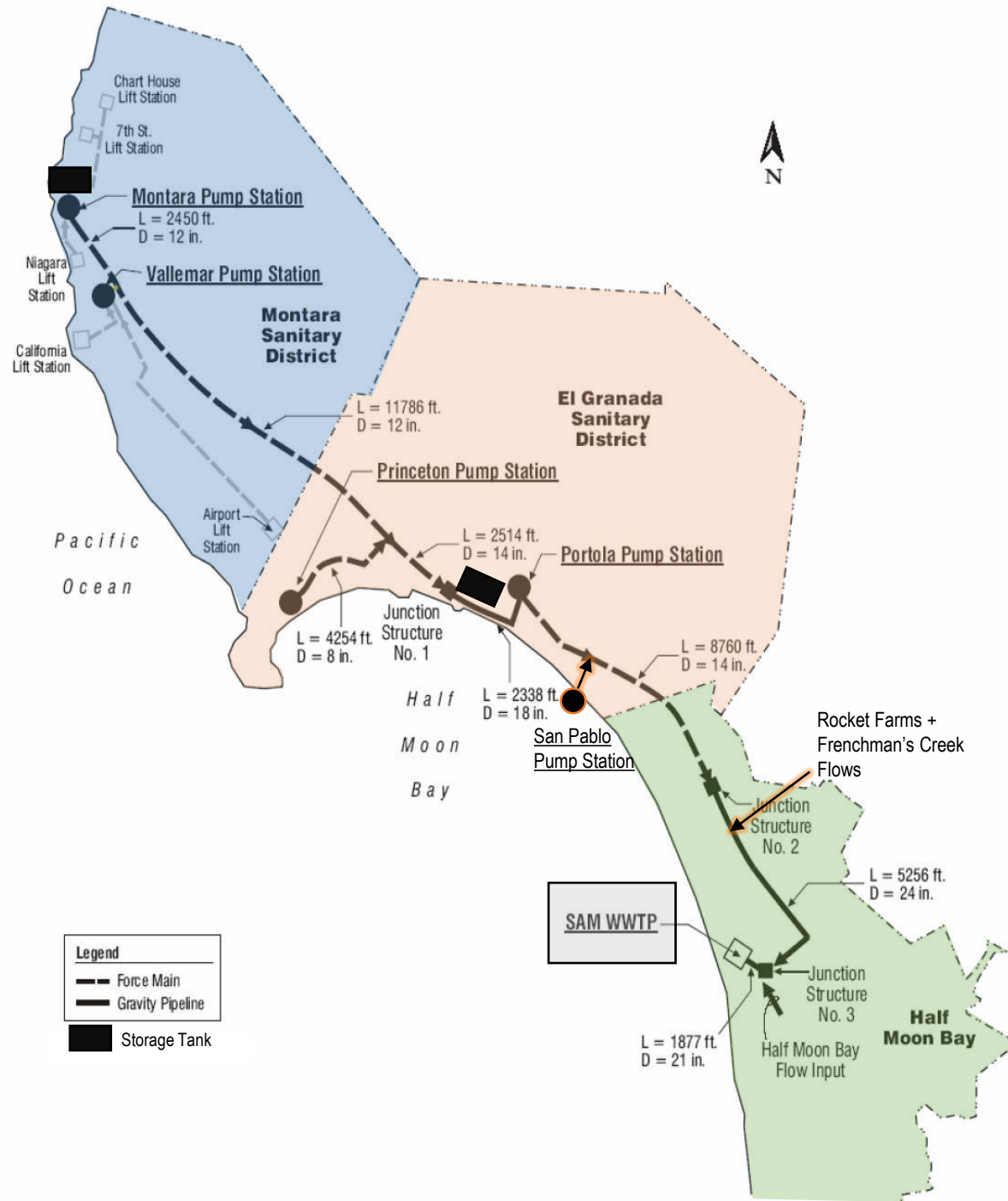# SUMMARY OF DATA-DRIVEN SYSTEM PERFORMANCE

Mira Chokshi, P.E.

Climate Adaptive Systems, LLC

Montara Water and Sanitary District (MWSD)
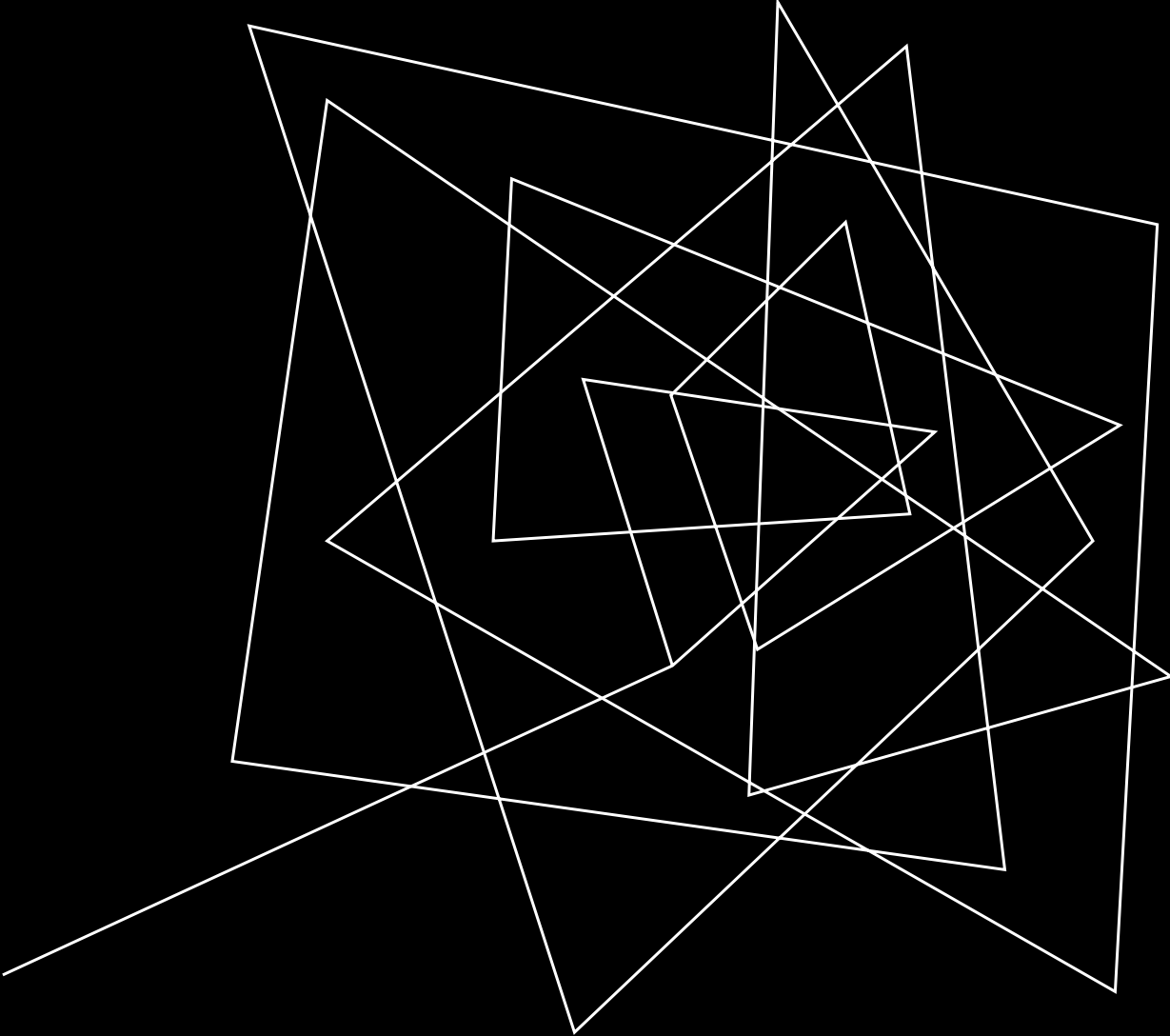
= Montara Pump Station
+ Vallemar Pump Station

Granada Community Sanitary District (GCSD)

= Portola Pump Station
+ San Pablo Pump Station
+ Rocket Farms Flow
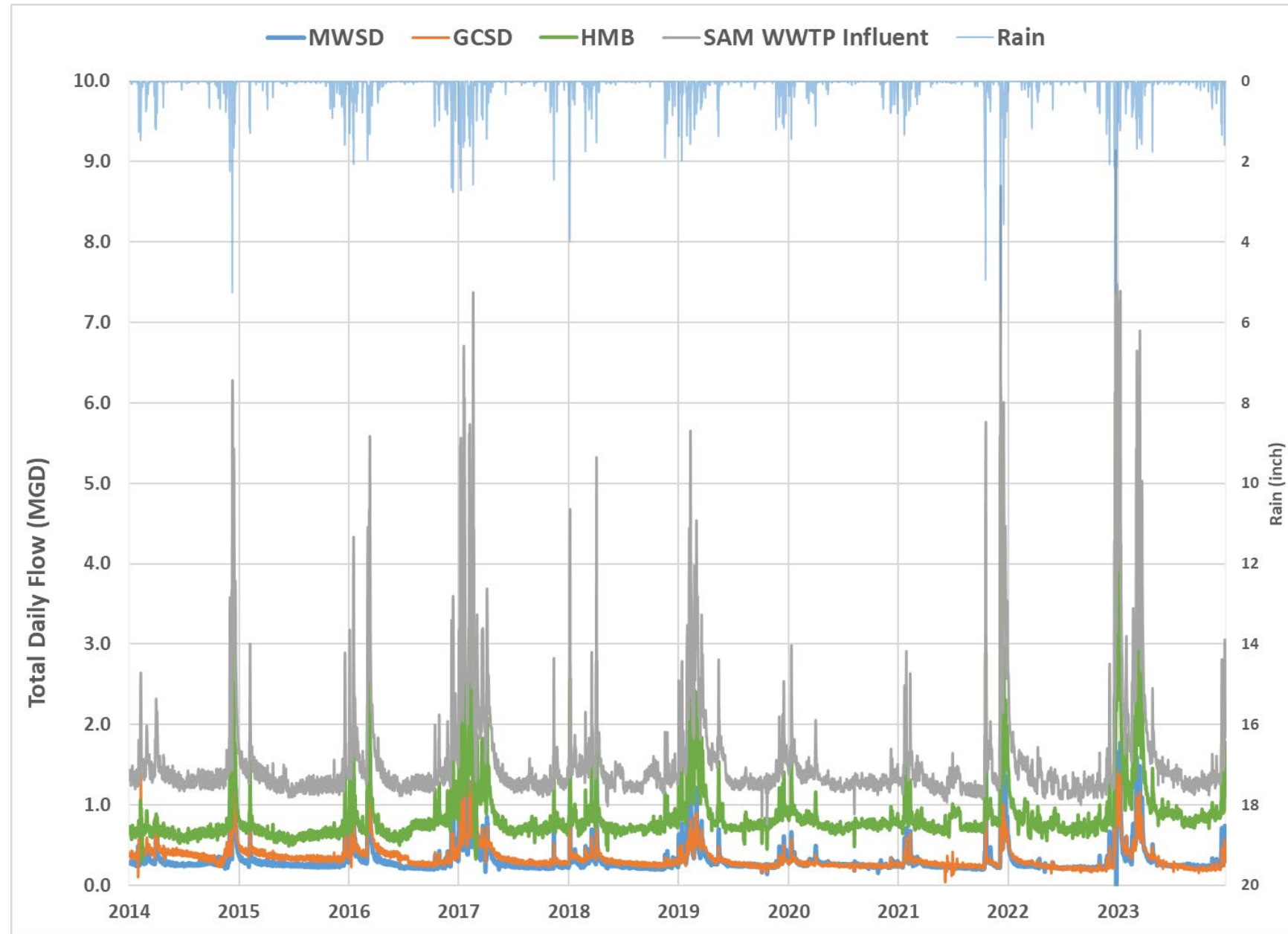+ Frenchman's Creek Flow
- MWSD

Half Moon Bay (HMB)

= SAM WWTP Influent
- Rocket Farms Ag/RO Reject
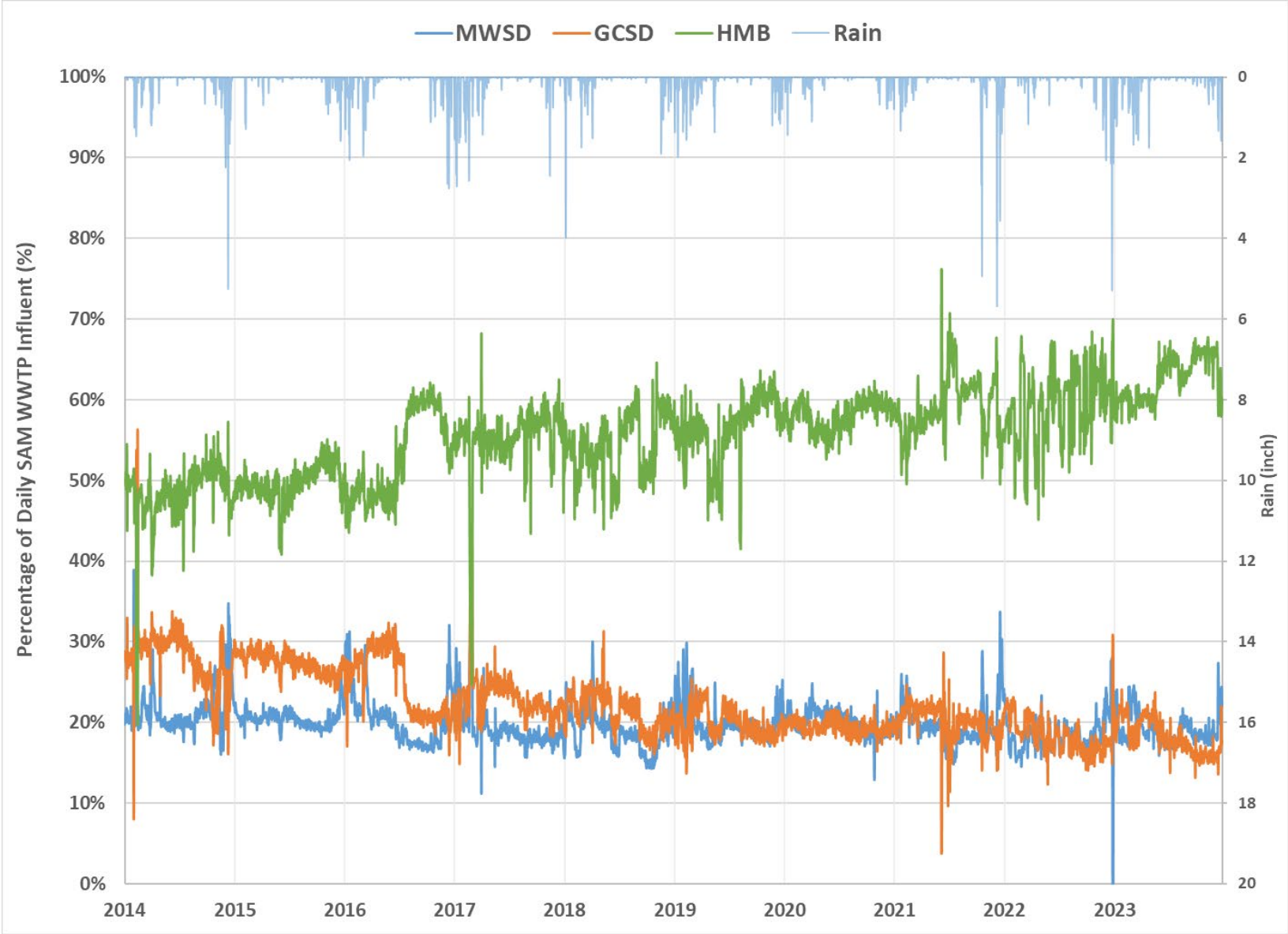- GCSD
- MWSD

VOLUMETRIC
FLOW ANALYSIS

LONG-TERM TREND
TOTAL DAILY FLOWS

LONG-TERM TREND

## TOTAL DAILY FLOWS AS A PERCENTAGE OF SAM PLANT

LONG-TERM TREND
DRY WEATHER FLOWS*

Year	Average Daily Dry Weather Flow Values (MG)			
	MWSD	GCSD	HMB	SAM Plant
2014	0.26	0.37	0.63	1.28
2015	0.24	0.33	0.59	1.21
2016	0.22	0.30	0.68	1.23
2017	0.23	0.29	0.70	1.26
2018	0.23	0.27	0.69	1.28
2019	0.25	0.26	0.73	1.30
2020	0.25	0.24	0.72	1.25
2021	0.22	0.24	0.77	1.23
2022	0.22	0.21	0.72	1.21
2023	0.24	0.23	0.85	1.32

Daily flows for summer months: June-September
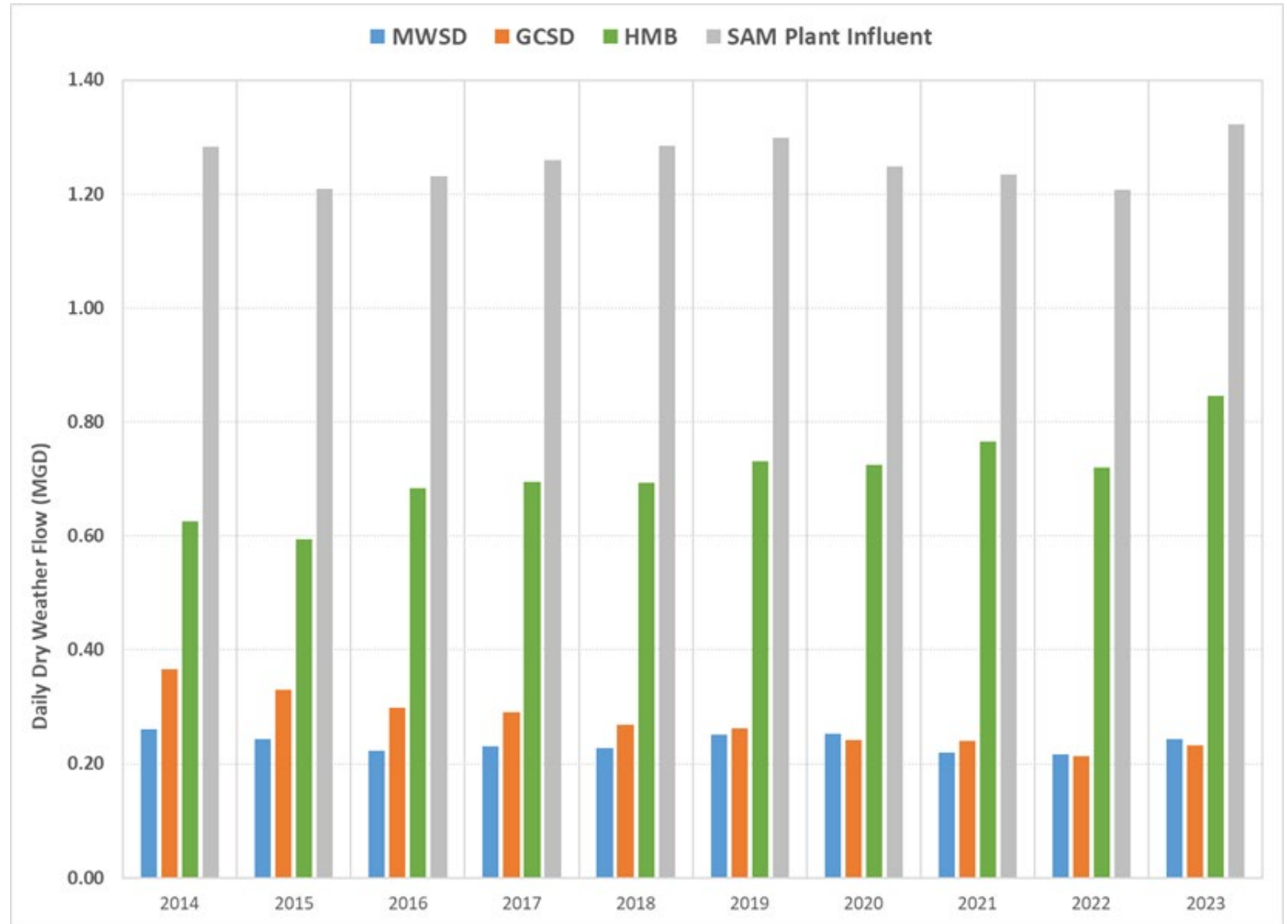
LONG-TERM TREND
WET WEATHER FLOWS

STEP 1: IDENTIFY STORM EVENTS

Year	Storm Events (#)	Total Rain (inch)
2014	14	36.4
2015	14	14.8
2016	17	39.2
2017	19	43.4
2018	15	25.8
2019	16	35.8
2020	14	15.2
2021	20	40.8
2022	18	37.5
2023	24	28.7
TOTAL	**171**	**317.6**
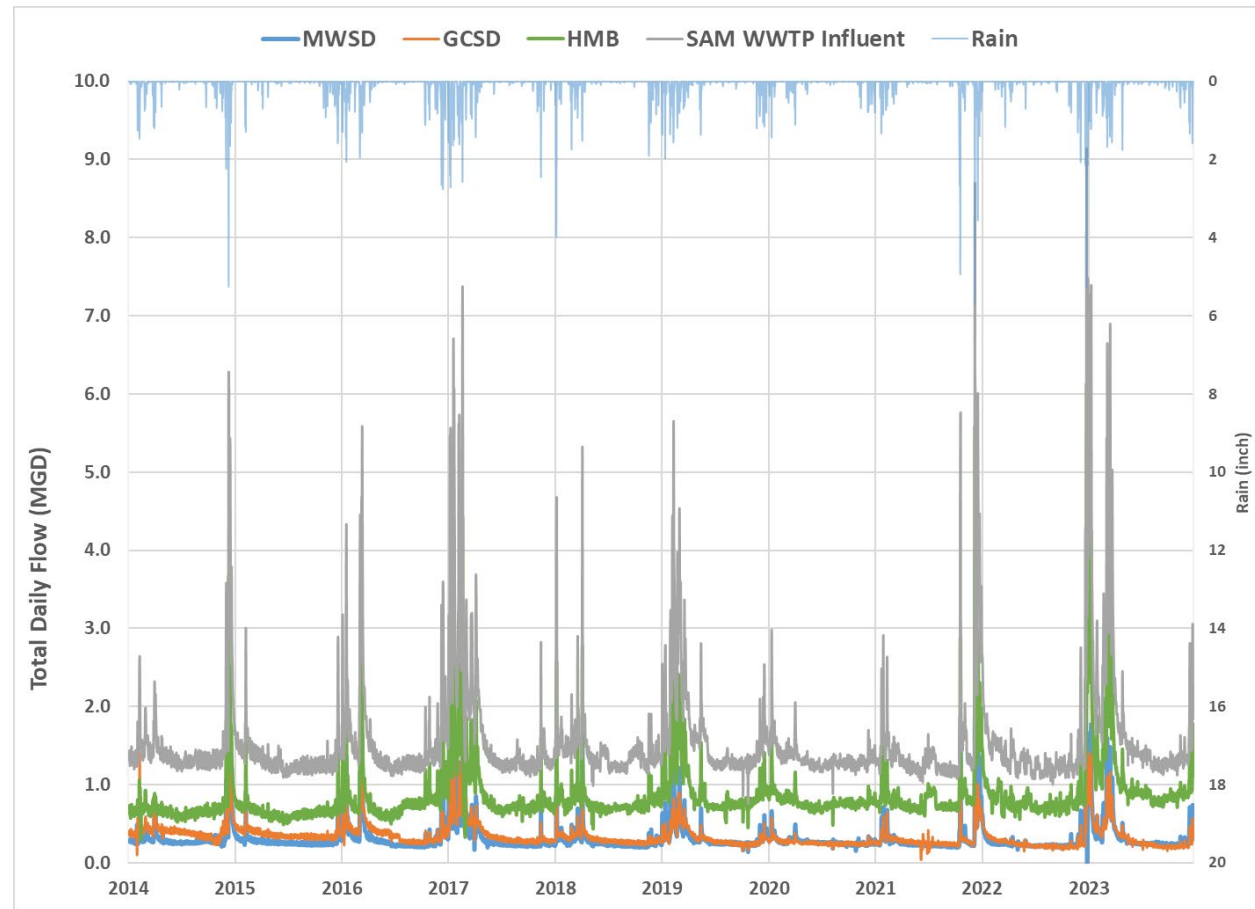
Use 2 dry days as inter-event window

LONG-TERM TREND

STEP 2: CALCULATE RDII FLOW

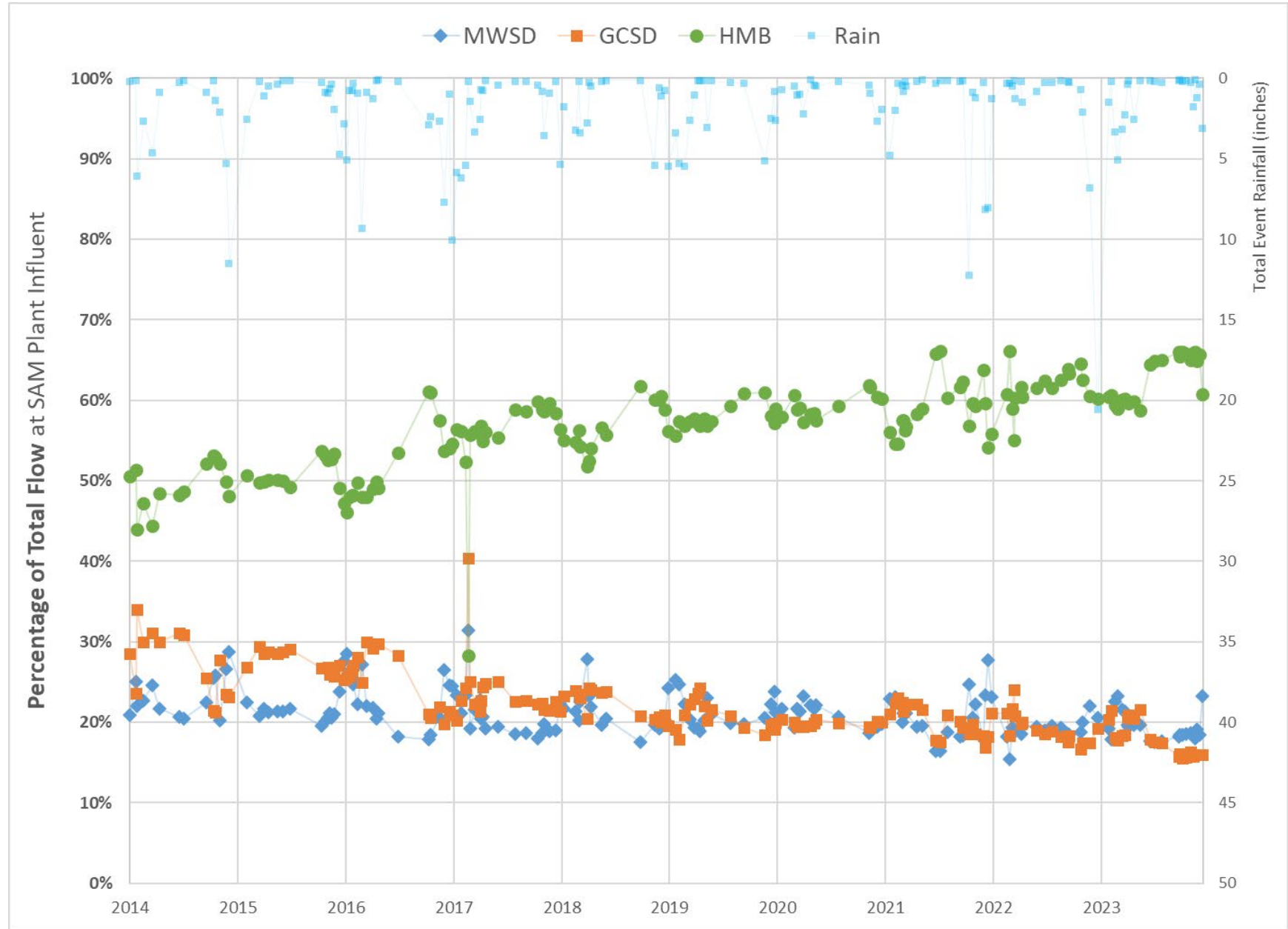**RDII Flow = Total Flow - Dry Weather Flow**
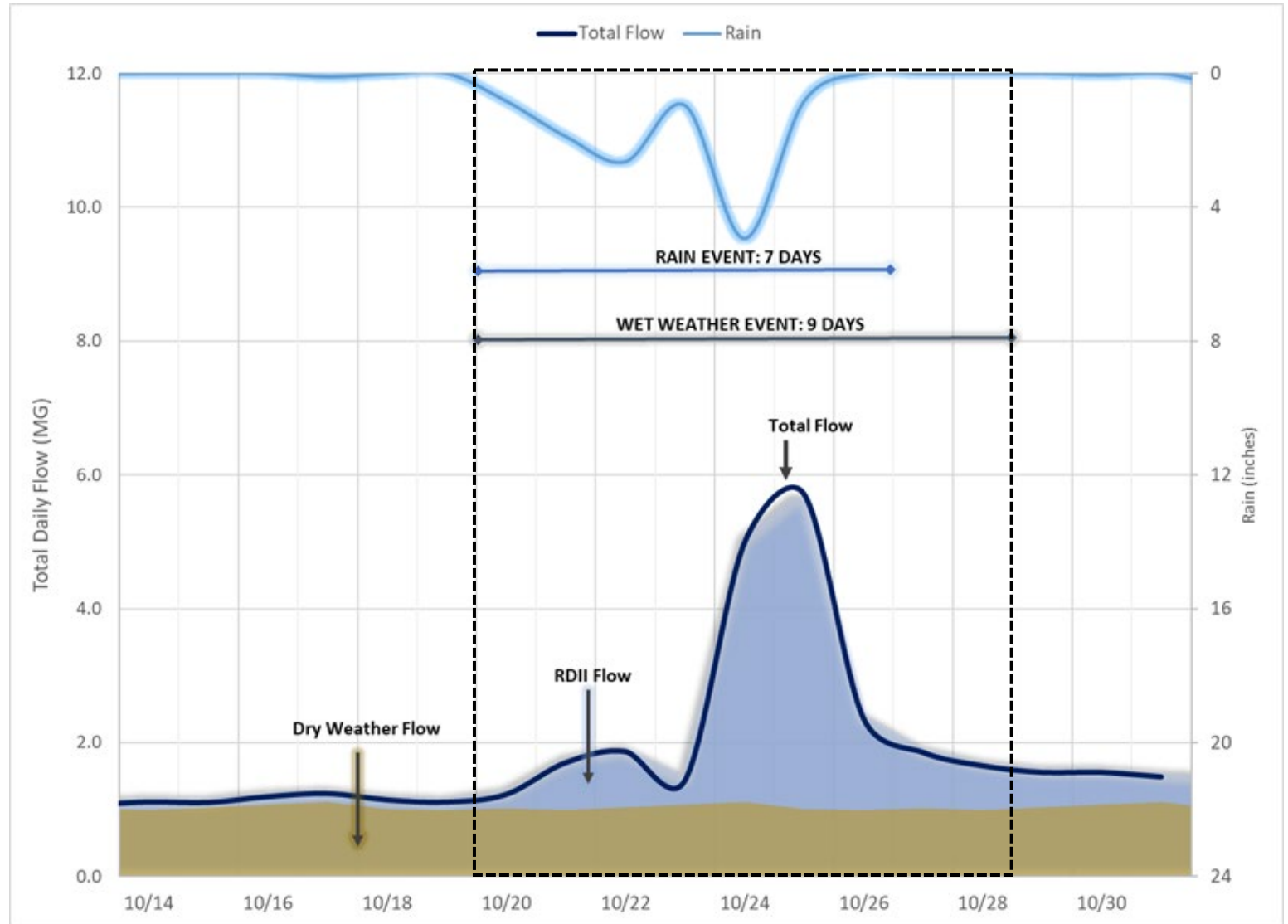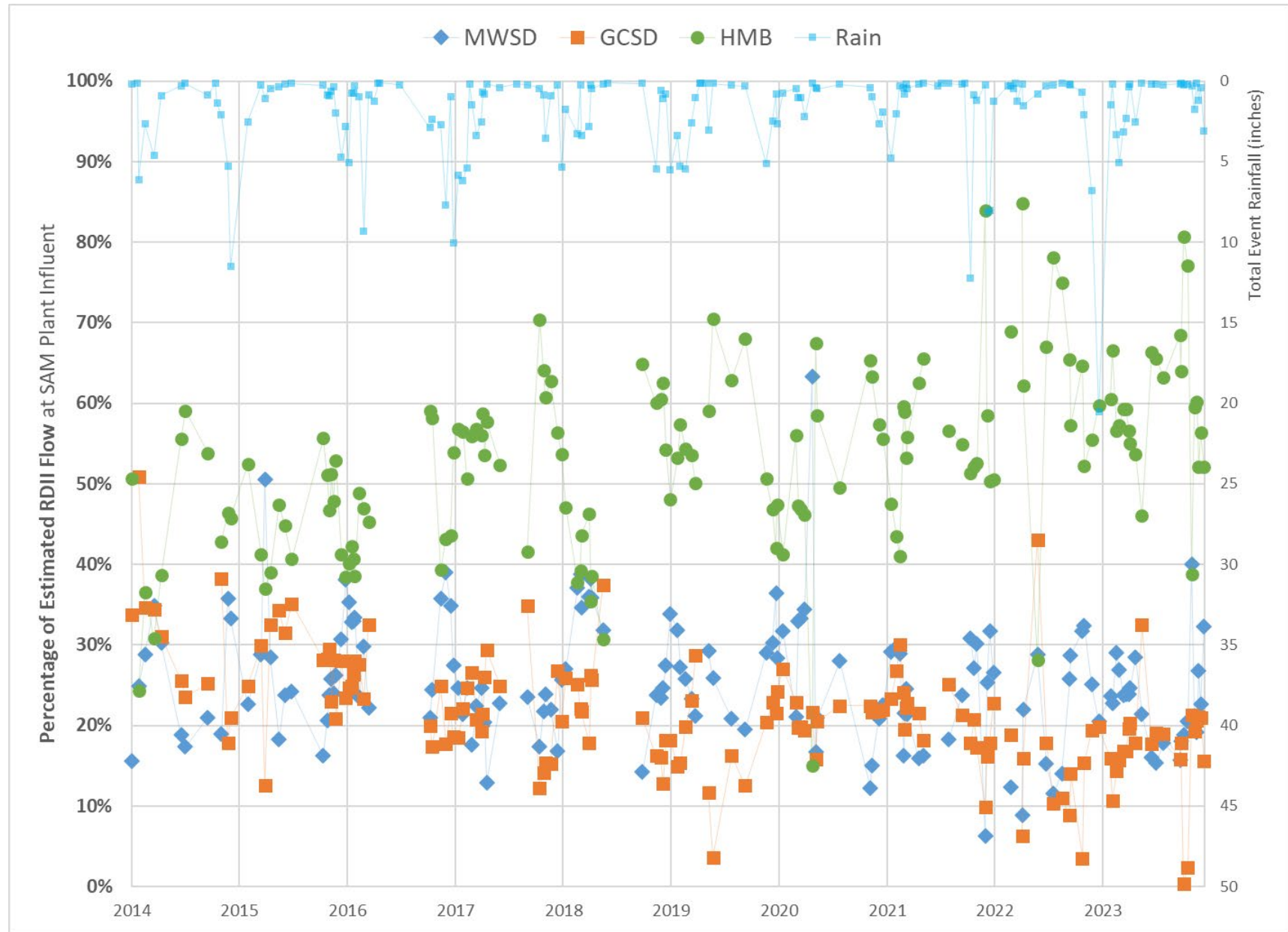
Use 2 dry days as inter-event window

LONG-TERM TREND

TOTAL FLOWS FOR EACH EVENT AS A PERCENTAGE OF SAM PLANT INFLUENT

LONG-TERM TREND

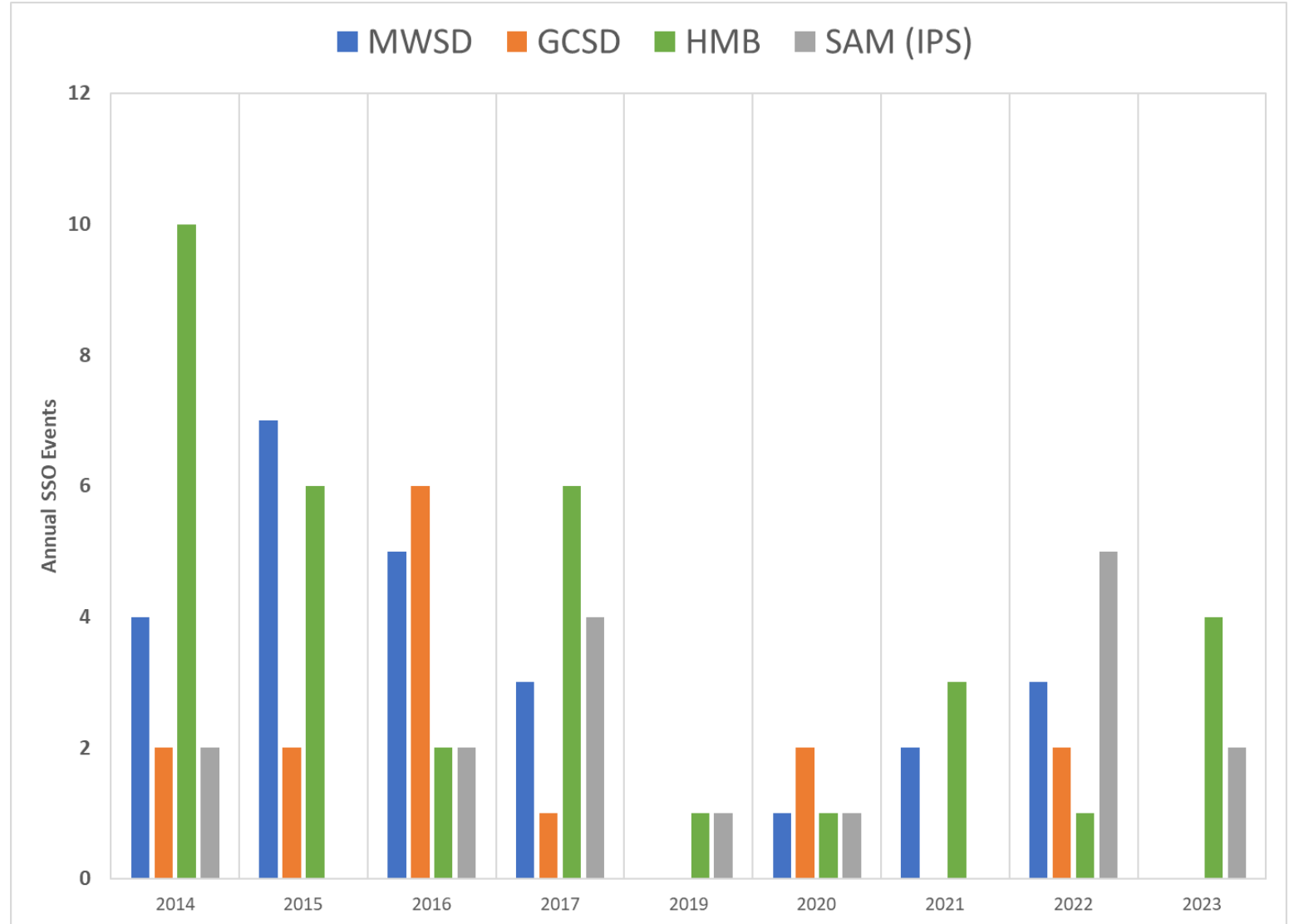## RDII FLOWS FOR EACH EVENT AS A PERCENTAGE OF SAM PLANT

Events with very low rainfall were not used for RDII estimates. Graph includes approx. 150 events
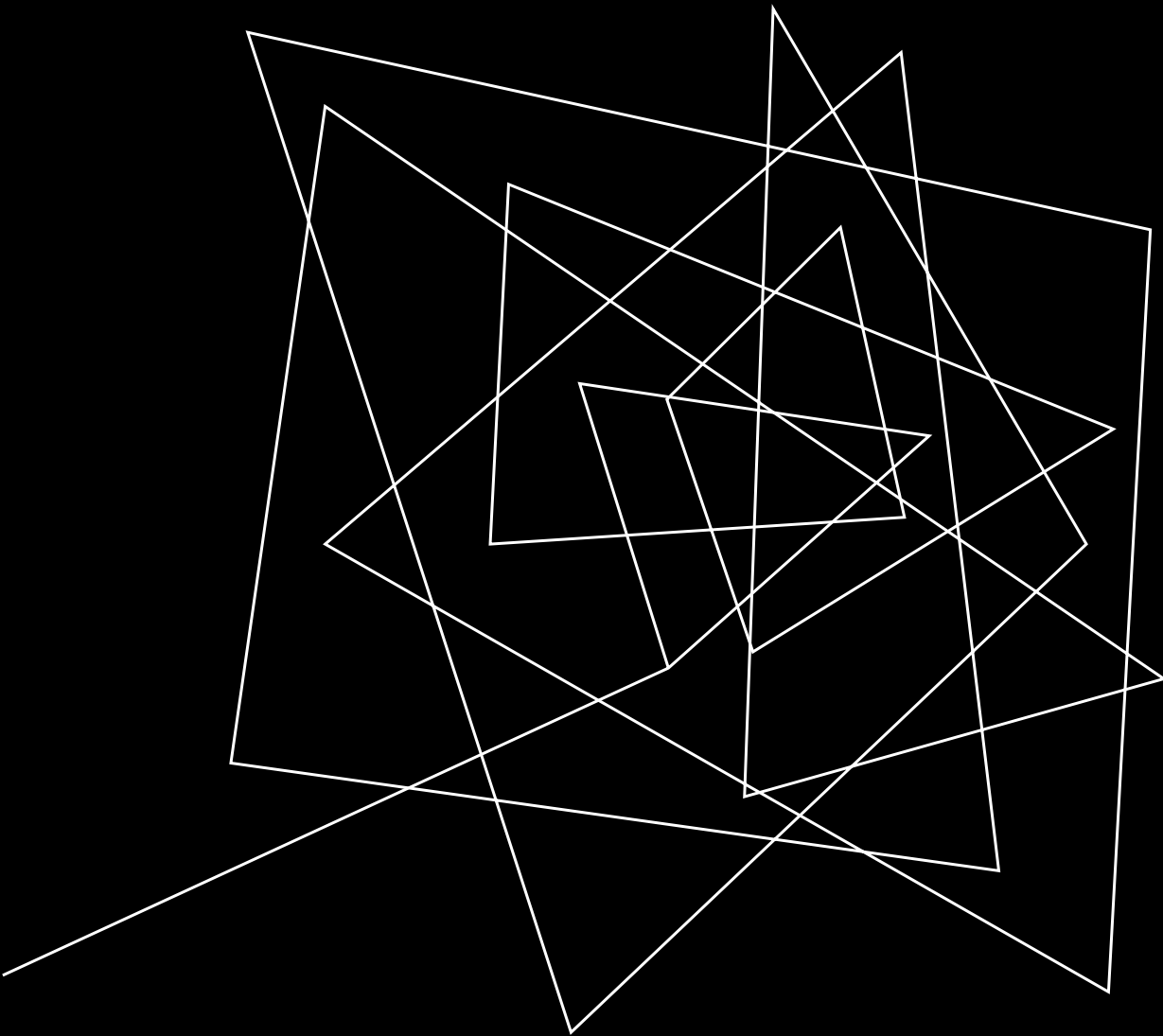
SSO REPORTS

1/1/2014 - 12/31/2023

System	Total Spills	Total Volume (Gal)
MWSD	25	42,640
GCSD	15	1,656
HMB	34	198,417
SAM	17	4,612,114

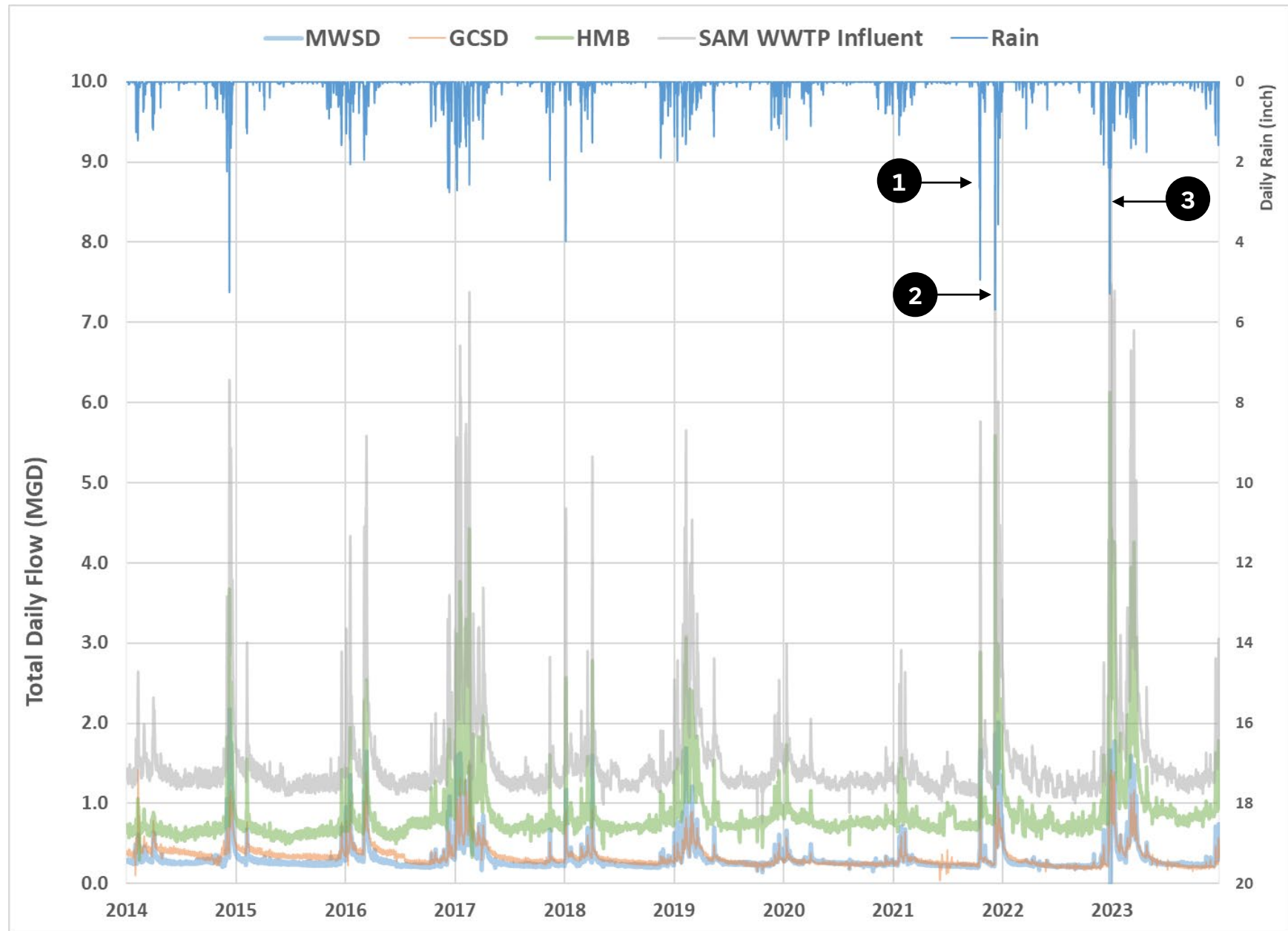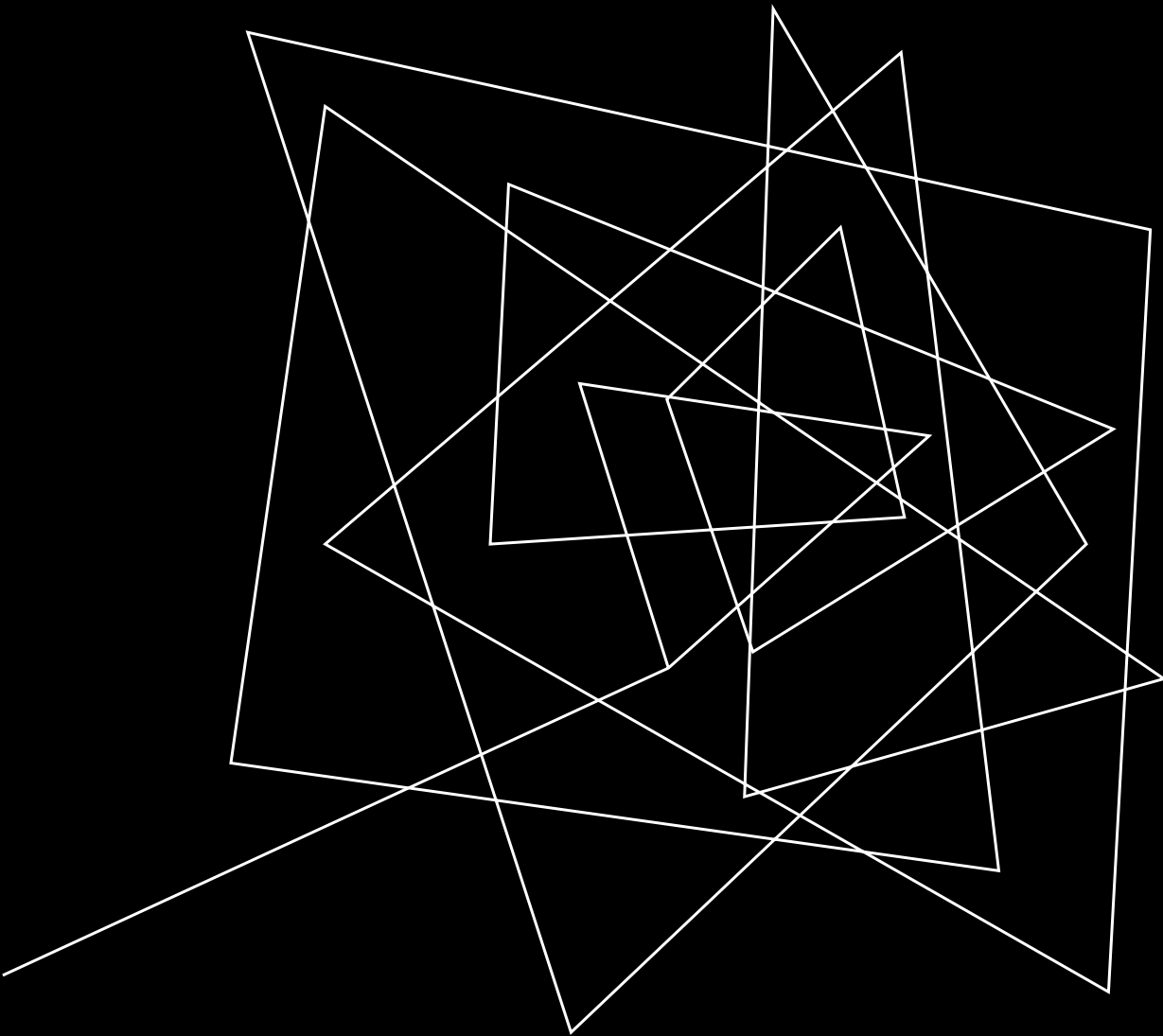*From CIWQS database for Category 1, 2 and 3

SYSTEM PERFORMANCE IN THE THREE HISTORICAL STORM EVENTS

THREE STORM EVENTS

1. OCTOBER 24, 2021
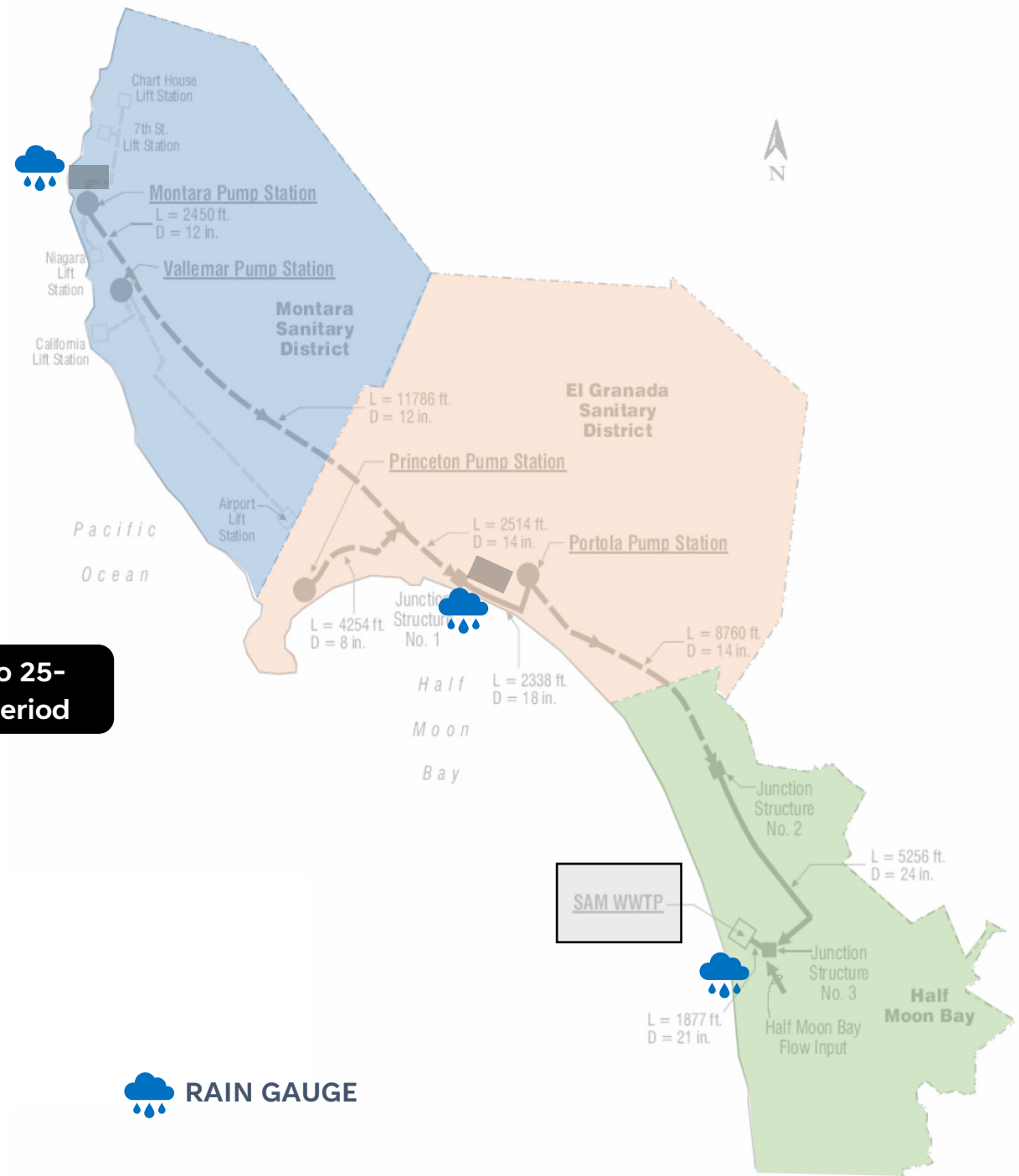2. DECEMBER 23, 2021
3. DECEMBER 31, 2022

OCTOBER 2021
STORM

OCTOBER 2021 STORM
OBSERVED RAINFALL

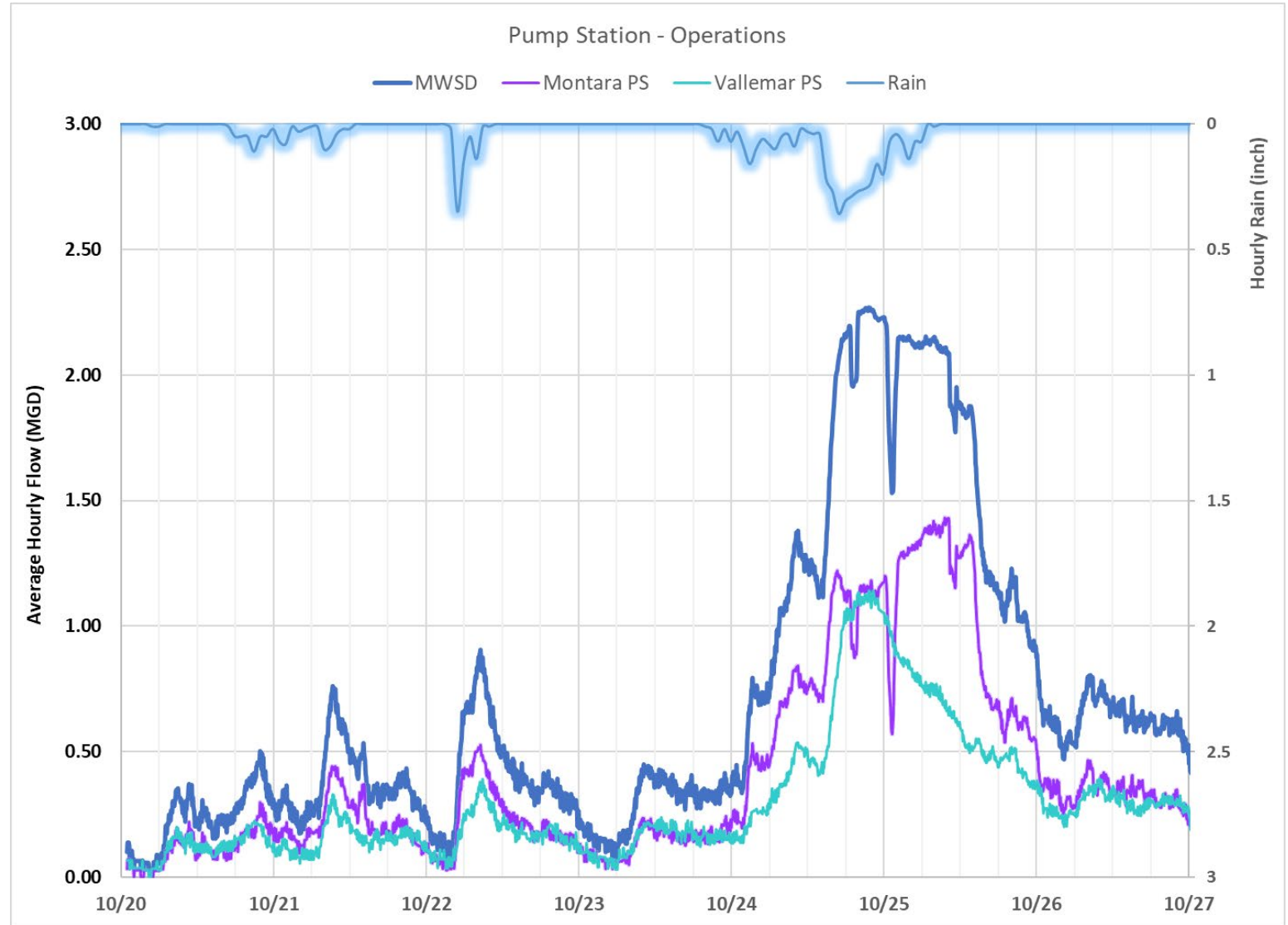| Location/ Date	Montara (inch)	Portola (inch)	Plant (inch)
10.20.21	0.6	0.8	0.6
10.21.21	0.8	0.7	1.9
10.22.21	0.9	1.5	2.6
10.23.21	0.4	1.0	0.3
10.24.21	**4.5**	**4.3**	**4.9**
10.25.21	0.3	0.6	0.8
Total Rain	**7.5**	**8.9**	**11.2**

Approx. 10 to 25-year return period

Based on NOAA Atlas 14 IDF curves at SAM Plant location on a 24-hour basis

RAIN GAUGE

OCTOBER 24, 2021

MWSD SYSTEM
PUMP PERFORMANCE

Pump Station - Operations

OCTOBER 24, 2021

MWSD SYSTEM STORAGE UTILIZATION

Pump Station - Operations

Montara PS ···· Montara Wet Well, feet

OVERFLOW ELEVATION
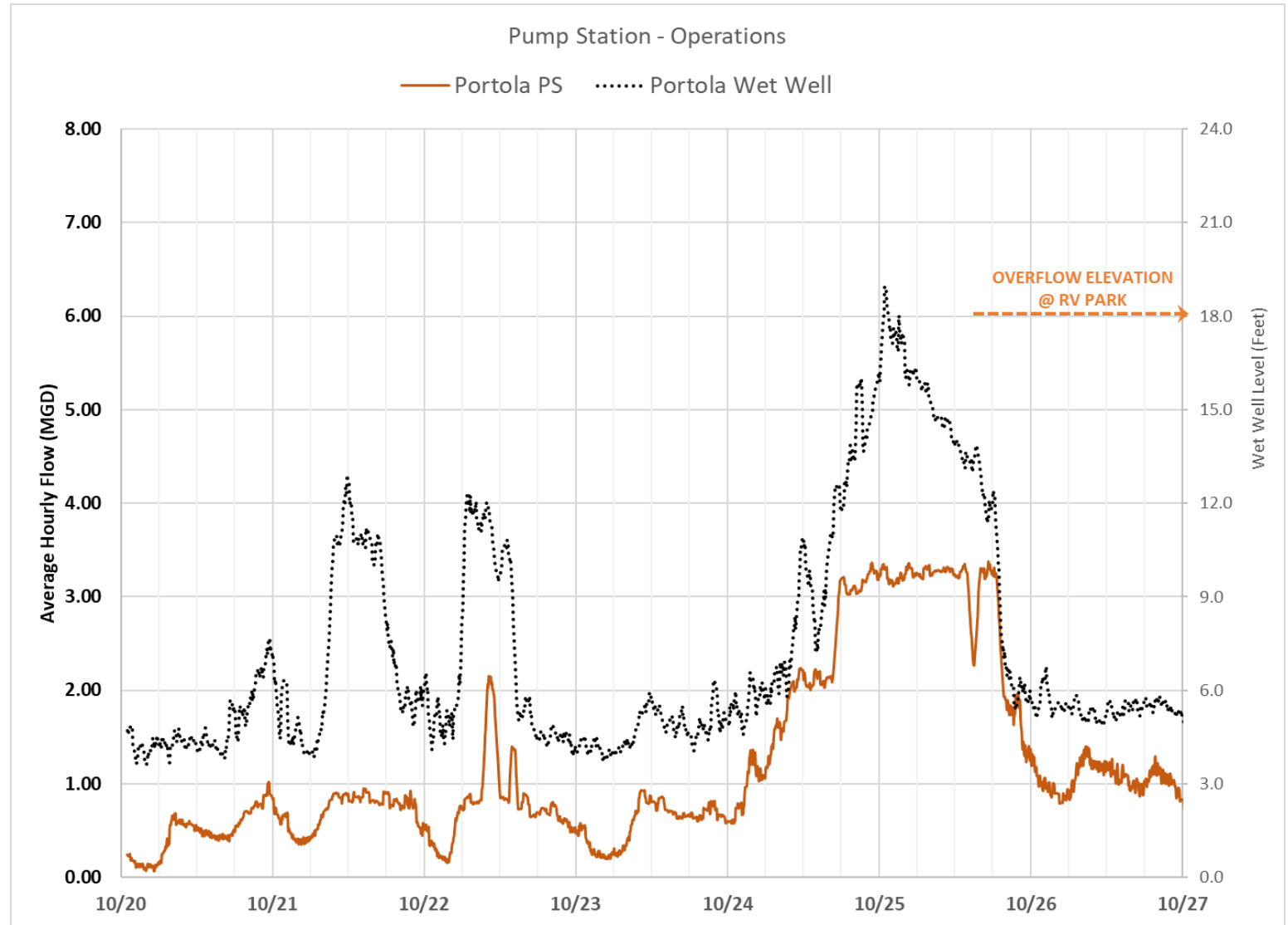
OCTOBER 24, 2021
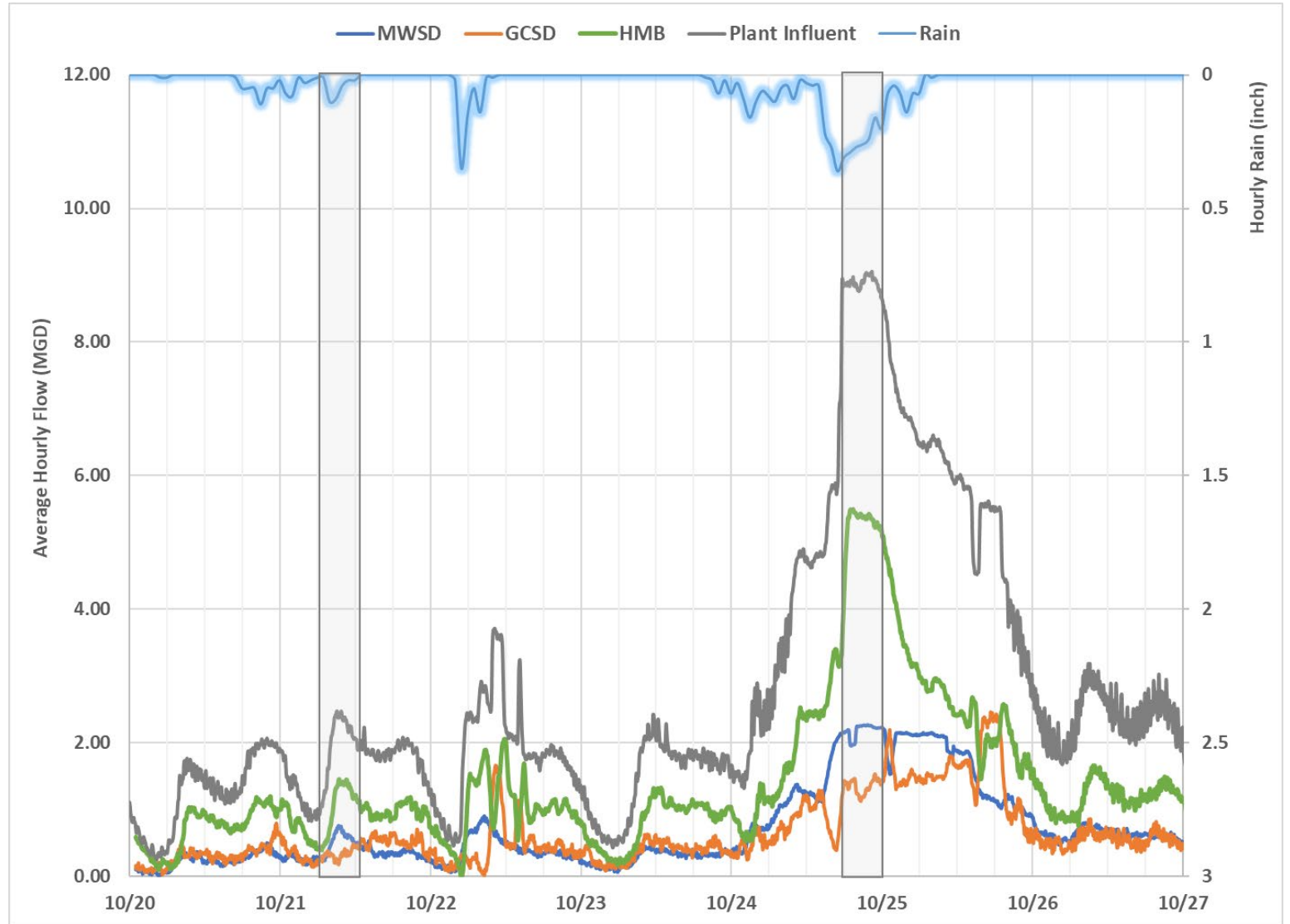
GCSD SYSTEM
PUMP PERFORMANCE

OCTOBER 24, 2021

GCSD SYSTEM STORAGE UTILIZATION

OCTOBER 24, 2021

SAM PLANT AND THE THREE AGENCY FLOWS

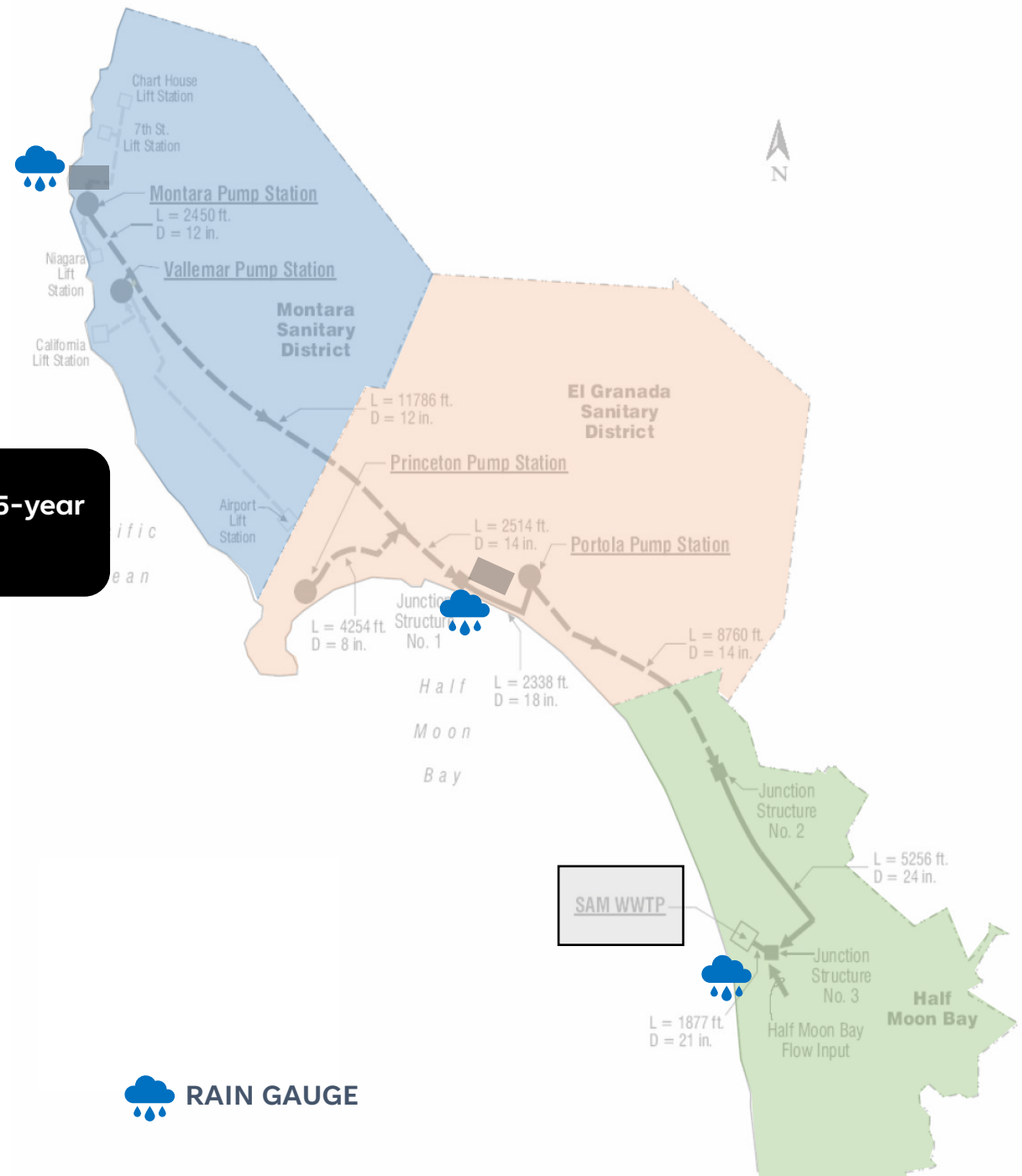| Date Peak Hour	Peak Flow as a Percentage of SAM Plant (%)		
	MWSD	GCSD	HMB
10/21/2021 9 - 10 am	28%	15%	57%
10/24/2021 10 – 11 pm	24%	16%	60%

DECEMBER 2021 STORM

DECEMBER 2021 STORM
OBSERVED RAINFALL

Location/ Date	Montara (inch)	Portola (inch)	Plant (inch)
12.21.21	0.3	0.4	0.4
12.22.21	0.3	0.4	0.8
12.23.21	**3.6**	**2.8**	**1.3**
12.24.21	0.3	0.2	0.2
12.25.21	0.3	0.4	0.3
12.26.21	0.5	0.7	0.2
12.27.21	0.3	0.4	0.4
12.28.21	0.0	0.0	0.0
12.29.21	1.4	0.9	0.7
Total Rain	**6.9**	**6.1**	**4.4**

Based on NOAA Atlas 14 IDF curves at SAM Plant location on a 24-hour basis

Approx. 1- to 5-year return period

RAIN GAUGE

DECEMBER 23, 2021

MWSD SYSTEM
PUMP PERFORMANCE

DECEMBER 23, 2021

MWSD SYSTEM
STORAGE UTILIZATION

Pump Station - Operations

Montara PS · · · · · Montara Wet Well, feet
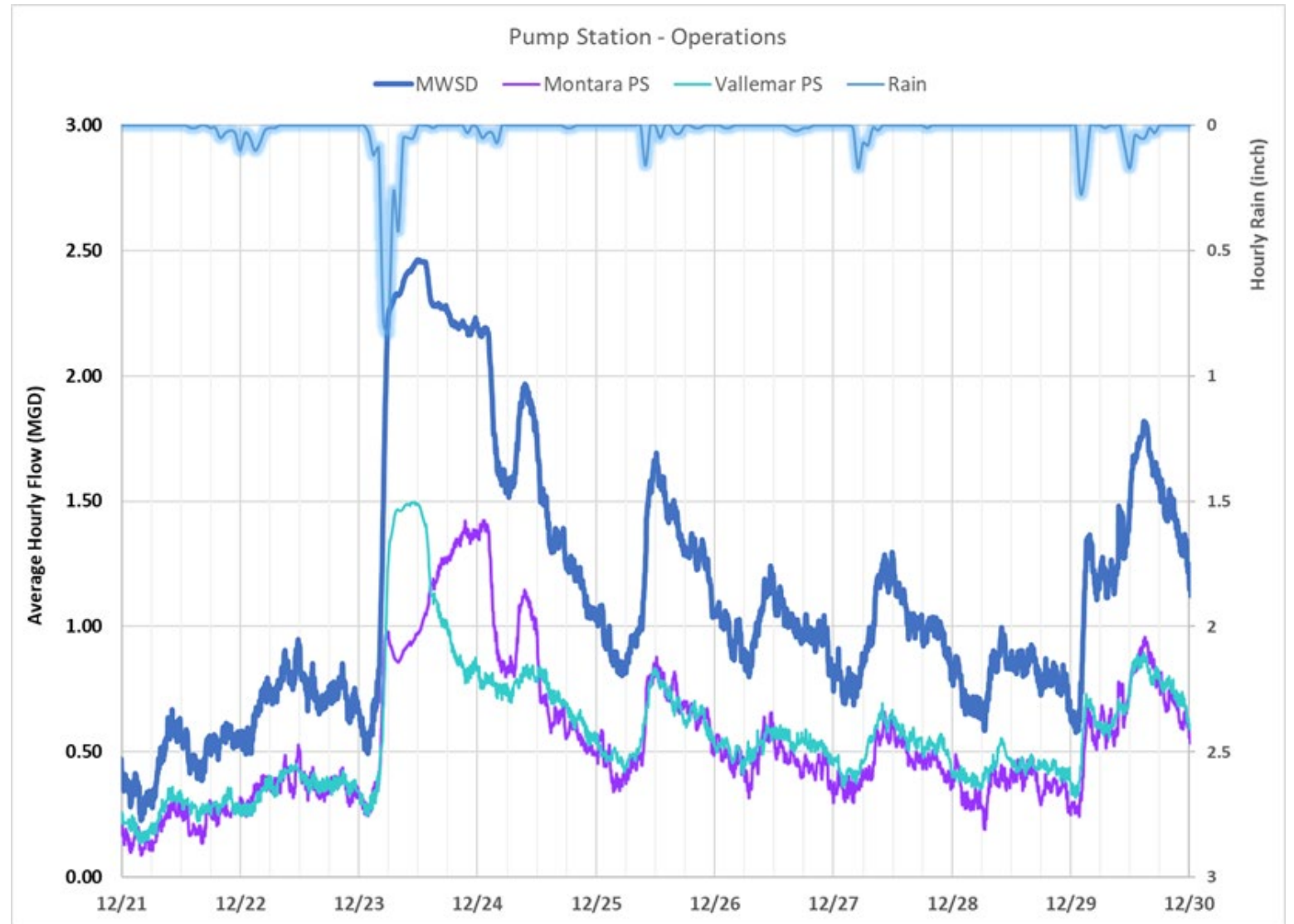
OVERFLOW ELEVATION

DECEMBER 23, 2021

GCSD SYSTEM PUMP PERFORMANCE

Pump Station - Operations

DECEMBER 23, 2021

GCSD SYSTEM
STORAGE UTILIZATION

Pump Station - Operations
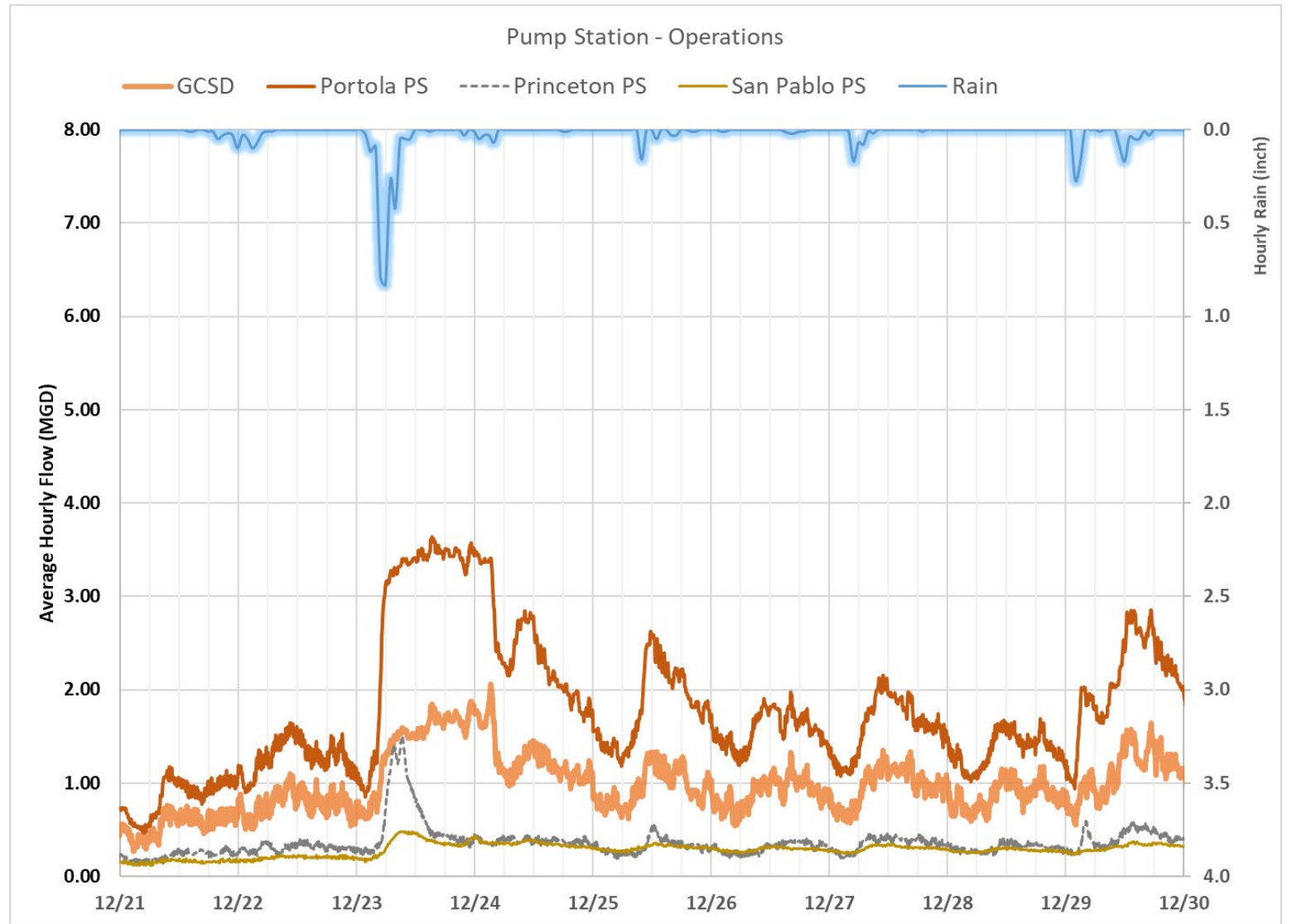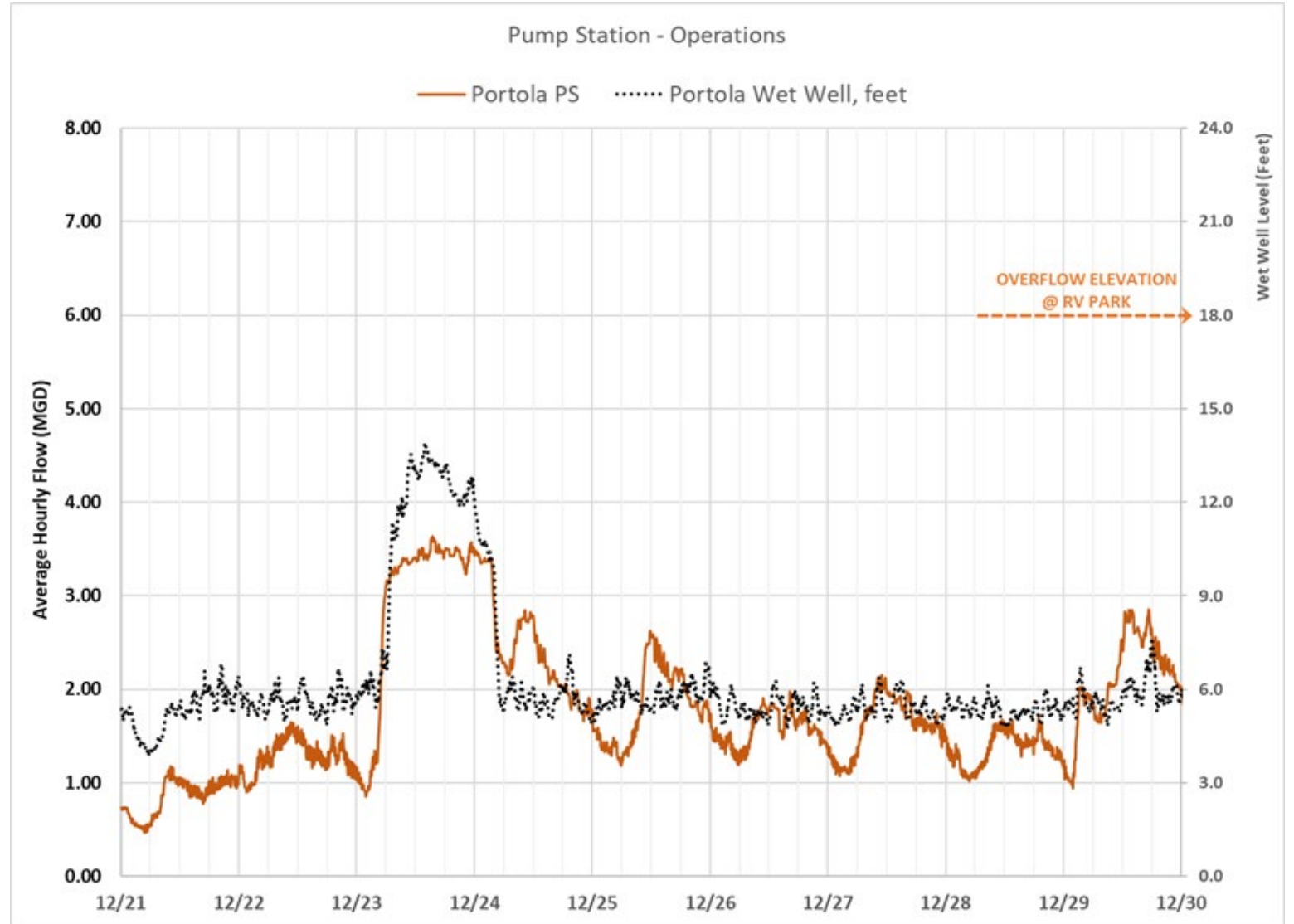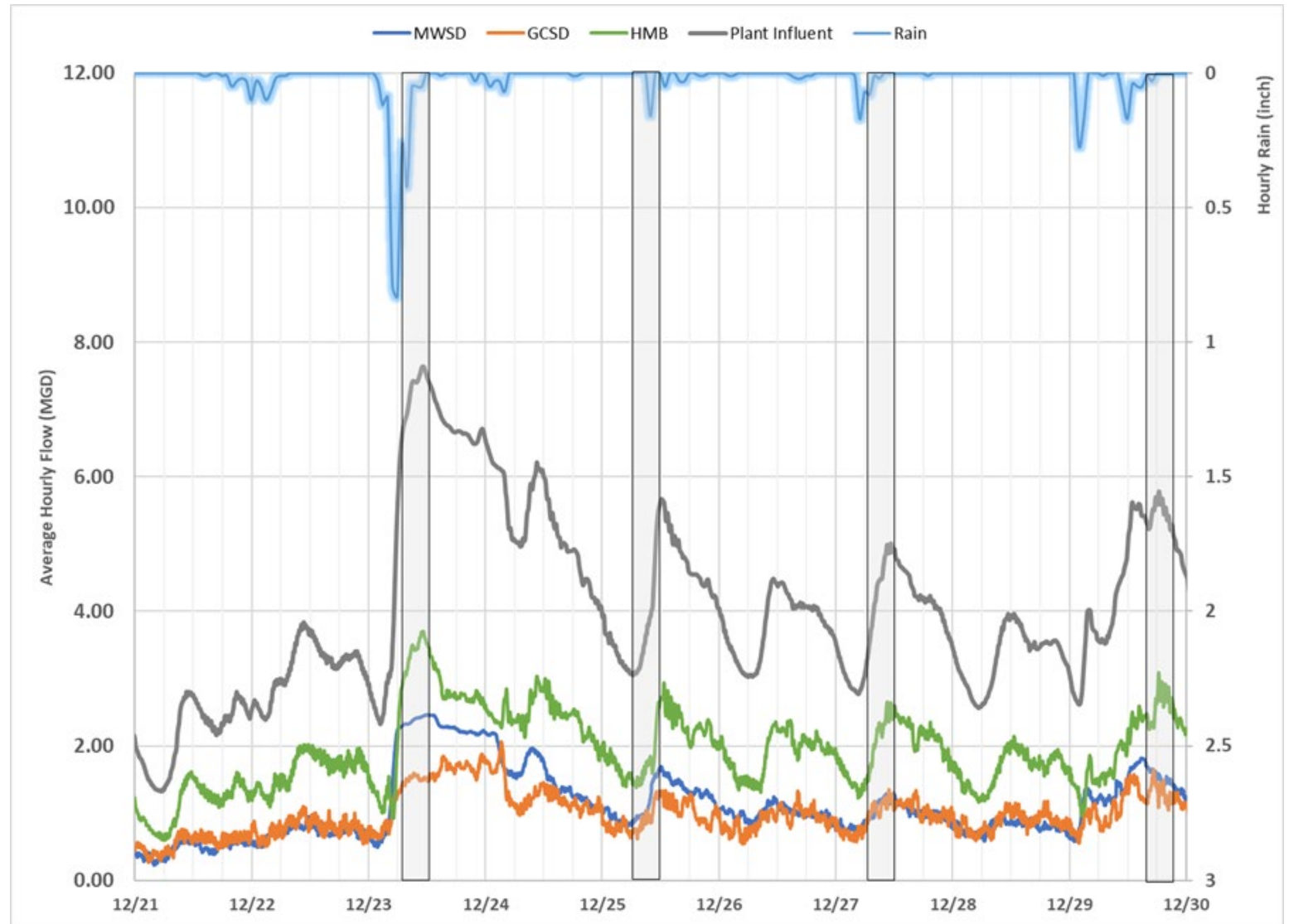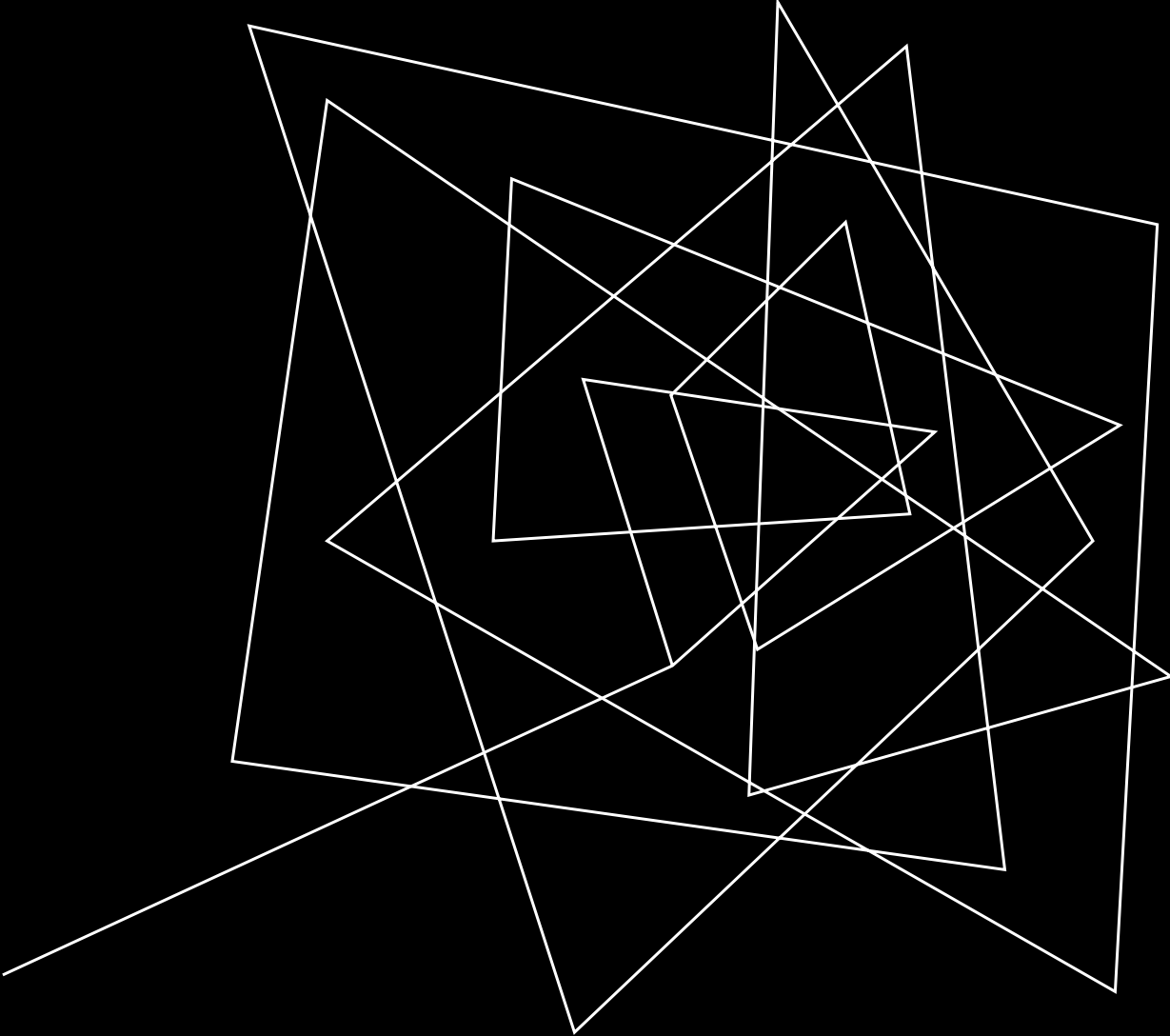
DECEMBER 23, 2021

SAM PLANT AND THE THREE AGENCY FLOWS

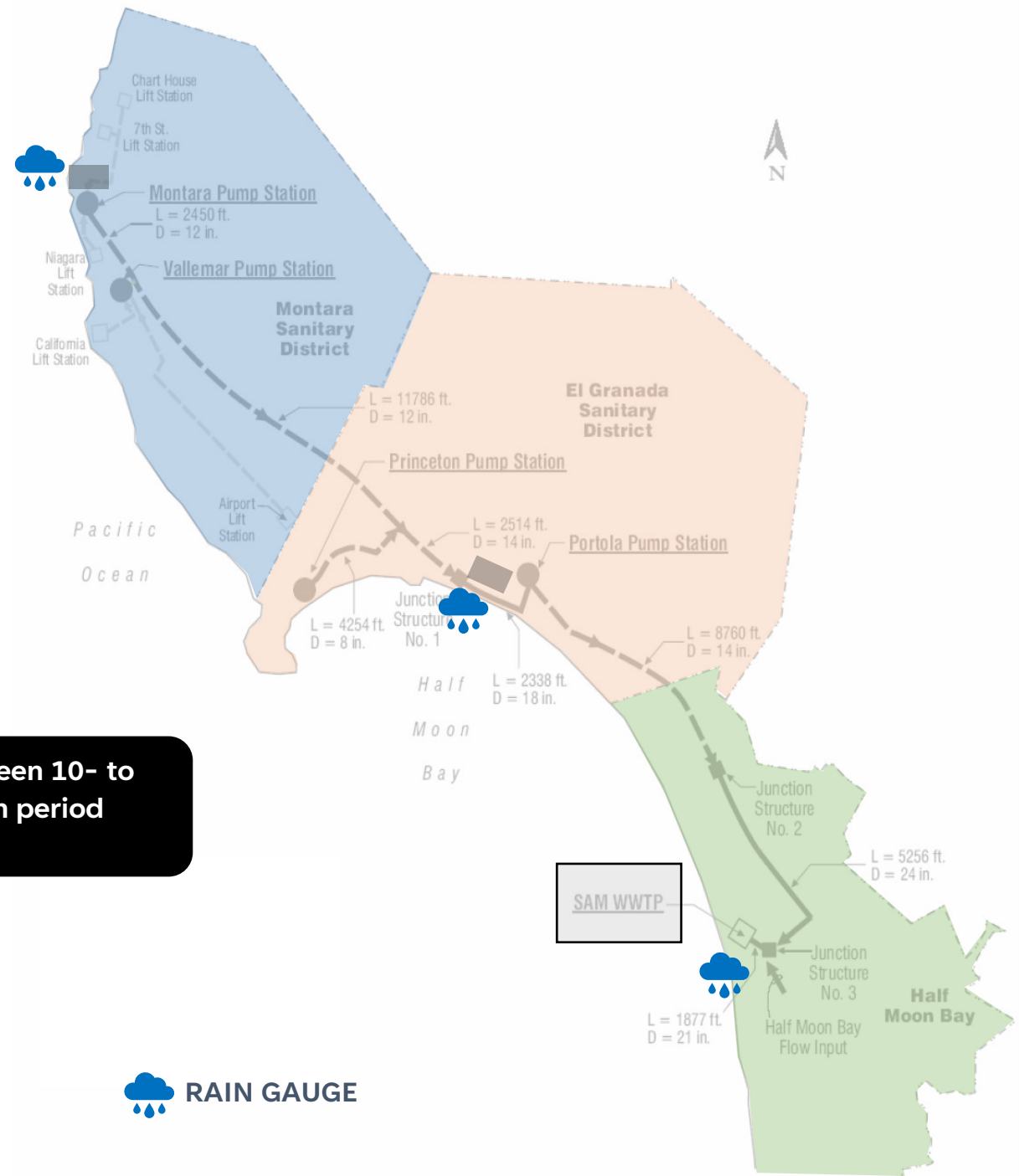| Date & Peak Hour Time	Peak Flow as a Percentage of SAM Plant (%)		
	MWSD	GCSD	HMB
12/23/2021 11-12 pm	32%	19%	48%
12/25/2021 12-1 pm	29%	22%	48%
12/27/2021 11-12 pm	23%	24%	53%
12/29/2021 6-7 pm	26%	21%	52%

DECEMBER 31, 2022

DECEMBER 2022 STORM
OBSERVED RAINFALL

Location/Date	Montara (inch)	Portola (inch)	Plant (inch)
12.26.22	0.3	0.3	0.5
12.27.22	1.9	2.1	1.4
12.28.22	0.0	0.0	0.2
12.29.22	0.6	0.6	0.7
12.30.22	0.6	0.6	0.7
12.31.22	**4.3**	**4.8**	**5.3**
01.01.22	0.0	0.0	0.0
01.02.22 - 01.18.23	7.7	9.9	9.9
Total Rain	**15.4**	**18.4**	**18.7**

Approx. between 10- to 50-year return period storm

Based on NOAA Atlas 14 IDF curves at SAM Plant location on a 24-hour basis

RAIN GAUGE

SAM OPERATIONS ON DECEMBER 31, 2022
SUMMARY OF OPERATOR NOTES

12/31/22 08:30 am – Pilarcitos Creek **flooded the SAM Plant**.

12/31/22 09:00 am - Montara, Vallemar & Portola PS shut down.

12/31/22 10:00 am - **Creek stopped overflowing** into the Plant.

12/31/22 11:15 am - Plant Influent at 7.3 mgd, one pump at Portola PS started.
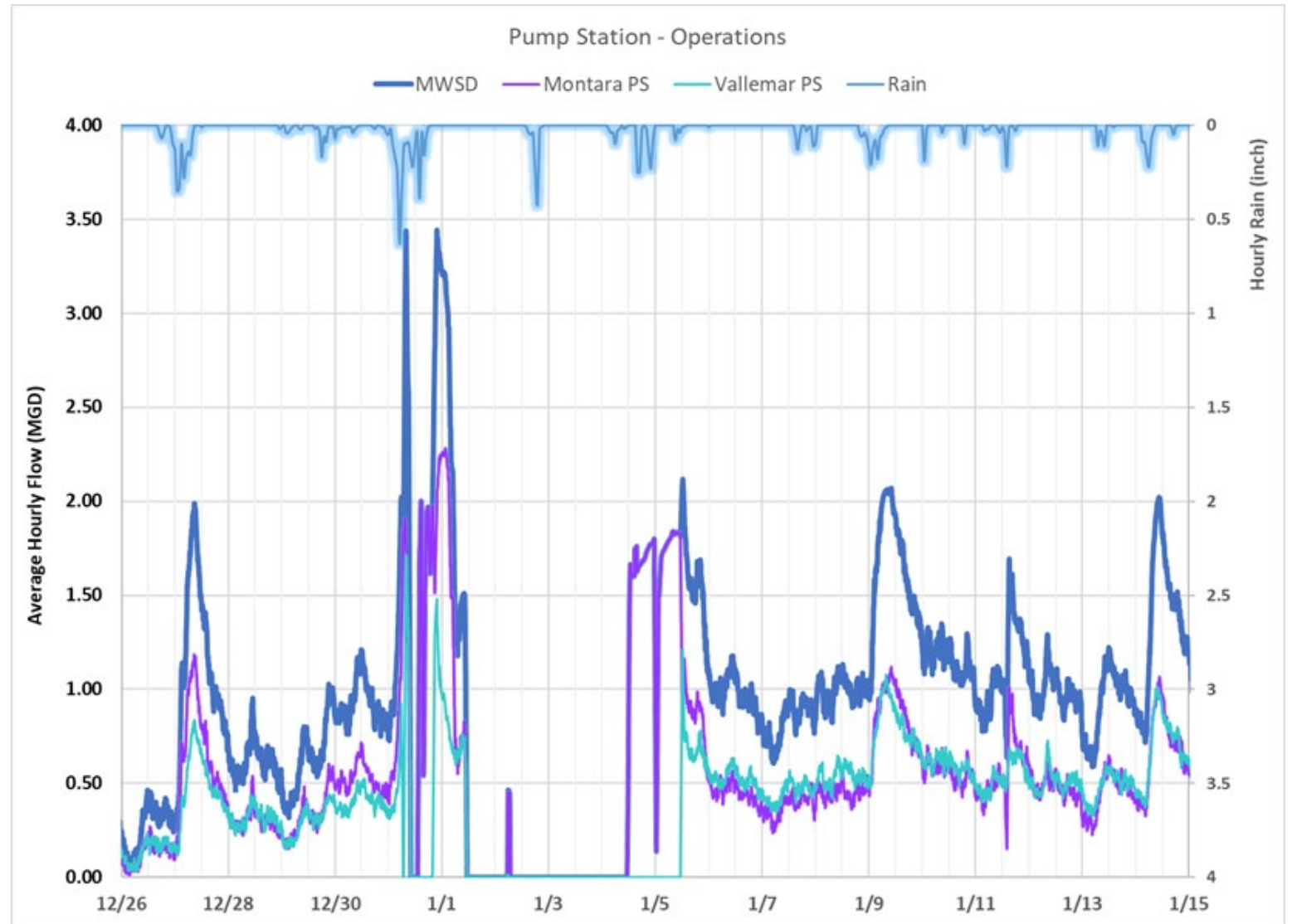
12/31/22 01:10 pm – One pump at Montara PS started.

12/31/22 08:15 pm - Vallemar PS turned on.

01/01/23 10:20 am - **IPS Force Main leak detected** near Vallemar PS.

01/01/23 10:35 am - Montara, Vallemar PS shut down to address IPS leak.
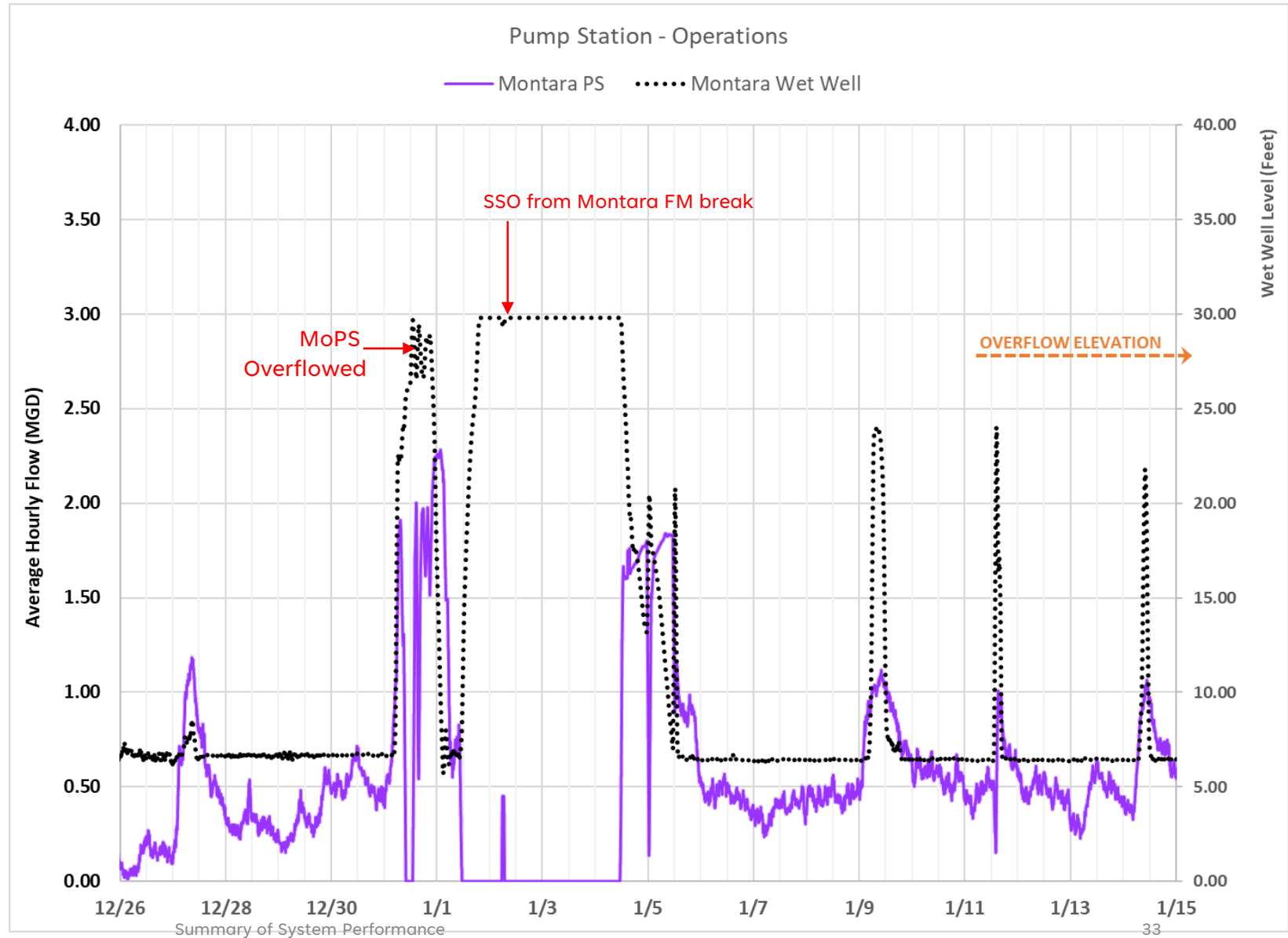
DECEMBER 31, 2022

MWSD SYSTEM
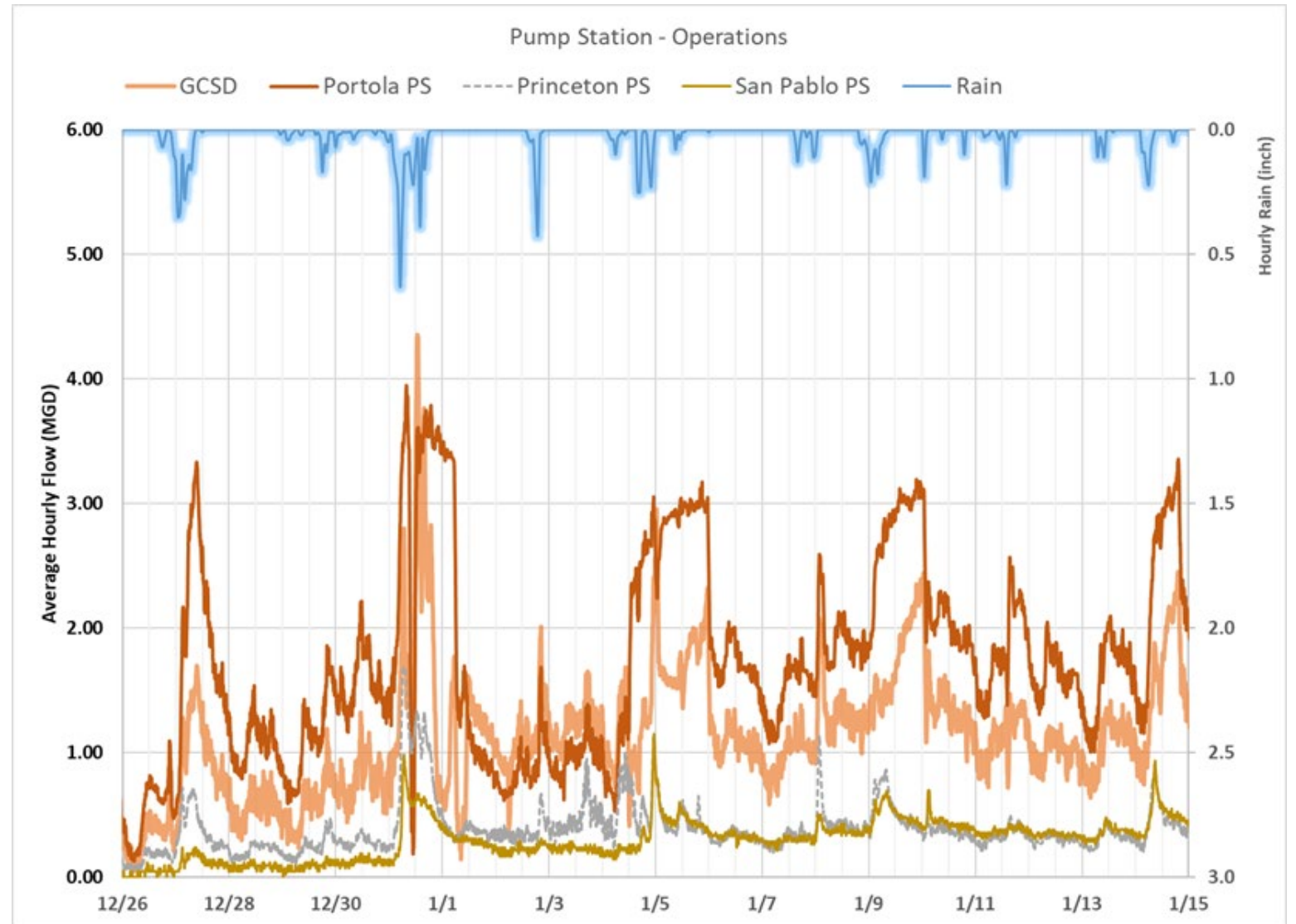PUMP PERFORMANCE

Pump Station - Operations

DECEMBER 31, 2022

MWSD SYSTEM STORAGE UTILIZATION
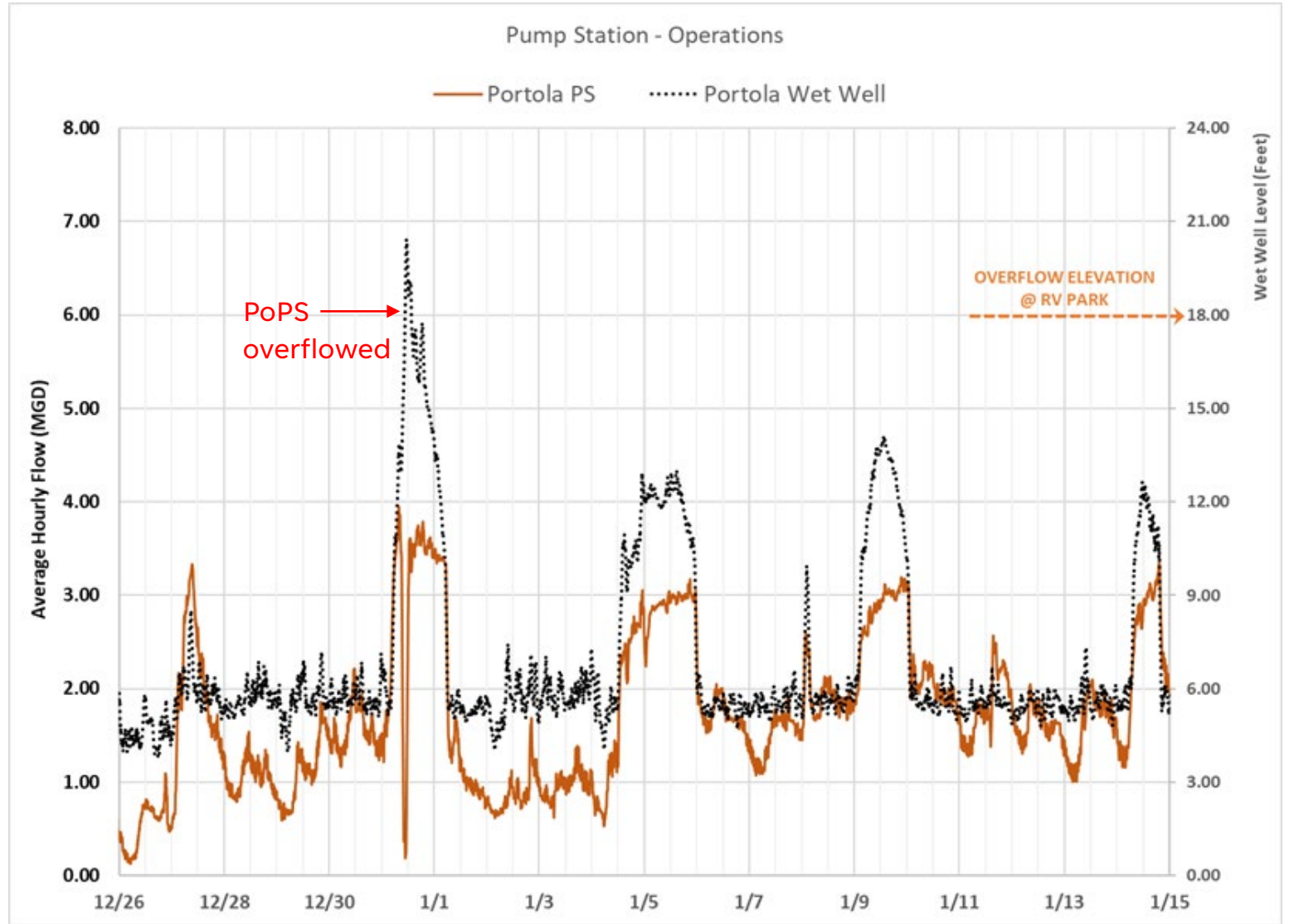
DECEMBER 31, 2022

GCSD SYSTEM
PUMP PERFORMANCE

DECEMBER 31, 2022

GCSD SYSTEM
STORAGE UTILIZATION

DECEMBER 31, 2022

SAM PLANT AND THE THREE AGENCY FLOWS

Date & Peak Hour	Peak Flow as a Percentage of SAM Plant (%)		
	MWSD	GCSD	HMB
12/27/2022 9 - 10 am	27%	23%	50%
12/31/2022 8 am*	29%	12%	60%
12/31/2022 10 am**	20%	8%	72%
1/4/2023 11 - 12 am	16%	19%	64%
1/9/2023 8 - 9 am	23%	16%	61%
1/14/2023 9 - 10 am	19%	15%	66%

*Right before SAM Plant was flooded
**Assumes SAM Plant didn't flood
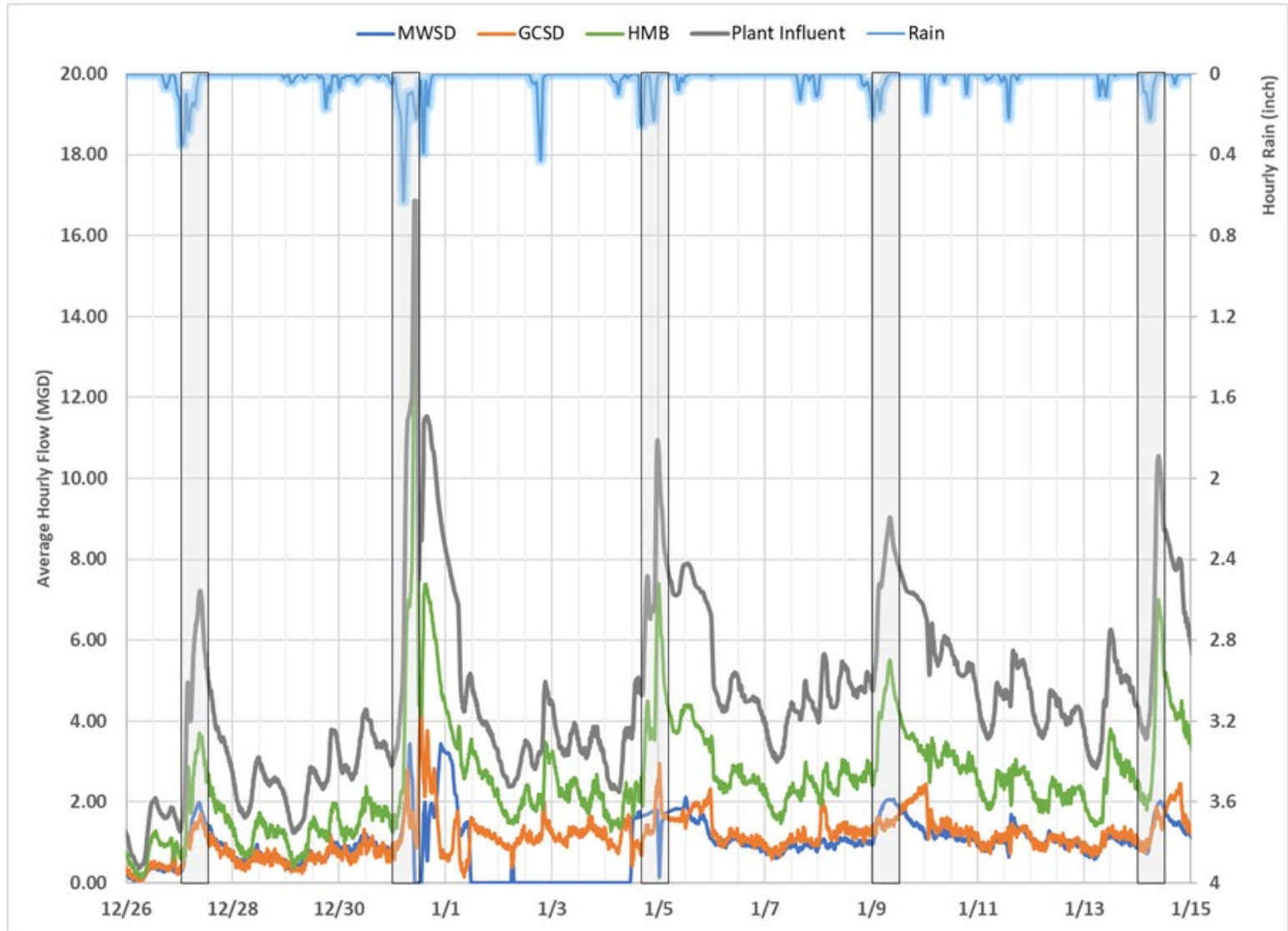
CONCLUSIONS

1. Significant increase in RDII from the City of HMB system over last ten years.

2. Montara, Vallemar, Princeton, San Pablo and Portola Pump Stations all operated correctly during the three storm events.

3. Walker Tank and WWMF storage was well utilized to reduce the peak flows from MWSD and GCSD.

4. Flows from City of HMB are conveyed to the Plant at a much faster rate, due to the proximity of HMB system to the Plant and absence of any storage to manage peak flows.

5. Percentage of peak flows from HMB system entering the SAM Plant increased further for storms with antecedent rainfall, indicating a higher RDII response from HMB system.

RECOMMENDATIONS

1. **Identify and Reduce RDII Sources**
   - Monitoring to identify and prioritize areas
   - Inflows – direct/cross connections
   - Infiltration –aging pipes/joints/manholes

2. **Manage Peak Flows from HMB System**
   - Storage Solutions

THANK YOU!

CONTACT:

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