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Date: September 10, 2024
Our Ref: 30227172.RPTI4
Subject: Results of Second Quarter 2024 System Operation and Monitoring, Bethpage Park Groundwater Containment System (BPGWCS), Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York, NYSDEC Site #1-30-003A.

Dear Ms. Johnston,

Enclosed is one electronic PDF copy of the Second Quarter 2024 Report for the BPGWCS Operation and Monitoring Program, prepared in accordance with the 2013 NYSDEC ROD, 2014 NYSDEC Order on Consent, OM&M Manual (Arcadis 2009) and the NYSDEC-approved Sampling and Analysis Plan (SAP; Arcadis 2009). As we have transitioned to electronic submittals (via PDF) in line with NYSDEC's paper reduction program, hard copies of the report can be provided on request.

The notable total and project VOC concentrations detected between Q3 2021 and Q2 2024 in RW-2, RW-1 (Figures 6A and 6B), and system influent water samples (Figure 7) have decreased significantly by Q3 2023. VOCs have not been detected in the BPGWCS Q2 2024 effluent water samples (Table 3). In addition, the air quality impact analysis (Table 9) shows that none of the detected compounds exceed the 6 NYCRR Part 212-2.2 Table 2 High Toxicity Air Contaminant List annual mass emission limits. We will continue monitoring this situation during subsequent quarterly monitoring rounds.

Ms. Sarah A. Johnston
NYSDEC RB

September 10, 2024

If you have any questions, please do not hesitate to contact me.

Sincerely,
Arcadis of New York, Inc.

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Vice President

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Tables

Table 1
Operational Summary
Bethpage Park Groundwater Containment System
Operable Unit 3 (Former Grumman Settling Ponds)
Northrop Grumman,
Bethpage, New York

MONTH	DAY																													Days Operational [1]
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
2009 Total																																160
2010 Total																																352
2011 Total																																351
2012 Total																																353
2013 Total																																354
2014 Total																																349
2015 Total																																348
2016 Total																																351
2017 Total																																354
2018 Total																																348
2019 Total																																355
2020 Total																																345
2021 Total																																346
2022 Total																																344
2023 Total																																332
1Q 2024																																88
April 2024																																31
May 2024																																23
June 2024																																28
2Q 2024																																82
2024 Total																																170
TOTAL																																**5212**

Legend:

Indicates system online for greater than 18 hours.
Indicates system operated with reduced flows for 6 hours or greater.
Indicates system off-line for 6 hours or greater.

Notes, Abbreviations, and Units on last page.

Table 1
Operational Summary
Bethpage Park Groundwater Containment System
Operable Unit 3 (Former Grumman Settling Ponds)
Northrop Grumman,
Bethpage, New York

Notes:

1. Days the system was operational for greater than 18 hours are counted as one day.

Abbreviations/Units:

2Q	Second Quarter 2024

Table 2
Summary of Influent Water Sample Analytical Results
Bethpage Park Groundwater Containment System
Operable Unit 3 (Former Grumman Settling Ponds)
Northrop Grumman,
Bethpage, New York

Compound[3] (All Constituent Concentrations in µg/L)	08/22/23	11/08/23	02/22/24	05/15/24
Project VOCs				
1,1,1 - Trichloroethane	< 1.0	< 1.0	< 1.0	< 1.0
1,1 - Dichloroethane	< 1.0	**0.91 J**	< 1.0	< 1.0
1,2 - Dichloroethane	< 1.0	< 1.0	< 1.0	< 1.0
1,1 - Dichloroethene	< 1.0	**0.71 J**	< 1.0	< 1.0
Tetrachloroethene	< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethene	**10.6**	**59.7**	**15.1**	**9.6**
Vinyl Chloride	**0.69 J**	**7.4**	**0.93 J**	< 1.0
cis 1,2-Dichloroethene	**12.1**	**131**	**13.7**	**10.2**
trans 1,2-Dichloroethene	< 1.0	**1.5**	< 1.0	< 1.1
Benzene	< 0.50	< 0.50	< 0.50	< 0.51
Toluene	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene	< 1.0	< 1.0	< 1.0	< 1.0
m,p-Xylene	< 1.0	< 1.0	< 1.0	< 1.0
Subtotal Project VOCs	**23.4**	**201.2**	**29.7**	**19.8**
Non-Project VOCs				
1,1,2,2-Tetrachloroethane	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloroethane	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Butadiene	< 5.0	< 5.0	< 5.0	< 5.1
2-Butanone	< 10	< 10	< 10	< 11
4-Methyl-2-Pentanone	< 5.0	< 5.0	< 5.0	< 5.1
Acetone	< 10	< 10	< 10	< 11
Bromodichloromethane	< 1.0	< 1.0	< 1.0	< 1.0
Bromoform	< 1.0	< 1.0	< 1.0	< 1.0
Bromomethane	< 2.0	< 2.0	< 2.0	< 2.0
Carbon Disulfide	< 2.0	< 2.0	< 2.0	< 2.0
Carbon Tetrachloride	< 1.0	< 1.0	< 1.0	< 1.0
Chlorobenzene	< 1.0	< 1.0	< 1.0	< 1.0
Chlorodibromomethane	< 1.0	< 1.0	< 1.0	< 1.0
Chlorodifluoromethane (Freon 22)	< 5.0	< 5.0	< 5.0	< 5.1
Chloroethane	< 1.0	< 1.0	< 1.0	< 1.1
Chloroform	< 1.0	**0.66 J**	**0.54 J**	< 1.0
Chloromethane	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,3-Dichloropropene	< 1.0	< 1.0	< 1.0	< 1.0

Notes, Abbreviations, Qualifiers, and Units on last page.

Table 2
Summary of Influent Water Sample Analytical Results
Bethpage Park Groundwater Containment System
Operable Unit 3 (Former Grumman Settling Ponds)
Northrop Grumman,
Bethpage, New York

Compound[3] (All Constituent Concentrations in µg/L)	08/22/23	11/08/23	02/22/24	05/15/24
Non-Project VOCs				
Dichlorodifluoromethane (Freon 12)	< 2.0	< 2.0	< 2.0	< 2.0
Dichloromethane	< 2.0	< 2.0	< 2.0	< 2.0
Ethylbenzene	< 1.0	< 1.0	< 1.0	< 1.1
Methyl N-Butyl Ketone	< 5.0	< 5.0	< 5.0	< 5.1
Methyl Tert-Butyl Ether	< 1.0	< 1.0	< 1.0	< 1.0
Styrene (Monomer)	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,3-Dichloropropene	< 1.0	< 1.0	< 1.0	< 1.0
Trichlorofluoromethane (Freon 11)	< 2.0	< 2.0	< 2.0	< 2.1
Trichlorotrifluoroethane (Freon 113)	< 5.0	< 5.0	< 5.0	< 5.0
1-Chloro-1,1-difluoroethane (Freon 142b)	< 5.0	< 5.0	< 5.0	< 5.0
Subtotal Non-Project VOCs	**ND**	**0.66**	**0.54**	**ND**
Total VOCs[1,4]	**23**	**202**	**30.27**	**19.8**
1,4-Dioxane	**0.58**	**2.80**	<0.24	**0.40**
pH[2]	5.8	5.5	5.8	6.4

Notes, Abbreviations, Qualifiers, and Units:

1. "Total VOCs" represents the sum of individual concentrations of the compounds detected. The values used in calculations referenced in this report have been rounded to the nearest whole number.

2. Influent pH samples collected and measured in the field by Arcadis personnel on the dates listed using a field calibrated pH/conductivity meter. pH units are standard units.

3. Results validated following protocols specified in Sampling and Analysis Plan in the Bethpage Park Groundwater Containment System OM&M Manual (Arcadis 2016). See previous annual reports for historical analytical results.

4. As of August 4, 2022 the RW-1 concentration is representative of the addition of BCPMW-4-1 and BCPMW-4-2 that were added as additional recovery wells.

VOC	Volatile Organic Compound
10.2	Bold value indicates a detection.
< 1.0	Compound not detected at or above the laboratory quantification limit.
µg/L	micrograms per liter
J	Result is estimated.

Table 3
Summary of Effluent Water Sample Analytical Results
Bethpage Park Groundwater Containment System
Operable Unit 3 (Former Grumman Settling Ponds)
Northrop Grumman,
Bethpage, New York

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Compound[6] (All Constituent Concentrations in µg/L)	Discharge Limit[1]	07/14/23	08/22/23	09/07/23	10/04/23	11/08/23	12/07/23	01/16/24	02/22/24	03/18/24	04/16/24	05/15/24	06/12/24
Project VOCs													
1,1,1-Trichloroethane	5[2]	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethene	5[2]	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Tetrachloroethene	5[2]	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Trichloroethene	5[2]	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Vinyl Chloride	5[2]	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
cis 1,2-Dichloroethene	5[2]	<1.0	<1.0	<1.0	<1.0	**0.62 J**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
trans 1,2-Dichloroethene	5[2]	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Subtotal Project VOCs		**ND**	**ND**	**ND**	**ND**	**0.62**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**

Compound[6] (All Constituent Concentrations in µg/L)	Discharge Limit[1]	07/14/23	08/22/23	09/07/23	10/04/23	11/08/23	12/07/23	01/16/24	02/22/24	03/18/24	04/16/24	05/15/24	06/12/24
Non-Project VOCs													
Acetone	50	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Chloroform	5[2]	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Ethylbenzene	5[2]	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichlorotrifluoroethane (Freon 113)	5[2]	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Subtotal Non-Project VOCs		**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**
Total VOCs[3,7]		**ND**	**ND**	**ND**	**ND**	**0.62**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**
Treatment Efficiency[4]		> 99.9%	> 99.9%	> 99.9%	> 99.9%	> 99.9%	> 99.9%	> 99.9%	> 99.9%	> 99.9%	> 99.9%	> 99.9%	> 99.9%

Compound[6] (All Constituent Concentrations in µg/L)	Discharge Limit[1]	07/14/23	08/22/23	09/07/23	10/04/23	11/8/2023 [9]	12/7/2023 [10]	01/16/24	02/22/24	03/18/24	04/16/24	05/15/24	06/12/24
Inorganics													
Total Iron	600	<100	**142**	<100	**192**	**1,410**	**3,190**	**270**	**295**	**235**	**191**	**198**	**1,800**
Total Manganese	600	**37.7**	**35.1**	**37.2**	**37.6**	**141.0**	**74.6**	**60.8**	**55.1**	**49.0**	**48.2**	**43.3**	**84.8**
Nitrate and Nitrite	10,000	**2,100**	**2,200**	**2,100**	**1,900**	--	**2,300**	**2.3**	**2.0**	**2.0**	**2.3**	**2.2**	**2.3**
Total Kjeldahl Nitrogen	10,000	< 100	< 100	<100	<200	--	<200	**0.2**	<0.20	<0.20	**0.27**	<0.20	**0.43**
Total Nitrogen	10,000	**2,100**	**2,200**	**2,100**	**2,100**	--	**2,300**	**2.5**	**2.0**	**2.0**	**2.6**	**2.2**	**2.7**
1,4-Dioxane	NE	**0.80**	**0.70**	**0.75**	**0.23**	**2.20**	**1.10**	**0.59**	**0.71**	**0.31**	**0.48**	**0.28**	< 0.24

Compound[6] (All Constituent Concentrations in µg/L)	Discharge Limit[1]	07/14/23	08/22/23	09/07/23	10/04/23	11/08/23	12/07/23	01/11/24	02/22/24	03/18/24	04/16/24	05/15/24	06/12/24
PCBs													
Aroclor 1016	0.095	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Aroclor 1221	0.095	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Aroclor 1232	0.095	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Aroclor 1242	0.095	< 0.050	**0.076**	**0.13**	**0.088**	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Aroclor 1248	0.095	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	**0.067**	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Aroclor 1254	0.095	< 0.050	< 0.050	< 0.050	< 0.050	**0.078**	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Aroclor 1260	0.095	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
pH[5]	5.5-8.5	7.2	7.1	8.4	8.7	6.2	6.5	7.3	6.6	7.0	6.6	6.4	6.5

Notes, Abbreviations, Qualifers, and Units on last page.

Table 3
Summary of Effluent Water Sample Analytical Results
Bethpage Park Groundwater Containment System
Operable Unit 3 (Former Grumman Settling Ponds)
Northrop Grumman,
Bethpage, New York

Notes, Abbreviations, Qualifiers, and Units:

1. Discharge limits per the interim SPDES equivalency program or Division of Water Technical and Operational Guidance Series (TOGS 1.1.1) Quality Standards and Guidance Values and Groundwater Effluent Limitations, if the compound is not part of the SPDES Permit Equivalency.

2. As of September 2017, the 10 SPDES VOCs discharge limits are per Site Number 1-30-003A Operable Unit 3 SPDES Permit Equivalency.

3. "Total VOCs" represents the sum of individual concentrations of compounds detected. The values used in calculations referenced in this report have been rounded to the nearest whole number.

4. Treatment efficiency was calculated by dividing the difference between the influent and effluent total VOC concentrations by the influent total VOC concentration.

5. Effluent pH measured on site using a handheld pH meter. pH units are standard units.

6. Results validated following protocols specified in Sampling and Analysis Plan in the Bethpage Park Groundwater Containment System OM&M Manual (Arcadis 2016). See previous annual reports for historical analytical results.

7. As of August 4, 2022 the RW-1 concentration is representative of the addition of BCPMW-4-1 and BCPMW-4-2 that were added as additional recovery wells.

8. Elevated readings are likely due to problems with lab results and therefore do not reflect actual discharge values.

9. The analytical results for iron collected from Outfall 1 (WSP-7) on November 8, 2023 were unusually high (1,410 ug/l). At the time the sample was collected, the replacement of pumps and cleaning of the lines of recovery wells 4-1 and 4-2 (completed on November 6, 2023) likely contributed to the high iron concentration reported. The iron concentrations will be closely monitored in upcoming sampling events.

10. The analytical results for iron collected from Outfall 1 (WSP-7) on December 7, 2023 were unusually high (3,190 ug/l). Bag filter maintenance conducted on the date the sample was collected likely contributed to the high iron concentration reported. Subsequently, Outfall WSP-7 was sampled on January 11, 2024 and iron concentrations reported from this sample was 270 ug/l. This decrease suggests that the bag filter maintenance event resulted in the high iron concentration reported and the system is currently operating within the SPDES permit effluent limit of 600 ug/l.

--	Not Analyzed
NYSDEC	New York State Department of Environmental Conservation
SPDES	State Pollutant Discharge Elimination System
VOC	Volatile Organic Compound
NE	Not Established
--	pH not recorded due to a field recording error.
2.6	Bold value indicates a detection.
< 1.0	Compound not detected above the laboratory quantification limit.
µg/L	micrograms per liter
ND	Analyte not detected at, or above its laboratory quantification limit.

Table 4
Influent Vapor Sample Analytical Results
Bethpage Park Groundwater Containment System
Operable Unit 3 (Former Grumman Settling Ponds)
Northrop Grumman,
Bethpage, New York

Compound[1,3] (All Constituent Concentrations in µg/m^3)	08/22/23	11/08/23	02/22/24	05/15/24
Project VOCs				
1,1,1 - Trichloroethane	< 1.1	< 1.1	**0.48**	< 0.44
1,1 - Dichloroethane	**2.5**	**15 J**	**3.5**	**2.1**
1,2 - Dichloroethane	< 1.6	< 1.6	< 0.65	< 0.65
1,1 - Dichloroethene	**1.6**	**9.1**	**1.6**	**0.91**
Tetrachloroethene	**2.9**	**5.8**	**3.4**	**3.0**
Trichloroethene	**286**	**1240**	**278**	**249**
Vinyl Chloride	**15**	**107**	**14**	**4.1**
cis 1,2-Dichloroethene	**316**	**1990**	**241**	**157**
trans 1,2-Dichloroethene	**3.2**	**17**	**2.6**	**1.3**
Benzene	**1.9**	**12 J**	**0.93**	**0.51**
Toluene	**0.98 J**	< 1.5	**0.35 J**	**3.6**
o-Xylene	**1.3 J**	< 1.7	< 0.69	< 0.69
m,p-Xylene	**1.4 J**	< 1.7	< 0.69	< 0.69
Subtotal Project VOCs	**633**	**3396**	**546**	**422**
Non-Project VOCs				
1,1,2,2-Tetrachloroethane	< 1.4	< 1.4	< 0.55	< 0.55
1,1,2-Trichloroethane	< 1.1	< 1.1	< 0.44	< 0.44
1,2-Dichloropropane	< 1.8	< 1.8	< 0.74	< 0.74
1,3-Butadiene	< 0.88	< 0.88	< 0.35	< 0.35
2-Butanone	**0.88 J**	< 1.2	**1.7**	**2.7**
4-Methyl-2-Pentanone	< 1.6	< 1.6	< 0.66	**4.1**
Acetone	**7.1**	**36.3**	**7.6**	**6.7**
Bromodichloromethane	< 1.3	< 1.3	< 0.54	< 0.54
Bromoform	< 0.83	< 8.3	< 0.33	<0.33
Bromomethane	< 1.6	< 1.6	< 0.62	<0.62
Carbon Disulfide	< 1.2	< 1.2	< 0.50	<0.50
Carbon Tetrachloride	< 0.50	< 0.50	< 0.20	<0.20
Chlorobenzene	< 1.8	< 1.8	< 0.74	<0.74
Chlorodibromomethane	< 1.7	< 1.7	**1.6**	**0.94**
Chlorodifluoromethane (Freon 22)	**3.4**	< 1.4	**3.2**	**3.1**
Chloroethane	< 1.1	< 1.1	< 0.42	<0.42
Chloroform	**13**	**16 J**	**14**	**13**
Chloromethane	< 0.83	< 8.3	**1.4**	**1.1**
cis-1,3-Dichloropropene	< 1.8	< 1.8	< 0.73	<0.73
Dichlorodifluoromethane (Freon 12)	**1.7 J**	< 2.0	**2.3**	**2.2**
Dichloromethane	< 1.4	< 1.4	**2.3**	**1.8**
Ethylbenzene	< 1.7	< 1.7	< 0.69	<0.69
Methyl N-Butyl Ketone	< 1.6	< 1.4	< 0.65	<0.65
Methyl Tert-Butyl Ether	< 1.4	< 1.4	**0.32 J**	**0.28 J**
Styrene (Monomer)	< 1.7	< 1.7	< 0.68	<0.68
trans-1,3-Dichloropropene	< 1.8	< 1.8	< 0.73	<0.73
Trichlorofluoromethane (Freon 11)	< 1.1	< 1.1	**1.6**	**1.5**
Trichlorotrifluoroethane (Freon 113)	**1.6**	< 1.5	**2.1**	**2.2**
1-Chloro-1,1-difluoroethane (Freon 142b)	< 1.6	< 1.6	**0.34 J**	<0.66
Subtotal Non-Project VOCs	**28**	**52**	**38**	**40**
Total VOCs[2,4,5]	**660**	**3448**	**584**	**461**

Notes, Abbreviations, Qualifiers, and Units on last page.

Table 4
Influent Vapor Sample Analytical Results
Bethpage Park Groundwater Containment System
Operable Unit 3 (Former Grumman Settling Ponds)
Northrop Grumman,
Bethpage, New York

Notes, Abbreviations, Qualifiers, and Units:

1. Vapor samples collected by Arcadis on the dates shown and submitted to a NYSDOH ELAP certified laboratory for VOC analyses per Modified USEPA Method TO-15. A VOC analyte list is provided in the DRAFT Bethpage Park Groundwater Containment System OM&M Manual (Arcadis 2016). Influent samples were collected at Vapor Sampling Port-1 (VSP-1); refer to Figure 3 of this OM&M Report for the location of VSP-1.

2. "Total VOCs" represents the sum of individual concentrations of compounds detected. The values used in calculations referenced in this report have been rounded to the nearest whole number.

3. Results validated following protocols specified in Sampling and Analysis Plan in the Bethpage Park Groundwater Containment System OM&M Manual (Arcadis 2016). See previous annual reports for historical analytical results.

4. As of August 4, 2022 the RW-1 concentration is representative of the addition of BCPMW-4-1 and BCPMW-4-2 that were added as additional recovery wells.

5. Influent vapor samples were not analyzed for the Q2 2023 reporting period due to a sampling error.

ELAP	Environmental Laboratory Approval Program
NYSDOH	New York State Department of Health
OM&M	Operation, Maintenance, and Monitoring
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compound
2.2	Bold value indicates a detection.
< 0.66	Compound not detected above the laboratory quantification limit.
J	Result is estimated.
µg/m^3	micrograms per cubic meter

Table 5
Summary of Effluent Vapor Sample Analytical Results
Bethpage Park Groundwater Containment System
Operable Unit 3 (Former Grumman Settling Ponds)
Northrop Grumman,
Bethpage, New York

Compound[1,3] (All Constituent Concentrations in µg/m^3)	08/22/23	11/07/23	02/22/24	05/15/24
Project VOCs				
1,1,1 - Trichloroethane	< 0.44	< 1.1	< 0.44	< 0.44
1,1 - Dichloroethane	**1.6**	**3.3**	**2.0**	**2.2**
1,2 - Dichloroethane	< 0.65	< 1.6	< 0.65	< 0.65
1,1 - Dichloroethene	**0.91**	**1.6**	**1.10**	**1.30**
Tetrachloroethene	**5.4**	**0.62**	**5.90**	**0.50**
Trichloroethene	**24**	**74.2**	**29.0**	**17.0**
Vinyl Chloride	**4.9**	**11**	**6.10**	**2.6**
cis 1,2-Dichloroethene	**99.1**	**199**	**94**	**115**
trans 1,2-Dichloroethene	**0.67**	**1.3 J**	**1.10**	**0.87**
Benzene	**1.7**	**1.2 J**	**0.51**	**0.27 J**
Toluene	**34**	< 1.5	**2.10**	**0.45 J**
o-Xylene	**1.4**	< 1.7	**0.96**	< 0.69
m,p-Xylene	**5.6**	< 1.7	**3.40**	< 0.69
Subtotal Project VOCs	**179**	**292**	**146**	**140**
Non-Project VOCs				
1,1,2,2-Tetrachloroethane	< 0.55	< 1.4	< 0.55	<0.55
1,1,2-Trichloroethane	< 0.44	< 1.1	< 0.44	<0.44
1,2-Dichloropropane	< 0.74	< 1.8	< 0.74	<0.74
1,3-Butadiene	< 0.35	< 0.88	< 0.35	<0.35
2-Butanone	**9.7**	**1.5**	**2.3**	**1.4**
4-Methyl-2-Pentanone	**0.94**	< 1.6	**0.41 J**	<0.66
Acetone	**18**	**19**	**22**	**13**
Bromodichloromethane	< 0.54	< 1.3	< 0.54	<0.54
Bromoform	< 0.33	< 0.83	< 0.33	<0.33
Bromomethane	< 0.62	< 1.6	< 0.62	<0.62
Carbon Disulfide	**0.27 J**	< 1.2	< 0.50	<0.50
Carbon Tetrachloride	< 0.20	< 0.50	**0.82**	<0.20
Chlorobenzene	< 0.74	< 1.8	< 0.74	<0.74
Chlorodibromomethane	< 0.68	< 1.7	< 0.68	<0.68
Chlorodifluoromethane (Freon 22)	**3.2**	**3**	**3.2**	**3.5**
Chloroethane	< 0.42	< 1.1	< 0.42	<0.42
Chloroform	**7.3**	**6.8**	**6.3**	**8.3**
Chloromethane	**1.1**	**1.1**	**9.5**	**1.5**
cis-1,3-Dichloropropene	< 0.73	< 1.8	< 0.73	<0.73
Dichlorodifluoromethane (Freon 12)	**1.3**	**1.8 J**	**2.1**	**2.6**
Dichloromethane	**0.73**	**2.1**	**1.5**	**2.1**
Ethylbenzene	**2.6**	< 1.7	**0.61 J**	<0.69
Methyl N-Butyl Ketone	< 0.65	< 1.4	< 0.65	<0.65
Methyl Tert-Butyl Ether	< 0.58	< 1.4	< 0.58	<0.58
Styrene (Monomer)	< 0.68	< 1.7	< 0.68	<0.68
trans-1,3-Dichloropropene	< 0.73	< 1.8	< 0.73	<0.73
Trichlorofluoromethane (Freon 11)	**1**	< 1.1	**1.3**	**1.7**
Trichlorotrifluoroethane (Freon 113)	< 0.61	< 1.5	< 0.61	<0.61
1-Chloro-1,1-difluoroethane (Freon 142b)	< 0.66	< 1.6	**0.35 J**	<0.66
Subtotal Non-Project VOCs	**53**	**35**	**50**	**34**
Total VOCs[2,4]	**177**	**328**	**197**	**174**

Notes, Abbreviations, Qualifiers, and Units on last page.

Table 5
Summary of Effluent Vapor Sample Analytical Results
Bethpage Park Groundwater Containment System
Operable Unit 3 (Former Grumman Settling Ponds)
Northrop Grumman,
Bethpage, New York

Notes, Abbreviations, Qualifiers, and Units:

1. Vapor samples collected by Arcadis on the dates shown and submitted to a NYSDOH ELAP certified laboratory for VOC analyses per Modified USEPA Method TO-15. A VOC analyte list is provided in the DRAFT Bethpage Park Groundwater Containment System OM&M Manual (Arcadis 2016). Effluent samples were collected at Vapor Sampling Port-5 (VSP-5); refer to Figure 3 of this OM&M Report for the location of VSP-5.

2. "Total VOCs" represents the sum of individual concentrations of all compounds detected. The values used in calculations referenced in this report have been rounded to the nearest whole number.

3. Results validated following protocols specified in Sampling and Analysis Plan in the Bethpage Park Groundwater Containment System OM&M Manual (Arcadis 2016). See previous annual reports for historical analytical results.

4. As of August 4, 2022 the RW-1 concentration is representative of the addition of BCPMW-4-1 and BCPMW-4-2 that were added as additional recovery wells.

ELAP	Environmental Laboratory Approval Program
NYSDOH	New York State Department of Health
OM&M	Operation, Maintenance, and Monitoring
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compound
1.7	Bold value indicates a detection.
< 0.69	Compound not detected above the laboratory quantification limit.
J	Result is estimated.
µg/m^3	micrograms per cubic meter

Table 6
Summary of Effluent Vapor Tentatively Identified Compounds
Bethpage Park Groundwater Containment System
Operable Unit 3 (Former Grumman Settling Ponds)
Northrop Grumman,
Bethpage, New York

Compound[1,3] (All Constituent Concentrations in ppbv)	08/22/23	11/08/23	02/22/24	05/15/24
Tentatively Identified Compounds				
1-Butanol	ND	ND	**3**	ND
Octane, 3-methyl	ND	ND	**6**	ND
Nonane	ND	ND	**2.5**	ND
alkane	ND	ND	**3.4**	**0.83 J**
Camphene	ND	ND	**2.7**	ND
Silanol, trimethyl-	ND	**3**	ND	ND
n-Propyl acetate	**1.1**	ND	ND	ND
Cyclohexane, methyl-	ND	**2.6**	ND	ND
Total VOC TICs[2,4]	**1.94**	**5.6**	**78**	**0.83**

Notes, Abbreviations, Qualifiers, and Units:

1. Vapor samples collected by Arcadis on the dates shown and submitted to a NYSDOH ELAP certified laboratory for VOC analyses per Modified USEPA Method TO-15. A VOC analyte list is provided in the DRAFT Bethpage Park Groundwater Containment System OM&M Manual (Arcadis 2016). Effluent samples were collected at Vapor Sampling Port-5 (VSP-5); refer to Figure 3 of this OM&M Report for the location of VSP-5.

2. Compounds found in associated method blank are not included in Total VOC TICs.

3. Results validated following protocols specified in Sampling and Analysis Plan in the Bethpage Park Groundwater Containment System OM&M Manual (Arcadis 2016). See previous annual reports for historical analytical results.

4. As of August 4, 2022 the RW-1 concentration is representative of the addition of BCPMW-4-1 and BCPMW-4-2 that were added as additional recovery wells.

ECU	Emission Control Unit
ELAP	Environmental Laboratory Approval Program
NYSDOH	New York State Department of Health
OM&M	Operation, Maintenance, and Monitoring
TIC	Tentatively Identified Compound
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compound
1	Bold value indicates a detection.
ND	TIC were not detected.
B	TIC was detected in the associated method blank.
J	Result is estimated.
N	Indicates presumptive evidence of a compound.
ppbv	parts per billion by volume

Table 7
Summary of System Parameters
Bethpage Park Groundwater Containment System
Operable Unit 3 (Former Grumman Settling Ponds)
Northrop Grumman,
Bethpage, New York

ARCADIS

Date [1,8]	Water Flow Rates (All Flows in gpm)						Water Pressures (All Pressures in psi)					Air Flow Rate (scfm) [2]	Air Pressures (All Pressures in iwc) [5,6]					Air Temp. (^{o}R)[5]
	Remedial Well [2]				Combined Influent [3]	Effluent [2]	Remedial Well Effluent [2,4]				Effluent [5]	Effluent	ECU Influents				Effluent	Effluent
	RW-1[7]	RW-2	RW-3	RW-4			RW-1	RW-2	RW-3	RW-4			GAC-501	GAC-502	PPZ-601	PPZ-602		
	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(psi)	(psi)	(psi)	(psi)	(psi)	(scfm)	(iwc)	(iwc)	(iwc)	(iwc)	(iwc)	(^{o}R)
08/22/23	30.3	73.9	78.1	31.0	213	219	57	27	35	54	16	1,128	2.5	< 1.0	< 1.0	< 1.0	< 1.0	546
09/07/23	30.9	73.6	76.0	31.0	212	221	57	26	40	54	22	1,103	2.5	< 1.0	< 1.0	< 1.0	< 1.0	553
10/04/23	28.9	73.4	75.7	30.7	209	220	59	26	38	54	12	1,107	2.5	< 1.0	< 1.0	< 1.0	4.0	540
11/08/23	24.6	75.4	76.3	29.7	206	212	8	23	41	56	12	1,099	1.5	< 1.0	< 1.0	< 1.0	3.5	528
12/07/23	24.0	81.2	75.7	29.5	210	285	8	22	41	56	12	1,171	2.0	< 1.0	< 1.0	< 1.0	4.5	522
01/11/24	25.2	75.2	77.5	30.4	208	286	8	67	65	70	17	1,068	2.0	< 1.0	< 1.0	< 1.0	< 1.0	526
02/22/24	25.5	69.5	78.1	29.9	203	254	7	46	33	57	12	1,026	2.0	< 1.0	< 1.0	< 1.0	1.0	520
03/18/24	25.8	73.6	78.0	29.6	207	260	8	38	33	58	25	1,064	1.5	< 1.0	< 1.0	< 1.0	< 1.0	526
04/16/24	29.0	71.7	76.6	28.8	206	260	8	43	39	59	17	1,012	1.5	< 1.0	< 1.0	< 1.0	< 1.0	538
05/15/24	20.1	71.7	76.9	28.0	197	249	8	42	38	60	11	948	1.0	< 1.0	< 1.0	< 1.0	< 1.0	534
06/12/24	30.2	75.8	77.7	29.9	214	261	8	30	35	58	18	1,044	2.0	< 1.0	< 1.0	< 1.0	< 1.0	546

Notes, Abbreviations, and Units on last page.

Table 7
Summary of System Parameters
Bethpage Park Groundwater Containment System
Operable Unit 3 (Former Grumman Settling Ponds)
Northrop Grumman,
Bethpage, New York

Notes, Abbreviations, and Units:

1. Operational data collected by Arcadis on days noted. Parameters listed were typically recorded during compliance monitoring events. Data in this table correspond to approximately the past year of system operation.
2. Instantaneous parameters obtained from the SCADA HMI: Water Flow Rate, Water Pressure, Air Flow Rate.
3. Combined influent water-flow rate is the sum of individual well flow rates via the SCADA System.
4. Remedial Well effluent pressure readings measured at the influent manifold within the treatment system building.
5. Instantaneous values recorded from field-mounted instruments during weekly site visits.
6. Pressure readings recorded as < 1.0 iwc due to pressure being too low for gauge sensitivity.
7. As of August 4, 2022 the RW-1 flow rate presented includes the combined flow rates from wells BCPMW-4-1 and BCPMW-4-2 as additional recovery wells.

ECU	Emission Control Unit
GAC	Granular Activated Carbon
HMI	Human-Machine Interface
RW	Remedial Well
SCADA	Supervisory Control and Data Acquisition
Temp	Temperature
gpm	gallons per minute
iwc	inches of water column
psi	pounds per square inch
^{o}R	degrees Rankine
scfm	standard cubic feet per minute

Table 8
Summary of Groundwater Recovered, VOC Mass Recovered, and VOC Mass Recovery Rates
Bethpage Park Groundwater Containment System
Operable Unit 3 (Former Grumman Settling Ponds)
Northrop Grumman,
Bethpage, New York

Operating Period [1]	Volume of Groundwater Recovered (x1,000 gal) [2]					VOC Mass Recovered (lbs) [3]															VOC Mass Recovery Rate (lbs/day) [4]											
						Total VOCs [5]					Project VOCs [6]					Non-Project VOCs [7]					Total VOCs [5]					Project VOCs [6]					Non-Project VOCs [7]				
	RW-1 [9]	RW-2	RW-3	RW-4	Total	RW-1	RW-2	RW-3	RW-4	Total	RW-1	RW-2	RW-3	RW-4	Total	RW-1	RW-2	RW-3	RW-4	Total	RW-1	RW-2	RW-3	RW-4	Total	RW-1	RW-2	RW-3	RW-4	Total	RW-1	RW-2	RW-3	RW-4	Total
System Pilot Test, Shakedown and Startup Totals [8]	137	270	251	150	808	NA	NA	NA	NA	1.1	NA	NA	NA	NA	1.0	NA	NA	NA	NA	0.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2010 Totals	15,726	35,127	38,160	15,689	104,702	0.56	172	412	89	672	0.56	171	28	0.10	200	< 0.01	0.17	383	89	469	< 0.01	0.46	1.1	0.24	1.8	< 0.01	0.46	0.075	< 0.01	0.54	< 0.01	< 0.01	1.0	0.24	1.3
2011 Totals	15,218	36,570	37,682	15,196	104,666	0.36	167	271	78	516	0.36	167	35	0.090	203	< 0.01	1.1	236	78	314	< 0.01	0.45	0.73	0.21	1.4	< 0.01	0.45	0.095	< 0.01	0.55	< 0.01	< 0.01	0.64	0.21	0.85
2012 Totals	15,260	35,178	36,111	15,336	101,885	0.28	114	113	40	267	0.25	113	12	0.39	126	< 0.01	1.5	101	40	141	< 0.01	0.31	0.31	0.11	0.73	< 0.01	0.31	0.032	< 0.01	0.35	< 0.01	< 0.01	0.28	0.11	0.39
2013 Totals	15,968	37,514	36,622	16,036	106,140	0.14	111	41	18	171	0.14	110	4.3	0.36	113	< 0.01	1.6	37	18	57	< 0.01	0.30	0.11	0.050	0.47	< 0.01	0.30	0.012	< 0.01	0.31	< 0.01	< 0.01	0.10	0.049	0.16
2014 Totals	15,690	33,222	31,199	15,691	95,802	0.063	67	9.9	8.1	85	0.063	65	2.0	0.20	67	< 0.01	1.5	8.1	7.9	17	< 0.01	0.19	0.028	0.023	0.24	< 0.01	0.18	< 0.01	< 0.01	0.19	< 0.01	< 0.01	0.023	0.022	0.047
2015 Totals	15,859	38,082	34,961	14,755	103,657	0.028	47	7.1	4.5	57	0.021	45	1.5	0.20	45	<0.01	1.7	5.6	4.2	12	<0.01	0.13	0.019	0.012	0.16	<0.01	0.12	<0.01	<0.01	0.12	<0.01	<0.01	0.015	0.012	0.032
2016 Totals	15,826	34,539	39,349	15,826	105,540	<0.01	38	3.2	2.2	44	<0.01	37	1.4	0.20	39	<0.01	1.5	1.7	2.0	5.2	<0.01	0.10	<0.01	<0.01	0.12	<0.01	0.10	<0.01	<0.01	0.11	<0.01	<0.01	<0.01	<0.01	0.014
2017 Totals	16,005	31,600	37,614	15,965	101,184	< 0.01	13	2.2	1.2	17	< 0.01	13	1.1	0.16	14	< 0.01	0.56	1.1	1.1	2.7	< 0.01	0.037	< 0.01	< 0.01	0.046	< 0.01	0.035	< 0.01	< 0.01	0.038	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
2018 Totals	15,145	37,712	32,473	14,917	100,247	< 0.01	13.71	0.90	0.56	15.2	< 0.01	13.5	0.70	< 0.01	14.2	< 0.01	0.27	0.19	0.52	0.97	< 0.01	0.038	< 0.01	< 0.01	0.042	< 0.01	0.037	< 0.01	< 0.01	0.039	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
2019 Totals	15,456	32,470	38,416	15,343	101,685	< 0.01	11.51	1.36	0.22	13.10	< 0.01	11.51	1.07	< 0.01	12.59	< 0.01	< 0.01	0.29	0.18	0.63	< 0.01	0.032	< 0.01	< 0.01	0.036	< 0.01	0.032	< 0.01	< 0.01	0.034	< 0.01	< 0.01	< 0.01	0.001	< 0.01
2020 Totals	14,475	35,814	37,537	15,113	102,939	< 0.01	19.3	1.3	< 0.01	20.6	< 0.01	19.3	0.91	< 0.01	20.2	< 0.01	< 0.01	0.36	< 0.01	0.36	< 0.01	0.053	< 0.01	< 0.01	0.056	< 0.01	0.053	< 0.01	< 0.01	0.055	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
2021 Totals	14,490	36,403	38,153	15,324	104,370	< 0.01	171.4	1.9	0.05	173.3	< 0.01	167.7	1.14	< 0.01	168.9	< 0.01	3.6	0.75	0.11	4.49	< 0.01	1.865	< 0.01	< 0.01	1.886	< 0.01	1.825	< 0.01	< 0.01	1.839	< 0.01	0.04	< 0.01	< 0.01	0.0470
2022 Totals	12,224	36,802	38,231	15,238	102,495	45	53	15	< 0.01	112.3	43.3	51.2	13.1	< 0.01	107.6	1.7	1.3	1.6	0.1	4.8	0.5	0.6	0.2	< 0.01	1.2	0.5	0.6	0.1	< 0.01	1.2	0.02	0.01	< 0.01	< 0.01	0.04
2023 Totals	13,740	33,732	37,815	15,084	100,372	4.75	12.97	8.90	< 0.01	46.88	24.89	12.97	8.47	< 0.01	46.3	0.1	< 0.01	0.3	< 0.01	0.4	0.1	0.14	0.10	< 0.01	0.51	0.27	0.14	0.09	< 0.01	0.51	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
January through March 2024																																			
01/01/24 · 02/01/24	1,058	3,039	3,214	1,259	8,570	0.9	0.45	0.48	< 0.01	1.86	0.9	0.5	0.33	< 0.01	1.7	< 0.01	< 0.01	<0.01	< 0.01	0.000	0.030	0.015	0.015	< 0.01	0.060	0.030	0.015	0.011	< 0.01	0.055	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
02/01/24 · 03/01/24	1,017	2,968	3,249	1,254	8,487	0.9	0.44	0.48	< 0.01	1.82	0.9	0.4	0.34	< 0.01	1.7	< 0.01	< 0.01	<0.01	< 0.01	0.000	0.031	0.015	0.017	< 0.01	0.063	0.031	0.015	0.012	< 0.01	0.058	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
03/01/24 · 04/01/24	1,145	3,251	3,474	1,319	9,189	1.0	0.48	0.52	< 0.01	2.01	1.0	0.5	0.36	< 0.01	1.9	< 0.01	< 0.01	<0.01	< 0.01	0.000	0.033	0.016	0.017	< 0.01	0.065	0.033	0.016	0.012	< 0.01	0.060	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Subtotal Jan - Mar 2024	3,220	9,258	9,937	3,832	26,247	2.8	1.37	1.47	< 0.01	5.68	2.8	1.4	1.04	< 0.01	5.2	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.031	0.015	0.016	< 0.01	0.062	0.031	0.015	0.011	< 0.01	0.058	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
April through June 2024																																			
04/01/24 · 05/01/24	1,201	3,105	3,323	1,231	8,861	0.6	1.4	1.5	0.6	4.06	0.6	0.6	0.6	0.6	2.2	< 0.01	< 0.01	< 0.01	< 0.01	0.000	0.018	0.047	0.051	0.019	0.135	0.018	0.018	0.018	0.018	0.073	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
05/01/24 · 06/01/24	815	2,401	2,659	967	6,842	0.4	1.1	1.2	0.4	3.14	0.4	0.4	0.4	0.4	1.5	< 0.01	< 0.01	< 0.01	< 0.01	0.000	0.012	0.036	0.039	0.014	0.101	0.012	0.012	0.012	0.012	0.048	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
06/01/24 · 07/01/24	1,056	2,971	3,098	1,186	8,311	0.5	1.4	1.4	0.5	3.81	0.5	0.5	0.5	0.5	1.9	< 0.01	< 0.01	< 0.01	< 0.01	0.000	0.016	0.045	0.047	0.018	0.127	0.016	0.016	0.016	0.016	0.065	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Subtotal Apr - Jun 2024	3,072	8,477	9,080	3,384	24,014	1.4	3.89	4.16	1.55	11.01	1.4	1.4	1.41	1.4	5.6	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.015	0.043	0.046	0.017	0.121	0.015	0.015	0.015	0.015	0.062	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
2024 Totals	6,292	17,735	19,018	7,215	50,260	4.244	5.259	5.637	1.551	16.691	4.250	2.782	2.444	1.410	10.879	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.046	0.058	0.062	0.017	0.183	0.046	0.030	0.026	0.015	0.120	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Total Since System Start Up	224,104	526,608	550,037	229,453	1,530,202	56	1,291	948	257	2,570	74	1,272	132	3	1,482	2	15	812	254	1,077	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Notes, Abbreviations, and Units on last page.

Table 8
Summary of Groundwater Recovered, VOC Mass Recovered, and VOC Mass Recovery Rates
Bethpage Park Groundwater Containment System
Operable Unit 3 (Former Grumman Settling Ponds)
Northrop Grumman,
Bethpage, New York

Notes, Abbreviations, Qualifiers, and Units:

1. Represents operating period between consecutive monitoring events.

2. Volume of groundwater recovered is based on individual local well totalized flow readings. Listed value is the difference between totalized flow values recorded between consecutive monitoring events. The total groundwater recovered during a given operating period is the sum of the individual well flow totals. Values shown are rounded to the nearest gallon, but should only be considered accurate to two significant figures to account for error associated with field measurements.

3. Mass recovered per well was calculated by multiplying the Total VOC concentration from the most recent sampling event by the number of gallons extracted during the reporting period. The total amount recovered during a given operating period is the sum of masses recovered from each of the individual wells. Values less than ten pounds are presented using two significant figures and values greater than ten pounds have been rounded to the nearest whole number; however, these values should only be considered accurate to two significant figures to account for error associated with field measurements and analytical data.

4. Mass recovery rates were calculated by dividing the total mass recovered for each well and for the system by the number of days in the respective operating period. Values are presented using two significant figures.

5. "Total VOCs" represents the sum of individual concentrations of the VOCs detected.

6. "Project VOCs" represents the sum of individual compound concentrations of 1,1,1-trichloroethane; 1,1-dichloroethane; 1,2-dichloroethane; 1,1-dichloroethene; tetrachloroethene; trichloroethelyene; vinyl chloride; cis-1,2-dichloroethene; trans-1,2-dichloroethene; benzene; toluene; and xylenes-o,m, p.

7. "Non-Project VOCs" represents the difference between Total VOCs and Project VOCs.

8. Values based on operational data recorded prior to system startup on July 21, 2009.

9. As of August 4, 2022 the RW-1 concentration is representative of the addition of BCPMW-4-1 and BCPMW-4-2 that were added as additional recovery wells.

NA	Not Applicable
VOC	Volatile Organic Compound.
<	Less than
gal	Gallons
lbs	Pounds
lbs/day	Pounds per day

Table 9
2024 Rule 212 Evaluation
Bethpage Park Soil Gas Containment System and Groundwater Containment System
Operable Unit 3 (Former Grumman Settling Ponds)
Northrop Grumman,
Bethpage, New York

Project VOCs	CAS#	HTAC?[1]	2024 BPGWCS Maximum Effluent Conc. (ug/m3)[2,8]	2024 BPSGCS Maximum Effluent Conc. (ug/m3)[2,8]	2024 BPGWCS Emissions (lb/yr)[4]	Facility Wide Emissions (lb/yr)[5]	Rule 212 Emission Limit (lb/yr)[6]	Further evaluation Required?[7]
1,1,1-Trichloroethane	71-55-6	No		1.9	0.000	0.095	100	N
1,1 - Dichloroethane	75-34-3	No	2.2	4.0	0.068	0.269	100	N
1,1 - Dichloroethene	75-35-4	No	1.3	0.6	0.040	0.070	100	N
Benzene	71-43-2	Yes	0.51	1.4	0.016	0.086	100	N
cis- 1,2-Dichloroethene	156-59-2	No	115	149	3.570	11.058	100	N
Tetrachloroethene	127-18-4	Yes	5.9	6.4	0.183	0.505	1000	N
Toluene	108-88-3	No	2.1	3.2	0.065	0.226	100	N
trans- 1,2-Dichloroethene	156-60-5	No	1.1	2.5	0.034	0.160	100	N
Trichloroethene	79-01-6	Yes	29	189	0.900	10.399	500	N
Vinyl Chloride	75-01-4	Yes	6.1	0.68	0.189	0.224	100	N
Xylenes[3]	1330-20-7	No	4.4	1.52	0.135	0.212	100	N
Non-Project VOCs								
1-Chloro-1,1-difluoroethane (Freon 142B)	75-68-3	No	0.35	106	0.011	5.338	100	N
2-Butanone	78-93-3	No	2.3	4.1	0.071	0.277	100	N
4-Methyl-2-Pentanone	108-10-1	No	0.41		0.013	0.013	100	N
Acetone	67-64-1	No	22	19.0	0.683	1.638	100	N
Carbon Tetrachloride	56-23-5	Yes	0.82	0.69	0.025	0.060	100	N
Chlorodifluoromethane (Freon 22)	75-45-6	No	3.5	0.98	0.109	0.158	100	N
Chloromethane	74-87-3	No	9.5	0.54	0.295	0.322	100	N
Chloroform	67-66-3	Yes	8.3	13	0.258	0.911	100	N
Dichlorodifluoromethane (Freon 12)	75-71-8	No	2.6	2.3	0.081	0.196	100	N
Ethylbenzene	100-41-4	No	2.1		0.065	0.065	100	N
Methylene Chloride	75-09-2	No	1.5	79.2	0.047	4.027	100	N
Styrene (Monomer)	100-42-5	No		1.4	0.000	0.066	100	N

Footnotes on last page

Table 9
2024 Rule 212 Evaluation
Bethpage Park Soil Gas Containment System and Groundwater Containment System
Operable Unit 3 (Former Grumman Settling Ponds)
Northrop Grumman,
Bethpage, New York

Project VOCs	CAS#	HTAC?[1]	2024 BPGWCS Maximum Effluent Conc. (ug/m3)[2,8]	2024 BPSGCS Maximum Effluent Conc. (ug/m3)[2,8]	2024 BPGWCS Emissions (lb/yr)[4]	Facility Wide Emissions (lb/yr)[5]	Rule 212 Emission Limit (lb/yr)[6]	Further evaluation Required?[7]
Non-Project VOCs (cont'd)								
Trichlorofluoromethane (Freon 11)	75-69-4	No	1.7	2	0.053	0.153	100	N
Trichlorotrifluoroethane (Freon 113)	76-13-1	No		0.68	0.000	0.032	100	N

Flowrates

Description	Flow (cfm)
BPGWCS	948
BPSGCS - combined with ISTR	578

Notes:

1. High toxicity air contaminant (HTAC) based on 6 CRR-NY Rule 212-2.2, Table 2 – high toxicity air contaminant list.

2. Maximum effluent concentrations for soil gas effluent from VSP-601 and GW vapor from VSP-05 based on sampling performed in 2023. Compounds not detected above the laboratory reporting limit are excluded from the air quality impact analysis summary.

3. Total for xylenes m, o, and P.

4. Emission rate calculated based on maximum effluent concentration and maximum air flow rates measured during the sampling events. Emission rate standardized at 70 ^{o}F and 1 atm.

e.g., TCE (lb/yr) = TCE [µg/m^3] x Air Flow Rate [ft^3/min] x (1 m^3/35.3147 ft^3) x (60 min/hr) x (0.000001 g/1 µg) x (0.0022 lb/g) x 8,760 hrs/yr

5. Combined 2022 emissions from groundwater, ISTR, and soil gas containment systems.

6. 100 lb/yr for non-HTACs, and mass emission limits based on Rule 212-2.2, Table 2 for HTACs.

7. For HTACs, no further demonstration (i.e., comparison to SGCs, AGCs, or air modeling) is required if the actual facility-wide emissions are less than mass emission limit. For non-HTACs, no further demonstration is required if the actual facility-wide emissions are less than 100 lbs/yr.

8. Blank cell indicates that the compound was not detected above its laboratory quantification limit.

Table 10
Summary of Remedial Well Groundwater Sample Analytical Results - VOCs
Bethpage Park Groundwater Containment System
Operable Unit 3 (Former Grumman Settling Ponds)
Northrop Grumman,
Bethpage, New York

Compound[1] (All Constituent Concentrations in µg/L)	Sample Location: Sample Date: NYSDEC SCGs	RW-1 8/22/2023	RW-1 11/7/2023	RW-1 2/22/2024	RW-1 5/15/2024	RW-2 8/22/2023	RW-2 8/22/2023	RW-2 2/22/2024	RW-2 5/15/2024
Project VOCs									
1,1,1-Trichloroethane	5	< 1.17	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane	5	< 1.0	**3.6**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloroethane	0.6	< 1.0	**0.62 J**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene	5	< 1.0	**2.9**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene	5	< 1.17	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethylene	5	< 1.0	**213**	**52.5**	**30.0**	**23.7**	**32.4**	**8.4**	**6.8**
Vinyl Chloride	2	< 1.0	**34.9**	**3.6**	**0.61 J**	**2.1**	**2.2**	**1.1**	**0.61 J**
cis-1,2-dichloroethene	5	< 1.0	**574**	**48.9**	**24.4**	**28.3**	**27.4**	**8.3**	**10.5**
trans-1,2-dichloroethene	5	< 1.0	**5.8**	**0.67 J**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Benzene	1	< 0.50	**2.1**	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Toluene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Xylene-o	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Xylenes-m,p	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Subtotal Project VOCs		**ND**	**831.12**	**105.7**	**55.0**	**54.1**	**62.0**	**17.8**	**18**
Non-Project VOCs									
1,1,2,2-Tetrachloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloroethane	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Butadiene	0.5	< 5.17	< 5.18	< 5.0	< 5.0	< 5.0	< 5.1	< 5.0	< 5.0
2-Butanone	NE	< 27	< 28	< 10	< 10	< 10	< 11	< 10	< 10
4-methyl-2-pentanone	50	< 5.17	< 5.18	< 5.0	< 5.0	< 5.0	< 5.1	< 5.0	< 5.0
Acetone	NE	< 27	< 28	< 10	< 10	< 10	< 11	< 10	< 10
Bromodichloromethane	50	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromoform	50	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromomethane	5	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Carbon Disulfide	60	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Carbon tetrachloride	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorobenzene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorodibromomethane	50	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorodifluoromethane (Freon 22)	NE	< 5.17	< 5.18	< 5.0	< 5.0	< 5.0	< 5.1	< 5.0	< 5.0
Chloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Notes, Abbreviations, Qualifiers, and Units on last page.

Table 10
Summary of Remedial Well Groundwater Sample Analytical Results - VOCs
Bethpage Park Groundwater Containment System
Operable Unit 3 (Former Grumman Settling Ponds)
Northrop Grumman,
Bethpage, New York

Compound[1] (All Constituent Concentrations in µg/L)	Sample Location: Sample Date: NYSDEC SCGs	RW-3 8/22/2023	RW-3 11/7/2023	RW-3 2/22/2024	RW-3 5/15/2024	RW-4 8/22/2023	RW-4 11/7/2023	RW-4 2/22/2024	RW-4 5/15/2024
Project VOCs									
1,1,1-Trichloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloroethane	0.6	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethylene	5	**9.1**	**8.1**	**6.5**	**5.6**	< 1.0	< 1.0	< 1.0	< 1.0
Vinyl Chloride	2	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,2-dichloroethene	5	**9.4**	**12.0**	**6.0**	**6.0**	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,2-dichloroethene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Benzene	1	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Toluene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Xylene-o	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Xylenes-m,p	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Subtotal Project VOCs		**19**	**20**	**12.5**	**11.60**	**ND**	**ND**	**ND**	**ND**
Non-Project VOCs									
1,1,2,2-Tetrachloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloroethane	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Butadiene	0.5	< 5.0	< 5.1	< 1.0	< 1.0	< 5.0	< 5.1	< 5.0	< 1.0
2-Butanone	NE	< 10	< 11	< 1.0	< 1.0	< 10	< 11	< 10	< 1.0
4-methyl-2-pentanone	50	< 5.0	< 5.1	< 1.0	< 1.0	< 5.0	< 5.1	< 5.0	< 1.0
Acetone	NE	< 10	< 11	< 1.0	< 1.0	< 10	< 11	< 10	< 1.0
Bromodichloromethane	50	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromoform	50	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromomethane	5	< 2.0	< 2.0	< 1.0	< 1.0	< 2.0	< 2.0	< 2.0	< 1.0
Carbon Disulfide	60	< 2.0	< 2.0	< 1.0	< 1.0	< 2.0	< 2.0	< 2.0	< 1.0
Carbon tetrachloride	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorobenzene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorodibromomethane	50	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorodifluoromethane (Freon 22)	NE	< 5.0	< 5.1	< 1.0	< 1.0	**0.52 J**	**0.62 J**	**0.55 J**	< 1.0
Chloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Notes, Abbreviations, Qualifiers, and Units on last page.

Table 10
Summary of Remedial Well Groundwater Sample Analytical Results - VOCs
Bethpage Park Groundwater Containment System
Operable Unit 3 (Former Grumman Settling Ponds)
Northrop Grumman,
Bethpage, New York

Compound[1] (All Constituent Concentrations in µg/L)	Sample Location: Sample Date: NYSDEC SCGs	RW-1 8/22/2023	RW-1 11/7/2023	RW-1 2/22/2024	RW-1 5/15/2024	RW-2 8/22/2023	RW-2 8/22/2023	RW-2 2/22/2024	RW-2 5/15/2024
Chloroform	7	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloromethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,3-dichloropropene	0.4	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dichlorodifluoromethane (Freon 12)	5	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Dichloromethane	5	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Ethylbenzene	5	**3.22**	**0.80 J**	< 1.0	< 1.0	< 1.0	< 1.1	< 1.0	< 1.0
Methyl N-Butyl Ketone	50	< 5.17	< 5.18	< 5.0	< 5.0	< 5.0	< 5.1	< 5.0	< 5.0
Methyl tert-Butyl Ether	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Styrene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,3-dichloropropene	0.4	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichlorofluoromethane (Freon 11)	5	< 2.17	< 2.18	< 2.0	< 2.0	< 2.0	< 2.1	< 2.0	< 2.0
Trichlorotrifluoroethane (Freon 113)	5	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
1-Chloro-1,1-difluoroethane (Freon 142b)	NE	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Subtotal Non-Project VOCs		**3.22**	**0.80**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**
Total VOCs[2,3,4]		**3.22**	**832**	**105.7**	**55.0**	**54.1**	**62.0**	**17.80**	**17.9**
1,4-Dioxane		**0.5**	**4.0 B**	**2.3**	**1.40**	**1.3**	**0.86 B**	**2.20**	**0.34**

Notes, Abbreviations, Qualifiers, and Units on last page.

Table 10
Summary of Remedial Well Groundwater Sample Analytical Results - VOCs
Bethpage Park Groundwater Containment System
Operable Unit 3 (Former Grumman Settling Ponds)
Northrop Grumman,
Bethpage, New York

Compound[1] (All Constituent Concentrations in µg/L)	Sample Location: Sample Date: NYSDEC SCGs	RW-3 8/22/2023	RW-3 11/7/2023	RW-3 2/22/2024	RW-3 5/15/2024	RW-4 8/22/2023	RW-4 11/7/2023	RW-4 2/22/2024	RW-4 5/15/2024
Chloroform	7	< 1.0	**0.96 J**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloromethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,3-dichloropropene	0.4	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dichlorodifluoromethane (Freon 12)	5	< 2.0	< 2.0	< 1.0	< 1.0	< 2.0	< 2.0	< 2.0	< 1.0
Dichloromethane	5	< 2.0	< 2.0	< 1.0	< 1.0	< 2.0	< 2.0	< 2.0	< 1.0
Ethylbenzene	5	< 1.0	< 1.1	< 1.0	< 1.0	< 1.0	< 1.1	< 1.0	< 1.0
Methyl N-Butyl Ketone	50	< 5.0	< 5.1	< 1.0	< 1.0	< 5.0	< 5.1	< 5.0	< 1.0
Methyl tert-Butyl Ether	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Styrene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,3-dichloropropene	0.4	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichlorofluoromethane (Freon 11)	5	< 2.0	< 2.1	< 1.0	< 1.0	< 2.0	< 2.1	< 2.0	< 1.0
Trichlorotrifluoroethane (Freon 113)	5	< 5.0	< 5.0	< 1.0	< 1.0	< 5.0	< 5.0	< 5.0	< 1.0
1-Chloro-1,1-difluoroethane (Freon 142b)	NE	< 5.0	< 5.0	< 1.0	< 1.0	< 5.0	< 5.0	< 5.0	< 1.0
Subtotal Non-Project VOCs		**ND**	**0.96**	**ND**	**ND**	**0.52**	**0.62**	**0.55**	**ND**
Total VOCs[2,3,4]		**18.5**	**21.1**	**12.5**	**11.60**	**0.52**	**0.62**	**0.6**	**ND**
1,4-Dioxane		**1.3**	**0.70 B**	< 0.24	**0.34**	**0.13 J**	< 0.24	< 0.24	**0.3**

Notes, Abbreviations, Qualifiers, and Units on last page.

Table 10
Summary of Remedial Well Groundwater Sample Analytical Results - VOCs
Bethpage Park Groundwater Containment System
Operable Unit 3 (Former Grumman Settling Ponds)
Northrop Grumman,
Bethpage, New York

Notes, Abbreviations, Qualifiers, and Units:

1. Water samples collected by Arcadis on the dates shown and submitted to a NYSDOH ELAP certified laboratory for VOC analyses per NYSDEC ASP 2005, Method OLM 4.3 (prior to September 1, 2014) and per USEPA Method 8260C (after September 1, 2014). Results validated following protocols specified in Sampling and Analysis Plan in the DRAFT Bethpage Park Groundwater Containment System OM&M Manual (Arcadis 2016). See previous quarterly reports for historical analytical results.
2. "Total VOCs" represents the sum of individual concentrations of the VOCs detected.
3. As of August 4, 2022 the RW-1 concentration is representative of the addition of BCPMW-4-1 and BCPMW-4-2 that were added as additional recovery wells.
4. The analytical results for project VOCs collected from RW-1 on November 7, 2023 were unusually high. At the time the sample was collected, the replacement of pumps and cleaning of the lines of recovery wells 4-1 and 4-2 (completed on November 6, 2023) likely contributed to the high project VOCs concentration reported.

ASP	Analytical Services Protocol
ELAP	Environmental Laboratory Approval Program
NE	Not Established
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
OLM	Ozone Limited Method
OM&M	Operation, Maintenance, and Monitoring
SCGs	Standards, Criteria, and Guidance values
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compound
	Bold cell outline indicates an exceedance of an SCG
2.1	Bold data indicates a detection
< 1.0	Compound not detected above its laboratory quantification limit
J	Compound detected below its reporting limit; value is estimated
U	Indicates the compound was analyzed for but not detected above the specified level
ND	Analyte not detected at, or above its laboratory quantification limit.
µg/L	micrograms per liter

Figures

SOURCE:
USGS 7.5 MIN. AMITYVILLE QUADRANGLE, AMITYVILLE, N.Y., 1994, FREEPORT QUADRANGLE, FREEPORT, N.Y., 1994, HICKSVILLE QUADRANGLE, HICKSVILLE, N.Y., 1967, PHOTOREVISED 1979, HUNTINGTON, N.Y., 1967, PHOTOREVISED 1979

0 2000' 4000'

SCALE IN FEET

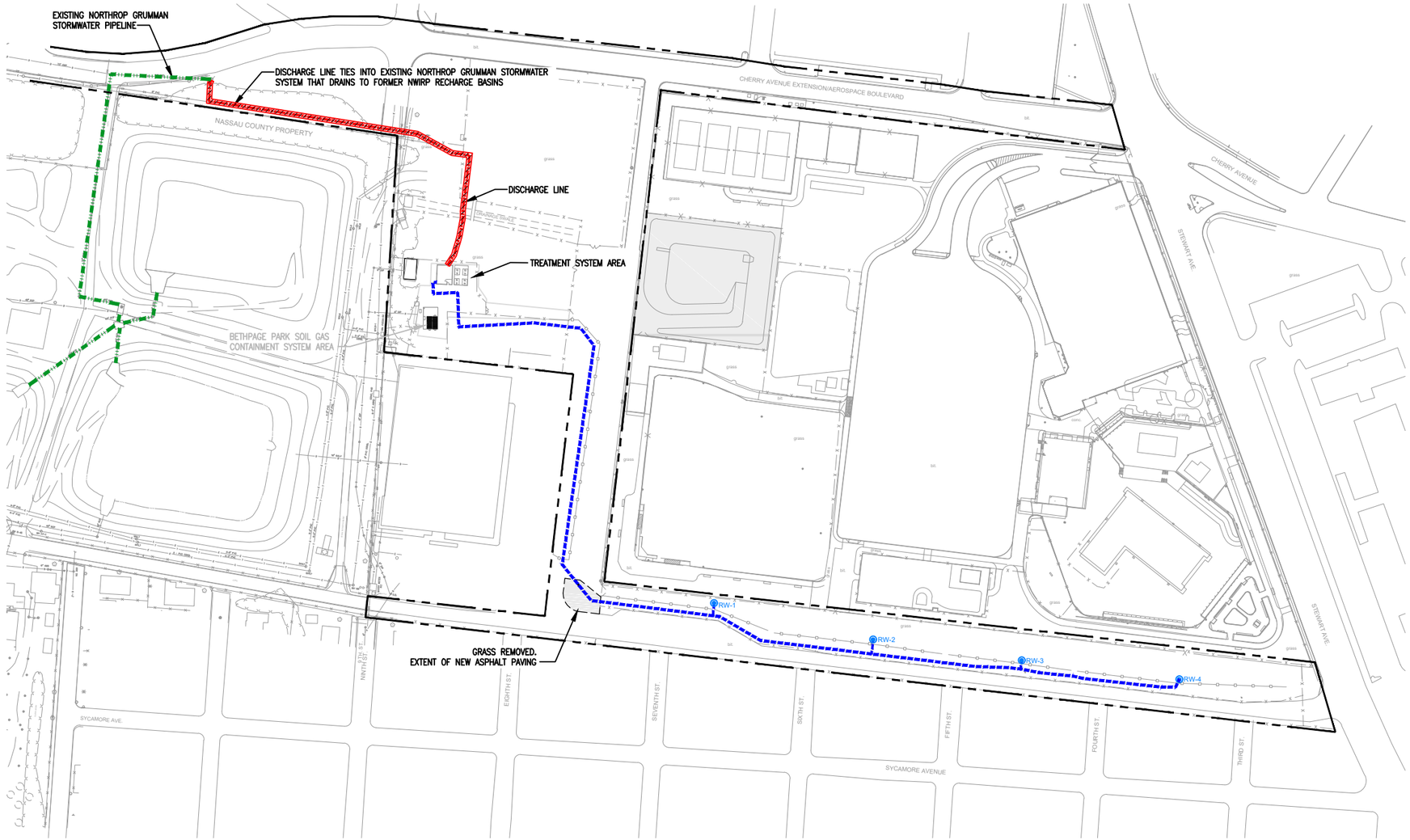
BETHPAGE PARK GROUNDWATER CONTAINMENT SYSTEM
OPERABLE UNIT 3
(FORMER GRUMMAN SETTLING PONDS)
BETHPAGE, NEW YORK

SITE LOCATION

ARCADIS

FIGURE 1

CITY:SYRACUSE-NY DIV/GROUP:ENV DB:A.SANCHEZ LD: PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
G:\ENVCAD\SYRACUSE\ACTIVITY\00149611\4\OMM\4INY1496-B01.dwg LAYOUT: BETHPAGE PARK SAVED: 11/11/2015 4:51 PM ACADVER: 19.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: ---- PLOTTED: 11/11/2015 4:54 PM BY: STOWELL, GARY
XREFS: IMAGES: PROJECTNAME: ----
AMITYVILLE.TIF
FREEPORT.TIF
HICKSVILLE.TIF
HUNTINGTON.TIF



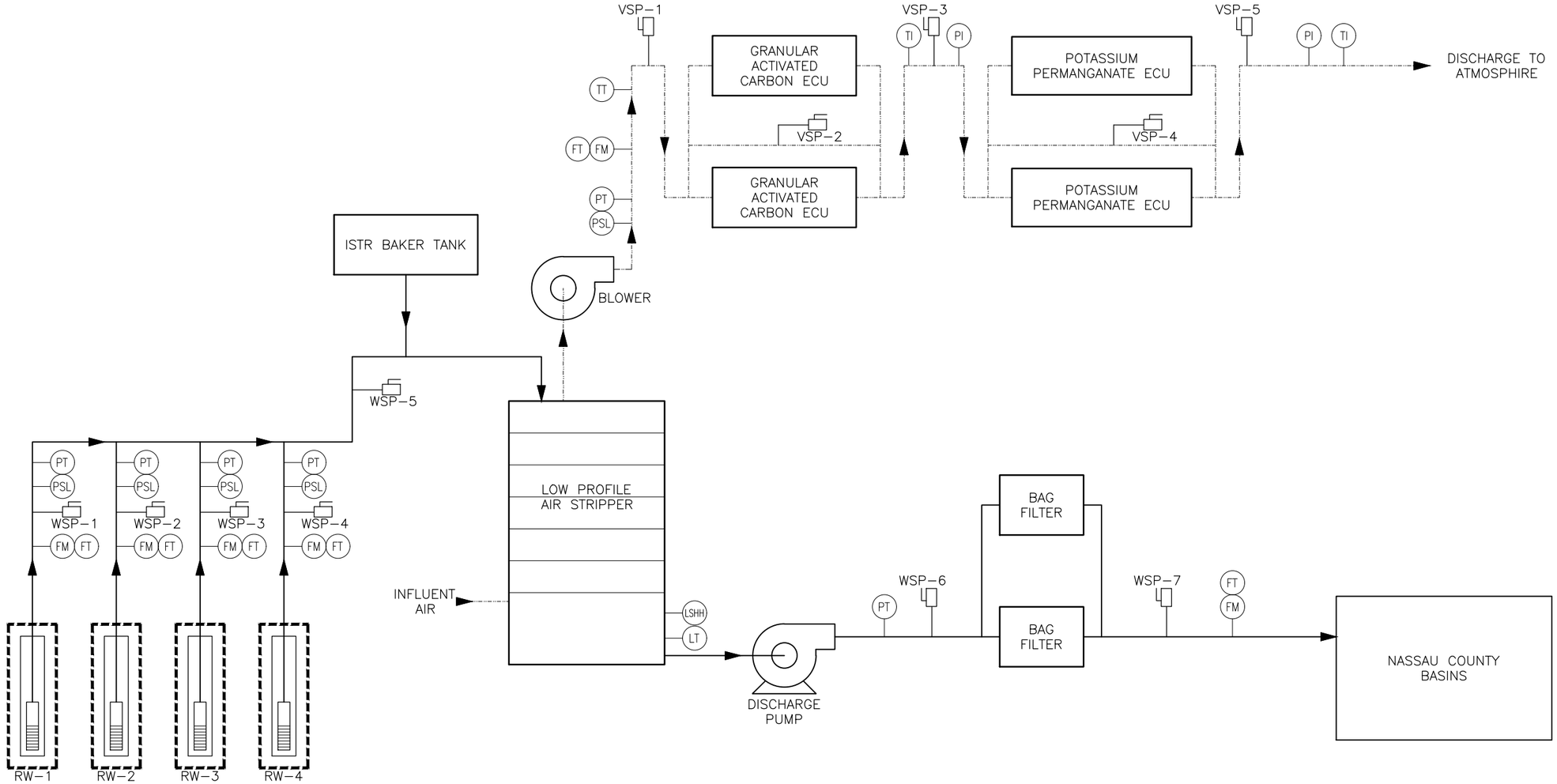
BETHPAGE PARK GROUNDWATER CONTAINMENT SYSTEM
OPERABLE UNIT 3
(FORMER GRUMMAN SETTLING PONDS)
BETHPAGE, NEW YORK

SITE AND GROUNDWATER CONTAINMENT SYSTEM

ARCADIS

FIGURE 2

CITY:SYRACUSE-NY DIV/GROUP:ENV DB:A.SANCHEZ LD:AS PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
C:\Users\alsanchez\OneDrive - ARCADIS\BIM 360 Docs\NORTHROP GRUMMAN\OMM4\NY1496B01.DWG LAYOUT:2 SAVED: 8/16/2018 1:24 PM ACADVER: 21.0S (LMS TECH) PAGESETUP:---- PLOTSTYLETABLE:---- PLOTTED: 8/16/2018 1:24 PM BY: SANCHEZ, ADRIAN
XREFS:
X-r1496X00
X-ONSITE-BASE SITE
IMAGES:
PROJECTNAME: ----



LEGEND:

- PROCESS WATER
- PROCESS AIR
- FM — INSTRUMENT
- SAMPLE PORT
- FLOW DIRECTION
- FM FLOW METER
- FT FLOW RATE TRANSMITTER
- PSL PRESSURE VACUUM LOW
- PT PRESSURE TRANSMITTER
- PI PRESSURE INDICATOR
- LSHH LEVEL SWITCH HIGH HIGH
- LT LEVEL TRANSMITTER
- TT TEMPERATURE TRANSMITTER
- TI TEMPERATURE INDICATOR
- WSP WATER SAMPLE PORT
- VSP VAPOR SAMPLE PORT
- ECU EMISSION CONTROL UNIT

BETHPAGE PARK GROUNDWATER CONTAINMENT SYSTEM
OPERABLE UNIT 3
(FORMER GRUMMAN SETTLING PONDS)
BETHPAGE, NEW YORK

GROUNDWATER TREATMENT SYSTEM PROCESS SCHEMATIC, PROCESS FLOW DIAGRAM, AND MONITORING LOCATIONS

ARCADIS

FIGURE 3

CHERRY AVENUE EXTENSION/AEROSPACE BOULEVARD

FORMER NURSERY AREAS

BALL FIELDS

grass

OU3 BETHPAGE PARK GROUNDWATER CONTAINMENT SYSTEM (BPGWCS) BUILDINGS

DRAINAGE SWALE

OU3 BETHPAGE PARK SOIL GAS CONTAINMENT SYSTEM (BPSGCS) BUILDINGS

McKAY FIELD

ACCESS ROAD

FORMER TRANSFORMER AREA

ARUMDAUN PRESBYTERIAN CHURCH VISION CENTER (FORMER GRUMMAN PLANT 24)

PARKING LOT

TENNIS COURTS

PADDLEBALL COURTS

BASKETBALL COURTS

B30MW-1

B24MW-2

RECHARGE BASIN

SKATE PARK

TOWN STORAGE AREA

STORAGE BUILDING

BLDG

GATE

bit.

PZ-10A

PARKING LOT

BASEBALL FIELD

BCPMW-3

BCPMW-2

PZ-5A

PZ-5B

PZ-5C

RW-1

B24MW-3

PLAYGROUND

BCPMW-4-2

BCPMW-4-3

BCPMW-4-1

PZ-1A

PZ-1B

PZ-1C

RW-2

PZ-2A

PZ-2B

PZ-2C

PZ-8B

PZ-8A

PZ-8C

RW-3

PZ-6A

PZ-6B

PZ-4

PZ-3

FORMER GRUMMAN PLANT 24 ACCESS ROAD PROPERTY

BCPMW-6-1

BCPMW-6-2

RW-4

PZ-7A

PZ-7B

BCPMW-7-1

GRASS REMOVED
EXTENT OF NEW ASPHALT PAVING

EIGHTH ST.

SEVENTH ST.

SIXTH ST.

FIFTH ST.

FOURTH ST.

THIRD ST.

MW-204-1

MW-205-1

MW-206-1

MW-200-1

MW-201-1

MW-202-1

MW-203-1

SYCAMORE AVENUE

MW-207-1a

MW-207-1b

MW-208-1

CHERRY AVENUE

STEWART AVE.

BETHPAGE HIGH SCHOOL PROPERTY

POOL HOUSE

INGROUND SWIMMING POOL

1 STORY MASONRY

POOL AREA

conc.

EXPLANATION:

- NORTHROP GRUMMAN PROPERTY LINE
- FENCE
- BASIN
- bit. BITUMINOUS PAVEMENT
- MW-200-1 MONITORING WELL
- RW-2 REMEDIAL WELL
- PZ-2C PIEZOMETER

NOTES:

1. MONITORING WELLS, REMEDIAL WELLS, AND PIEZOMETERS SURVEYED TO NORTH AMERICAN DATUM (NAD) 83.

0 100' 200'

APPROXIMATE SCALE IN FEET

BETHPAGE PARK GROUNDWATER CONTAINMENT SYSTEM
OPERABLE UNIT 3
(FORMER GRUMMAN SETTLING PONDS)
BETHPAGE, NEW YORK

GROUNDWATER MONITORING NETWORK SITE PLAN

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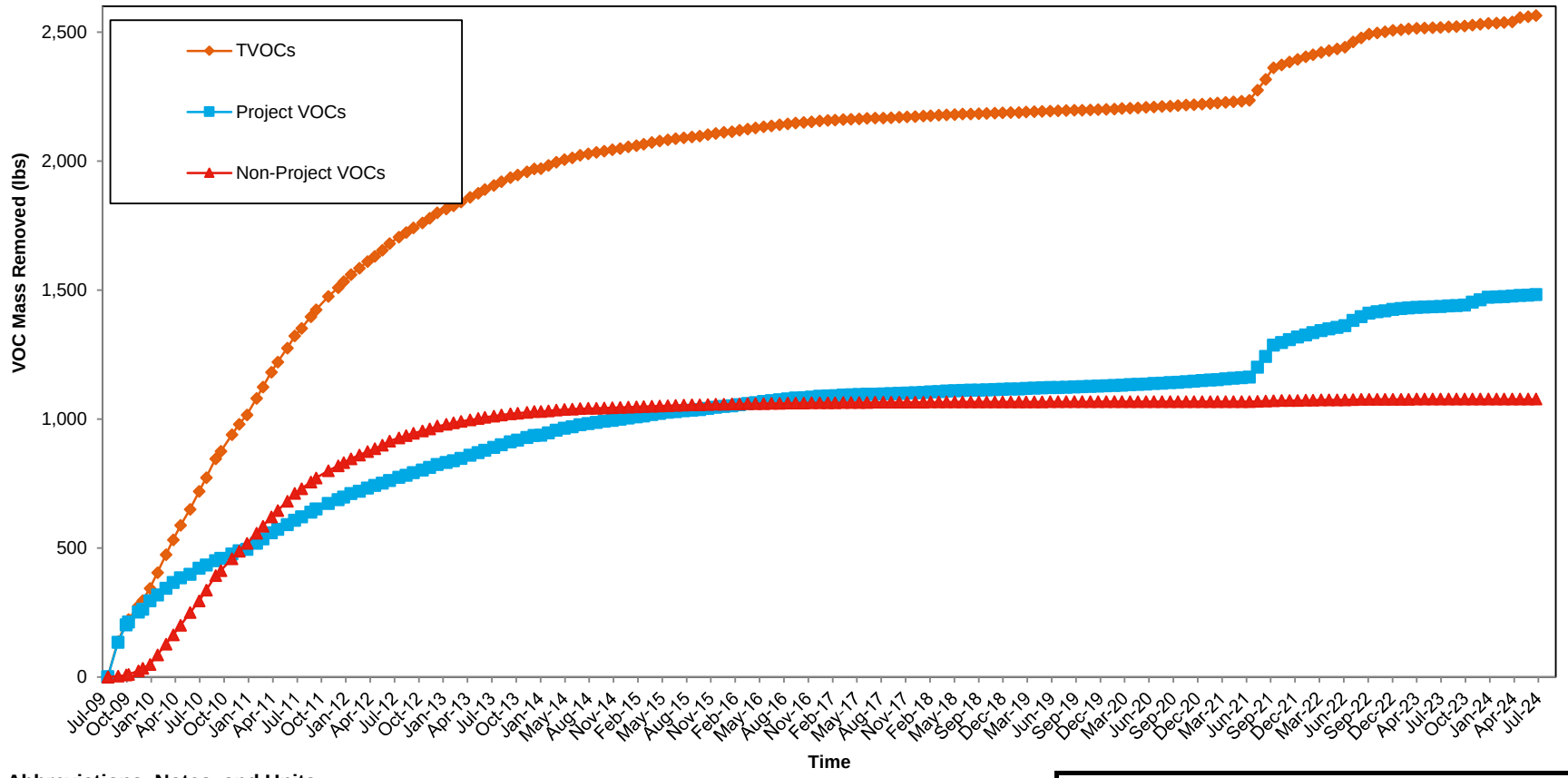
FIGURE 4



Abbreviations, Notes, and Units:

VOC = Volatile Organic Compound
TVOCs = Total VOCs removed

Project VOCs = sum of 1,1,1-trichloroethane; 1,1-dichloroethane; 1,2-dichloroethane; 1,1-dichloroethene; tetrachloroethene; trichloroethene; vinyl chloride; cis-1,2-dichloroethene; trans-1,2-dichloroethene; benzene; toluene; and total xylenes.
Non-Project VOCs = sum of VOCs that are not Project VOCs.

1. A notable increase in VOC mass removal was observed between Q3 2021 and Q1 2022 due to the increase in TVOCs detected (Figures 6A)
2. As of August 4, 2022 the RW-1 concentration is representative of the addition of BCPMW-4-1 and BCPMW-4-2 that were added as additional recovery wells.

lbs = pounds

BETHPAGE PARK GROUNDWATER CONTAINMENT SYSTEM
OPERABLE UNIT 3
(FORMER GRUMMAN SETTLING PONDS)
BETHPAGE, NEW YORK

CUMULATIVE TOTAL, PROJECT, AND NON-PROJECT VOC MASS REMOVED

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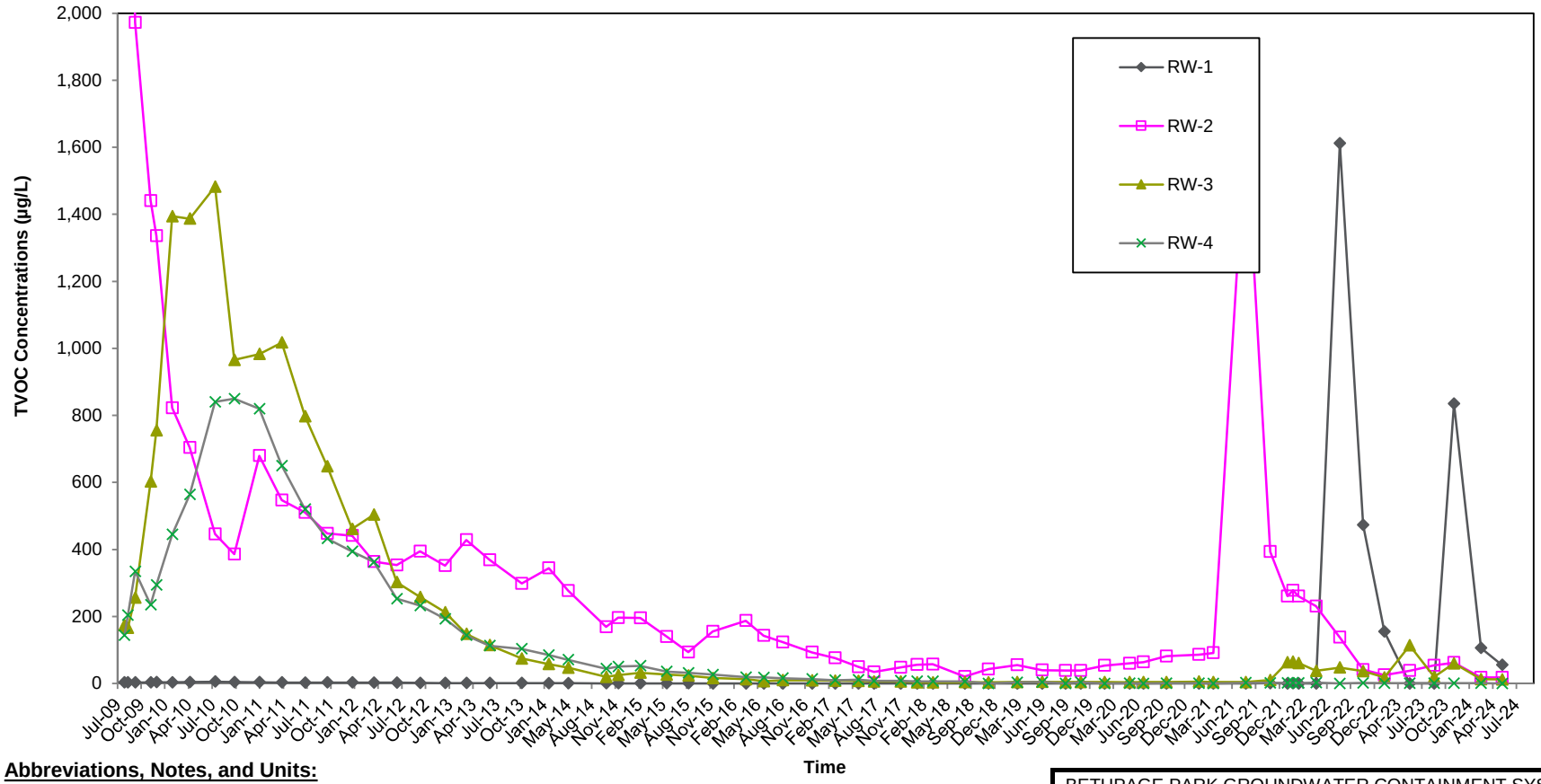
FIGURE
5



Abbreviations, Notes, and Units:

VOC = Volatile Organic Compound
TVOCs = Total VOCs detected

1. Results prior to September 10, 2009 are not shown to improve figure clarity. The TVOC concentrations were greater than 2,000 µg/L. See previous reports for full data set.
2. A notable increase in TVOCs was detected in the August 13, 2021, sample from RW-2. This increase is likely due to the ISTR system activities on the Bethpage Community Park property
3. As of August 4, 2022 the RW-1 concentration is representative of the addition of BCPMW-4-1 and BCPMW-4-2 that were added as additional recovery wells. A notable increase in TVOCs was detected in the August 22, 2022 sample from RW-1, which is likely due to the addition of BCPMW-4-1 and BCPMW-4-2.
5. A notable increase in VOCs was detected in the November 07, 2023, RW-1 sample. At the time the sample was collected, the replacement of pumps and cleaning of the lines of recovery wells 4-1 and 4-2 (completed on November 6, 2023) likely contributed to the high project VOCs concentration reported.

µg/L = micrograms per liter

BETHPAGE PARK GROUNDWATER CONTAINMENT SYSTEM
OPERABLE UNIT 3
(FORMER GRUMMAN SETTLING PONDS)
BETHPAGE, NEW YORK

REMEDIAL WELL TOTAL VOC CONCENTRATIONS

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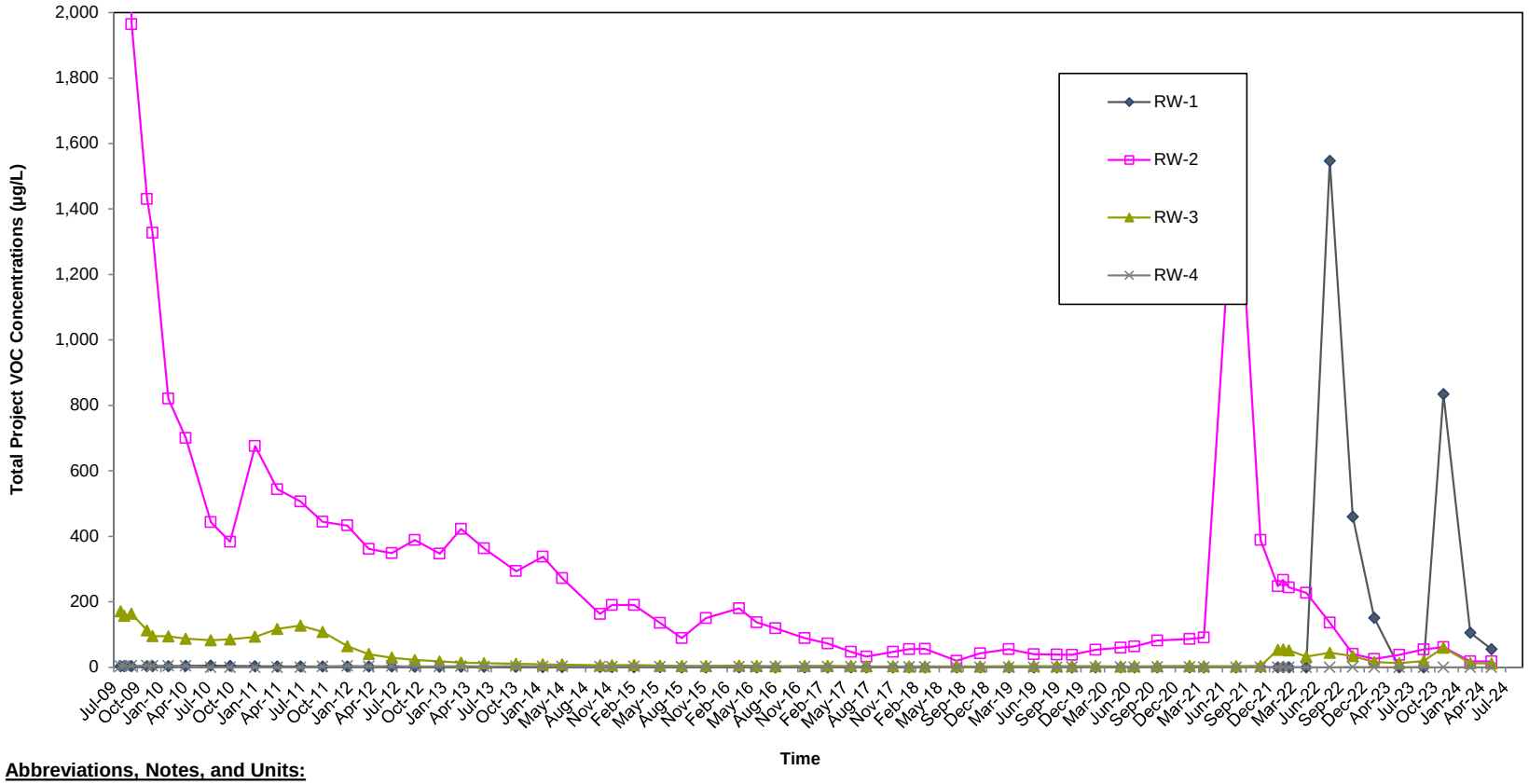
FIGURE

6A



Abbreviations, Notes, and Units:

VOC = Volatile Organic Compound
TVOCs = Total VOCs detected

Project VOCs = sum of 1,1,1-trichloroethane; 1,1-dichloroethane; 1,2-dichloroethane; 1,1-dichloroethene; tetrachloroethene; trichloroethene; vinyl chloride; cis-1,2-dichloroethene; trans-1,2-dichloroethene; benzene; toluene; and total xylenes.

1. Results prior to September 10, 2009 are not shown to improve figure clarity. Total Project VOC concentrations are greater than 2,000 µg/L. See previous reports for full data set.
2. A notable increase in Project VOCs was detected in the August 13, 2021, sample from RW-2. This increase is likely due to the ISTR system activities on the Bethpage Community Park property
3. As of August 4, 2022 the RW-1 concentration is representative of the addition of BCPMW-4-1 and BCPMW-4-2 that were added as additional recovery wells. A notable increase in TVOCs was detected in the August 22, 2022 sample from RW-1, which is likely due to the addition of BCPMW-4-1 and BCPMW-4-2.
4. A notable increase in VOCs was detected in the November 07, 2023, RW-1 sample. At the time the sample was collected, the replacement of pumps and cleaning of the lines of recovery wells 4-1 and 4-2 (completed on November 6, 2023) likely contributed to the high project VOCs concentration reported.

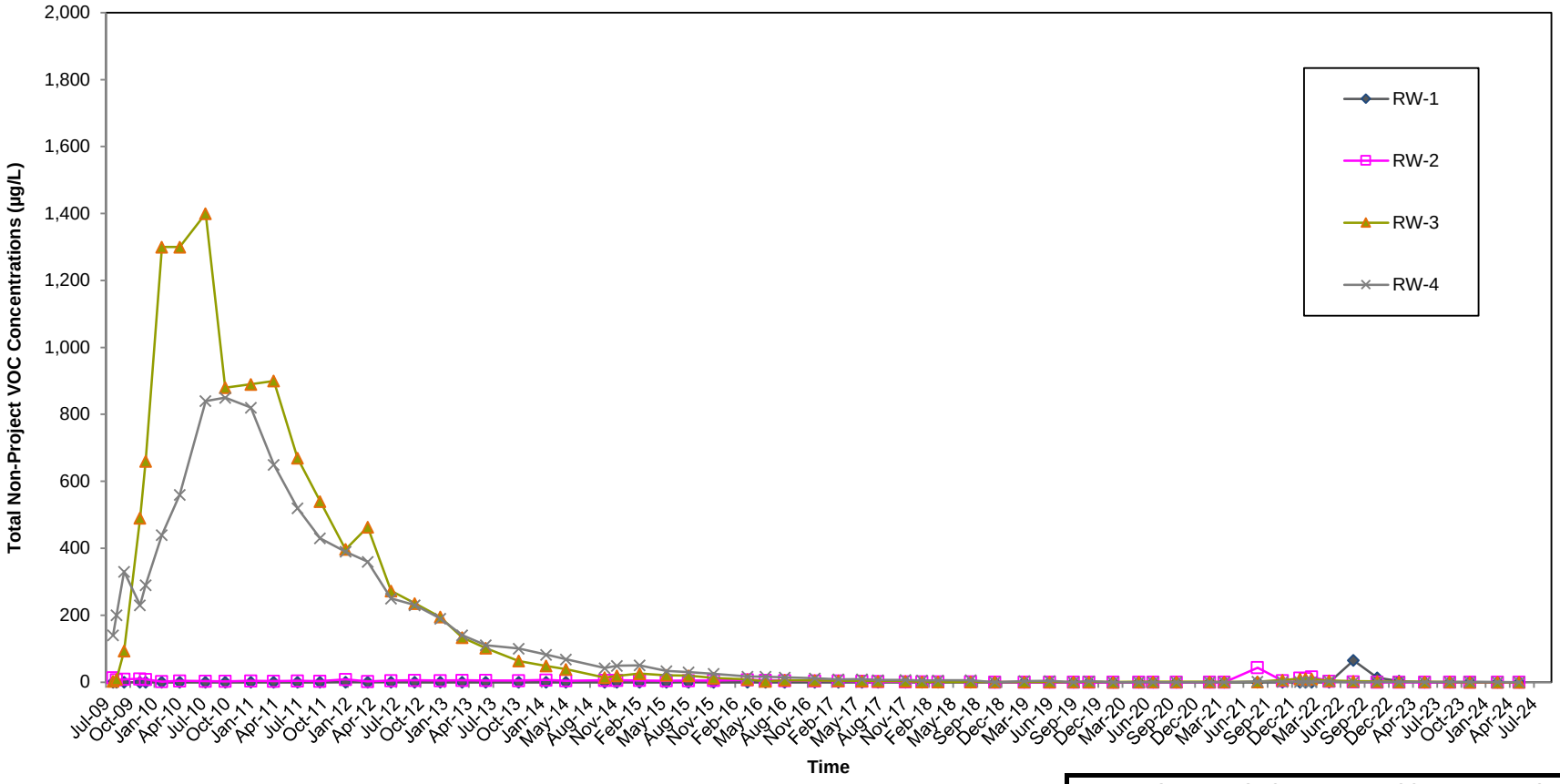
µg/L = micrograms per liter

BETHPAGE PARK GROUNDWATER CONTAINMENT SYSTEM
OPERABLE UNIT 3
(FORMER GRUMMAN SETTLING PONDS)
BETHPAGE, NEW YORK

REMEDIAL WELL PROJECT VOC CONCENTRATIONS

ARCADIS

FIGURE
6B



Abbreviations, Notes, and Units:

VOC = Volatile Organic Compound
TVOCs = Total VOCs detected.

Non-Project VOCs = sum of TVOCs that are not Project VOCs.

1. As of August 4, 2022 the RW-1 concentration is representative of the addition of BCPMW-4-1 and BCPMW-4-2 that were added as additional recovery wells. A notable increase in TVOCs was detected in the August 22, 2022 sample from RW-1, which is likely due to the addition of BCPMW-4-1 and BCPMW-4-2.

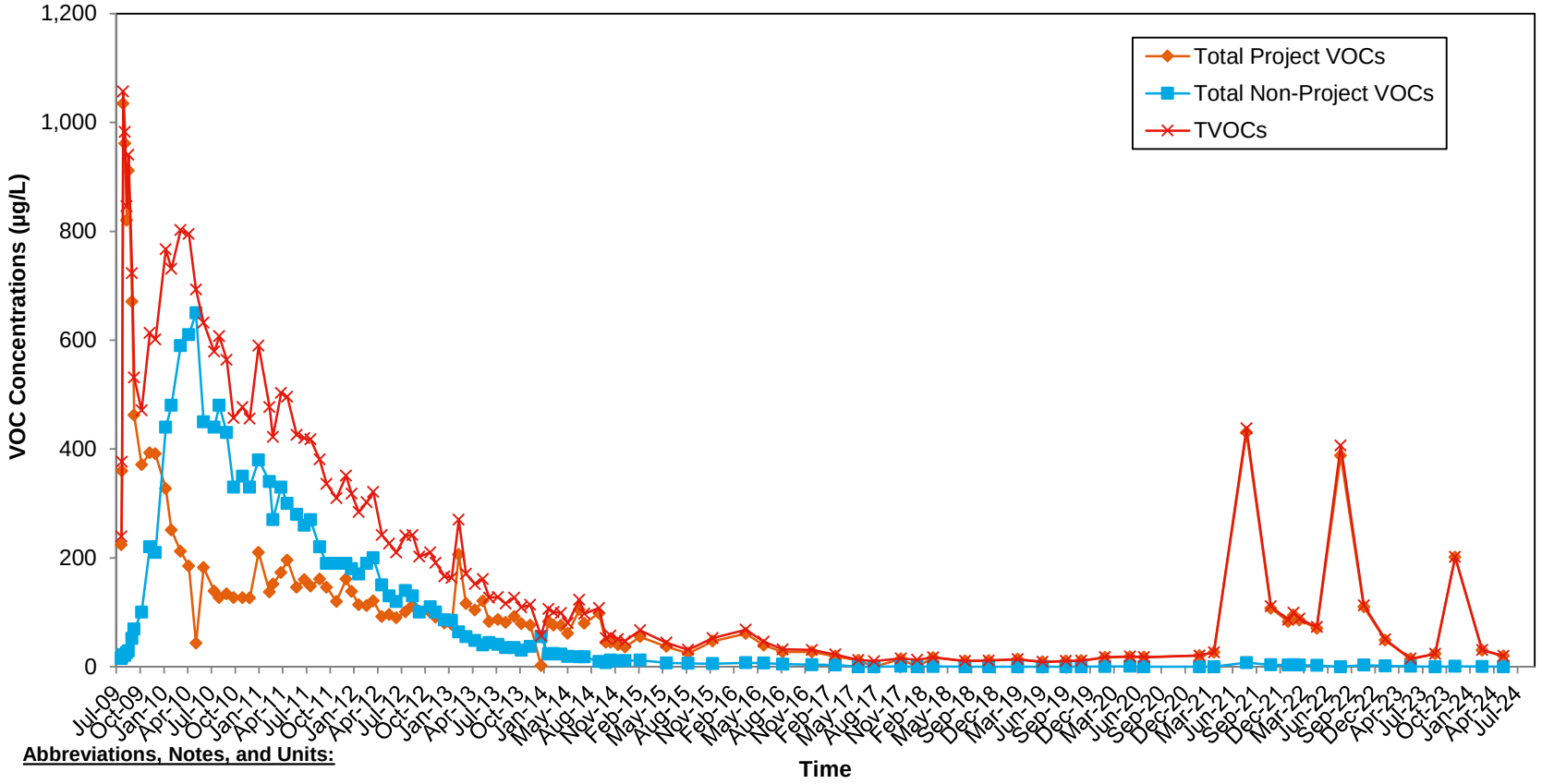
µg/L = micrograms per liter

BETHPAGE PARK GROUNDWATER CONTAINMENT SYSTEM
OPERABLE UNIT 3
(FORMER GRUMMAN SETTLING PONDS)
BETHPAGE, NEW YORK

REMEDIAL WELL NON-PROJECT VOC CONCENTRATIONS

ARCADIS

FIGURE
6C



Abbreviations, Notes, and Units:

VOC = Volatile Organic Compound
TVOCs = Total VOCs detected.

Project VOCs = sum of 1,1,1-trichloroethane; 1,1-dichloroethane; 1,2-dichloroethane; 1,1-dichloroethene; tetrachloroethene; trichloroethene; vinyl chloride; cis-1,2-dichloroethene; trans-1,2-dichloroethene; benzene; toluene; and total xylenes.

Non-Project VOCs = sum of VOCs that are not Project VOCs.

1. Quarter 4 2020 sampling was conducted during ISTR Baker Tank discharge. The combined Influent sample port (WSP-5) is located upstream of the ISTR connection into the influent line. Due to this setup, the combined influent port (WSP-5) was not sampled as it would not be representative of the true combined influent.
2. A notable increase in VOCs was detected in the August 13, 2021, system influent sample. This increase is likely due to the ISTR system activities on the Bethpage Community Park property
3. As of August 4, 2022 the RW-1 concentration is representative of the addition of BCPMW-4-1 and BCPMW-4-2 that were added as additional recovery wells.A notable increase in TVOCs was detected in the August 22, 2022 sample from RW-1, which is likely due to the addition of BCPMW-4-1 and BCPMW-4-2.
4. A notable increase in VOCs was detected in the November 07, 2023, sytem influent sample. At the time the sample was collected, the replacement of pumps and cleaning of the lines of recovery wells 4-1 and 4-2 (completed on November 6, 2023) likely contributed to the high project VOCs concentration reported.

BETHPAGE PARK GROUNDWATER CONTAINMENT SYSTEM
OPERABLE UNIT 3
(FORMER GRUMMAN SETTLING PONDS)
BETHPAGE, NEW YORK

INFLUENT TOTAL, PROJECT AND NON-PROJECT VOC CONCENTRATIONS

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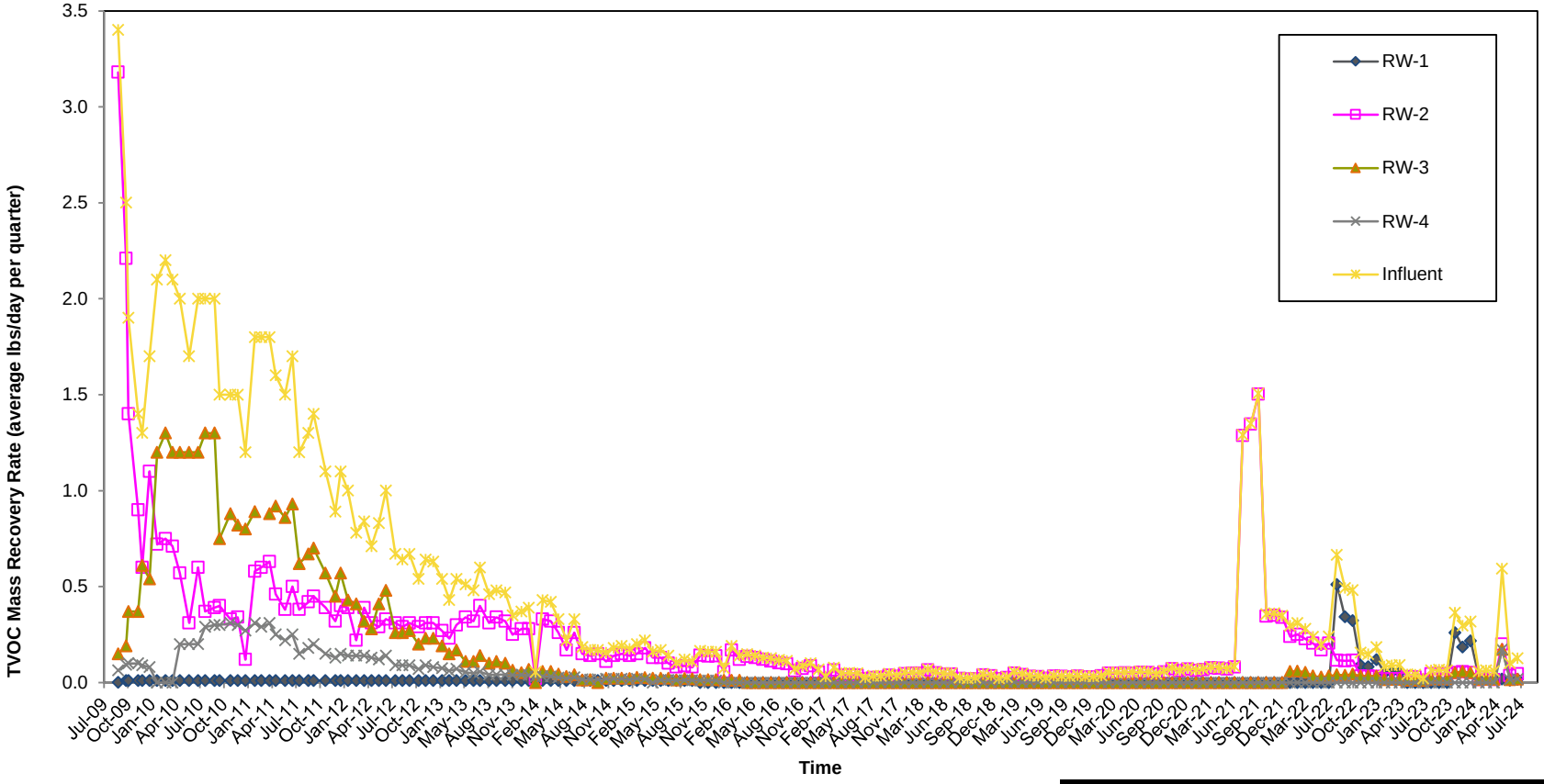
FIGURE
7

https://arcadiso365.sharepoint.com/teams/portfolio-813733/Shared Documents/OU3.2 Groundwater Containment System/11 Draft Reports-Presentations/Reports/2024 Q2/Tables/Q2_Table 2-8Figure 7 Comb. Inf. VOC Conc.



Abbreviation, Notes, and Units:

VOC = Volatile Organic Compound
TVOCs = Total VOCs

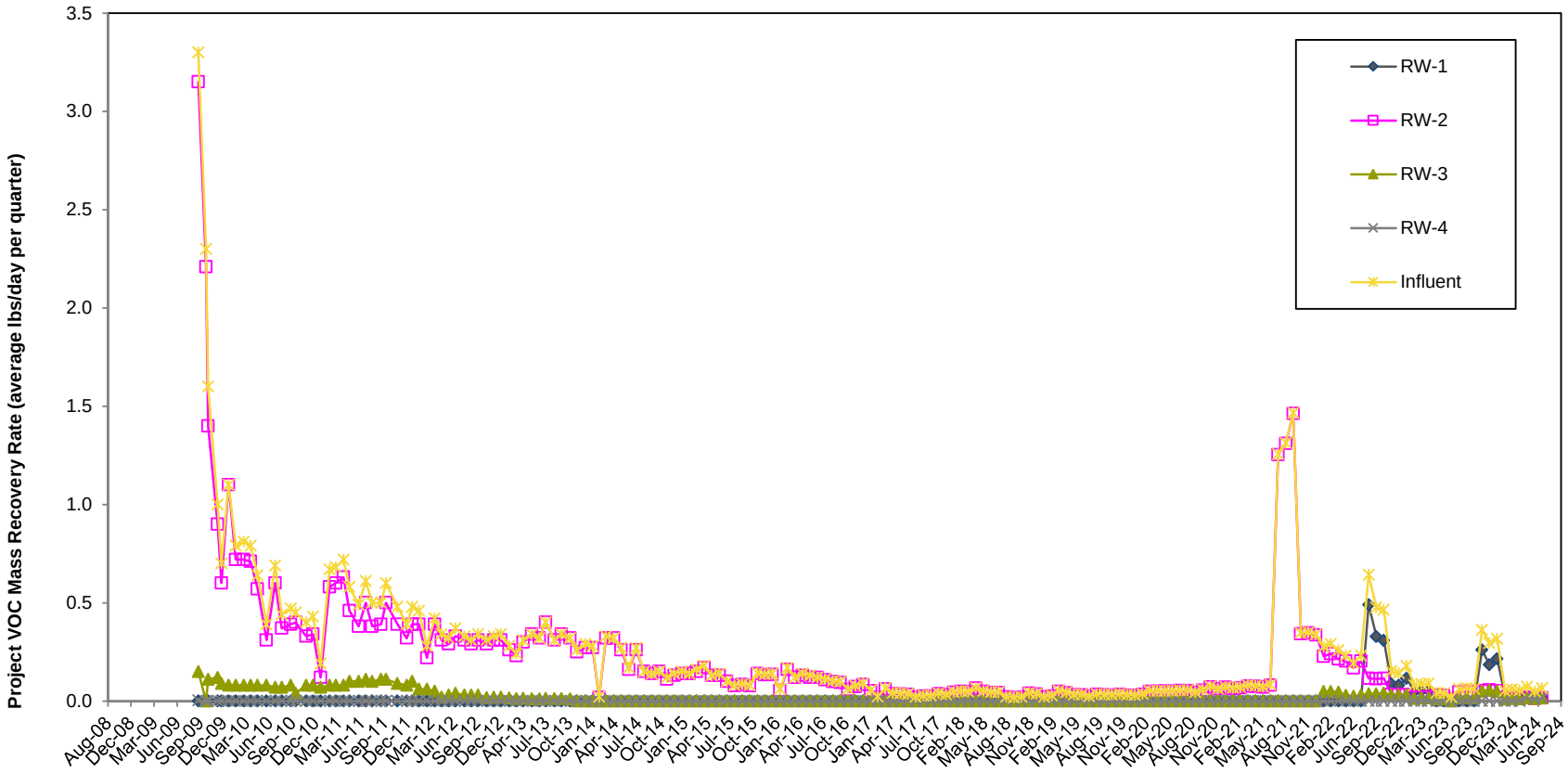
1. A notable increase in TVOC mass recovery rates was observed between Q3 2021 and Q1 2022, and Q3 2023 and Q4 2023 due to the increase in TVOCs detected (Figure 6A)
2. As of August 4, 2022 the RW-1 concentration is representative of the addition of BCPMW-4-1 and BCPMW-4-2 that were added as additional recovery wells.A notable increase in TVOCs was detected in the August 22, 2022 sample from RW-1, which is likely due to the addition of BCPMW-4-1 and BCPMW-4-2.

BETHPAGE PARK GROUNDWATER CONTAINMENT SYSTEM
OPERABLE UNIT 3
(FORMER GRUMMAN SETTLING PONDS)
BETHPAGE, NEW YORK

TOTAL VOC MASS RECOVERY RATES

ARCADIS

FIGURE
8A



Abbreviations, Notes, and Units:

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Project VOCs = Sum of 1,1,1-trichloroethane; 1,1-dichloroethane; 1,2-dichloroethane; 1,1-dichloroethene; tetrachloroethene; trichloroethene; vinyl chloride; cis-1,2-dichloroethene; trans-1,2-dichloroethene; benzene; toluene; and total xylenes

1. A notable increase in TVOC mass recovery rates was observed between Q3 2021 and Q1 2022, and Q3 2023 and Q4 2023 due to the increase in TVOCs detected (Figure 6B)
2. As of August 4, 2022 the RW-1 concentration is representative of the addition of BCPMW-4-1 and BCPMW-4-2 that were added as additional recovery wells. A notable increase in TVOCs was detected in the August 22, 2022 sample from RW-1, which is likely due to the addition of BCPMW-4-1 and BCPMW-4-2.

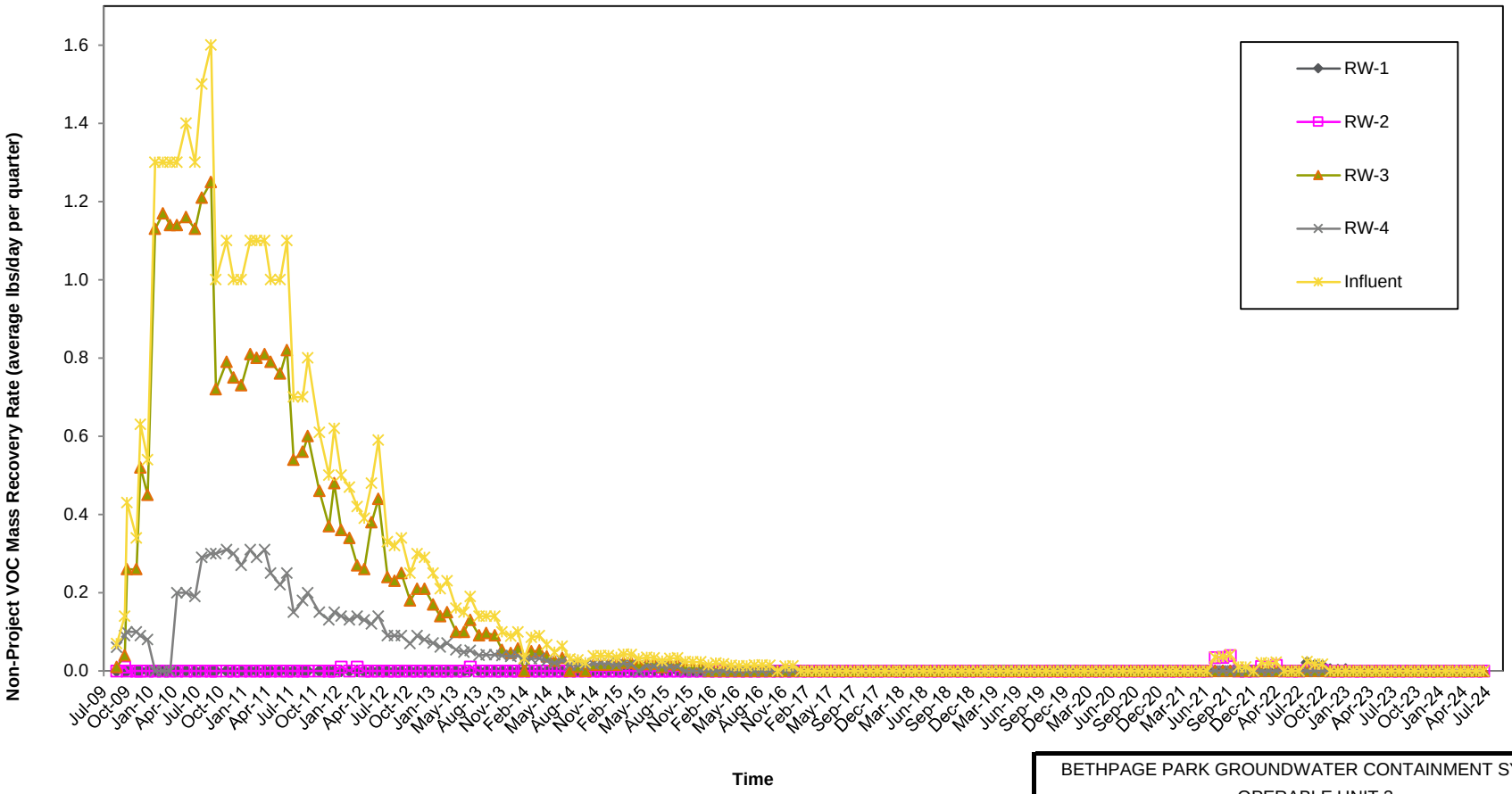
lbs/day = pounds per day

BETHPAGE PARK GROUNDWATER CONTAINMENT SYSTEM
OPERABLE UNIT 3
(FORMER GRUMMAN SETTLING PONDS)
BETHPAGE, NEW YORK

PROJECT VOC MASS RECOVERY RATES

ARCADIS

FIGURE
8B



Abbreviations, Notes, and Units:

VOC = Volatile Organic Compound

Non-Project VOCs = sum of VOCs that are not Project VOCs.

1. As of August 4, 2022 the RW-1 concentration is representative of the addition of BCPMW-4-1 and BCPMW-4-2 that were added as additional recovery wells.

lbs/day = pounds per day

BETHPAGE PARK GROUNDWATER CONTAINMENT SYSTEM
OPERABLE UNIT 3
(FORMER GRUMMAN SETTLING PONDS)
BETHPAGE, NEW YORK

NON-PROJECT VOC MASS RECOVERY RATES

ARCADIS

FIGURE
8C