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PHASE II LONG TERM CONTROL PLAN

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ALT2W7A
Regulator Modifications at
CSOs 1008/1009/1012/1013/1014/1033
to Maximize Interceptor Capacity



Analysis

Goals:

1. Control west side CSOs to 4 activations.
2. Provide a reasonable Level of Service (i.e. no flooded basements/manholes)

Alternative:

1. Increased overflow weir elevation and/or the underflow capacity.
2. Started analyzing the regulator improvements from CSO 1008 and move upstream to CSO 1033.

Results:

Meets 4 activations goal for the west side CSOs but violates freeboard goals along 27" and 36" interceptors.

Summary



CSO 1008	CSO 1009	CSO 1012
Increased weir inlet offset from 12" to 54"; Increased 104 ft of underflow pipe from 10" to 27".	Removed Leaping weir control rule configuration; Added a overflow weir with 15" offset; Increased underflow orifice opening from 8"X14" to 15"X15"; Increased 431 ft of underflow pipe from 12 to 27" & 539 ft of 15" to 27" from CSO 1009 to Wheeling St PS POC (end of YMCA FM)	Removed Leaping weir control rule configuration; Increase 447 ft of underflow pipe from 15" to 24" & 593 ft of 14" to 24" & 321 from 16" to 24" from Memorial drive between 5th and Mulberry
CSO 1013	CSO 1014	CSO 1033
Removed Leaping weir control rule configuration; Increased overflow weir offset from 1.65' to 2'; Increased underflow orifice size from 6" to 18"; Increased 30 ft of underflow pipe from 10 to 18" & 391 ft of 11.25" to 18" from CSO 1013 to CSO 1012 regulator.	Added a new 456 ft of 18" underflow line from regulator to the 36" interceptor just upstream of YMCA PS; Closing the existing 12" underflow line from the regulator to the 36" interceptor	Added a new 600 ft of 15" underflow line from regulator to the 36" interceptor; Closing the existing 10" underflow line from the regulator to the 36" interceptor

Alternative vs. Baseline



ALT2W7A
Typical Year CSO Overflow Statistics

2014 Baseline with 2035 Growth
Typical Year CSO Overflow Statistics

VS

CSO No.	Total Volume (MG)	Total Duration (Hrs)	Number of Events
CSO1004	0.3	4	4
CSO1008	0.6	4	4
CSO1009	0.6	4	4
CSO1011	0.0	0	0
CSO1012	0.5	5	4
CSO1013	0.5	4	4
CSO1014	0.3	3	3
CSO1033	0.4	3	3

10.7

CSO No.	Total Volume (MG)	Total Duration (Hrs)	Number of Events
CSO1004	12.7	49	10
CSO1008	1.4	48	27
CSO1009	4.4	227	77
CSO1011	0.0	0	0
CSO1012	4.4	200	58
CSO1013	4.8	166	77
CSO1014	1.7	21	18
CSO1019	3.5	19	16
CSO1026	0.0	0	0
CSO1027	0.0	0	0
CSO1029	3.7	70	31
CSO1033	1.1	7	6

37.7

Note: EQ volume will increase with east side improvements

New EQ at the plant required capacity is ~4.3 MG



ALT3W3A
EQ at YMCA Capturing Flows from
CSOs 1014 & 1033



Analysis

Goals:

1. Control CSOs 1014 and 1033 to 4 activations or less.
2. Provide a reasonable Level of Service (i.e. no flooded basements/manholes)

Alternative:

1. Regulator modifications at CSO 1014 and CSO 1033.
2. Proposed EQ at YMCA.

Results:

With regulator modifications at CSO 1014 and CSO 1033 and proposed EQ at YMCA we have 4 or less activations and doesn't violate freeboard goals between CSO 1033 and CSO 1014, upstream of CSOs 1014 and 1033.

Summary

CSO 1008	CSO 1009	CSO 1012
Increased weir inlet offset from 12" to 54"; Increased 104 ft of underflow pipe from 10" to 27".	Removed Leaping weir control rule configuration; Added a overflow weir with 15" offset; Increased underflow orifice opening from 8"X14" to 15"X15"; Increased 431 ft of underflow pipe from 12 to 27" & 539 ft of 15" to 27" from CSO 1009 to Wheeling St PS POC (end of YMCA FM)	Removed Leaping weir control rule configuration; Increase weir inlet offset from 3.25 ft to 3.4 ft; Increase 447 ft of underflow pipe from 15" to 24 & 593 ft of 14" to 24" & 321 from 16" to 24" from Memorial drive between 5th and Mulberry
CSO 1013	CSO 1014	CSO 1033
Removed Leaping weir control rule configuration; increased overflow weir offset from 1.65' to 2'; Increased underflow orifice size from 6" to 18"; Increased 30 ft of underflow pipe from 10 to 18" & 391 ft of 11.25" to 18" from CSO 1013 to CSO 1012 regulator.	Increase 456 ft of underflow pipe from 12" to 18"; Close existing 12" pipe	Increase 600 ft of underflow pipe from 10" to 12"; Close existing 10"
Additional Notes		
Proposed EQ at YMCA		

Alternative vs. Baseline

ALT3W3A
Typical Year CSO Overflow Statistics

2014 Baseline with 2035 Growth
Typical Year CSO Overflow Statistics

VS

CSO No.	Total Volume (MG)	Total Duration (Hrs)	Number of Events
CSO1004	0.3	3	4
CSO1008	0.3	2	3
CSO1009	0.6	4	4
CSO1011	0.0	0	0
CSO1012	0.5	5	4
CSO1013	0.5	4	4
CSO1014	0.2	2	3
CSO1033	0.7	5	4

3.1

East side CSOs volume not included in the total volume

CSO No.	Total Volume (MG)	Total Duration (Hrs)	Number of Events
CSO1004	12.7	49	10
CSO1008	1.4	46	27
CSO1009	4.4	227	77
CSO1011	0.0	0	0
CSO1012	4.4	200	58
CSO1013	4.8	166	77
CSO1014	1.7	21	18
CSO1019	3.5	19	16
CSO1026	0.0	0	0
CSO1027	0.0	0	0
CSO1029	3.7	70	31
CSO1033	1.1	7	6

37.7

Note: EQ volume will change with east side improvements

New EQ at YMCA required capacity is ~0.36 MG
New EQ at the plant required capacity is ~4.2 MG



ALT3W4A
EQ at YMCA Capturing Flows from
CSOs 1013, 1014 & 1033



Analysis

Goals:

1. Control CSOs 1014 and 1033 to 4 activations or less.
2. Provide a reasonable Level of Service (i.e. no flooded basements/manholes)

Alternative:

1. Regulator modifications at CSO 1014 and CSO 1033.
2. Re-route CSO 1013 flow to CSO 1014.
3. Proposed EQ at YMCA.

Results:

With regulator modifications at CSO 1014 and CSO 1033, re-routing CSO 1013 to CSO 1014 and proposed EQ at YMCA we have 4 or less activations but violates freeboard goals between CSO 1033 and CSO 1014 and upstream of CSO 1014.

Summary



CSO 1008	CSO 1009	CSO 1012
Increased weir inlet offset from 12" to 54"; Increased 104 ft of underflow pipe from 10" to 27".	Removed Leaping weir control rule configuration; Added a overflow weir with 15" offset; Increased underflow orifice opening from 8"X14" to 15"X15"; Increased 431 ft of underflow pipe from 12 to 27" & 539 ft of 15" to 27" from CSO 1009 to Wheeling St PS POC (end of YMCA FM)	Removed Leaping weir control rule configuration; Increase 447 ft of underflow pipe from 15" to 24 & 593 ft of 14" to 24" & 321 from 16" to 24" from Memorial drive between 5th and Mulberry
CSO 1013	CSO 1014	CSO 1033
Route all flows from regulator CSO 1013 to upstream of regulator CSO 1014 with a new 525 ft length of 24" pipe	Increase 456 ft of underflow pipe from 12" to 24"; Close existing 12" pipe	Increase 600 ft of underflow pipe from 10" to 12"; Close existing 10"
Additional Notes		
Proposed EQ at YMCA		

Alternative vs. Baseline



ALT3W4A
Typical Year CSO Overflow Statistics

2014 Baseline with 2035 Growth
Typical Year CSO Overflow Statistics

VS

CSO No.	Total Volume (MG)	Total Duration (Hrs)	Number of Events
CSO1004	0.3	3	3
CSO1008	0.3	2	3
CSO1009	0.6	4	4
CSO1011	0.0	0	0
CSO1012	0.2	2	3
CSO1013	0.0	0	0
CSO1014	0.8	3	3
CSO1033	0.8	5	4

2.9

East side CSOs volume not included in the total volume

Note: EQ volume will change with east side improvements

New EQ at YMCA required capacity is ~0.38 MG
New EQ at the plant required capacity is ~4.3 MG

CSO No.	Total Volume (MG)	Total Duration (Hrs)	Number of Events
CSO1004	12.7	49	10
CSO1008	1.4	46	27
CSO1009	4.4	227	77
CSO1011	0.0	0	0
CSO1012	4.4	200	58
CSO1013	4.8	166	77
CSO1014	1.7	21	18
CSO1019	3.5	19	16
CSO1026	0.0	0	0
CSO1027	0.0	0	0
CSO1029	3.7	70	31
CSO1033	1.1	7	6

37.7



**ALT4W3A1
EQ at YMCA with
2025 Separation Projects at
CSOs 1008/1009/1012/1013**



Analysis

Goals:

1. Control CSOs 1014 and 1033 to 4 activations or less.
2. Provide a reasonable Level of Service (i.e. no flooded basements/manholes)

Alternative:

1. 2025 Separation.
2. Regulator modifications at CSO 1014 and CSO 1033.
3. Proposed EQ at YMCA.

Results:

With 2025 separation, regulator modifications at CSO 1014 and CSO 1033 and proposed EQ at YMCA we have 4 or less activations and doesn't violate freeboard goals between CSO 1033 and CSO 1014, upstream of CSO 1014/CSO 1033 and along the 36" interceptor.

Summary



CSO 1008	CSO 1009	CSO 1012
2025 Separation	2025 Separation	2025 Separation
CSO 1013	CSO 1014	CSO 1033
2025 Separation	Increase 456 ft underflow pipe from 12" to 18"; Close existing 12" pipe	Increase 600 ft underflow pipe from 10" to 12"; Close existing 10" pipe
Additional Notes		
Proposed EQ at YMCA		

Alternative vs. Baseline



ALT4W3A1
Typical Year CSO Overflow Statistics

2014 Baseline with 2035 Growth
Typical Year CSO Overflow Statistics

VS

CSO No.	Total Volume (MG)	Total Duration (Hrs)	Number of Events
CSO1004	0.2	2	3
CSO1008	0.1	1	3
CSO1009	0.0	1	1
CSO1011	0.0	0	0
CSO1012	0.0	0	1
CSO1013	0.0	0	0
CSO1014	0.2	2	3
CSO1033	0.1	2	3
	0.6		

CSO No.	Total Volume (MG)	Total Duration (Hrs)	Number of Events
CSO1004	12.7	49	10
CSO1008	1.4	46	27
CSO1009	4.4	227	77
CSO1011	0.0	0	0
CSO1012	4.4	200	58
CSO1013	4.8	166	77
CSO1014	1.7	21	18
CSO1019	3.5	19	16
CSO1026	0.0	0	0
CSO1027	0.0	0	0
CSO1029	3.7	70	31
CSO1033	1.1	7	6
	37.7		

East side CSOs volume not included in the total volume

Note: EQ volume will change with east side improvements

New EQ at YMCA required capacity is ~0.28 MG
New EQ at the plant required capacity is ~3.6 MG



ALT5W7A1
2025 Separation Projects Without
Regulator Modifications at
CSOs 1008/1009/1012/1013/1014/1033



Analysis

Goals:

1. Control west side CSOs to 4 activations or less.
2. Provide a reasonable Level of Service (i.e. no flooded basements/manholes)

Alternative:

1. 2025 separation analysis based on the projects proposed by the City.

Results:

With 2025 separation projects in place except CSO 1033 other CSOs on the west side (i.e., CSOs 1008, 1009, 1012, 1013, 1014) still have more than 4 activations.

Summary



CSO 1008	CSO 1009	CSO 1012
2025 Separation Projects	2025 Separation Projects	2025 Separation Projects
CSO 1013	CSO 1014	CSO 1033
2025 Separation Projects	2025 Separation Projects	2025 Separation Projects

Alternative vs. Baseline



ALT5W7A1
Typical Year CSO Overflow Statistics

2014 Baseline with 2035 Growth
Typical Year CSO Overflow Statistics

VS

CSO No.	Total Volume (MG)	Total Duration (Hrs)	Number of Events
CSO1004	0.0	0	1
CSO1008	0.4	17	17
CSO1009	1.4	145	67
CSO1011	0.0	0	0
CSO1012	0.7	56	28
CSO1013	0.4	17	16
CSO1014	1.7	21	18
CSO1033	0.3	4	3
	4.8		

CSO No.	Total Volume (MG)	Total Duration (Hrs)	Number of Events
CSO1004	12.7	49	10
CSO1008	1.4	46	27
CSO1009	4.4	227	77
CSO1011	0.0	0	0
CSO1012	4.4	200	58
CSO1013	4.8	166	77
CSO1014	1.7	21	18
CSO1019	3.5	19	16
CSO1026	0.0	0	0
CSO1027	0.0	0	0
CSO1029	3.7	70	31
CSO1033	1.1	7	6
	37.7		

East side CSOs volume not included in the total volume

Note: EQ volume will change with east side improvements

New EQ at the plant required capacity is ~3.1 MG



ALT5W7A2
2050 Separation Projects Without
Regulator Modifications at
CSOs 1008/1009/1012/1013/1014/1033



Analysis

Goals:

1. Control west side CSOs to 4 activations or less.
2. Provide a reasonable Level of Service (i.e. no flooded basements/manholes)

Alternative:

1. 2050 separation analysis based on the projects proposed by the City.

Results:

With 2050 separation projects in place except CSO 1008 all other CSOs on the west side (i.e., CSOs 1009, 1012, 1013, 1014 and 1033) have less than 4 activations.



Summary



CSO 1008	CSO 1009	CSO 1012
2050 Separation Projects	2050 Separation Projects	2050 Separation Projects
CSO 1013	CSO 1014	CSO 1033
2050 Separation Projects	2050 Separation Projects	2050 Separation Projects



Alternative vs. Baseline



ALT5W7A2
Typical Year CSO Overflow Statistics

2014 Baseline with 2035 Growth
Typical Year CSO Overflow Statistics

VS

CSO No.	Total Volume (MG)	Total Duration (Hrs)	Number of Events
CSO1004	0.0	0	0
CSO1008	0.2	8	9
CSO1009	0.0	0	0
CSO1011	0.0	0	0
CSO1012	0.0	2	1
CSO1013	0.0	0	0
CSO1014	0.0	0	0
CSO1033	0.3	4	3
	0.5		

CSO No.	Total Volume (MG)	Total Duration (Hrs)	Number of Events
CSO1004	12.7	49	10
CSO1008	1.4	46	27
CSO1009	4.4	227	77
CSO1011	0.0	0	0
CSO1012	4.4	200	58
CSO1013	4.8	166	77
CSO1014	1.7	21	18
CSO1019	3.5	19	16
CSO1026	0.0	0	0
CSO1027	0.0	0	0
CSO1029	3.7	70	31
CSO1033	1.1	7	6
	37.7		

East side CSOs volume not included in the total volume

Note: EQ volume will change with east side improvements

New EQ at the plant required capacity is ~2.6 MG



ALT6W7A1
2025 Separation Projects With
Regulator Modifications at
CSOs 1008/1009/1012/1013/1014/1033



Analysis

Goals:

1. Control west side CSOs to 4 activations or less.
2. Provide a reasonable Level of Service (i.e. no flooded basements/manholes)

Alternative:

1. 2025 separation analysis based on the projects proposed by the City.
2. Increased overflow weir elevation and/or the underflow capacity.
3. Started analyzing the regulator improvements from CSO 1008 and move upstream to CSO 1033.

Results:

With 2025 separation projects and CSO regulator modifications all CSOs on the west side now have 4 or less activations but violates freeboard goals along the 27" interceptor.

Summary



CSO 1008	CSO 1009	CSO 1012
2025 Separation; Increased weir inlet offset from 12" to 27"	2025 Separation; Removed Leaping weir control rule configuration; Added a overflow weir with 12" offset; Increased underflow orifice opening from 8"X14" to 14"X14"; Increased 431 ft of underflow pipe from 12 to 15"	2025 Separation; Removed Leaping weir control rule configuration; Increased the overflow weir inlet offset from 3.25 ft to 3.6 ft
CSO 1013	CSO 1014	CSO 1033
2025 Separation; Removed Leaping weir control rule configuration; Increased underflow orifice size from 6" to 15"; Increased 30 ft of underflow pipe from 10 to 15" & 391 ft of 11.25" to 15" from CSO 1013 to CSO 1012 regulator.	2025 Separation; Added a new 456 ft of 18" underflow line from regulator to the 36" interceptor just upstream of YMCA PS; Closing the existing 12" underflow line from the regulator to the 36" interceptor	2025 Separation

Alternative vs. Baseline



ALT6W7A1
Typical Year CSO Overflow Statistics

2014 Baseline with 2035 Growth
Typical Year CSO Overflow Statistics

VS

CSO No.	Total Volume (MG)	Total Duration (Hrs)	Number of Events
CSO1004	0.1	1	2
CSO1008	0.3	5	4
CSO1009	0.3	4	4
CSO1011	0.0	0	0
CSO1012	0.2	4	4
CSO1013	0.1	3	3
CSO1014	0.2	2	3
CSO1033	0.3	4	3
Total	1.4		

CSO No.	Total Volume (MG)	Total Duration (Hrs)	Number of Events
CSO1004	12.7	49	10
CSO1008	1.4	48	27
CSO1009	4.4	227	77
CSO1011	0.0	0	0
CSO1012	4.4	200	58
CSO1013	4.8	166	77
CSO1014	1.7	21	18
CSO1019	3.5	19	16
CSO1026	0.0	0	0
CSO1027	0.0	0	0
CSO1029	3.7	70	31
CSO1033	1.1	7	6
Total	37.7		

East side CSOs volume not included in the total volume

Note: EQ volume will change with east side improvements

New EQ at the plant required capacity is ~3.6 MG



ALT6W7A2 2050 Separation Projects With Regulator Modifications at CSO 1008



Analysis

Goals:

1. Control west side CSOs to 4 activations or less.
2. Provide a reasonable Level of Service (i.e. no flooded basements/manholes)

Alternative:

1. 2050 separation analysis based on the projects proposed by the City.
2. Increased overflow weir elevation at CSO 1008.

Results:

With 2050 separation projects and CSO 1008 regulator modifications all CSOs on the west side have 4 or less activations.

Summary



CSO 1008	CSO 1009	CSO 1012
2050 Separation; Increased weir inlet offset from 12" to 18"	2050 Separation	2050 Separation
CSO 1013	CSO 1014	CSO 1033
2050 Separation	2050 Separation	2050 Separation

Alternative vs. Baseline



ALT6W7A2
Typical Year CSO Overflow Statistics

2014 Baseline with 2035 Growth
Typical Year CSO Overflow Statistics

VS

CSO No.	Total Volume (MG)	Total Duration (Hrs)	Number of Events
CSO1004	0.0	0	0
CSO1008	0.1	4	4
CSO1009	0.0	0	0
CSO1011	0.0	0	0
CSO1012	0.0	2	1
CSO1013	0.0	0	0
CSO1014	0.0	0	0
CSO1033	0.3	4	3

0.4

East side CSOs volume not included in the total volume

CSO No.	Total Volume (MG)	Total Duration (Hrs)	Number of Events
CSO1004	12.7	49	10
CSO1008	1.4	46	27
CSO1009	4.4	227	77
CSO1011	0.0	0	0
CSO1012	4.4	200	58
CSO1013	4.8	166	77
CSO1014	1.7	21	18
CSO1019	3.5	19	16
CSO1026	0.0	0	0
CSO1027	0.0	0	0
CSO1029	3.7	70	31
CSO1033	1.1	7	6

37.7

Note: EQ volume will change with east side improvements

New EQ at the plant required capacity is ~2.7 MG



ALT7W7A
Regulator Modifications at
CSOs 1008/1009/1012/1013/1014/1033 and
Interceptor Capacity Improvements



Analysis

Goals:

1. Control west side CSOs to 4 activations or less.
2. Provide a reasonable Level of Service (i.e. no flooded basements/manholes)

Alternative:

1. Increased overflow weir elevation and/or the underflow capacity.
2. Started analyzing the regulator improvements from CSO 1008 and move upstream to CSO 1033.
3. Increased the interceptor pipe size from 27" to 36".

Results:

With CSO regulator modifications and increase in 27" interceptor capacity all CSOs on the west side now have 4 or less activations and doesn't violate freeboard goals.

Summary



CSO 1008	CSO 1009	CSO 1012
Increased weir inlet offset from 12" to 54"; Increased 104 ft of underflow pipe from 10" to 27".	Removed Leaping weir control rule configuration; Added a overflow weir with 15" offset; Increased underflow orifice opening from 8"X14" to 15"X15"; Increased 431 ft of underflow pipe from 12 to 27" & 599 ft of 15" to 27" from CSO 1009 to Wheeling St PS POC (end of YMCA FM)	Removed Leaping weir control rule configuration; increased the weir inlet offset from 3.25 ft to 3.4 ft; Increase 447 ft of underflow pipe from 15" to 24" & 593 ft of 14" to 24" & 321 from 16" to 24" from Memorial drive between 5th and Mulberry
CSO 1013	CSO 1014	CSO 1033
Removed Leaping weir control rule configuration; Increased overflow weir offset from 1.65' to 2'; Increased underflow orifice size from 6" to 18"; Increased 30 ft of underflow pipe from 10 to 18" & 391 ft of 11.25" to 18" from CSO 1013 to CSO 1012 regulator.	Added a new 456 ft of 18" underflow line from regulator to the 36" interceptor just upstream of YMCA PS; Closing the existing 12" underflow line from the regulator to the 36" interceptor	Added a new 600 ft of 15" underflow line from regulator to the 36" interceptor; Closing the existing 10" underflow line from the regulator to the 36" interceptor
Additional Notes		
Increased 6377 ft of 27" interceptor to 36" from CSO 1008 to downstream of Maple St connection		

Alternative vs. Baseline



ALT7W7A
Typical Year CSO Overflow Statistics

2014 Baseline with 2035 Growth
Typical Year CSO Overflow Statistics

VS

CSO No.	Total Volume (MG)	Total Duration (Hrs)	Number of Events
CSO1004	0.6	4	4
CSO1008	0.7	4	3
CSO1009	0.6	4	4
CSO1011	0.0	0	0
CSO1012	0.5	4	4
CSO1013	0.5	4	4
CSO1014	0.3	3	3
CSO1033	0.4	3	3
3.5			

East side CSOs volume not included in the total volume

Note: EQ volume will change with east side improvements

New EQ at the plant required capacity is ~4.5 MG

CSO No.	Total Volume (MG)	Total Duration (Hrs)	Number of Events
CSO1004	12.7	49	10
CSO1008	1.4	46	27
CSO1009	4.4	227	77
CSO1011	0.0	0	0
CSO1012	4.4	200	58
CSO1013	4.8	166	77
CSO1014	1.7	21	18
CSO1019	3.5	19	16
CSO1026	0.0	0	0
CSO1027	0.0	0	0
CSO1029	3.7	70	31
CSO1033	1.1	7	6
37.7			



ALT8W7A1
2025 Separation Projects With
Regulator Modifications at
CSOs 1008/1009/1012/1013/1014/1033 and
Interceptor Capacity Improvements



Analysis

Goals:

1. Control west side CSOs to 4 activations or less.
2. Provide a reasonable Level of Service (i.e. no flooded basements/manholes)

Alternative:

1. 2025 separation projects in place.
2. Increased overflow weir elevation and/or the underflow capacity.
3. Started analyzing the regulator improvements from CSO 1008 and move upstream to CSO 1033.
4. Increased the interceptor pipe size from 27" to 36".

Results:

With CSO regulator modifications and increase in 27" interceptor capacity all CSOs on the west side now have 4 or less activations and doesn't violate freeboard goals.

Summary



CSO 1008	CSO 1009	CSO 1012
2025 separation; Increased weir inlet offset from 12" to 27"	2025 separation; Removed Leaping weir control rule configuration; Added a overflow weir with 12" offset; Increased underflow orifice opening from 8"X14" to 14"X14"; Increased 431 ft of underflow pipe from 12 to 15"	2025 separation; Removed Leaping weir control rule configuration; Increased the overflow weir inlet offset from 3.25 ft to 3.6 ft
CSO 1013	CSO 1014	CSO 1033
2025 separation; Removed Leaping weir control rule configuration; Increased underflow orifice size from 6" to 15"; Increased 30 ft of underflow pipe from 10 to 15" & 391 ft of 11.25" to 15" from CSO 1013 to CSO 1012 regulator.	2025 separation; Added a new 456 ft of 18" underflow line from regulator to the 36" interceptor just upstream of YMCA PS; Closing the existing 12" underflow line from the regulator to the 36" interceptor	2025 Separation
Additional Notes		
Increased 6377 ft of 27" interceptor to 36" from CSO 1008 to downstream of Maple St connection		

Alternative vs. Baseline



ALT8W7A1
Typical Year CSO Overflow Statistics

2014 Baseline with 2035 Growth
Typical Year CSO Overflow Statistics

VS

CSO No.	Total Volume (MG)	Total Duration (Hrs)	Number of Events
CSO1004	0.1	2	2
CSO1008	0.1	3	3
CSO1009	0.3	4	4
CSO1011	0.0	0	0
CSO1012	0.2	4	4
CSO1013	0.1	3	3
CSO1014	0.2	2	3
CSO1033	0.3	4	3
1.2			

East side CSOs volume not included in the total volume

Note: EQ volume will change with east side improvements

New EQ at the plant required capacity is ~3.6 MG

CSO No.	Total Volume (MG)	Total Duration (Hrs)	Number of Events
CSO1004	12.7	49	10
CSO1008	1.4	46	27
CSO1009	4.4	227	77
CSO1011	0.0	0	0
CSO1012	4.4	200	58
CSO1013	4.8	166	77
CSO1014	1.7	21	18
CSO1019	3.5	19	16
CSO1026	0.0	0	0
CSO1027	0.0	0	0
CSO1029	3.7	70	31
CSO1033	1.1	7	6
37.7			



**ALT2E1A
Regulator Modifications at
CSOs 1019/1029 to
Maximize Interceptor Capacity
(ALT2W7A Included)**



Analysis

Goals:

1. Control east side CSOs to 4 activations or less.
2. Provide a reasonable Level of Service (i.e. no flooded basements/manholes)

Alternative:

1. CSO 1019 and CSO 1029 regulator modifications.

Results:

With regulator modifications at CSOs 1019 and 1029 we have 4 or less activations but violates freeboard goals along the 27" parallel to existing 36" Baldwin Run interceptor.

Summary

CSO 1008	CSO 1009	CSO 1012
Increased weir inlet offset from 12" to 54"; Increased 104 ft of underflow pipe from 10" to 27".	Removed Leaping weir control rule configuration; Added a overflow weir with 15" offset; Increased underflow orifice opening from 8"X14" to 15"X15"; Increased 431 ft of underflow pipe from 12 to 27" & 539 ft of 15" to 27" from CSO 1009 to Wheeling St PS POC (end of YMCA FM)	Removed Leaping weir control rule configuration; Increased weir inlet offset from 3.25 ft 3.4 ft; Increase 447 ft of underflow pipe from 15" to 24 & 593 ft of 14" to 24" & 321 from 16" to 24" from Memorial drive between 5th and Mulberry
CSO 1013	CSO 1014	CSO 1033
Removed Leaping weir control rule configuration; Increased overflow weir offset from 1.65' to 2'; Increased underflow orifice size from 6" to 18"; Increased 30 ft of underflow pipe from 10 to 18" & 391 ft of 11.25" to 18" from CSO 1013 to CSO 1012 regulator.	Added a new 456 ft of 18" underflow line from regulator to the 36" interceptor just upstream of YMCA PS; Closing the existing 12" underflow line from the regulator to the 36" interceptor	Added a new 600 ft of 15" underflow line from regulator to the 36" interceptor; Closing the existing 10" underflow line from the regulator to the 36" interceptor
CSO 1029	CSO 1019	Additional Notes
Increased the underflow bottom Orifice opening from 10" to 24"; Increased 56 ft of underflow pipe from 8" to 24" from CSO 1029 regulator to Baldwin Run Interceptor	Increased the underflow Orifice opening from 12" to 24"; Increased 156 ft of underflow pipe from 18" to 30" from CSO 1019 regulator to Main St Interceptor POC.	Increased the 344' interceptor pipe segment from 42" to 48"

Alternative vs. Baseline

ALT2E1A
Typical Year CSO Overflow Statistics

2014 Baseline with 2035 Growth
Typical Year CSO Overflow Statistics

VS

CSO No.	Total Volume (MG)	Total Duration (Hrs)	Number of Events
CSO1004	1.8	5	5
CSO1008	0.7	4	4
CSO1009	0.6	4	4
CSO1011	0.0	0	0
CSO1012	0.5	5	4
CSO1013	0.5	4	4
CSO1014	0.3	3	3
CSO1019	1.3	3	3
CSO1026	0.0	0	0
CSO1027	0.4	5	4
CSO1029	0.6	3	3
CSO1033	0.4	3	3

7.1

CSO No.	Total Volume (MG)	Total Duration (Hrs)	Number of Events
CSO1004	12.7	49	10
CSO1008	1.4	46	27
CSO1009	4.4	227	77
CSO1011	0.0	0	0
CSO1012	4.4	200	58
CSO1013	4.8	166	77
CSO1014	1.7	21	18
CSO1019	3.5	19	16
CSO1026	0.0	0	0
CSO1027	0.0	0	0
CSO1029	3.7	70	31
CSO1033	1.1	7	6

37.7

New EQ at the plant required capacity is ~4.7 MG



**ALT3E1A1
2025 Separation Projects Without
Regulator Modifications at
CSOs 1019/1029
(ALT2W7A Included)**



Analysis

Goals:

1. Control east side CSOs to 4 activations or less.
2. Provide a reasonable Level of Service (i.e. no flooded basements/manholes)

Alternative:

1. 2025 separation analysis based on the projects proposed by the City.

Results:

With 2025 separation projects in place east side CSOs still have more than 4 activations.

Summary



CSO 1008	CSO 1009	CSO 1012
Increased weir inlet offset from 12" to 54"; Increased 104 ft of underflow pipe from 10" to 27".	Removed Leaping weir control rule configuration; Added a overflow weir with 15" offset; Increased underflow orifice opening from 8"X14" to 15"X15"; Increased 431 ft of underflow pipe from 12 to 27" & 539 ft of 15" to 27" from CSO 1009 to Wheeling St PS POC (end of YMCA FM)	Removed Leaping weir control rule configuration; Increased weir inlet offset from 3.25 ft 3.4 ft; Increase 447 ft of underflow pipe from 15" to 24 & 593 ft of 14" to 24" & 321 from 16" to 24" from Memorial drive between 5th and Mulberry
CSO 1013	CSO 1014	CSO 1033
Removed Leaping weir control rule configuration; Increased overflow weir offset from 1.65' to 2'; Increased underflow orifice size from 6" to 18"; Increased 30 ft of underflow pipe from 10 to 18" & 391 ft of 11.25" to 18" from CSO 1013 to CSO 1012 regulator.	Added a new 456 ft of 18" underflow line from regulator to the 36" interceptor; just upstream of YMCA PS; Closing the existing 12" underflow line from the regulator to the 36" interceptor	Added a new 600 ft of 15" underflow line from regulator to the 36" interceptor; Closing the existing 10" underflow line from the regulator to the 36" interceptor
CSO 1029	CSO 1019	Additional Notes
2025 Separation Projects	2025 Separation Projects	Increased the 344' interceptor pipe segment from 42" to 48"

Alternative vs. Baseline



ALT3E1A1
Typical Year CSO Overflow Statistics

2014 Baseline with 2035 Growth
Typical Year CSO Overflow Statistics

VS

CSO No.	Total Volume (MG)	Total Duration (Hrs)	Number of Events
CSO1004	0.1	3	4
CSO1008	0.6	4	4
CSO1009	0.6	4	4
CSO1011	0.0	0	0
CSO1012	0.5	5	4
CSO1013	0.5	4	4
CSO1014	0.3	3	3
CSO1019	2.7	13	14
CSO1026	0.0	0	0
CSO1027	0.3	5	4
CSO1029	0.9	25	19
CSO1033	0.4	3	3
Total	6.9		

CSO No.	Total Volume (MG)	Total Duration (Hrs)	Number of Events
CSO1004	12.7	49	10
CSO1008	1.4	46	27
CSO1009	4.4	227	77
CSO1011	0.0	0	0
CSO1012	4.4	200	58
CSO1013	4.8	166	77
CSO1014	1.7	21	18
CSO1019	3.5	19	16
CSO1026	0.0	0	0
CSO1027	0.0	0	0
CSO1029	3.7	70	31
CSO1033	1.1	7	6
Total	37.7		

New EQ at the plant required capacity is ~3.7 MG



**ALT3E1A2
2050 Separation Projects Without
Regulator Modifications at
CSOs 1019/1029
(ALT2W7A Included)**



Analysis

Goals:

1. Control east side CSOs to 4 activations or less.
2. Provide a reasonable Level of Service (i.e. no flooded basements/manholes)

Alternative:

1. 2050 separation analysis based on the projects proposed by the City.

Results:

With 2050 separation projects in place east side CSOs have 4 or less activations but surcharging along the Baldwin Run interceptor may be an issue.

Summary



CSO 1008	CSO 1009	CSO 1012
Increased weir inlet offset from 12" to 54"; Increased 104 ft of underflow pipe from 10" to 27"	Removed Leaping weir control rule configuration; Added a overflow weir with 15" offset; Increased underflow orifice opening from 8"X14" to 15"X15"; Increased 431 ft of underflow pipe from 12 to 27" & 539 ft of 15" to 27" from CSO 1009 to Wheeling St PS POC (end of YMCA FM)	Removed Leaping weir control rule configuration; Increased weir inlet offset from 3.25 ft 3.4 ft; Increase 447 ft of underflow pipe from 15" to 24 & 593 ft of 14" to 24" & 321 from 16" to 24" from Memorial drive between 5th and Mulberry
CSO 1013	CSO 1014	CSO 1033
Removed Leaping weir control rule configuration; Increased overflow weir offset from 1.65' to 2'; Increased underflow orifice size from 6" to 18"; Increased 30 ft of underflow pipe from 10 to 18" & 391 ft of 11.25" to 18" from CSO 1013 to CSO 1012 regulator.	Added a new 456 ft of 18" underflow line from regulator to the 36" interceptor just upstream of YMCA PS; Closing the existing 12" underflow line from the regulator to the 36" interceptor	Added a new 600 ft of 15" underflow line from regulator to the 36" interceptor; Closing the existing 10" underflow line from the regulator to the 36" interceptor
CSO 1029	CSO 1019	Additional Notes
2050 Separation Projects	2050 Separation Projects	Increased the 344' interceptor pipe segment from 42" to 48"

Alternative vs. Baseline



ALT3E1A2
Typical Year CSO Overflow Statistics

2014 Baseline with 2035 Growth
Typical Year CSO Overflow Statistics

VS

CSO No.	Total Volume (MG)	Total Duration (Hrs)	Number of Events
CSO1004	0.0	1	1
CSO1008	0.5	4	4
CSO1009	0.6	4	4
CSO1011	0.0	0	0
CSO1012	0.5	5	4
CSO1013	0.5	4	4
CSO1014	0.3	3	3
CSO1019	0.9	5	4
CSO1026	0.0	0	0
CSO1027	0.3	5	4
CSO1029	0.0	0	0
CSO1033	0.4	3	3

4.1

CSO No.	Total Volume (MG)	Total Duration (Hrs)	Number of Events
CSO1004	12.7	49	10
CSO1008	1.4	46	27
CSO1009	4.4	227	77
CSO1011	0.0	0	0
CSO1012	4.4	200	58
CSO1013	4.8	166	77
CSO1014	1.7	21	18
CSO1018	3.5	19	16
CSO1026	0.0	0	0
CSO1027	0.0	0	0
CSO1029	3.7	70	31
CSO1033	1.1	7	6

37.7

New EQ at the plant required capacity is ~3.0 MG



**ALT4E1A1
2025 Separation Projects With
Regulator Modifications at
CSOs 1019/1029
(ALT2W7A Included)**



Analysis

Goals:

1. Control east side CSOs to 4 activations or less.
2. Provide a reasonable Level of Service (i.e. no flooded basements/manholes)

Alternative:

1. 2025 separation projects in place and CSO 1019 and CSO 1029 regulator modifications.

Results:

With 2025 separation projects and regulator modifications at CSOs 1019 and 1029 we have 4 or less activations but violates freeboard goals along the 27" parallel to existing 36" Baldwin Run interceptor.

Summary

CSO 1008	CSO 1009	CSO 1012
Increased weir inlet offset from 12" to 54"; Increased 104 ft of underflow pipe from 10" to 27".	Removed Leaping weir control rule configuration; Added a overflow weir with 15" offset; Increased underflow orifice opening from 8"X14" to 15"X15"; Increased 431 ft of underflow pipe from 12 to 27" & 539 ft of 15" to 27" from CSO 1009 to Wheeling St PS POC (end of YMCA FM)	Removed Leaping weir control rule configuration; Increased weir inlet offset from 3.25 ft 3.4 ft; Increase 447 ft of underflow pipe from 15" to 24 & 593 ft of 14" to 24" & 321 from 16" to 24" from Memorial drive between 5th and Mulberry
CSO 1013	CSO 1014	CSO 1033
Removed Leaping weir control rule configuration; Increased overflow weir offset from 1.65' to 2'; Increased underflow orifice size from 6" to 18"; Increased 30 ft of underflow pipe from 10 to 18" & 391 ft of 11.25" to 18" from CSO 1013 to CSO 1012 regulator.	Added a new 456 ft of 18" underflow line from regulator to the 36" interceptor just upstream of YMCA PS; Closing the existing 12" underflow line from the regulator to the 36" interceptor	Added a new 600 ft of 15" underflow line from regulator to the 36" interceptor; Closing the existing 10" underflow line from the regulator to the 36" interceptor
CSO 1029	CSO 1019	Additional Notes
2025 Separation; Increased 56 ft of underflow pipe from 8" to 12" from CSO 1029 regulator to Baldwin Run interceptor	2025 Separation; Increased the underflow Orifice opening from 12" to 24"; Increased 156 ft of underflow pipe from 18" to 24" from CSO 1019 regulator to Main St interceptor POC.	Increased the 344' interceptor pipe segment from 42" to 48"

Alternative vs. Baseline

ALT4E1A1
Typical Year CSO Overflow Statistics

2014 Baseline with 2035 Growth
Typical Year CSO Overflow Statistics

VS

CSO No.	Total Volume (MG)	Total Duration (Hrs)	Number of Events
CSO1004	0.6	4	4
CSO1008	0.6	4	4
CSO1009	0.6	4	4
CSO1011	0.0	0	0
CSO1012	0.5	5	4
CSO1013	0.5	4	4
CSO1014	0.3	3	3
CSO1019	1.2	4	4
CSO1026	0.0	0	0
CSO1027	0.3	5	4
CSO1029	0.2	3	3
CSO1033	0.4	3	3

5.3

CSO No.	Total Volume (MG)	Total Duration (Hrs)	Number of Events
CSO1004	12.7	49	10
CSO1008	1.4	46	27
CSO1009	4.4	227	77
CSO1011	0.0	0	0
CSO1012	4.4	200	58
CSO1013	4.8	166	77
CSO1014	1.7	21	18
CSO1019	3.5	19	16
CSO1026	0.0	0	0
CSO1027	0.0	0	0
CSO1029	3.7	70	31
CSO1033	1.1	7	6

37.7

New EQ at the plant required capacity is ~4.0 MG

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