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January 19, 2024

Kip Walby, SEMSD Director of Operations
Southeast Macomb Sanitary District
20001 Pleasant Avenue
St. Clair Shores, Michigan 48080

Reference: MRIDDD 2023 End of Year System Summary

Dear Mr. Walby:

The system data for 2023 has been reviewed and compared with previous years data in effort to evaluate the facilities operational performance over the past year. The primary goals for managing the wastewater are to prevent basement backups and limit retention treatment basin (RTB) discharges to the waters of the State. This letter is intended to provide a summary of the findings and observations for calendar year 2023.

Rainfall Data

The rain gauge located at the Milk River RTB (R-5) was reviewed and compared with previous years. A total of 33.44 inches of rainfall was recorded at the gauge in 2023. The total rainfall was 90% of the 8-year average of 37.2 inches.

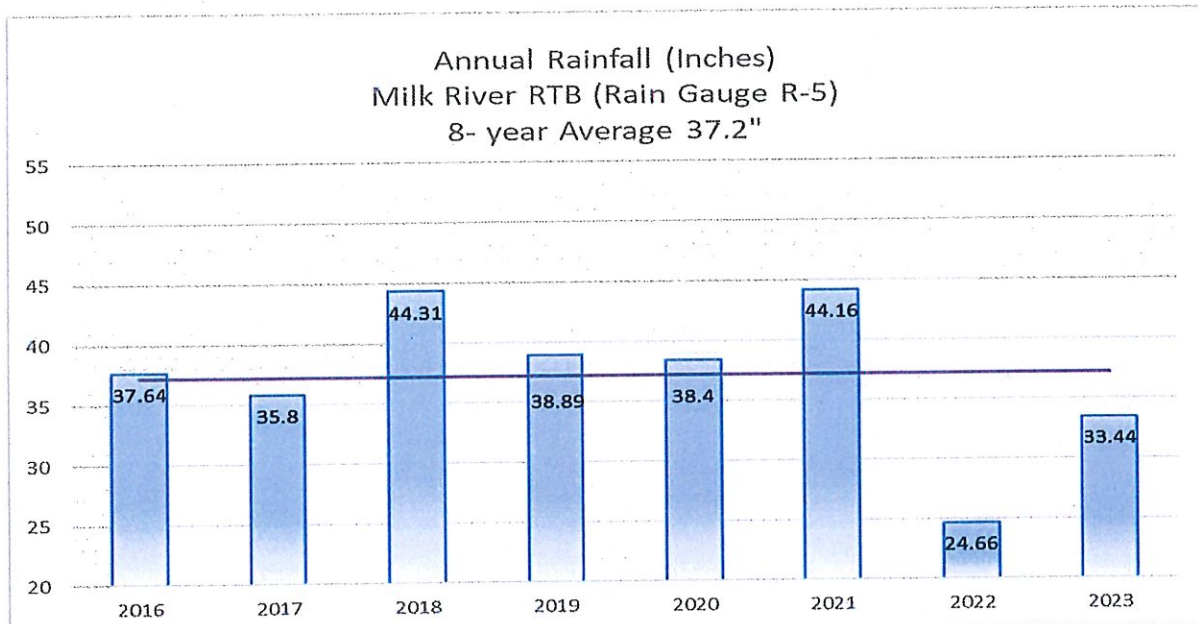


Figure 1: Annual Rainfall Data



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Milk River Total Flows for 2023

In calendar year 2023, a total of 2.3 billion gallons of combined sewage was delivered to the Milk River System. Of these 2.3 billion gallons, 2.0 billion gallons was delivered to the Fox Creek for treatment at the Great Lakes Water Authority's Water Resource Recovery Facility (WRRF). Of these 2.0 billion gallons, 840 million gallons was stored in the RTB or in-pipe system. The remaining 315 million gallons was treated at the RTB and discharged to the Milk River during six events.

The tables below summarize the CSO discharges by facility for the 2023 calendar year.

Tables 2-4: 2023 System RTB Discharges

Martin RTB			Chapaton RTB			Milk River RTB		
2023 CSO Discharges			2023 CSO Discharges			2023 CSO Discharges		
Date	Volume (MG)	Rain (in)	Date	Volume (MG)	Rain (in)	Date	Volume (MG)	Rain (in)
02/09/23	6.30	0.96	04/01/23	56.2	2.42	02/27/23	8.8	0.95
02/27/23	9.6	1.08	04/04/23	3.4	0.87	03/31/23	96.5	2.25
03/31/23	89.9	2.36	08/23/23	59.5	3.54	04/03/23	45.0	0.80
04/04/23	37.6	1.09				04/05/23	9.30	0.24
04/29/23	9.0	1.26				04/29/23	11.40	1.06
08/23/23	52.3	4.52				08/23/23	143.85	3.55
2023 Total	204.70	-	2023 Total	119.10	-	2023 Total	314.85	-

Table 5: Annual Discharge Summary

Milk River Retention Treatment Basin			
Year	Annual Rainfall (in)	Number of Discharges	Volume of Discharge
2017	35.80	15	327.20
2018	44.31	16	603.70
2019	38.89	5	210.80
2020	38.40	9	425.60
2021	44.16	12	799.10
2022	24.66	2	55.50
2023	33.44	6	314.85



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Based on 2023 Milk River discharge data and our evaluation, the expected threshold that the RTB would discharge is a 0.75-inch rain storm. This falls in line with the last several years of operation where the long-term trend from October 2018 to present shows that the RTB would discharge with a 0.76-inch rain storm.

When evaluating the time period between January 2016 to October 2018, this threshold was about 0.20 inches. October 2018 was a period of operational procedure changes and therefore was selected as a logical period break for analyzing the data. The chart below displays the Milk River RTB discharges versus reported rainfall totals for the other time periods.

Table 6: Summary of Rainfall Causing Milk River RTB Overflow

Timeline	Approximate Rainfall Total Causing an RTB Overflow at Milk River (inches)
January 2016 - October 2018	0.20
October 2018 – December 2021	0.78
October 2018 – December 2022	0.76
October 2018 – December 2023	0.76

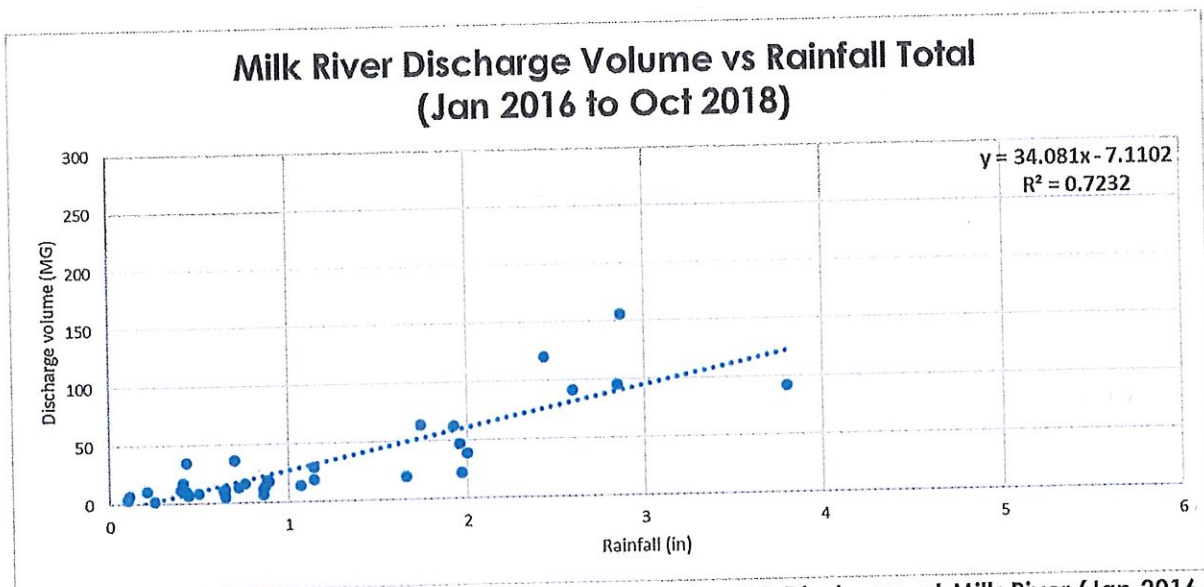
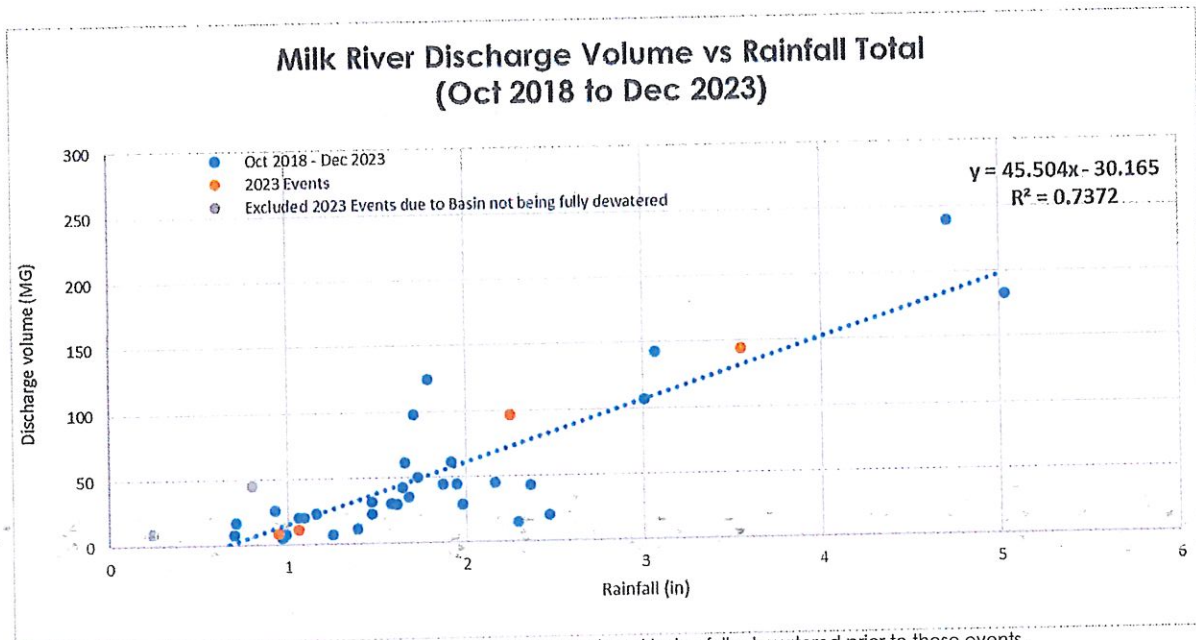


Figure 2: Threshold determination of Rainfall Total causing RTB Discharge at Milk River (Jan 2016-Oct 2018)



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Data was updated this year by adding the six storms from 2023 to the trend from October 2018 to present. Events from 2023 are shown in orange on Figure 3.



Discharge on April 3 and 5, 2023 was not considered due to the basin not being fully dewatered prior to these events.

Figure 3: Threshold determination of Rainfall Total causing RTB Discharge at Milk River (Oct 2018- Dec 2023)



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NPDES Permit

E. Coli

The 2023 discharge events from the Milk River RTB met their National Pollution Discharge Elimination System (NPDES) permit requirements for Escherichia coli (E. coli). The permit allows a maximum limit for E. coli of 300 cts/100ml between May to October and 1,000 cts/100ml between November and April. The following table summarizes the maximum E. coli limits discharged to the Milk River from the RTB during the 2023 discharge events.

Table 7: E coli.

Date	Max Limit E. coli (cts/100ml)	
	NPDES Permit Maximum	Event Geometric Mean
02/27/23	1,000	177
03/31/23	1,000	27
04/03/23	1,000	15
04/05/23	1,000	42
04/29/23	1,000	77
08/23/23	300	7

Total Residual Chlorine (TRC)

The 2023 discharge events from the Milk River RTB met their National Pollution Discharge Elimination System (NPDES) permit goal for TRC. The permit goal is to be below an event average of 1.50 mg/L for TRC. The following table summarizes the event average TRC discharged to the Milk River from the RTB during the 2023 discharge events.

Table 8: Total Residual Chlorine (TRC)

Date	TRC Event Average (mg/L)	
	NPDES Permit Maximum	Actual Measured
02/27/23	1.50	0.97
03/31/23	1.50	1.16
04/03/23	1.50	1.23
04/05/23	1.50	1.23
04/29/23	1.50	0.99
08/23/23	1.50	1.14



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Total Suspended Solids

The Milk River RTB Total Suspended Solids (TSS) was reviewed. Table 9 summarizes the event average Effluent TSS by year.

Table 9: Total Suspended Solids Yearly Average

Milk River RTB	
Year	Event Average Effluent TSS (mg/L)
2018	88.4
2019	85.2
2020	66.4
2021	51.7
2022	80.8
2023	61.9

Since the final removal of the sludge build up from the retention treatment basin around 2020 we have seen the total suspended solids effluent reduced to 51.7 mg/l. In 2023 recorded average effluent TSS is 61.9 mg/l. This is likely attributed to the cleaning activities and flushing improvements made to the RTB in the Priority 1b Project and the active flushing completed by the SEMSD after each RTB Event.

2023 Summary

The overall analysis indicates that the SEMSD is continuing to operate in an efficient manner, meeting NPDES permit requirements, containing smaller sized storms, containing more volume with in-line storage and in some cases preventing RTB discharges.

We will continue to review operations and evaluate for opportunities to improve.

Sincerely,

Taylor Sting, PE
Project Manager

Kyle Seidel, PE
Project Manager

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