results were summarized in the February 2016 *CSO Outfall Repair Early Action Project Schedule* submittal, and the responses to EPA/DEP comments in the June 2016 *CSO Outfall Repair Early Action Project Schedule – Response to EPA/DEP Comments*. In April 2017 the *Early Action Outfall Repairs Schedule Update* submittal was provided based on additional information developed for the March 2017 *System Characterization Report*. The recommendations included flap gate evaluation and replacement at seven locations and structural outfall repairs at nine locations; updates on the status of these repairs are provided below. The river intrusion analysis findings are summarized below.

**River Intrusion Analysis:** Each outfall has up to four barriers which prevent river/creek water from entering the interceptors, including: flood gate, flap gate, diversion weir, and Brown and Brown (B&B) regulator gate. The intended purpose of the flood gates is to protect the system from Susquehanna River flooding, which is often independent of precipitation events causing CSOs. Therefore, the flood gates may be closed to prevent river intrusion when there is no/limited precipitation in Harrisburg (i.e. after a large wet weather event ends, but while river level remains high). Flap gates prevent river water from reaching the diversion chamber. River intrusion can only occur when the river stage exceeds the elevation of the diversion weir.

The diversion weir elevation was utilized as the controlling factor in categorizing CSO structures with the highest potential for river intrusion in a comparison against a range of receiving water flood stage elevations. CRW identified nine outfalls with diversion weir elevations with potential river intrusion at the 1-year flood stage.



**Early Action Outfall Repair Progress to Date:** CRW's progress on the flap gate evaluations and outfall repairs is reported on in the NMC Plan Updates, OMM Updates, and Semi-Annual Reports. A summary is provided below:

- **Flap Gates:** CRW evaluated the feasibility of repairing the seven selected outfalls (006, 008, 021, 022, 024, 032, and 051) and determined that repairs were not feasible. The flap gate replacements will be significant projects that will be incorporated as part of future capital projects or as a separate indefinite delivery, indefinite quantity contract. The flap gate at outfall 022 is partially operable and currently utilized. Outfall 032 is scheduled for sewer separation.
- **Outfall Repairs Completed:** The recommended structural repairs were completed at the following four outfalls: 010, 034, 053, and 062.
- **Outfall Repairs Deferred:** CRW is deferring the repairs at the remaining five outfalls due to adverse field conditions and utility conflicts (007 and 029), upcoming sewer separation projects (027 and 041), or possible abandonment/sewer separation (038).
- **Front Street Pumping Station:** River intrusion protection for outfall 002 was incorporated in the pumping station upgrade.

## Current Conditions & Repair Recommendations

### Ongoing Inspections

CRW conducts daily inspections of the regulator chambers and diversion/flood chambers to ensure proper operation. CRW also performs semi-annual preventative maintenance and inspections of each outfall and the related structures. Inspections are documented in the Cityworks database system and work orders are created for necessary repairs. In 2017 CRW also conducted structural inspections of 23 outfalls, including the diversion chambers, pipes, weirs, regulator chambers, gates, float chambers, and flood chambers, where applicable. **Table 1** summarizes the current condition of the outfalls and related structures.

### Diversion Weir Modifications

CRW is also implementing regulator modifications throughout the system (to increase wet weather flows to the treatment plant) in a phased approach in conjunction with the completion of key interceptor improvements. Some of these improvements will involve raising the diversion weir.

**Table 1** includes the diversion weirs that have been raised.

### Potential Reconfiguration

CRW is currently preparing an updated long-term control plan, which will include potential sewer catchment consolidation, outfall abandonment, sewer separation, or modifications to outfalls and outfall-related structures. Several key projects are identified in Appendix B of the MPCD, which include the Paxton Creek Interceptor Replacement, Spring Creek Pumping Station Upgrade, and

Table 1. CSO Completed Repairs and Planned Improvements

Receiving Water	CSO <sup>1</sup>	Structural Condition Assessment			Completed Repairs	Recommended Repair	Potential Reconfiguration	Planned Improvements
		Pipes	Manholes	Gates				
Susquahanna River	2	Submerged	Good	Good	River intrusion prevention	None		
	4	Good	Good	Good		None	Yes	
	5	Good	Good	Good		None		
	6	Fair	Good	Good		Shotcrete or CIPP	Yes	Flap gate replacement
	7	Critical	Good	Good		Slipline or Replace	Yes	Replace w/ 27-in pipe; utility conflicts
	8	Good	Poor	Good	Replaced broken weir	None	Yes	Flap gate replacement
	9	Good	Good	Good	Repaired weir	None	Yes	
	10	Good	Good	Good	Lined outfall	None	Yes	
	11	Good	Fair	Crack		Inspect	Yes	
	12	Good	Poor	Good		Manhole Rehab	Yes	
	13	Good	Critical	Good		None		Structural lining of regulator chamber
	14	Good	Fair	Crack		Inspect		
	15	Good	Fair	Good		None		
	16	Good	Fair	Good		None		
	17	Good	Fair	Good		None	Yes	
	18	Fair	Fair	Good		Shotcrete CSO Pipe	Yes	
	19	Poor	Fair	Good		Shotcrete or CIPP	Yes	Line outfall pipe; enlarge gate
	20	Good	Good	Good		None	Yes	Flap gate replacement
	49	Good	Good	None		None	Yes	
	50	Good	Fair	Good		None	Yes	
	51	Good	Fair	Good		None	Yes	Flap gate replacement
	52	Submerged	Fair	None		Unknown	Yes	
	53	Good	Good	None	Replaced CSO Pipe	None	Yes	
	54	Good	Good	None		None	Yes	
	55	Good	Good	None		None		
	56	Good	Fair	None		None		
	57	Good	Fair	None	Spot repairs in bypass chamber	None	Yes	
	58	Good	Good	Good		None		Flap gate replacement

NOTES:

1. Highlighting indicates the diversion weir elevations for these CSOs are lower than the 1-year (purple), 2-year (red), 5-year (orange), 10-year (yellow), 25-year (green), and beyond 25-year (blue) flood stages, respectively.

Receiving Water	CSO <sup>1</sup>	Structural Condition Assessment			Completed Repairs	Recommended Repair	Potential Reconfiguration	Planned Improvements
		Pipes	Manholes	Gates				
Paxton Creek	3	Submerged	Good	Good		None		River intrusion protection w/ pump station upgrade
	21	Poor	Fair	Good		Rehab/Replace Pipe	Yes; PCI	Flap gate replacement
	22	Good	Fair	Good	Raised weir 1-ft	None	Yes; PCI	Flap gate replacement
	23	Good	Fair	Good		None	Yes; PCI	
	24	Fair	Good	Good	Raised weir 2.5-ft	Rehab Pipe	Yes; PCI	Flap gate replacement
	25	Good	Fair	Good		None	Yes; PCI	
	26	Good	Fair	Good		None	Yes; PCI	
	27	Critical	Good	Good		Shotcrete or CIPP	Yes	Scheduled for sewer separation
	28	Good	Fair	Good		None	Yes; PCI	
	29	Critical	Fair	None		Shotcrete Pipe	Yes; PCI	Replace w/ 36-in pipe; further coordination required
	30	Good	Good	None		None	Yes; PCI	
	31	Good	Fair	Good		None	Yes; PCI	
	32	Good	Fair	Good	Raised weir 2.5-ft	None	Yes	Scheduled for sewer separation
	33	Fair	Fair	Good	Repaired weir; replaced flood chamber top section	Rehab Pipe	Yes; PCI	
	34	Good	Fair	Good	Lined outfall	None	Yes; PCI	
	37	Good	Good	Good	Repaired weir	None	Yes; PCI	
	38	Critical	Good	Good	Repaired weir	Shotcrete or CIPP	Yes; PCI	Possible sewer separation
						Replace outfall	Yes; PCI	
	39	Poor	Critical	Good		Shotcrete pipe	Yes; PCI	Bypass structures for full condition assessment
	40	Obscured	Fair	Good		Unknown	Yes; PCI	
	41	Critical	Fair	Good		Rehab/Replace Pipe	Yes; PCI	Scheduled for sewer separation
	42	Good	Critical	Good		None	Yes; PCI	Bypass structures for full condition assessment
	43	Fair	Critical	Good	Raised weir	Shotcrete or CIPP	Yes; PCI	
	44	Good	Good	None		None	Yes; PCI	
	45	Good	Good	Good		None	Yes; PCI	
	46	Poor	Fair	Poor		Replace flap gate; fix offset joint	Yes; PCI	
	48	Good	Good	None		None	Yes; PCI	
	59	Good	Fair	None	Repaired weir	Shotcrete Outlet (cover reinforcing steel)	Yes; PCI	
60	Fair	Good	Good		CIPP Liner		Scheduled for sewer separation	
61	Good	Good	Good	Raised weir 1-ft	None	Yes		
62	Good	Good	Good	Raised weir 1-ft; repaired outfall erosion	None	Yes		
63	Good	Good	Good	Raised weir 1-ft	None			
64	Good	Good	Good	Raised weir 1-ft	None	Yes		

multiple sewer separation projects. **Table 1** includes the outfalls that are being considered for these types of projects. If the outfalls do not have critical repair needs, CRW plans to select the final outfall rehabilitation approach for each outfall in conjunction with the approved long-term control plan and Appendix B projects, where applicable.

### **Asset Management Program**

In July 2023 CRW completed the *Asset Management Plan (AMP): Wastewater Collection System*, which is a comprehensive asset management program to address the highest priority rehabilitation and replacement projects in the most efficient manner throughout the system, including outfalls and related structures. AMP implementation includes a *20-Year Collection System Rehabilitation and Replacement Capital Improvement Plan (20-Yr CIP)* that divides the wastewater collection system into project areas. Scheduling the rehabilitation/replacement construction will be prioritized based on the highest concentration of critical pipes.

Implementation of the *20-Yr CIP* and *AMP*, in conjunction with CRW's *Nine Minimum Controls Plan* and *Operation and Maintenance Manual*, will include replacing and repairing the outfalls and related structures within the project areas. As additional condition information is collected through routine inspections and prioritized assessments, critical projects will be performed on an as-needed basis. Outfall repairs will continue to be reported in each six-month semi-annual report.

### **Prioritized Recommendations**

CRW identified several key short-term outfall repair projects based on recent inspections. Details are provided in **Table 1**, and key projects are summarized below.

#### *Critical Priority*

- **Outfall 013 (Front & Cumberland):** The regulator chamber is in poor condition with multiple holes in the structure that were repaired in 2016. In 2023 additional repair attempts were made (to prevent discharge from the deteriorated sections of the chamber) that were unsuccessful. This outfall is currently under bypass until a permanent solution is completed. CRW authorized a rehabilitation company to apply a polyurea liner in the regulator chamber. The work started in February 2024.
- **Outfalls 042 & 043 (Kittatinny & Cameron):** The concrete structures at outfall 043 are severely pitted and will be resurfaced. Outfalls 042 and 043 share a silt basin that is in poor condition. CRW intends bypass both outfalls (and related structures) to fully assess the conditions and develop a plan to implement the necessary repairs, which is expected to be structural lining.
- **Outfall 039 (Mulberry & Cameron):** The diversion chamber floor has deteriorated, and there are holes in the walls and weir. The outfall is recommended for shotcrete lining. CRW intends bypass the outfall (and related structures) to fully assess the conditions and develop a plan to implement the necessary repairs.

### High Priority

- **Outfall 008 (Front & Muench):** The weir was replaced in 2023. There are holes in multiple structure walls. CRW intends bypass the outfall (and related structures) to fully assess the conditions and develop a plan to implement the necessary repairs.
- **Outfall 019 (Front & Paxton):** The outfall pipe is in poor condition and recommended for shotcrete lining. CRW also intends to increase the gate size.

### Schedule

CRW intends to address the prioritized outfall projects described above as presented **Table 2**. Additional outfall rehabilitation and replacement projects, including gate replacement will be scheduled to align with the finalized long-term control plan and collection system project areas outlined in the 20-yr CIP. Minor repairs are continually identified and addressed as part of the combined efforts of the OMM, NMC Plan, and AMP.

**Table 2. CSO Outfall Repair Schedule**

Time Period	Recommended Actions
February 2024	▪ Repair outfall 013 regulator chamber
March 2024 (Annually)	▪ Outfall assessments during routine annual CSO cleaning
March 2024 – August 2024	<ul style="list-style-type: none"> <li>▪ Conduct details assessments (under bypass pumping) of the structures at the following outfalls and develop repair strategies with schedules:               <ul style="list-style-type: none"> <li>- Outfalls 042 &amp; 043</li> <li>- Outfall 039</li> <li>- Outfall 008</li> </ul> </li> <li>▪ Implement repairs at outfall 019</li> </ul>
CSO Long-Term Control Plan Development: October 2024 – December 2024	<ul style="list-style-type: none"> <li>▪ Schedule outfall repairs or reconfiguration strategy for the following critical outfalls:               <ul style="list-style-type: none"> <li>- Outfall 007 (replace with 27-in pipe; utility conflicts)</li> <li>- Outfall 029 (replace with 36-in pipe; further coordination required)</li> <li>- Outfall 038 (possible sewer separation)</li> </ul> </li> <li>▪ Schedule flap gate replacement at outfalls 006, 008, 020, 021, 022, 024, 051, and 058 as part of a future LTCP project or IDIQ contract</li> </ul>
2025-2026	<ul style="list-style-type: none"> <li>▪ Implement sewer separation projects at the following critical outfalls: 027 &amp; 041</li> <li>▪ Finalize scope of near-term (5-yr) outfall improvements in conjunction with LTCP, AMP, and near-term 20-Yr CIP project areas</li> </ul>
2027-2028	▪ Incorporate river intrusion protection into Spring Creek PS rehabilitation (outfall 003)
2029-2030	▪ Implement Paxton Creek outfall and regulator
Ongoing	▪ Condition of outfalls and related structures is monitored during daily CSO checks; minor repairs are made as needed.





We will continue to provide updates on the status of the outfall repair progress in our semi-annual report submissions. Please contact me directly to discuss any questions or concerns you may have.

Sincerely yours,

