QUARTERLY REPORT

JULY 1 – SEPTEMBER 30, 2022

Hampton Roads Sanitation District

1434 Air Rail Avenue

Virginia Beach, VA 23455

December 16, 2022

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1. Introduction and Purpose

On September 26, 2007, the Hampton Roads Sanitation District (HRSD) entered into a Special Order by Consent (SOC) with the Virginia Department of Environmental Quality (DEQ) and thirteen (13) area Localities for the purpose of resolving certain alleged violations of environmental laws and regulations related to Sanitary Sewer Overflows (SSOs). On February 23, 2010, HRSD entered into an Amended Consent Decree ("Consent Decree") with the United States of America and the Commonwealth of Virginia for the purpose of fulfilling the objectives of the Clean Water Act and the Virginia State Water Control Law. This Consent Decree has been modified five times by agreement of all parties in 2011, 2013, 2014, 2017, and 2022. In December 2014, the SOC was eliminated by DEQ and HRSD is no longer under state enforcement. On February 8, 2022, the Fifth Amendment to the Consent Decree was entered.

The Fifth Amendment to the Consent Decree requires:

"HRSD will submit quarterly SSO reports to VADEQ and EPA, in which HRSD will identify all SSOs, SSDs, Prohibited Bypasses, or unauthorized discharges from the HRSD SS System or the HRSD STPs. HRSD will identify those SSOs, SSDs, Prohibited Bypasses, or unauthorized discharges for which it asserts a claim of force majeure. If HRSD asserts a force majeure claim, it shall document the basis for such claim in the quarterly SSO reports. It will pay the associated undisputed stipulated penalties for all SSOs, SSDs, Prohibited Bypasses, or unauthorized discharges for which it did not assert a claim of force majeure within 90 days of the close of each calendar quarter. In addition, HRSD will submit all of HRSD's post-storm synopses reports for rain events during the quarterly reporting period to VADEQ and EPA as part of the quarterly reports for rain events that satisfy HRSD's current criteria for publishing a post-storm analysis, i.e.: (a.) one or more rain gauge sites meet a two-year or greater rainfall recurrence interval and at least 50% of sites in any treatment plant service area receive one inch of rainfall or greater; (b.) a rain gauge meets a five-year or greater rainfall recurrence interval; or (c.) a weather-related SSO occurs."

This quarterly report is submitted pursuant to Section XVII.D of the Consent Decree. HRSD has prepared this quarterly report in accordance with the above requirements to apprise the EPA (representing the United States of America) and the DEQ (representing the Commonwealth of Virginia) of steps taken toward meeting the obligations of the Consent Decree. Specifically, this quarterly report summarizes all Sanitary Sewer Overflows (SSOs), Sanitary Sewer Discharges (SSDs), Prohibited Bypasses, or unauthorized discharges from the HRSD Sanitary Sewer System or the HRSD Sewage Treatment Plants from July 1, 2022, through September 30, 2022, the associated post-storm synopses reports, claims of force majeure, and undisputed stipulated penalties.

During the reporting period, there were a total of six (6) SSOs, SSDs, Prohibited Bypasses, and unauthorized discharges from the HRSD SS System or the HRSD STPs. These are summarized in Tables 1 & 2.

2. Claim of Force Majeure

2.1. Sanitary Sewer Overflow

There was one (1) SSOs from the HRSD SS System during the 3-month reporting period. HRSD asserts a force majeure claim for one (1) of the SSOs.

2.1.1. Basis of Claim

The one SSO occurred due to Post Tropical Cyclone Ian. Post Tropical Cyclone Ian had tides of over 5 feet mean low low water (MLLW) and a recorded rainfall of 4.45 inches. Moreover, HRSD has an innovative Clearwater Source Tracking and Reduction (CSTR) program that is actively investigating and addressing excessive inflow sources, such as tidal inundation, into the gravity collection systems of our partner localities. Gravity collection systems were not designed to prevent inflow when the ground surface is inundated. The CSTR program is needed to address excessive inflow associated with intense rain and extreme high tides today, and to prepare for and adapt to anticipated higher tides in the future associated with sea level rise. As to extreme rainfall and extraordinary high tidal events, HRSD thinks the agencies should judge HRSD system performance based upon the quality of HRSD's progressive Clearwater Source Tracking and Reduction program.

2.2. Unusual Discharges (Sanitary Sewer Discharge, Prohibited Bypasses, Unauthorized Discharge)

There were five (5) unusual discharges from the HRSD SS System or the HRSD STPs during the 3-month reporting period. HRSD asserts a force majeure claim for one (1) Unusual Discharges that was non potable water or final effluent.

2.2.1. Basis of Claim

A description of the circumstances supporting a claim of force majeure is included in Table 2.

3. Undisputed Stipulated Penalties

3.1. Sanitary Sewer Overflow

There was one (1) SSO from the HRSD SS System during the 3-month reporting period. HRSD will pay undisputed stipulated penalties for zero (0) SSOs.

3.1.1. Basis of Undisputed Stipulated Penalties
Calculation of undisputed stipulated penalties is outlined in Section XX "Stipulated Penalties" paragraph 110 of the Consent Decree. The calculated stipulated penalties are shown in Table 1.

Volume of the SSD or Prohibited Bypass	Penalty from the date of entry
Less than 100 gallons	$ 100
100 to 2,499 gallons	$ 750
2,500 to 9,999 gallons	$ 1,250
10,000 to 99,999 gallons	$ 4,700
100,000 to 999,999 gallons	$ 10,000
1,000,000 gallons or greater	$ 15,000

3.2. Unusual Discharges (Sanitary Sewer Discharge, Prohibited Bypasses, Unauthorized Discharge)
There were five (5) unusual discharges from the HRSD SS System or the HRSD STPs during the 3-month reporting period. HRSD will pay undisputed stipulated penalties in the amount of $3,000 for four (4) Unusual Discharges.

3.2.1. Basis of Undisputed Stipulated Penalties

Calculation of undisputed stipulated penalties is outlined in Section XX "Stipulated Penalties" paragraph 110 of the Consent Decree. The calculated stipulated penalties are shown in Table 2.

Volume of the SSD or Prohibited Bypass	Penalty from the date of entry
Less than 100 gallons	$ 100
100 to 2,499 gallons	$ 750
2,500 to 9,999 gallons	$ 1,250
10,000 to 99,999 gallons	$ 4,700
100,000 to 999,999 gallons	$ 10,000
1,000,000 gallons or greater	$ 15,000

4. Post-Storm Synopses Reports

Post-Storm Synopses Reports are generated when:

- One or more rain gauge sites meets a two year or greater rainfall recurrence interval and 50% of sites receive one inch or greater rainfall
- A rain gauge meets a five-year or greater rainfall recurrence interval or
- A capacity related wet weather SSO occurs

Post-Storm Synopses Reports are attached for the 3-month reporting period.

Table 1. Detailed Listing of HRSD SSOs

(July 1, 2022, to September 30, 2022)

Date and Time of Incident	Location	Sewer System Component	Potential Receiving Waters	Spilled In Jurisdiction	SSO Classification	Description of Incident from SSORS	SSO Duration	Action Taken and Explanation of SSO	Discharge Quantity (gallons)**	Amount Reaching State Waters (gallons)**	DEQ IR	Force Majeure Rationale or Stipulated Penalty
9/30/2022 10:23 PM	1136 Saunders Drive	Suffolk PS MH	Shingle Creek	Suffolk	Capacity – Weather Related	Heavy rain associated with Tropical Storm Ian caused higher than normal flows and pressures. Suffolk PS saw a maximum rainfall of 0.28" in 15 minutes (09/30/22 at 9:30 pm), with a total of 0.75" falling in 1 hour. Total rainfall for the rain event for this rain gauge was 4.30". As a result, the Suffolk PS duty pumps and standby pump were unable to keep up with the flows entering the wet well. By the time staff arrived onsite, the overflow alarm had cleared. Staff observed that the water levels within the creek had submerged the manhole where the overflow had occurred.	0 hour(s) 43 minute(s)	Staff tested the standby pump and verified that it performed as it should. -----October 5, 2022, 1:00 PM-----	8,000	8,000	SSORS#2023-T-106180	The HRSD service area experienced a post tropical cyclone that brought an approximate 17-hour rainfall event that resulted in approximately 3 inches of rain across the South Shore. The associated rain gauge of the overflow measured 4.3 inches; a 5yr RRI. As such, Force Majeure is asserted for this overflow.

Table 2. Detailed Listing of HRSD Treatment Plant Unusual Discharges

(July 1, 2022 to September 30, 2022)

Date	Location	Description/Cause	Duration of Event (minutes)	Corrective Action	Estimated Quantity Discharged (gallons)	Estimated Quantity to State Waters (gallons)	Type of Overflow	Receiving Water	Force Majeure Rationale Or Stipulated Penalty
7/2/2022	Nansemond	SWIFT drain pump station overflowed. Level transmitter failed and drain pumps turned off while floc-sed to ozone flow was being re-established and flow was being sent to drain pump station.	1	Once SWIFT Lead Operator found station overflowing turned pumps on in manual and pumped level down which stopped anymore flow from overflowing the pump station.	300	300	Floc-Sed Effluent	Pavement/ground	$750
7/26/2022	Nansemond	The manual barscreen channel drain to sanitary wet well was opened by plant staff to allow a contractor to clean the channel out. The wet well drain pumps were secured due to believing the level sensor was inaccurate. Once the channel cleaning was complete, the drain was not secured, and the pumps were not turned back on in auto. This caused the sanitary wet well too overfill and began the spill from two manholes on plant site. ~250 gallons was spilled on the ground. A heavy rain event occurred during the attempted recovery effort which rendered recovery unsuccessful.	1	Started sanitary well pumps	250	250	Raw Influent (RWI)	Ground	$750
7/31/2022	Atlantic	OCS (Odor Control Station) D, Train 1 fan motor caught fire.	123	Fire dept called, Scrubber train secured and fire was extinguished.	300	300	NPW and Fire foam	Ground	$750
9/13/2022	VIP	Plant Personnel opened the drain on the #2 Versatile Bio Reactor (VBR) after it was taken out of service. This resulted in the South Scum Room floor drain overflowing. The Scum Room drain has a valve that is to remain closed. It was left open and allowed MLSS from the draining VBR to overflow out of the floor drain and out of the room. The spill reached a storm catch basin. It was found 10 minutes after the start of the tank (VBR) draining.	10	The tank valves were immediately closed on VBR as well as the Scum Room floor drain valve. A procedure will be written and a lock installed on the Scum Room floor drain valve to ensure it stays closed until it is needed. The plant will evaluate changing the Scum Room floor drain piping connection from a tank drain system to a sanitary sewer.	200	200	Mixed Liquor Suspended Solids (MLSS)	storm drain to Elizabeth River	$750

Table 2. Detailed Listing of HRSD Treatment Plant Unusual Discharges (July 1, 2022 to September 30, 2022)									
Date	Location	Description/Cause	Duration of Event (minutes)	Corrective Action	Estimated Quantity Discharged (gallons)	Estimated Quantity to State Waters (gallons)	Type of Overflow	Receiving Water	Force Majeure Rationale Or Stipulated Penalty
9/19/2022	Army Base	On Call Lead Operator (LO) received a call about a water leak located next to NPW building 01 around 01:10. Once on site around 02:00 Tom was able to secure an isolation valve upstream and stop the leak. The LO estimated 30-40 gallons entered the storm drain just west of the leak. Upon further investigation at daybreak, the leak appears to be coming from underneath the roadway. Contractors arrived on site around 10:00am 9/19 to excavate.	50	Valve was closed to secure non potable water flow. Repairs to the line are ongoing.	40	40	Non-Potable Water (NPW)	ground, storm drain to Elizabeth River	NPW force majeure

Note: NPW (non-potable water) is fully treated and chlorinated final effluent.

Appendix A. Post-Storm Synopses Reports

Appendix B. Definitions

"Bypass" shall mean the intentional diversion of waste streams from any portion of a treatment facility, as defined by 40 C.F.R. § 122.41(m).

"HRSD SS System" or "HRSD Sanitary Sewer System" shall mean the wastewater collection and transmission systems, including all pipes, Force Mains, Gravity Sewer Lines, lift stations, Pumping Stations, Pressure Reducing Stations, manholes, and any other appurtenances thereto, which are owned or operated by HRSD as of the Effective Date of this Consent Decree, and which serve the Localities. It does not include the portions of the sewer system that serves the Middle Peninsula communities within King William County, King and Queen County, Middlesex County, and Mathews County.

"Non-potable water (NPW)" is fully treated and chlorinated final effluent.

"Prohibited Bypass" shall mean a Bypass within the meaning of 40 C.F.R § 122.41(m)(4).

"Sanitary Sewer Overflow" or "SSO" shall mean an overflow, spill, diversion, or release of wastewater from or caused by the Regional SS System. This term shall include: (i) discharges to waters of the State or United States from the Regional SS System and (ii) any release of wastewater from the Regional SS System to public or private property that does not reach waters of the United States or the State, including Building/Private Property Backups.

"Sanitary Sewer Discharge" or "SSD" shall mean any discharge to waters of the State or the United States from the HRSD SS System through a point source not authorized in any Permit.

Hampton Roads Sanitation District

Post-Storm Report

July 9-10, 2022

HRSD
Cleaning wastewater every day for a better Bay.

DISCLAIMER:

About the information on this HRSD server

This report is intended to provide the HRSD regional community summary information about the HRSD system during select wet weather events/anomalies. The attached report contains a selection of *official* Interceptor and Treatment data, as well as other environmental and meteorological data provided through other services. In an effort to enhance the HRSD system, the attached products have been made accessible on this server and care must be taken when using such products as they are intended for informational and not operational, legal, or other purposes.

This report is located on an HRSD server and is intended to be available 24 hours a day, seven days a week. However, timely availability and/or delivery of data and products from this server through the Internet is subject to numerous potential constraints and is, therefore, not guaranteed. Official HRSD dissemination of information is available only through a written response to a formal written request for data from the user.

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Summary

From July 9th through July 10th, there was an approximate 36-hour rainfall event that resulted in 3 sites on the North Shore and 12 sites on the South Shore that met a 1 to 5-year rainfall recurrence interval throughout the HRSD rain gauge network. Humid air brought rain showers into Hampton Roads with some pockets of much heavier rain. After an initial period of heavier rain on Saturday, showers remained in the area through Sunday. North Shore sites averaged around 1.22 inches of rain while South Shore sites averaged around 1.44 inches. There was minimal impact on groundwater levels compared to July 2021. See Appendix C for the Historical Shallow Well comparison.

No HRSD interceptor weather-related overflow(s) were reported.

HRSD flow and pressure meters met data reliability requirements per the MOM program. For all pressure meters in the aggregate and all pressure-side flow meters in the aggregate for each treatment plant service area listed below, at least 90% reliable data was achieved, based on the duration of system response to this rainfall event. The data reliability for the gravity flow meters is not included in this synopsis.

- Duration of system response: See Table Below
- Aggregate flow meter validity: 94.38%
- Aggregate pressure meter validity: 98.65%

Currently, rainfall recurrence intervals are only analyzed for a maximum of 96-hours. Rainfall analysis begins after 0.1 inches of rain has occurred. A 72-hour dry period of less than 0.1 inches of rain is typically used to signify two separate events. However, if a site returns to "dry weather" conditions prior to the next rainfall that occurs within 72 hours of the previous event, it is also considered for separate analysis. See Appendix A for the Rainfall Total System Maps.

The current criteria for publishing a post-storm analysis are the following:

- One or more rain gauge sites meet a two-year or greater RRI (rainfall recurrence interval) and at least 50% of sites in any treatment plant service area receive one inch of rainfall or greater,
- A rain gauge site meets a five-year or greater RRI, or
- A weather-related SSO occurs.

Treatment Plant Data: ***(Data obtained from Telog Database)***
See Appendix B for HRSD Treatment Plant Flows

HRSD Treatment Plant Data
7/9/2022 – 7/10/2022

North Shore				
Treatment Plant	**Date of Peak Hourly Flow**	**Peak Hourly Flow (MGD)**	**Peak Hour**	**TPSA Total Rainfall Avg (in)**
Boat Harbor	7/9/2022	19.19	15:00	0.88
	7/10/2022	14.42	13:00	0.25
James River	7/9/2022	21.08	14:00	0.73
	7/10/2022	16.46	13:00	0.38
Williamsburg	7/9/2022	14.33	13:00	0.65
	7/10/2022	13.36	13:00	0.21
York River	7/9/2022	16.95	14:00	1.29
	7/10/2022	12.59	19:00	0.29

HRSD Treatment Plant Data
7/9/2022 – 7/10/2022

South Shore				
Treatment Plant	**Date of Peak Hourly Flow**	**Peak Hourly Flow (MGD)**	**Peak Hour**	**TPSA Total Rainfall Avg (in)**
Army Base	7/9/2022	20.82	15:00	1.40
	7/10/2022	11.35	20:00	0.39
Atlantic	7/9/2022	92.34	15:00	1.11
	7/10/2022	65.58	17:00	0.58
Nansemond	7/9/2022	26.35	15:00	1.10
	7/10/2022	21.18	17:00	0.53
VIP	7/9/2022	34.01	15:00	0.64
	7/10/2022	29.32	17:00	0.62

North Shore

Weather:

Rainfall (HRSD Rainfall Gauges): *Recurrence intervals based on NOAA Atlas 14*

Rain Gauge Site	Peak Rainfall RI (Duration)	Jurisdiction
Boat Harbor Treatment Plant Service Area[1]		
Bayshore PS	DNQ	HAMP
Bridge Street Tide Gate	DNQ	HAMP
Boat Harbor	1-year (1hr)	NEWP
Copeland Park PS	DNQ	NEWP
Hampton PS 159	DNQ	HAMP
James River Treatment Plant Service Area[1]		
Hilton School PS	DNQ	NEWP
James River Main Flow (Influent)	DNQ	NEWP
Lee Hall PRS	DNQ	NEWP
Lucas Creek PS	DNQ	NEWP
Morrison PS	DNQ	NEWP
Williamsburg Treatment Plant Service Area[1]		
Ford's Colony	DNQ	JCSA
Fort Eustis PS	DNQ	NEWP
Greensprings PS	DNQ	JCA
Solarex	DNQ	JCSA
Williamsburg Main Flow (Effluent)	DNQ	JCSA
Williamsburg PS	DNQ	WILL
York Skimino Hills PS	DNQ	YORK
York River Treatment Plant Service Area[1]		
Big Bethel PRS	DNQ	HAMP
Freeman PS	DNQ	HAMP
Gloucester Court House	1- to 2-year (1hr)	GLOU
Guinea Rd at Maryus Rd	2- to 5-year (1hr)	GLOU
Ordinary PCV	DNQ	GLOU
Poquoson PS 6	DNQ	POQ
Wolf Trappe PCV	DNQ	YORK
York Kiln Creek 1 PS	DNQ	YORK
York PS 15	DNQ	YORK
York River Main Flow (Influent)	DNQ	YORK
York River Crossing (York River Rectifier)	DNQ	GLOU

Note:

1. Typical treatment plant service area.

Newport News-Williamsburg International (PHF)

- Wind and Rainfall (daily total):

Date	Gust (max)	Sustained (max)	Sustained (avg)	Direction	Rainfall (in)
7/9/22	23 mph	12 mph	5 mph	NE	0.70
7/10/22	23 mph	9 mph	5 mph	NE	0.36

Tide:

- Yorktown USCG Training Center:
  - Storm Surge: An approximate 1.3-foot storm surge was observed.

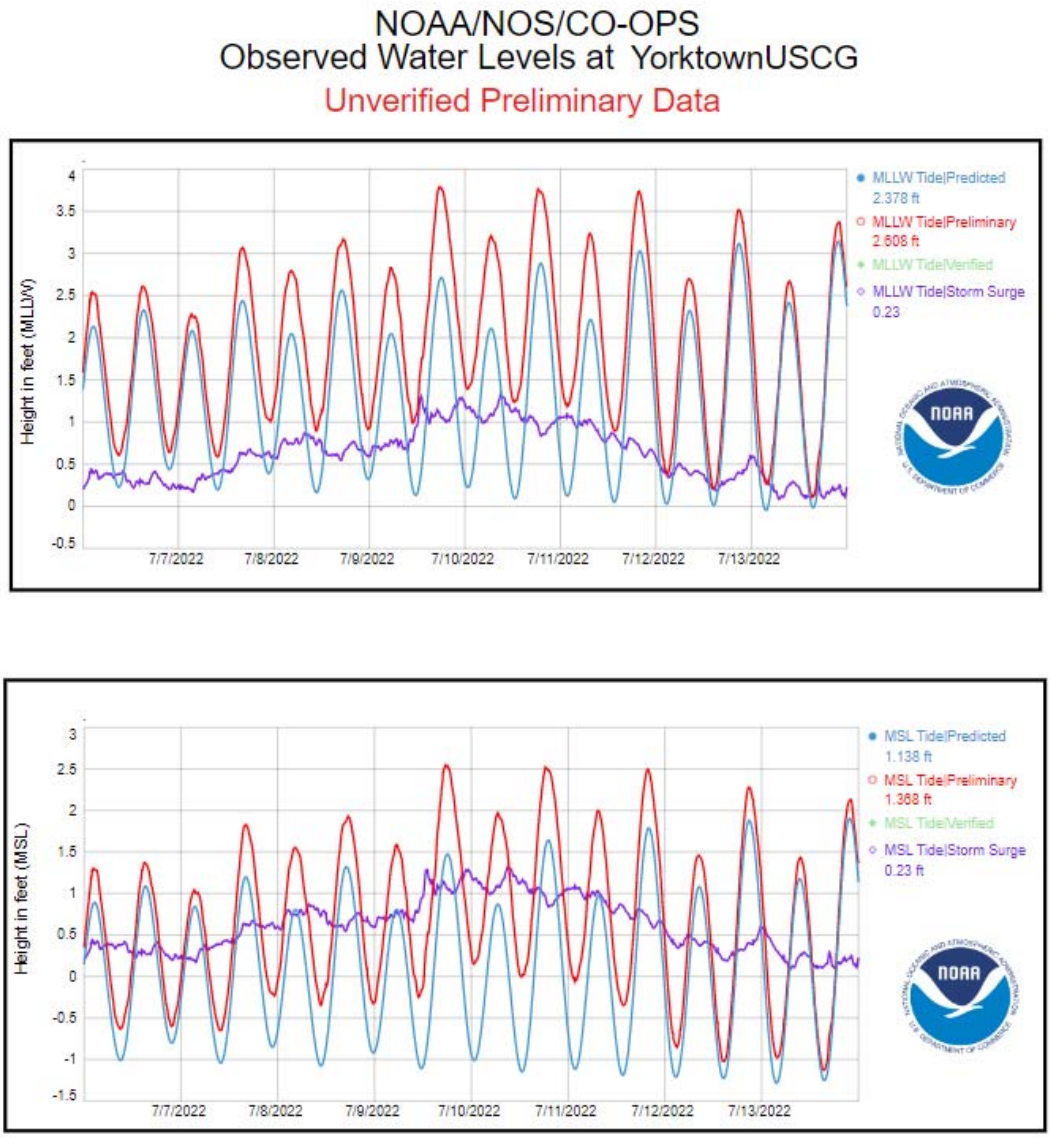


Figure 1. Preliminary data obtained from NOAA and a connection with Open Weather

- Sewells Point Tide Station:
  - Storm Surge: An approximate 1.4 foot storm surge was observed.

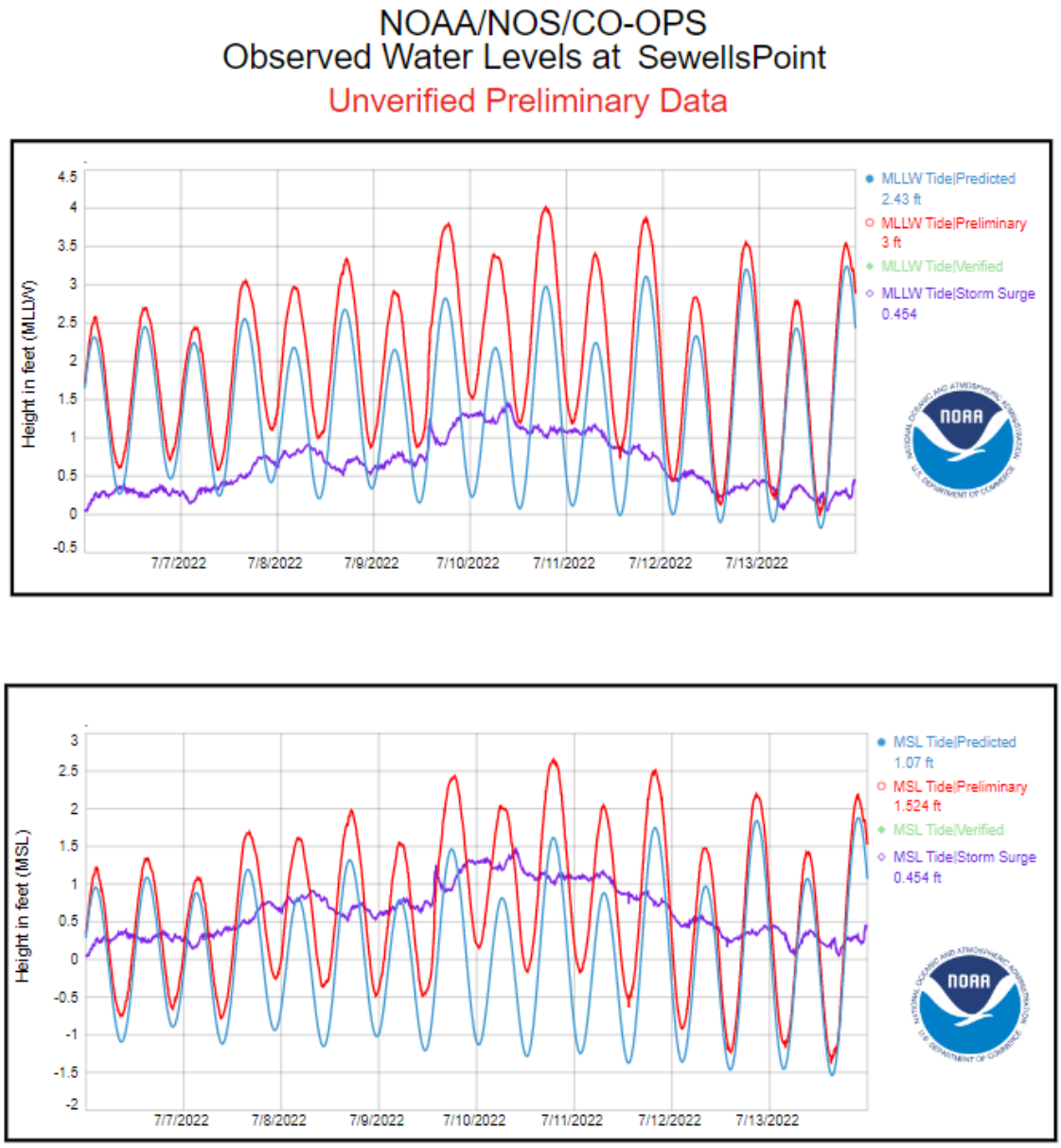


Figure 2. Preliminary data obtained from NOAA and a connection with Open Weather

South Shore

Weather:

Rainfall (HRSD Rainfall Gauges): *Recurrence intervals based on NOAA Atlas 14*

Rain Gauge Site	Peak Rainfall RI (Duration)	Jurisdiction
Army Base Treatment Plant Service Area[1]		
Bancker Rd (Dovercourt Discharge)	1-year (1hr)	NORF
Taussig Blvd PS	1-year (1hr)	NORF
Atlantic Treatment Plant Service Area[1]		
Callison at GB Locks	1- to 2-year (1hr)	CHES
Chesapeake PS 243	DNQ	CHES
Chesapeake PS 254	1- to 2-year (1hr)	CHES
Courthouse PRS	DNQ	VAB
Elbow Rd	DNQ	CHES
John B. Dey MLV-AT side	DNQ	VAB
Kempsville PRS	DNQ	VAB
Lagomar IFM at Atlantic TP	DNQ	VAB
Laskin Rd PRS	1- to 2-year (1hr)	VAB
Pine Tree PRS	1- to 2-year (1hr)	VAB
Shipps Corner PRS	DNQ	VAB
Ches-Liz Treatment Plant Service Area[1]		
Ches-Liz Weather	Disconnected	VAB
Dozier's Corner PS	DNQ	CHES
Independence PRS	1-year (1hr)	VAB
Northampton Blvd at Wesleyan Dr	DNQ	NORF
Providence PRS	1- to 2-year (1hr)	VAB
Shore Dr @ Jack Frost	1- to 2-year (1hr)	CHES
Nansemond Treatment Plant Service Area[1]		
Bowers Hill PRS	DNQ	CHES
Cedar Lane PS	DNQ	PORT
Chesapeake PS 158	DNQ	CHES
Chesapeake PS 238	DNQ	CHES
Crittenden Rd_Chuckatuck Rectifier	DNQ	SUFF
Deep Creek PRS	DNQ	CHES
Lake Kilby WTP	2- to 5-year (1hr)	SUFF
Nansemond Main Flow (Effluent)	DNQ	SUFF
Pagan River Rectifier	DNQ	IOW
Pughsville PS	DNQ	SUFF
Route 337 PRS	DNQ	CHES
Smithfield High School	DNQ	IOW
Suffolk PS	2- to 5-year (1hr)	SUFF
Suffolk PS 81	DNQ	SUFF
Suffolk PS 87	DNQ	SUFF
Windsor Duke St PS	DNQ	IOW
Windsor PCV	5-year (1hr)	SUFF

VIP Treatment Plant Service Area[1]		
Elizabeth River Crossing_Eastern Branch	DNQ	NORF
Ferebee Avenue PS	DNQ	CHES
Luxembourg Avenue PS	DNQ	NORF
Rodman Ave PS	DNQ	PORT
Va Beach Blvd PS	DNQ	NORF
VIP Main Flow (Effluent)	DNQ	NORF

Note:

1. Typical treatment plant service area.

*Duration represents the minimum amount of time it took to reach the specified RRI.

Norfolk International Airport (ORF)

- Wind and Rainfall (daily total):

Date	Gust (max)	Sustained (max)	Sustained (avg)	Direction	Rainfall (in)
7/9/2022	37 mph	16 mph	5 mph	NE	1.44
7/10/2022	29 mph	15 mph	10 mph	NE	0.5

Tide:

- Sewells Point Tide Station:
  - Storm Surge: An approximate 1.4 foot storm surge was observed.

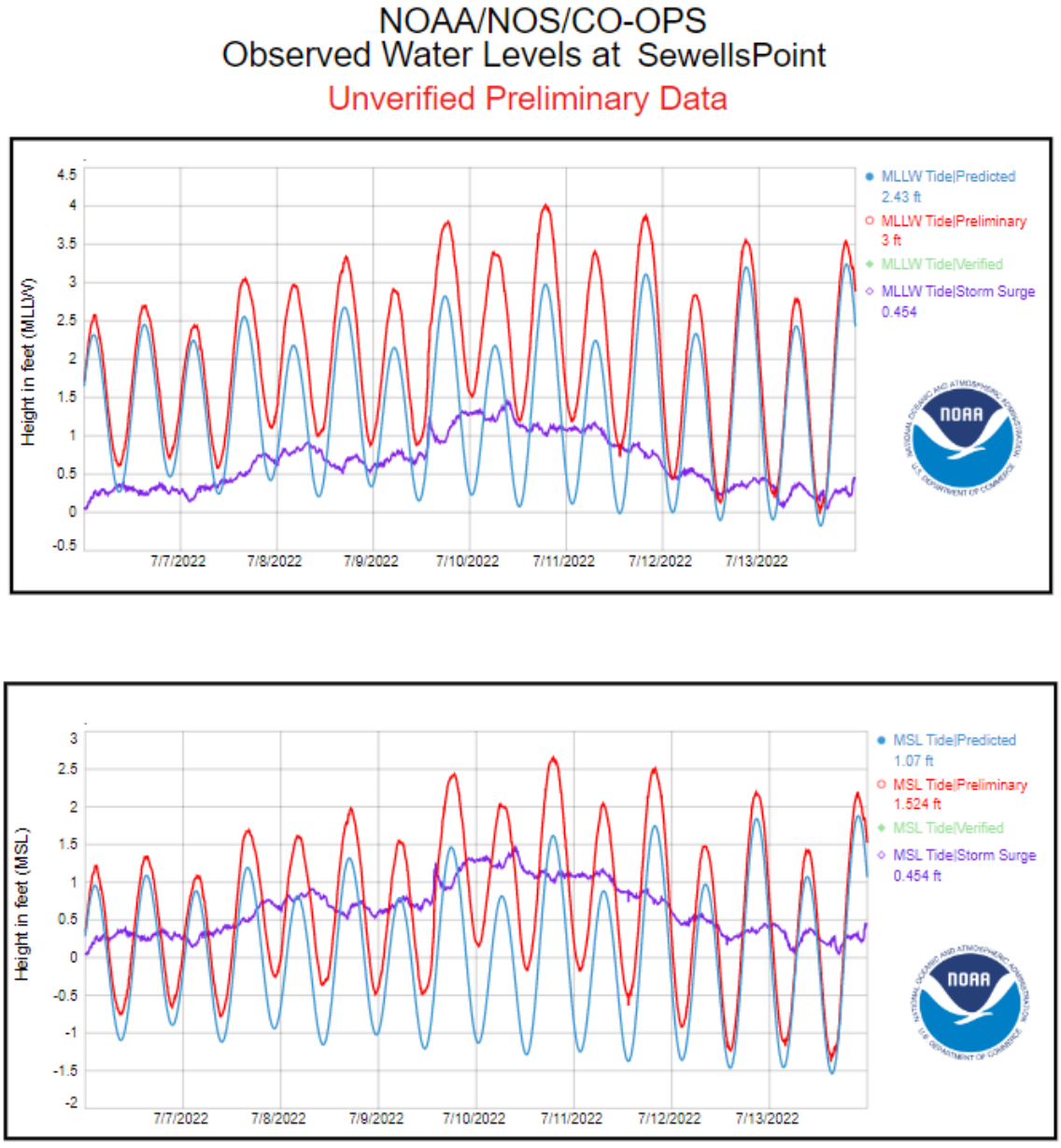


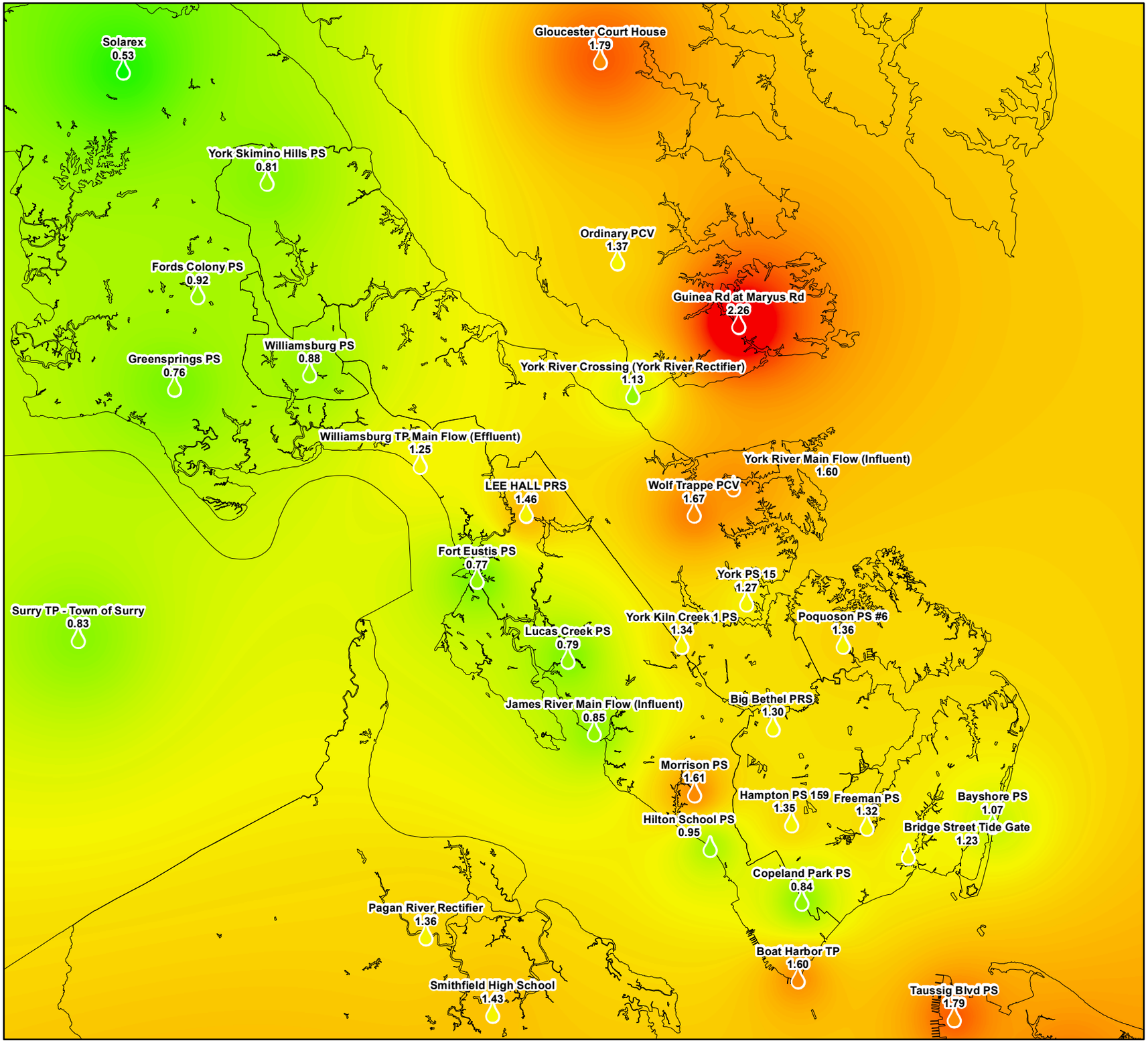
Figure 3. Preliminary data obtained from NOAA and a connection with Open Weather

Shallow Well Analysis:

Shallow wells are located at/or near HRSD Pump Stations to measure groundwater levels. The water column is measured using a pressure transducer located near the bottom of the well. The installed sensor measures gauge pressure in inches of water. The Shallow Well_NAVD88 measurement referenced in Appendix C refers to the elevation (referenced as NAVD 88) of the sensor plus the gauge measurement in feet.

Appendix A

HRSD Rain Gauge Network
Rainfall Totals



North Shore

July 9-10, 2022 Rainfall Analysis Total Rainfall

Rain Gauges (in):

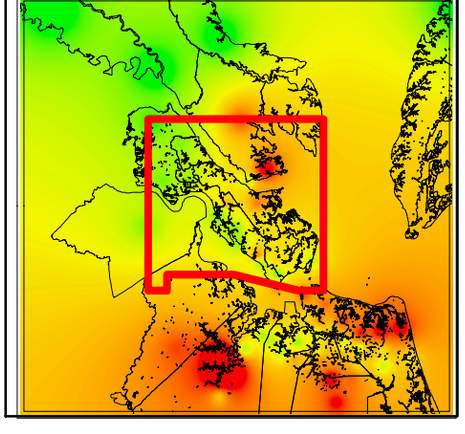
- **2.09 - 3.21**
- **1.54 - 2.08**
- **1.16 - 1.53**
- **0.54 - 1.15**
- **0.04 - 0.53**

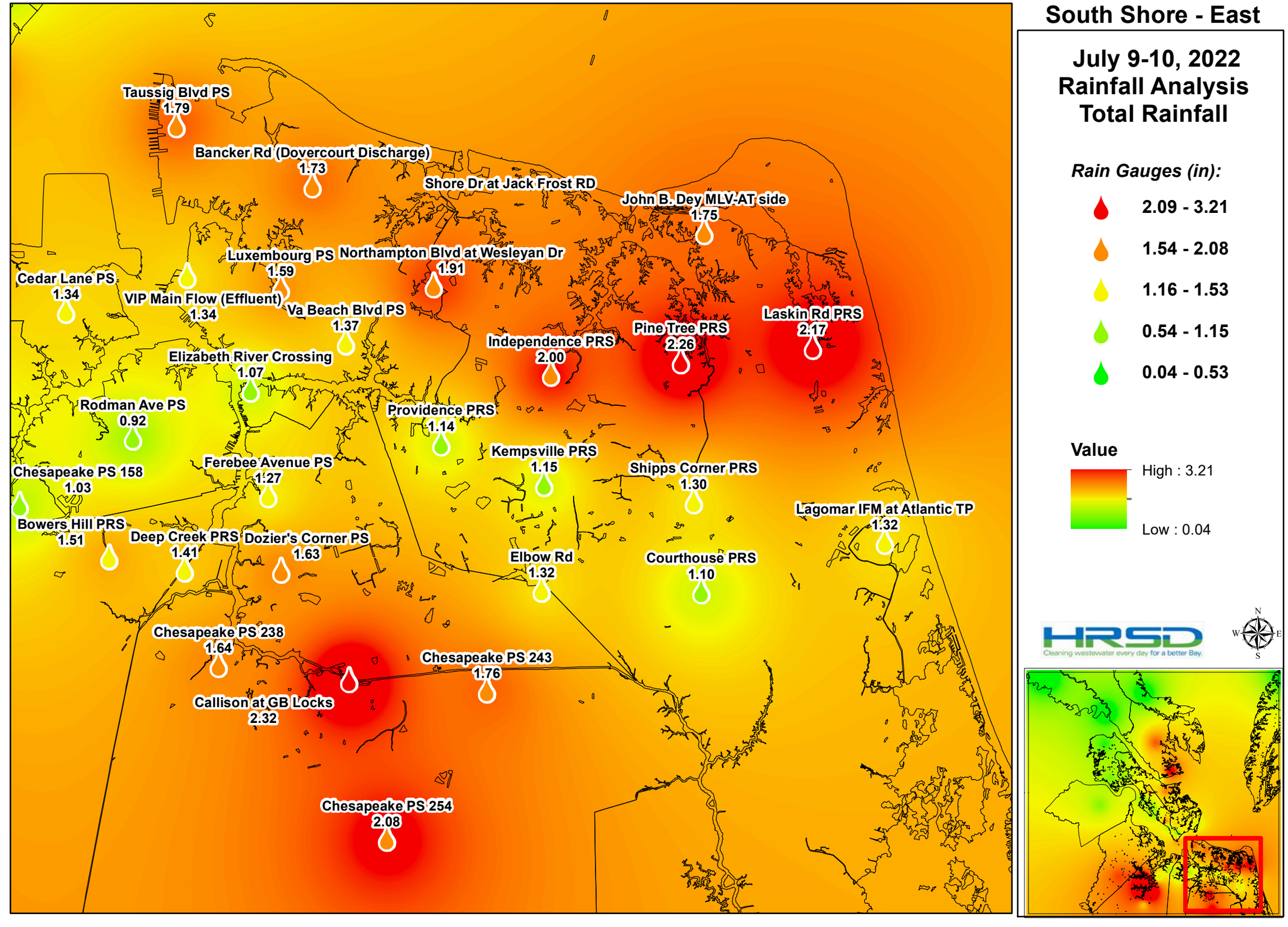
Value

High : 3.21

Low : 0.04

HRSD
Cleaning wastewater every day for a better Bay.




South Shore - East
July 9-10, 2022
Rainfall Analysis
Total Rainfall
Rain Gauges (in):
2.09 - 3.21
1.54 - 2.08
1.16 - 1.53
0.54 - 1.15
0.04 - 0.53
Value
High : 3.21
Low : 0.04
Taussig Blvd PS 1.79
Bancker Rd (Dovercourt Discharge) 1.73
Shore Dr at Jack Frost RD
John B. Dey MLV-AT side 1.75
Luxembourg PS 1.59
Northampton Blvd at Wesleyan Dr 1.91
Cedar Lane PS 1.34
VIP Main Flow (Effluent) 1.34
Va Beach Blvd PS 1.37
Laskin Rd PRS 2.17
Pine Tree PRS 2.26
Independence PRS 2.00
Elizabeth River Crossing 1.07
Rodman Ave PS 0.92
Providence PRS 1.14
Kempsville PRS 1.15
Shipps Corner PRS 1.30
Ferebee Avenue PS 1.27
Chesapeake PS 158 1.03
Lagomar IFM at Atlantic TP 1.32
Bowers Hill PRS 1.51
Deep Creek PRS 1.41
Dozier's Corner PS 1.63
Elbow Rd 1.32
Courthouse PRS 1.10
Chesapeake PS 238 1.64
Chesapeake PS 243 1.76
Callison at GB Locks 2.32
Chesapeake PS 254 2.08
HRSD
Cleaning wastewater every day for a better Bay.
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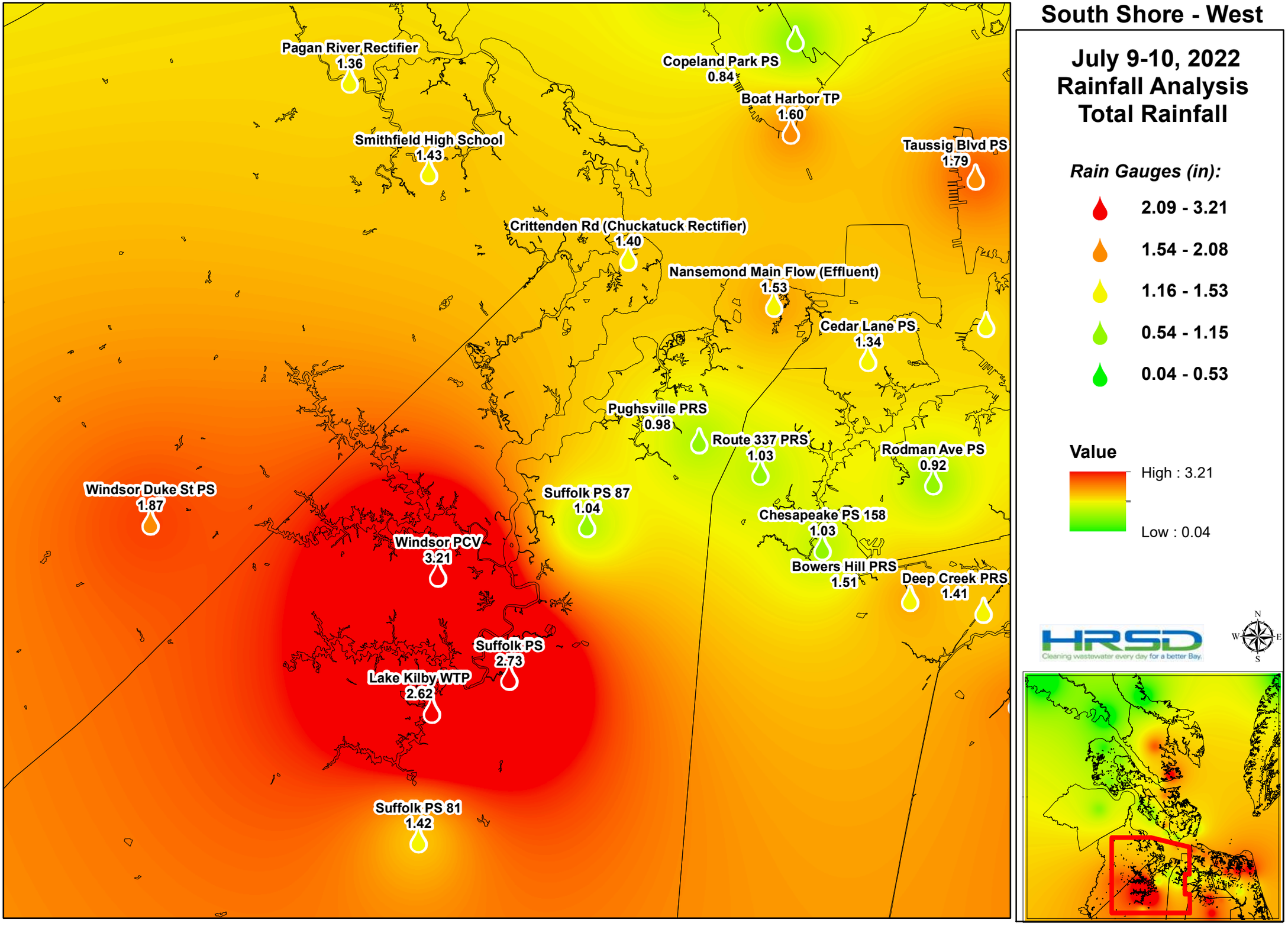
South Shore - West
July 9-10, 2022
Rainfall Analysis
Total Rainfall
Rain Gauges (in):
2.09 - 3.21
1.54 - 2.08
1.16 - 1.53
0.54 - 1.15
0.04 - 0.53
Value
High : 3.21
Low : 0.04
Pagan River Rectifier
1.36
Copeland Park PS
0.84
Boat Harbor TP
1.60
Smithfield High School
1.43
Taussig Blvd PS
1.79
Crittenden Rd (Chuckatuck Rectifier)
1.40
Nansemond Main Flow (Effluent)
1.53
Cedar Lane PS
1.34
Pughsville PRS
0.98
Route 337 PRS
1.03
Rodman Ave PS
0.92
Windsor Duke St PS
1.87
Suffolk PS 87
1.04
Chesapeake PS 158
1.03
Windsor PCV
3.21
Bowers Hill PRS
1.51
Deep Creek PRS
1.41
Suffolk PS
2.73
Lake Kilby WTP
2.62
Suffolk PS 81
1.42
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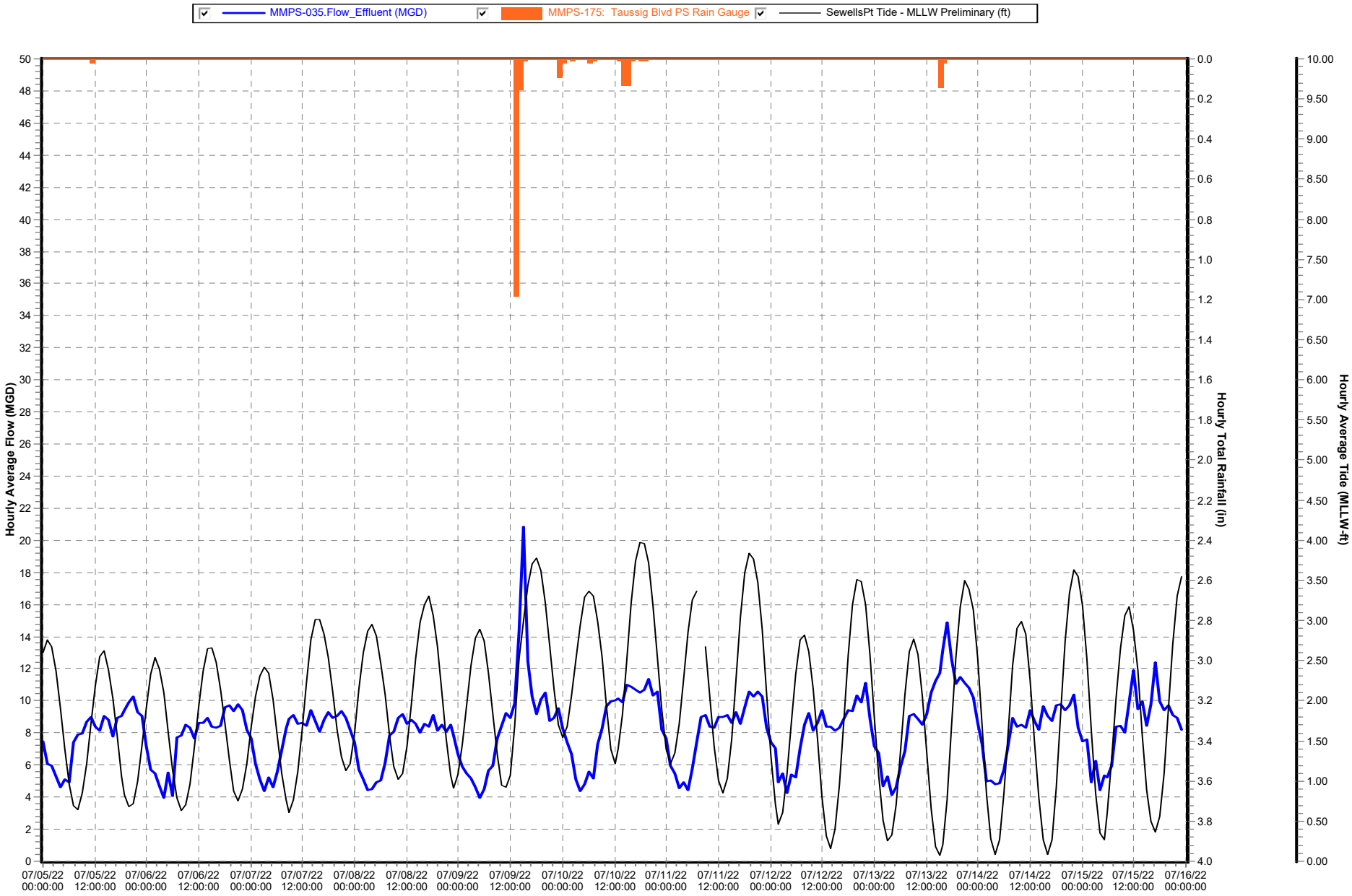
Appendix B

HRSD Treatment Plant Flows

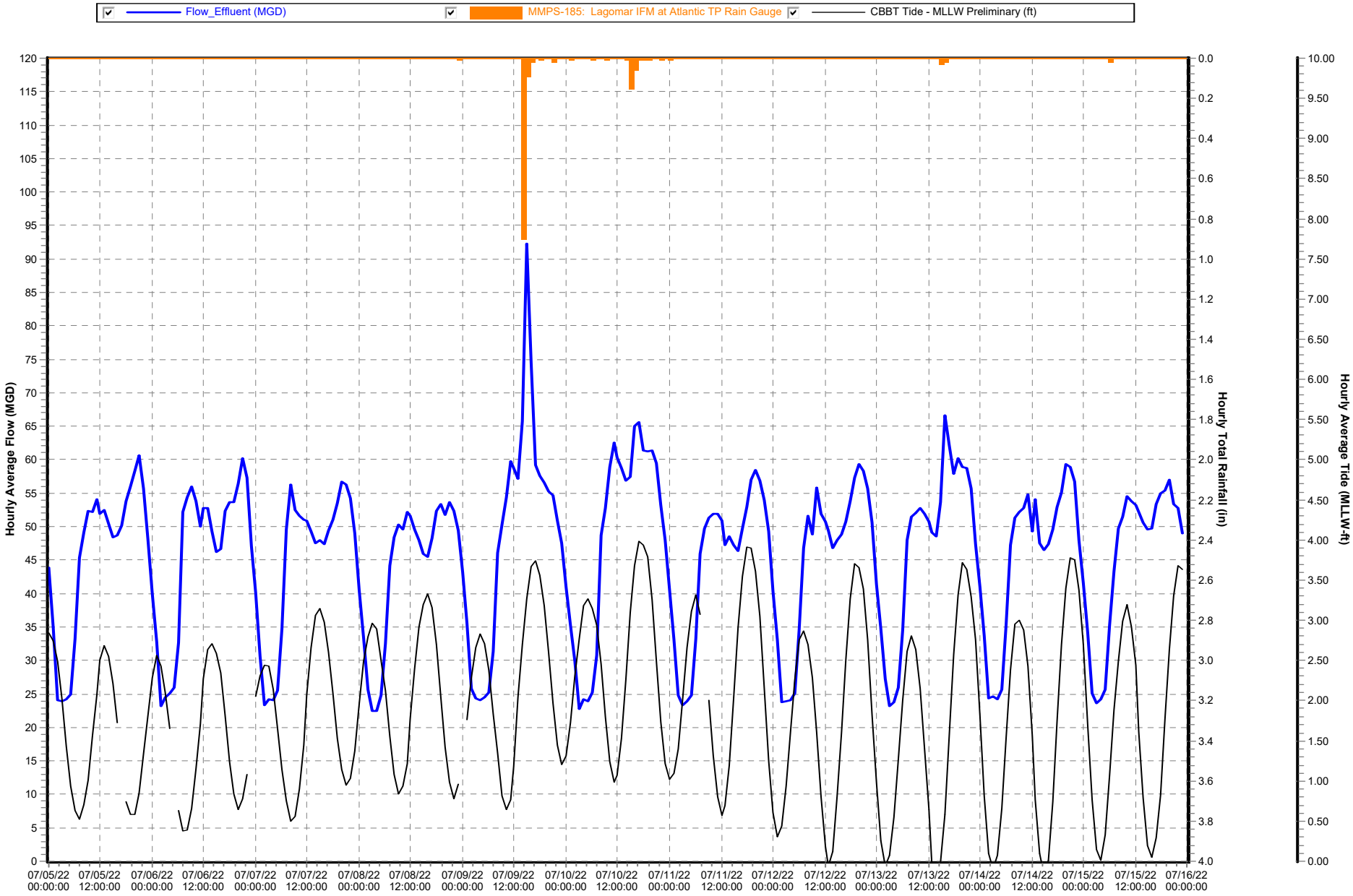
Army Base Treatment Plant

MMPS-035 (07/05/22 to 07/16/22)



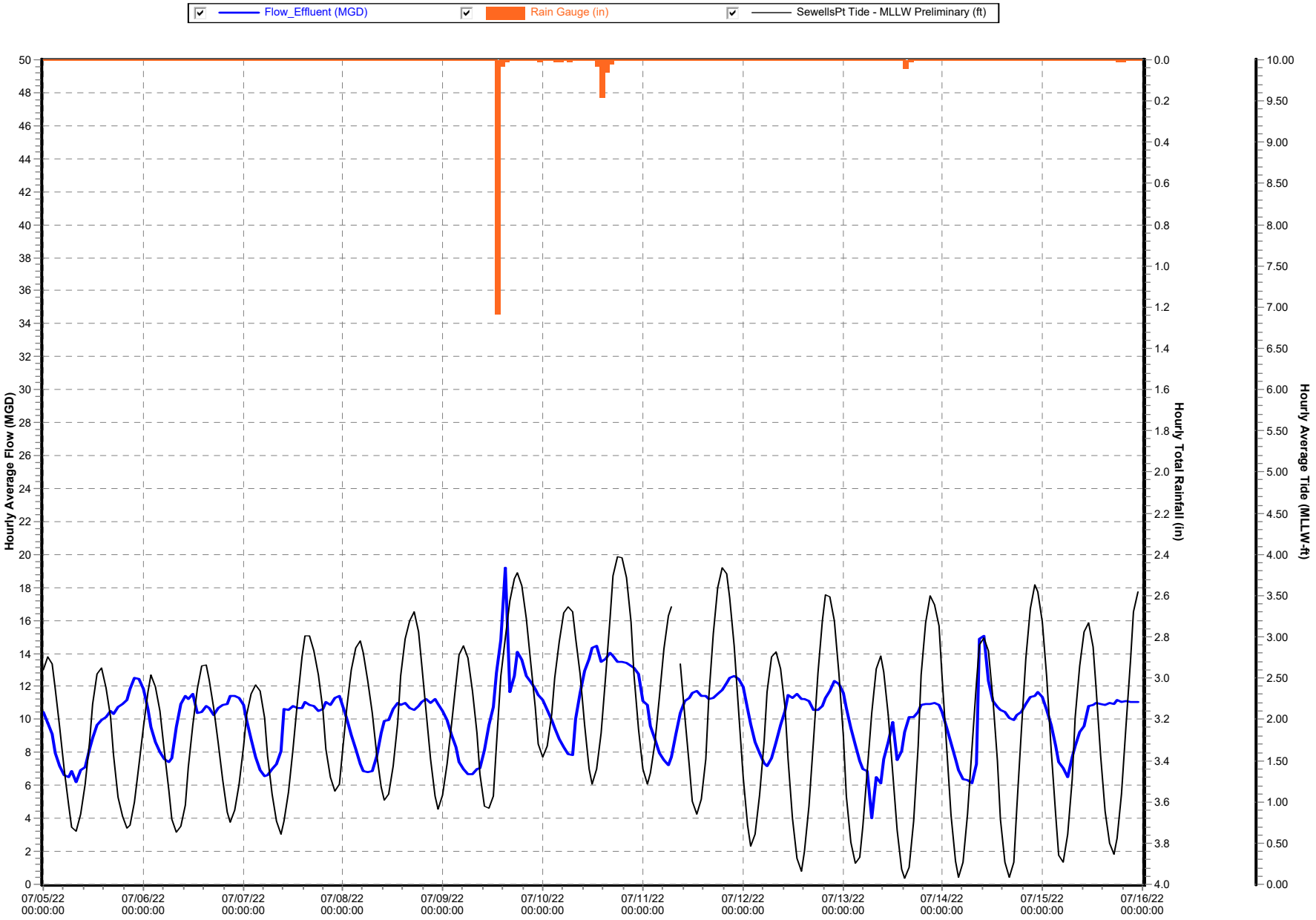
Atlantic Treatment Plant

MMPS-071 (07/05/22 to 07/16/22)



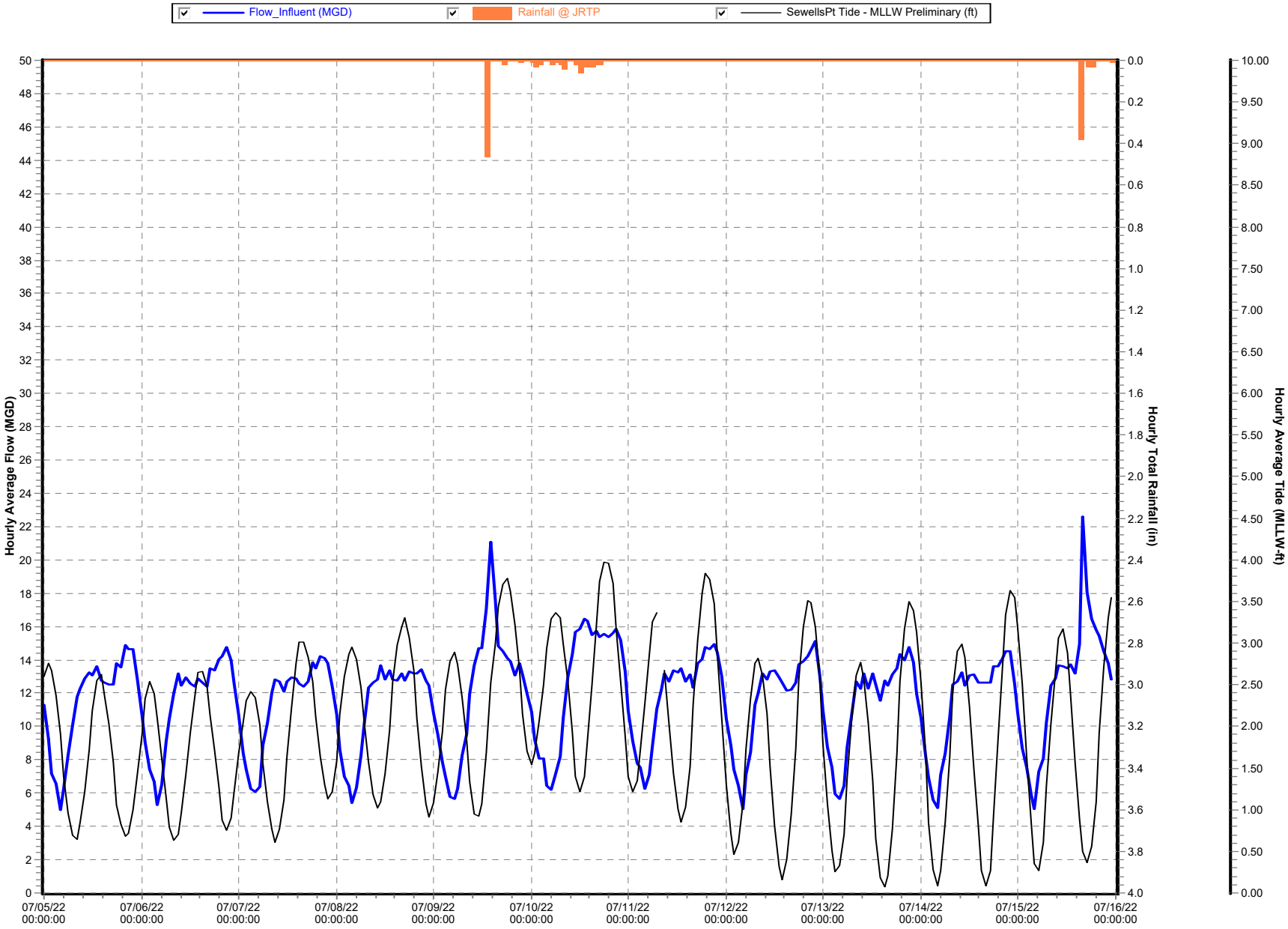
Boat Harbor Treatment Plant

MMPS-075 (07/05/22 to 07/16/22)



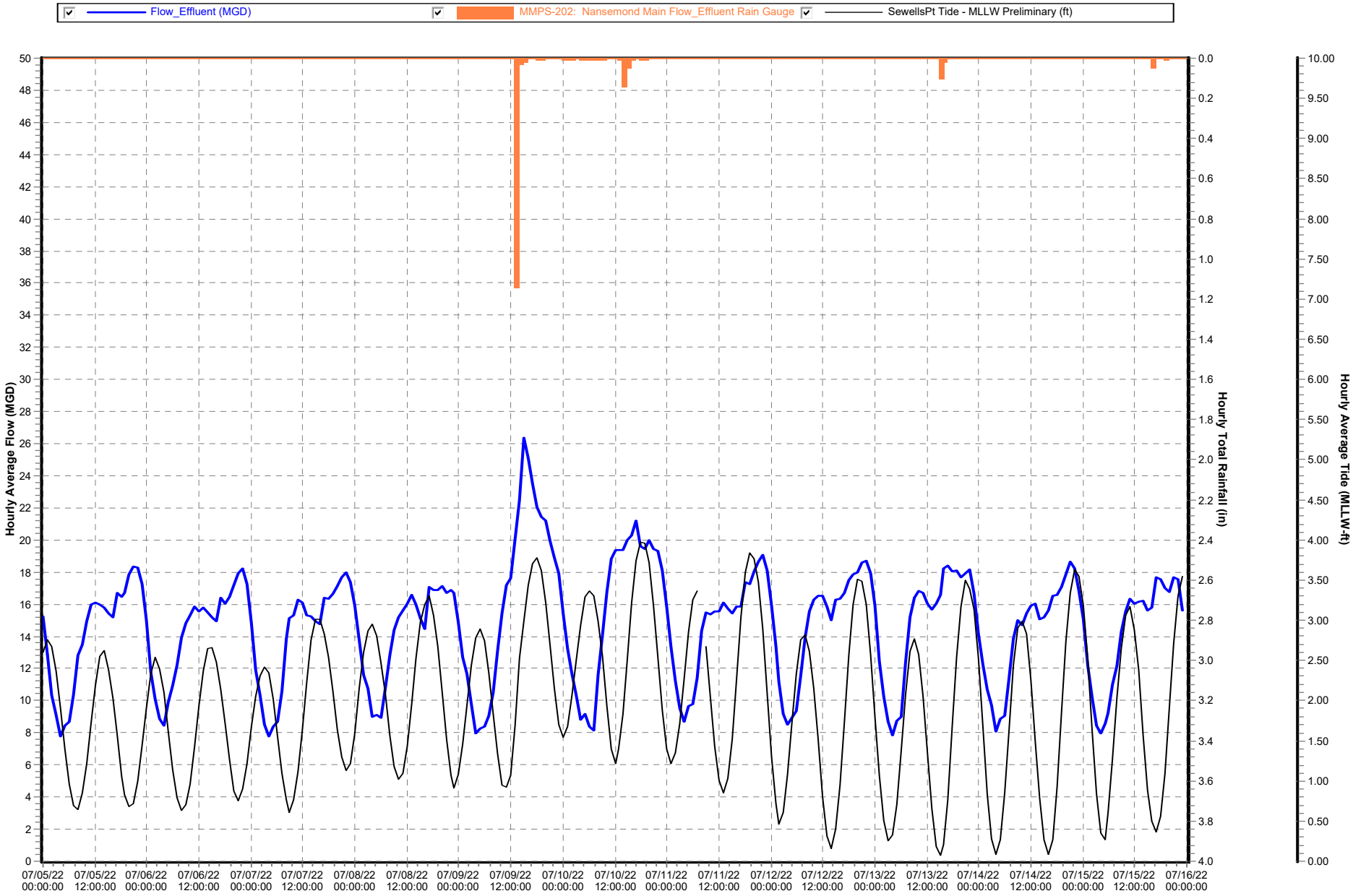
James River Treatment Plant

MMPS-184 (07/05/22 to 07/16/22)



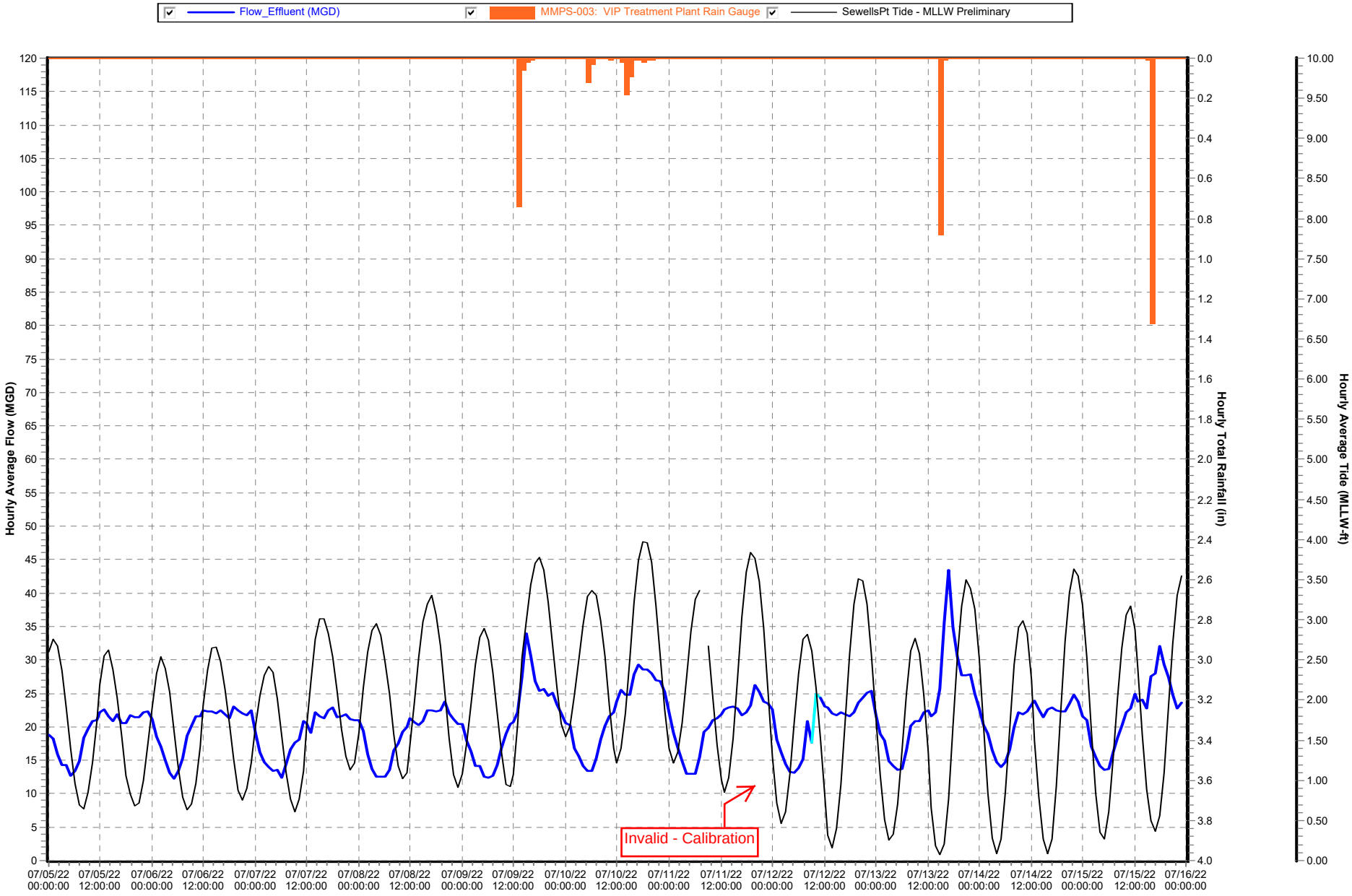
Nansemond Treatment Plant

MMPS-202 (07/05/22 to 07/16/22)



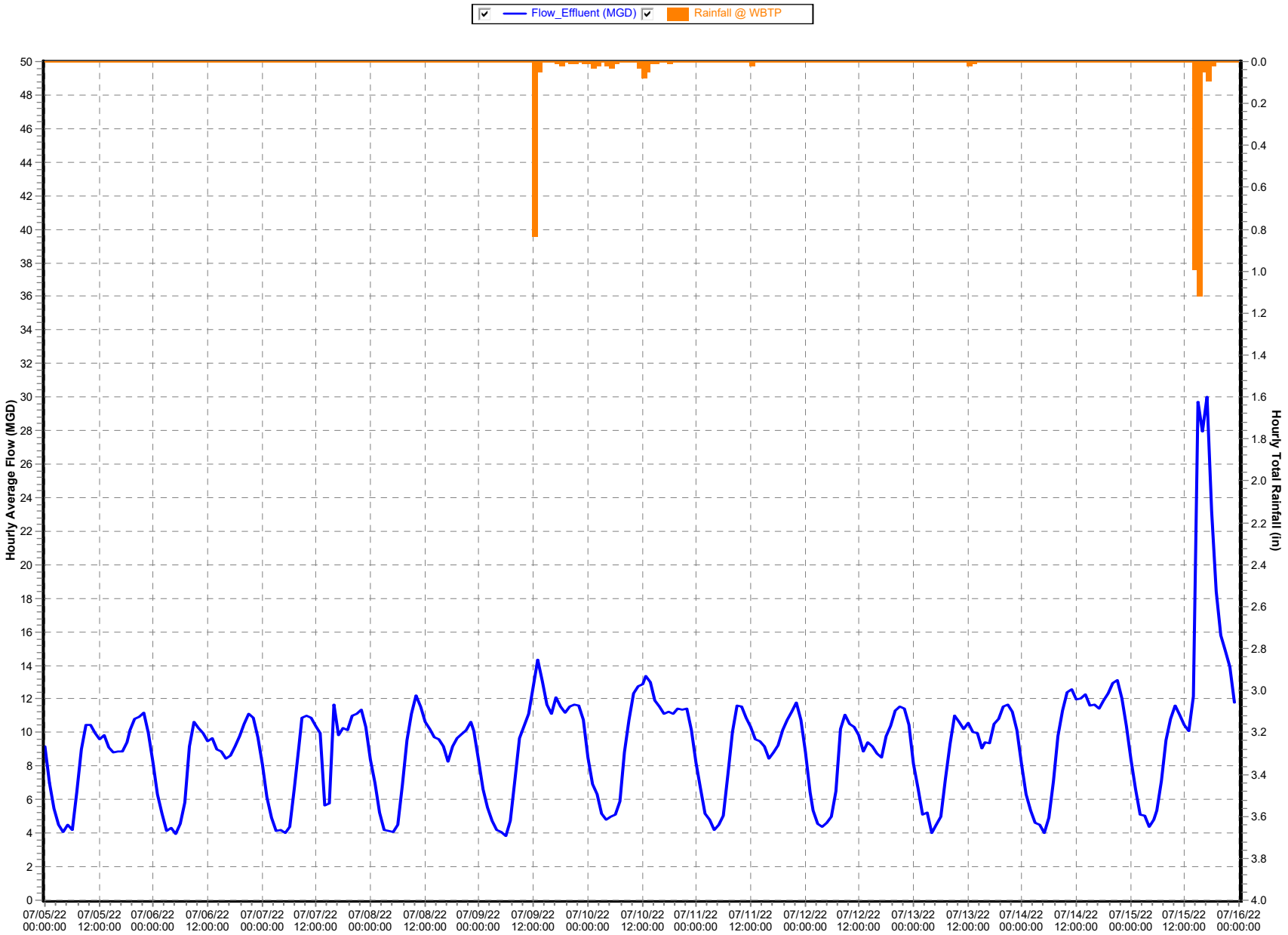
VIP Treatment Plant

MMPS-003 (07/05/22 to 07/16/22)



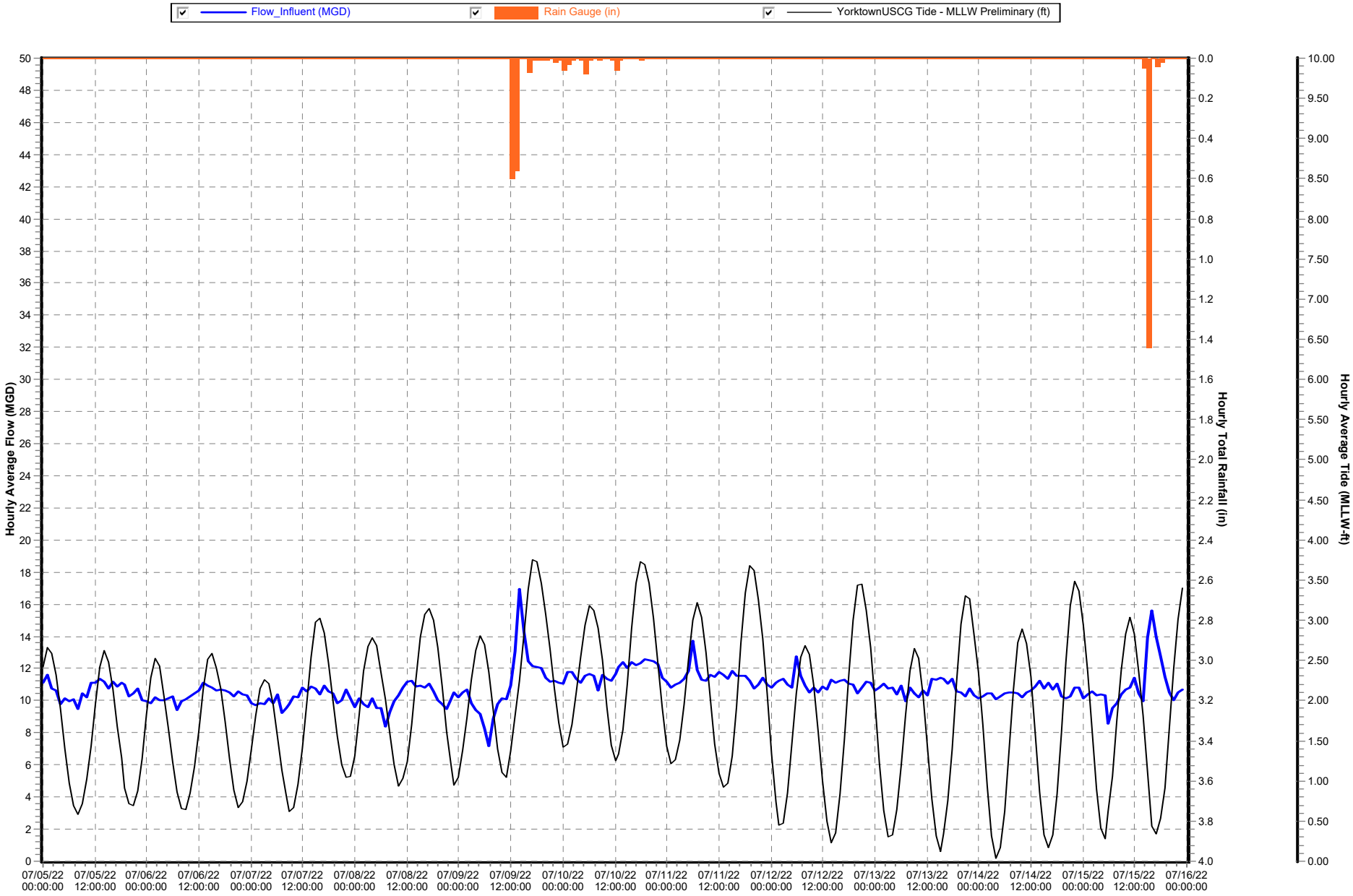
Williamsburg Treatment Plant

MMPS-222 (07/05/22 to 07/16/22)



York River Treatment Plant

MMPS-235 (07/05/22 to 07/16/22)



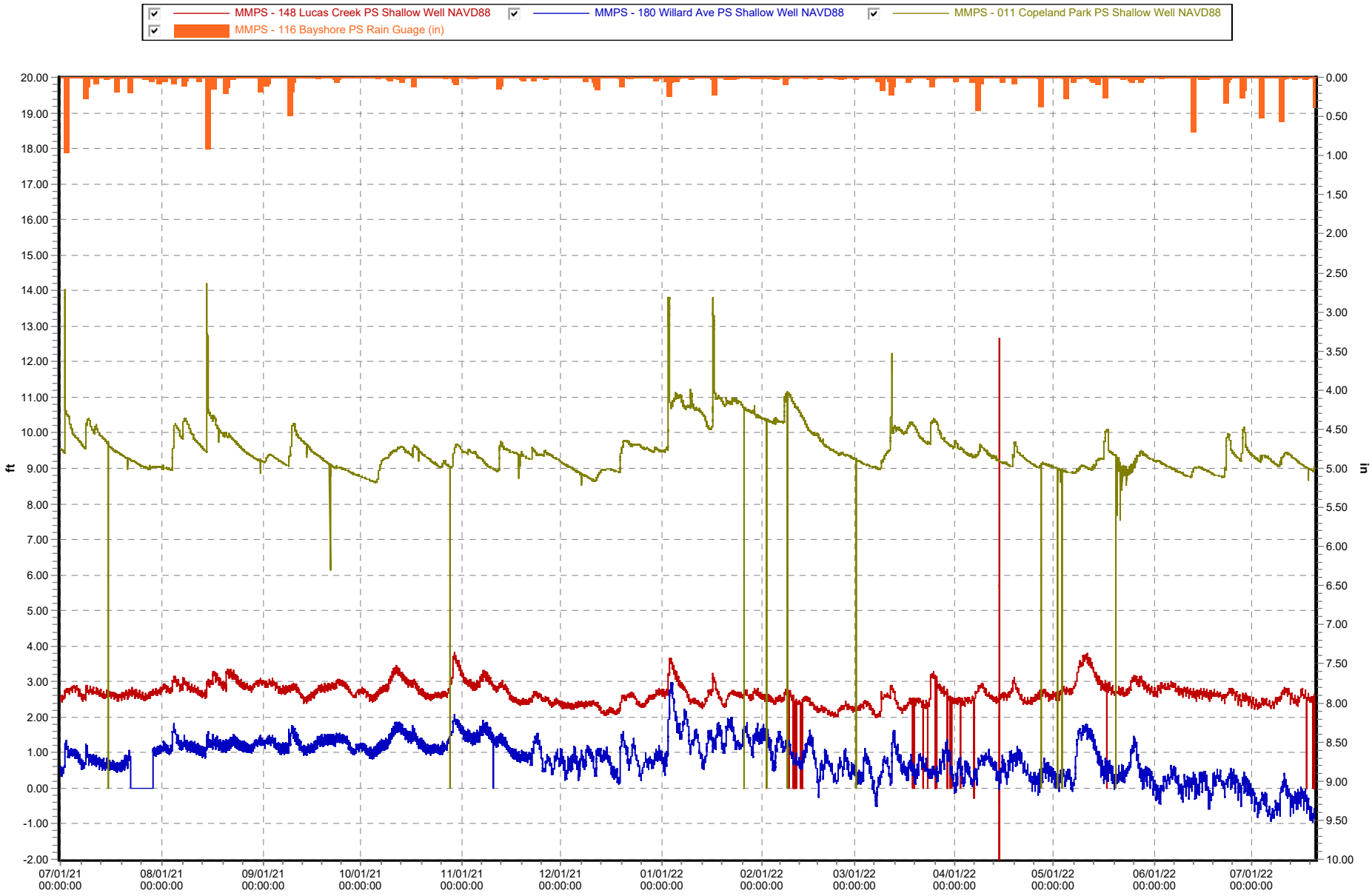
Appendix C

Shallow Well Analysis

1-year

HRSD NP - Lucas Creek PS

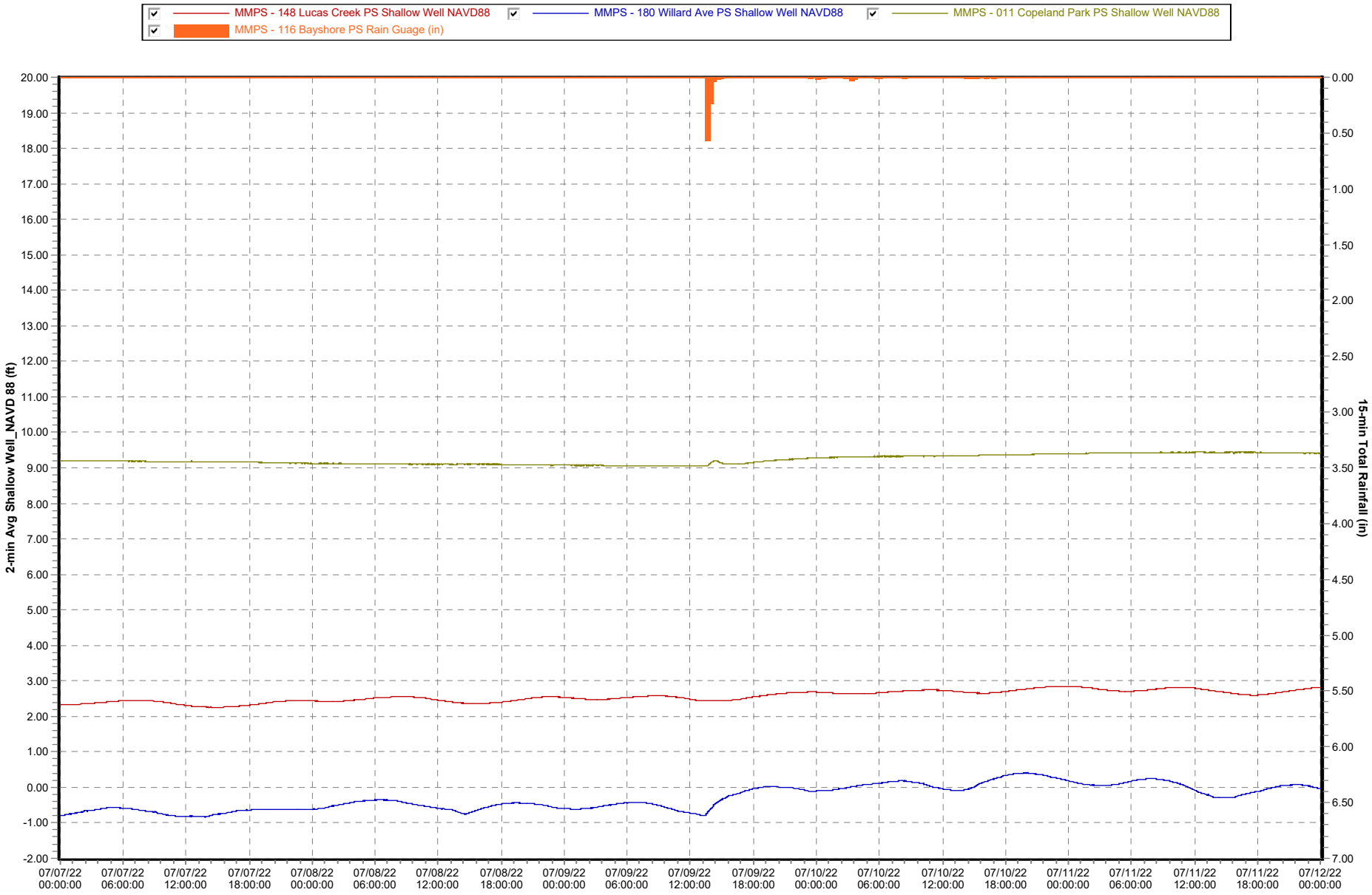
MMPS-148 (07/01/21 to 07/20/22)



5-day

North Shore Shallow Well Graphs

07/07/22 to 07/12/22

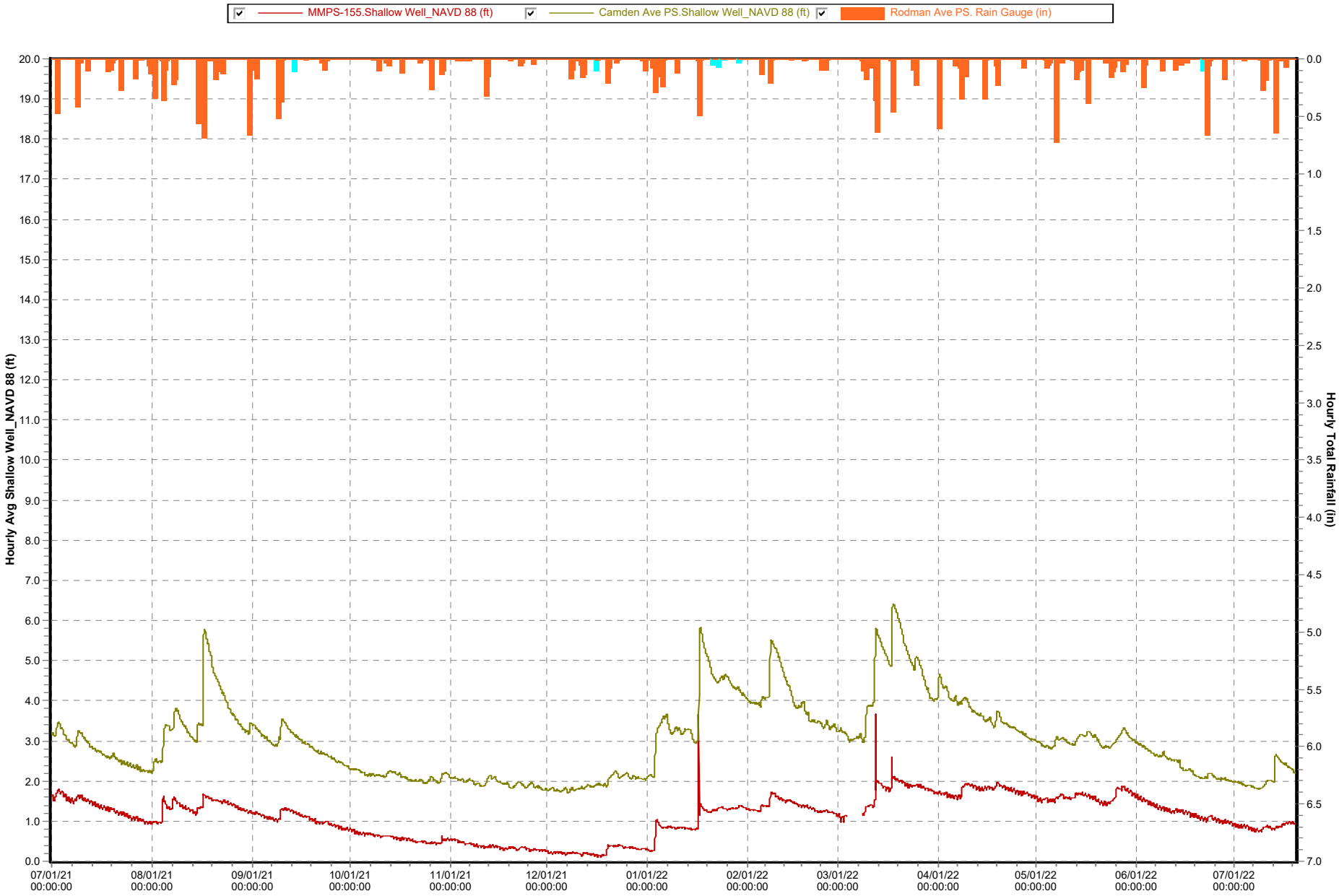


Teal showing invalid Rainfall

1-year

South Shore Shallow Well Graphs

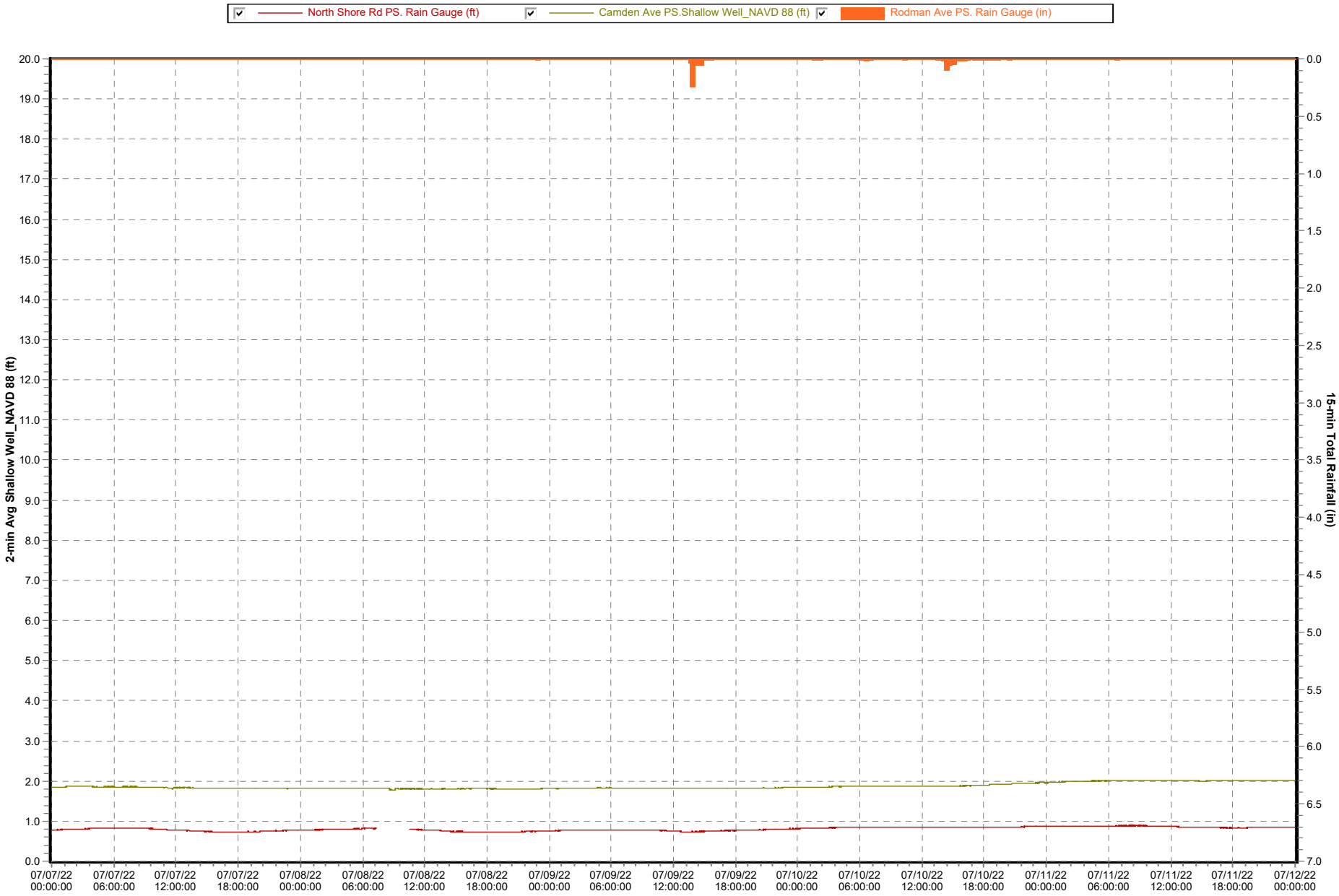
07/01/21 to 07/20/22



5-day

South Shore Shallow Well Graphs

07/07/22 to 07/12/22



Hampton Roads Sanitation District

Post-Storm Report

July 15th, 2022

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Summary

On July 15th, there was an approximate 7-hour rainfall event that resulted in 8 sites on the North Shore and 1 site on the South Shore that met a 1 to 25-year rainfall recurrence interval throughout the HRSD rain gauge network. Humid air brought scattered rain showers into Hampton Roads with some pockets of heavier storms. North Shore sites averaged around 1.02 inches of rain while South Shore sites averaged around 0.14 inches. There was minimal impact on groundwater levels compared to July 2021. See Appendix C for the Historical Shallow Well comparison. This Report will be for North Shore only.

No HRSD interceptor weather-related overflow(s) were reported.

HRSD flow and pressure meters met data reliability requirements per the MOM program. For all pressure meters in the aggregate and all pressure-side flow meters in the aggregate for each treatment plant service area listed below, at least 90% reliable data was achieved, based on the duration of system response to this rainfall event. The data reliability for the gravity flow meters is not included in this synopsis.

- Duration of system response: See Table Below
- Aggregate flow meter validity: 94.12%
- Aggregate pressure meter validity: 99.10%

Currently, rainfall recurrence intervals are only analyzed for a maximum of 96-hours. Rainfall analysis begins after 0.1 inches of rain has occurred. A 72-hour dry period of less than 0.1 inches of rain is typically used to signify two separate events. However, if a site returns to "dry weather" conditions prior to the next rainfall that occurs within 72 hours of the previous event, it is also considered for separate analysis. See Appendix A for the Rainfall Total System Maps.

The current criteria for publishing a post-storm analysis are the following:

- One or more rain gauge sites meet a two-year or greater RRI (rainfall recurrence interval) and at least 50% of sites in any treatment plant service area receive one inch of rainfall or greater,
- A rain gauge site meets a five-year or greater RRI, or
- A weather-related SSO occurs.

Treatment Plant Data: ***(Data obtained from Telog Database)***
See Appendix B for HRSD Treatment Plant Flows

HRSD Treatment Plant Data
7/15/2022

North Shore				
Treatment Plant	**Date of Peak Hourly Flow**	**Peak Hourly Flow (MGD)**	**Peak Hour**	**TPSA Total Rainfall Avg (in)**
Boat Harbor	7/15/2022	11.37	00:00	0.01
James River	7/15/2022	22.60	16:00	0.62
Williamsburg	7/15/2022	30.00	17:00	1.57
York River	7/15/2022	15.64	16:00	0.82

North Shore

Weather:

Rainfall (HRSD Rainfall Gauges): *Recurrence intervals based on NOAA Atlas 14*

Rain Gauge Site	Peak Rainfall RI (Duration)	Jurisdiction
Boat Harbor Treatment Plant Service Area[1]		
Bayshore PS	DNQ	HAMP
Bridge Street Tide Gate	DNQ	HAMP
Boat Harbor	DNQ	NEWP
Copeland Park PS	DNQ	NEWP
Hampton PS 159	DNQ	HAMP
James River Treatment Plant Service Area[1]		
Hilton School PS	DNQ	NEWP
James River Main Flow (Influent)	DNQ	NEWP
Lee Hall PRS	1-year (1hr)	NEWP
Lucas Creek PS	2- to 5-year (1hr)	NEWP
Morrison PS	DNQ	NEWP
Williamsburg Treatment Plant Service Area[1]		
Ford's Colony	DNQ	JCSA
Fort Eustis PS	DNQ	NEWP
Greensprings PS	10- to 25-year (2hr)	JCA
Solarex	DNQ	JCSA
Williamsburg Main Flow (Effluent)	2- to 5-year (1hr)	JCSA
Williamsburg PS	2- to 5-year (1hr)	WILL
York Skimino Hills PS	10-year (1hr)	YORK
York River Treatment Plant Service Area[1]		
Big Bethel PRS	DNQ	HAMP
Freeman PS	DNQ	HAMP
Gloucester Court House	DNQ	GLOU
Guinea Rd at Maryus Rd	DNQ	GLOU
Ordinary PCV	DNQ	GLOU
Poquoson PS 6	DNQ	POQ
Wolf Trappe PCV	DNQ	YORK
York Kiln Creek 1 PS	DNQ	YORK
York PS 15	DNQ	YORK
York River Main Flow (Influent)	1- to 2-year (1hr)	YORK
York River Crossing (York River Rectifier)	10-year (1hr)	GLOU

Note:

1. Typical treatment plant service area.

Newport News-Williamsburg International (PHF)

- Wind and Rainfall (daily total):

Date	Gust (max)	Sustained (max)	Sustained (avg)	Direction	Rainfall (in)
7/15/22	18 mph	8 mph	3 mph	CALM	0.70

Tide:

- Yorktown USCG Training Center:
  - Storm Surge: An approximate 0.5-foot storm surge was observed.

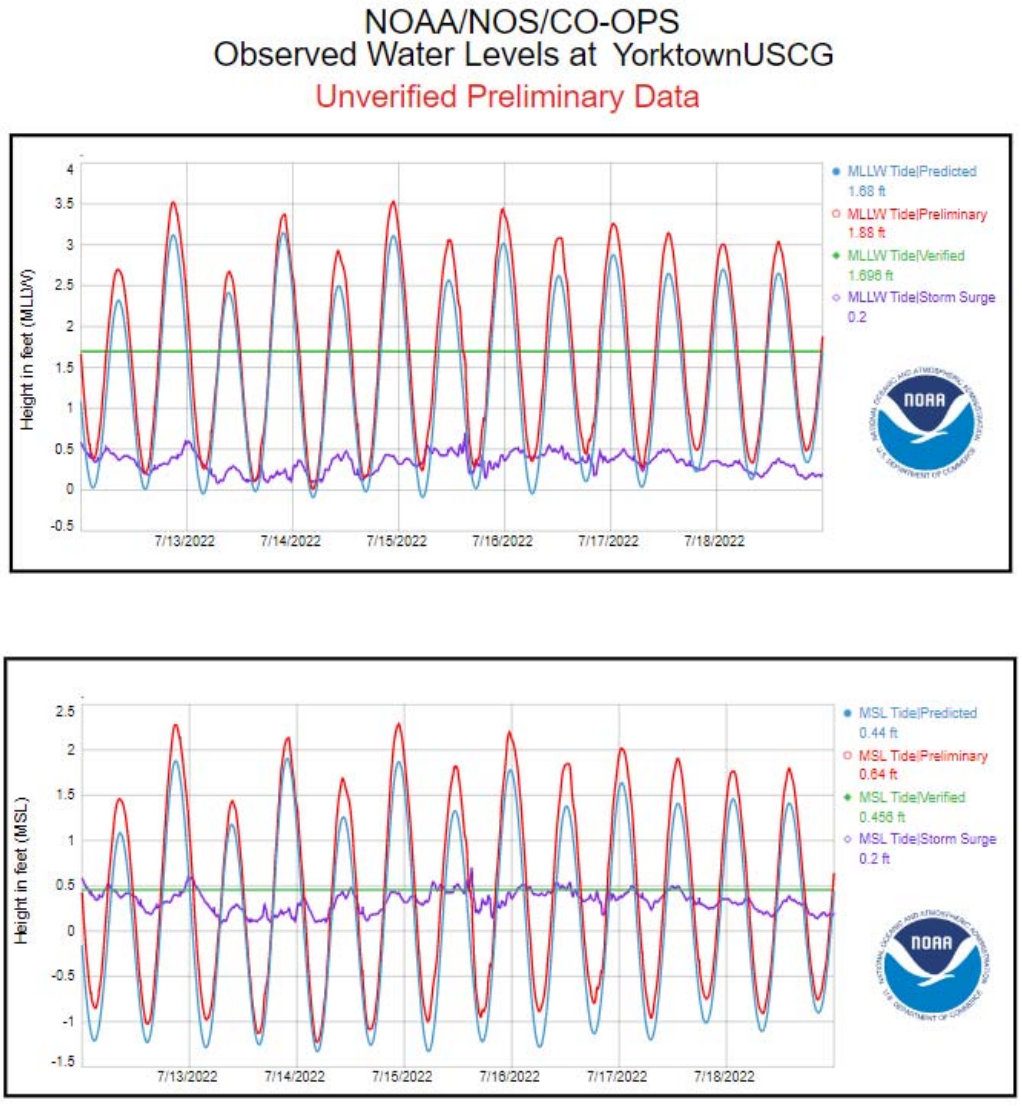


Figure 1. Preliminary data obtained from NOAA and a connection with Open Weather

- Sewells Point Tide Station:
  - Storm Surge: An approximate 0.5 foot storm surge was observed.

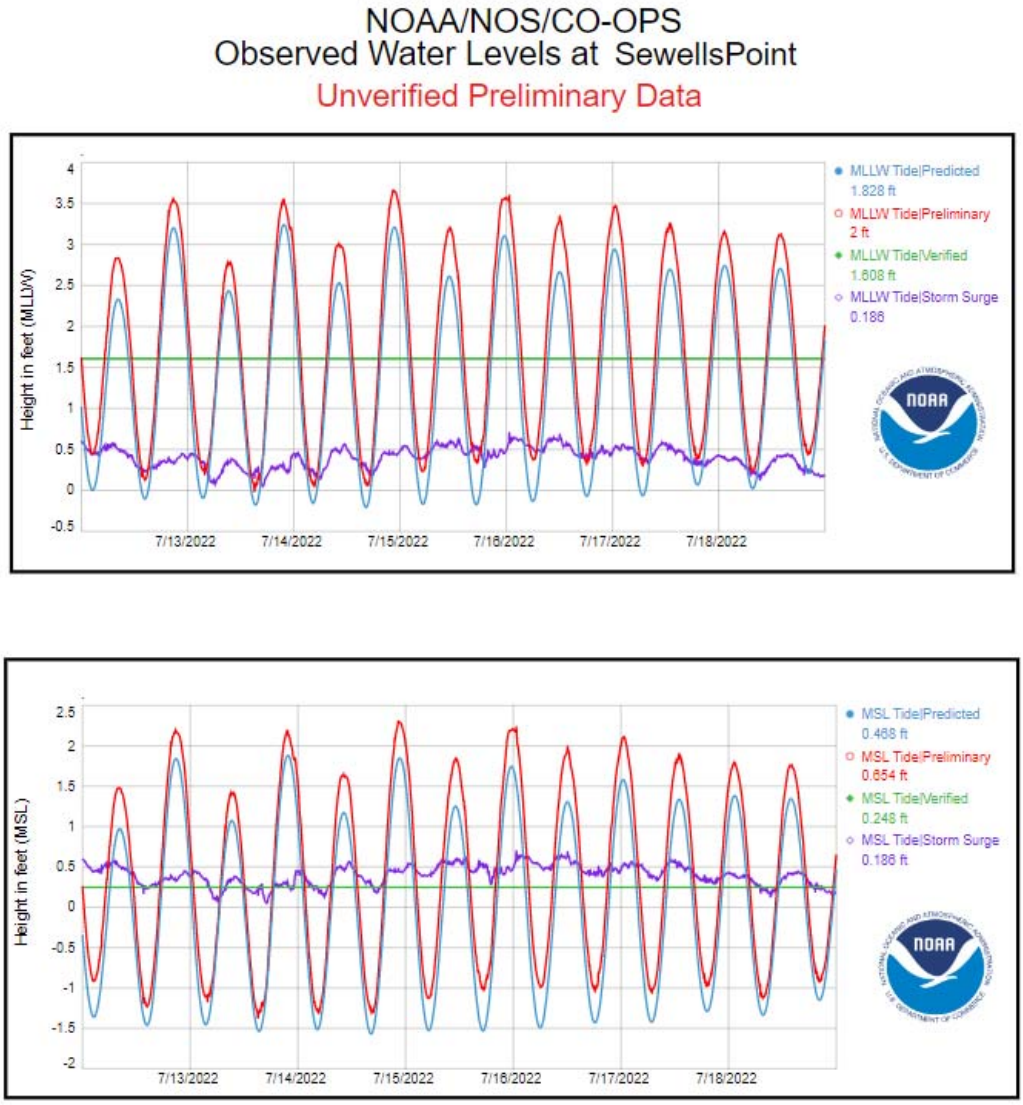


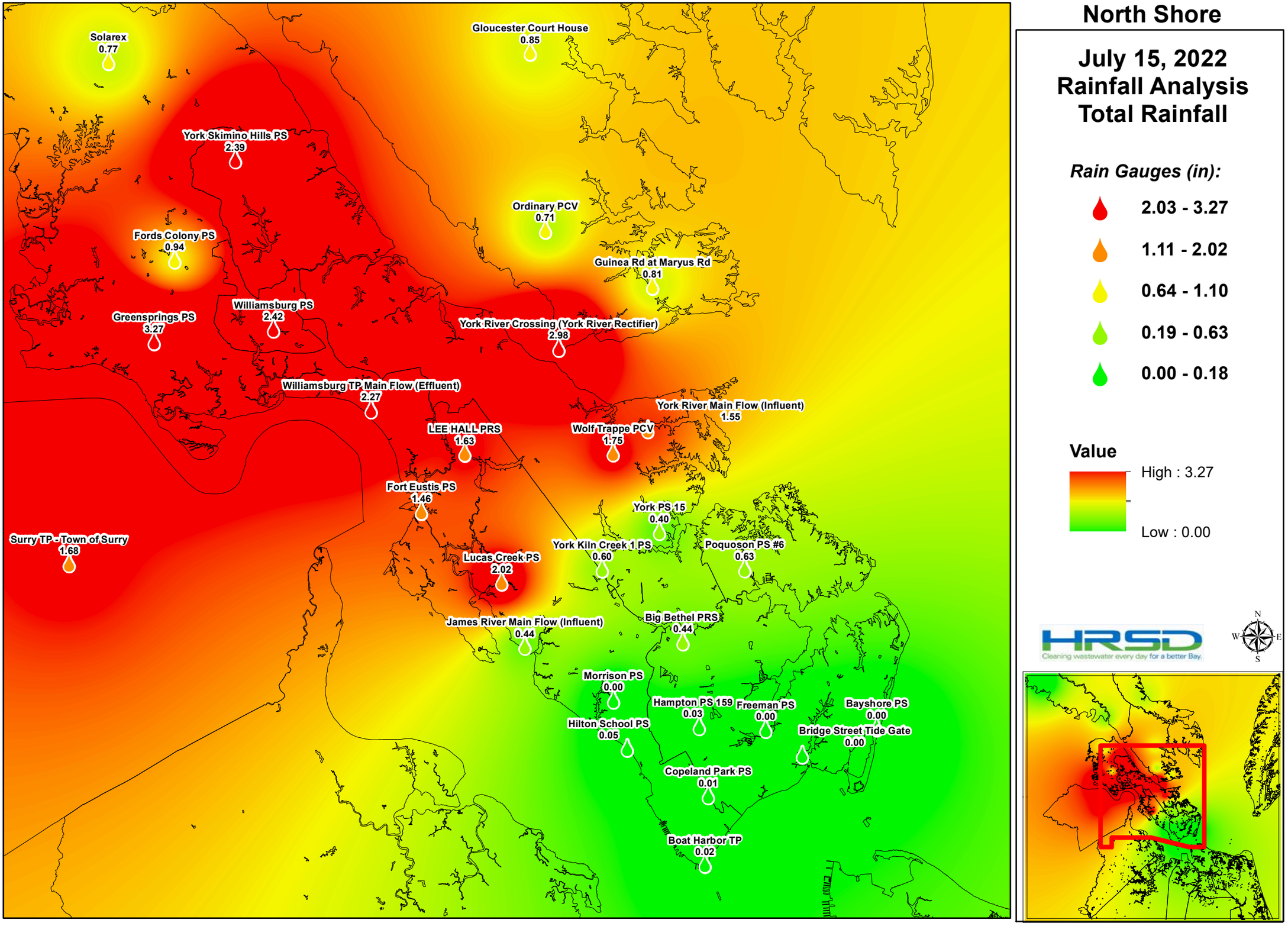
Figure 2. Preliminary data obtained from NOAA and a connection with Open Weather

Shallow Well Analysis:

Shallow wells are located at/or near HRSD Pump Stations to measure groundwater levels. The water column is measured using a pressure transducer located near the bottom of the well. The installed sensor measures gauge pressure in inches of water. The Shallow Well_NAVD88 measurement referenced in Appendix D refers to the elevation (referenced as NAVD 88) of the sensor plus the gauge measurement in feet.

Appendix A

HRSD Rain Gauge Network
Rainfall Totals



North Shore

July 15, 2022
Rainfall Analysis
Total Rainfall

Rain Gauges (in):

- **2.03 - 3.27**
- **1.11 - 2.02**
- **0.64 - 1.10**
- **0.19 - 0.63**
- **0.00 - 0.18**

Value

High : 3.27

Low : 0.00

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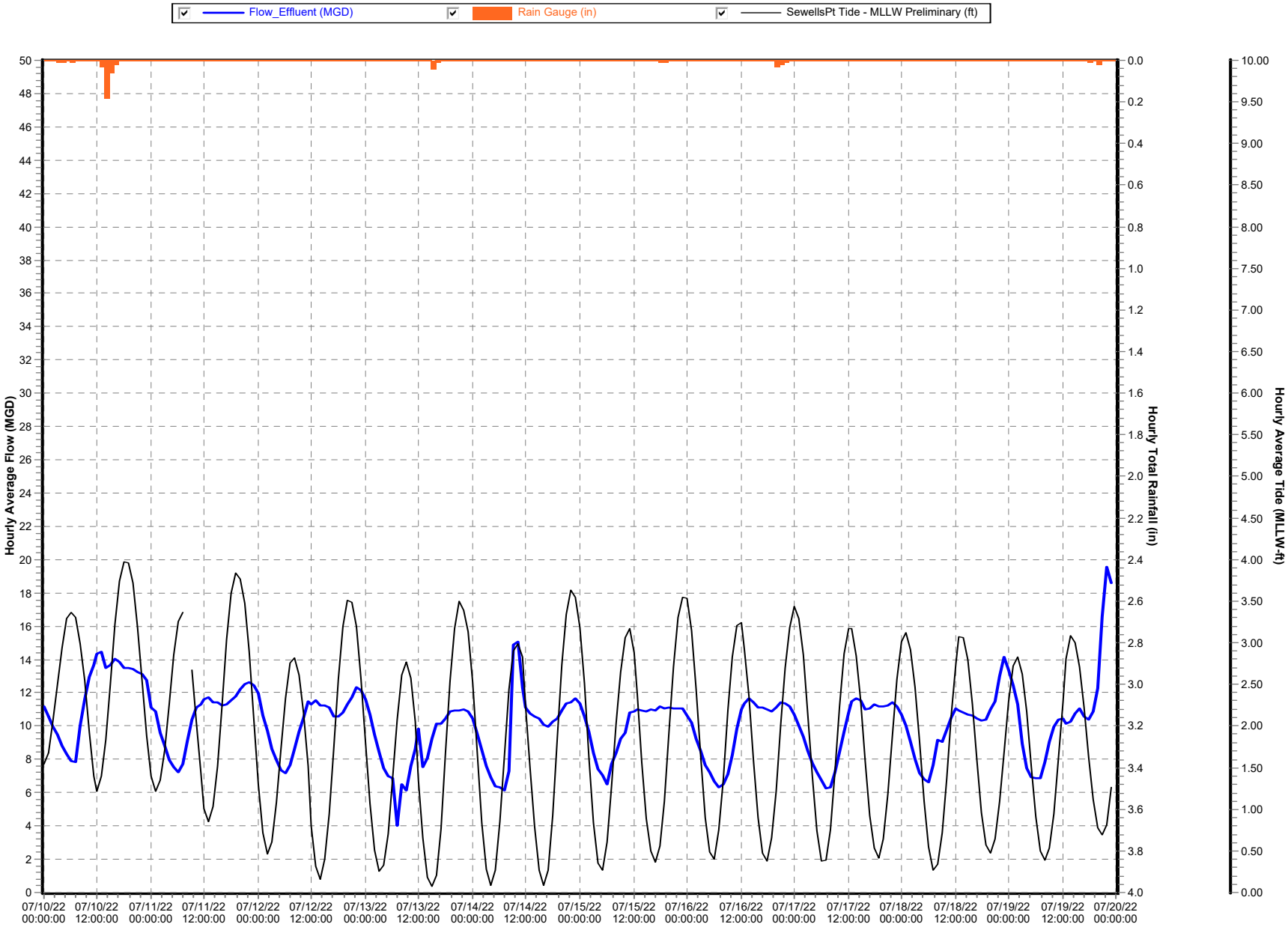
Appendix B

HRSD Treatment Plant Flows

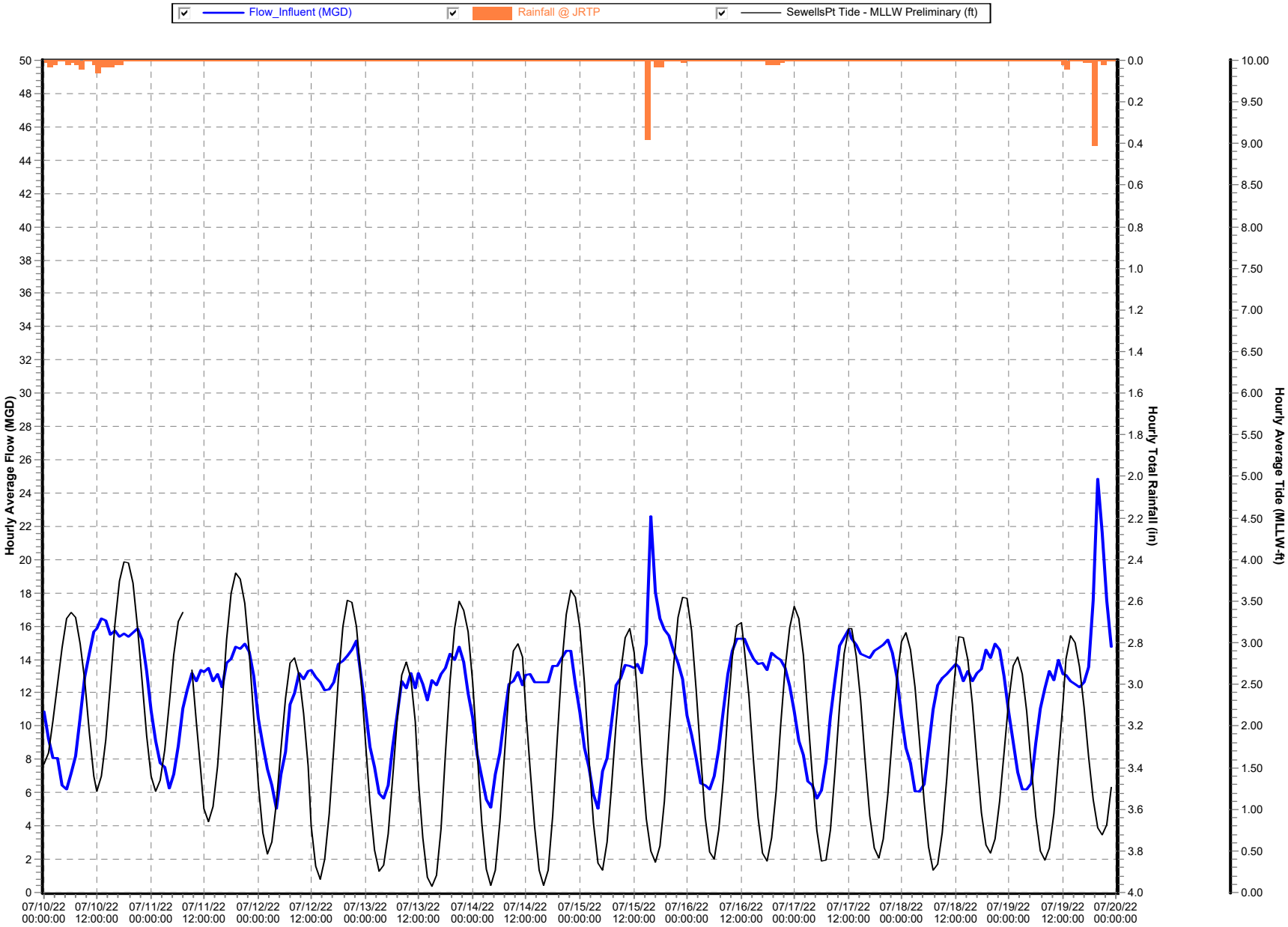
Boat Harbor Treatment Plant

MMPS-075 (07/10/22 to 07/20/22)



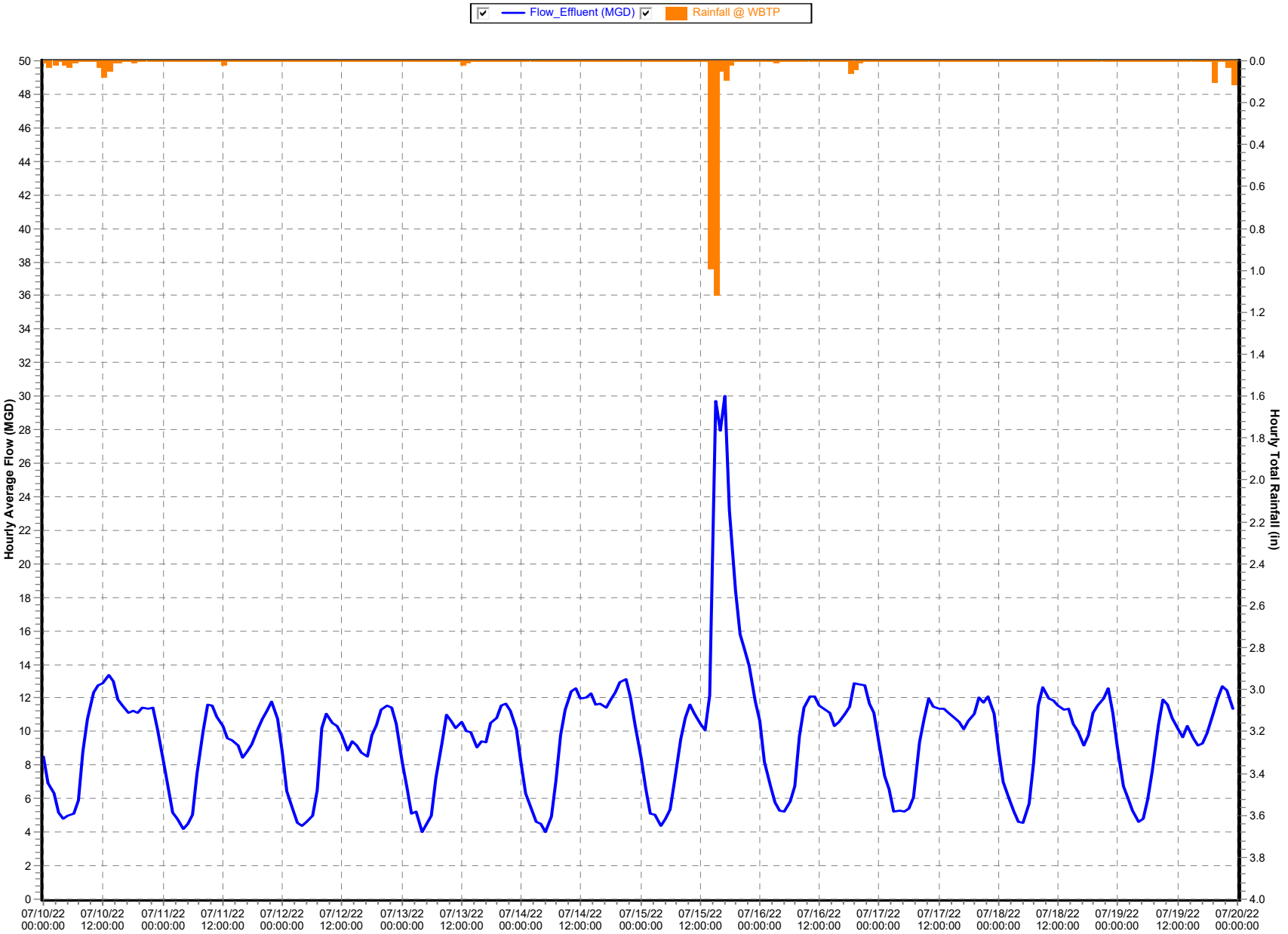
James River Treatment Plant

MMPS-184 (07/10/22 to 07/20/22)



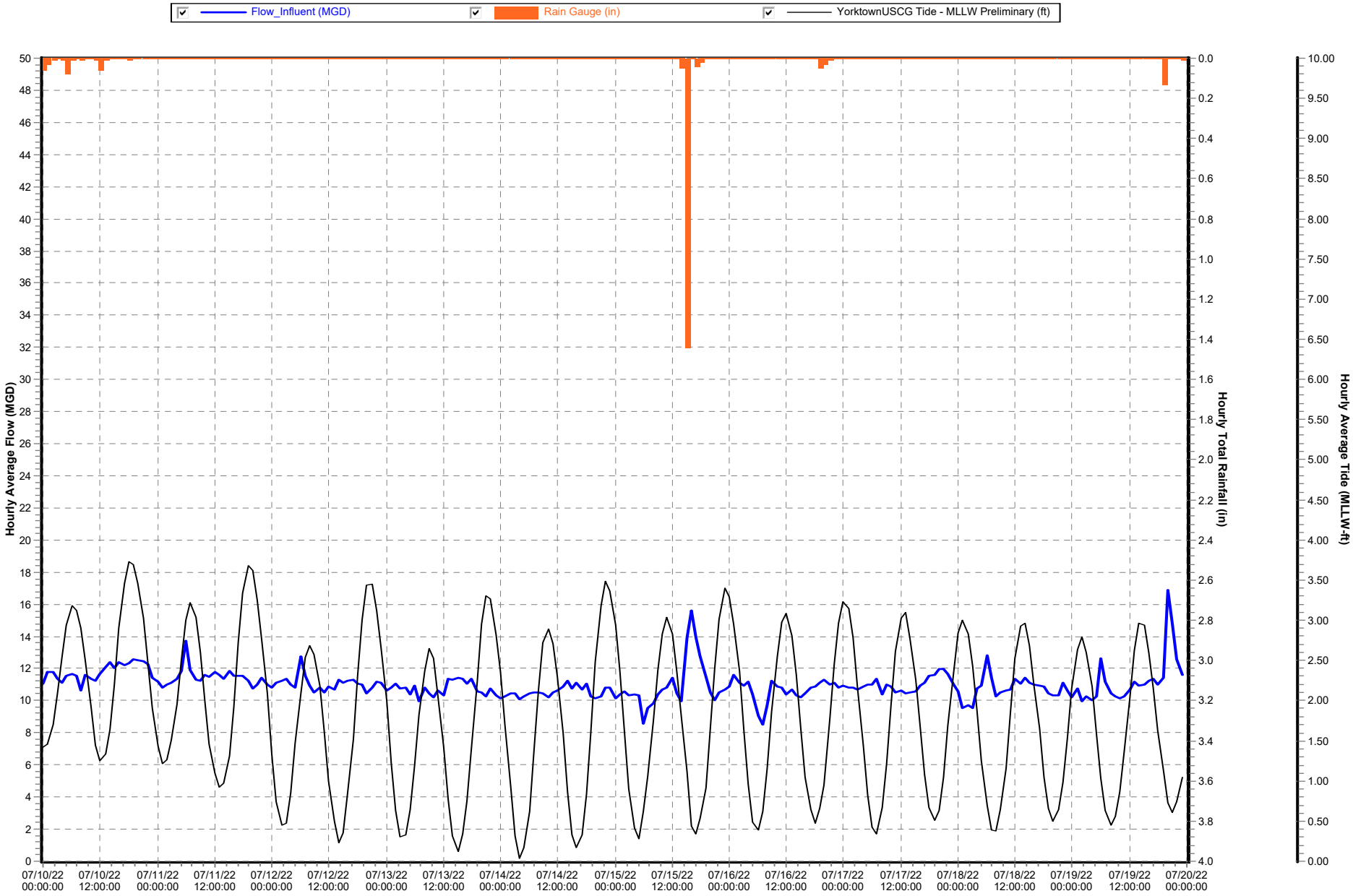
Williamsburg Treatment Plant

MMPS-222 (07/10/22 to 07/20/22)



York River Treatment Plant

MMPS-235 (07/10/22 to 07/20/22)



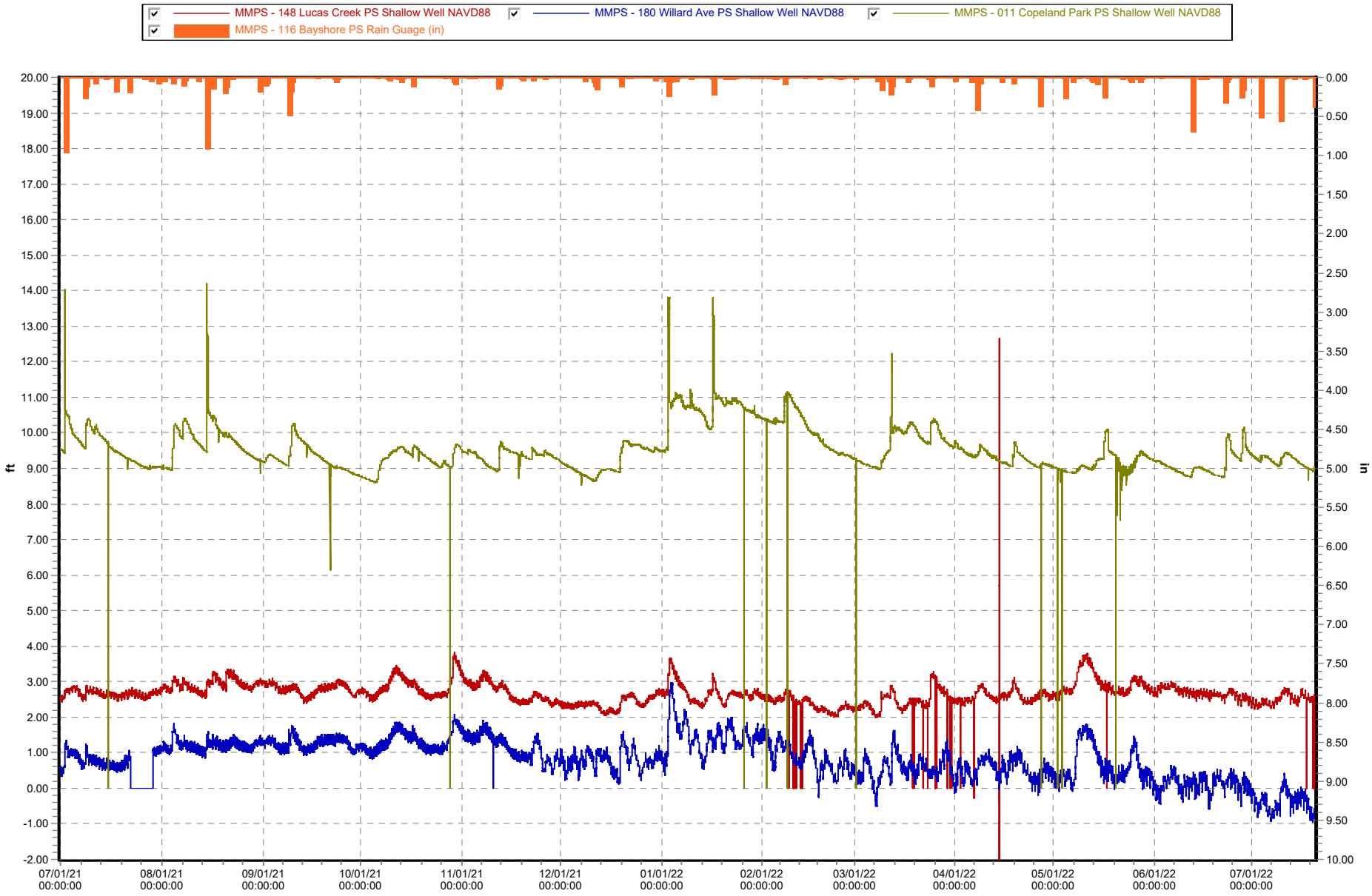
Appendix C

Shallow Well Analysis

1-year

HRSD NP - Lucas Creek PS

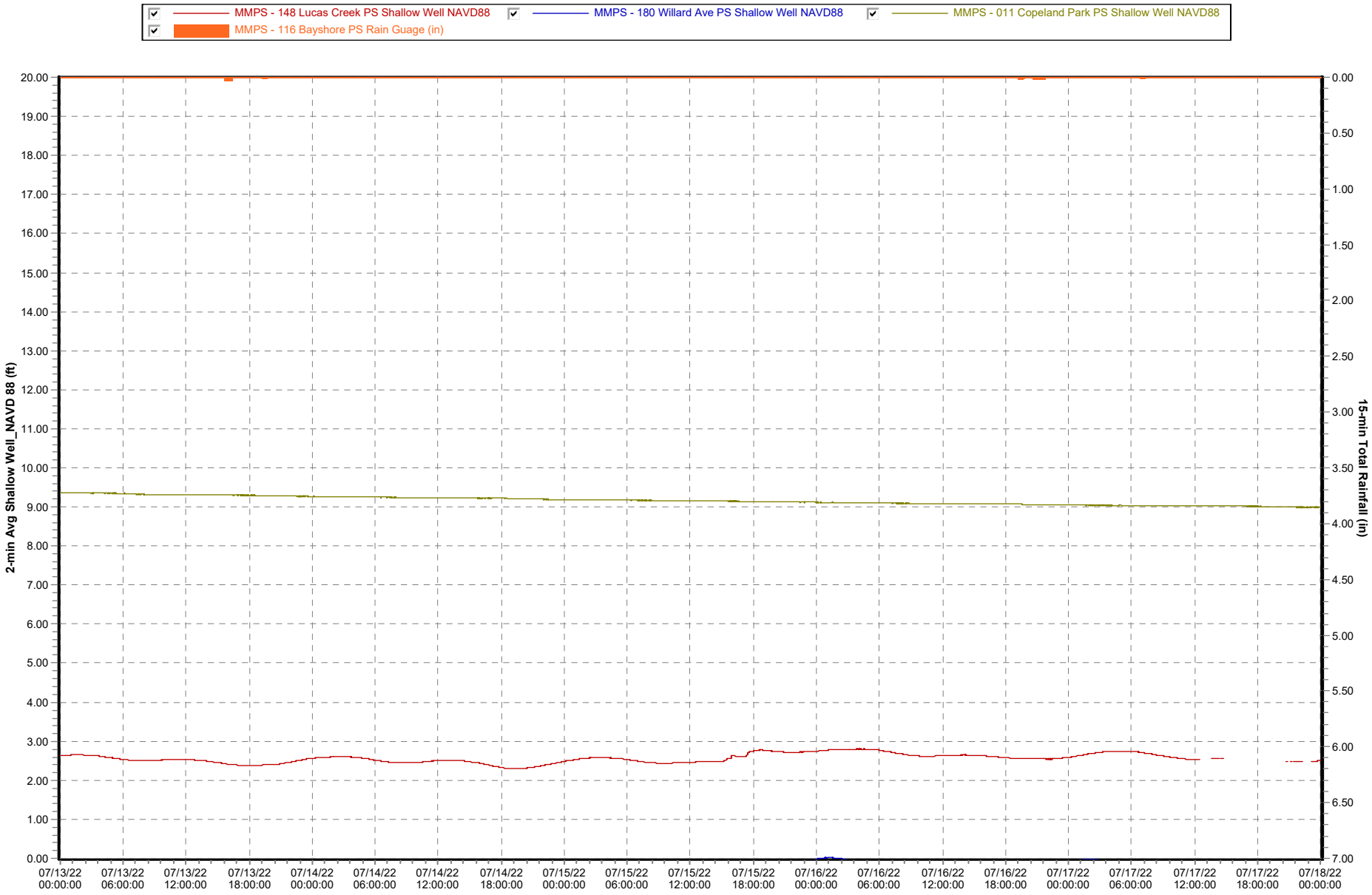
MMPS-148 (07/01/21 to 07/20/22)



5-day

North Shore Shallow Well Graphs

07/13/22 to 07/18/22



Hampton Roads Sanitation District

Post-Storm Report

July 26, 2022

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Summary

On July 26th, there was an approximate 9-hour rainfall event that resulted in 4 sites on the North Shore and 1 site on the South Shore that met a 1 to 25-year rainfall recurrence interval throughout the HRSD rain gauge network. A cold front stalled out over the region bringing showers in the morning hours. The afternoon brought increased showers and thunderstorms with pockets of very heavy storms. North Shore sites averaged around 0.88 inches of rain while South Shore sites averaged around 0.52 inches. There was minimal impact on groundwater levels compared to July 2021. See Appendix C for the Historical Shallow Well comparison.

No HRSD interceptor weather-related overflow(s) were reported.

HRSD flow and pressure meters met data reliability requirements per the MOM program. For all pressure meters in the aggregate and all pressure-side flow meters in the aggregate for each treatment plant service area listed below, at least 90% reliable data was achieved, based on the duration of system response to this rainfall event. The data reliability for the gravity flow meters is not included in this synopsis.

- Duration of system response: See Table Below
- Aggregate flow meter validity: 91.49%
- Aggregate pressure meter validity: 98.17%

Currently, rainfall recurrence intervals are only analyzed for a maximum of 96-hours. Rainfall analysis begins after 0.1 inches of rain has occurred. A 72-hour dry period of less than 0.1 inches of rain is typically used to signify two separate events. However, if a site returns to "dry weather" conditions prior to the next rainfall that occurs within 72 hours of the previous event, it is also considered for separate analysis. See Appendix A for the Rainfall Total System Maps.

The current criteria for publishing a post-storm analysis are the following:

- One or more rain gauge sites meet a two-year or greater RRI (rainfall recurrence interval) and at least 50% of sites in any treatment plant service area receive one inch of rainfall or greater,
- A rain gauge site meets a five-year or greater RRI, or
- A weather-related SSO occurs.

Treatment Plant Data: ***(Data obtained from Telog Database)***
See Appendix B for HRSD Treatment Plant Flows

HRSD Treatment Plant Data
7/26/2022

North Shore

Treatment Plant	Date of Peak Hourly Flow	Peak Hourly Flow (MGD)	Peak Hour	TPSA Total Rainfall Avg (in)
Boat Harbor	7/26/2022	17.45	17:00	0.67
James River	7/26/2022	24.04	19:00	0.83
Williamsburg	7/26/2022	16.95	21:00	0.74
York River	7/26/2022	20.27	18:00	0.97

HRSD Treatment Plant Data
7/26/2022

South Shore

Treatment Plant	Date of Peak Hourly Flow	Peak Hourly Flow (MGD)	Peak Hour	TPSA Total Rainfall Avg (in)
Army Base	7/26/2022	15.91	17:00	0.63
Atlantic	7/26/2022	68.86	14:00	0.75
Nansemond	7/26/2022	19.93	20:00	0.34
VIP	7/26/2022	27.51	15:00	0.66

North Shore

Weather:

Rainfall (HRSD Rainfall Gauges): *Recurrence intervals based on NOAA Atlas 14*

Rain Gauge Site	Peak Rainfall RI (Duration)	Jurisdiction
Boat Harbor Treatment Plant Service Area[1]		
Bayshore PS	DNQ	HAMP
Bridge Street Tide Gate	DNQ	HAMP
Boat Harbor	DNQ	NEWP
Copeland Park PS	DNQ	NEWP
Hampton PS 159	DNQ	HAMP
James River Treatment Plant Service Area[1]		
Hilton School PS	DNQ	NEWP
James River Main Flow (Influent)	DNQ	NEWP
Lee Hall PRS	5-year (1hr)	NEWP
Lucas Creek PS	DNQ	NEWP
Morrison PS	Invalid	NEWP
Williamsburg Treatment Plant Service Area[1]		
Ford's Colony	DNQ	JCSA
Fort Eustis PS	1-year (2hr)	NEWP
Greensprings PS	DNQ	JCA
Solarex	DNQ	JCSA
Williamsburg Main Flow (Effluent)	DNQ	JCSA
Williamsburg PS	DNQ	WILL
York Skimino Hills PS	DNQ	YORK
York River Treatment Plant Service Area[1]		
Big Bethel PRS	DNQ	HAMP
Freeman PS	DNQ	HAMP
Gloucester Court House	DNQ	GLOU
Guinea Rd at Maryus Rd	DNQ	GLOU
Ordinary PCV	DNQ	GLOU
Poquoson PS 6	1-year (2hr)	POQ
Wolf Trappe PCV	DNQ	YORK
York Kiln Creek 1 PS	DNQ	YORK
York PS 15	10- to 25-year (1hr)	YORK
York River Main Flow (Influent)	DNQ	YORK
York River Crossing (York River Rectifier)	DNQ	GLOU

Note:

1. Typical treatment plant service area.

Newport News-Williamsburg International (PHF)

- Wind and Rainfall (daily total):

Date	Gust (max)	Sustained (max)	Sustained (avg)	Direction	Rainfall (in)
7/26/22	28 mph	13 mph	6 mph	SW	1.04

Tide:

- Yorktown USCG Training Center:
  - Storm Surge: An approximate 0.0-foot storm surge was observed.

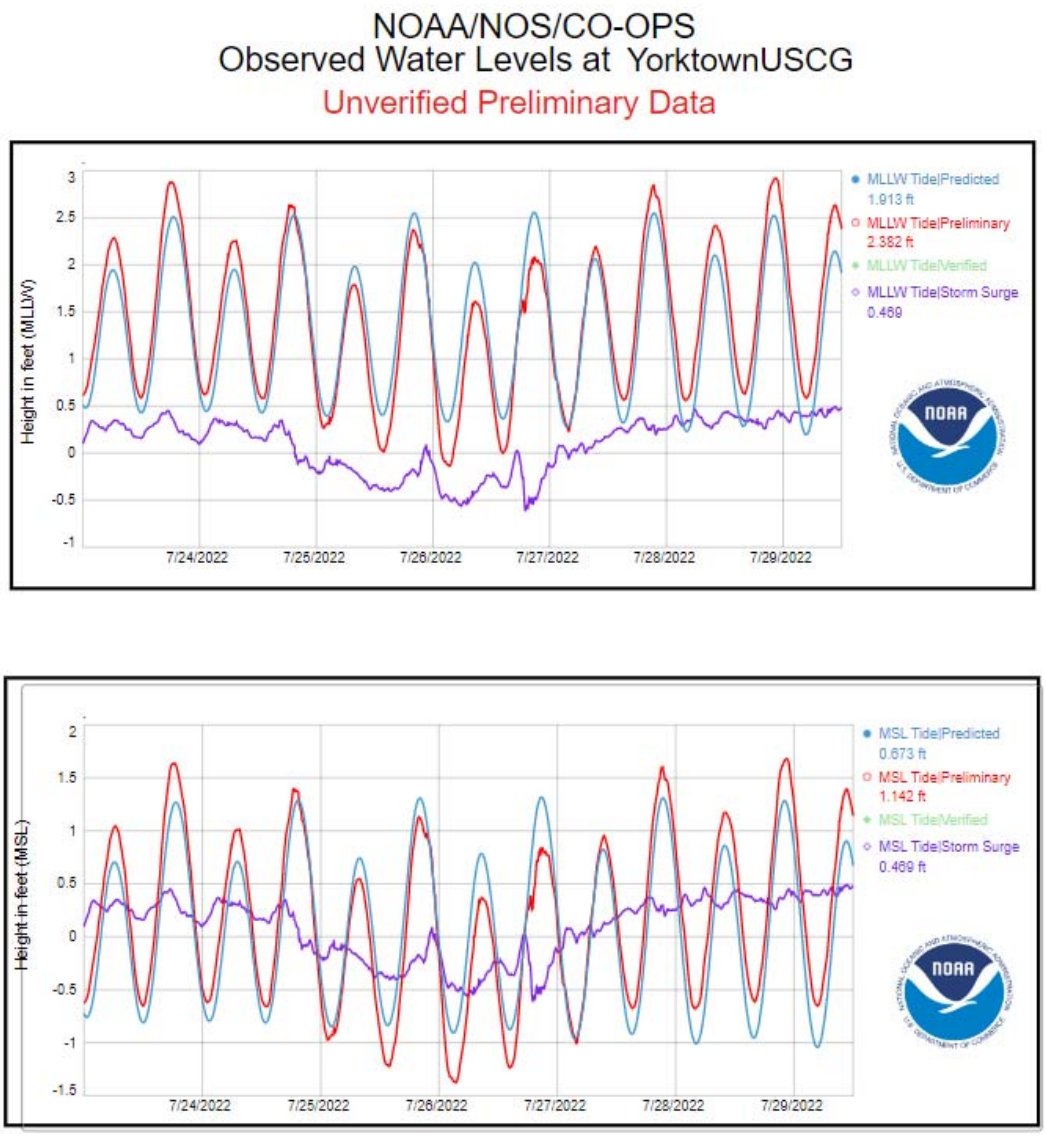


Figure 1. Preliminary data obtained from NOAA and a connection with Open Weather

- Sewells Point Tide Station:
  - Storm Surge: An approximate 0.0 foot storm surge was observed.

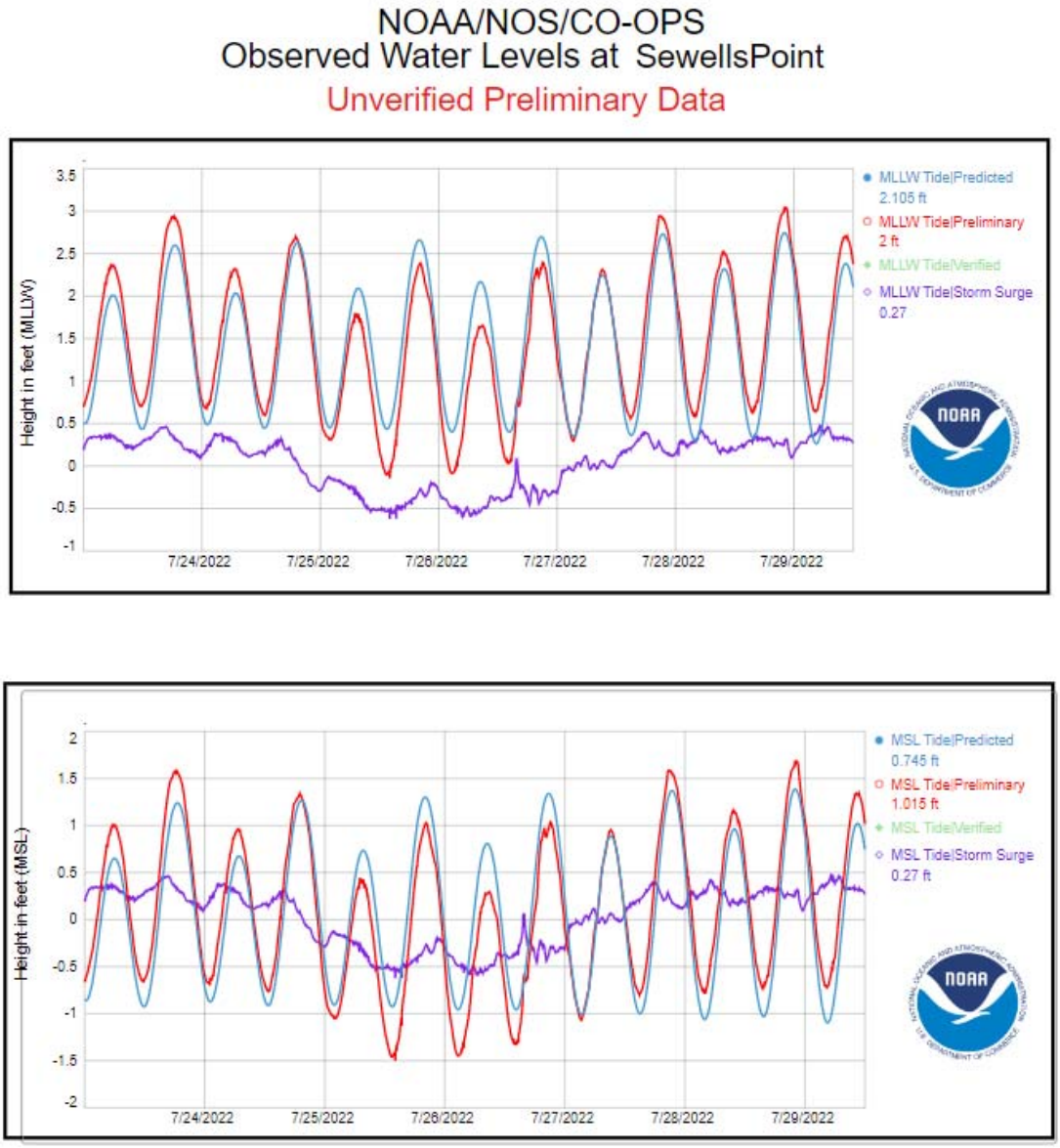


Figure 2. Preliminary data obtained from NOAA and a connection with Open Weather

South Shore

Weather:

Rainfall (HRSD Rainfall Gauges): *Recurrence intervals based on NOAA Atlas 14*

Rain Gauge Site	Peak Rainfall RI (Duration)	Jurisdiction
Army Base Treatment Plant Service Area[1]		
Bancker Rd (Dovercourt Discharge)	DNQ	NORF
Taussig Blvd PS	DNQ	NORF
Atlantic Treatment Plant Service Area[1]		
Callison at GB Locks	DNQ	CHES
Chesapeake PS 243	DNQ	CHES
Chesapeake PS 254	DNQ	CHES
Courthouse PRS	DNQ	VAB
Elbow Rd	DNQ	CHES
John B. Dey MLV-AT side	DNQ	VAB
Kempsville PRS	DNQ	VAB
Lagomar IFM at Atlantic TP	5-year (1hr)	VAB
Laskin Rd PRS	DNQ	VAB
Pine Tree PRS	DNQ	VAB
Shipps Corner PRS	DNQ	VAB
Ches-Liz Treatment Plant Service Area[1]		
Ches-Liz Weather	Disconnected	VAB
Dozier's Corner PS	DNQ	CHES
Independence PRS	DNQ	VAB
Northampton Blvd at Wesleyan Dr	DNQ	NORF
Providence PRS	DNQ	VAB
Shore Dr @ Jack Frost	DNQ	CHES
Nansemond Treatment Plant Service Area[1]		
Bowers Hill PRS	DNQ	CHES
Cedar Lane PS	Invalid	PORT
Chesapeake PS 158	DNQ	CHES
Chesapeake PS 238	DNQ	CHES
Crittenden Rd_Chuckatuck Rectifier	DNQ	SUFF
Deep Creek PRS	DNQ	CHES
Lake Kilby WTP	DNQ	SUFF
Nansemond Main Flow (Effluent)	DNQ	SUFF
Pagan River Rectifier	DNQ	IOW
Pughsville PS	DNQ	SUFF
Route 337 PRS	DNQ	CHES
Smithfield High School	DNQ	IOW
Suffolk PS	DNQ	SUFF
Suffolk PS 81	DNQ	SUFF
Suffolk PS 87	DNQ	SUFF
Windsor Duke St PS	DNQ	IOW
Windsor PCV	DNQ	SUFF

VIP Treatment Plant Service Area[1]		
Elizabeth River Crossing_Eastern Branch	DNQ	NORF
Ferebee Avenue PS	DNQ	CHES
Luxembourg Avenue PS	DNQ	NORF
Rodman Ave PS	DNQ	PORT
Va Beach Blvd PS	DNQ	NORF
VIP Main Flow (Effluent)	DNQ	NORF

Note:

1. Typical treatment plant service area.

*Duration represents the minimum amount of time it took to reach the specified RRI.

Norfolk International Airport (ORF)

- Wind and Rainfall (daily total):

Date	Gust (max)	Sustained (max)	Sustained (avg)	Direction	Rainfall (in)
7/26/2022	37 mph	18 mph	8 mph	SW	0.71

Tide:

- Sewells Point Tide Station:
  - Storm Surge: An approximate 0.0 foot storm surge was observed.

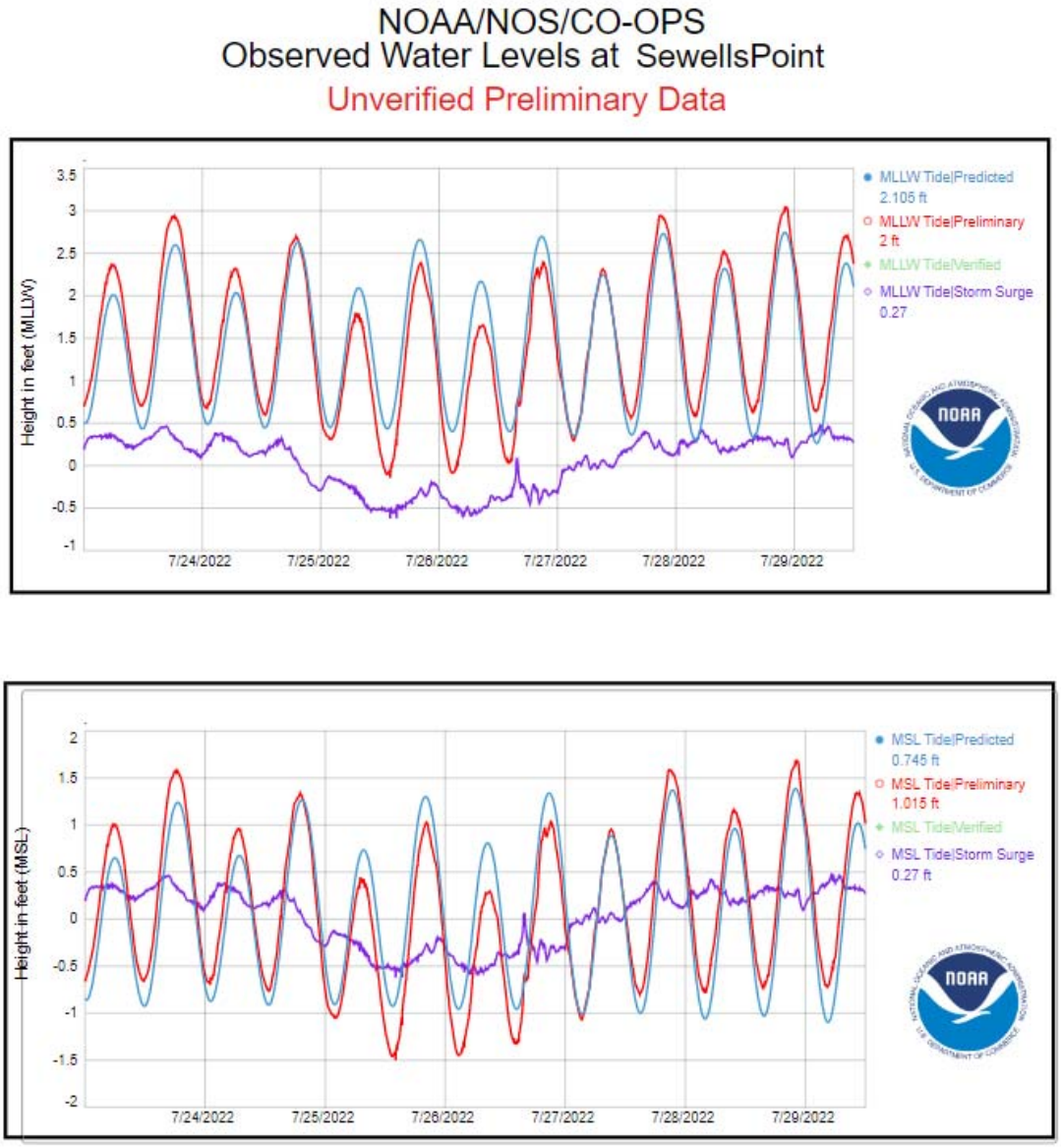


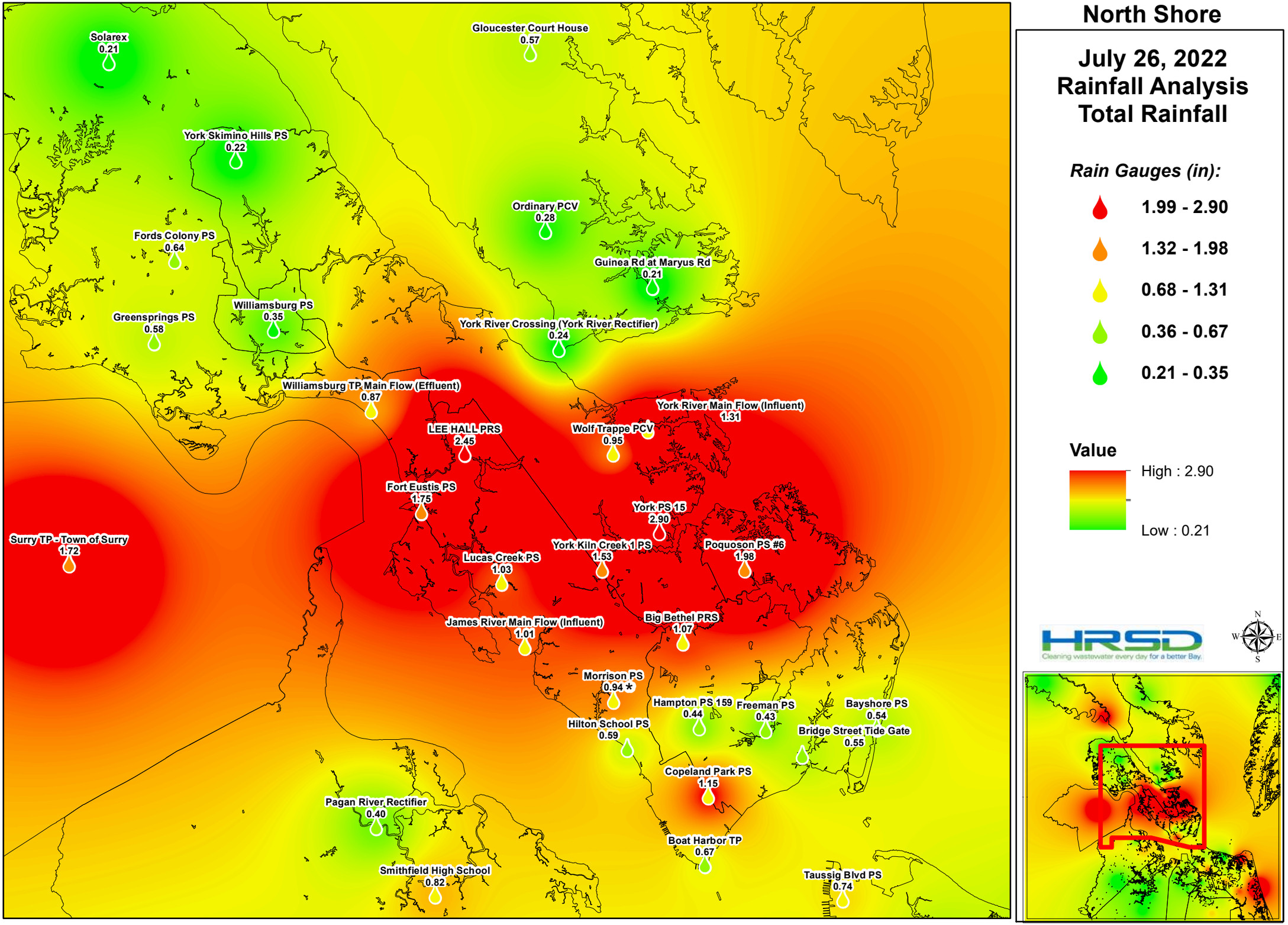
Figure 3. Preliminary data obtained from NOAA and a connection with Open Weather

Shallow Well Analysis:

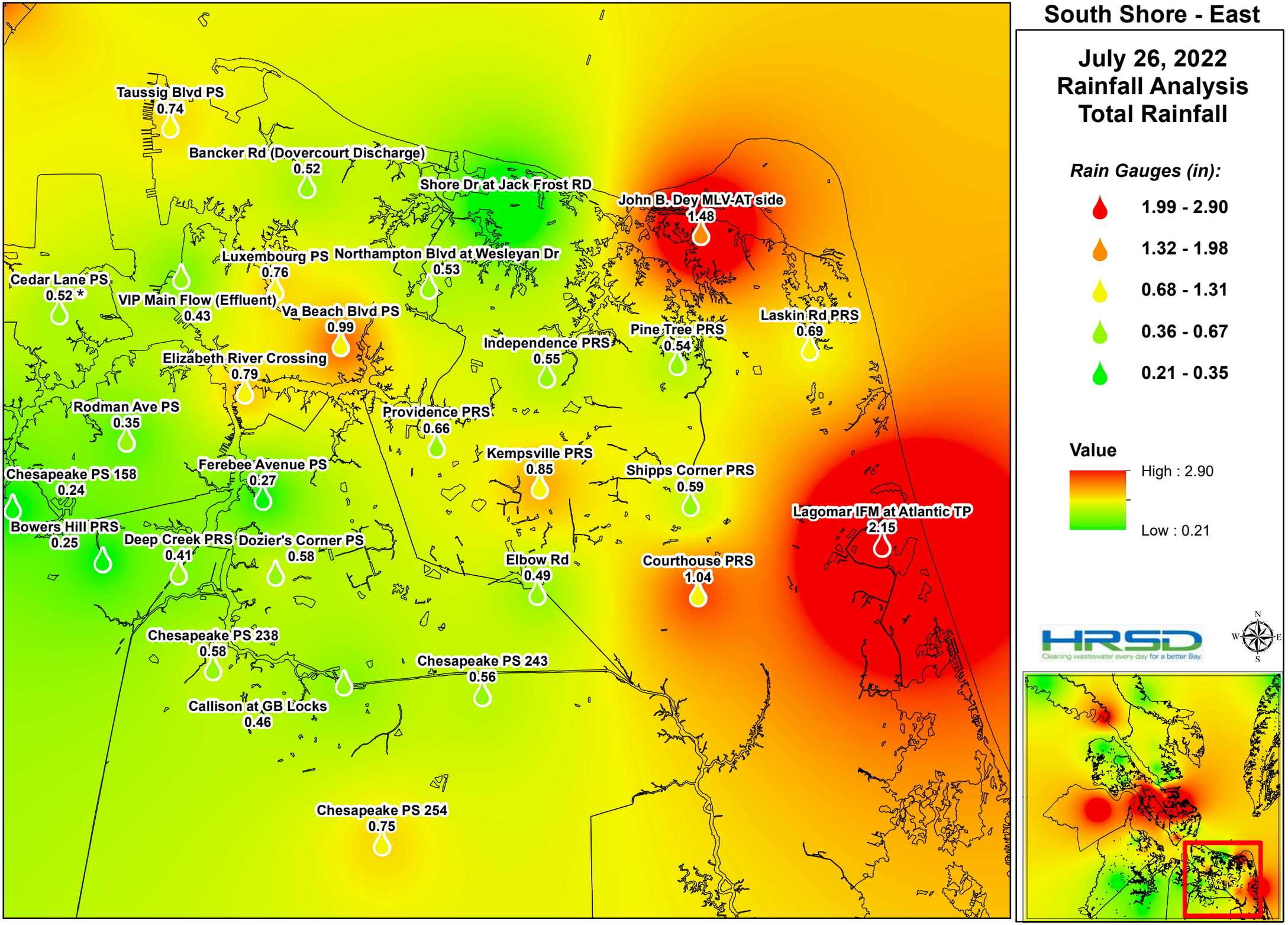
Shallow wells are located at/or near HRSD Pump Stations to measure groundwater levels. The water column is measured using a pressure transducer located near the bottom of the well. The installed sensor measures gauge pressure in inches of water. The Shallow Well_NAVD88 measurement referenced in Appendix C refers to the elevation (referenced as NAVD 88) of the sensor plus the gauge measurement in feet.

Appendix A

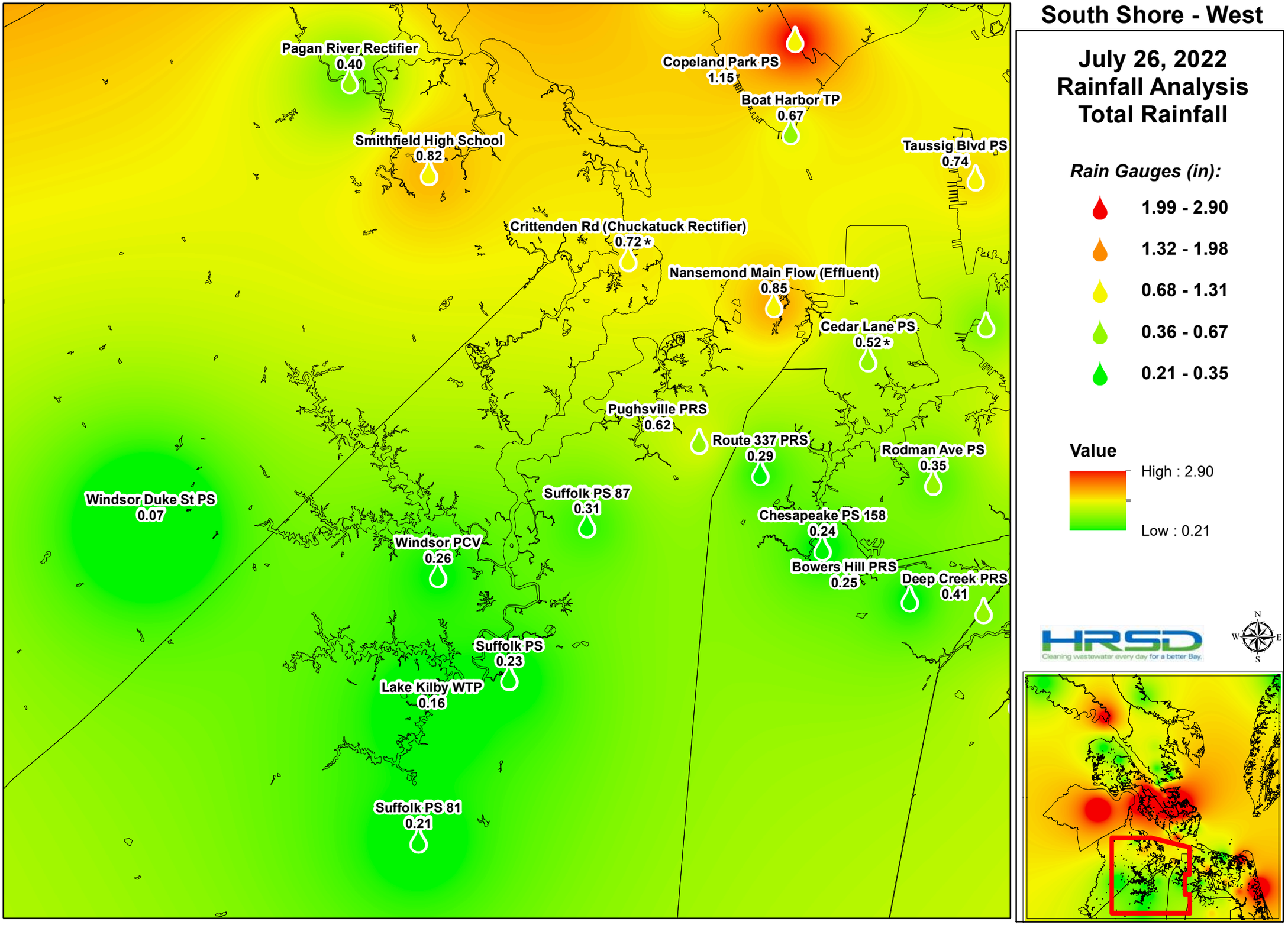
HRSD Rain Gauge Network
Rainfall Totals



*Note: Rain Gauge was invalid during event and an average of surrounding sites was used.



*Note: Rain Gauge was invalid during event and an average of surrounding sites was used.



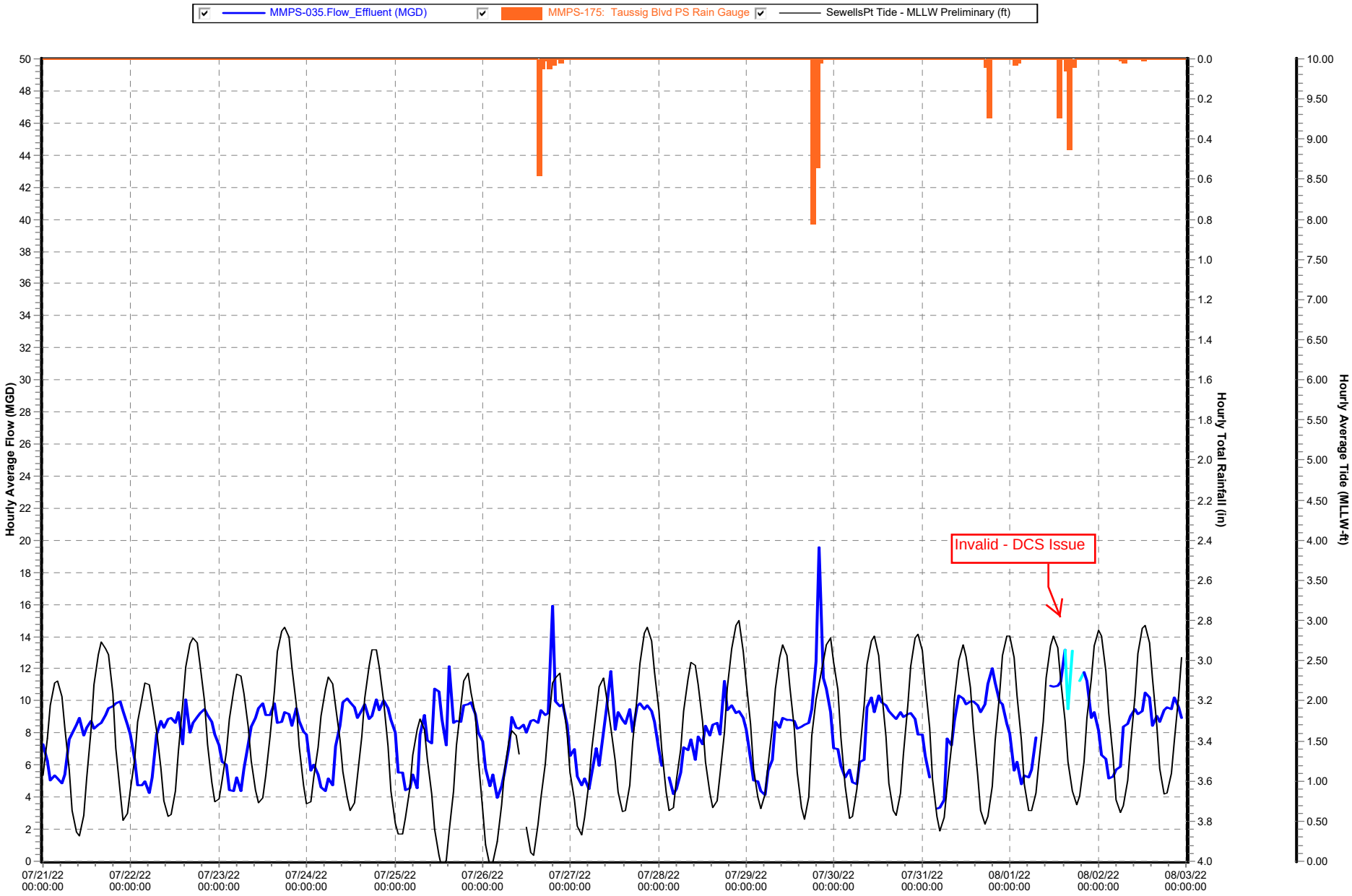
*Note: Rain Gauge was invalid during event and an average of surrounding sites was used.

Appendix B

HRSD Treatment Plant Flows

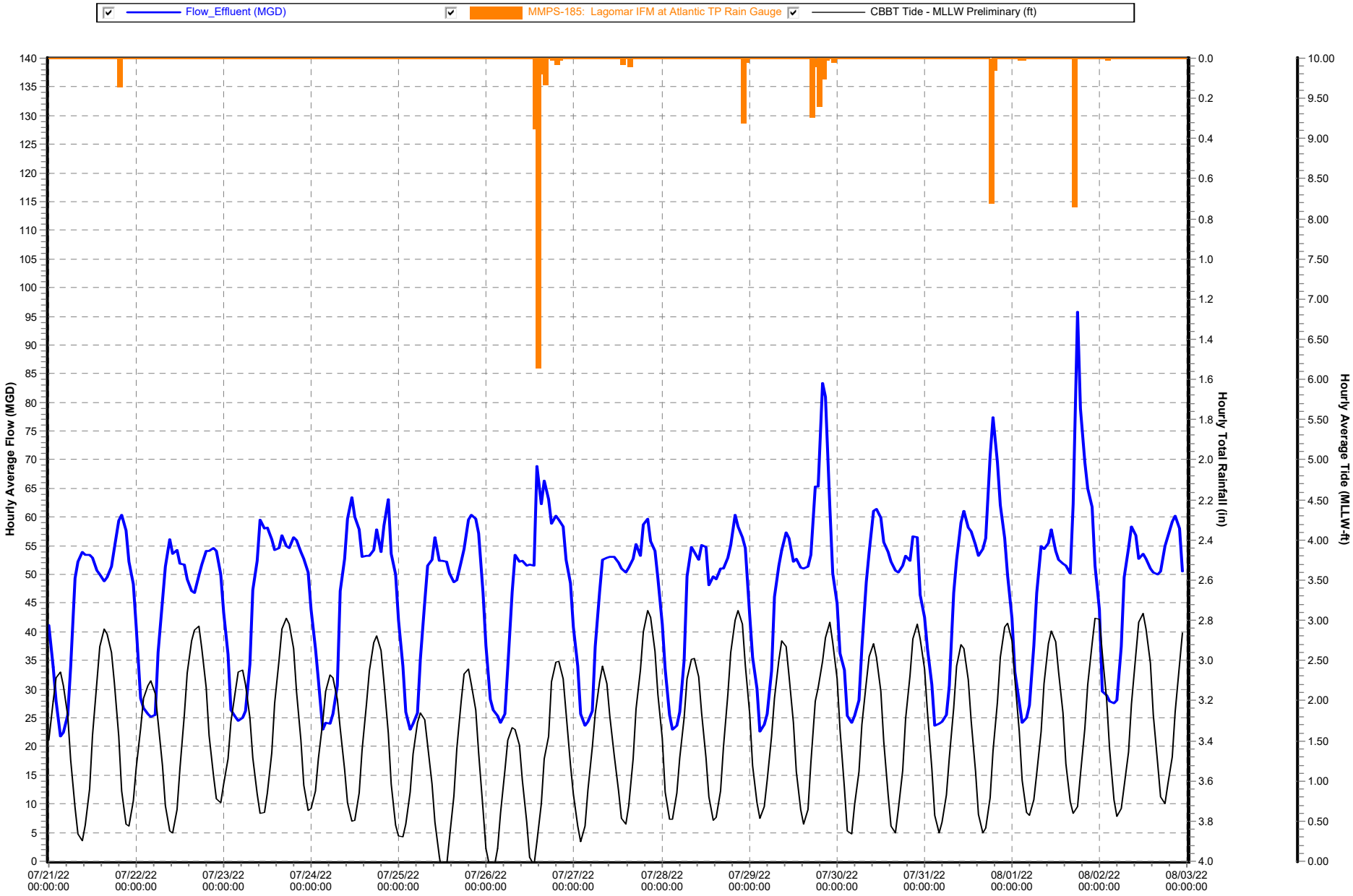
Army Base Treatment Plant

MMPS-035 (07/21/22 to 08/03/22)



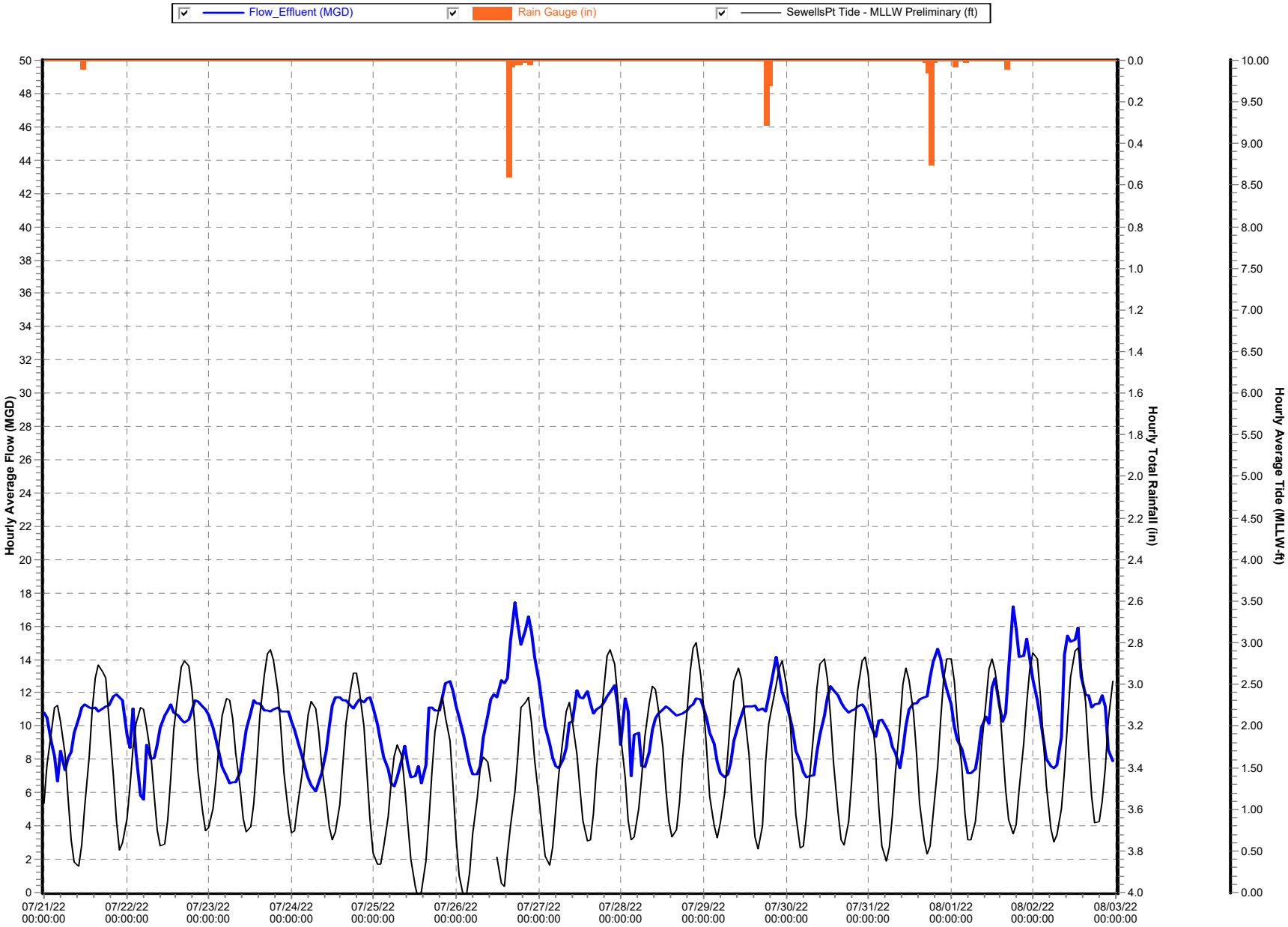
Atlantic Treatment Plant

MMPS-071 (07/21/22 to 08/03/22)



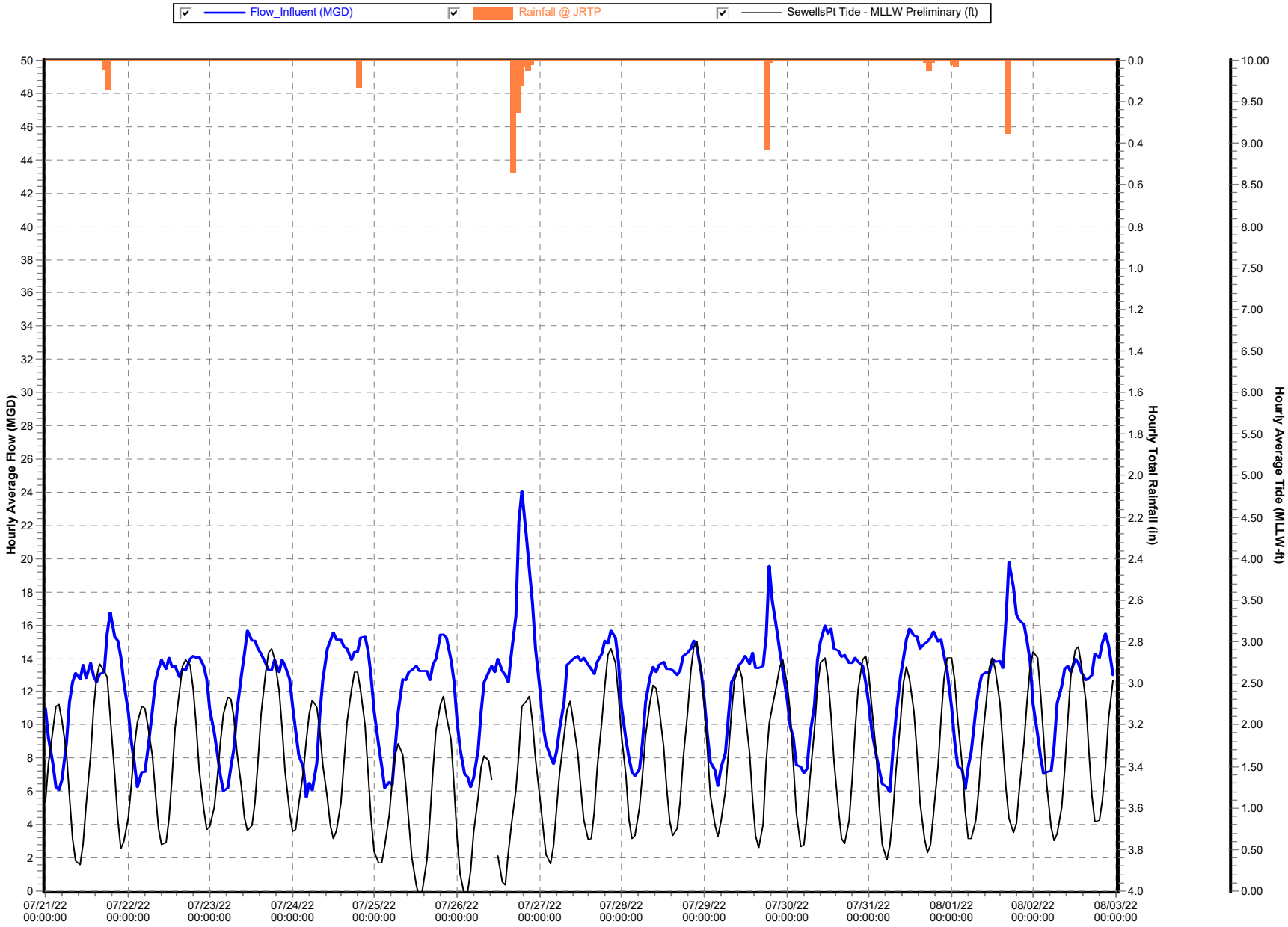
Boat Harbor Treatment Plant

MMPS-075 (07/21/22 to 08/03/22)



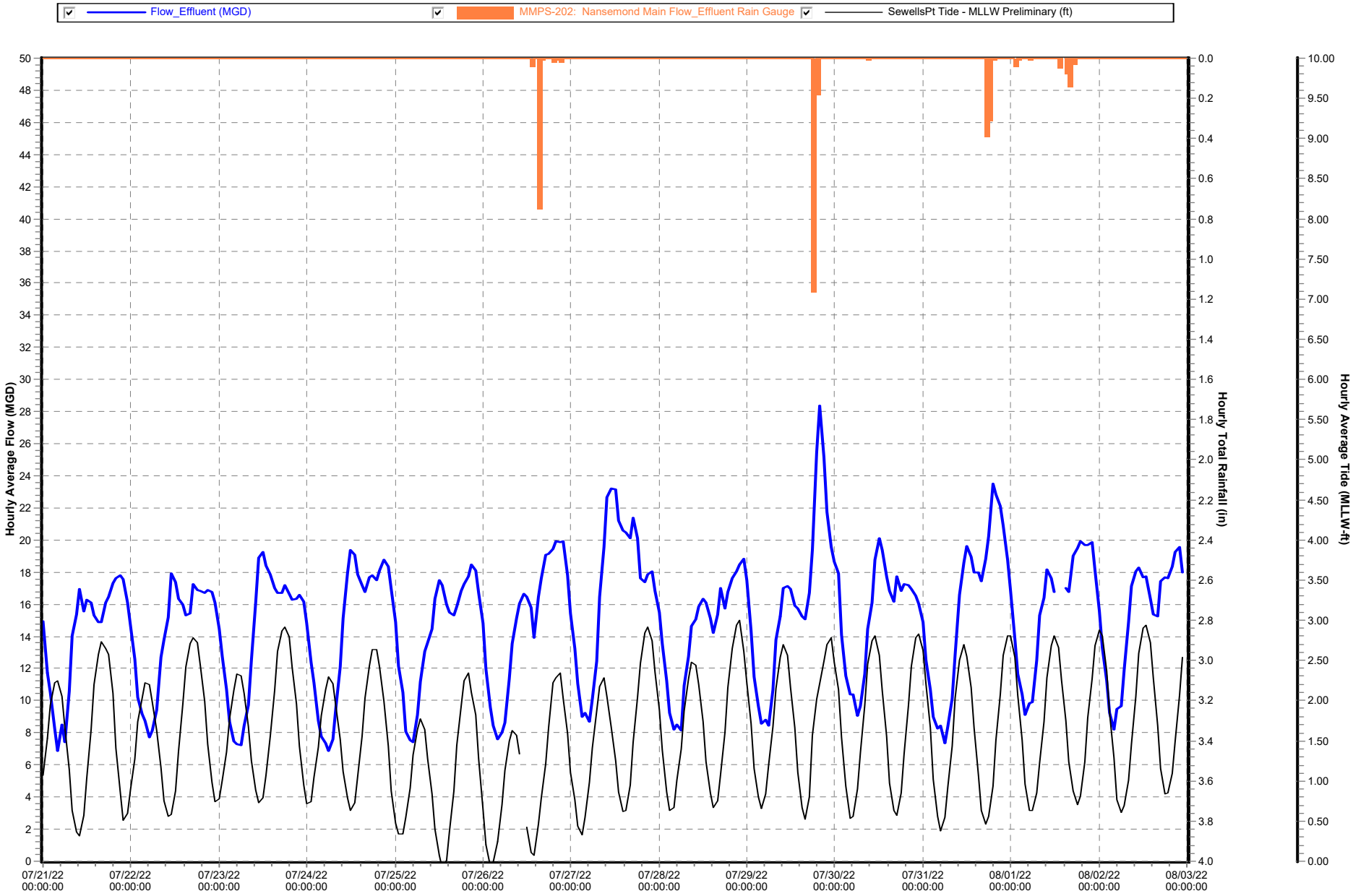
James River Treatment Plant

MMPS-184 (07/21/22 to 08/03/22)



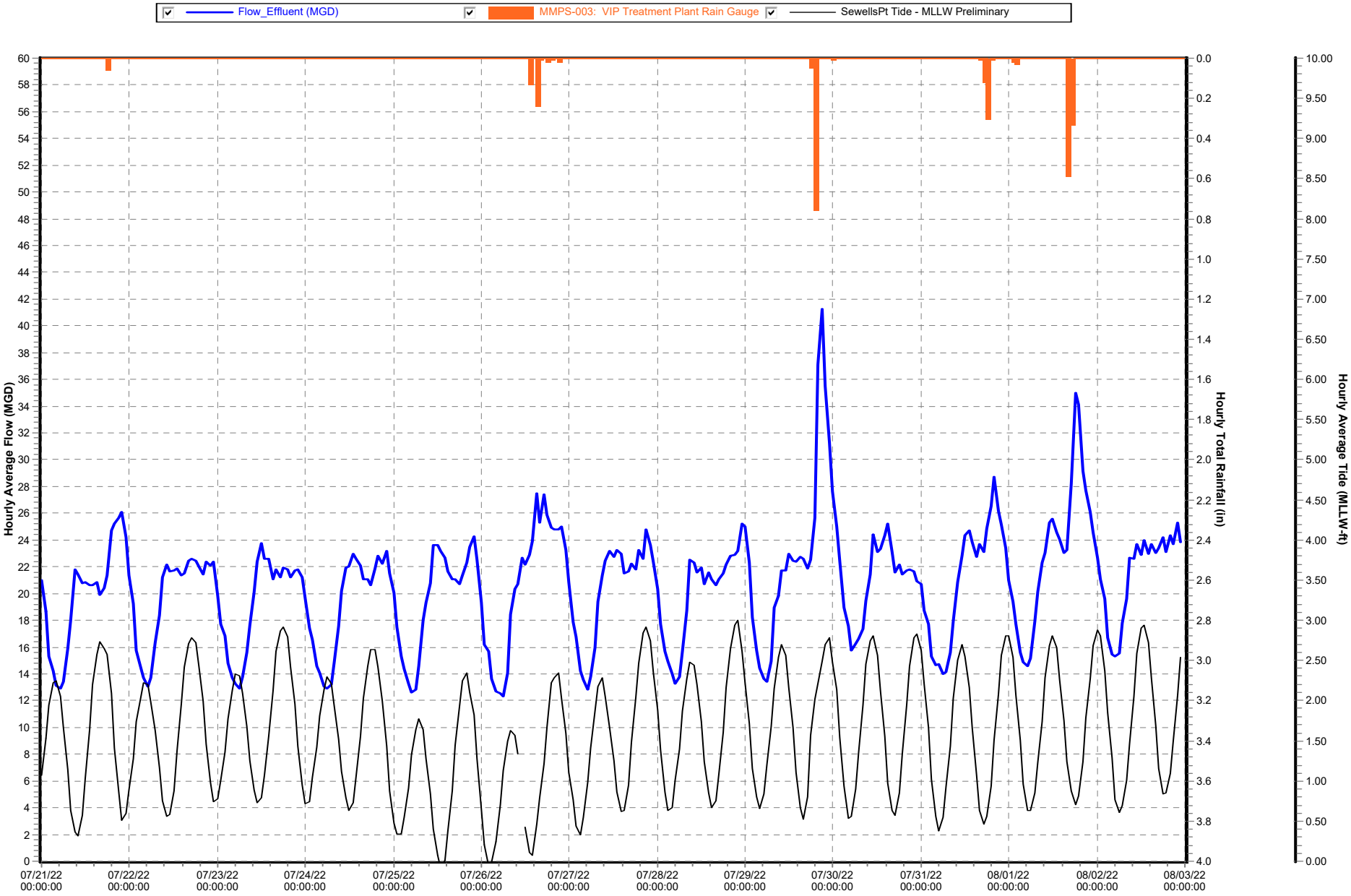
Nansemond Treatment Plant

MMPS-202 (07/21/22 to 08/03/22)



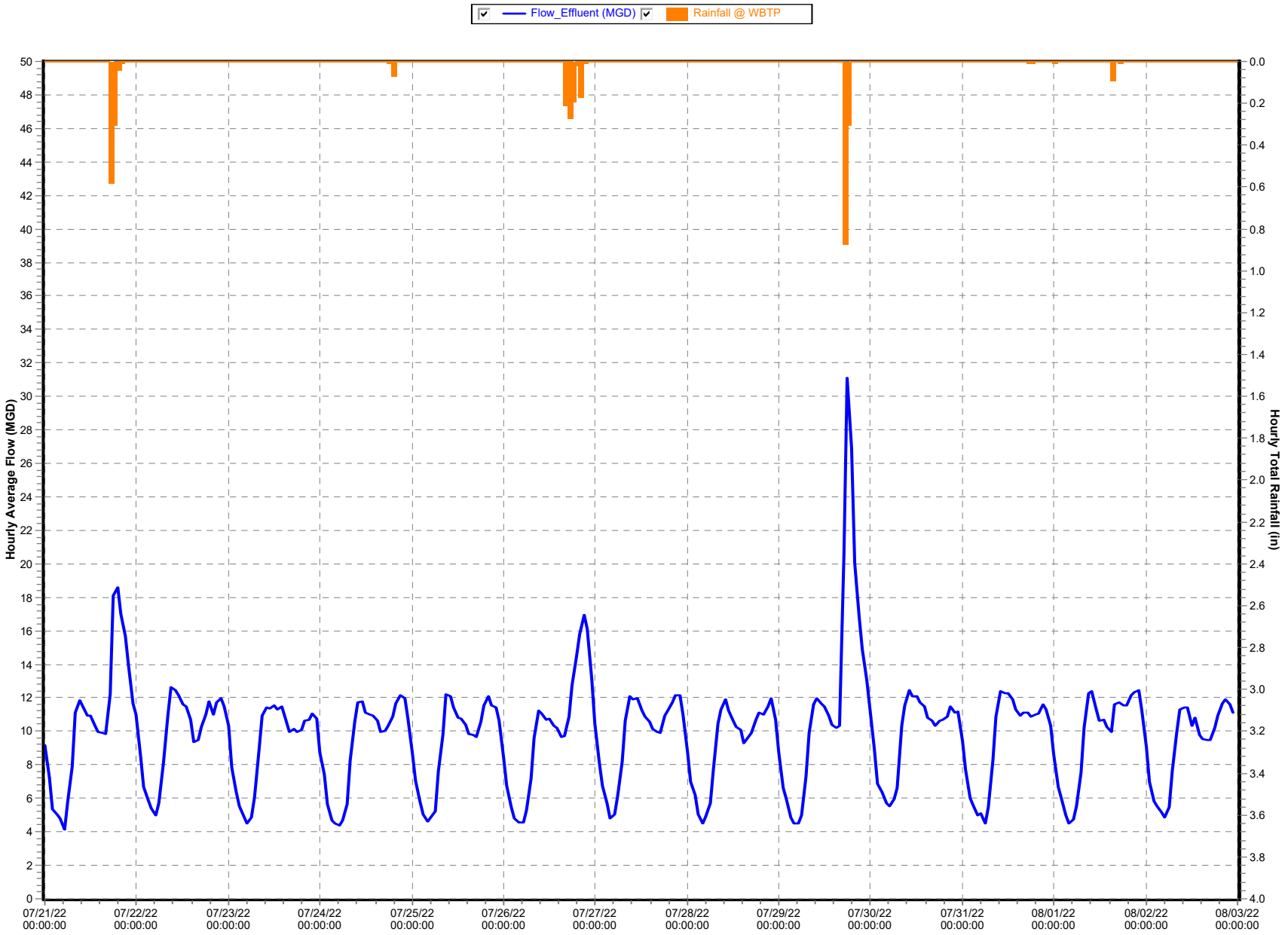
VIP Treatment Plant

MMPS-003 (07/21/22 to 08/03/22)



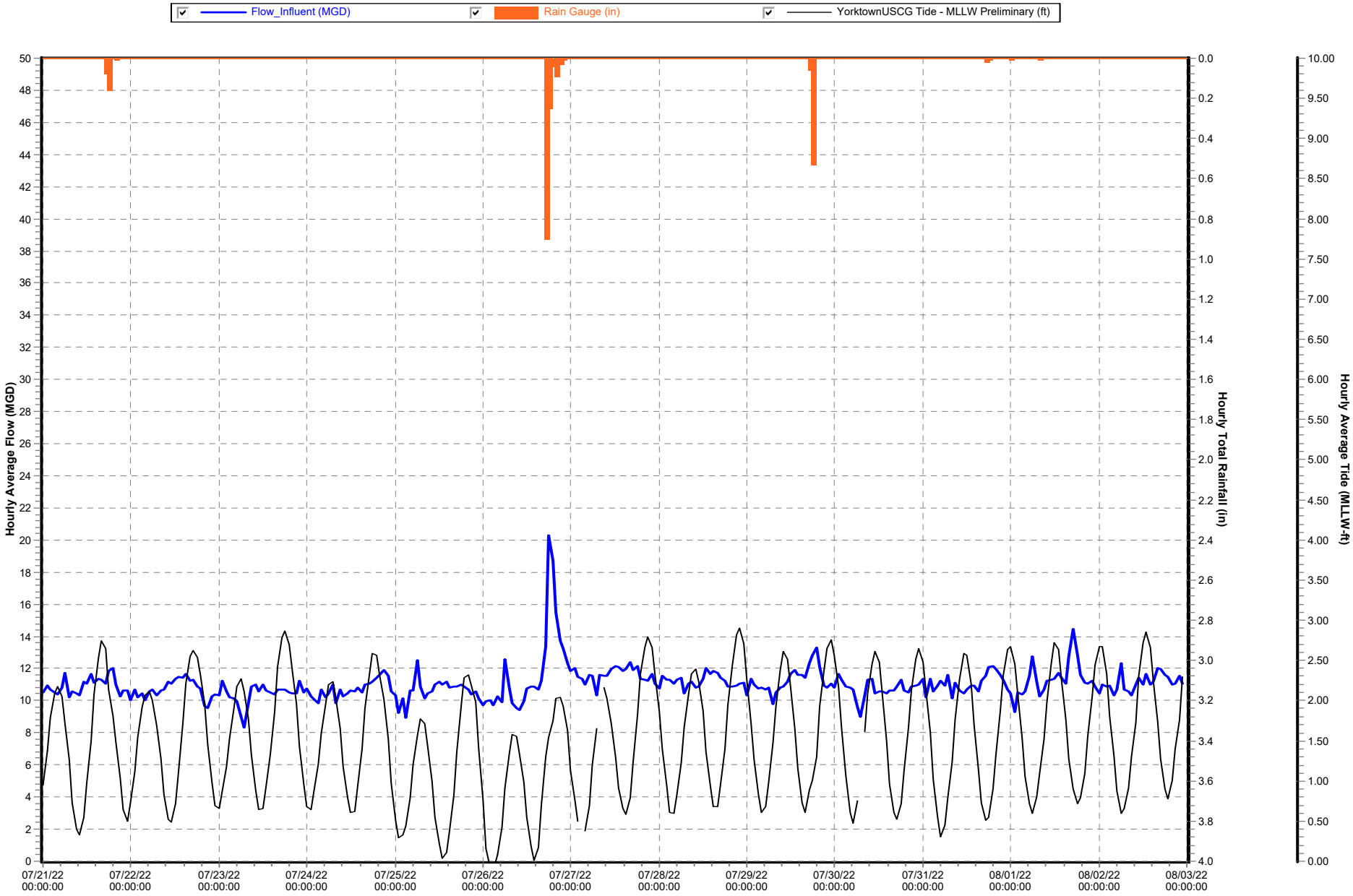
Williamsburg Treatment Plant

MMPS-222 (07/21/22 to 08/03/22)



York River Treatment Plant

MMPS-235 (07/21/22 to 08/03/22)



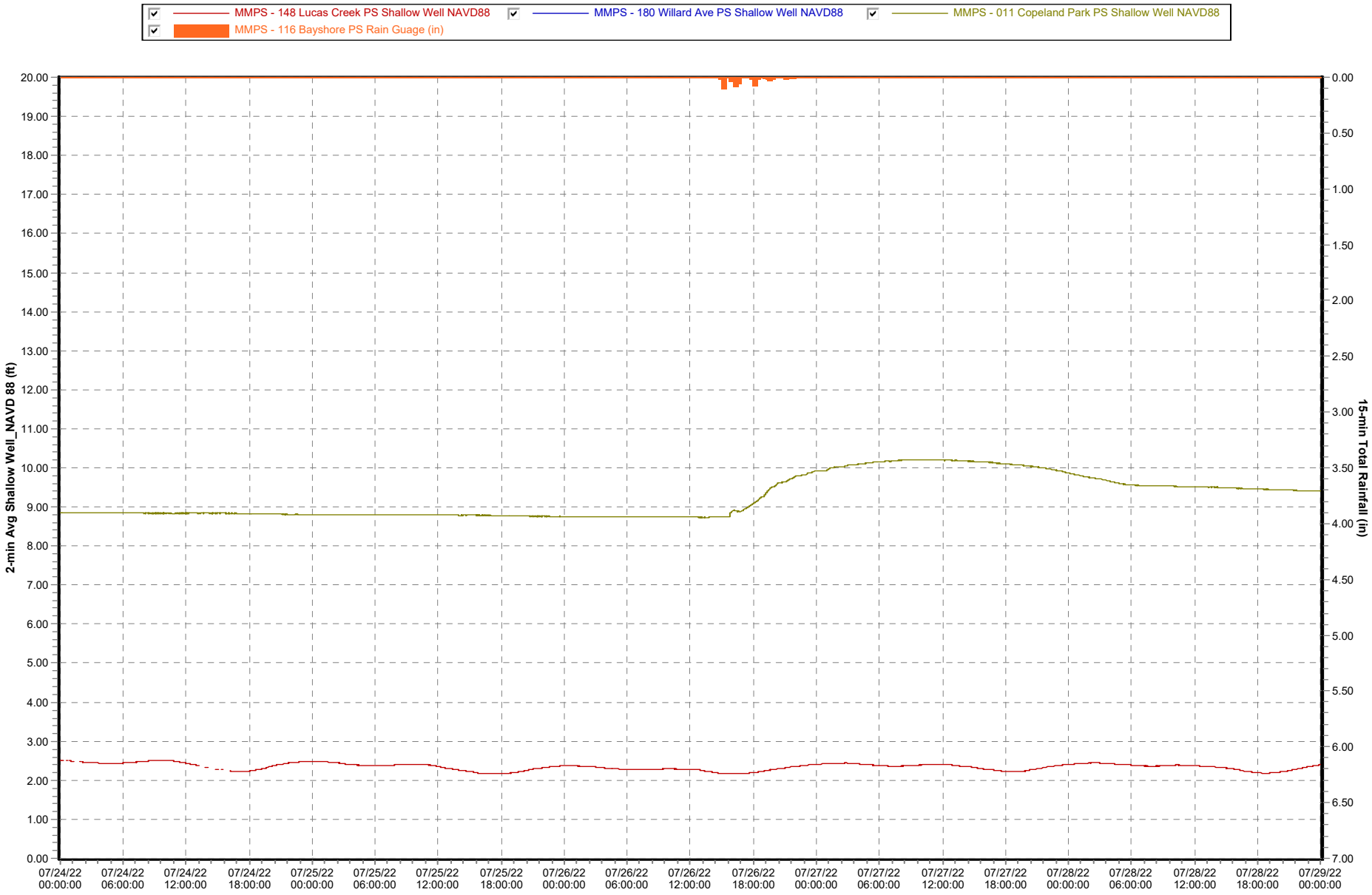
Appendix C

Shallow Well Analysis

5-day

North Shore Shallow Well Graphs

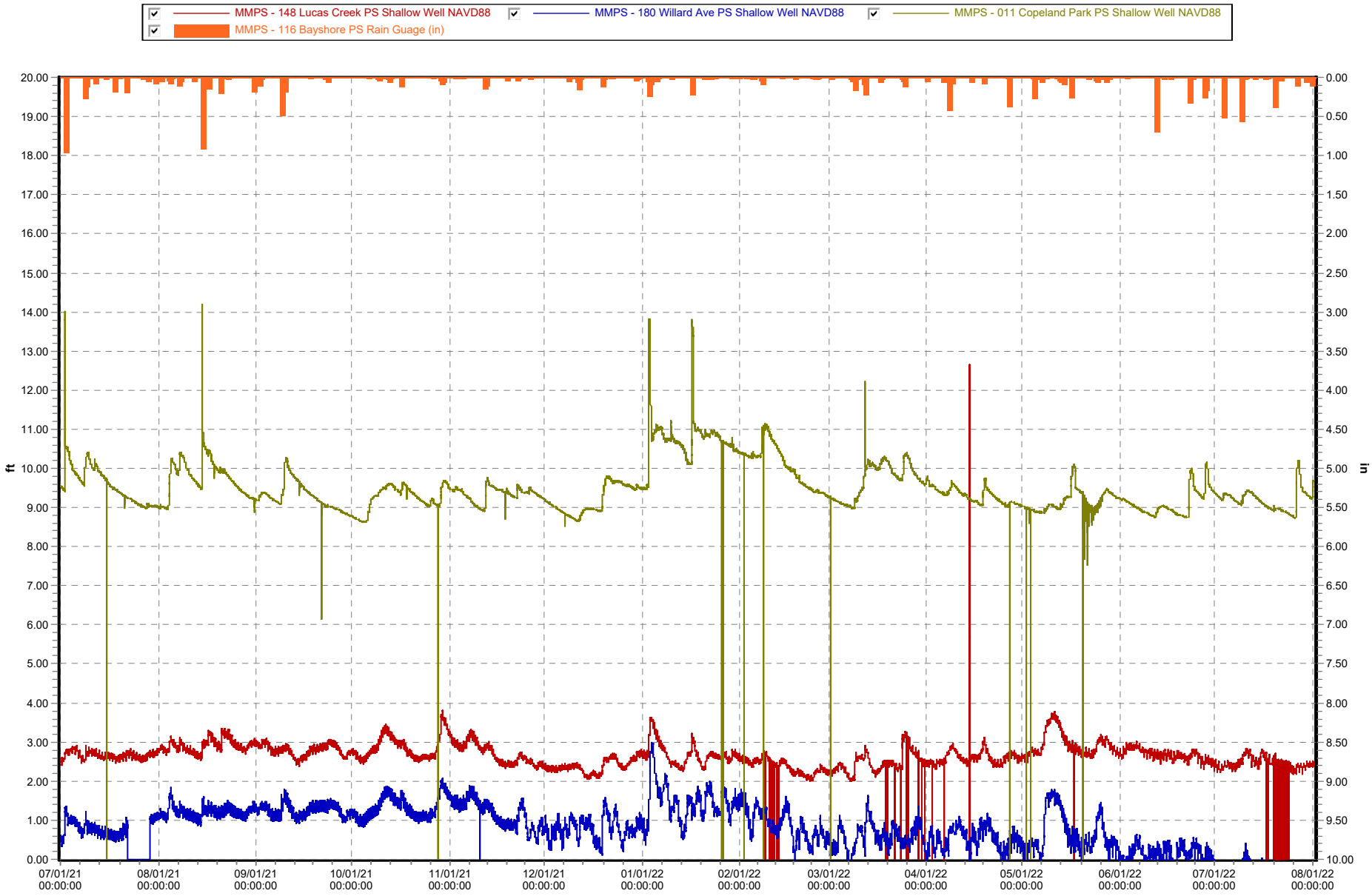
07/24/22 to 07/29/22



1-year

HRSD NP - Lucas Creek PS

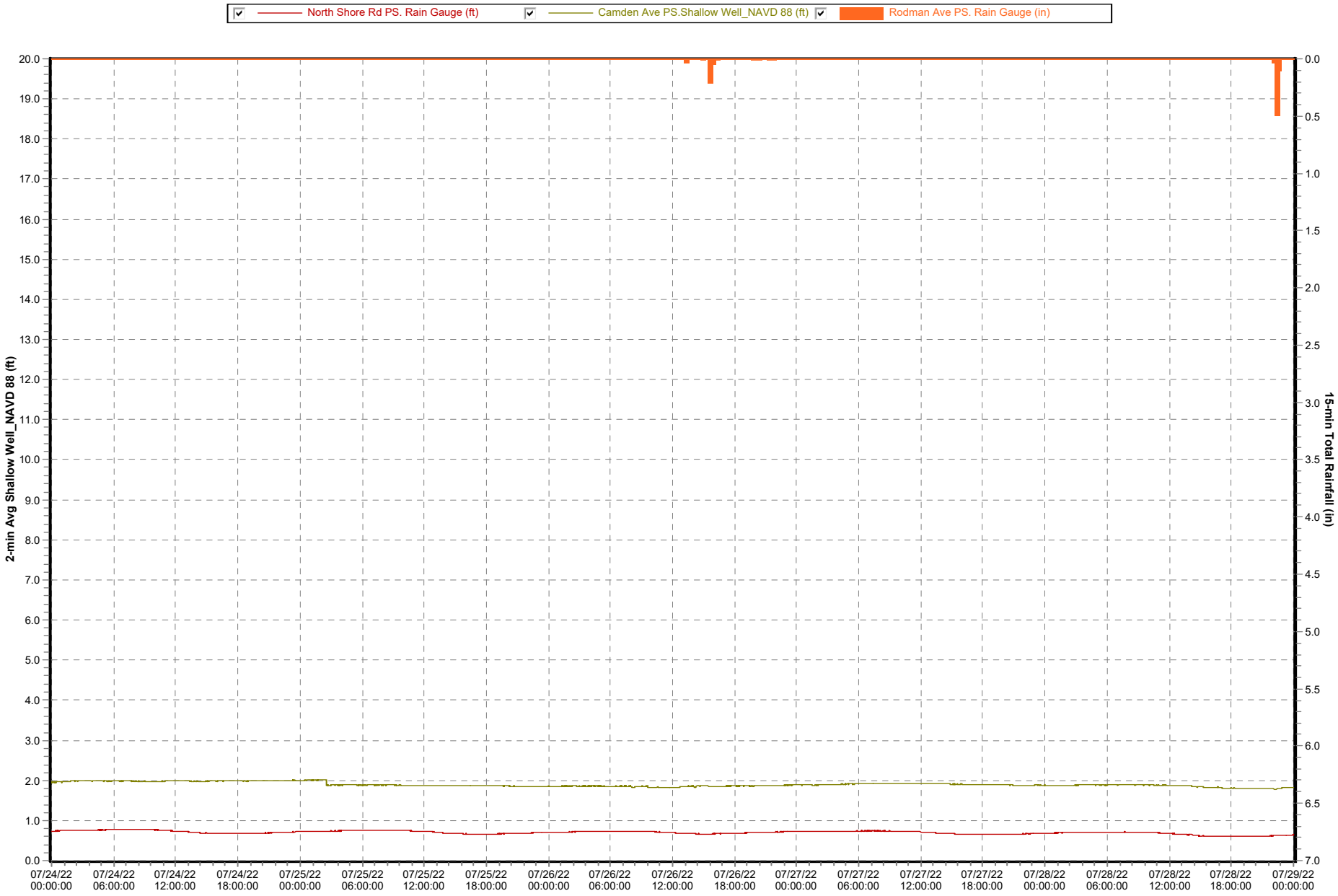
MMPS-148 (07/01/21 to 08/01/22)



5-day

South Shore Shallow Well Graphs

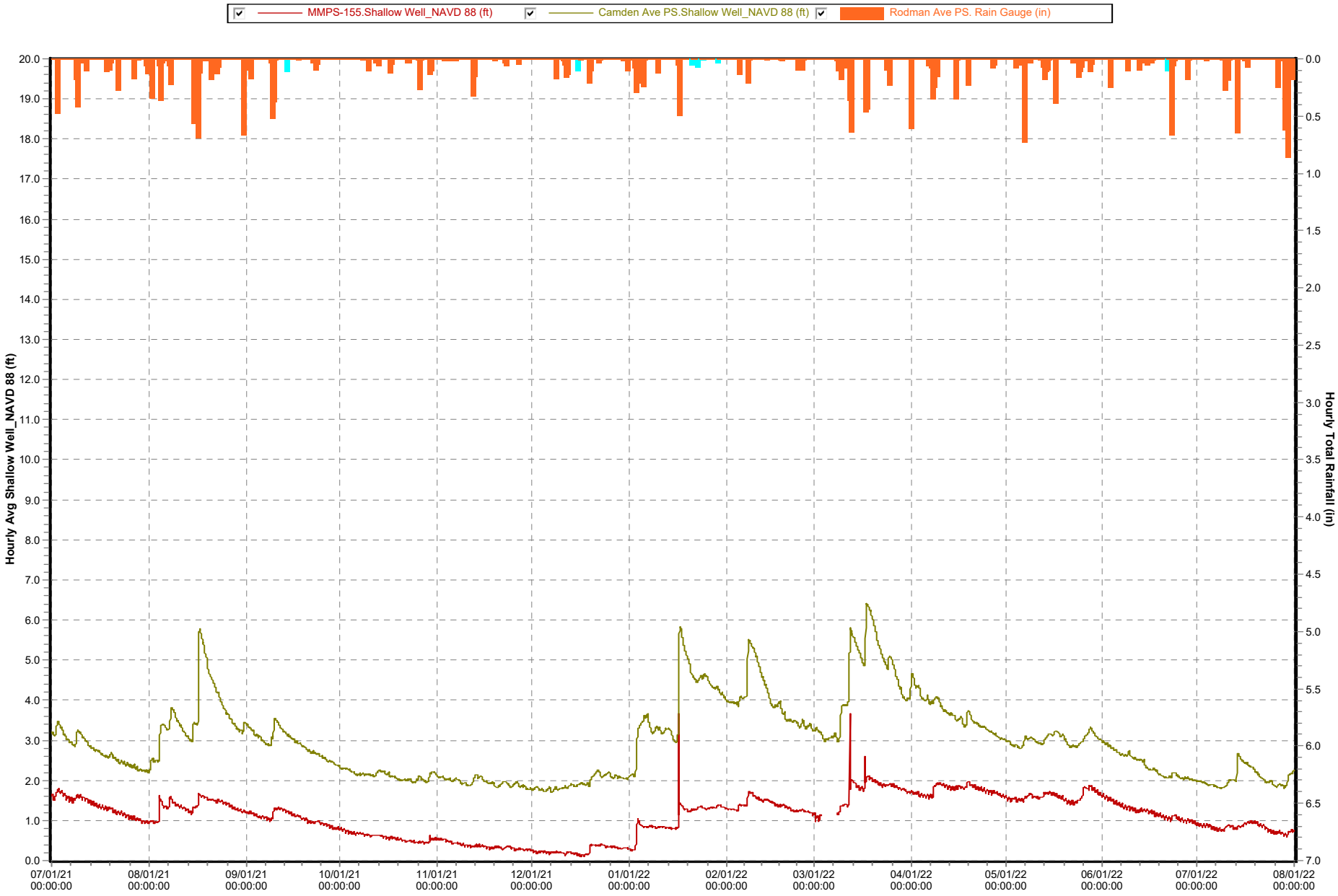
07/24/22 to 07/29/22



1-year

South Shore Shallow Well Graphs

07/01/21 to 08/01/22



Hampton Roads Sanitation District

Post-Storm Report

July 29, 2022

HRSD
Cleaning wastewater every day for a better Bay.

DISCLAIMER:

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This report is intended to provide the HRSD regional community summary information about the HRSD system during select wet weather events/anomalies. The attached report contains a selection of *official* Interceptor and Treatment data, as well as other environmental and meteorological data provided through other services. In an effort to enhance the HRSD system, the attached products have been made accessible on this server and care must be taken when using such products as they are intended for informational and not operational, legal, or other purposes.

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Summary

On July 29th, there was an approximate 9-hour rainfall event that resulted in 5 sites on the North Shore and 1 site on the South Shore that met a 1 to 10-year rainfall recurrence interval throughout the HRSD rain gauge network. A cold front came into the area sparking heavy localized storms and gusty winds. North Shore sites averaged around 0.86 inches of rain while South Shore sites averaged around 0.83 inches. There was minimal impact on groundwater levels compared to July 2021. See Appendix C for the Historical Shallow Well comparison. This report will be for North Shore only.

No HRSD interceptor weather-related overflow(s) were reported.

HRSD flow and pressure meters met data reliability requirements per the MOM program. For all pressure meters in the aggregate and all pressure-side flow meters in the aggregate for each treatment plant service area listed below, at least 90% reliable data was achieved, based on the duration of system response to this rainfall event. The data reliability for the gravity flow meters is not included in this synopsis.

- Duration of system response: See Table Below
- Aggregate flow meter validity: 93.17%
- Aggregate pressure meter validity: 97.45%

Currently, rainfall recurrence intervals are only analyzed for a maximum of 96-hours. Rainfall analysis begins after 0.1 inches of rain has occurred. A 72-hour dry period of less than 0.1 inches of rain is typically used to signify two separate events. However, if a site returns to "dry weather" conditions prior to the next rainfall that occurs within 72 hours of the previous event, it is also considered for separate analysis. See Appendix A for the Rainfall Total System Maps.

The current criteria for publishing a post-storm analysis are the following:

- One or more rain gauge sites meet a two-year or greater RRI (rainfall recurrence interval) and at least 50% of sites in any treatment plant service area receive one inch of rainfall or greater,
- A rain gauge site meets a five-year or greater RRI, or
- A weather-related SSO occurs.

Treatment Plant Data: ***(Data obtained from Telog Database)***
See Appendix B for HRSD Treatment Plant Flows

HRSD Treatment Plant Data
7/29/2022

North Shore				
Treatment Plant	**Date of Peak Hourly Flow**	**Peak Hourly Flow (MGD)**	**Peak Hour**	**TPSA Total Rainfall Avg (in)**
Boat Harbor	7/29/2022	14.13	21:00	0.21
James River	7/29/2022	19.54	19:00	0.45
Williamsburg	7/29/2022	31.12	18:00	1.32
York River	7/29/2022	13.28	17:00	1.05

North Shore

Weather:

Rainfall (HRSD Rainfall Gauges): *Recurrence intervals based on NOAA Atlas 14*

Rain Gauge Site	Peak Rainfall RI (Duration)	Jurisdiction
Boat Harbor Treatment Plant Service Area[1]		
Bayshore PS	DNQ	HAMP
Bridge Street Tide Gate	DNQ	HAMP
Boat Harbor	DNQ	NEWP
Copeland Park PS	DNQ	NEWP
Hampton PS 159	DNQ	HAMP
James River Treatment Plant Service Area[1]		
Hilton School PS	DNQ	NEWP
James River Main Flow (Influent)	DNQ	NEWP
Lee Hall PRS	DNQ	NEWP
Lucas Creek PS	DNQ	NEWP
Morrison PS	DNQ	NEWP
Williamsburg Treatment Plant Service Area[1]		
Ford's Colony	DNQ	JCSA
Fort Eustis PS	DNQ	NEWP
Greensprings PS	DNQ	JCA
Solarex	DNQ	JCSA
Williamsburg Main Flow (Effluent)	DNQ	JCSA
Williamsburg PS	1-year (2hr)	WILL
York Skimino Hills PS	2-year (1hr)	YORK

York River Treatment Plant Service Area[1]		
Big Bethel PRS	DNQ	HAMP
Freeman PS	DNQ	HAMP
Gloucester Court House	1-year (1hr)	GLOU
Guinea Rd at Maryus Rd	2-year (1hr)	GLOU
Ordinary PCV	5- to 10-year (1hr)	GLOU
Poquoson PS 6	DNQ	POQ
Wolf Trappe PCV	DNQ	YORK
York Kiln Creek 1 PS	DNQ	YORK
York PS 15	DNQ	YORK
York River Main Flow (Influent)	DNQ	YORK
York River Crossing (York River Rectifier)	DNQ	GLOU

Note:

1. Typical treatment plant service area.

Newport News-Williamsburg International (PHF)

- Wind and Rainfall (daily total):

Date	Gust (max)	Sustained (max)	Sustained (avg)	Direction	Rainfall (in)
7/29/22	23 mph	16 mph	6 mph	SW	0.51

Tide:

- Yorktown USCG Training Center:
  - Storm Surge: An approximate 0.5-foot storm surge was observed.

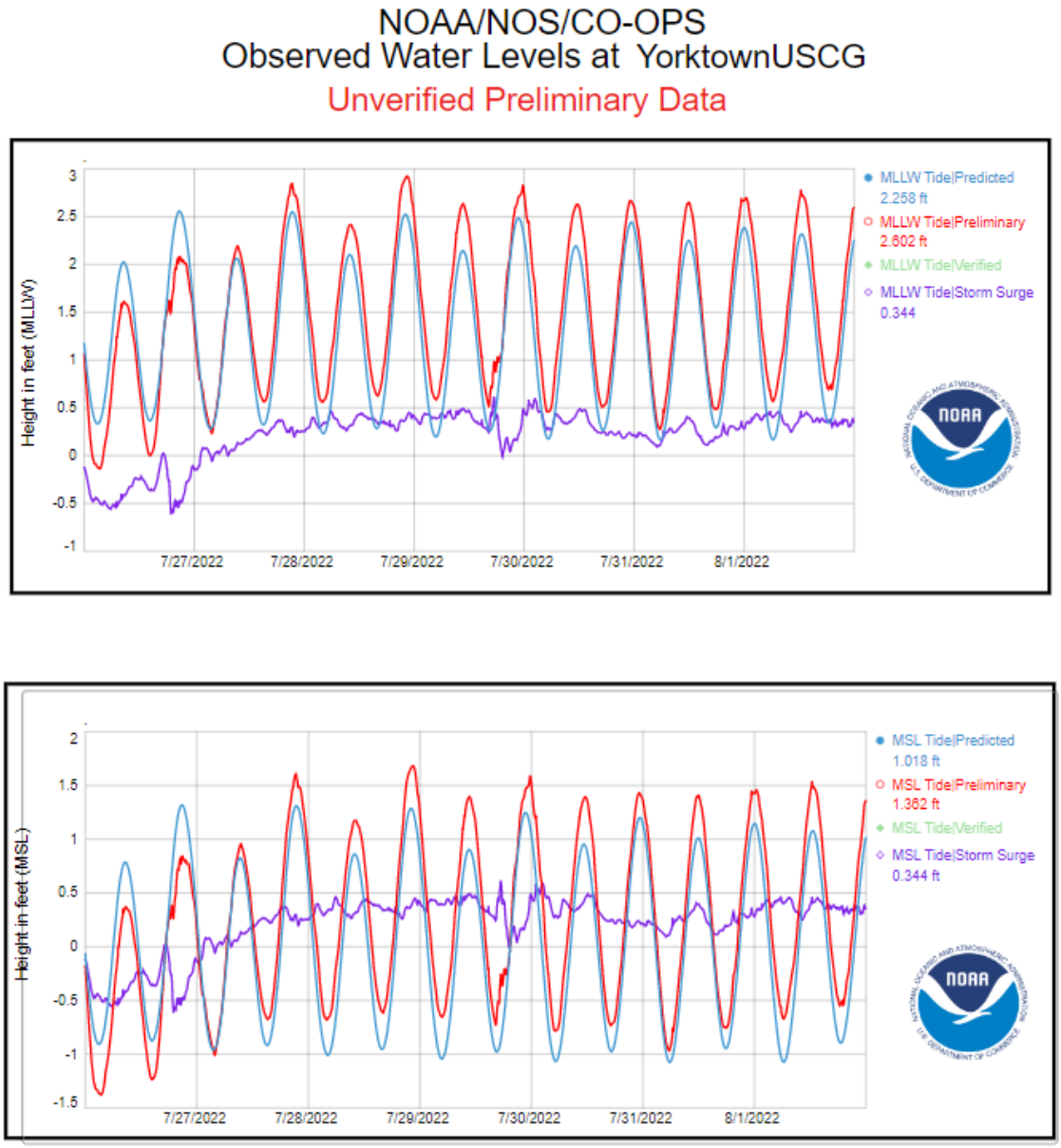


Figure 1. Preliminary data obtained from NOAA and a connection with Open Weather

- Sewells Point Tide Station:
  - Storm Surge: An approximate 0.75-foot storm surge was observed.

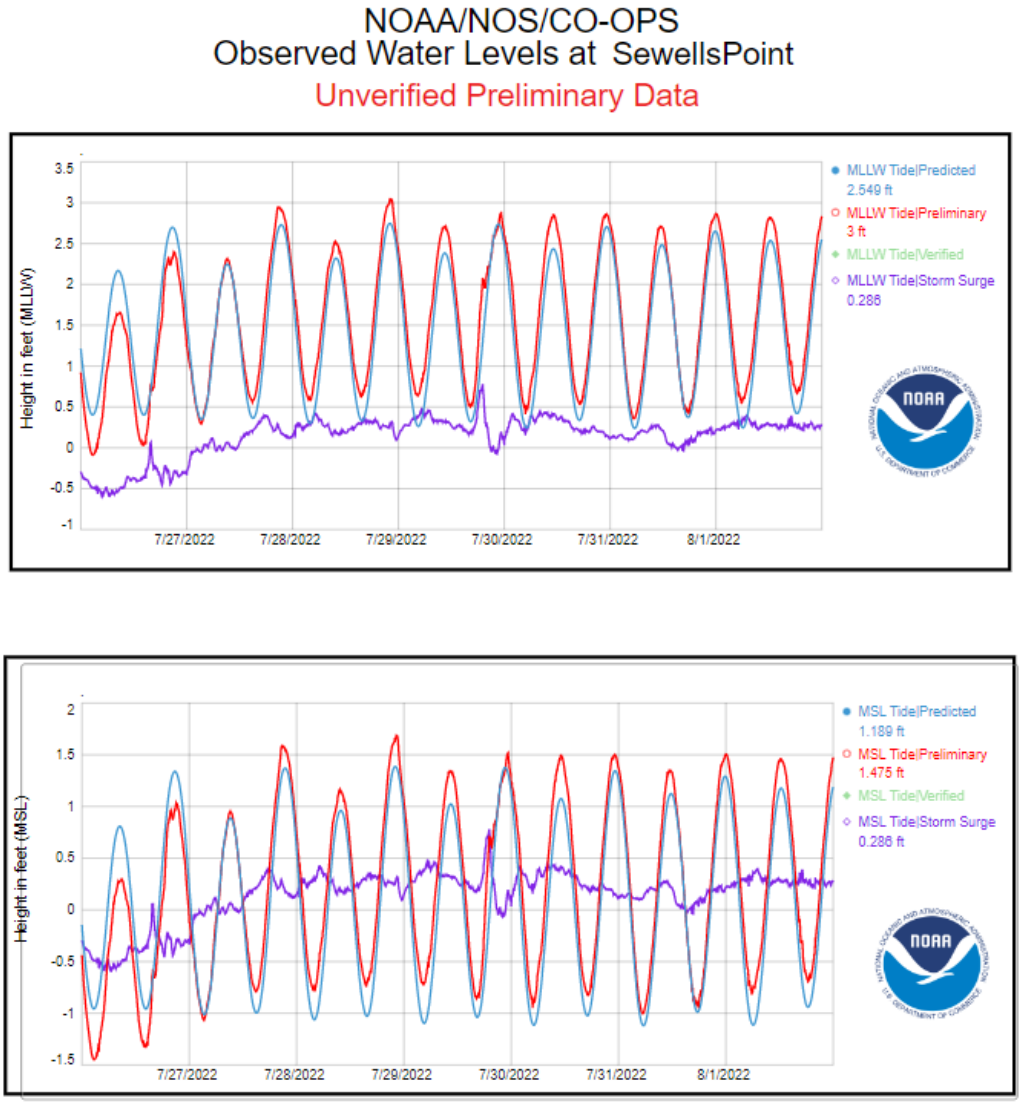


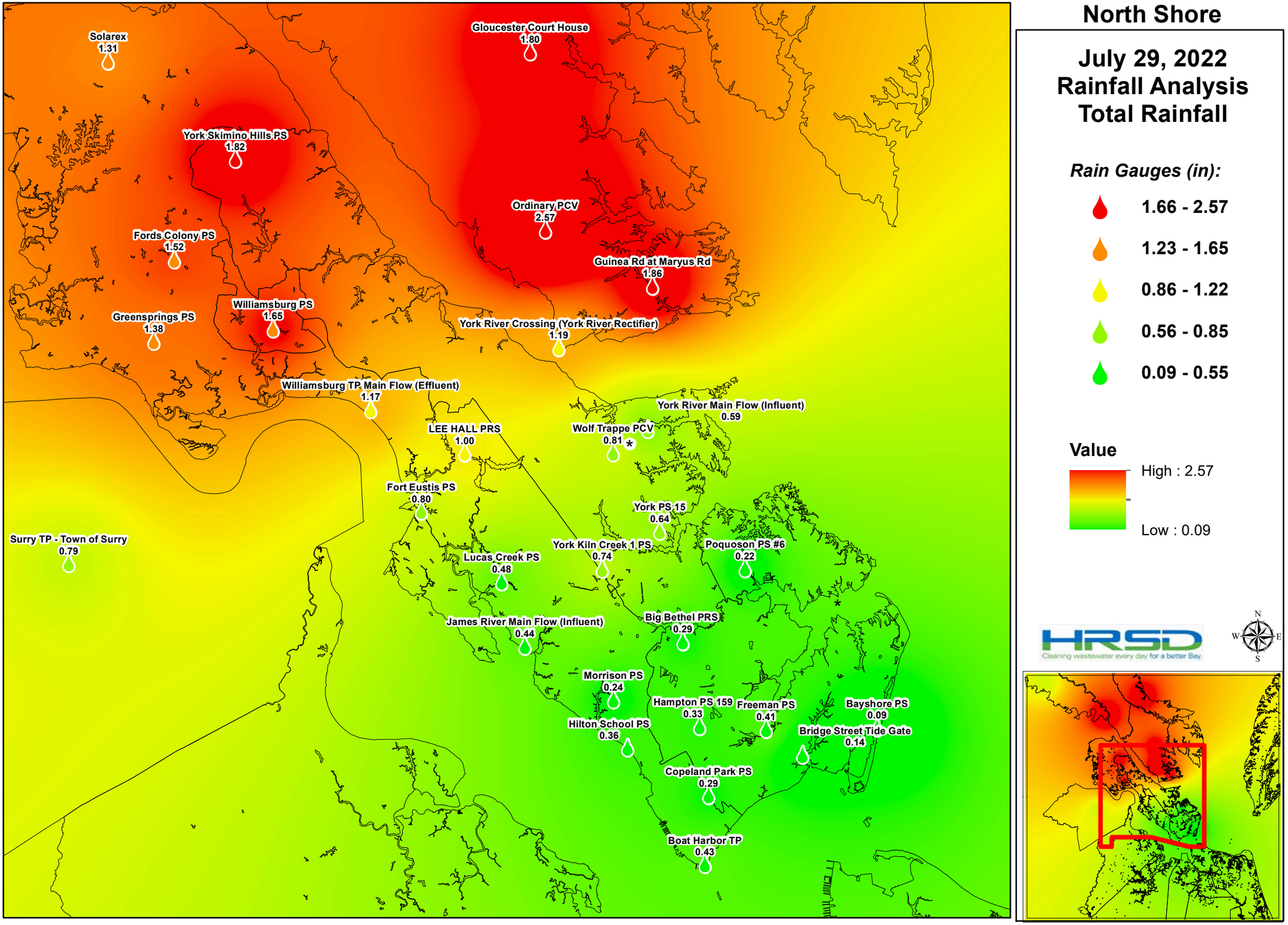
Figure 2. Preliminary data obtained from NOAA and a connection with Open Weather

Shallow Well Analysis:

Shallow wells are located at/or near HRSD Pump Stations to measure groundwater levels. The water column is measured using a pressure transducer located near the bottom of the well. The installed sensor measures gauge pressure in inches of water. The Shallow Well_NAVD88 measurement referenced in Appendix D refers to the elevation (referenced as NAVD 88) of the sensor plus the gauge measurement in feet.

Appendix A

HRSD Rain Gauge Network
Rainfall Totals



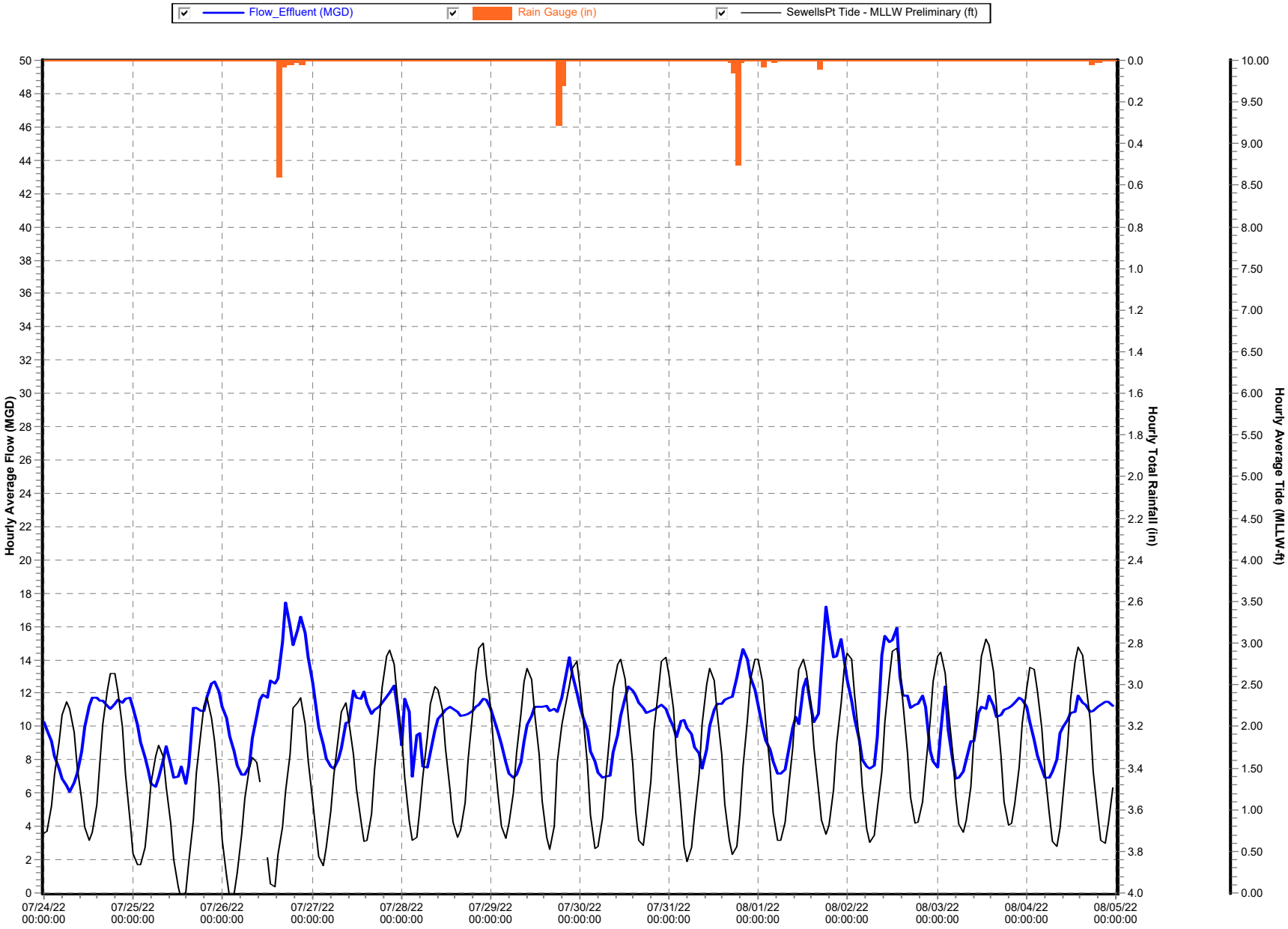
*Note: Rain Gauge was invalid for event and an average of surrounding sites was used.

Appendix B

HRSD Treatment Plant Flows

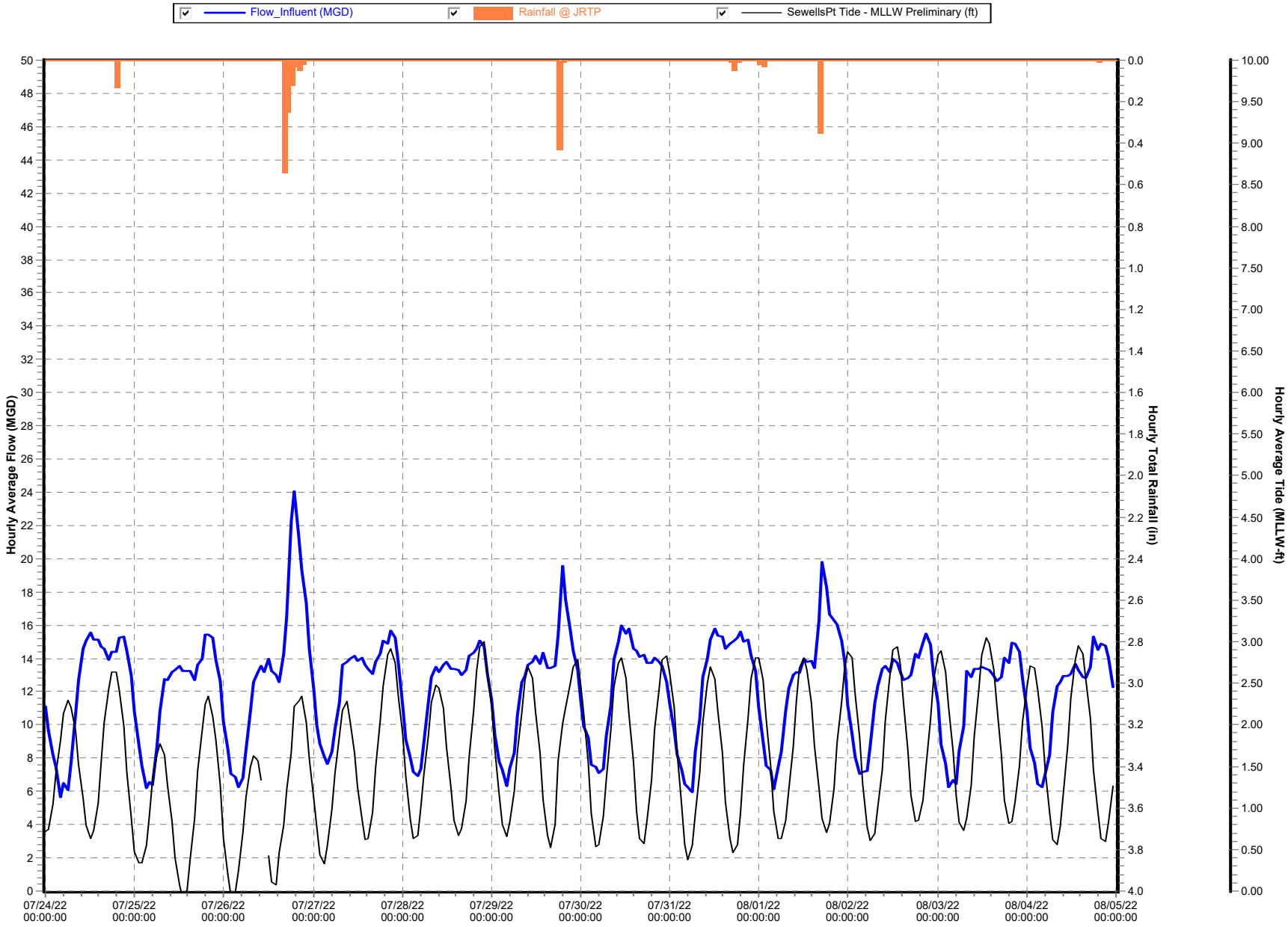
Boat Harbor Treatment Plant

MMPS-075 (07/24/22 to 08/05/22)



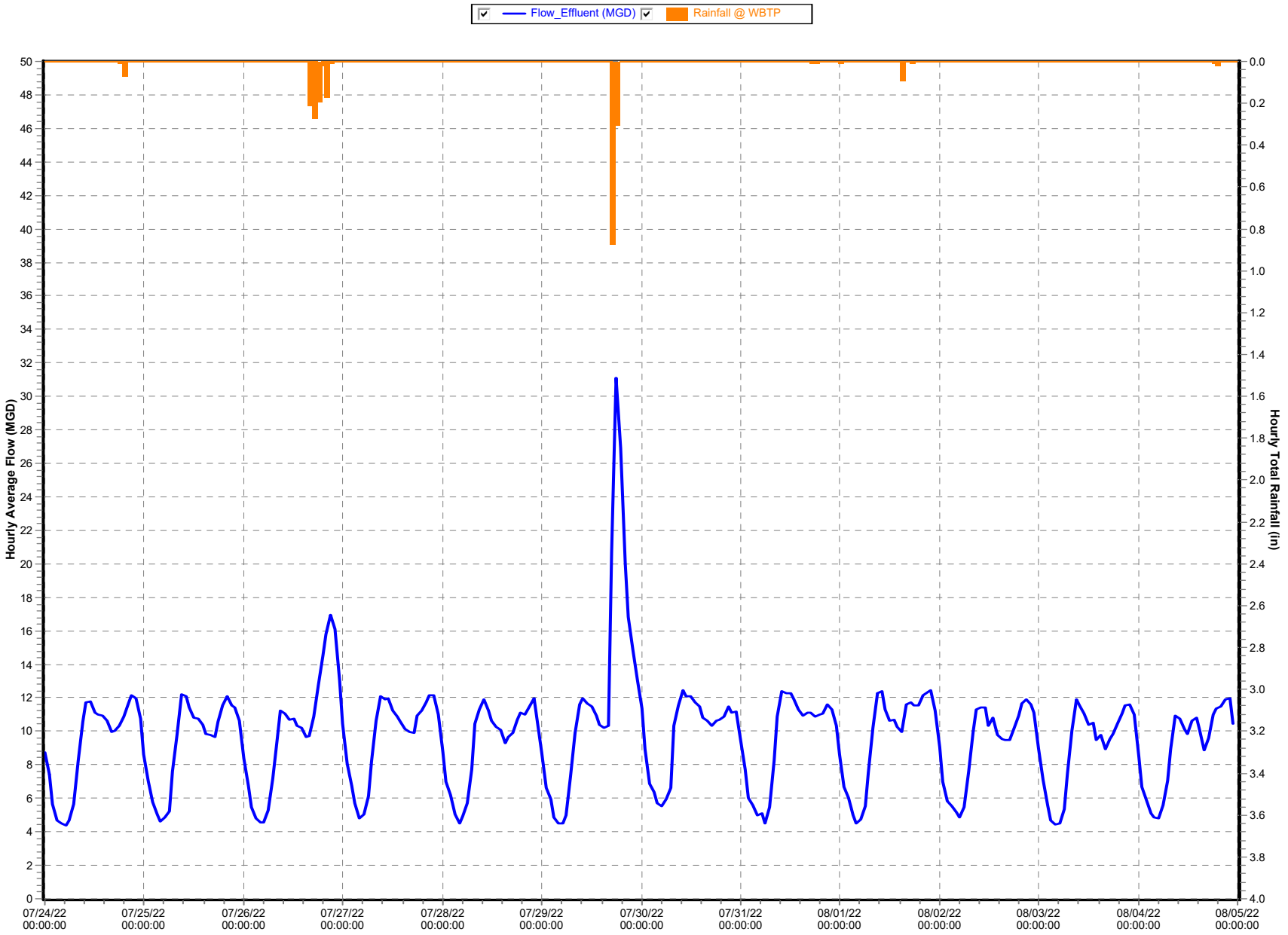
James River Treatment Plant

MMPS-184 (07/24/22 to 08/05/22)



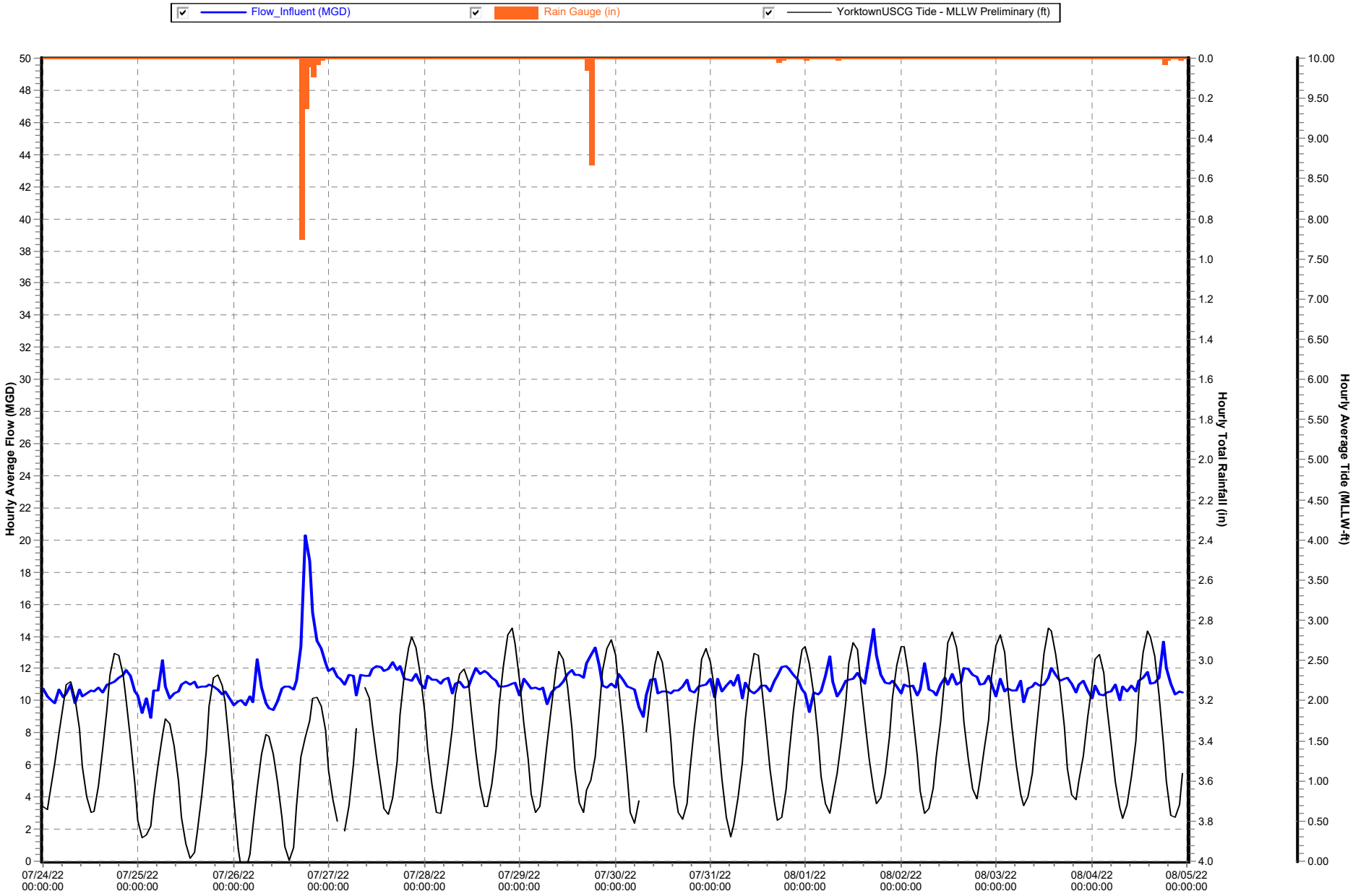
Williamsburg Treatment Plant

MMPS-222 (07/24/22 to 08/05/22)



York River Treatment Plant

MMPS-235 (07/24/22 to 08/05/22)



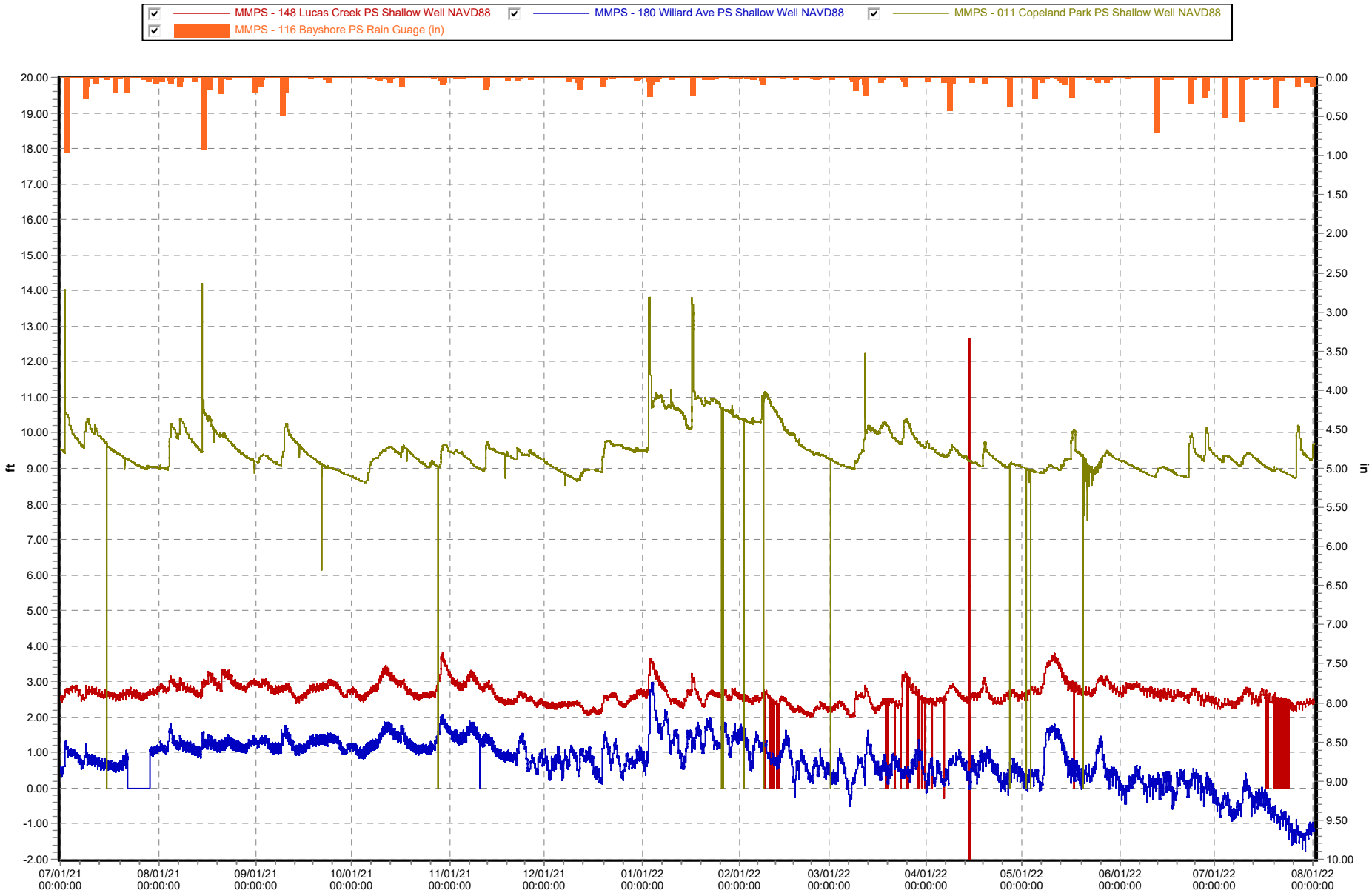
Appendix C

Shallow Well Analysis

1-year

HRSD NP - Lucas Creek PS

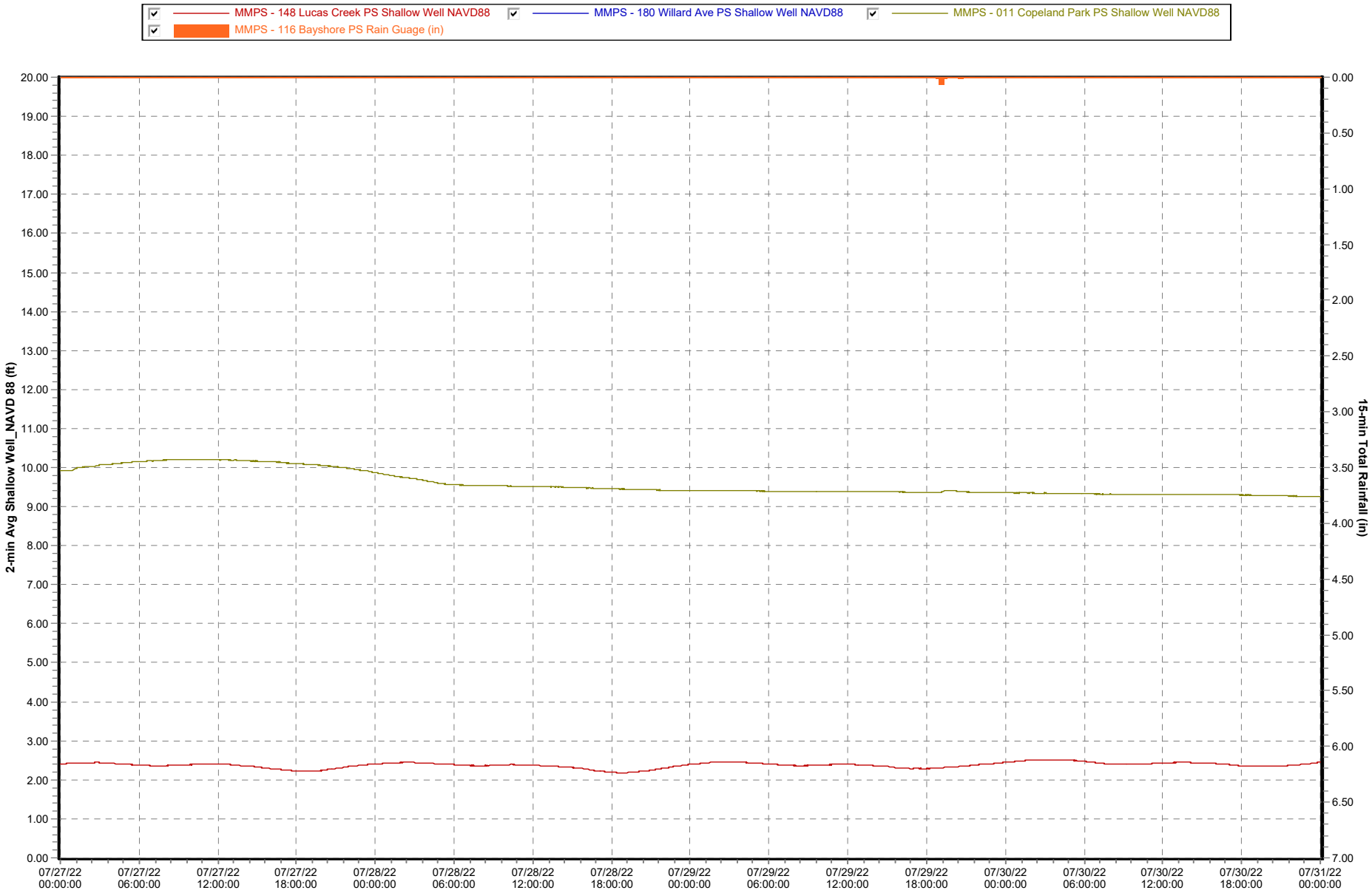
MMPS-148 (07/01/21 to 08/01/22)



5-day

North Shore Shallow Well Graphs

07/27/22 to 07/31/22



Hampton Roads Sanitation District

Post-Storm Report

August 10, 2022

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Cleaning wastewater every day for a better Bay.

DISCLAIMER:

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Before using information obtained from this server special attention should be given to the date & time of the data and products being displayed. HRSD makes best efforts to provide accurate date & time data but given the sheer volume of data we manage, there may be errors and you should not rely absolutely on any such data.

The user assumes the entire risk related to its use of these data. HRSD is providing these data 'as is,' and HRSD disclaims any and all warranties, whether express or implied, including (without limitation) any implied warranties of merchantability or fitness for a particular purpose. In no event will HRSD be liable to you or to any third party for any direct, indirect, incidental, consequential, special or exemplary damages or lost profit resulting from any use or misuse of this server or the information contained herein.

These data are part of HRSD’s governmental function and HRSD reserves all rights and immunities relating to these data and the terms and manner in which it is made available.

Summary

On August 10th, there was an approximate 9-hour rainfall event that resulted in 4 sites on the North Shore and 10 sites on the South Shore that met a 1 to 100-year rainfall recurrence interval throughout the HRSD rain gauge network. High pressure system brought a few days of very high heat into the area. This was followed by a cool front that allowed for a cluster of storms to drop into the area from the north. These storms brough heavy downpours, gusty winds, and a flood watch for most of the area. North Shore sites averaged around 1.10 inches of rain while South Shore sites averaged around 0.95 inches. There was minimal impact on groundwater levels compared to July 2021. See Appendix C for the Historical Shallow Well comparison.

No HRSD interceptor weather-related overflow(s) were reported.

HRSD flow and pressure meters met data reliability requirements per the MOM program. For all pressure meters in the aggregate and all pressure-side flow meters in the aggregate for each treatment plant service area listed below, at least 90% reliable data was achieved, based on the duration of system response to this rainfall event. The data reliability for the gravity flow meters is not included in this synopsis.

- Duration of system response: See Table Below
- Aggregate flow meter validity: 90.45%
- Aggregate pressure meter validity: 96.92%

Currently, rainfall recurrence intervals are only analyzed for a maximum of 96-hours. Rainfall analysis begins after 0.1 inches of rain has occurred. A 72-hour dry period of less than 0.1 inches of rain is typically used to signify two separate events. However, if a site returns to "dry weather" conditions prior to the next rainfall that occurs within 72 hours of the previous event, it is also considered for separate analysis. See Appendix A for the Rainfall Total System Maps.

The current criteria for publishing a post-storm analysis are the following:

- One or more rain gauge sites meet a two-year or greater RRI (rainfall recurrence interval) and at least 50% of sites in any treatment plant service area receive one inch of rainfall or greater,
- A rain gauge site meets a five-year or greater RRI, or
- A weather-related SSO occurs.

Treatment Plant Data: ***(Data obtained from Telog Database)***
See Appendix B for HRSD Treatment Plant Flows

HRSD Treatment Plant Data
8/10/2022

North Shore

Treatment Plant	Date of Peak Hourly Flow	Peak Hourly Flow (MGD)	Peak Hour	TPSA Total Rainfall Avg (in)
Boat Harbor	8/10/2022	14.90	12:00	0.25
James River	8/10/2022	33.12	17:00	1.87
Williamsburg	8/10/2022	19.51	17:00	1.41
York River	8/10/2022	15.31	17:00	0.94

HRSD Treatment Plant Data
8/10/2022

South Shore

Treatment Plant	Date of Peak Hourly Flow	Peak Hourly Flow (MGD)	Peak Hour	TPSA Total Rainfall Avg (in)
Army Base	8/10/2022	12.38	12:00	0.27
Atlantic	8/10/2022	93.35	18:00	1.51
Nansemond	8/10/2022	23.85	21:00	0.99
VIP	8/10/2022	29.52	21:00	0.27

North Shore

Weather:

Rainfall (HRSD Rainfall Gauges): *Recurrence intervals based on NOAA Atlas 14*

Rain Gauge Site	Peak Rainfall RI (Duration)	Jurisdiction
Boat Harbor Treatment Plant Service Area[1]		
Bayshore PS	DNQ	HAMP
Bridge Street Tide Gate	DNQ	HAMP
Boat Harbor	DNQ	NEWP
Copeland Park PS	DNQ	NEWP
Hampton PS 159	DNQ	HAMP
James River Treatment Plant Service Area[1]		
Hilton School PS	DNQ	NEWP
James River Main Flow (Influent)	1-year (1hr)	NEWP
Lee Hall PRS	DNQ	NEWP
Lucas Creek PS	25- to 50-year (1hr)	NEWP
Morrison PS	DNQ	NEWP
Williamsburg Treatment Plant Service Area[1]		
Ford's Colony	DNQ	JCSA
Fort Eustis PS	DNQ	NEWP
Greensprings PS	DNQ	JCA
Solarex	DNQ	JCSA
Williamsburg Main Flow (Effluent)	DNQ	JCSA
Williamsburg PS	DNQ	WILL
York Skimino Hills PS	DNQ	YORK
York River Treatment Plant Service Area[1]		
Big Bethel PRS	DNQ	HAMP
Freeman PS	DNQ	HAMP
Gloucester Court House	DNQ	GLOU
Guinea Rd at Maryus Rd	1-year (1hr)	GLOU
Ordinary PCV	DNQ	GLOU
Poquoson PS 6	DNQ	POQ
Wolf Trappe PCV	DNQ	YORK
York Kiln Creek 1 PS	5-year (1hr)	YORK
York PS 15	DNQ	YORK
York River Main Flow (Influent)	DNQ	YORK
York River Crossing (York River Rectifier)	DNQ	GLOU

Note:

1. Typical treatment plant service area.

Newport News-Williamsburg International (PHF)

- Wind and Rainfall (daily total):

Date	Gust (max)	Sustained (max)	Sustained (avg)	Direction	Rainfall (in)
8/10/22	56 mph	16 mph	9 mph	SW	2.06

Tide:

- Yorktown USCG Training Center:
  - Storm Surge: An approximate 0.1-foot storm surge was observed.

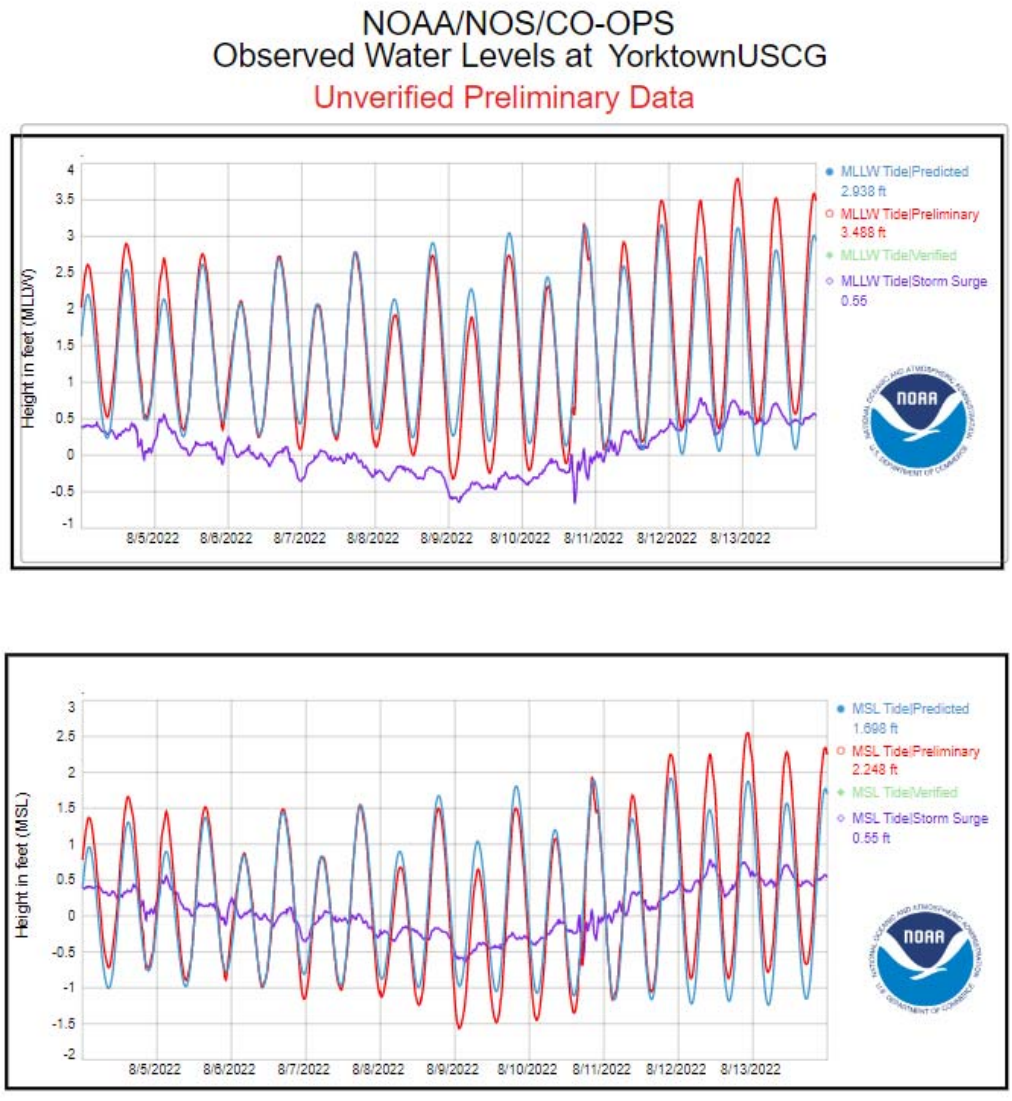


Figure 1. Preliminary data obtained from NOAA and a connection with Open Weather

- Sewells Point Tide Station:
  - Storm Surge: An approximate 0.4 foot storm surge was observed.

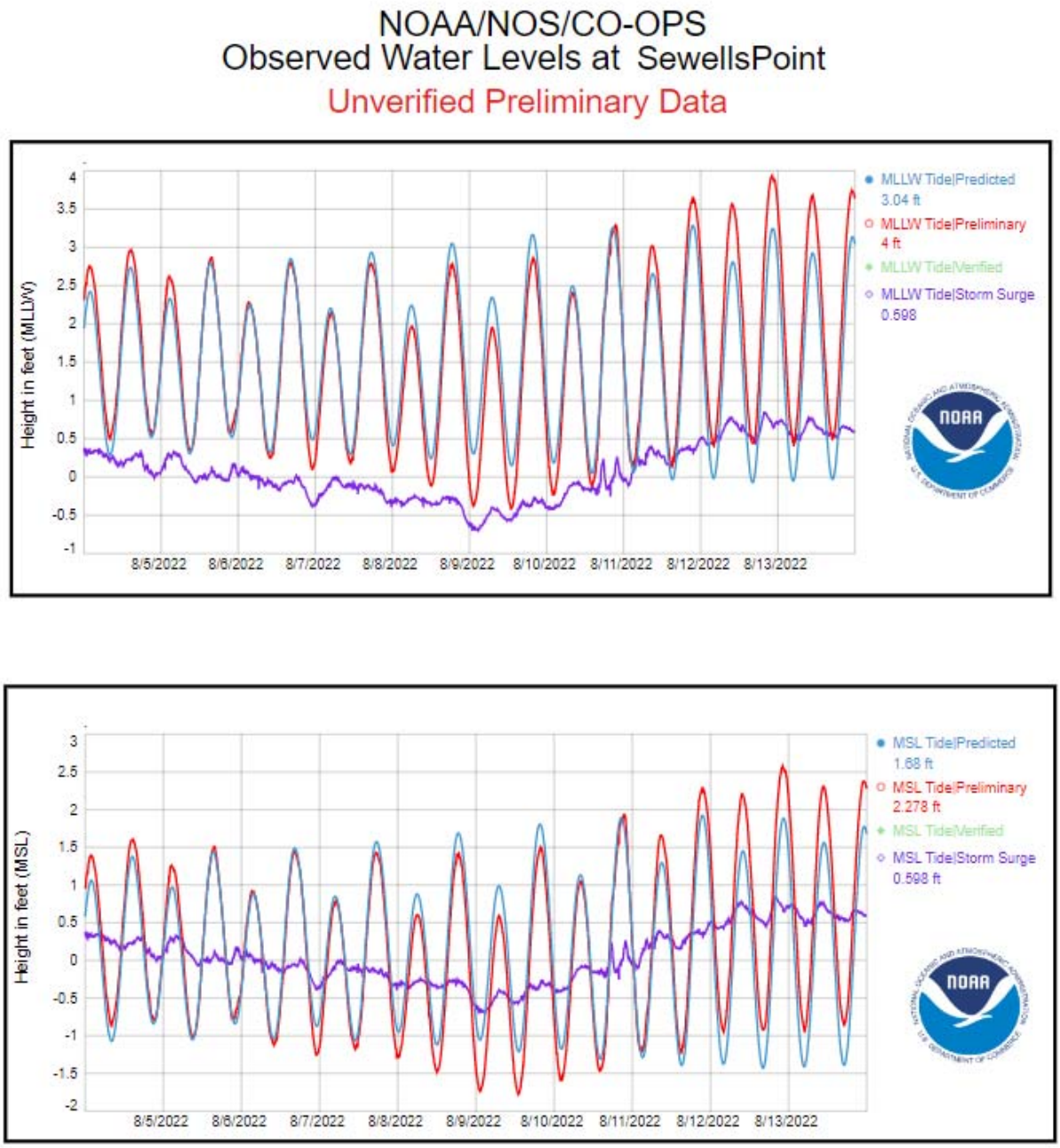


Figure 2. Preliminary data obtained from NOAA and a connection with Open Weather

South Shore

Weather:

Rainfall (HRSD Rainfall Gauges): *Recurrence intervals based on NOAA Atlas 14*

Rain Gauge Site	Peak Rainfall RI (Duration)	Jurisdiction
Army Base Treatment Plant Service Area[1]		
Bancker Rd (Dovercourt Discharge)	DNQ	NORF
Taussig Blvd PS	DNQ	NORF
Atlantic Treatment Plant Service Area[1]		
Callison at GB Locks	DNQ	CHES
Chesapeake PS 243	1-year (1hr)	CHES
Chesapeake PS 254	DNQ	CHES
Courthouse PRS	1-year (1hr)	VAB
Elbow Rd	Invalid	CHES
John B. Dey MLV-AT side	DNQ	VAB
Kempsville PRS	100-year (1hr)	VAB
Lagomar IFM at Atlantic TP	DNQ	VAB
Laskin Rd PRS	DNQ	VAB
Pine Tree PRS	DNQ	VAB
Shipps Corner PRS	2-year (1hr)	VAB
Ches-Liz Treatment Plant Service Area[1]		
Ches-Liz Weather	Disconnected	VAB
Dozier's Corner PS	DNQ	CHES
Independence PRS	2- to 5-year (1hr)	VAB
Northampton Blvd at Wesleyan Dr	DNQ	NORF
Providence PRS	25- to 50-year (1hr)	VAB
Shore Dr @ Jack Frost	DNQ	CHES
Nansemond Treatment Plant Service Area[1]		
Bowers Hill PRS	2-year (1hr)	CHES
Cedar Lane PS	DNQ	PORT
Chesapeake PS 158	DNQ	CHES
Chesapeake PS 238	DNQ	CHES
Crittenden Rd_Chuckatuck Rectifier	DNQ	SUFF
Deep Creek PRS	1- to 2-year (2hr)	CHES
Lake Kilby WTP	DNQ	SUFF
Nansemond Main Flow (Effluent)	DNQ	SUFF
Pagan River Rectifier	DNQ	IOW
Pughsville PS	DNQ	SUFF
Route 337 PRS	DNQ	CHES
Smithfield High School	DNQ	IOW
Suffolk PS	1-year (1hr)	SUFF
Suffolk PS 81	2-year (1hr)	SUFF
Suffolk PS 87	DNQ	SUFF
Windsor Duke St PS	DNQ	IOW
Windsor PCV	DNQ	SUFF

VIP Treatment Plant Service Area[1]		
Elizabeth River Crossing_Eastern Branch	DNQ	NORF
Ferebee Avenue PS	DNQ	CHES
Luxembourg Avenue PS	DNQ	NORF
Rodman Ave PS	DNQ	PORT
Va Beach Blvd PS	DNQ	NORF
VIP Main Flow (Effluent)	DNQ	NORF

Note:

1. Typical treatment plant service area.

*Duration represents the minimum amount of time it took to reach the specified RRI.

Norfolk International Airport (ORF)

- Wind and Rainfall (daily total):

Date	Gust (max)	Sustained (max)	Sustained (avg)	Direction	Rainfall (in)
8/10/2022	26 mph	13 mph	6 mph	SW	0.18

Tide:

- Sewells Point Tide Station:
  - Storm Surge: An approximate 0.4 foot storm surge was observed.

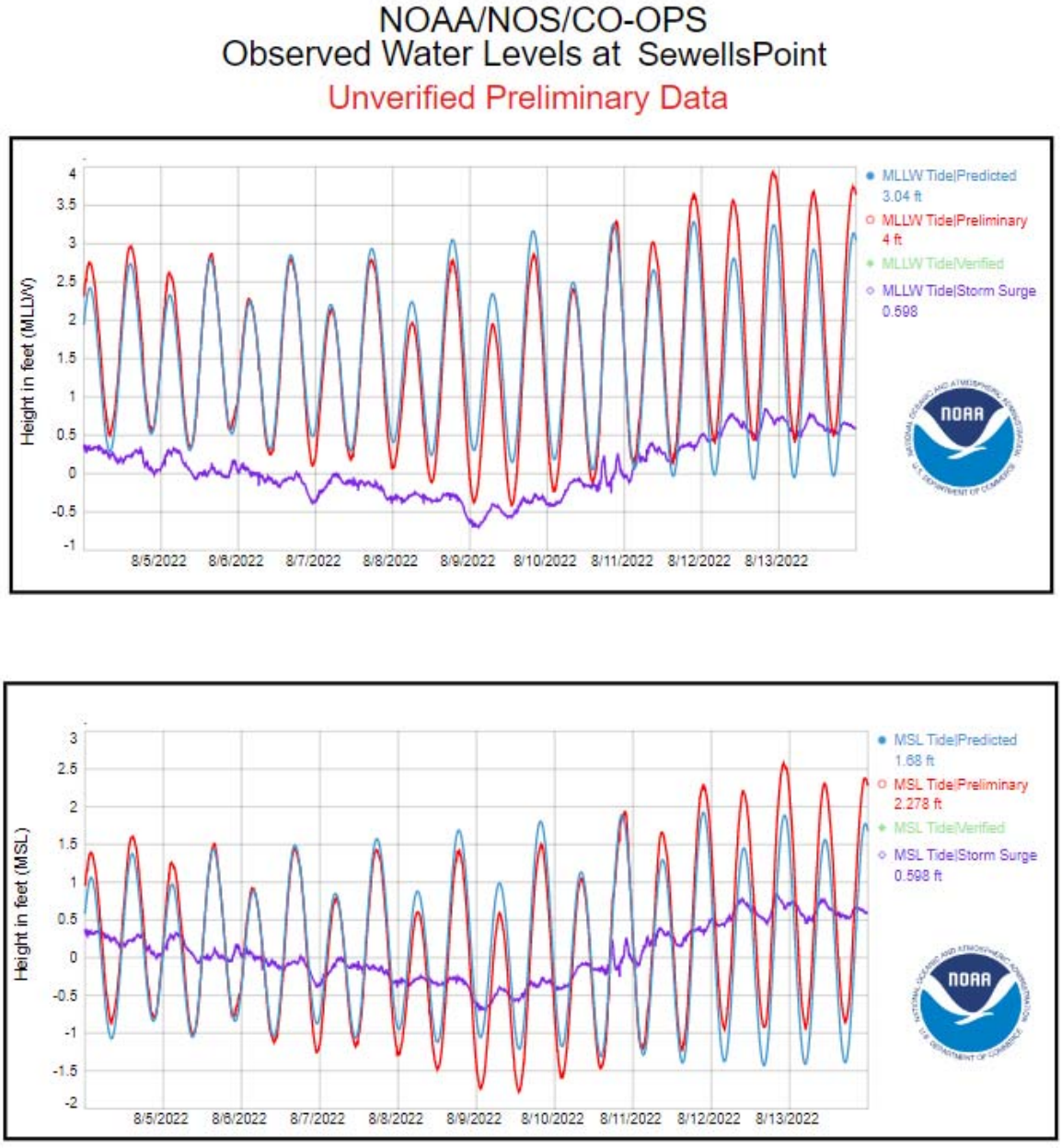


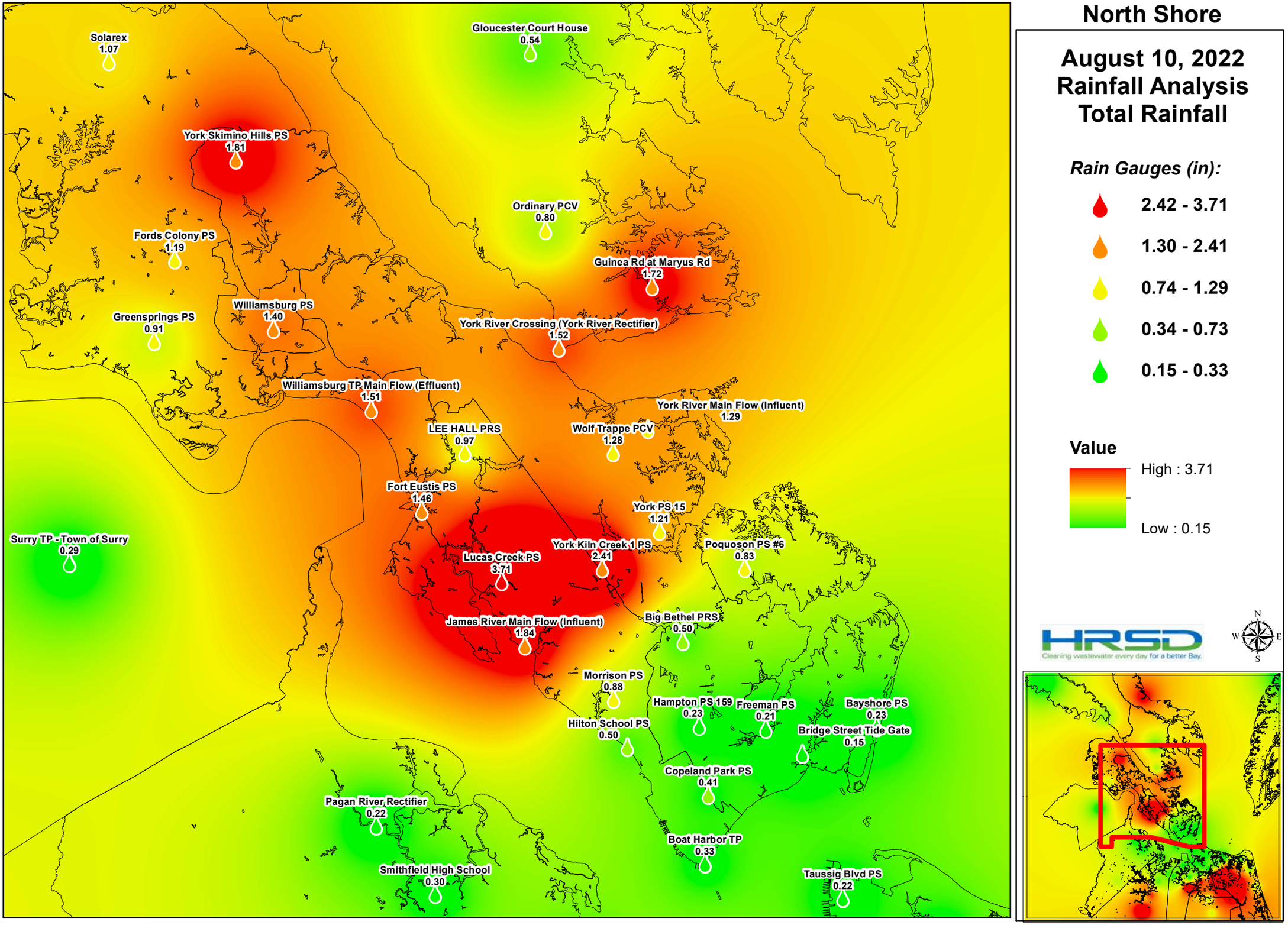
Figure 3. Preliminary data obtained from NOAA and a connection with Open Weather

Shallow Well Analysis:

Shallow wells are located at/or near HRSD Pump Stations to measure groundwater levels. The water column is measured using a pressure transducer located near the bottom of the well. The installed sensor measures gauge pressure in inches of water. The Shallow Well_NAVD88 measurement referenced in Appendix C refers to the elevation (referenced as NAVD 88) of the sensor plus the gauge measurement in feet.

Appendix A

HRSD Rain Gauge Network
Rainfall Totals



North Shore

August 10, 2022 Rainfall Analysis Total Rainfall

Rain Gauges (in):

- 2.42 - 3.71
- 1.30 - 2.41
- 0.74 - 1.29
- 0.34 - 0.73
- 0.15 - 0.33

Value

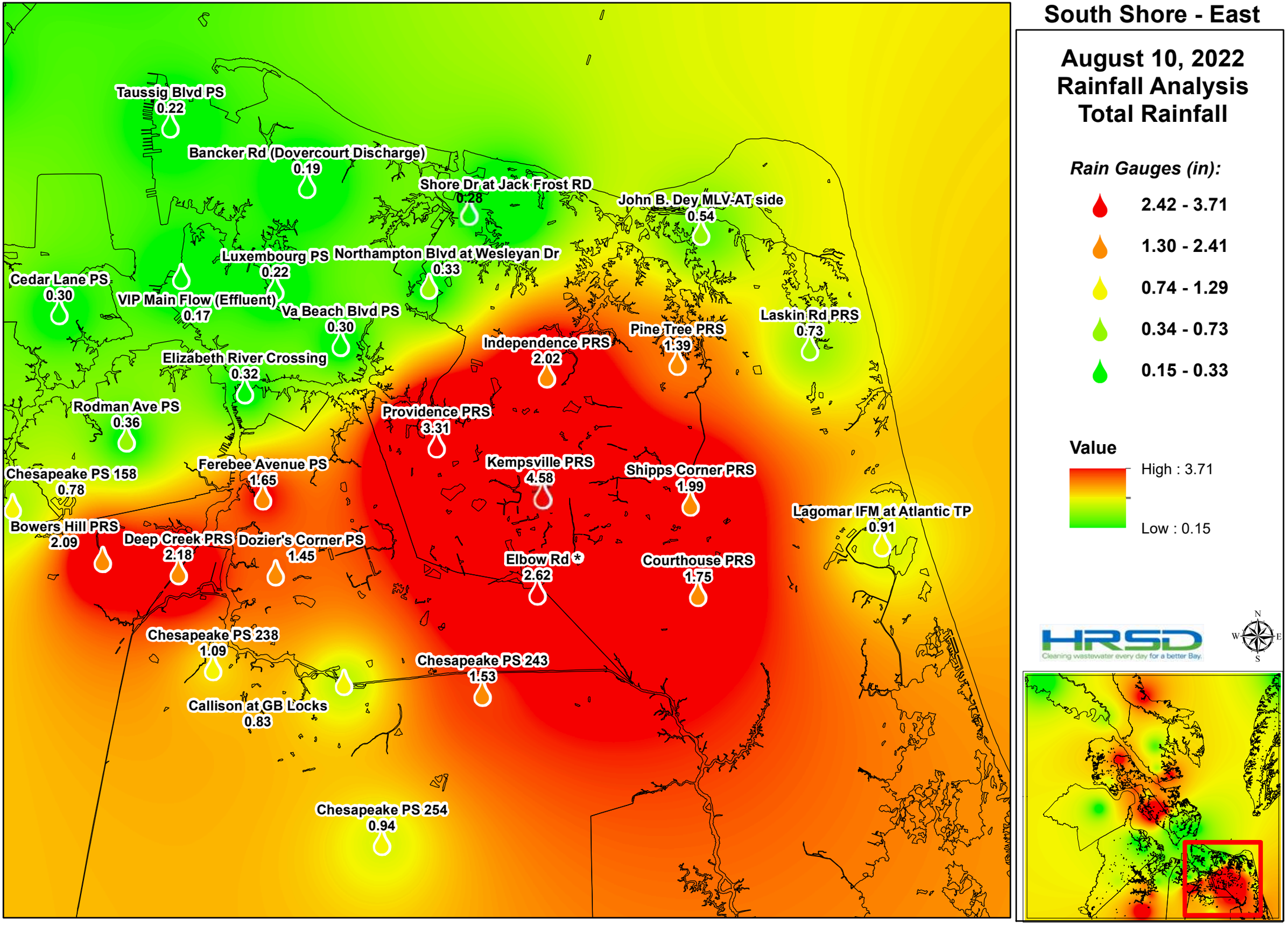
High : 3.71

Low : 0.15

HRSD
Cleaning wastewater every day for a better Bay.

N W E S

*Note: Rain Gauge was invalid for event and an average of surrounding sites was used.



South Shore - East

August 10, 2022 Rainfall Analysis Total Rainfall

Rain Gauges (in):

- 2.42 - 3.71
- 1.30 - 2.41
- 0.74 - 1.29
- 0.34 - 0.73
- 0.15 - 0.33

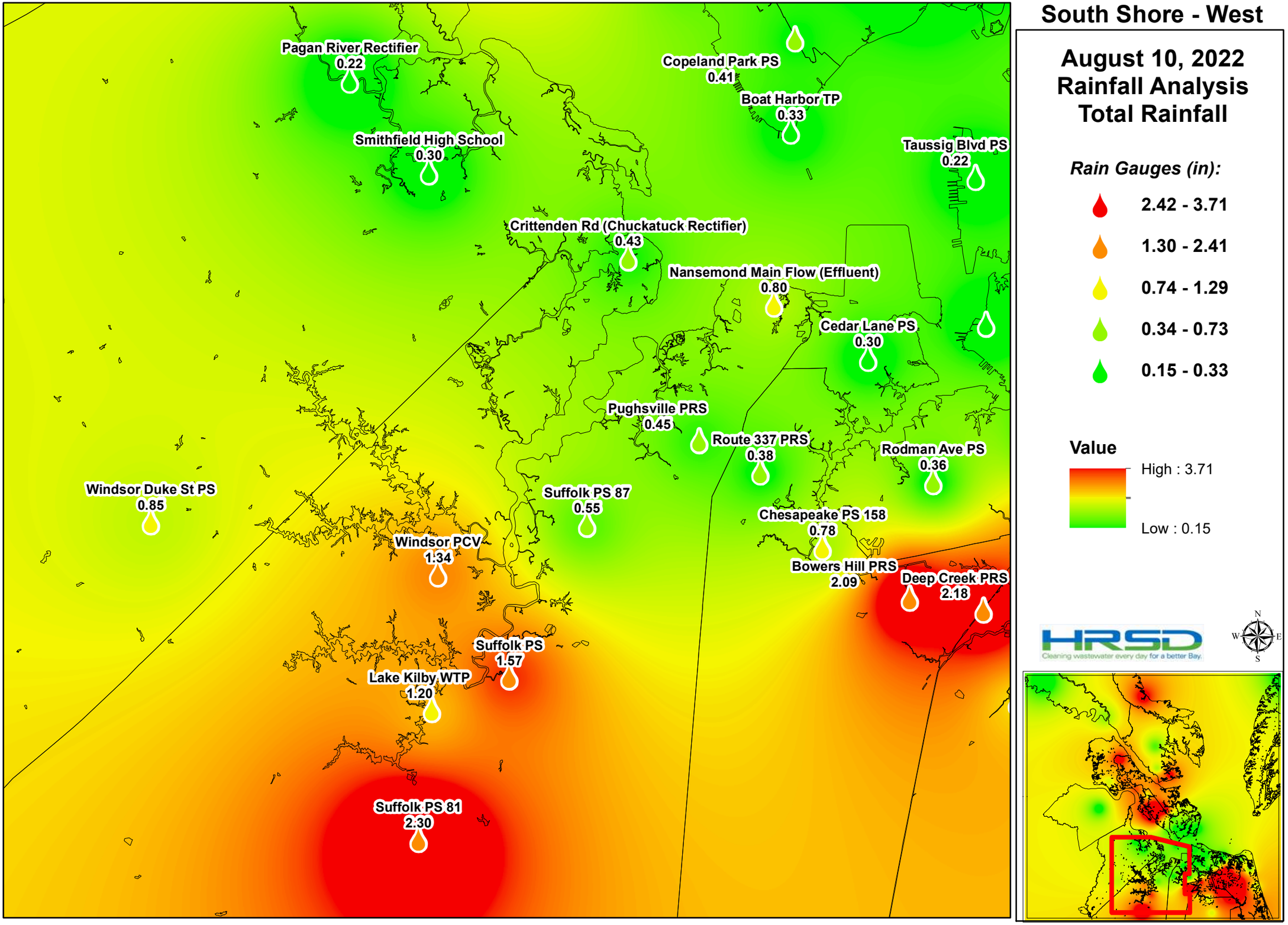
Value

High : 3.71

Low : 0.15

HRSD
Cleaning wastewater every day for a better Bay.

*Note: Rain Gauge was invalid for event and an average of surrounding sites was used.



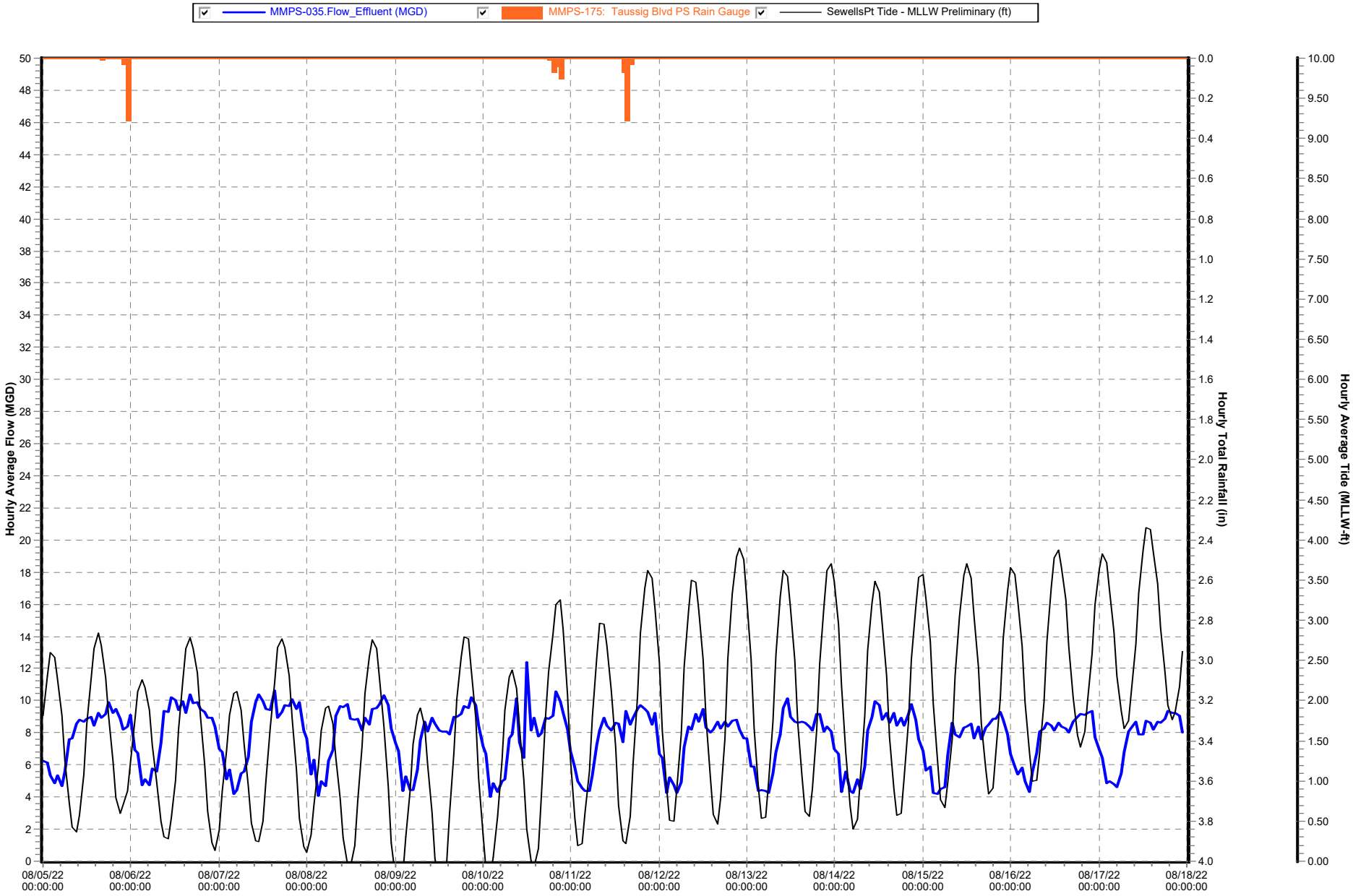
*Note: Rain Gauge was invalid for event and an average of surrounding sites was used.

Appendix B

HRSD Treatment Plant Flows

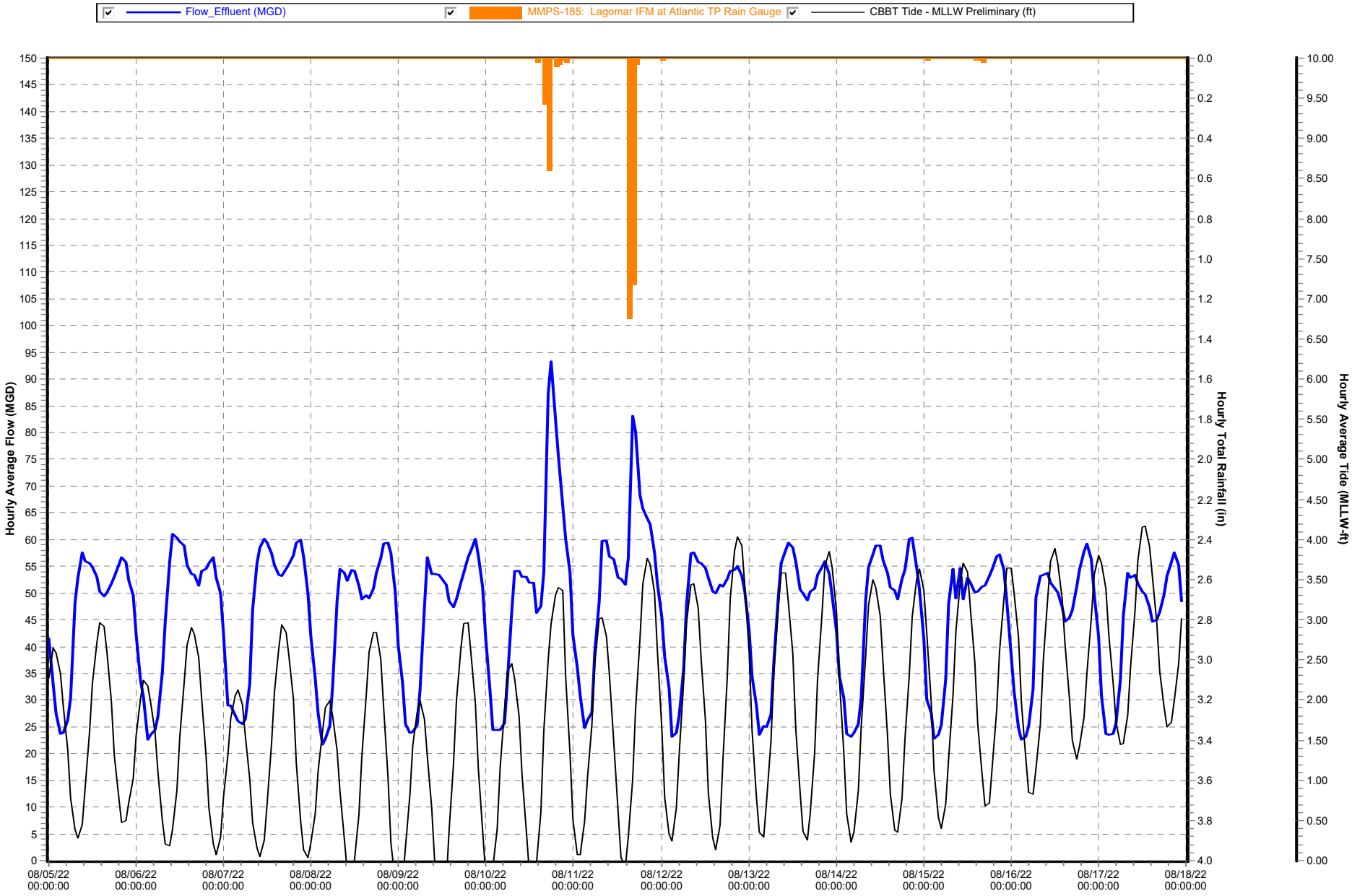
Army Base Treatment Plant

MMPS-035 (08/05/22 to 08/18/22)



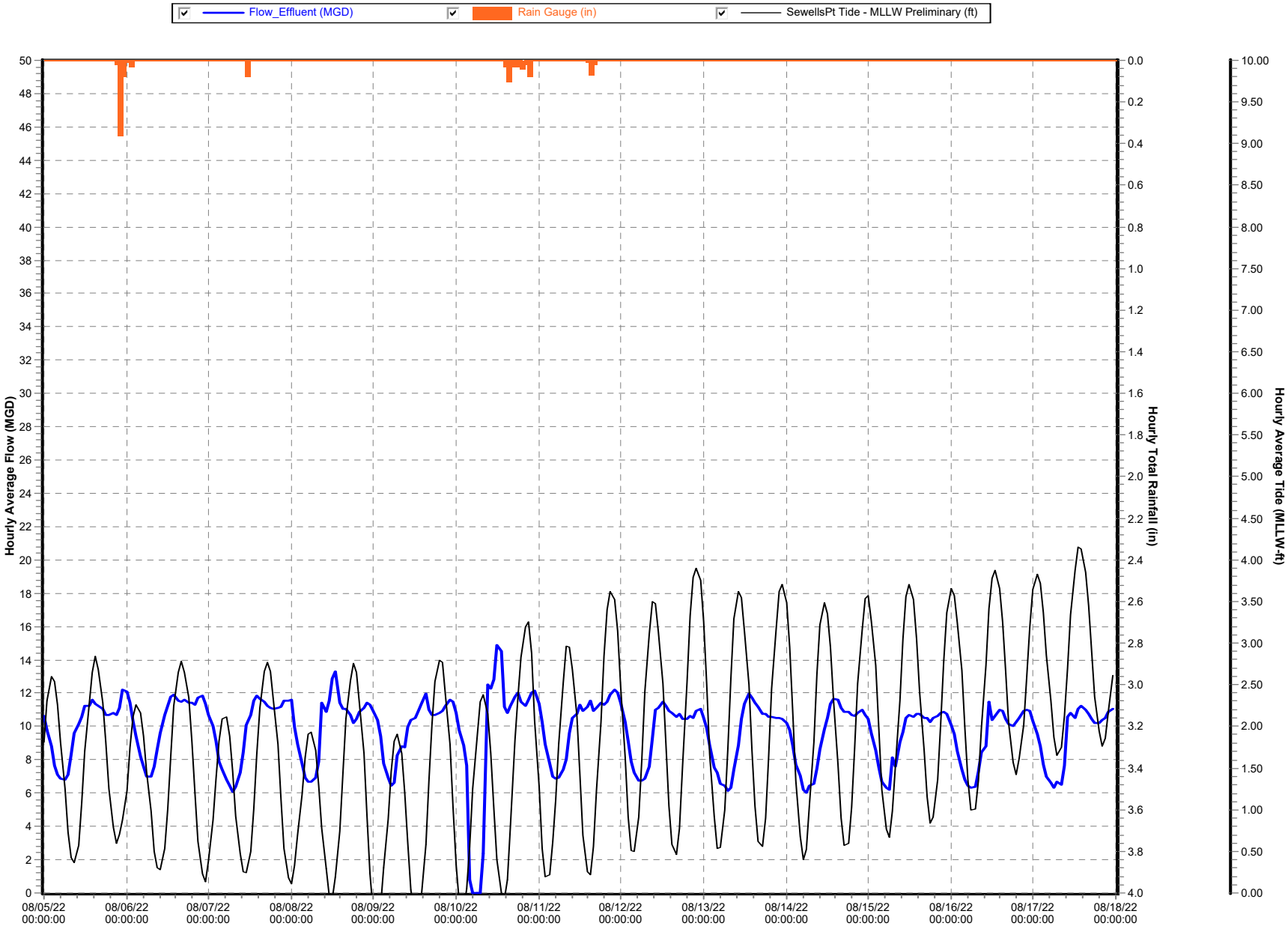
Atlantic Treatment Plant

MMPS-071 (08/05/22 to 08/18/22)



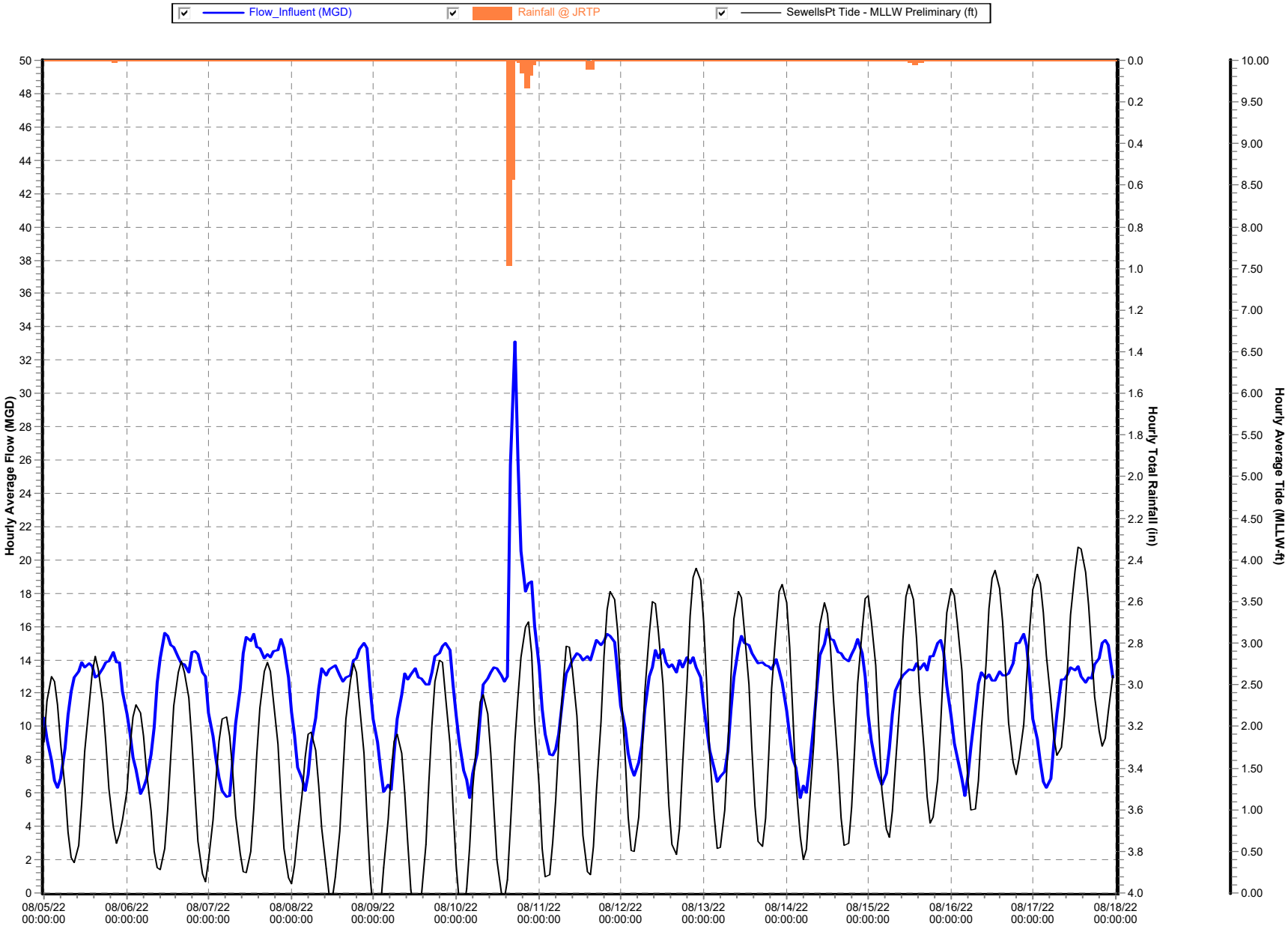
Boat Harbor Treatment Plant

MMPS-075 (08/05/22 to 08/18/22)



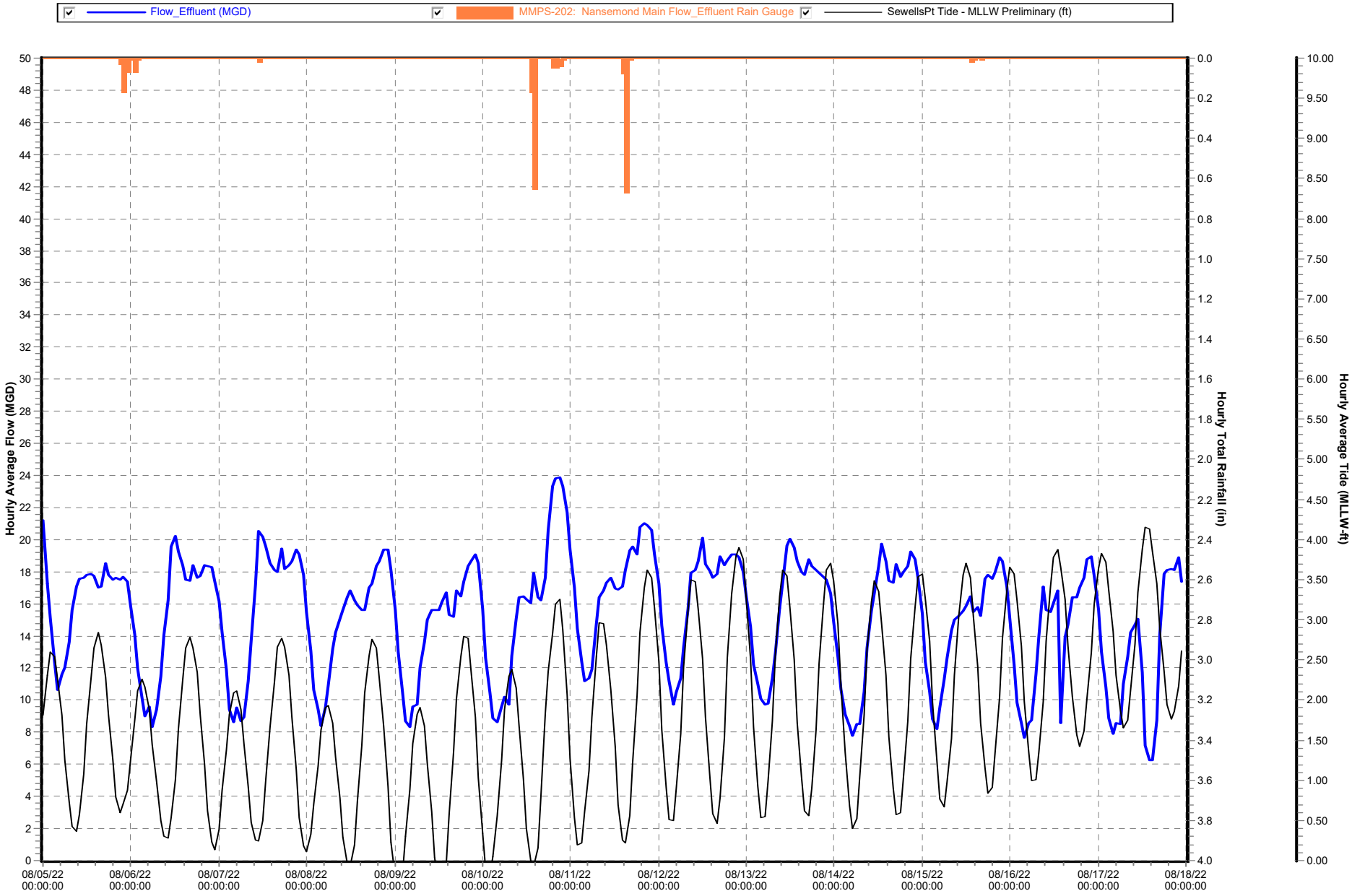
James River Treatment Plant

MMPS-184 (08/05/22 to 08/18/22)



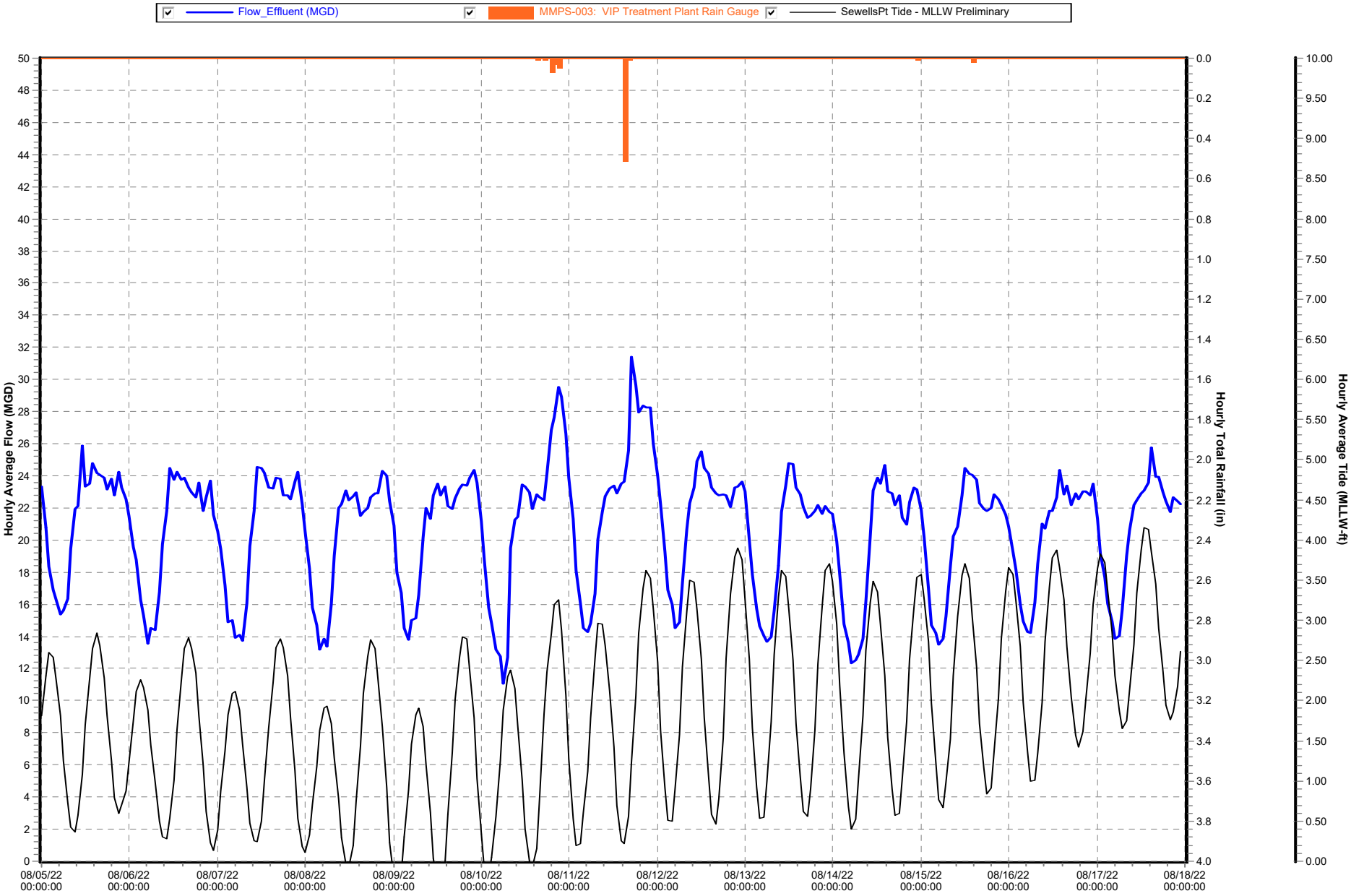
Nansemond Treatment Plant

MMPS-202 (08/05/22 to 08/18/22)



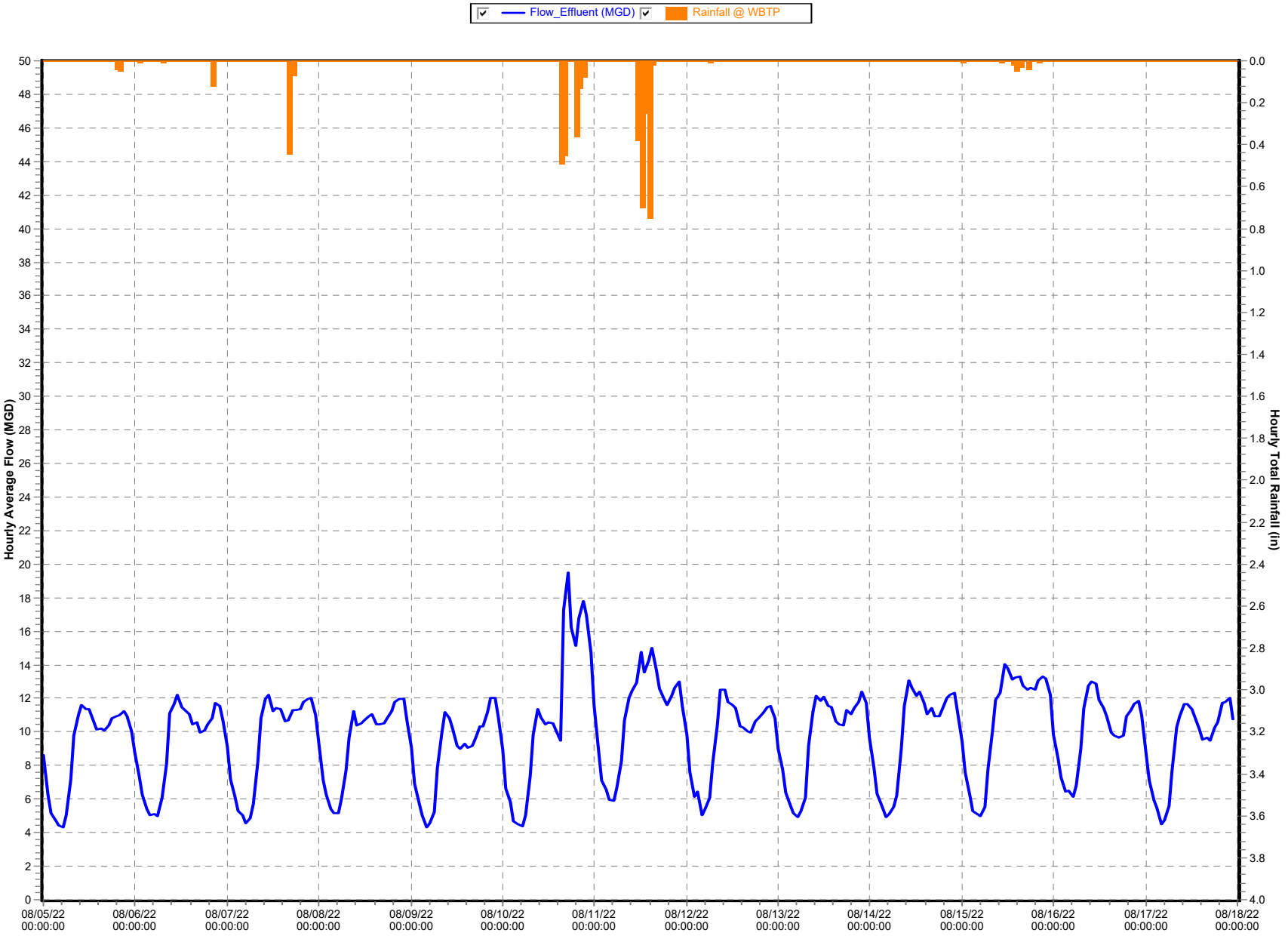
VIP Treatment Plant

MMPS-003 (08/05/22 to 08/18/22)



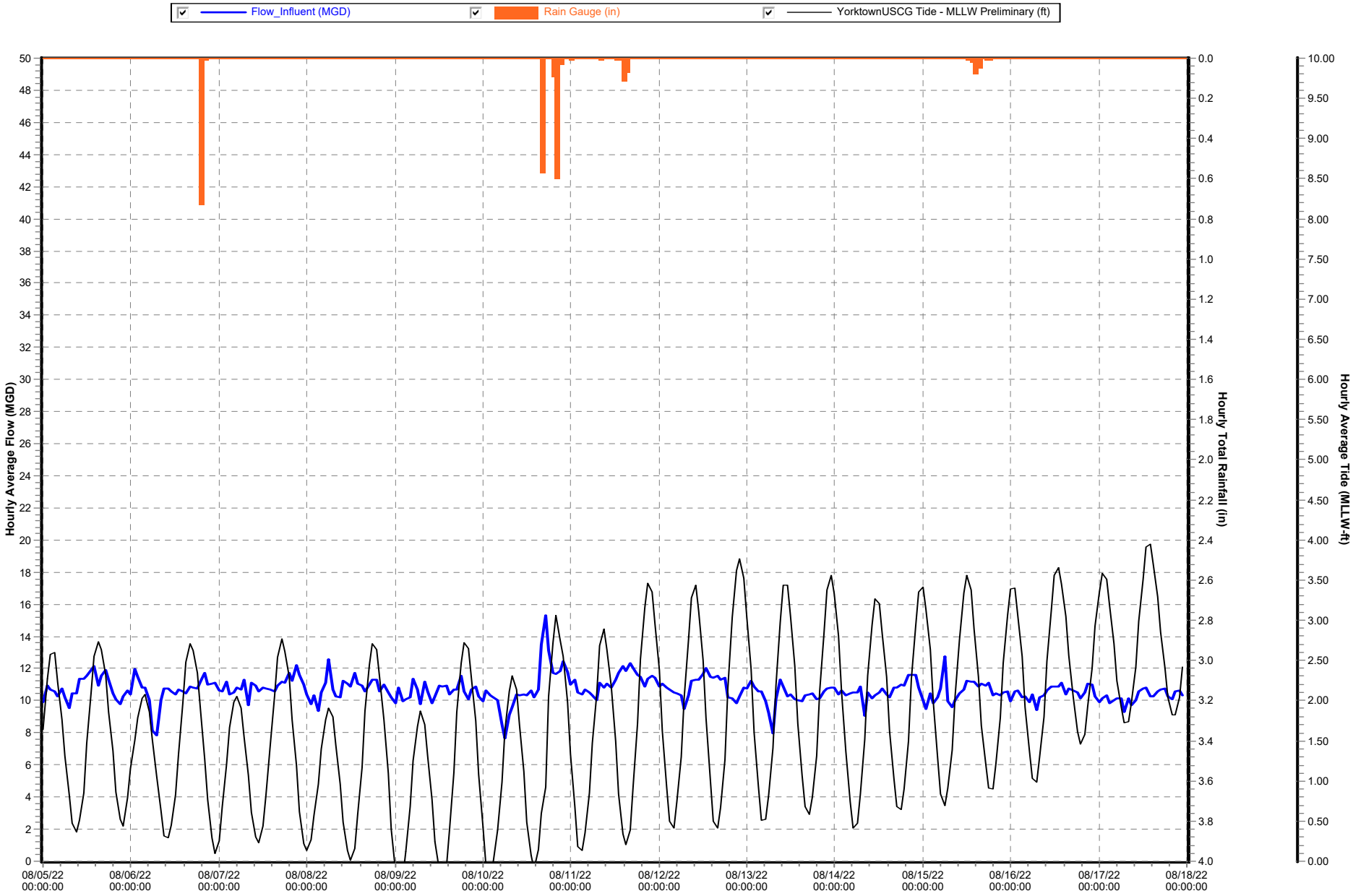
Williamsburg Treatment Plant

MMPS-222 (08/05/22 to 08/18/22)



York River Treatment Plant

MMPS-235 (08/05/22 to 08/18/22)



Appendix C

Shallow Well Analysis

1-year

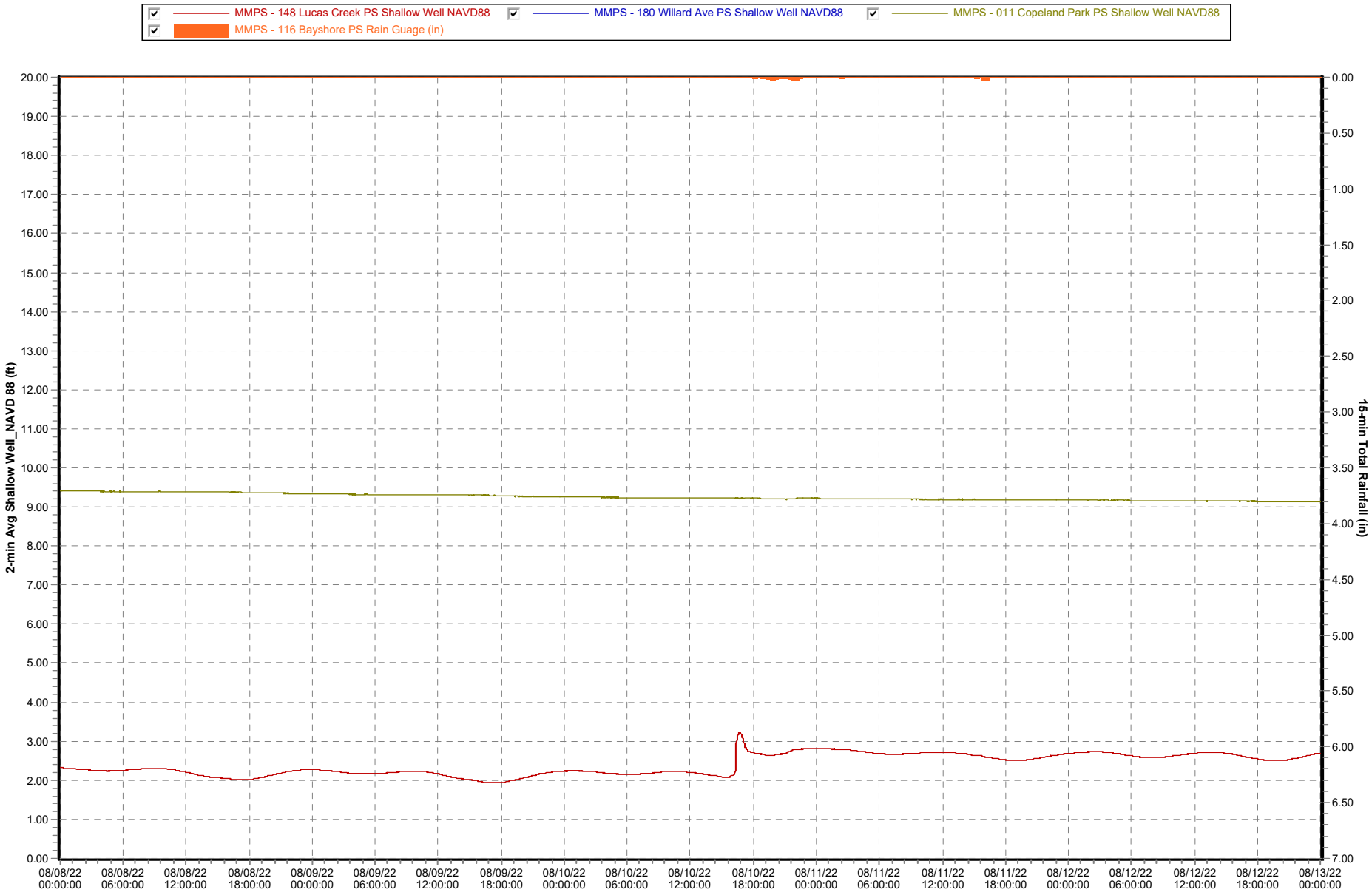
HRSD NP - Lucas Creek PS

MMPS-148 (07/01/21 to 08/30/22)

5-day

North Shore Shallow Well Graphs

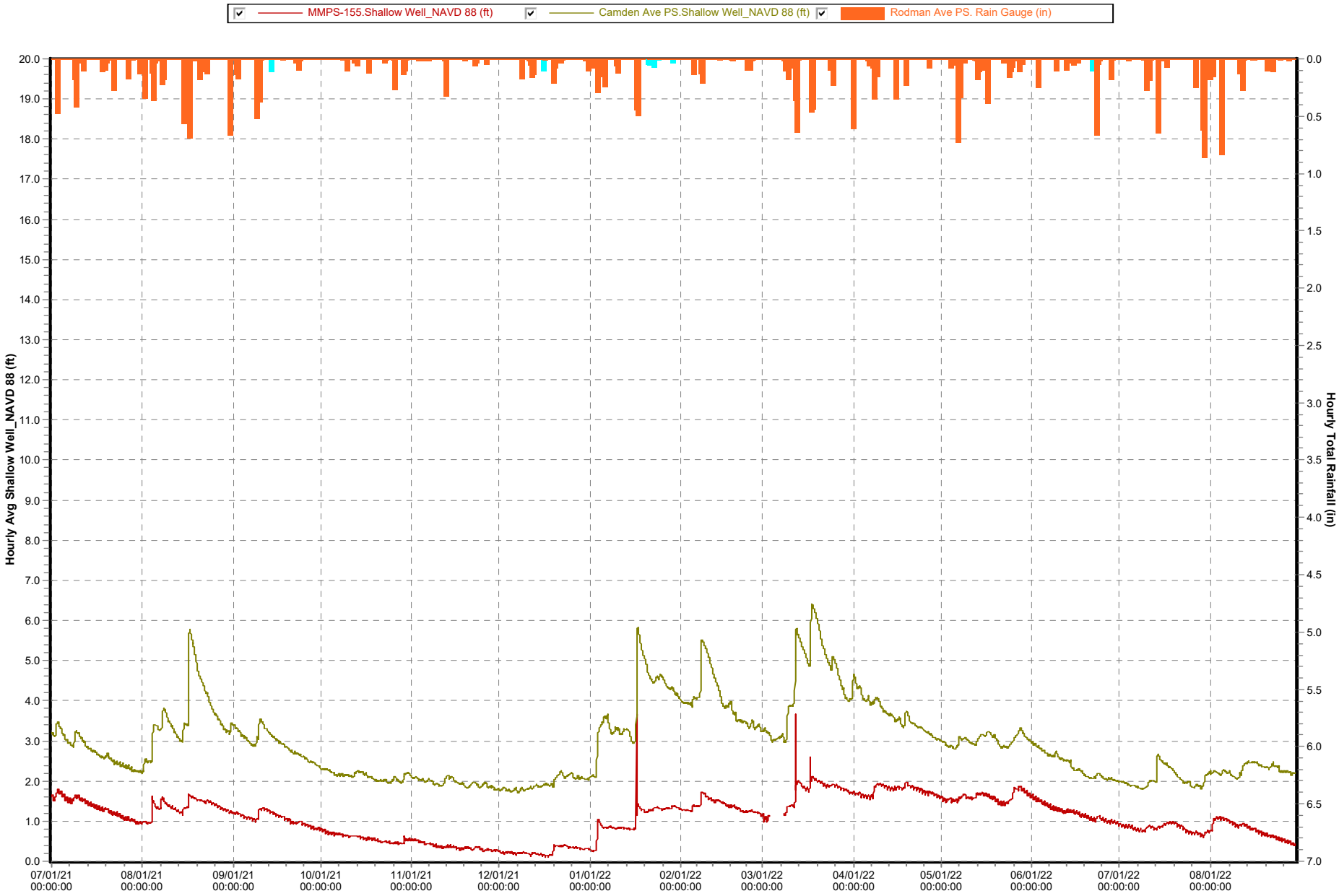
08/08/22 to 08/13/22



1-year

South Shore Shallow Well Graphs

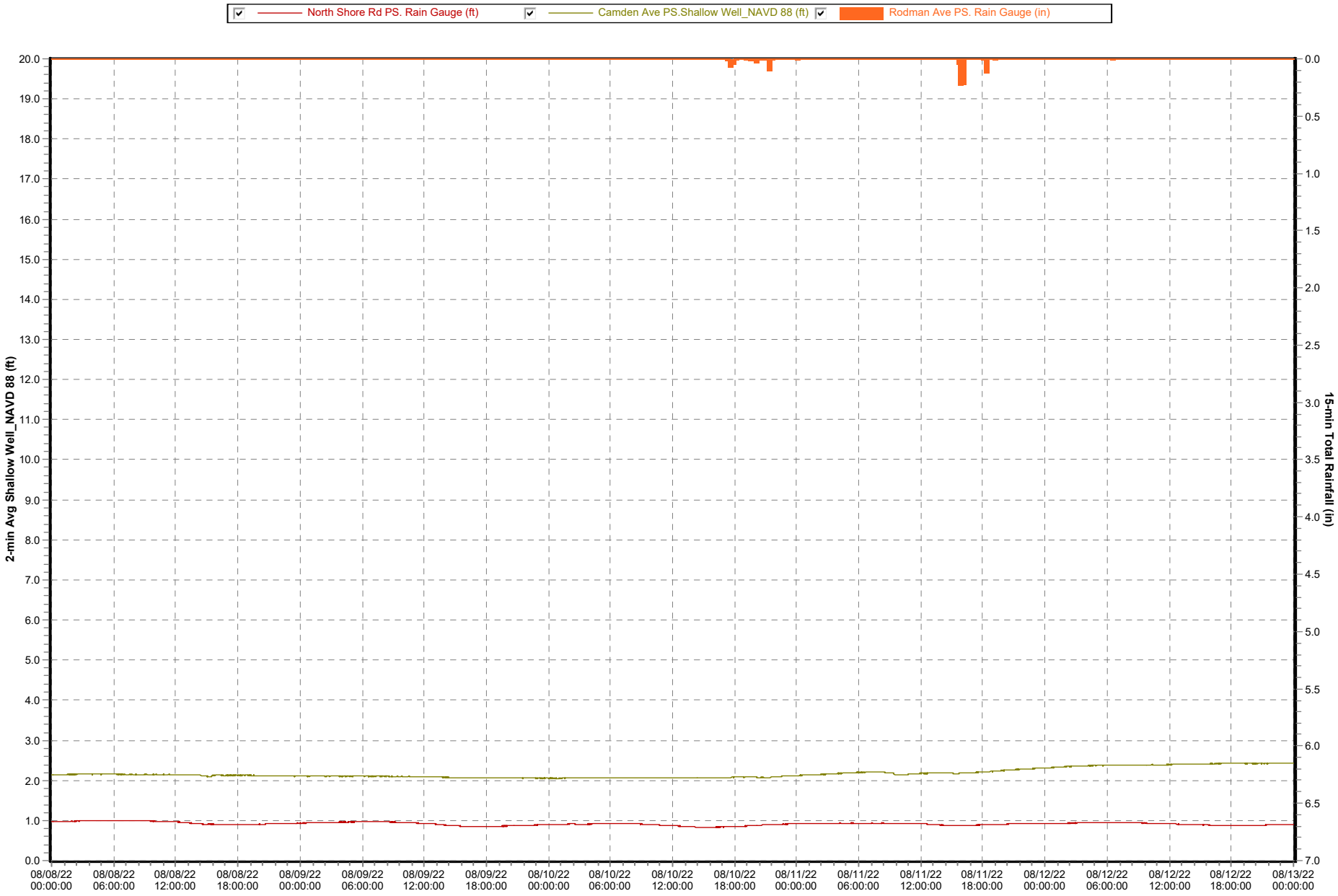
07/01/21 to 08/30/22



5-day

South Shore Shallow Well Graphs

08/08/22 to 08/13/22



Hampton Roads Sanitation District

Post-Storm Report

August 4, 2022

HRSD
Cleaning wastewater every day for a better Bay.

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This report is intended to provide the HRSD regional community summary information about the HRSD system during select wet weather events/anomalies. The attached report contains a selection of *official* Interceptor and Treatment data, as well as other environmental and meteorological data provided through other services. In an effort to enhance the HRSD system, the attached products have been made accessible on this server and care must be taken when using such products as they are intended for informational and not operational, legal, or other purposes.

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Summary

On August 4th, there was an approximate 6-hour rainfall event that resulted in 0 sites on the North Shore and 5 site on the South Shore that met a 1 to 50-year rainfall recurrence interval throughout the HRSD rain gauge network. High heat and lots of sunshine brought afternoon pop up storms into some parts of the region. Suffolk and the Nansemond SA were impacted by these pop-up storms the most. North Shore sites averaged around 0.11 inches of rain while South Shore sites averaged around 0.40 inches. There was minimal impact on groundwater levels compared to July 2021. See Appendix C for the Historical Shallow Well comparison.

One Locality interceptor weather-related overflow(s) were reported.

HRSD flow and pressure meters met data reliability requirements per the MOM program. For all pressure meters in the aggregate for each treatment plant service area listed below, at least 90% reliable data was achieved, based on the duration of system response to this rainfall event. The pressure-side flow meters in the aggregate for this event, were under 90% reliable. The data reliability for the gravity flow meters is not included in this synopsis.

- Duration of system response: See Table Below
- Aggregate flow meter validity: 89.51%
- Aggregate pressure meter validity: 98.43%

Currently, rainfall recurrence intervals are only analyzed for a maximum of 96-hours. Rainfall analysis begins after 0.1 inches of rain has occurred. A 72-hour dry period of less than 0.1 inches of rain is typically used to signify two separate events. However, if a site returns to "dry weather" conditions prior to the next rainfall that occurs within 72 hours of the previous event, it is also considered for separate analysis. See Appendix A for the Rainfall Total System Maps.

The current criteria for publishing a post-storm analysis are the following:

- One or more rain gauge sites meet a two-year or greater RRI (rainfall recurrence interval) and at least 50% of sites in any treatment plant service area receive one inch of rainfall or greater,
- A rain gauge site meets a five-year or greater RRI, or
- A weather-related SSO occurs.

Sanitary Sewer Overflows:

Small Communities

Location	Jurisdiction	Start Date
West Constance Rd	Suffolk	08/4/2022

Treatment Plant Data: ***(Data obtained from Telog Database)***
See Appendix B for HRSD Treatment Plant Flows

HRSD Treatment Plant Data
8/4/2022

South Shore				
Treatment Plant	**Date of Peak Hourly Flow**	**Peak Hourly Flow (MGD)**	**Peak Hour**	**TPSA Total Rainfall Avg (in)**
Army Base	8/4/2022	9.73	20:00	0.03
Atlantic	8/4/2022	61.75	19:00	0.01
Nansemond	8/4/2022	26.91	20:00	0.90
VIP	8/4/2022	31.58	20:00	0.33

South Shore

Weather:

Rainfall (HRSD Rainfall Gauges): *Recurrence intervals based on NOAA Atlas 14*

Rain Gauge Site	Peak Rainfall RI (Duration)	Jurisdiction
Army Base Treatment Plant Service Area[1]		
Bancker Rd (Dovercourt Discharge)	DNQ	NORF
Taussig Blvd PS	DNQ	NORF
Atlantic Treatment Plant Service Area[1]		
Callison at GB Locks	DNQ	CHES
Chesapeake PS 243	DNQ	CHES
Chesapeake PS 254	DNQ	CHES
Courthouse PRS	DNQ	VAB
Elbow Rd	DNQ	CHES
John B. Dey MLV-AT side	DNQ	VAB
Kempsville PRS	DNQ	VAB
Lagomar IFM at Atlantic TP	DNQ	VAB
Laskin Rd PRS	DNQ	VAB
Pine Tree PRS	DNQ	VAB
Shipps Corner PRS	DNQ	VAB

Ches-Liz Treatment Plant Service Area[1]		
Ches-Liz Weather	DNQ	VAB
Dozier's Corner PS	DNQ	CHES
Independence PRS	DNQ	VAB
Northampton Blvd at Wesleyan Dr	DNQ	NORF
Providence PRS	DNQ	VAB
Shore Dr @ Jack Frost	DNQ	CHES
Nansemond Treatment Plant Service Area[1]		
Bowers Hill PRS	DNQ	CHES
Cedar Lane PS	DNQ	PORT
Chesapeake PS 158	DNQ	CHES
Chesapeake PS 238	DNQ	CHES
Crittenden Rd_Chuckatuck Rectifier	DNQ	SUFF
Deep Creek PRS	DNQ	CHES
Lake Kilby WTP	2- to 5-year (1hr)	SUFF
Nansemond Main Flow (Effluent)	DNQ	SUFF
Pagan River Rectifier	DNQ	IOW
Pughsville PS	DNQ	SUFF
Route 337 PRS	DNQ	CHES
Smithfield High School	DNQ	IOW
Suffolk PS	5-year (1hr)	SUFF
Suffolk PS 81	DNQ	SUFF
Suffolk PS 87	2-year (1hr)	SUFF
Windsor Duke St PS	Invalid	IOW
Windsor PCV	25- to 50-year (1hr)	SUFF
VIP Treatment Plant Service Area[1]		
Elizabeth River Crossing_Eastern Branch	DNQ	NORF
Ferebee Avenue PS	DNQ	CHES
Luxembourg Avenue PS	DNQ	NORF
Rodman Ave PS	1-year (1hr)	PORT
Va Beach Blvd PS	DNQ	NORF
VIP Main Flow (Effluent)	DNQ	NORF

Note:

1. Typical treatment plant service area.

*Duration represents the minimum amount of time it took to reach the specified RRI.

Norfolk International Airport (ORF)

- Wind and Rainfall (daily total):

Date	Gust (max)	Sustained (max)	Sustained (avg)	Direction	Rainfall (in)
8/4/2022	24 mph	9 mph	3 mph	SSW	0.00

Tide:

- Sewells Point Tide Station:
  - Storm Surge: An approximate 0.3 foot storm surge was observed.

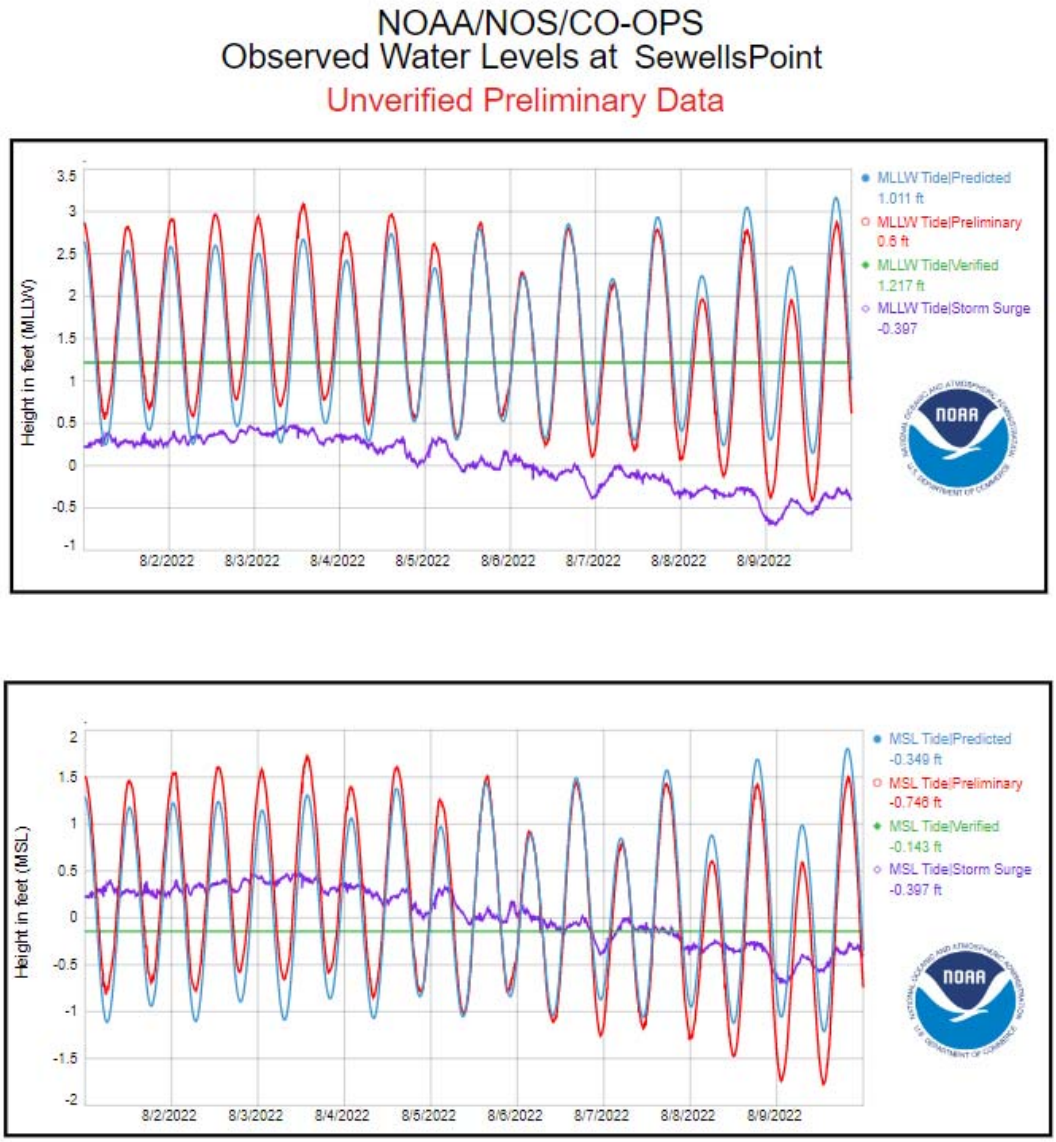


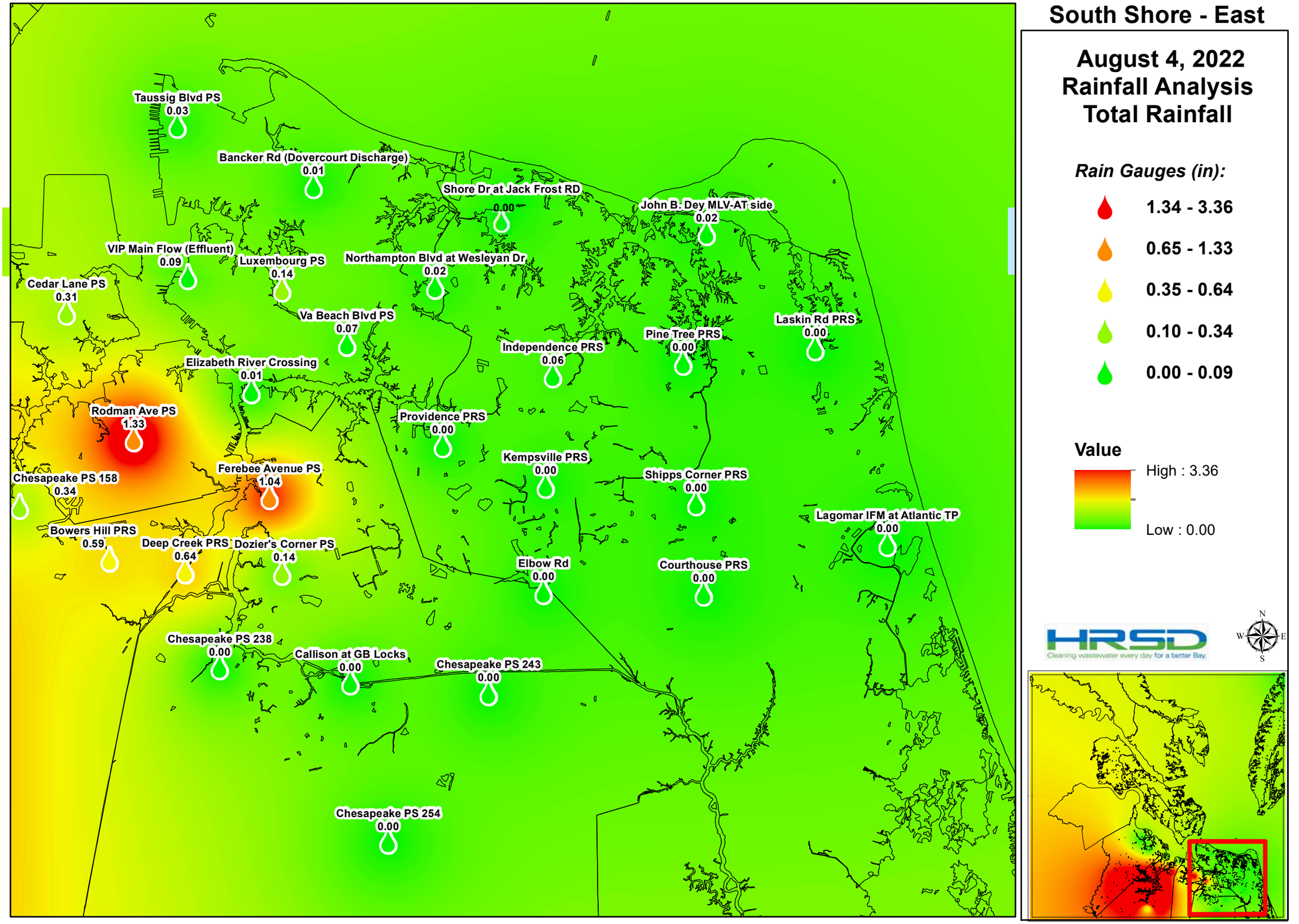
Figure 3. Preliminary data obtained from NOAA and a connection with Open Weather

Shallow Well Analysis:

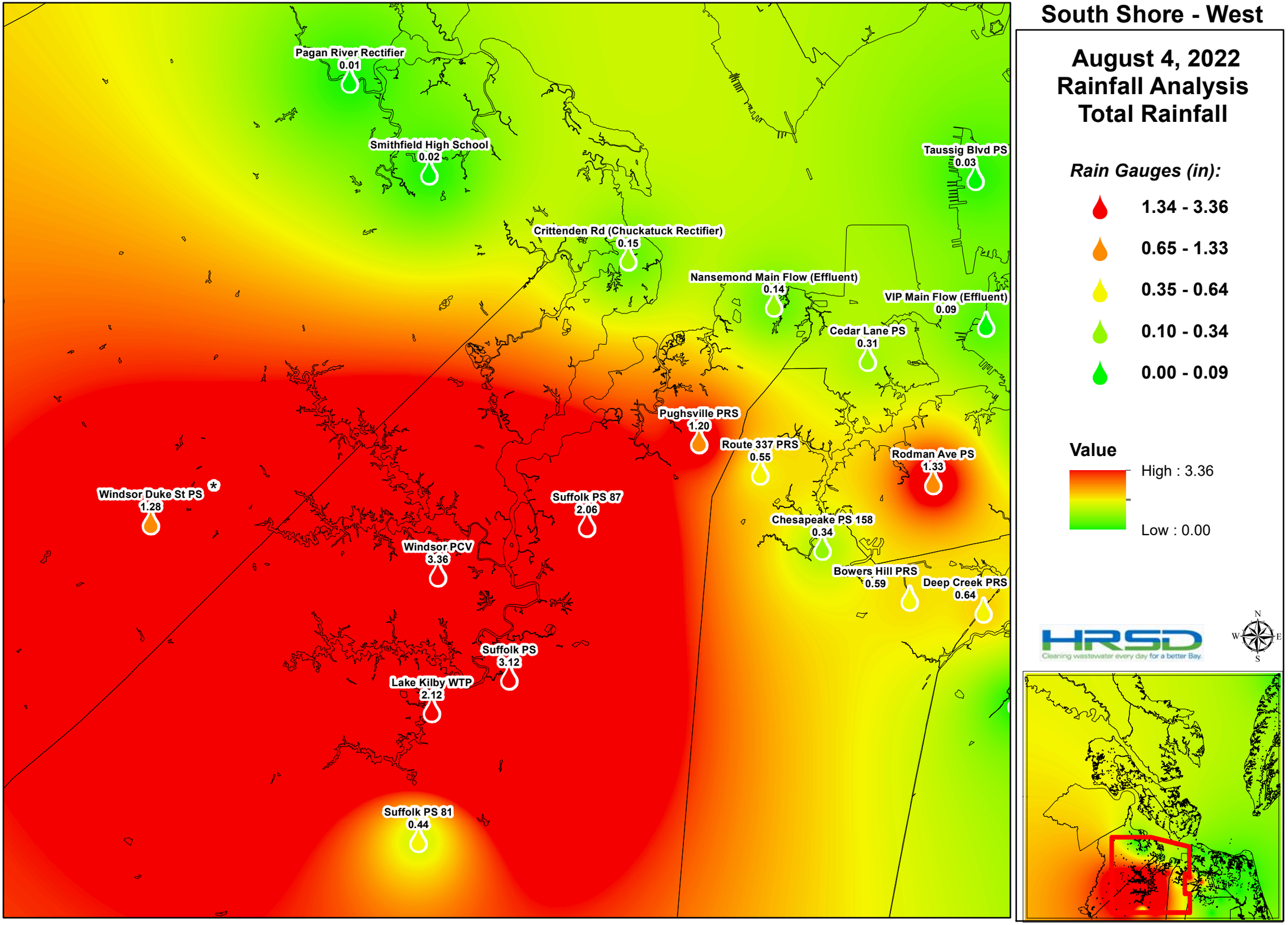
Shallow wells are located at/or near HRSD Pump Stations to measure groundwater levels. The water column is measured using a pressure transducer located near the bottom of the well. The installed sensor measures gauge pressure in inches of water. The Shallow Well_NAVD88 measurement referenced in Appendix C refers to the elevation (referenced as NAVD 88) of the sensor plus the gauge measurement in feet.

Appendix A

HRSD Rain Gauge Network
Rainfall Totals



*Note: Rain Gauge was invalid for event and an average of surrounding sites was used.



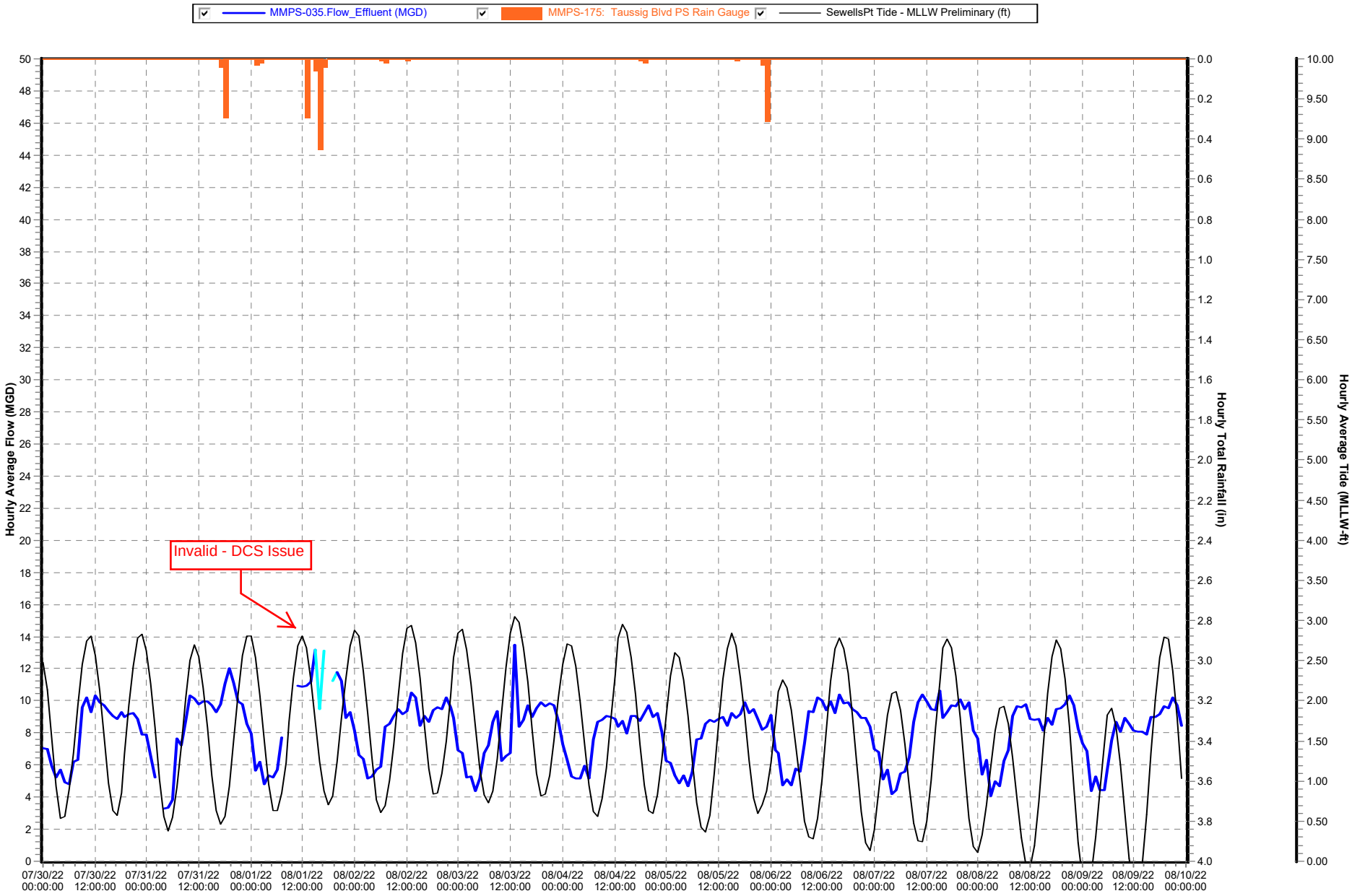
*Note: Rain Gauge was invalid for event and an average of surrounding sites was used.

Appendix B

HRSD Treatment Plant Flows

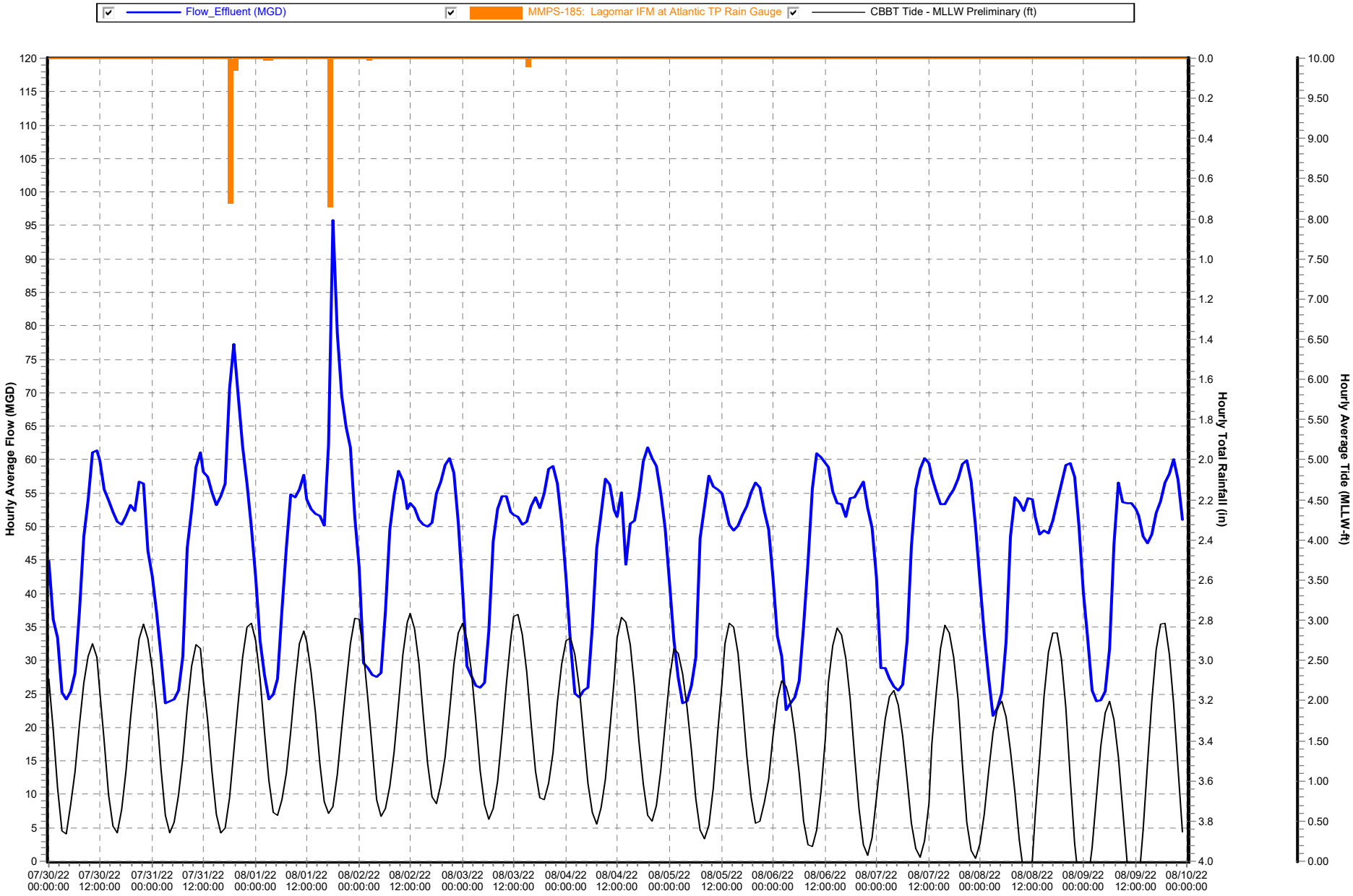
Army Base Treatment Plant

MMPS-035 (07/30/22 to 08/10/22)



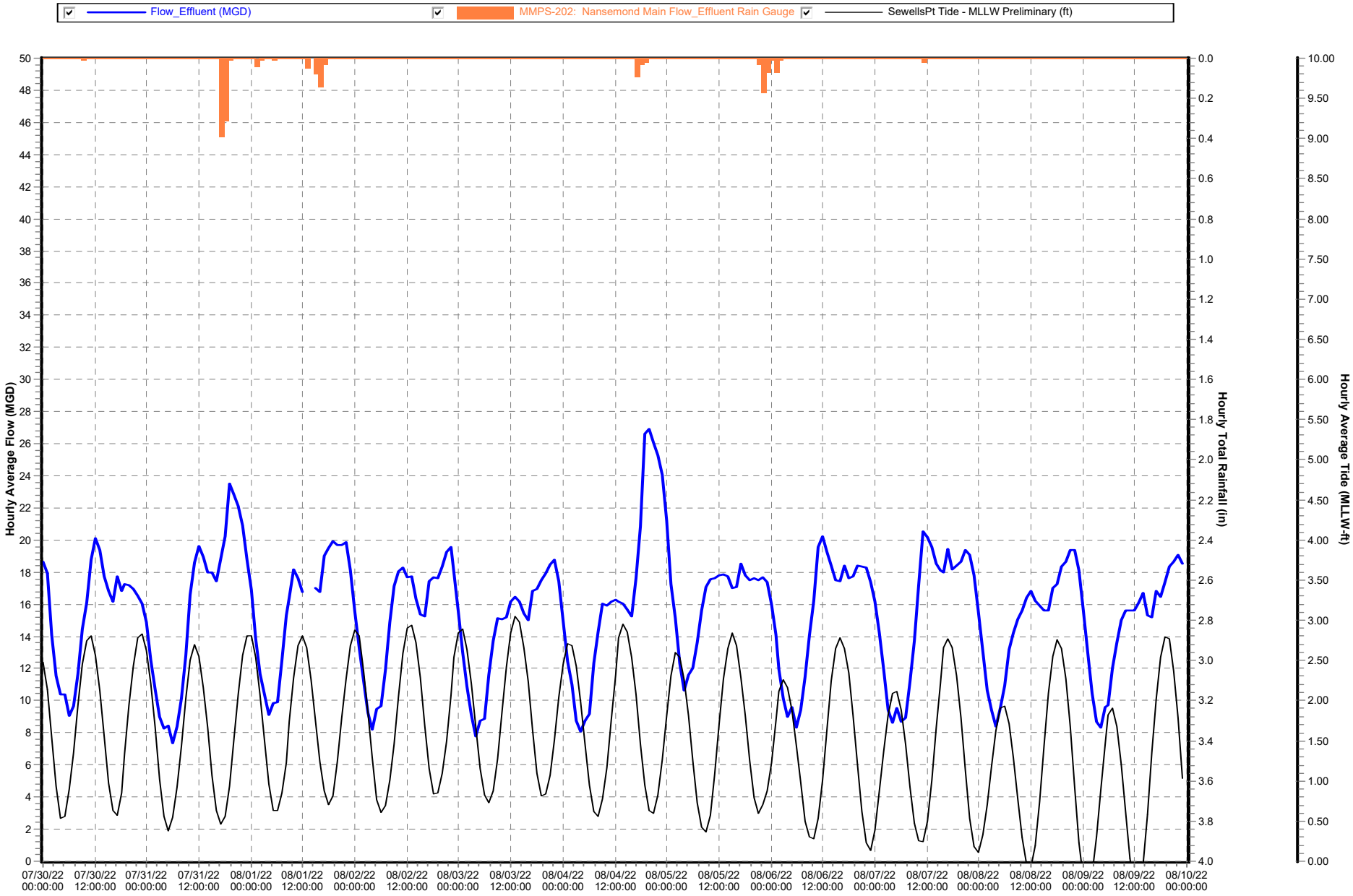
Atlantic Treatment Plant

MMPS-071 (07/30/22 to 08/10/22)



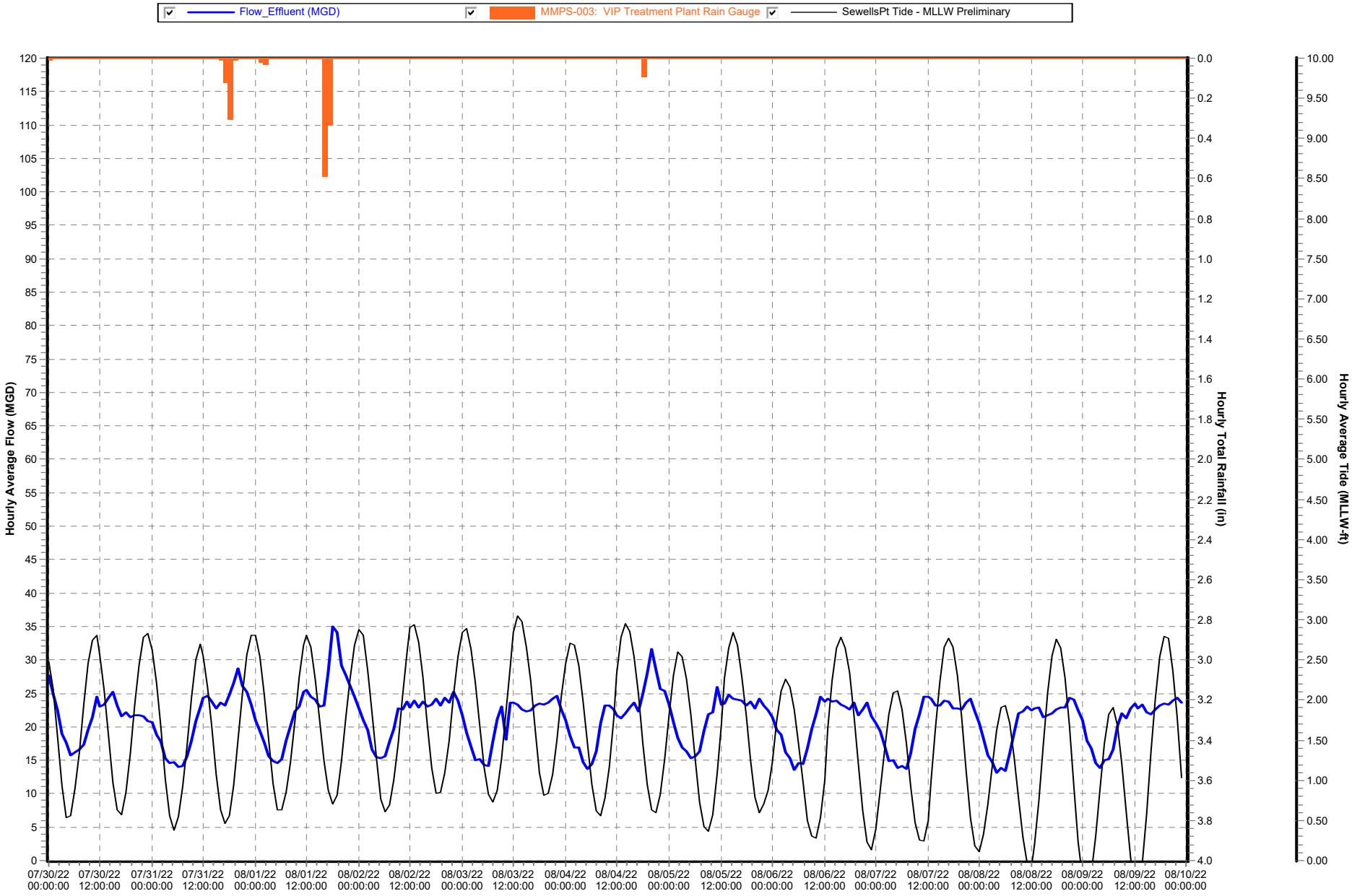
Nansemond Treatment Plant

MMPS-202 (07/30/22 to 08/10/22)



VIP Treatment Plant

MMPS-003 (07/30/22 to 08/10/22)

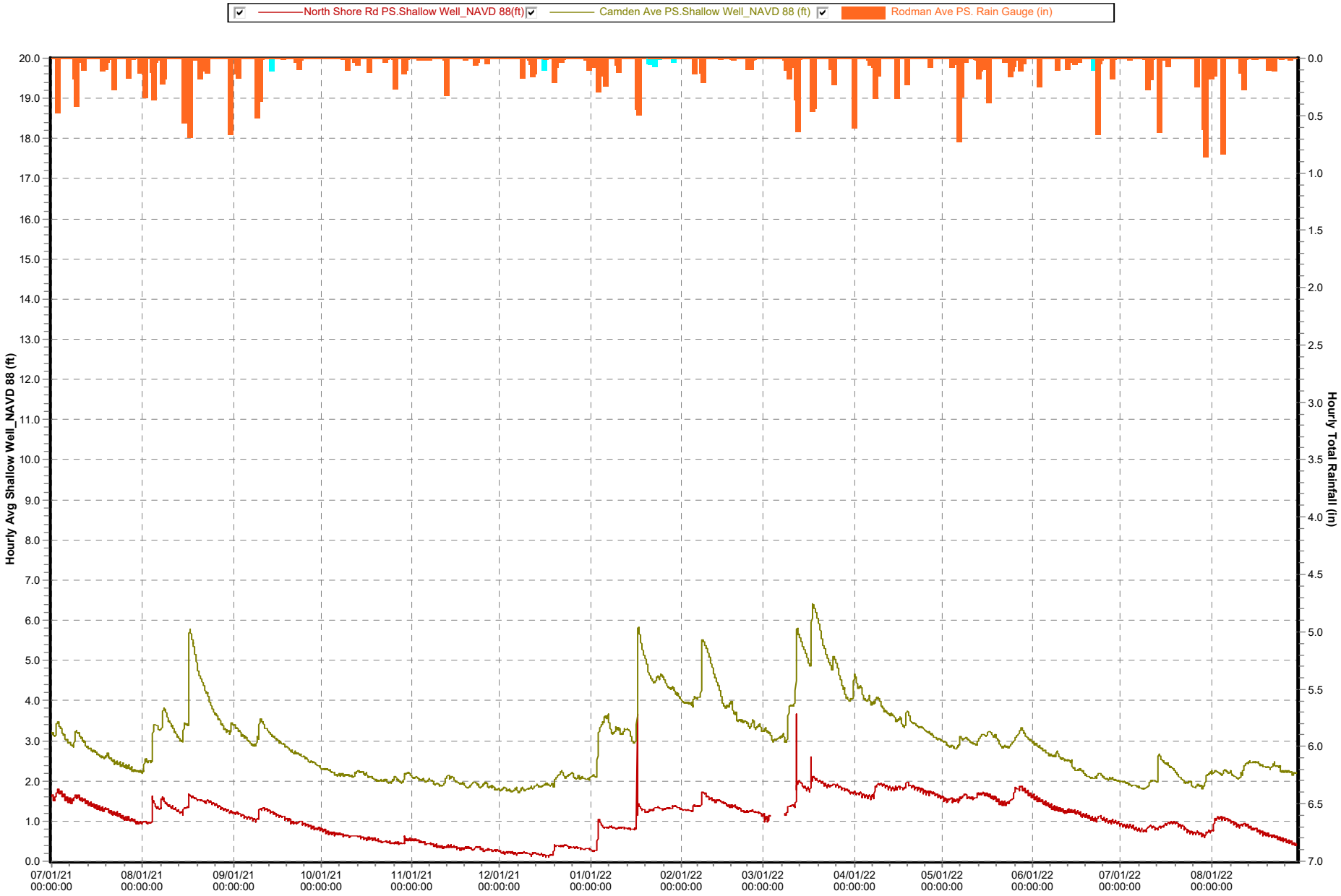


Appendix C

Shallow Well Analysis

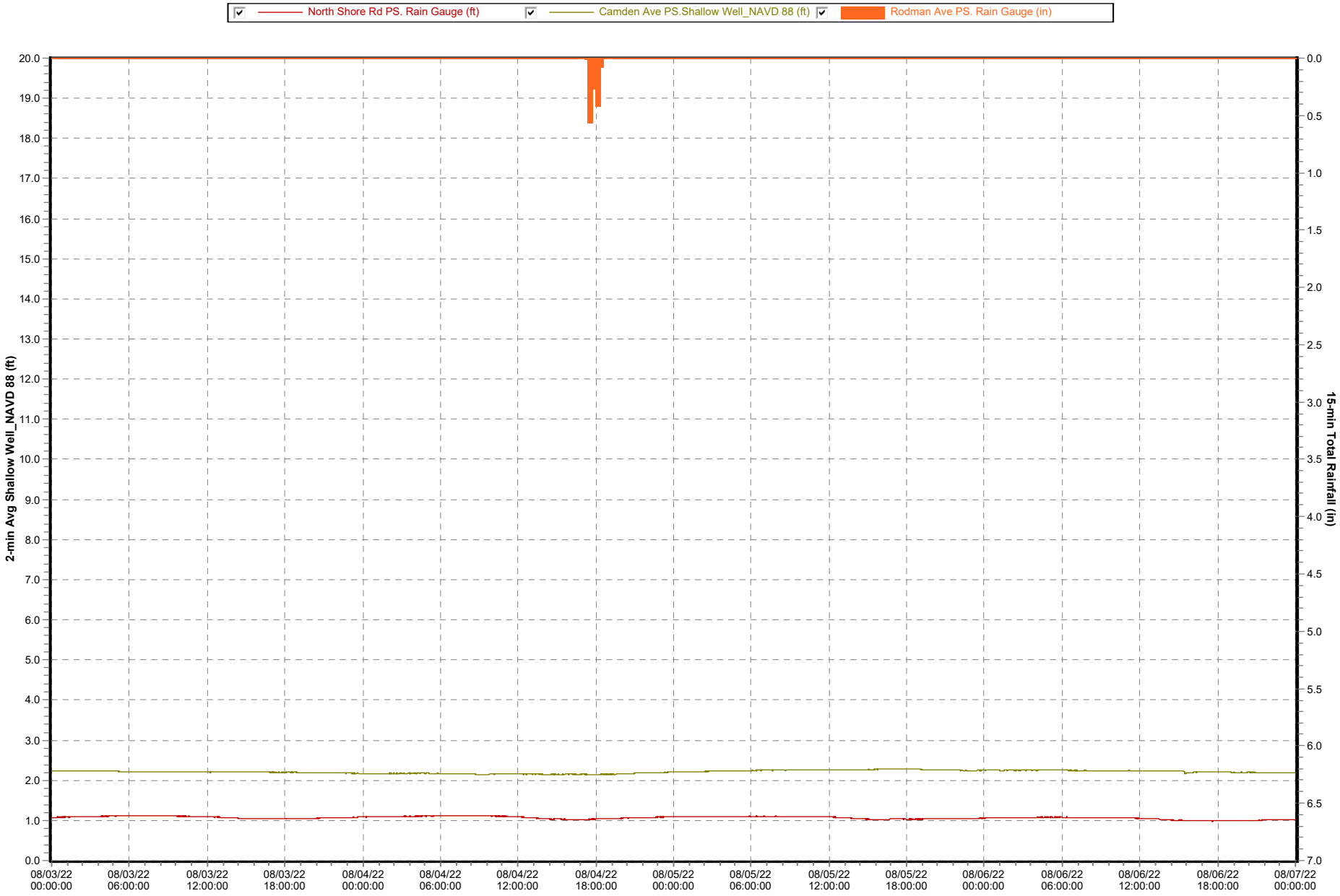
South Shore Shallow Well Graphs

07/01/21 to 08/30/22



South Shore Shallow Well Graphs

08/03/22 to 08/07/22



Hampton Roads Sanitation District

Post-Storm Report

Sept. 11th, 2022

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Summary

On September 11th, there was an approximate 15-hour rainfall event that resulted in 2 sites on the North Shore and 3 sites on the South Shore that met a 1 to 5-year rainfall recurrence interval throughout the HRSD rain gauge network. Humid air brought rain showers into Hampton Roads with some pockets of much heavier rain. North Shore sites averaged around 1.04 inches of rain while South Shore sites averaged around 0.51 inches. There was minimal impact on groundwater levels compared to July 2021. See Appendix C for the Historical Shallow Well comparison.

No HRSD interceptor weather-related overflow(s) were reported.

HRSD flow and pressure meters met data reliability requirements per the MOM program. For all pressure meters in the aggregate and all pressure-side flow meters in the aggregate for each treatment plant service area listed below, at least 90% reliable data was achieved, based on the duration of system response to this rainfall event. The data reliability for the gravity flow meters is not included in this synopsis.

- Duration of system response: See Table Below
- Aggregate flow meter validity: 90.71%
- Aggregate pressure meter validity: 98.20%

Currently, rainfall recurrence intervals are only analyzed for a maximum of 96-hours. Rainfall analysis begins after 0.1 inches of rain has occurred. A 72-hour dry period of less than 0.1 inches of rain is typically used to signify two separate events. However, if a site returns to "dry weather" conditions prior to the next rainfall that occurs within 72 hours of the previous event, it is also considered for separate analysis. See Appendix A for the Rainfall Total System Maps.

The current criteria for publishing a post-storm analysis are the following:

- One or more rain gauge sites meet a two-year or greater RRI (rainfall recurrence interval) and at least 50% of sites in any treatment plant service area receive one inch of rainfall or greater,
- A rain gauge site meets a five-year or greater RRI, or
- A weather-related SSO occurs.

Treatment Plant Data: ***(Data obtained from Telog Database)***
See Appendix B for HRSD Treatment Plant Flows

HRSD Treatment Plant Data
9/11/2022

North Shore

Treatment Plant	Date of Peak Hourly Flow	Peak Hourly Flow (MGD)	Peak Hour	TPSA Total Rainfall Avg (in)
Boat Harbor	9/11/2022	24.24	22:00	0.98
James River	9/11/2022	26.50	21:00	1.31
Williamsburg	9/11/2022	19.06	20:00	0.81
York River	9/11/2022	18.54	21:00	1.19

HRSD Treatment Plant Data
9/11/2022

South Shore

Treatment Plant	Date of Peak Hourly Flow	Peak Hourly Flow (MGD)	Peak Hour	TPSA Total Rainfall Avg (in)
Army Base	9/11/2022	16.95	23:00	1.18
Atlantic	9/11/2022	76.56	15:00	1.14
Nansemond	9/11/2022	22.87	21:00	0.33
VIP	9/11/2022	25.65	13:00	0.28

North Shore

Weather:

Rainfall (HRSD Rainfall Gauges): *Recurrence intervals based on NOAA Atlas 14*

Rain Gauge Site	Peak Rainfall RI (Duration)	Jurisdiction
Boat Harbor Treatment Plant Service Area[1]		
Bayshore PS	DNQ	HAMP
Bridge Street Tide Gate	DNQ	HAMP
Boat Harbor	DNQ	NEWP
Copeland Park PS	DNQ	NEWP
Hampton PS 159	DNQ	HAMP
James River Treatment Plant Service Area[1]		
Hilton School PS	DNQ	NEWP
James River Main Flow (Influent)	DNQ	NEWP
Lee Hall PRS	DNQ	NEWP
Lucas Creek PS	1- to 2-year (1hr)	NEWP
Morrison PS	DNQ	NEWP
Williamsburg Treatment Plant Service Area[1]		
Ford's Colony	DNQ	JCSA
Fort Eustis PS	DNQ	NEWP
Greensprings PS	DNQ	JCA
Solarex	DNQ	JCSA
Williamsburg Main Flow (Effluent)	DNQ	JCSA
Williamsburg PS	DNQ	WILL
York Skimino Hills PS	DNQ	YORK
York River Treatment Plant Service Area[1]		
Big Bethel PRS	DNQ	HAMP
Freeman PS	1-year (1hr)	HAMP
Gloucester Court House	DNQ	GLOU
Guinea Rd at Maryus Rd	DNQ	GLOU
Ordinary PCV	DNQ	GLOU
Poquoson PS 6	DNQ	POQ
Wolf Trappe PCV	DNQ	YORK
York Kiln Creek 1 PS	DNQ	YORK
York PS 15	DNQ	YORK
York River Main Flow (Influent)	DNQ	YORK
York River Crossing (York River Rectifier)	DNQ	GLOU

Note:

1. Typical treatment plant service area.

Newport News-Williamsburg International (PHF)

- Wind and Rainfall (daily total):

Date	Gust (max)	Sustained (max)	Sustained (avg)	Direction	Rainfall (in)
9/11/22	23 mph	10 mph	3 mph	SE	1.67

Tide:

- Yorktown USCG Training Center:
  - Storm Surge: An approximate 0.95-foot storm surge was observed.

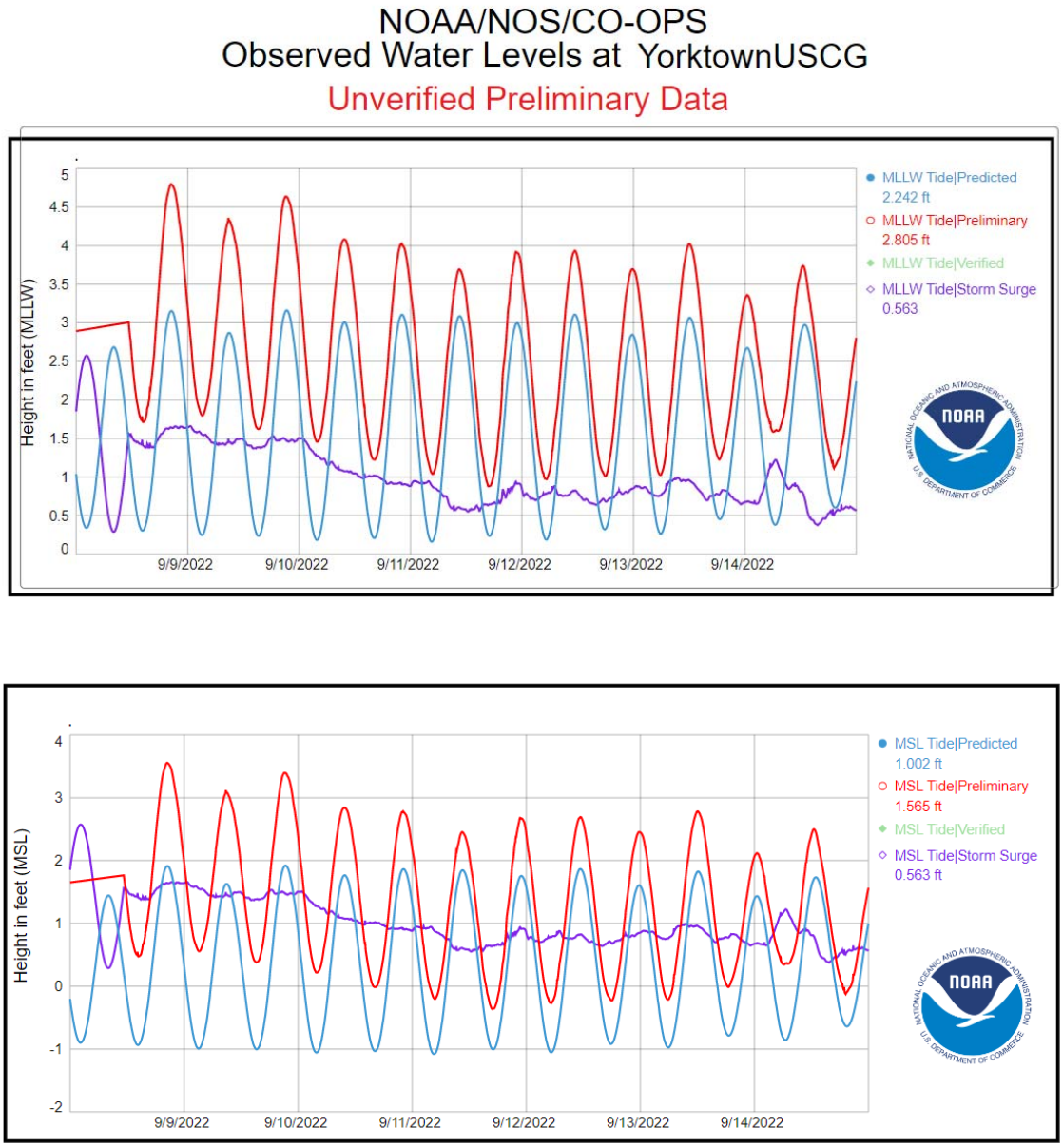


Figure 1. Preliminary data obtained from NOAA and a connection with Open Weather

- Sewells Point Tide Station:
  - Storm Surge: An approximate 0.85 foot storm surge was observed.

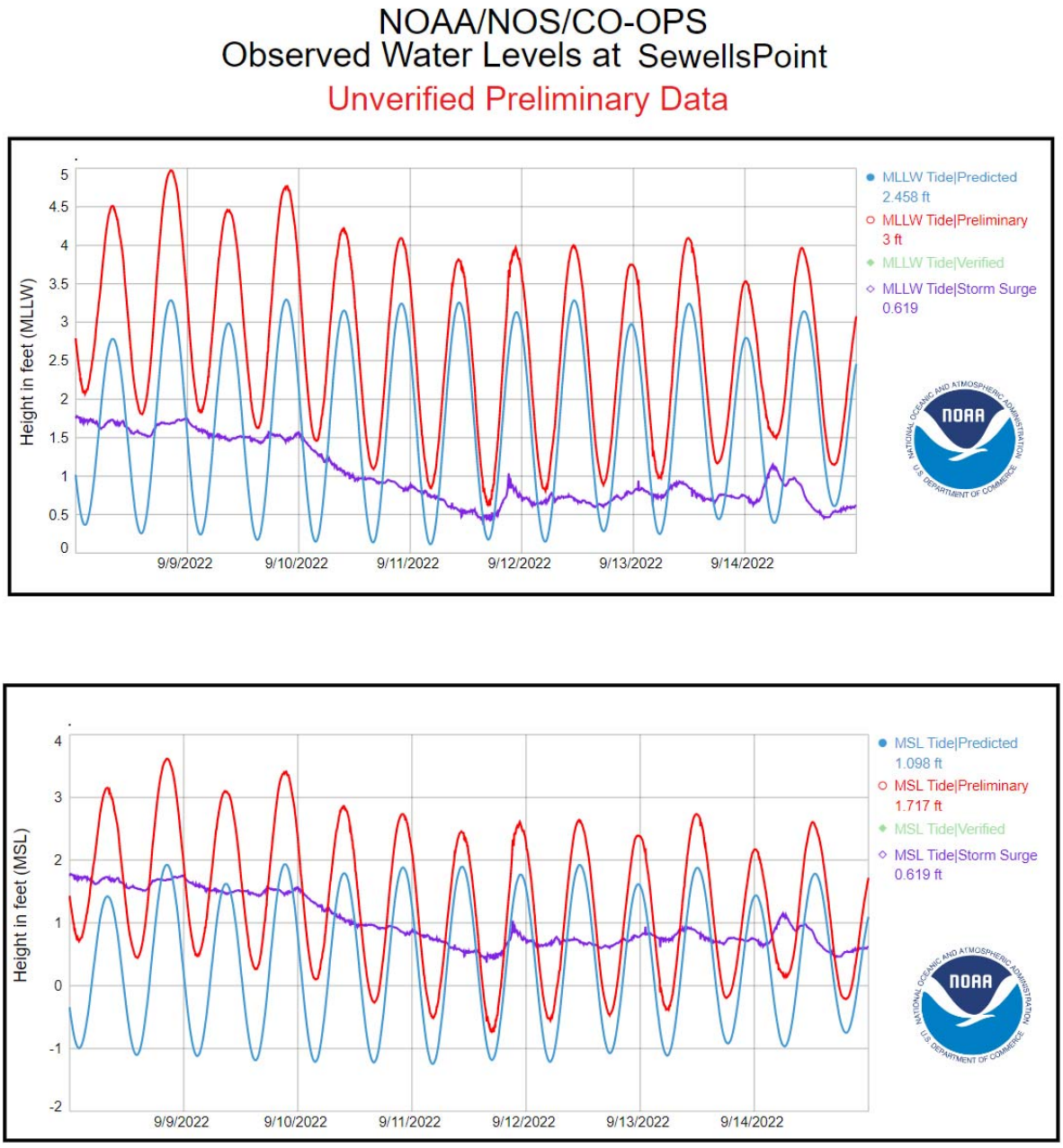


Figure 2. Preliminary data obtained from NOAA and a connection with Open Weather

South Shore

Weather:

Rainfall (HRSD Rainfall Gauges): *Recurrence intervals based on NOAA Atlas 14*

Rain Gauge Site	Peak Rainfall RI (Duration)	Jurisdiction
Army Base Treatment Plant Service Area[1]		
Bancker Rd (Dovercourt Discharge)	DNQ	NORF
Taussig Blvd PS	2- to 5-year (1hr)	NORF
Atlantic Treatment Plant Service Area[1]		
Callison at GB Locks	DNQ	CHES
Chesapeake PS 243	DNQ	CHES
Chesapeake PS 254	DNQ	CHES
Courthouse PRS	2- to 5-year (2hr)	VAB
Elbow Rd	DNQ	CHES
John B. Dey MLV-AT side	DNQ	VAB
Kempsville PRS	DNQ	VAB
Lagomar IFM at Atlantic TP	DNQ	VAB
Laskin Rd PRS	DNQ	VAB
Pine Tree PRS	DNQ	VAB
Shipps Corner PRS	1-year (1hr)	VAB
Ches-Liz Treatment Plant Service Area[1]		
Ches-Liz Weather	DNQ	VAB
Dozier's Corner PS	DNQ	CHES
Independence PRS	DNQ	VAB
Northampton Blvd at Wesleyan Dr	DNQ	NORF
Providence PRS	DNQ	VAB
Shore Dr @ Jack Frost	DNQ	CHES
Nansemond Treatment Plant Service Area[1]		
Bowers Hill PRS	DNQ	CHES
Cedar Lane PS	DNQ	PORT
Chesapeake PS 158	DNQ	CHES
Chesapeake PS 238	DNQ	CHES
Crittenden Rd_Chuckatuck Rectifier	DNQ	SUFF
Deep Creek PRS	DNQ	CHES
Lake Kilby WTP	DNQ	SUFF
Nansemond Main Flow (Effluent)	DNQ	SUFF
Pagan River Rectifier	DNQ	IOW
Pughsville PS	DNQ	SUFF
Route 337 PRS	DNQ	CHES
Smithfield High School	DNQ	IOW
Suffolk PS	DNQ	SUFF
Suffolk PS 81	DNQ	SUFF
Suffolk PS 87	DNQ	SUFF
Windsor Duke St PS	DNQ	IOW
Windsor PCV	Disconnected	SUFF
Hill Point Rectifier	DNQ	SUFF

VIP Treatment Plant Service Area[1]		
Elizabeth River Crossing_Eastern Branch	DNQ	NORF
Ferebee Avenue PS	DNQ	CHES
Luxembourg Avenue PS	DNQ	NORF
Rodman Ave PS	DNQ	PORT
Va Beach Blvd PS	DNQ	NORF
VIP Main Flow (Effluent)	DNQ	NORF

Note:

1. Typical treatment plant service area.

*Duration represents the minimum amount of time it took to reach the specified RRI.

Norfolk International Airport (ORF)

- Wind and Rainfall (daily total):

Date	Gust (max)	Sustained (max)	Sustained (avg)	Direction	Rainfall (in)
9/11/2022	22 mph	9 mph	3 mph	S	0.17

Tide:

- Sewells Point Tide Station:
  - Storm Surge: An approximate 0.85 foot storm surge was observed.

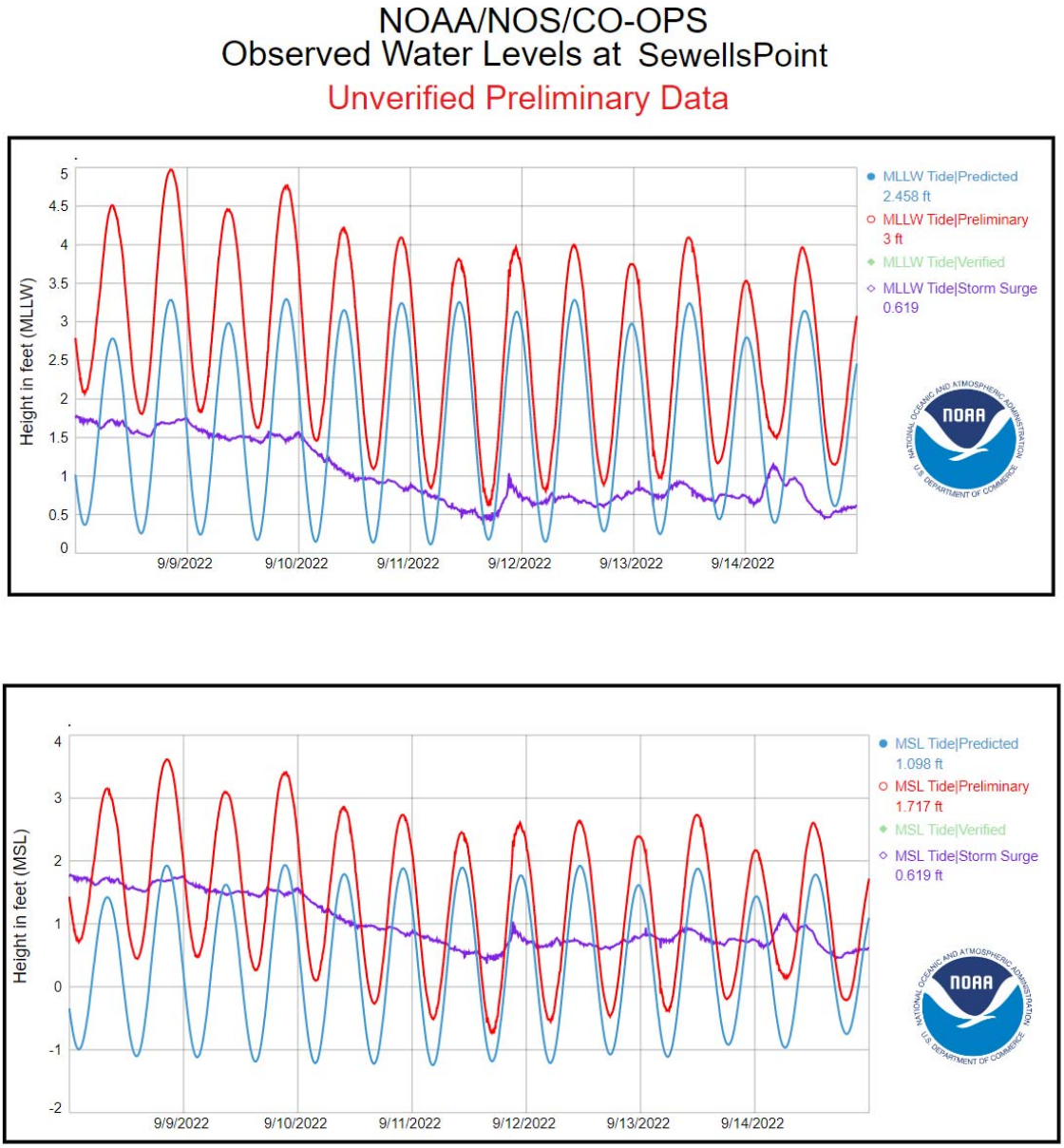


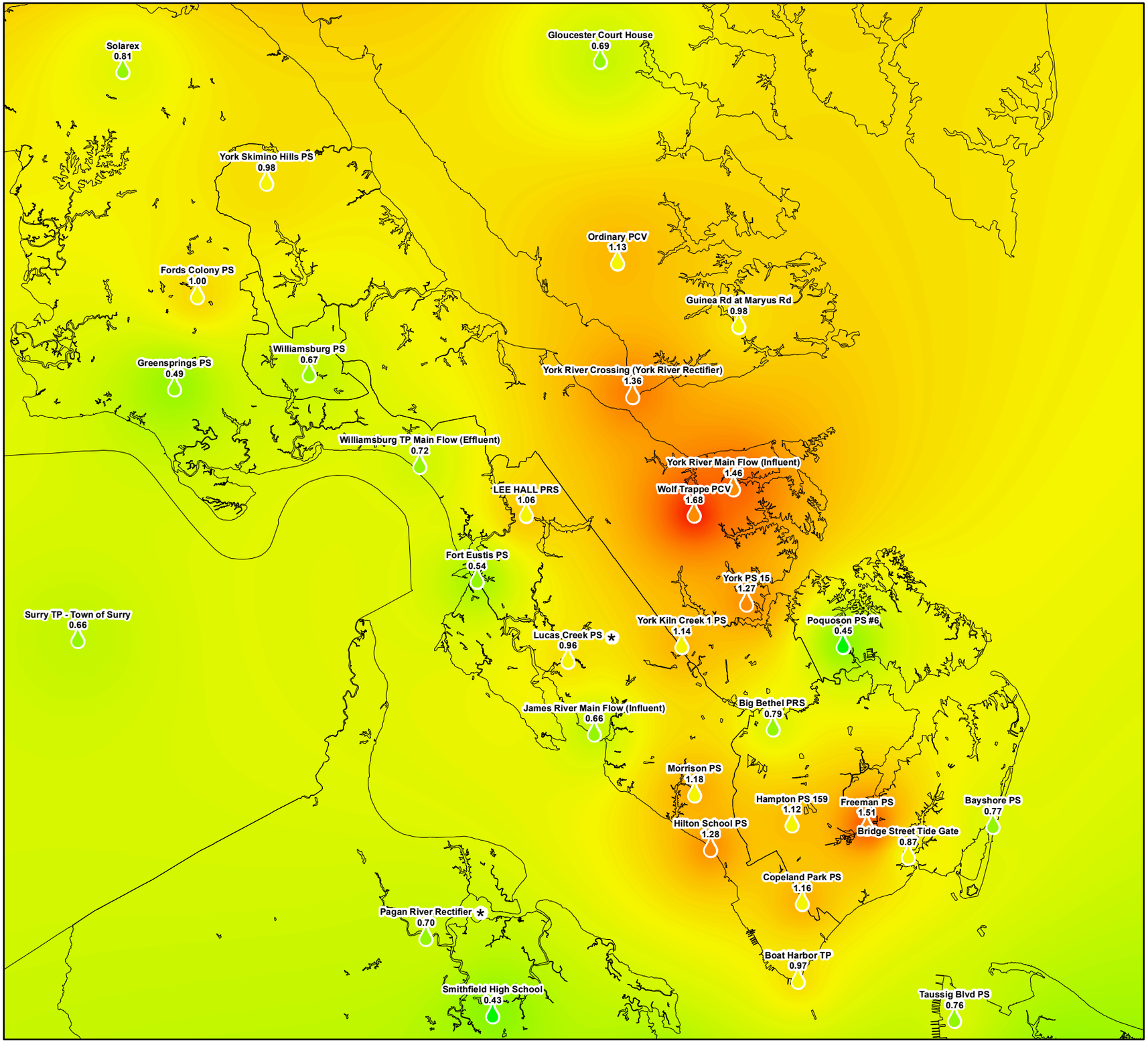
Figure 3. Preliminary data obtained from NOAA and a connection with Open Weather

Shallow Well Analysis:

Shallow wells are located at/or near HRSD Pump Stations to measure groundwater levels. The water column is measured using a pressure transducer located near the bottom of the well. The installed sensor measures gauge pressure in inches of water. The Shallow Well_NAVD88 measurement referenced in Appendix C refers to the elevation (referenced as NAVD 88) of the sensor plus the gauge measurement in feet.

Appendix A

HRSD Rain Gauge Network
Rainfall Totals



North Shore

September 11, 2022 Rainfall Analysis Total Rainfall

Rain Gauges (in):

- **1.69 - 3.99**
- **1.19 - 1.68**
- **0.82 - 1.18**
- **0.46 - 0.81**
- **0.11 - 0.45**

Value

High : 3.99

Low : 0.11

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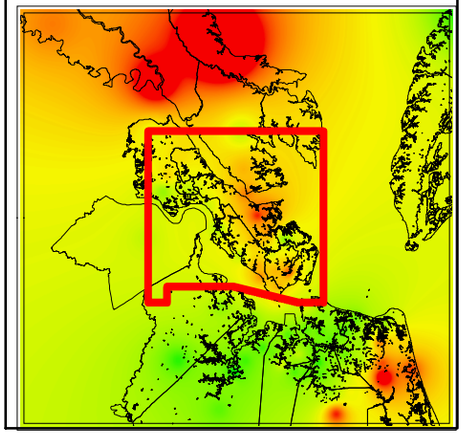
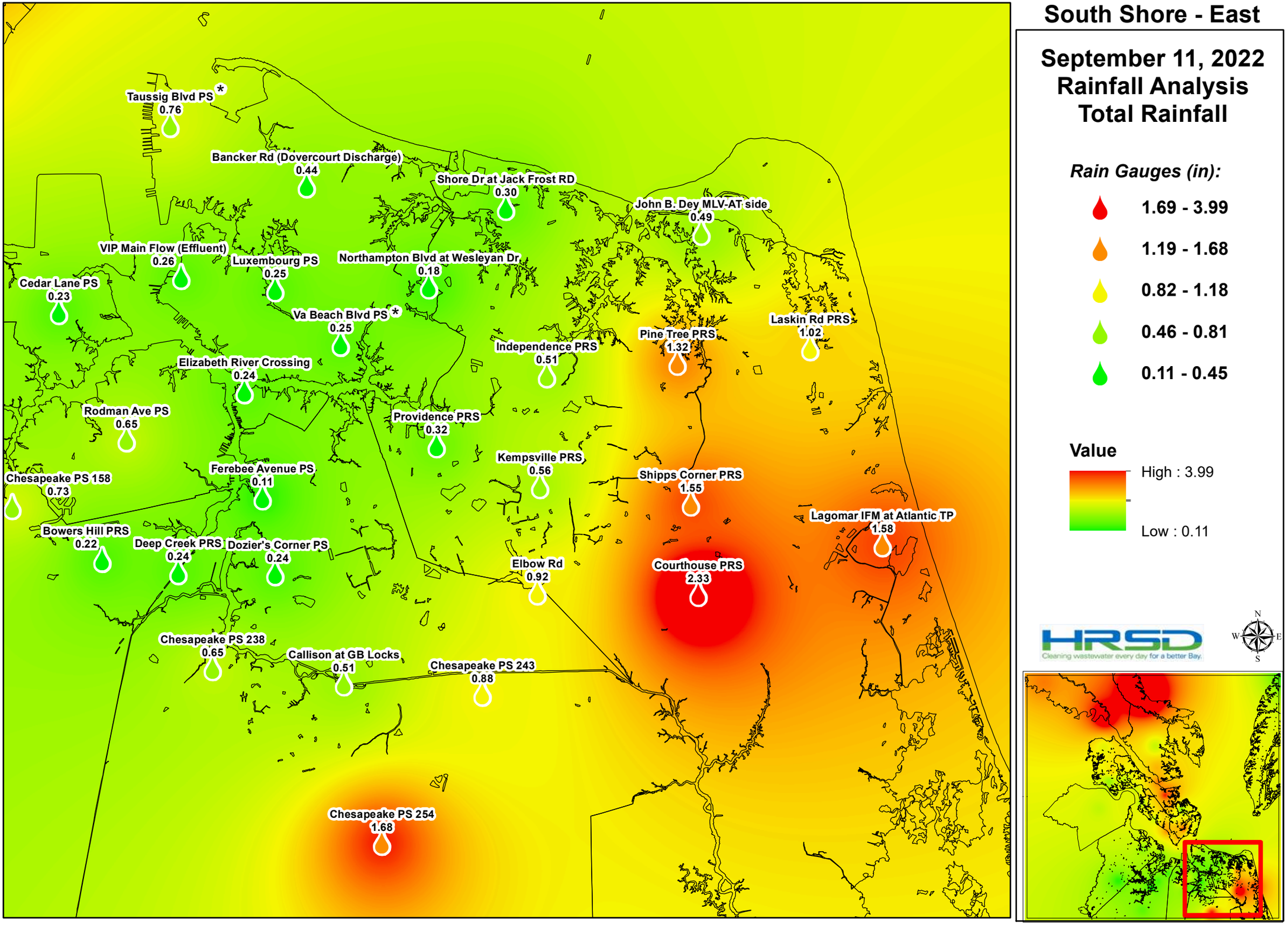
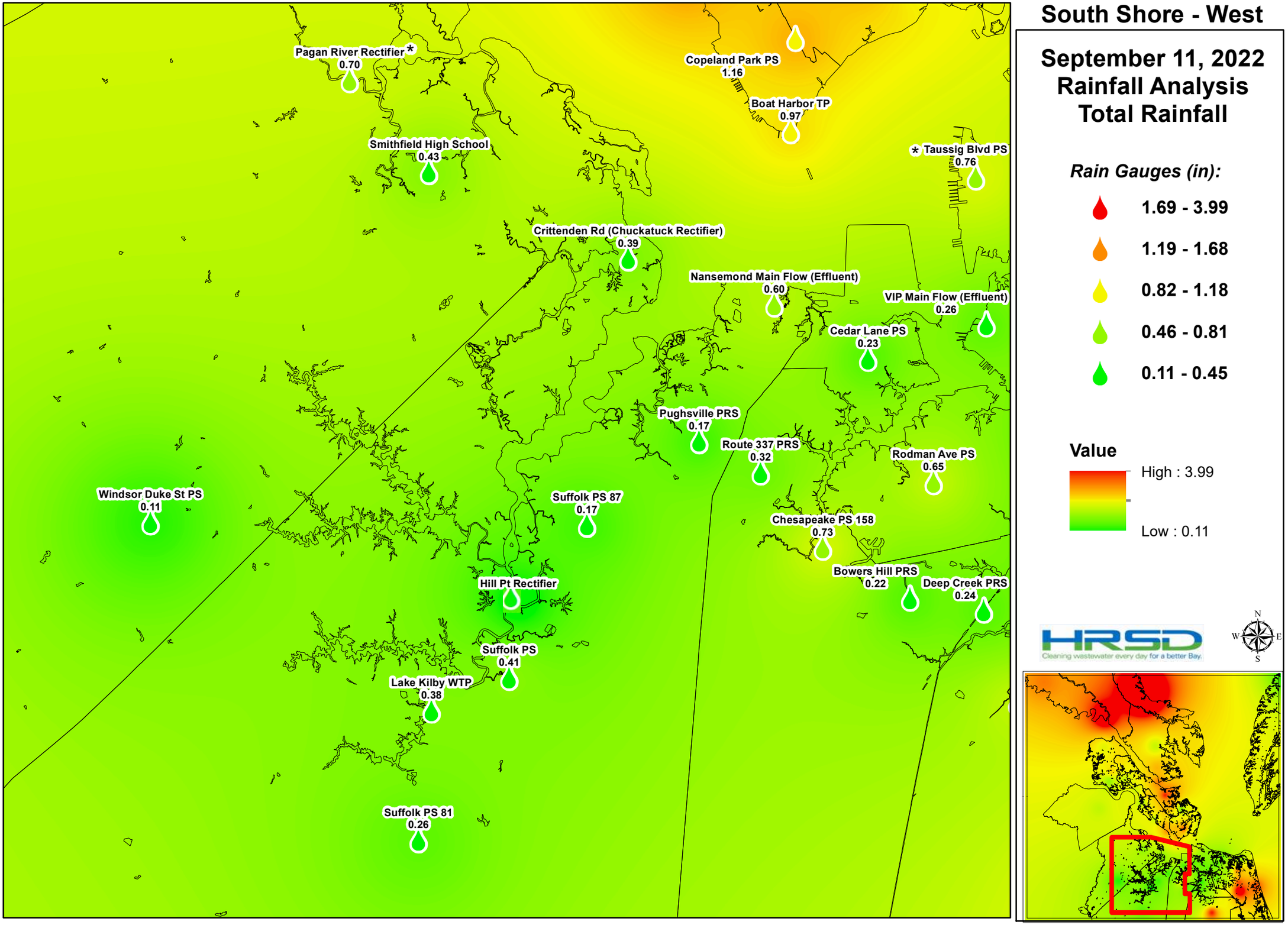
N W E S



*Note: Rain Gauge was invalid for event and an average of surrounding sites was used.



*Note: Rain Gauge was invalid for event and an average of surrounding sites was used.



South Shore - West

September 11, 2022 Rainfall Analysis Total Rainfall

Rain Gauges (in):

- 1.69 - 3.99
- 1.19 - 1.68
- 0.82 - 1.18
- 0.46 - 0.81
- 0.11 - 0.45

Value

High : 3.99

Low : 0.11

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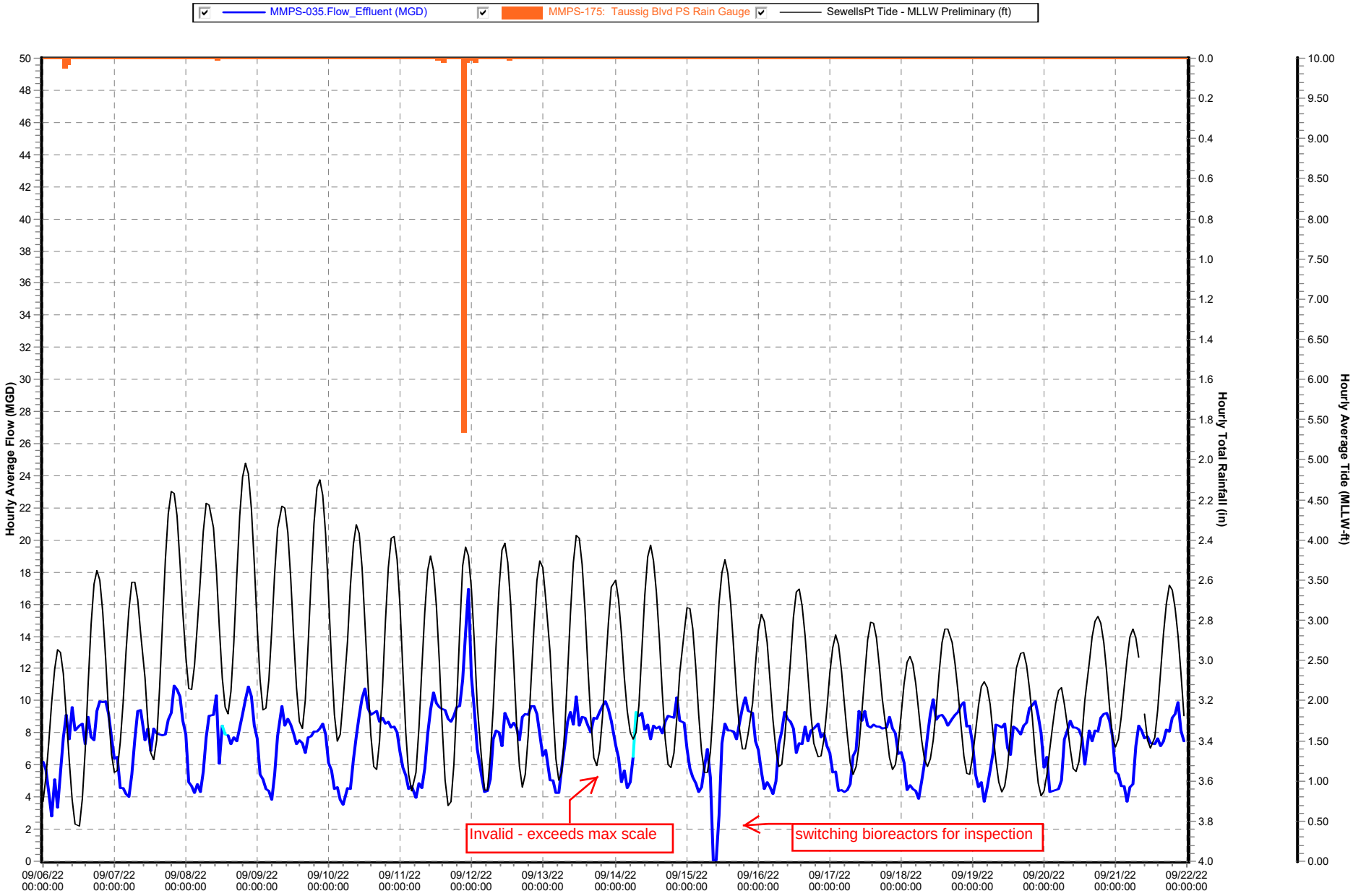
*Note: Rain Gauge was invalid for event and an average of surrounding sites was used.

Appendix B

HRSD Treatment Plant Flows

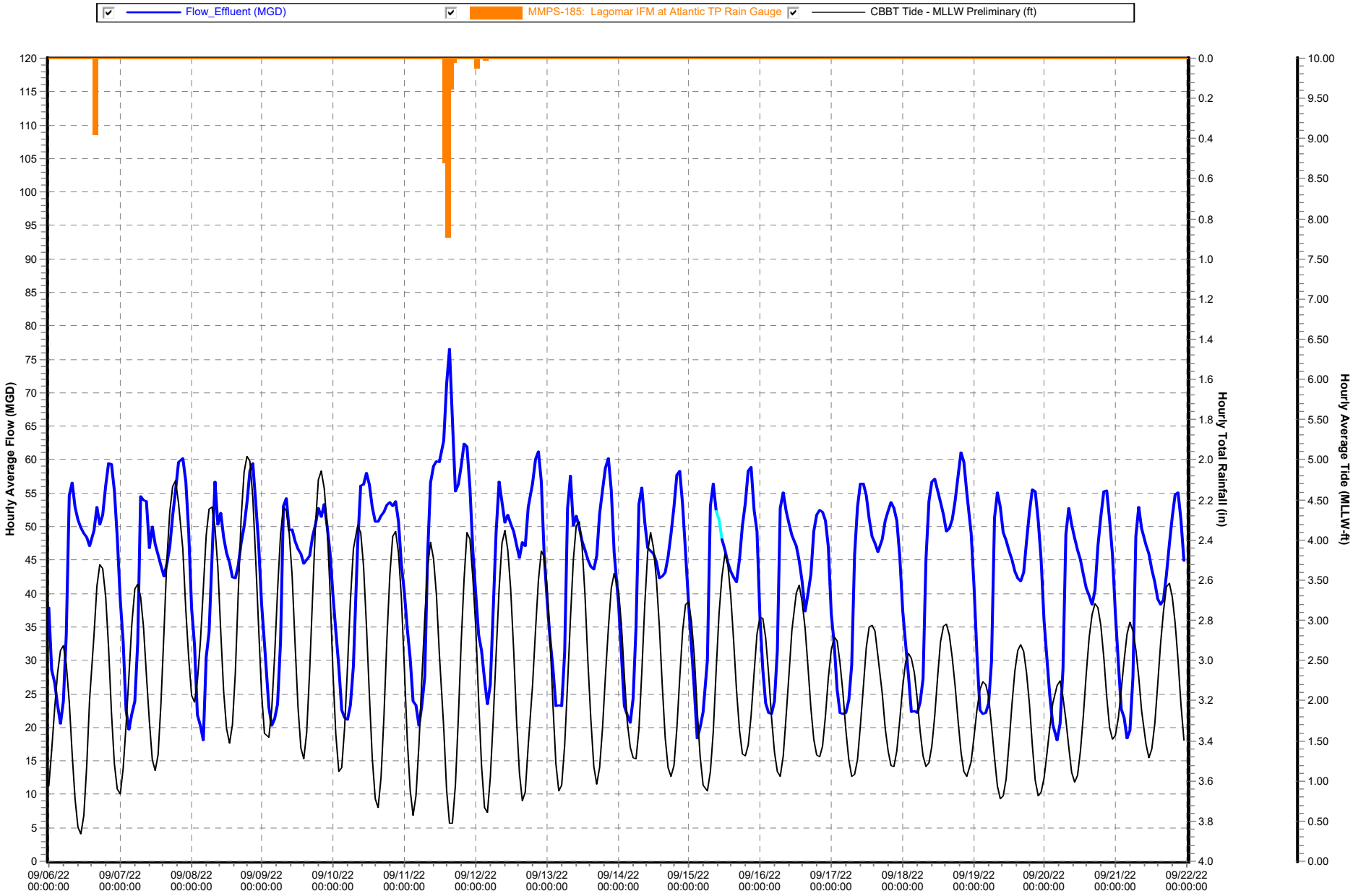
Army Base Treatment Plant

MMPS-035 (09/06/22 to 09/22/22)



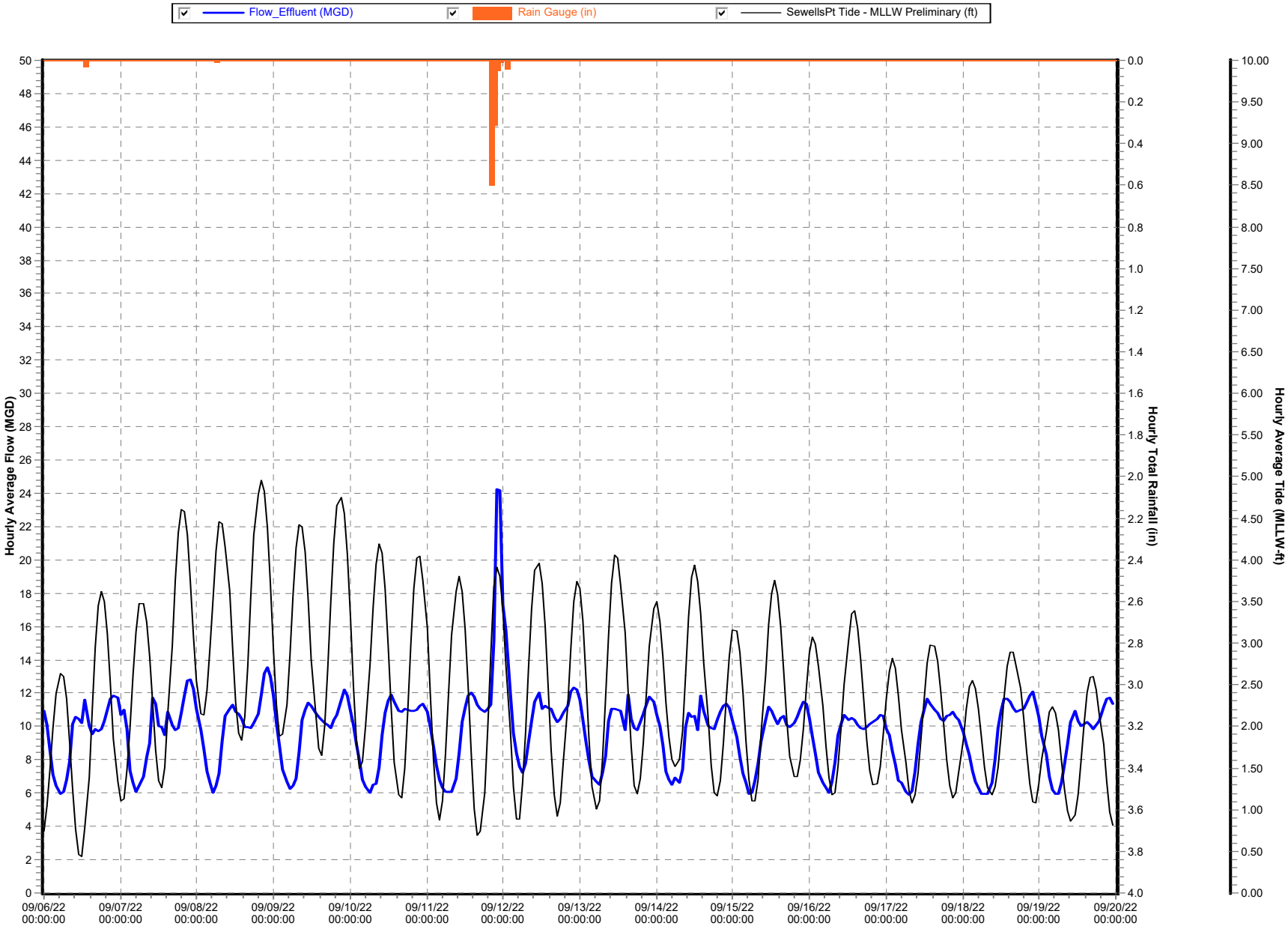
Atlantic Treatment Plant

MMPS-071 (09/06/22 to 09/22/22)



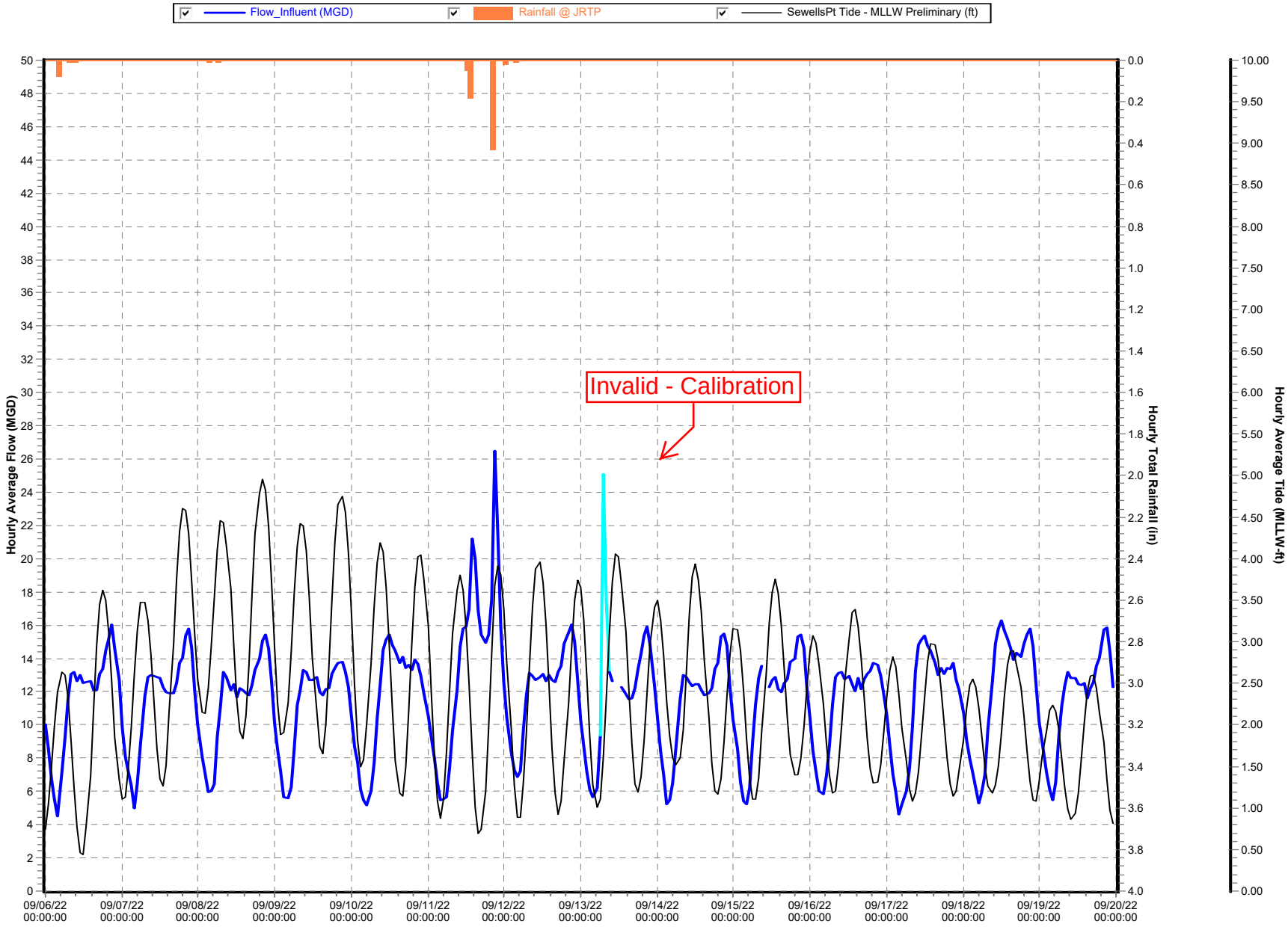
Boat Harbor Treatment Plant

MMPS-075 (09/06/22 to 09/20/22)



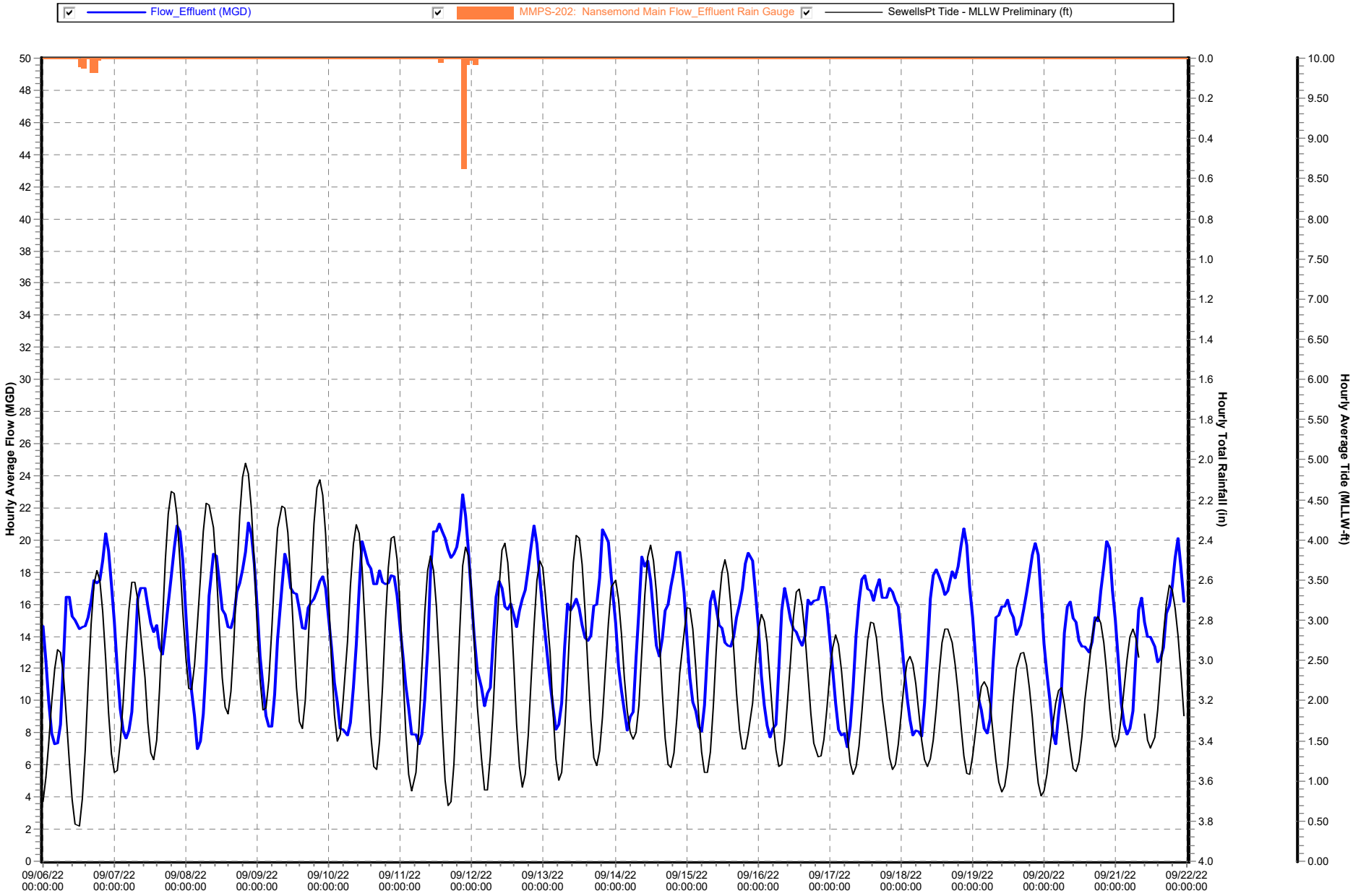
James River Treatment Plant

MMPS-184 (09/06/22 to 09/20/22)



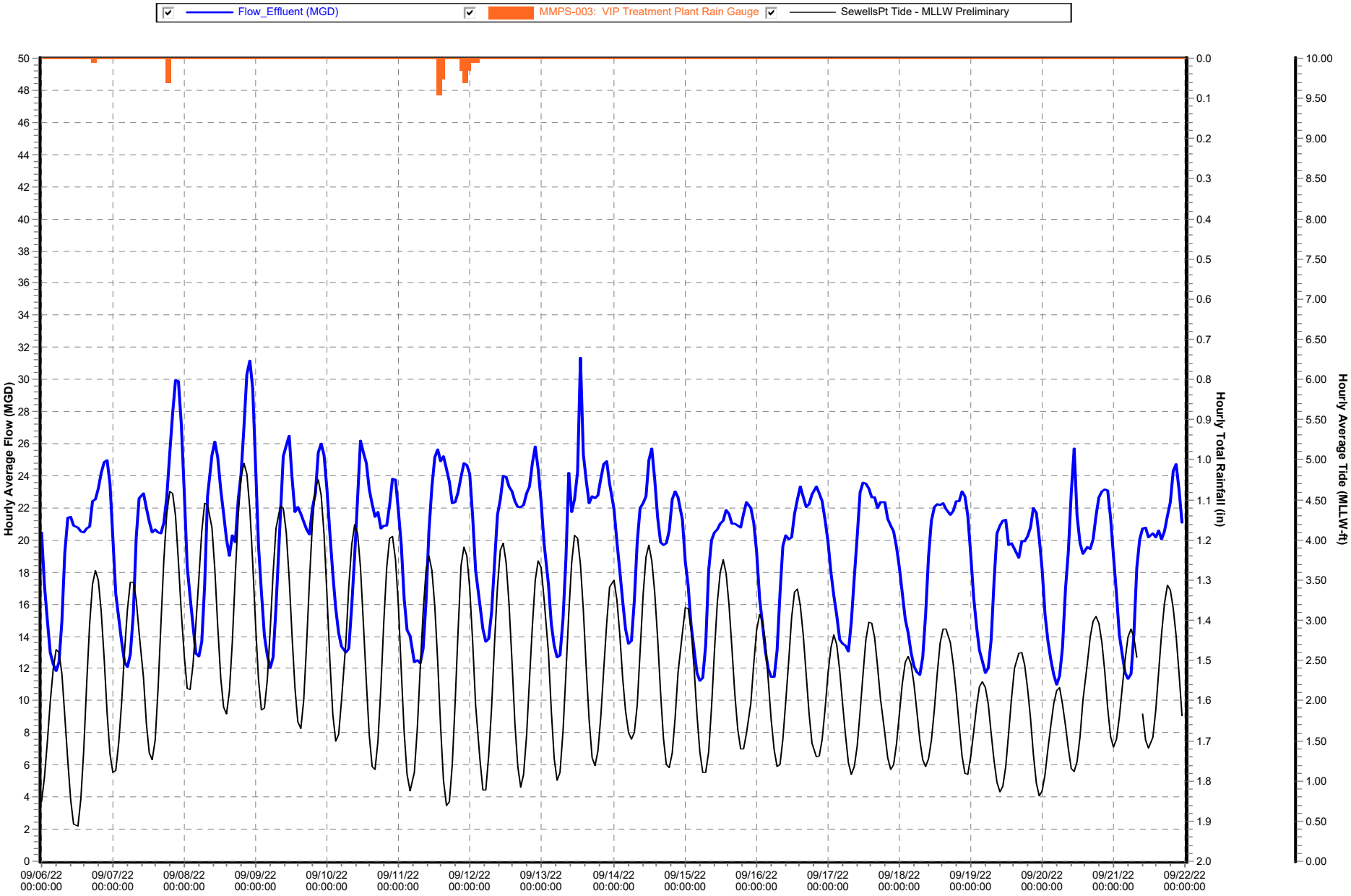
Nansemond Treatment Plant

MMPS-202 (09/06/22 to 09/22/22)



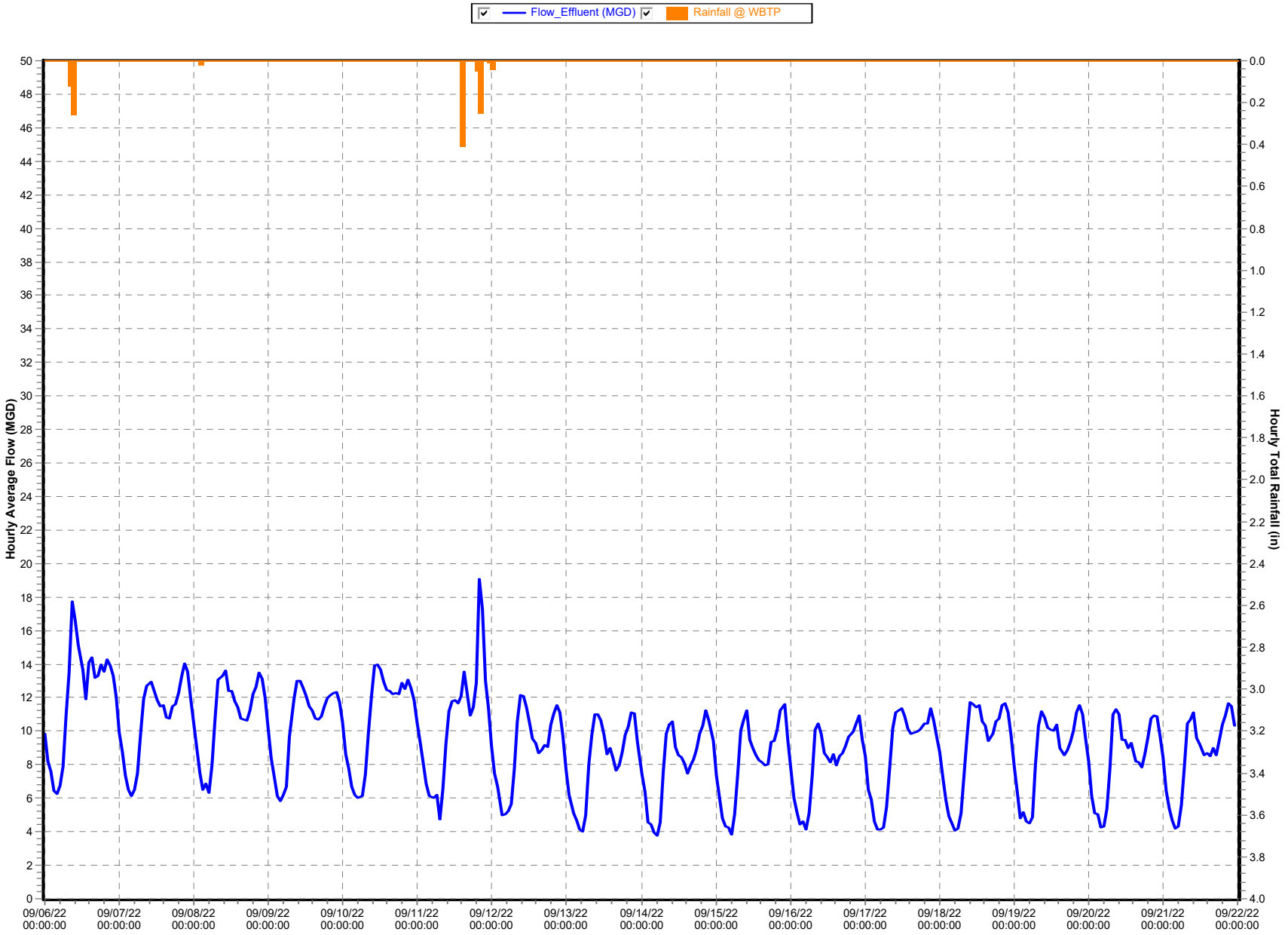
VIP Treatment Plant

MMPS-003 (09/06/22 to 09/22/22)



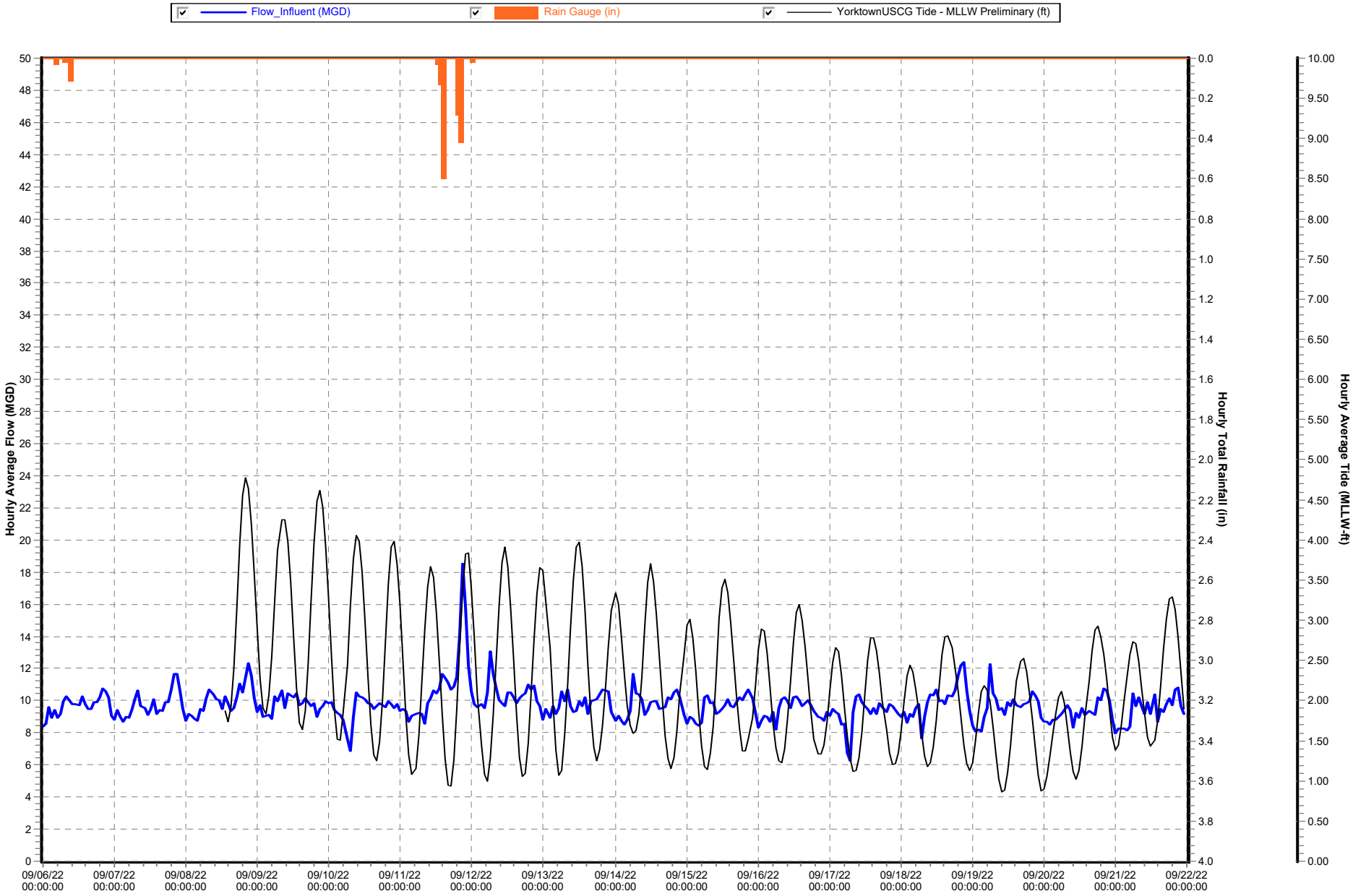
Williamsburg Treatment Plant

MMPS-222 (09/06/22 to 09/22/22)



York River Treatment Plant

MMPS-235 (09/06/22 to 09/22/22)



Appendix C

Shallow Well Analysis

1-year

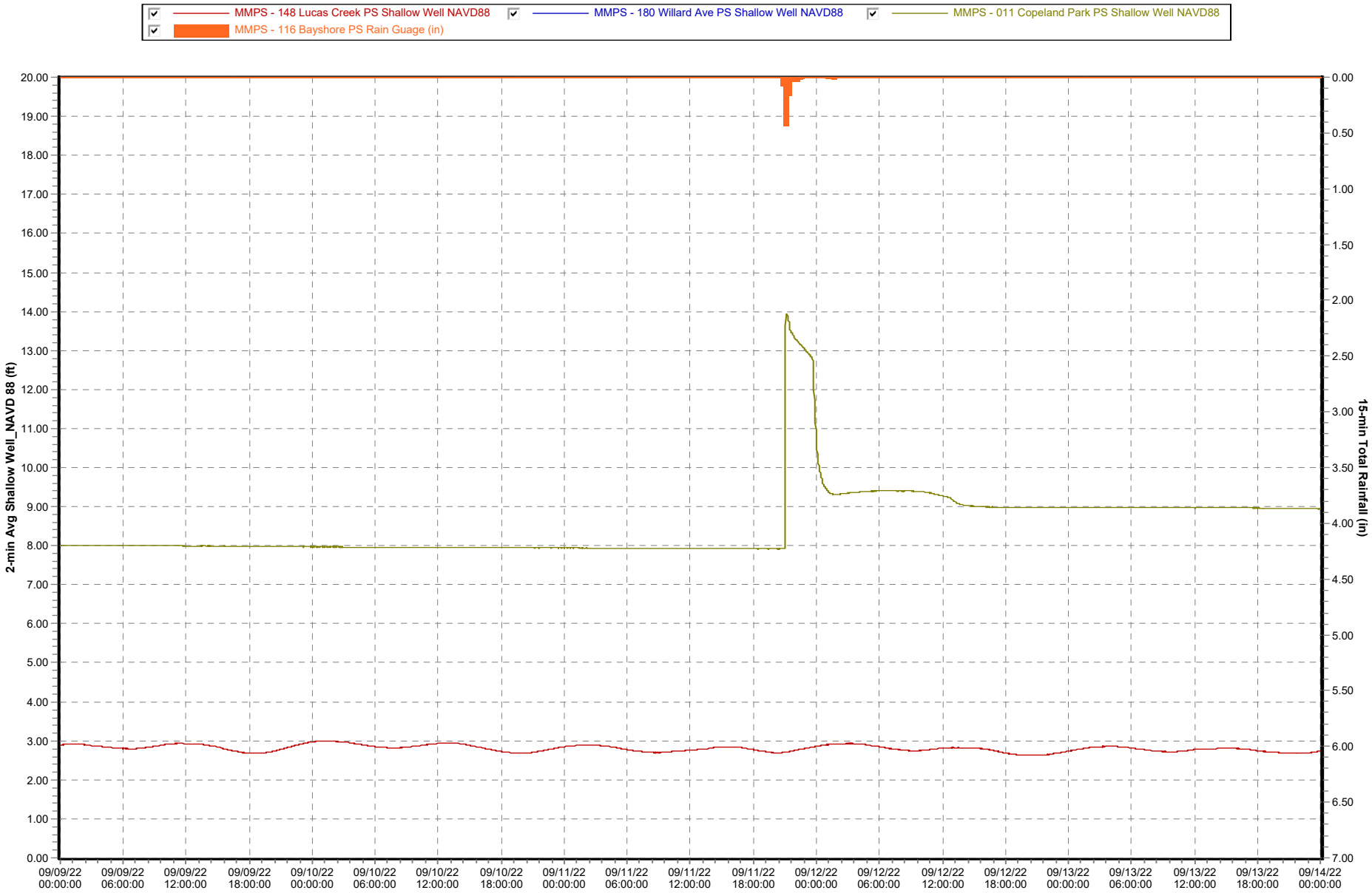
North Shore Shallow Well Graph

MMPS-148 (09/01/21 to 10/01/22)

5-day

North Shore Shallow Well Graphs

09/09/22 to 09/14/22

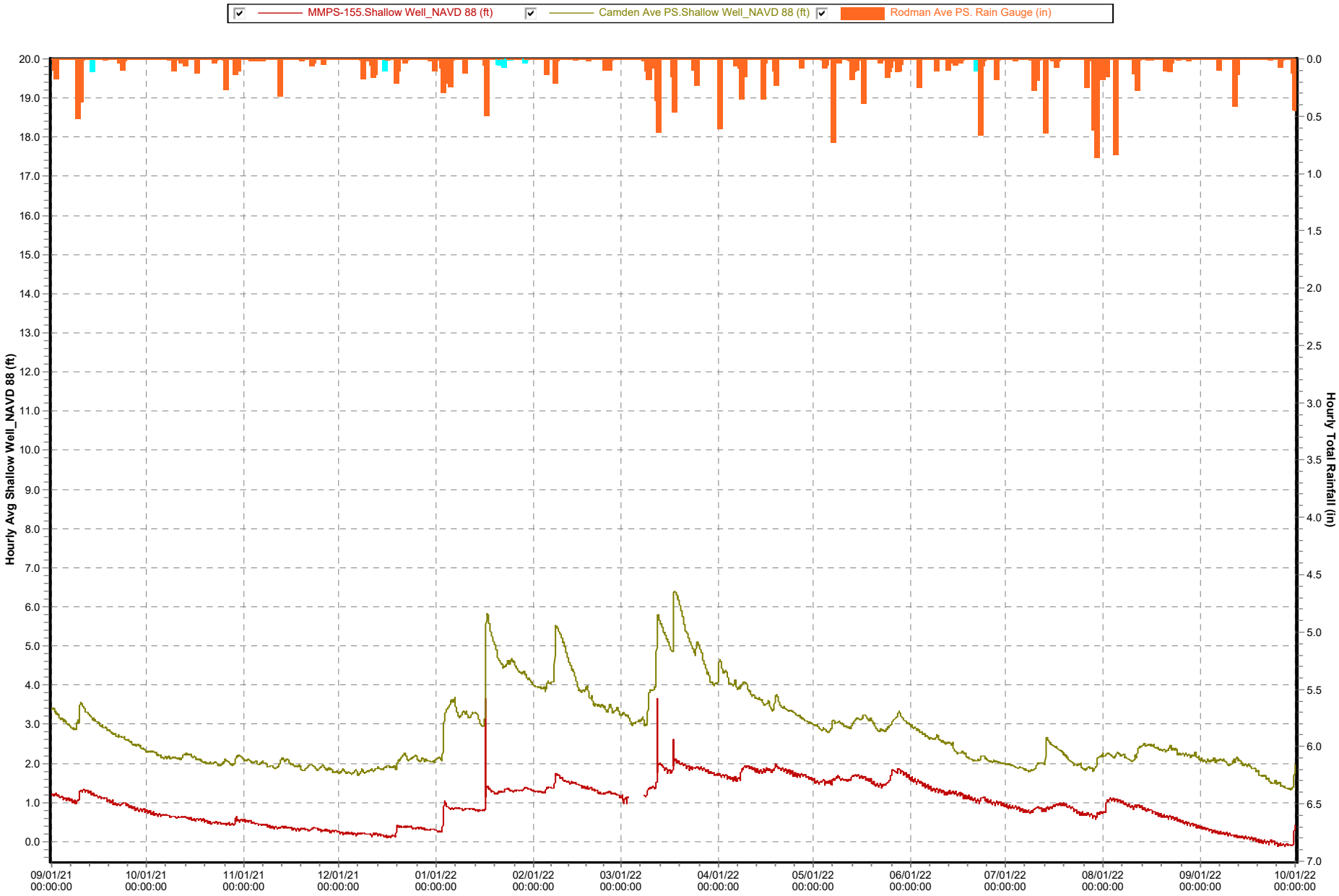


Teal shows invalid RG data

1-year

South Shore Shallow Well Graphs

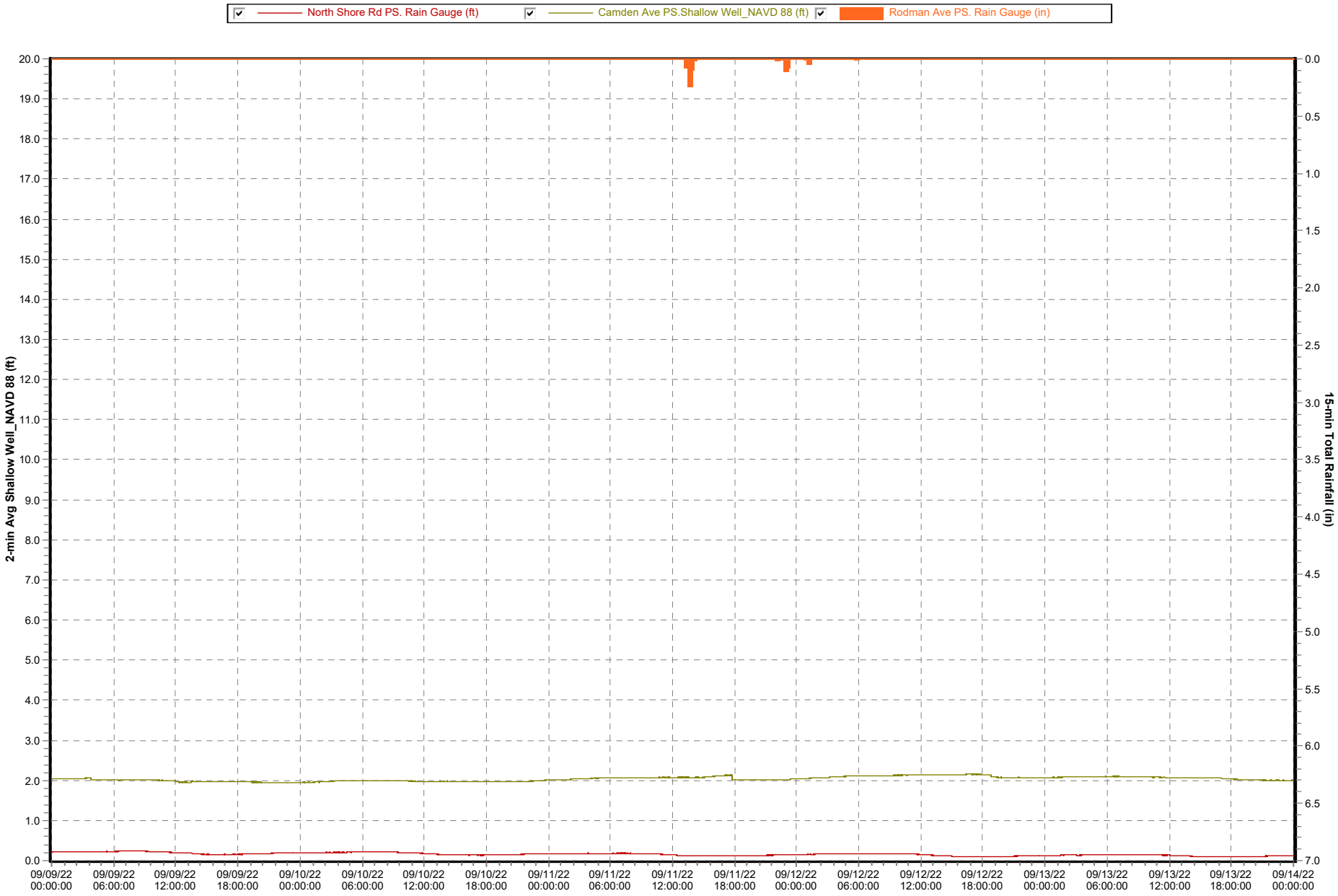
09/01/21 to 10/01/22



5-day

South Shore Shallow Well Graphs

09/09/22 to 09/14/22



Hampton Roads Sanitation District

Post-Storm Report

September 30, 2022

Post Tropical Cyclone Ian

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Summary

From September 30th through October 1st, Post Tropical Cyclone Ian brought an approximate 17-hour rainfall event that resulted in 20 sites on the North Shore and 37 sites on the South Shore that met a 1 to 5-year rainfall recurrence interval throughout the HRSD rain gauge network. In fact, all valid rain gauges on South Shore hit a 1 year or greater RRI (38/41). North Shore sites averaged around 2.90 inches of rain while South Shore sites averaged around 3.00 inches. There was minimal impact on groundwater levels compared to July 2021, but we saw levels increase compared to recent months. See Appendix C for the Historical Shallow Well comparison.

One HRSD interceptor weather-related overflow(s) were reported.

One Locality interceptor weather-related overflow(s) were reported

HRSD flow and pressure meters met data reliability requirements per the MOM program. For all pressure meters in the aggregate and all pressure-side flow meters in the aggregate for each treatment plant service area listed below, at least 90% reliable data was achieved, based on the duration of system response to this rainfall event. The data reliability for the gravity flow meters is not included in this synopsis.

- Duration of system response: See Table Below
- Aggregate flow meter validity: 97.28%
- Aggregate pressure meter validity: 99.90%

Currently, rainfall recurrence intervals are only analyzed for a maximum of 96-hours. Rainfall analysis begins after 0.1 inches of rain has occurred. A 72-hour dry period of less than 0.1 inches of rain is typically used to signify two separate events. However, if a site returns to "dry weather" conditions prior to the next rainfall that occurs within 72 hours of the previous event, it is also considered for separate analysis. See Appendix A for the Rainfall Total System Maps.

The current criteria for publishing a post-storm analysis are the following:

- One or more rain gauge sites meet a two-year or greater RRI (rainfall recurrence interval) and at least 50% of sites in any treatment plant service area receive one inch of rainfall or greater,
- A rain gauge site meets a five-year or greater RRI, or
- A weather-related SSO occurs.

Sanitary Sewer Overflows:

South Shore

Location	Jurisdiction	Start Date
1136 Saunders Dr	Suffolk	09/30/2022

Localities

Location	Jurisdiction	Start Date
Manning Road	Suffolk	09/30/2022

Treatment Plant Data: ***(Data obtained from Telog Database)***
See Appendix B for HRSD Treatment Plant Flows

HRSD Treatment Plant Data
9/30/2022 – 10/1/2022

North Shore

Treatment Plant	Date of Peak Hourly Flow	Peak Hourly Flow (MGD)	Peak Hour	TPSA Total Rainfall Avg (in)
Boat Harbor	9/30/2022	24.83	23:00	2.73
	10/01/2022	27.79	00:00	0.01
James River	9/30/2022	31.00	20:00	3.48
	10/01/2022	23.49	00:00	0.11
Williamsburg	9/30/2022	27.03	21:00	2.26
	10/01/2022	23.80	00:00	0.18
York River	9/30/2022	20.85	17:00	2.68
	10/01/2022	18.06	00:00	0.07

HRSD Treatment Plant Data
9/30/2022 – 10/1/2022

South Shore

Treatment Plant	Date of Peak Hourly Flow	Peak Hourly Flow (MGD)	Peak Hour	TPSA Total Rainfall Avg (in)
Army Base	9/30/2022	16.19	16:00	3.35
	10/01/2022	13.09	00:00	0.05
Atlantic	9/30/2022	95.56	17:00	4.02
	10/01/2022	69.66	00:00	0.01
Nansemond	9/30/2022	34.17	22:00	3.31
	10/01/2022	30.01	00:00	0.03
VIP	9/30/2022	55.58	16:00	3.52
	10/01/2022	54.59	00:00	0.01

North Shore

Weather:

Rainfall (HRSD Rainfall Gauges): *Recurrence intervals based on NOAA Atlas 14*

North Shore Table

Rain Gauge Site	Peak Rainfall RI (Duration)	Jurisdiction
Boat Harbor Treatment Plant Service Area[1]		
Bayshore PS	DNQ	HAMP
Bridge Street Tide Gate	1-year (12hr)	HAMP
Boat Harbor	5-year (12hr)	NEWP
Copeland Park PS	DNQ	NEWP
Hampton PS 159	1-year (12hr)	HAMP
James River Treatment Plant Service Area[1]		
Hilton School PS	1- to 2-year (24hr)	NEWP
James River Main Flow (Influent)	2-year (12hr)	NEWP
Lee Hall PRS	2-year (12hr)	NEWP
Lucas Creek PS	2- to 5-year (12hr)	NEWP
Morrison PS	2- to 5-year (12hr)	NEWP
Williamsburg Treatment Plant Service Area[1]		
Ford's Colony	DNQ	JCSA
Fort Eustis PS	1-year (12hr)	NEWP
Greensprings PS	DNQ	JCA
Solarex	DNQ	JCSA
Williamsburg Main Flow (Effluent)	1- to 2-year (12hr)	JCSA
Williamsburg PS	1-year (12hr)	WILL
York Skimino Hills PS	DNQ	YORK
York River Treatment Plant Service Area[1]		
Big Bethel PRS	2-year (12hr)	HAMP
Freeman PS	1- to 2-year (12hr)	HAMP
Gloucester Court House	DNQ	GLOU
Guinea Rd at Maryus Rd	1-year (12hr)	GLOU
Ordinary PCV	1-year (12hr)	GLOU
Poquoson PS 6	1-year (12hr)	POQ
Wolf Trappe PCV	1- to 2-year (12hr)	YORK
York Kiln Creek 1 PS	2-year (12hr)	YORK
York PS 15	Invalid	YORK
York River Main Flow (Influent)	1-year (12hr)	YORK
York River Crossing (York River Rectifier)	1-year (12hr)	GLOU

Note:

1. Typical treatment plant service area.

Newport News-Williamsburg International (PHF)

- Wind and Rainfall (daily total):

Date	Gust (max)	Sustained (max)	Sustained (avg)	Direction	Rainfall (in)
9/30/2022	47 mph	23 mph	9 mph	NE	3.48
10/1/2022	14 mph	10 mph	6 mph	NE	0.00

Tide:

- Yorktown USCG Training Center:
  - Storm Surge: An approximate 3.5-foot storm surge was observed.

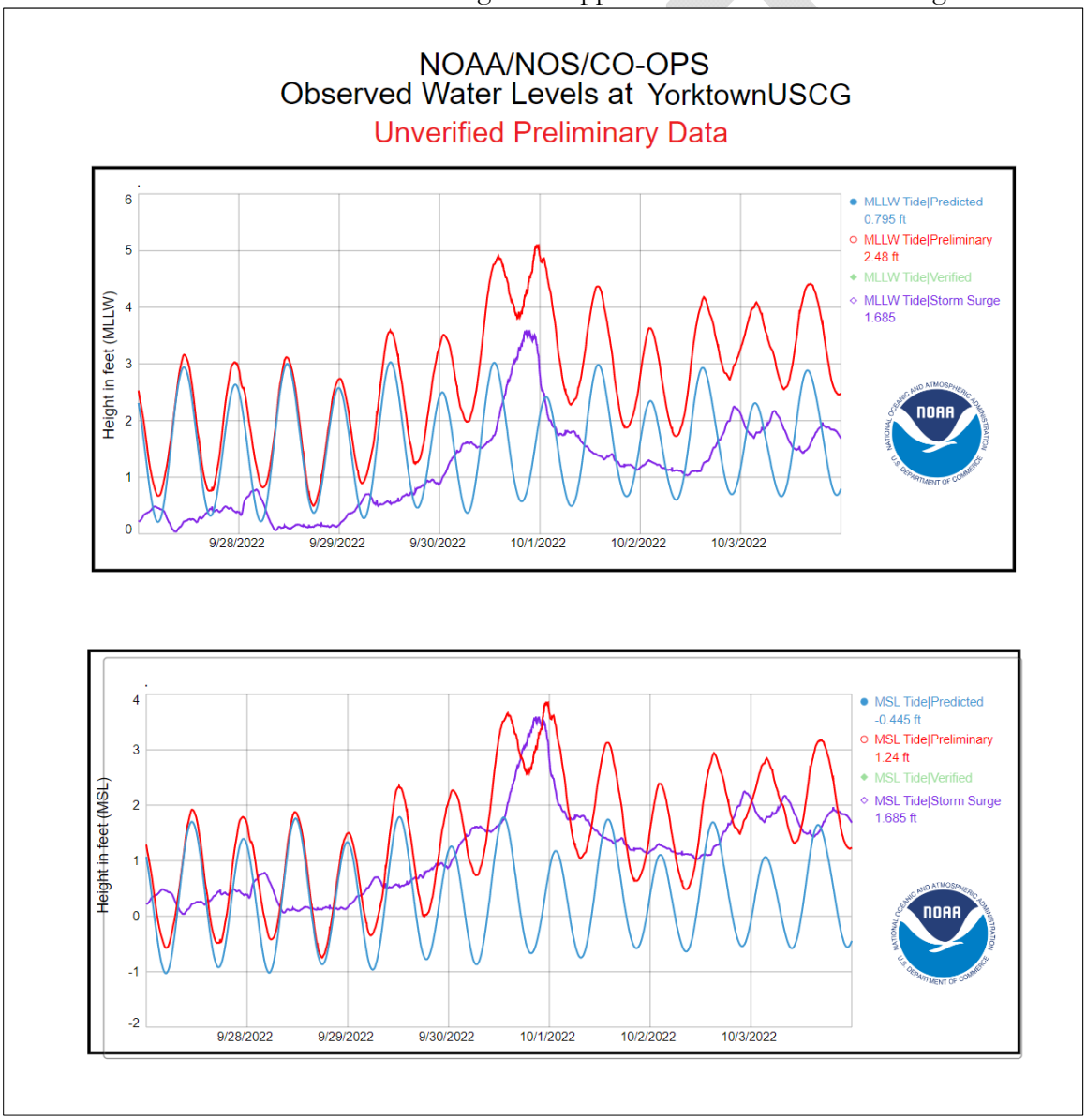


Figure 1. Preliminary data obtained from NOAA and a connection with Open Weather

- Sewells Point Tide Station:
  - Storm Surge: An approximate 3.8 foot storm surge was observed.

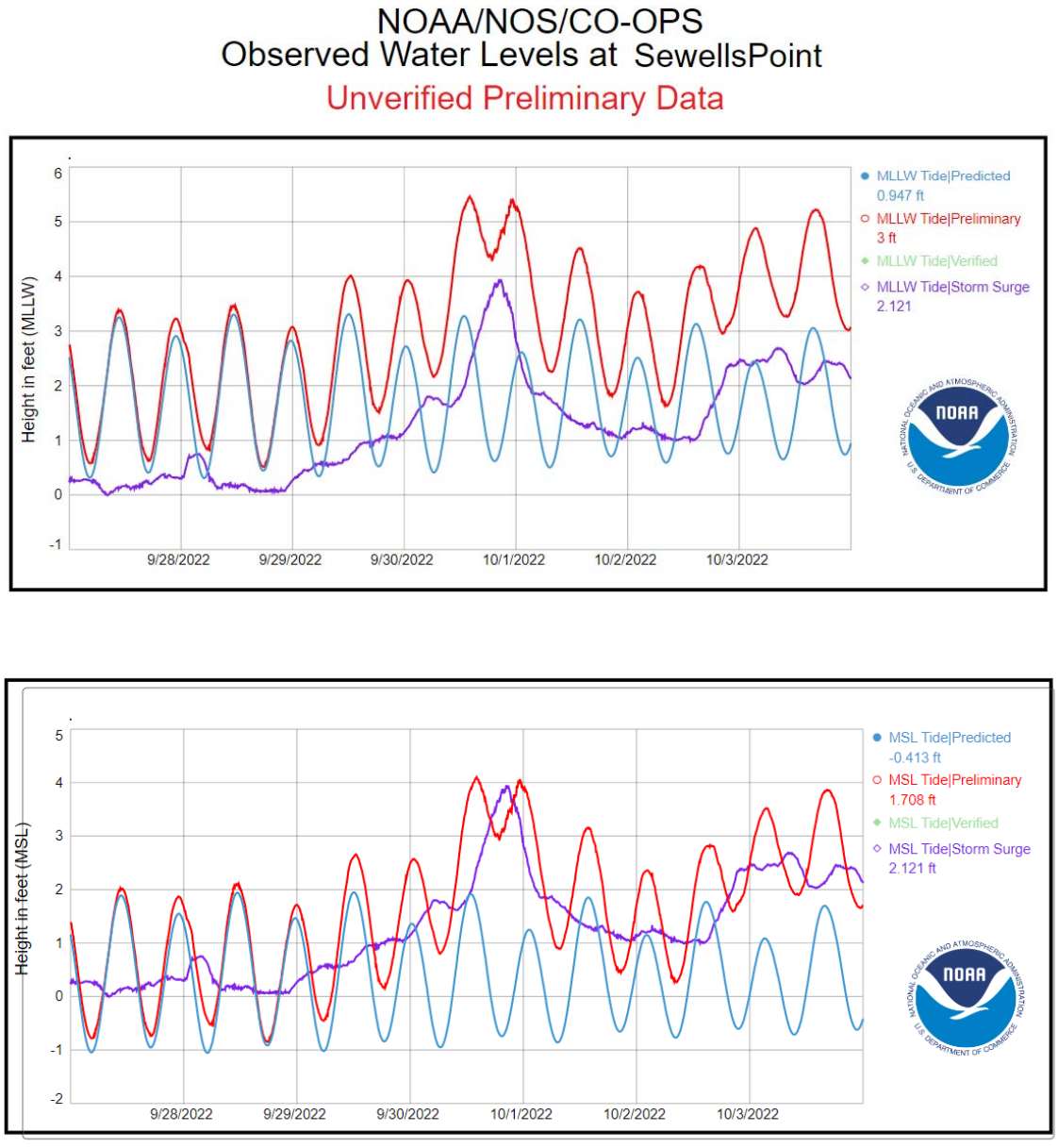


Figure 2. Preliminary data obtained from NOAA and a connection with Open Weather

South Shore

Weather:

Rainfall (HRSD Rainfall Gauges): *Recurrence intervals based on NOAA Atlas 14*

Rain Gauge Site	Peak Rainfall RI (Duration)	Jurisdiction
Army Base Treatment Plant Service Area[1]		
Bancker Rd (Dovercourt Discharge)	1-year (12hr)	NORF
Taussig Blvd PS	2- to 5-year (12hr)	NORF
Atlantic Treatment Plant Service Area[1]		
Callison at GB Locks	5-year (12hr)	CHES
Chesapeake PS 243	2-year (12hr)	CHES
Chesapeake PS 254	2-year (12hr)	CHES
Courthouse PRS	2-year (12hr)	VAB
Elbow Rd	2- to 5-year (12hr)	CHES
John B. Dey MLV-AT side	1-year (24hr)	VAB
Kempsville PRS	5-year (12hr)	VAB
Lagomar IFM at Atlantic TP	Invalid	VAB
Laskin Rd PRS	1- to 2-year (12hr)	VAB
Pine Tree PRS	2- to 5-year (12hr)	VAB
Shipps Corner PRS	2- to 5-year (12hr)	VAB
Ches-Liz Treatment Plant Service Area[1]		
Ches-Liz Weather	Disconnected	VAB
Dozier's Corner PS	5-year (12hr)	CHES
Independence PRS	2- to 5-year (24hr)	VAB
Northampton Blvd at Wesleyan Dr	5-year (12hr)	NORF
Providence PRS	2- to 5-year (12hr)	VAB
Shore Dr @ Jack Frost	1- to 2-year (24hr)	CHES
Nansemond Treatment Plant Service Area[1]		
Bowers Hill PRS	1- to 2-year (12hr)	CHES
Cedar Lane PS	5-year (12hr)	PORT
Chesapeake PS 158	Invalid	CHES
Chesapeake PS 238	1- to 2-year (12hr)	CHES
Crittenden Rd_Chuckatuck Rectifier	2-year (12hr)	SUFF
Deep Creek PRS	2-year (12hr)	CHES
Lake Kilby WTP	2- to 5-year (12hr)	SUFF
Nansemond Main Flow (Effluent)	1- to 2-year (24hr)	SUFF
Pagan River Rectifier	1-year (12hr)	IOW
Pughsville PS	2-year (12hr)	SUFF
Route 337 PRS	1- to 2-year (12hr)	CHES
Smithfield High School	2- to 5-year (12hr)	IOW
Suffolk PS	5-year (12hr)	SUFF
Suffolk PS 81	1- to 2-year (12hr)	SUFF
Suffolk PS 87	1-year (12hr)	SUFF
Windsor Duke St PS	Invalid	IOW
Windsor PCV	Disconnected	SUFF
Hill Point Rectifier	5-year (12hr)	SUFF

VIP Treatment Plant Service Area[1]

Elizabeth River Crossing_Eastern Branch	2- to 5-year (12hr)	NORF
Ferebee Avenue PS	2- to 5-year (12hr)	CHES
Luxembourg Avenue PS	1- to 2-year (12hr)	NORF
Rodman Ave PS	1- to 2-year (12hr)	PORT
Va Beach Blvd PS	2-year (12hr)	NORF
VIP Main Flow (Effluent)	1- to 2-year (12hr)	NORF

Note:

1. Typical treatment plant service area.

*Duration represents the minimum amount of time it took to reach the specified RRI.

Norfolk International Airport (ORF)

- Wind and Rainfall (daily total):

Date	Gust (max)	Sustained (max)	Sustained (avg)	Direction	Rainfall (in)
9/30/2022	30 mph	16 mph	9 mph	NE	3.40
10/1/2022	10 mph	4 mph	2 mph	SSW	0.00

Tide:

- Sewells Point Tide Station:
  - Storm Surge: An approximate 3.8 foot storm surge was observed.

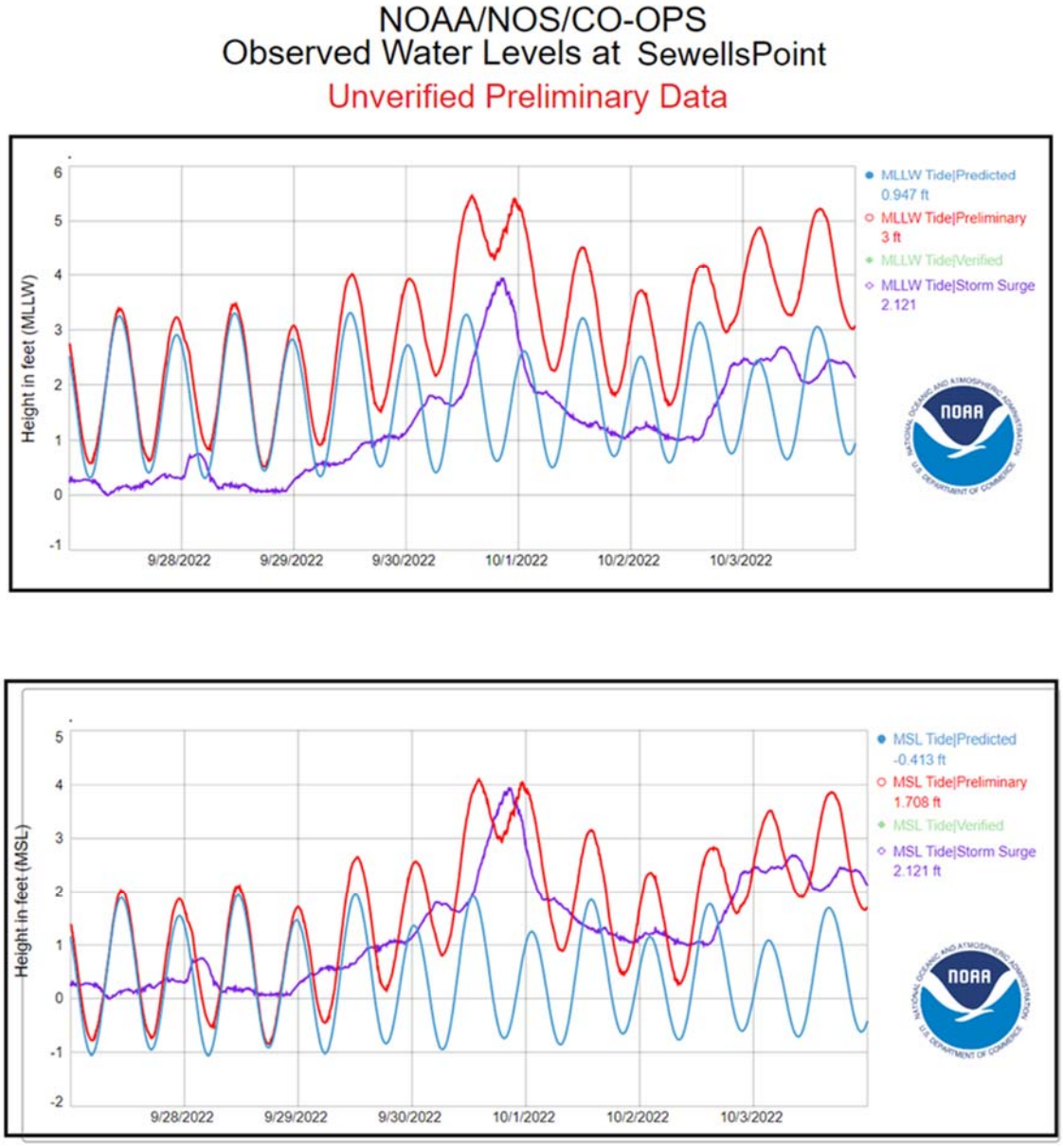


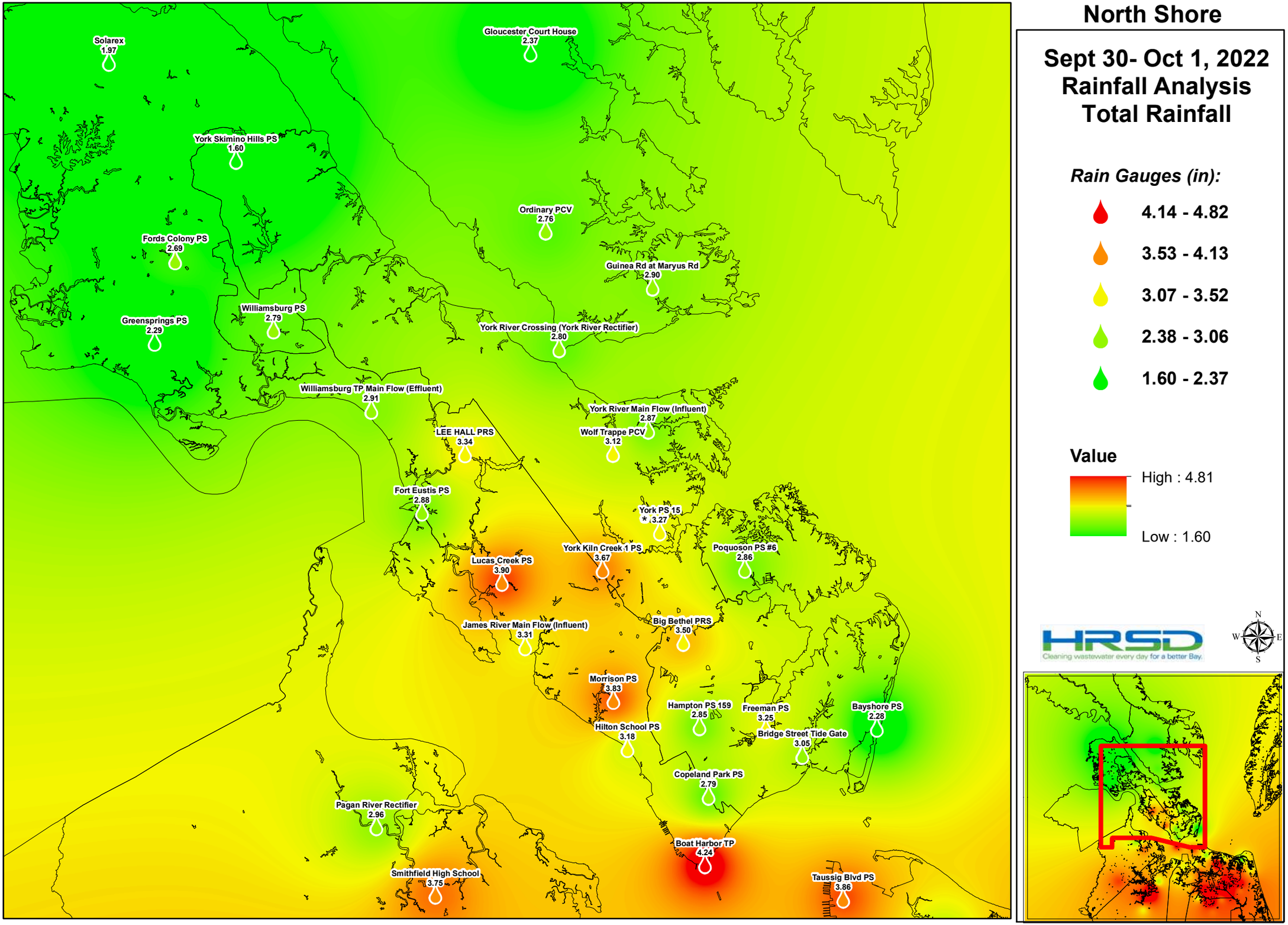
Figure 3. Preliminary data obtained from NOAA and a connection with Open Weather

Shallow Well Analysis:

Shallow wells are located at/or near HRSD Pump Stations to measure groundwater levels. The water column is measured using a pressure transducer located near the bottom of the well. The installed sensor measures gauge pressure in inches of water. The Shallow Well_NAVD88 measurement referenced in Appendix C refers to the elevation (referenced as NAVD 88) of the sensor plus the gauge measurement in feet.

Appendix A

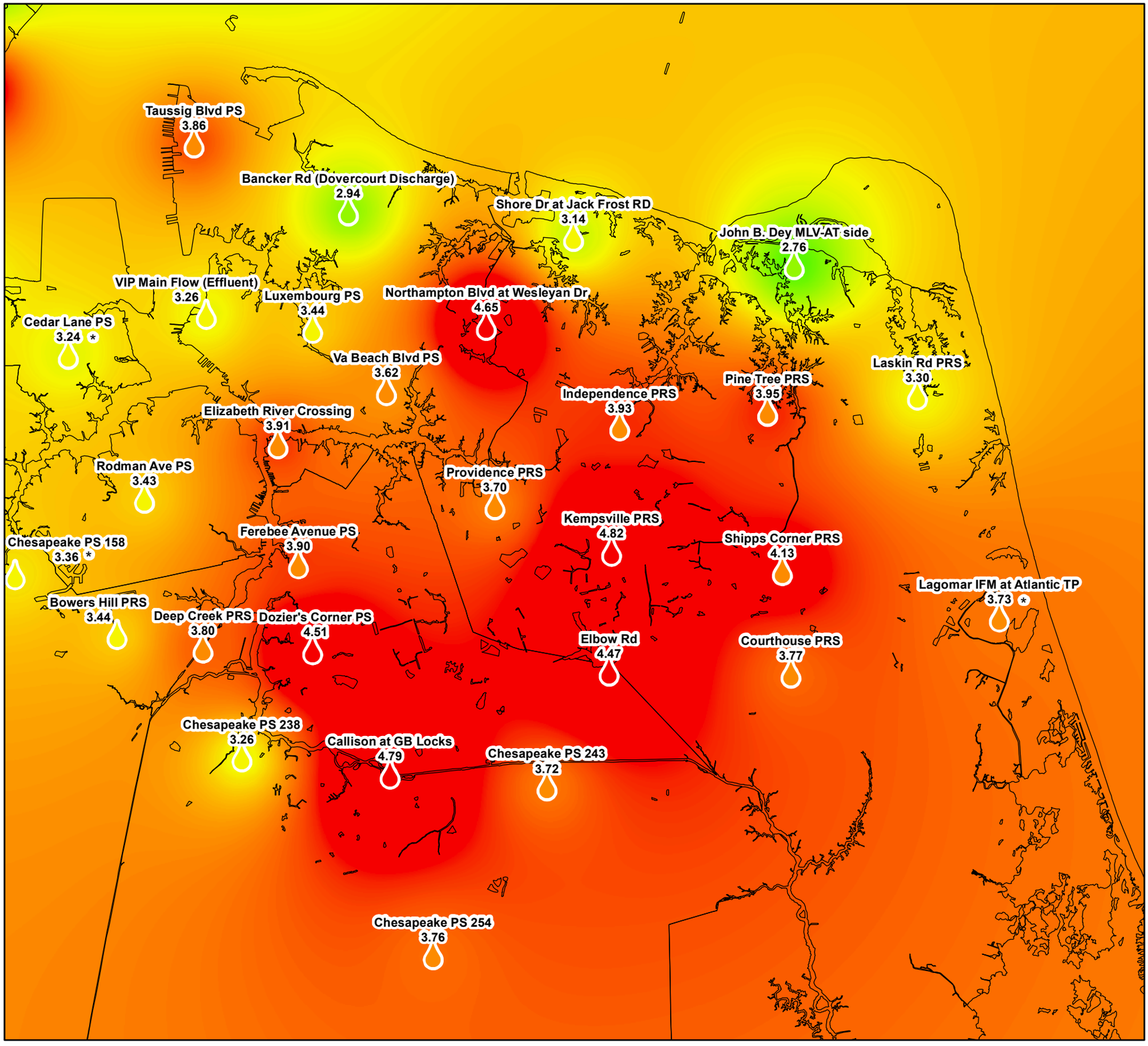
HRSD Rain Gauge Network
Rainfall Totals



*Note: Rain Gauge was invalid for event and an average of surrounding sites was used.

South Shore - East

Sept 30-Oct 1, 2022 Rainfall Analysis Total Rainfall



Rain Gauges (in):

- 4.14 - 4.82
- 3.53 - 4.13
- 3.07 - 3.52
- 2.38 - 3.06
- 1.60 - 2.37

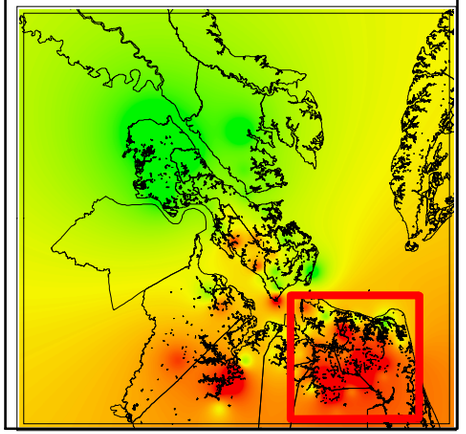
Value

High : 4.81

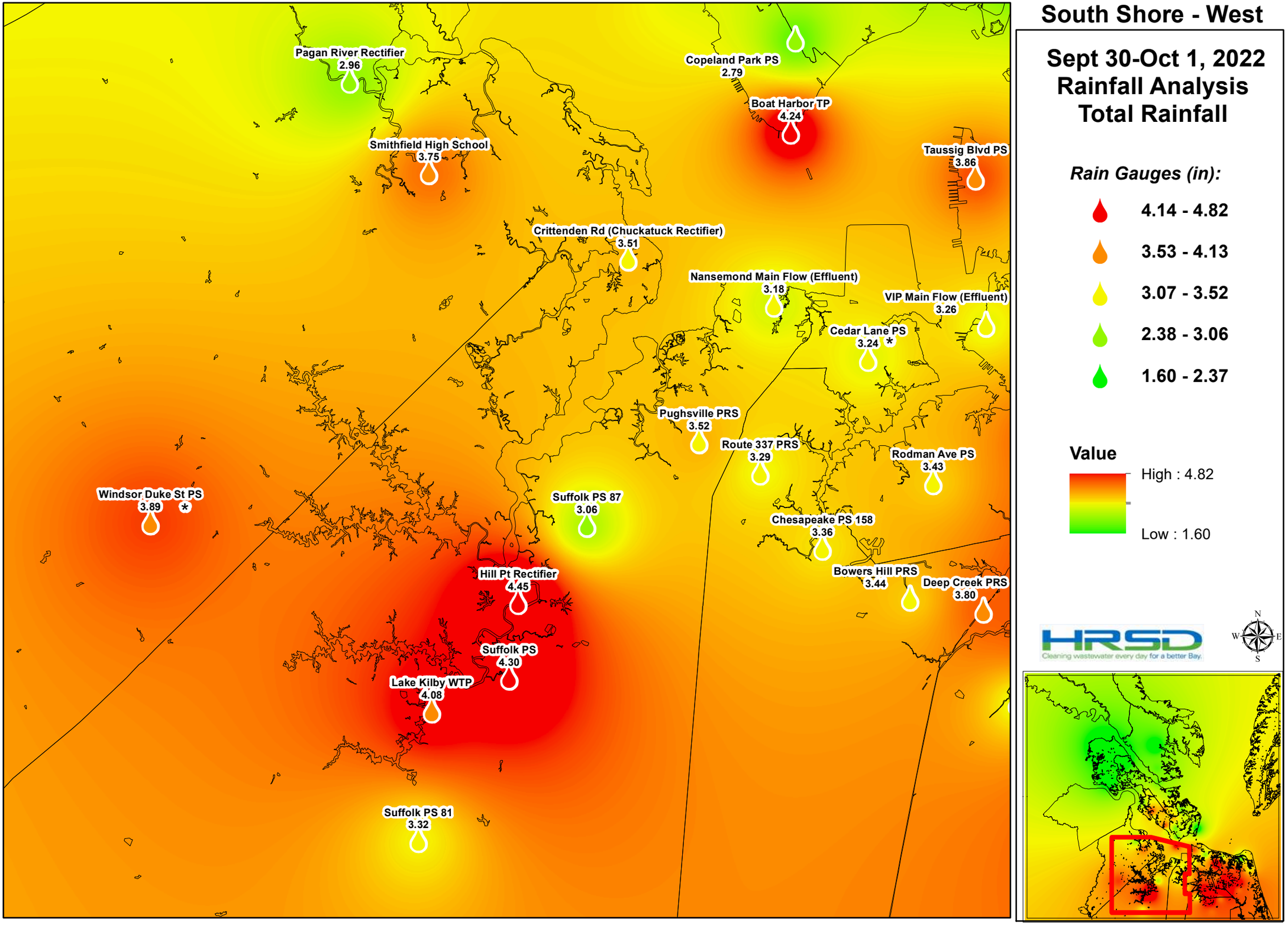
Low : 1.60

HRSD
Cleaning wastewater every day for a better Bay.

N W E S



*Note: Rain Gauge was invalid for event and an average of surrounding sites was used.



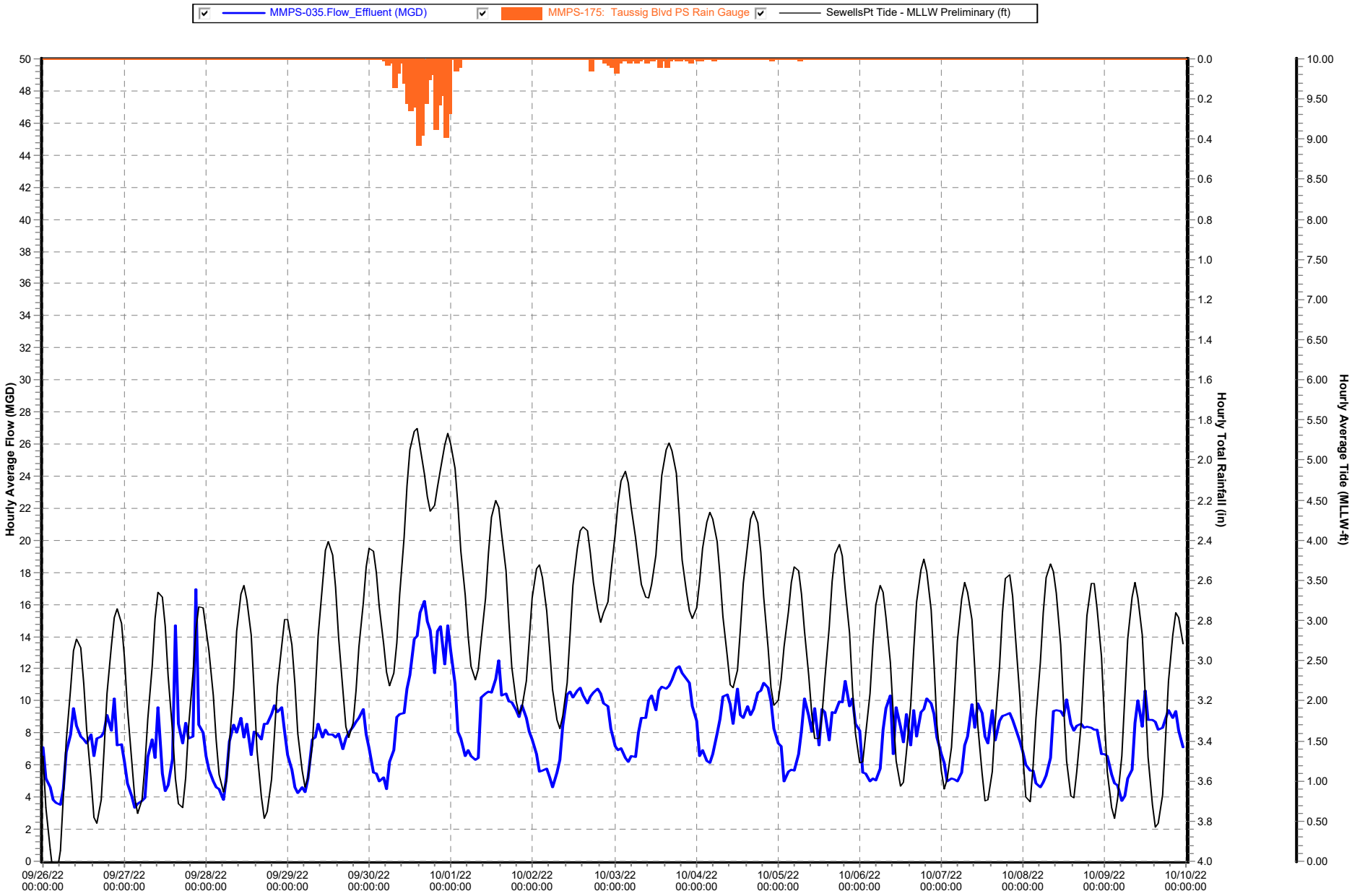
*Note: Rain Gauge was invalid for event and an average of surrounding sites was used.

Appendix C

HRSD Treatment Plant Flows

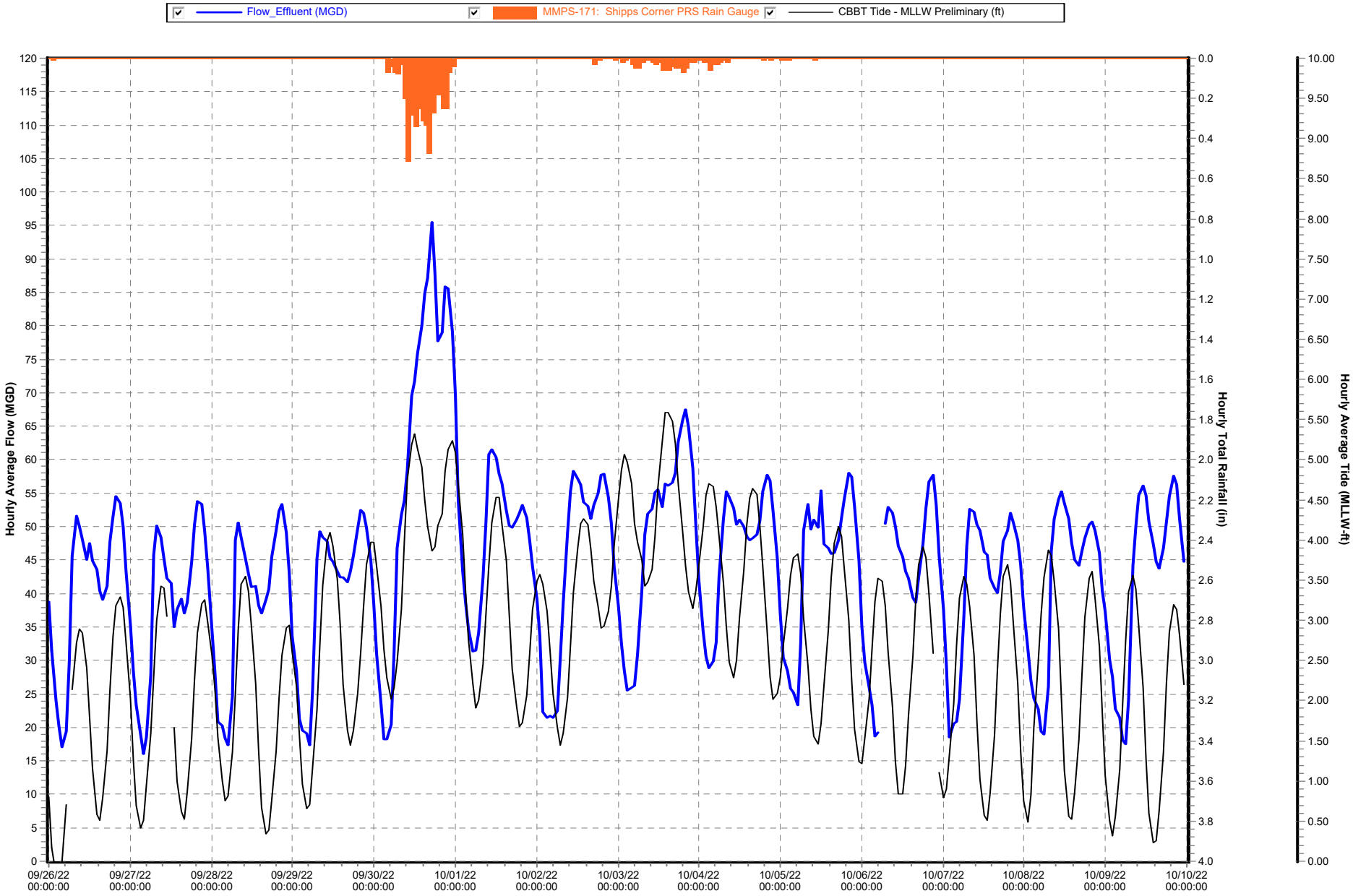
Army Base Treatment Plant

MMPS-035 (09/26/22 to 10/10/22)



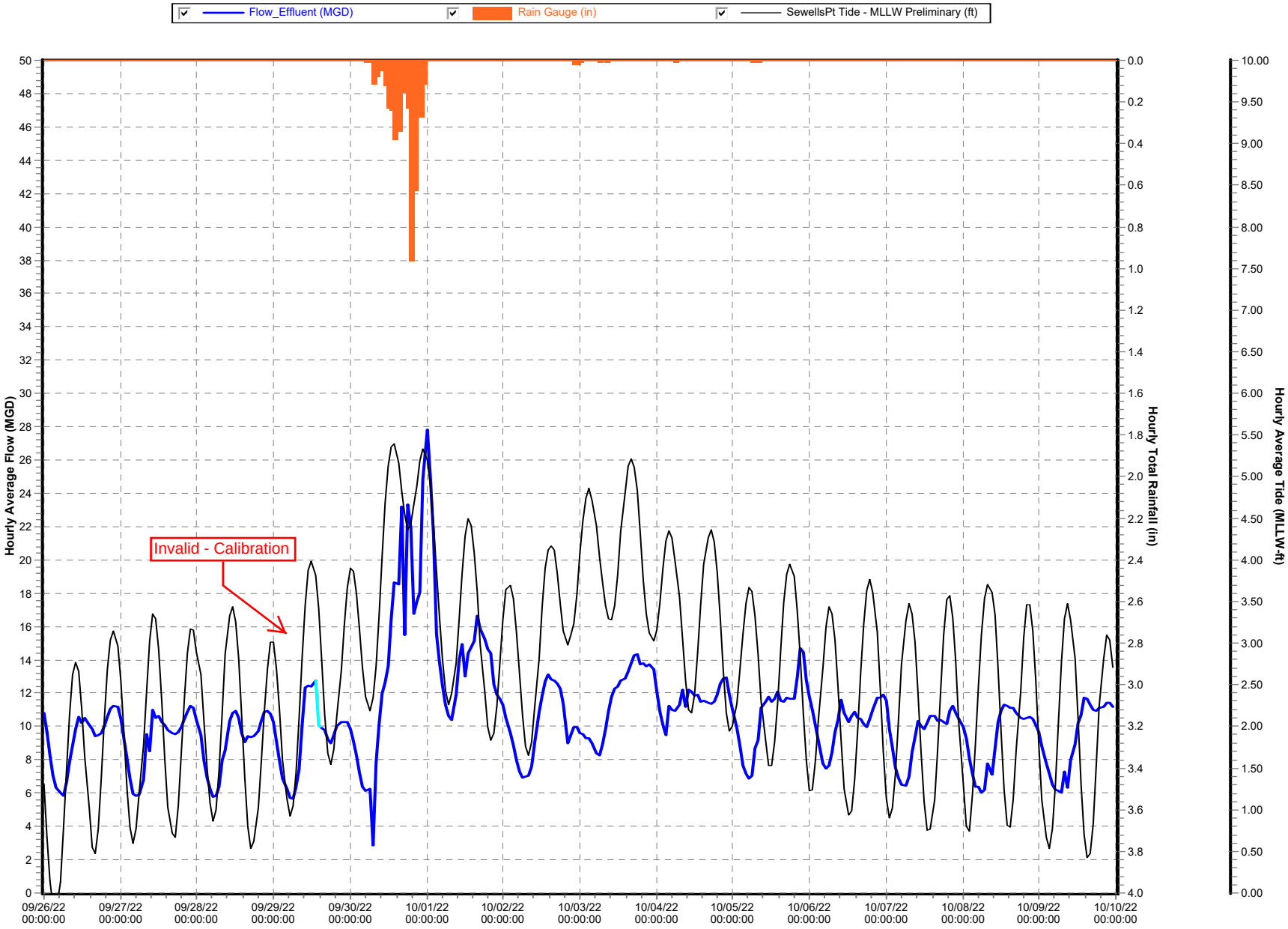
Atlantic Treatment Plant

MMPS-071 (09/26/22 to 10/10/22)



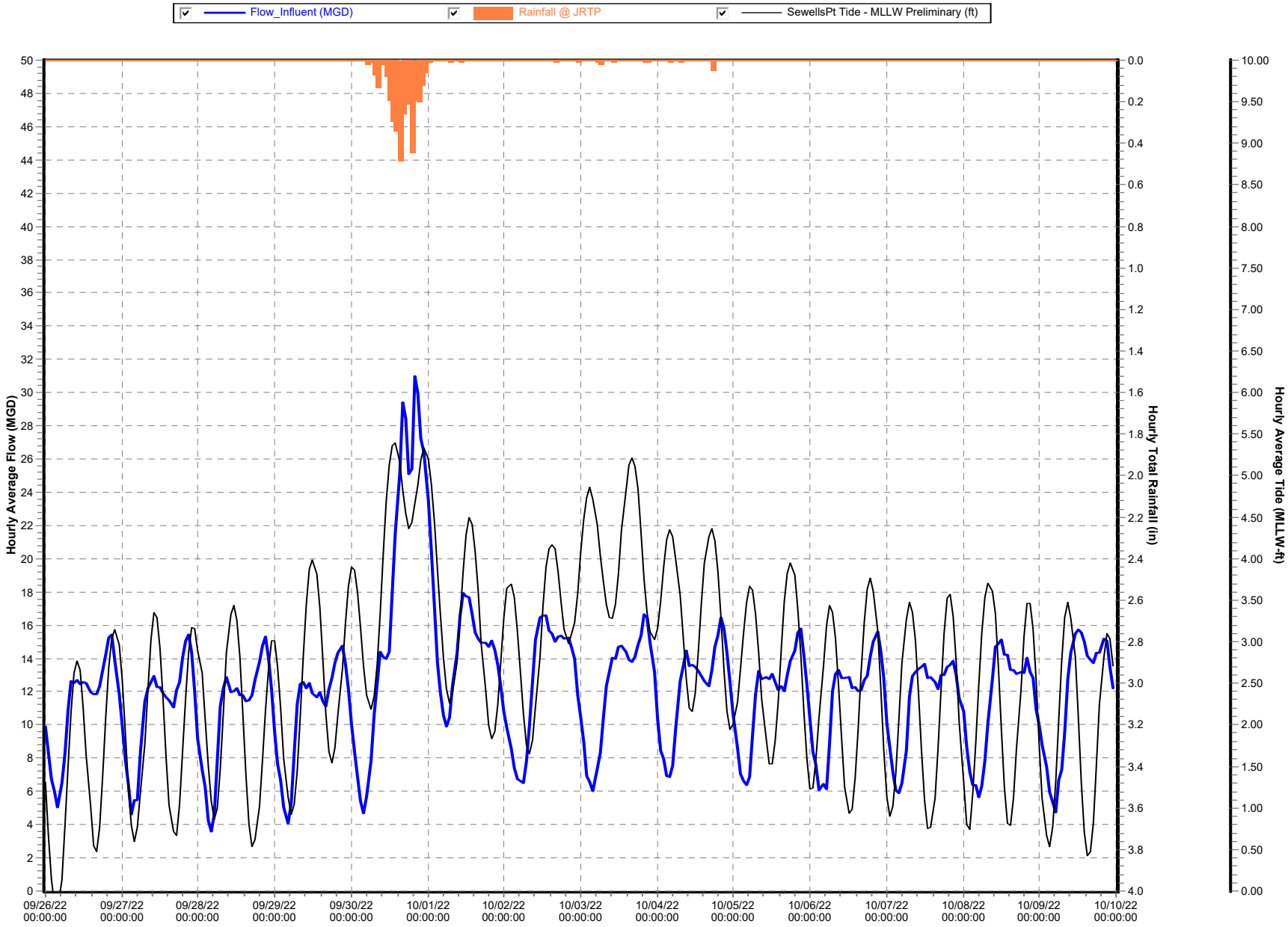
Boat Harbor Treatment Plant

MMPS-075 (09/26/22 to 10/10/22)



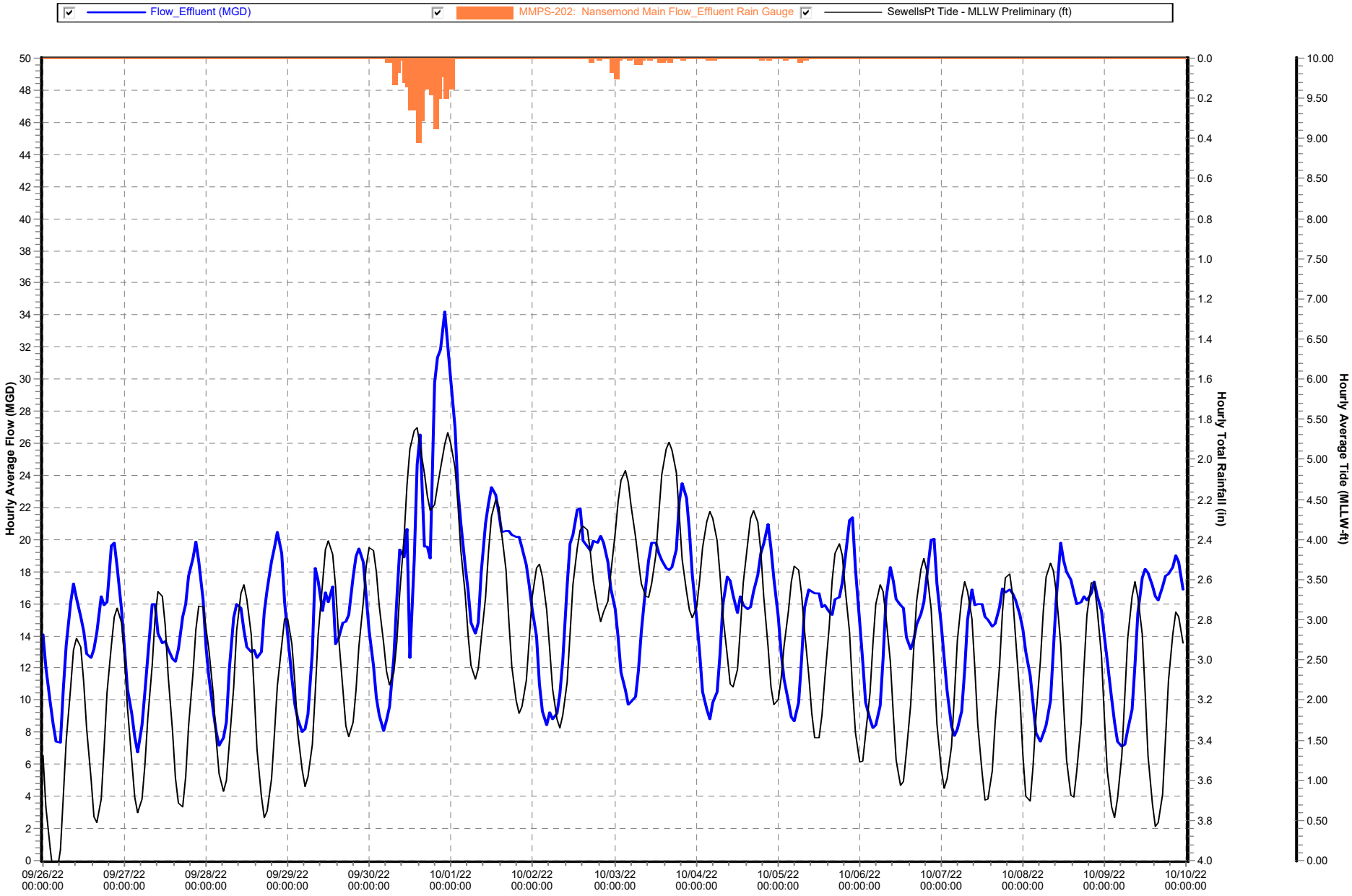
James River Treatment Plant

MMPS-184 (09/26/22 to 10/10/22)



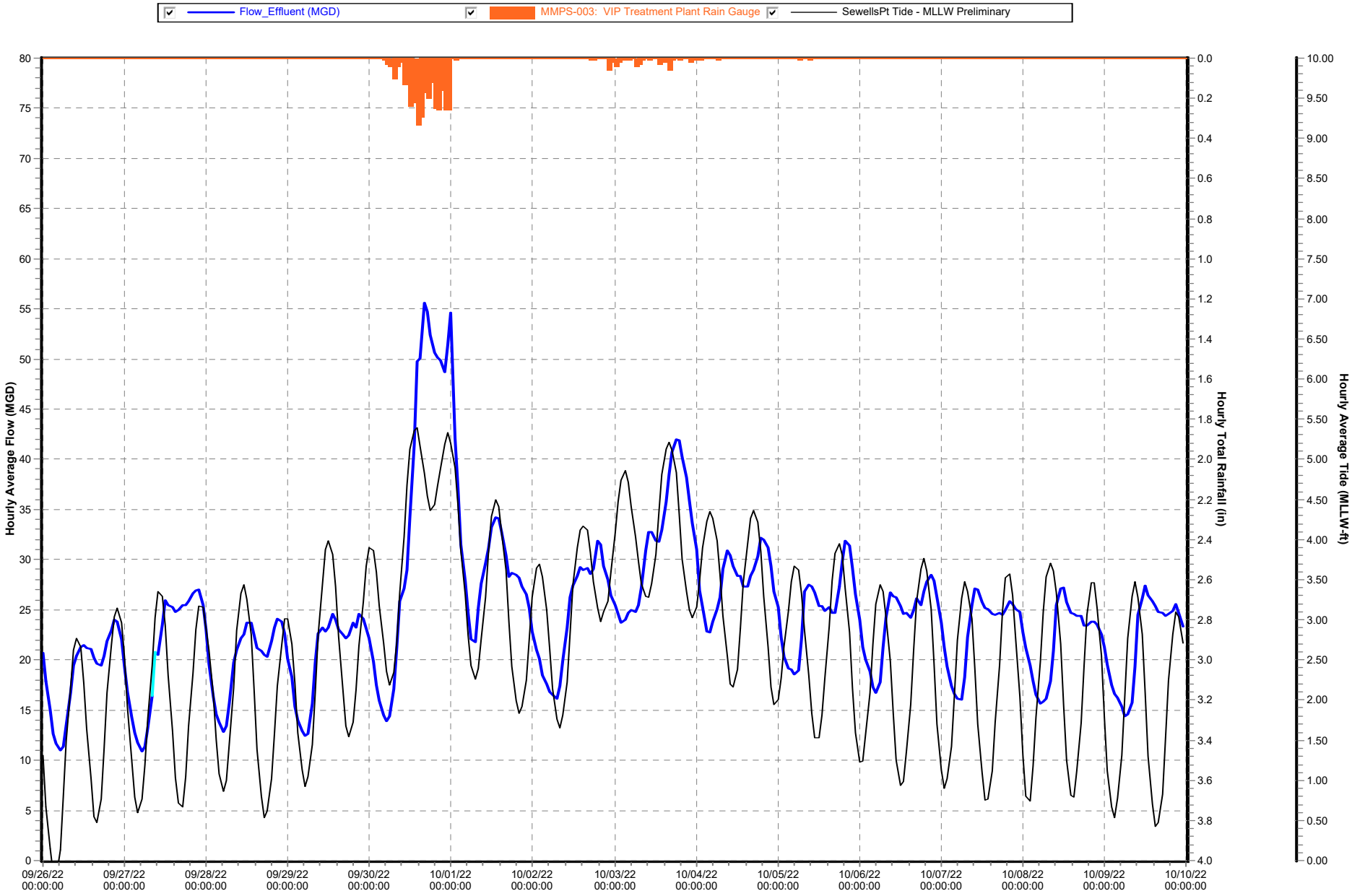
Nansemond Treatment Plant

MMPS-202 (09/26/22 to 10/10/22)



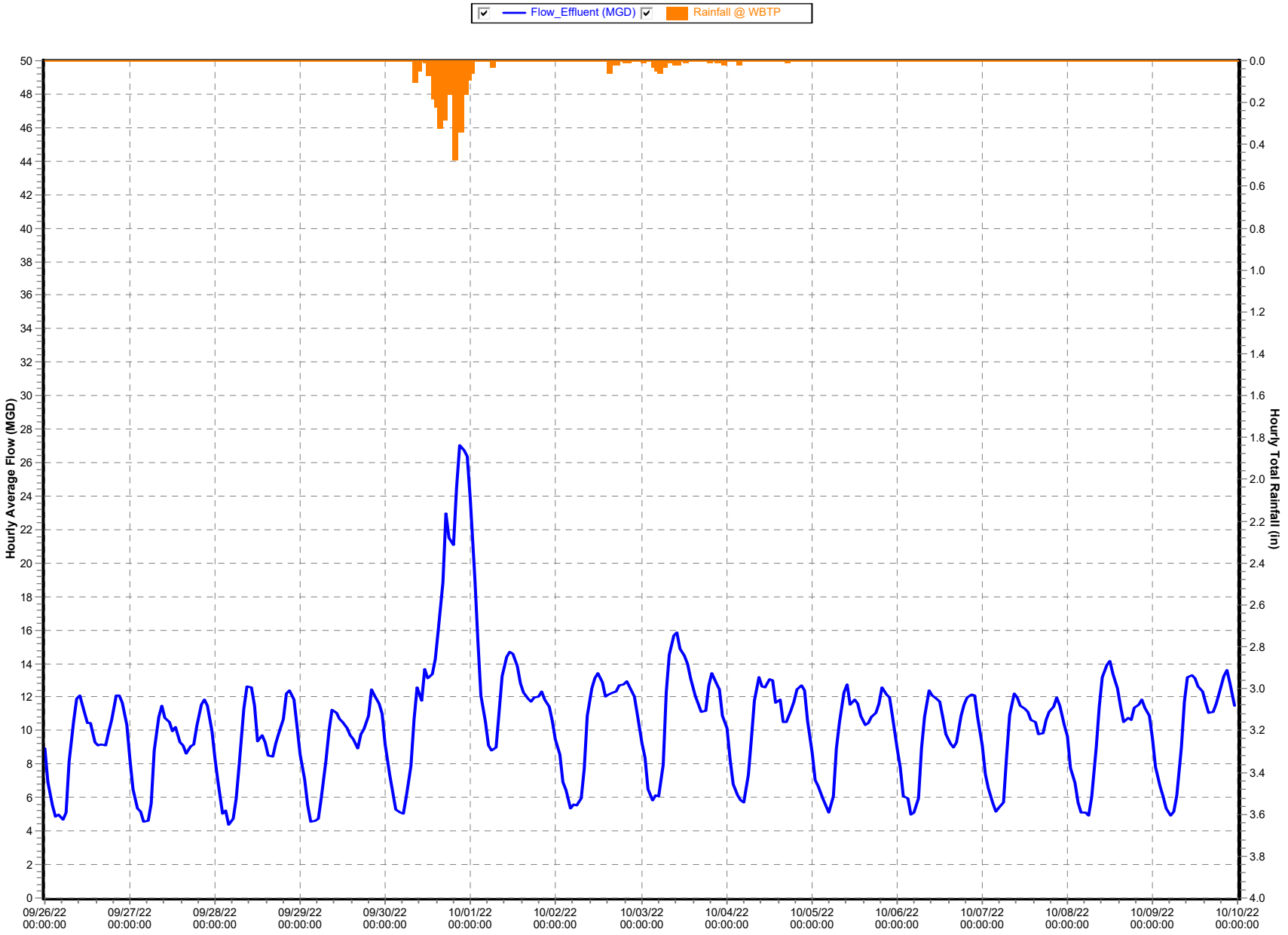
VIP Treatment Plant

MMPS-003 (09/26/22 to 10/10/22)



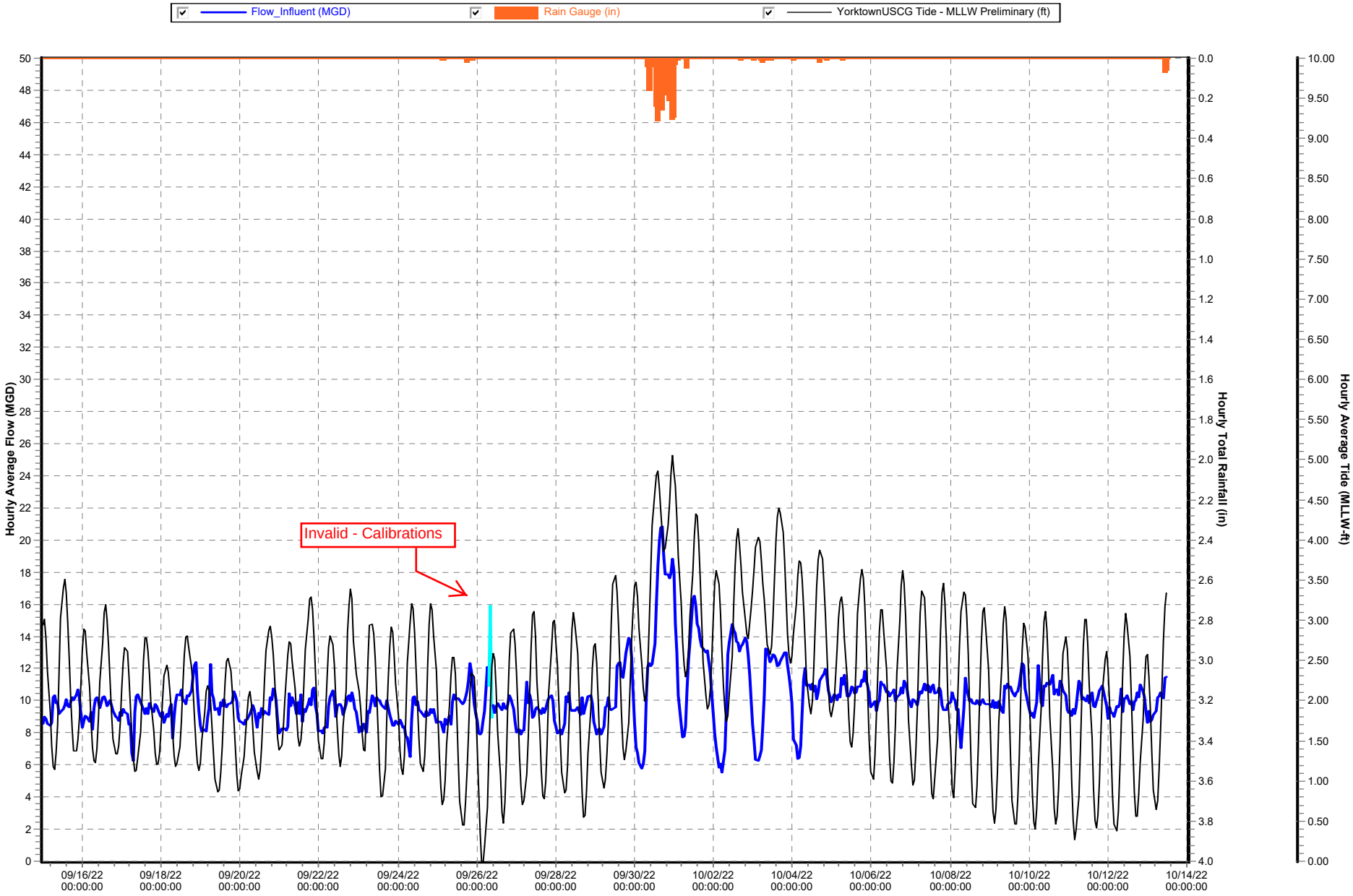
Williamsburg Treatment Plant

MMPS-222 (09/26/22 to 10/10/22)



York River Treatment Plant

MMPS-235 (09/15/22 to 10/14/22)



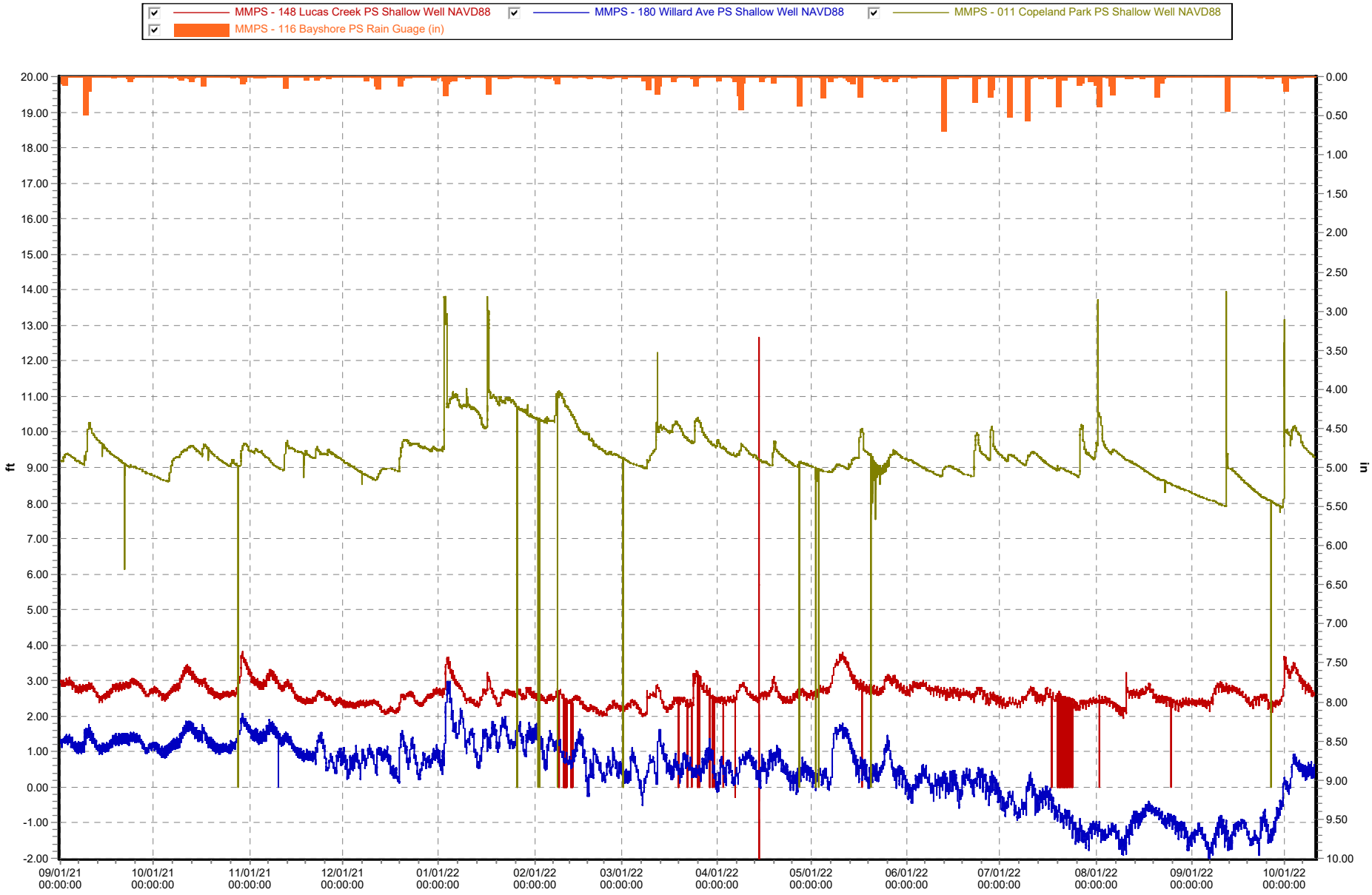
Appendix D

Shallow Well Analysis

1-year

North Shore Shallow Well Graphs

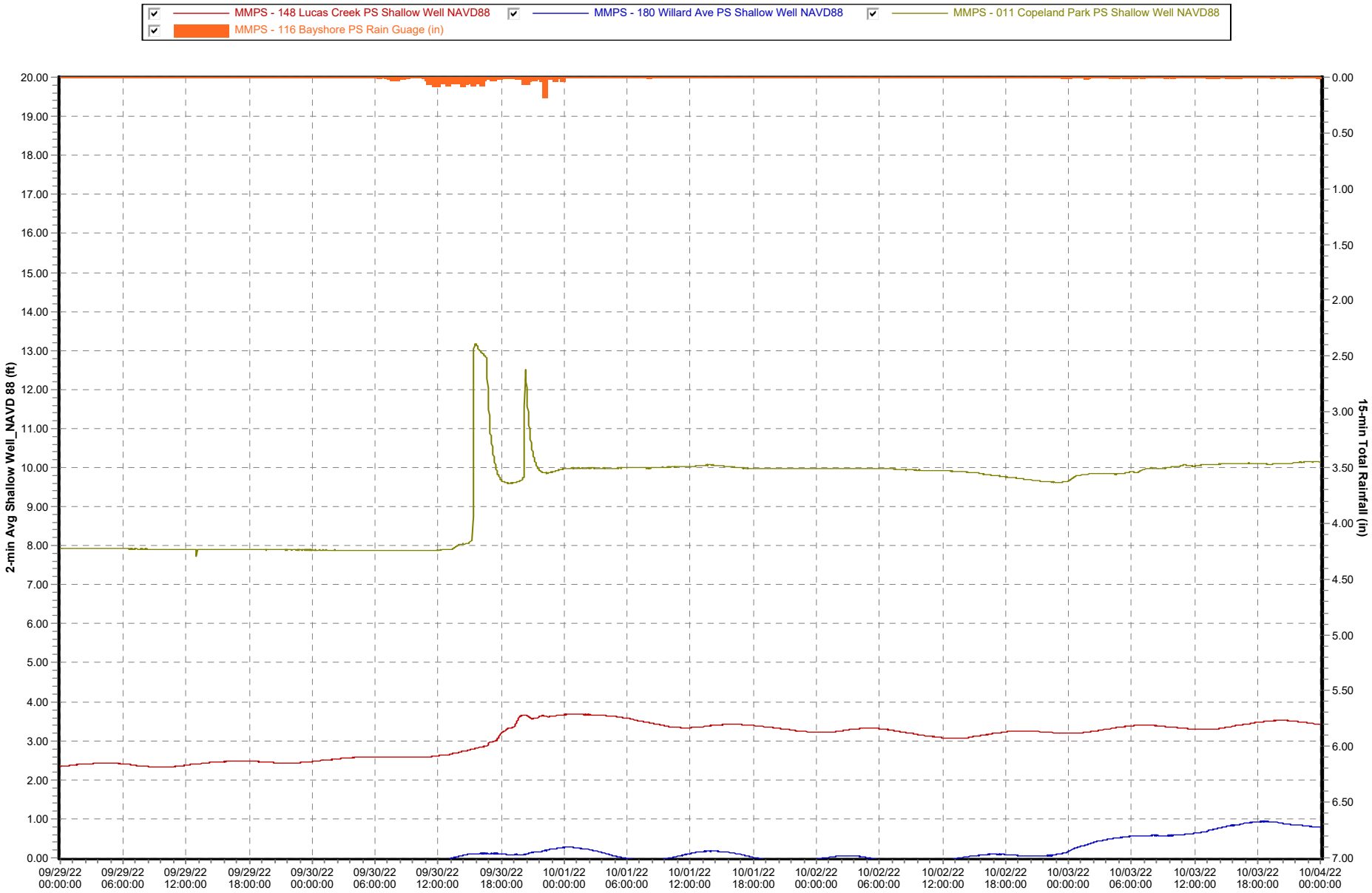
MMPS-148 (09/01/21 to 10/10/22)



5-day

North Shore Shallow Well Graphs

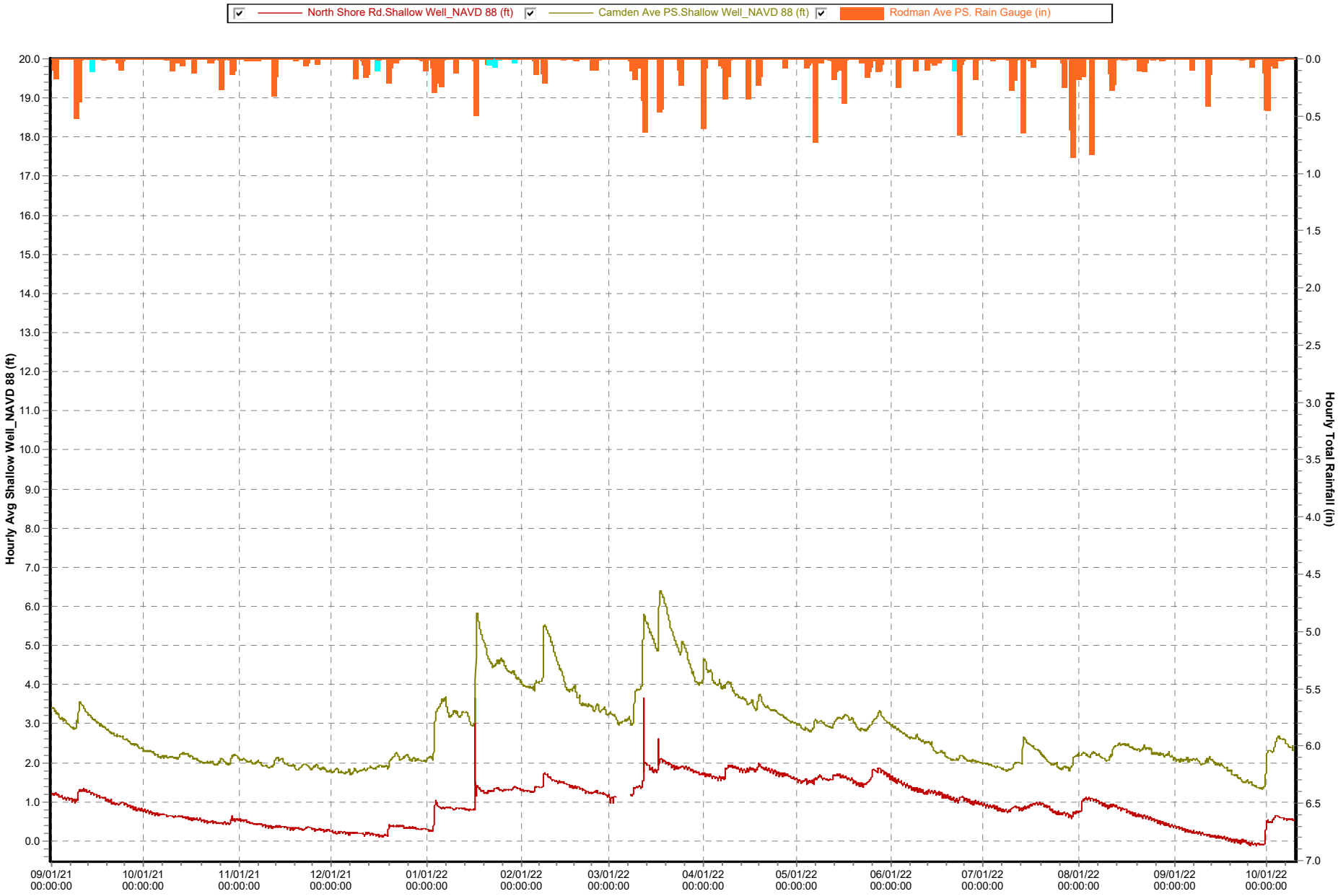
09/29/22 to 10/04/22



1-year

South Shore Shallow Well Graphs

09/01/21 to 10/10/22



5-day

South Shore Shallow Well Graphs

09/29/22 to 10/04/22