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Subject: 2022 First Quarter Operation, Maintenance, and Monitoring Report, Operable Unit 2, Northrop Grumman and Naval Weapons Industrial Reserve Plant (NWIRP) Sites, Bethpage, New York.
(NYSDEC Site #'s 1-30-003A and B)

Dear Jason:

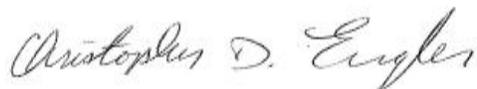
On behalf of Northrop Grumman, Arcadis is providing the NYSDEC with the First Quarter 2022 Operation, Maintenance, and Monitoring Report (Report). This Report was prepared to document the operation, maintenance, and monitoring (OM&M) activities conducted for the on-site portion of the Operable Unit 2 (OU2) groundwater remedy and the results of ongoing volatile organic compound (VOC) and inorganic monitoring in groundwater to meet the remedial objectives set forth in the March 2001 OU2 Record of Decision (ROD) and associated December 2019 Amended Record of Decision (AROD).

Table 1 summarizes OU2 remedial system performance operational data, total mass removal, and water balance. **Tables 2 and 3A/3B** provide the analytical results for remedial system water and vapor samples, respectively, for this period. **Tables 4A and 4B** provide the air modeling inputs and outputs and resulting analyses based on quarterly vapor samples collected from the Tower 96 and Tower 102 systems, respectively, for this period. **Tables 5A and 5B** provide a summary of percent mass emittance of TCE from vapor sampling completed during the Second Quarter 2021 through the First Quarter 2022. **Table 6** provides validated analytical results associated with groundwater monitoring efforts completed during this period. **Figures 1 through 3** show the Locations of Wells and On-site Groundwater Remedy, ONCT Groundwater Extraction and Treatment System Site Plan, and the ONCT Groundwater Extraction and Treatment System Schematic, respectively.

Jason Pelton
NYSDEC
June 1, 2022

Please contact us if you have any questions or comments.

Sincerely,
Arcadis of New York, Inc.



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Richard Kern – New York American Water
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John Reinhardt – Town of Hempstead Water District
Michael Boufis – Bethpage Water District
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Enclosures

Tables

Table 1
Operational Summary for the Treatment System
First Quarter 2022⁽¹⁾ Reporting Period
Operable Unit 2
Northrop Grumman
Bethpage, New York



	Quarterly Flow Rates (gpm)		Quarterly Flow Volumes (MG)			Quarterly VOC Concentrations (µg/L)		VOC Mass Removed (lbs)		First Quarter Remedial Well Uptime (%)
	Current Model Design ⁽²⁾	Current Operational Flow ^(3,4)	Design ⁽²⁾	Actual ^(3,4)	% of Design	TCE ⁽⁵⁾	TVOC ^(5,6)	Quarterly	Cumulative	
Influent Groundwater ⁽⁷⁾										
Well 1	800	812	104	97	93%	678	713	578	54,908	93%
Well 3R	700	799	91	96	105%	199	263	211	93,963	92%
Well 17	1,000	1,026	130	128	98%	157	181	194	55,699	96%
Well 18	800	1,032	104	127	122%	35.6	60.7	64	7,342	95%
Well 19	500	523	65	64	98%	90.2	111.8	60	9,567	95%
Total ⁽⁸⁾	3,800	4,192	494	512	104%	--	--	1,107	221,479	--
Effluent Groundwater ⁽⁹⁾										
Calpine	100 - 400	70	--	9	--	--	--	--	--	--
OXY Biosparge ⁽¹⁰⁾	2 - 42	0	--	0	--	--	--	--	--	--
West Recharge Basins	1,112 - 1,455	1,313	--	170	--	--	ND	--	--	--
South Recharge Basins	2,231	2,567	289	333	115%	--	ND	--	--	--
Total	--	3,950	--	512	--	--	--	--	--	--
Additional Flow to South Recharge Basins										
Storm Water Runoff Contributing to South Recharge Basins Flow Volume ⁽¹¹⁾	--	--	--	13	--	--	--	--	--	--
Total Flow Volume to South Recharge Basins ^(10,11,12)	--	--	289	346	120%	--	--	--	--	--
Treatment Efficiencies ⁽¹³⁾										
Tower 96 System:	>99.9%									
Tower 102 System:	>99.9%									

See Notes and Abbreviations on last page.

Notes and Abbreviations:

- (1) Quarterly reporting period: January 1, 2022 through March 31, 2022.
- (2) "Current Model Design" flow rates were determined for the five remedial wells and for the South Recharge Basin based on computer modeling (ARCADIS G&M, Inc. 2002, updated in 2021). Flow rates for Calpine Power Plant (Calpine), Occidental Chemical (OXY) Biosparge, and West Recharge Basin flow rates are typical flow rates and are provided for reader information. "Design" flow volumes represent the volume of water that is expected to be pumped/discharged during the reporting period and is calculated by multiplying the design rate by the reporting period duration.
- (3) Actual flow rates for the remedial wells represent the average actual pumping rates when the pumps are operational and do not take into account the time that a well is not operational. Actual flow volumes are collated from the monthly SPDES reports, which are calculated using the SCADA instantaneous flow rates transmitted from local flow meters.
- (4) "Actual" flow rates for the system discharges represent the average flow rate during the reporting period and are determined by dividing the total flow recorded during the reporting period by the reporting period duration.
- (5) The TCE and TVOC concentrations are from the quarterly sampling events performed during this reporting period on February 16, 2022.
- (6) The TVOC concentrations for the West Recharge Basin (Outfall 006 of the Tower 96 System) and the South Recharge Basin (Outfall 005 of the Tower 102 System) are their respective average monthly Outfall SPDES concentrations for the current quarter.
- (7) Tower 96 was shut down this reporting period to bypass the regenerative vapor-phase GAC vessels and modify the ductwork to treat air stripper effluent through exterior GAC units only, and other smaller-scale repairs. As such, the system was shut down approximately 3 days in January, approximately 5 days in February, and approximately 6 days in March. Tower 102 System was shut down this reporting period to replace the weir flow meter and other smaller-scale repairs. As such, the system was shut down approximately 2 days in January, approximately 2 days in February, and approximately 2 days in March.
- (8) Total pumpage/recharge rates are accurate to $\pm 15\%$ based on available information and expected or typical precision/accuracy factors for the gauges and meters.
- (9) There are four possible discharges for the effluent groundwater: South Recharge Basins, West Recharge Basins, Calpine, and the OXY Biosparge system. Treated water is continuously discharged to the south and west recharge basins during routine operation, and is available "on-demand" to both Calpine for use as make-up water, and the OXY Biosparge remediation system. For this quarter, the quarterly flow rates to the south and west recharge basins (SRB and WRB, respectively) were calculated using the remedial well flow rates and available additional information and assumptions provided by Northrop Grumman regarding flow distribution, as follows: the Tower 96 system (Remedial Wells 1 and 3R) discharges effluent water to the WRB, less Calpine usage and less 119 gpm of Tower 102 steam condenser usage (15.8 MG); the Tower 102 System (Remedial Wells 17 through 19), including the Tower 102 steam condenser usage (15.8 MG), discharges effluent water to the SRB.
- (10) Oxy has not reported any water usage for the OXY Biosparge system since May 2016.
- (11) Storm water runoff volume is calculated by multiplying the adjusted tributary area and NOAA precipitation data for the reporting periods. The tributary area is adjusted by the runoff coefficient to exclude the infiltration volume from the total rainfall volume. The tributary area, runoff coefficient, and adjusted tributary area are from Dvirka and Bartilucci Consulting Engineers' Storm Water Permit Evaluation Report (January, 28, 2010). The NOAA precipitation data are calculated as a sum of NOAA daily precipitation data for the reporting period. NOAA precipitation data are retrieved from Station GHCND:USW00054787 - FARMINGDALE REPUBLIC AIRPORT, NY US for January, February, and March 2022.
- (12) Total flow volume to South Recharge Basins is estimated as a sum of flow volumes contributed by the effluent groundwater to South Recharge Basins and from storm water runoff to South Recharge Basins. First Quarter 2022 calculated South Recharge Basin flow volume is within historical operating range.
- (13) Treatment system efficiencies are calculated by dividing the difference between the remedial well flow weighted influent and effluent TVOC concentrations by the remedial well flow weighted influent concentration.

--	Not Applicable
$\mu\text{g/L}$	micrograms per liter
gpm	gallons per minute
lbs	pounds
MG	million gallons
NOAA	National Oceanic and Atmospheric Administration
SCADA	Supervisory Controls and Data Acquisition
SPDES	State Pollution Discharge Elimination System
TCE	trichloroethene
TVOC	total volatile organic compounds
VOC	volatile organic compounds

Table 2
Concentrations of Constituents in Remedial Wells and
Treatment System Effluents
First Quarter 2022⁽¹⁾ Reporting Period
Operable Unit 2
Northrop Grumman,
Bethpage, New York



Constituents ⁽²⁾ (Units in µg/L)	CAS#	Location ID: Sample ID: Sample Date:	WELL 1 WELL 1 2/16/2022	WELL 3R WELL 3R 2/16/2022	WELL 3R REP-021622-KC-1 2/16/2022	96 EFFLUENT 96 EFFLUENT 2/16/2022
Volatile Organic Compounds (VOCs)⁽³⁾						
1,1,1-Trichloroethane	00071-55-6		0.28 J	0.57	0.59	< 0.50
1,1,2,2-Tetrachloroethane	00079-34-5		< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloroethane	00079-00-5		< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane	00075-34-3		0.92 J	1.7	1.7	< 1.0
1,1-Dichloroethene	00075-35-4		2.2	5.3	5.0	< 0.50
1,2-Dichloroethane	00107-06-2		< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane	00078-87-5		4.2	< 1.0	< 1.0	< 1.0
2-Butanone (MEK)	00078-93-3		< 10	< 10	< 10	< 10
2-Hexanone (MBK)	00591-78-6		< 5.0	< 5.0	< 5.0	< 5.0
4-Methyl-2-Pentanone (MIK)	00108-10-1		< 5.0	< 5.0	< 5.0	< 5.0
Acetone	00067-64-1		< 10	< 10	< 10	< 10
Benzene	00071-43-2		< 0.50	< 0.50	< 0.50	< 0.50
Bromodichloromethane	00075-27-4		< 1.0	< 1.0	< 1.0	< 1.0
Bromoform	00075-25-2		< 1.0	< 1.0	< 1.0	< 1.0
Bromomethane	00074-83-9		< 2.0	< 2.0	< 2.0	< 2.0
Carbon Disulfide	00075-15-0		< 2.0	< 2.0	< 2.0	< 2.0
Carbon Tetrachloride	00056-23-5		< 1.0	< 1.0	< 1.0	< 1.0
Chlorobenzene	00108-90-7		< 1.0	< 1.0	< 1.0	< 1.0
Chloroethane	00075-00-3		< 1.0	< 1.0	< 1.0	< 1.0
Chloroform	00067-66-3		0.43 J	0.51	0.48 J	< 0.50
Chloromethane	00074-87-3		< 1.0	< 1.0	< 1.0	< 1.0
cis-1,2-Dichloroethene	00156-59-2		6.7	4.1	4.2	< 0.50
cis-1,3-Dichloropropene	10061-01-5		< 1.0	< 1.0	< 1.0	< 1.0
Dibromochloromethane	00124-48-1		< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	00100-41-4		< 1.0	< 1.0	< 1.0	< 1.0
Dichloromethane	00075-09-2		< 0.50	< 0.50	< 0.50	< 0.50
Styrene	00100-42-5		< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene	00127-18-4		16.6	46.0	45.1	< 0.50
Toluene	00108-88-3		< 1.0	< 1.0	< 1.0	< 1.0
trans-1,2-Dichloroethene	00156-60-5		0.28 J	< 0.50	< 0.50	< 0.50
trans-1,3-Dichloropropene	10061-02-6		< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethylene	00079-01-6		678	199	197	< 0.50
Trichlorotrifluoroethane (Freon 113)	00076-13-1		3.6	2.6	2.6	< 0.50
Vinyl Chloride	00075-01-4		< 0.50	3.4	3.3	< 0.50
Xylene-o	00095-47-6		< 1.0	< 1.0	< 1.0	< 1.0
Xylene-m,p	179601-23-1		< 1.0	< 1.0	< 1.0	< 1.0
Total VOCs⁽⁴⁾			713	263	260	ND
1,4-Dioxane⁽³⁾			6.8	6.6	6.9	5.8

Notes and abbreviations on last page.

Table 2
Concentrations of Constituents in Remedial Wells and
Treatment System Effluents
First Quarter 2022⁽¹⁾ Reporting Period
Operable Unit 2
Northrop Grumman,
Bethpage, New York



Constituents ⁽²⁾ (Units in µg/L)	CAS#	Location ID:	WELL 17	WELL 18	WELL 19	102 EFFLUENT
		Sample ID: Sample Date:	WELL 17 2/16/2022	WELL 18 2/16/2022	WELL 19 2/16/2022	102 EFFLUENT 2/16/2022
Volatile Organic Compounds (VOCs)⁽³⁾						
1,1,1-Trichloroethane	00071-55-6		< 0.50	0.31 J	< 0.50	< 0.50
1,1,2,2-Tetrachloroethane	00079-34-5		< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloroethane	00079-00-5		< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane	00075-34-3		0.70 J	1.6	< 1.0	< 1.0
1,1-Dichloroethene	00075-35-4		1.3	2.3	1.3	< 0.50
1,2-Dichloroethane	00107-06-2		< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane	00078-87-5		1.1	< 1.0	< 1.0	< 1.0
2-Butanone (MEK)	00078-93-3		< 10	< 10	< 10	< 10
2-Hexanone (MBK)	00591-78-6		< 5.0	< 5.0	< 5.0	< 5.0
4-Methyl-2-Pentanone (MIK)	00108-10-1		< 5.0	< 5.0	< 5.0	< 5.0
Acetone	00067-64-1		< 10	< 10	< 10	< 10
Benzene	00071-43-2		< 0.50	< 0.50	< 0.50	< 0.50
Bromodichloromethane	00075-27-4		< 1.0	< 1.0	< 1.0	< 1.0
Bromoform	00075-25-2		< 1.0	< 1.0	< 1.0	< 1.0
Bromomethane	00074-83-9		< 2.0	< 2.0	< 2.0	< 2.0
Carbon Disulfide	00075-15-0		< 2.0	< 2.0	< 2.0	< 2.0
Carbon Tetrachloride	00056-23-5		< 1.0	< 1.0	< 1.0	< 1.0
Chlorobenzene	00108-90-7		< 1.0	< 1.0	< 1.0	< 1.0
Chloroethane	00075-00-3		< 1.0	< 1.0	< 1.0	< 1.0
Chloroform	00067-66-3		< 0.50	< 0.50	0.33 J	< 0.50
Chloromethane	00074-87-3		< 1.0	< 1.0	< 1.0	< 1.0
cis-1,2-Dichloroethene	00156-59-2		2.7	3.1	12.6	< 0.50
cis-1,3-Dichloropropene	10061-01-5		< 1.0	< 1.0	< 1.0	< 1.0
Dibromochloromethane	00124-48-1		< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	00100-41-4		< 1.0	< 1.0	< 1.0	< 1.0
Dichloromethane	00075-09-2		< 0.50	< 0.50	< 0.50	< 0.50
Styrene	00100-42-5		< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene	00127-18-4		15.7	16.7	6.3	< 0.50
Toluene	00108-88-3		< 1.0	< 1.0	< 1.0	< 1.0
trans-1,2-Dichloroethene	00156-60-5		< 0.50	< 0.50	< 0.50	< 0.50
trans-1,3-Dichloropropene	10061-02-6		< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethylene	00079-01-6		157	35.6	90.2	< 0.50
Trichlorotrifluoroethane (Freon 113)	00076-13-1		2.4	1.1	1.1	< 0.50
Vinyl Chloride	00075-01-4		< 0.50	< 0.50	< 0.50	< 0.50
Xylene-o	00095-47-6		< 1.0	< 1.0	< 1.0	< 1.0
Xylene-m,p	179601-23-1		< 1.0	< 1.0	< 1.0	< 1.0
Total VOCs⁽⁴⁾			181	60.7	111.8	ND
1,4-Dioxane⁽³⁾			3.6	2.4	2.4	3.6

Notes and abbreviations on last page.

Notes and Abbreviations:

- (1) Quarterly reporting period: January 1, 2022 through March 31, 2022.
- (2) Results for the program are validated at 20% frequency, per protocols specified in OU2 Groundwater Monitoring Plan (Arcadis 2016).
- (3) VOC samples analyzed using USEPA Method 8260C. 1,4-Dioxane samples analyzed using USEPA Method 8270D-SIM.
- (4) TVOC concentrations are rounded to the number of decimal places of the individual VOC with the least numerical precision (decimal place), including whole numbers with no decimal place.

2.6	Bold value indicates a detection
< 0.5	Compound is not detected above its laboratory quantification limit
µg/L	micrograms per liter
J	Compound detected below its reporting limit; value is estimated
ND	Not detected
OU2	Operable Unit 2
REP	Blind Replicate Sample
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compound

Table 3A
Vapor Sample Analytical Results
Tower 96 Treatment System
First Quarter 2022⁽¹⁾ Reporting Period
Operable Unit 2
Northrop Grumman
Bethpage, New York



Constituents (units in µg/m ³)	Location ID: Sample ID: Sample Date:	96 INFLUENT T96 INFLUENT (AA) 2/16/2022	96 MID-EFFLUENT T96 MIDTRAIN (AA) 2/16/2022	96 EFFLUENT T96 EFFLUENT (AA) 2/16/2022
Volatile Organic Compounds (VOCs)⁽²⁾	CAS #			
1,1,1-Trichloroethane	00071-55-6	12	3.5	2.8
1,1,2,2-Tetrachloroethane	00079-34-5	< 0.55	< 0.58	< 0.55
1,1,2-Trichloroethane	00079-00-5	56.2	6.5	< 0.44
1,1-Dichloroethane	00075-34-3	41.3	11	9.3
1,1-Dichloroethene	00075-35-4	120	32	25
1,2-Dichloroethane	00107-06-2	1.9	0.61 J	0.53 J
1,2-Dichloropropane	00078-87-5	490	11	45
Benzene	00071-43-2	1.9	0.8	0.42 J
Bromodichloromethane	00075-27-4	7.4	< 0.57	< 0.54
Bromoform	00075-25-2	< 0.33	< 0.35	< 0.33
Bromomethane	00074-83-9	< 0.62	< 0.66	< 0.62
Carbon Disulfide	00075-15-0	< 0.50	< 0.53	< 0.50
Carbon Tetrachloride	00056-23-5	2.4	0.88	0.69
Chlorobenzene	00108-90-7	< 0.74	< 0.78	< 0.74
Chloroethane	00075-00-3	4	1	0.71
Chloroform	00067-66-3	14	4	3.3
Chloromethane	00074-87-3	2.5	1.2	1.2
cis-1,2-Dichloroethene	00156-59-2	167	46.4	38
cis-1,3-Dichloropropene	10061-01-5	< 0.73	< 0.77	< 0.73
Dibromochloromethane	00124-48-1	< 0.68	< 0.72	< 0.68
Ethylbenzene	00100-41-4	0.48 J	< 0.74	< 0.69
Dichloromethane	00075-09-2	2.2	1.2	20
Styrene	00100-42-5	< 0.68	< 0.72	< 0.68
Tetrachloroethene	00127-18-4	475	140	2
Toluene	00108-88-3	75.4	5.7	44.8
trans-1,2-Dichloroethene	00156-60-5	1.9	0.52 J	0.44 J
trans-1,3-Dichloropropene	10061-02-6	< 0.73	< 0.77	< 0.73
Trichloroethylene	00079-01-6	5,430	2,580	10,900
Trichlorotrifluoroethane (Freon 113)	00076-13-1	89.7	25	21
Vinyl Chloride	00075-01-4	46.8	13	8.9
Xylene-o	00095-47-6	0.41 J	< 0.74	< 0.69
Xylene-m,p	179601-23-1	1.3	< 0.74	< 0.69
Total VOCs^(3,4,5)		7,044	2,884	11,124

Notes and abbreviations on last page.

**Table 3A
 Vapor Sample Analytical Results,
 Tower 96 Treatment System,
 First Quarter 2022⁽¹⁾ Reporting Period
 Operable Unit 2
 Northrop Grumman
 Bethpage, New York**



Notes and Abbreviations:

- (1) Quarterly reporting period: January 1, 2022 through March 31, 2022.
- (2) 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.
- (3) TVOC concentrations are rounded to the number of decimal places of the individual VOC with the least numerical precision (decimal place), including whole numbers with no decimal place.
- (4) Given that other contaminants in the sample set generally show an expected decline from influent, to midfluent, to effluent concentrations, it is unclear why the effluent TCE concentration is markedly higher than influent and midfluent TCE concentrations.
 Following the collection of the Q1 2022 sample, the system was reconfigured to bypass the regenerative vapor-phase GAC components and treat air stripper effluent directly through the exterior GAC beds.
 A follow-up vapor-phase sample was collected in April 2022, as part of enhanced monthly monitoring activities following system reconfiguration in March 2022, and following change-out of the exterior GAC in April 2022. As will be reported in the Q2 Report, this sample exhibited contaminant concentrations more in-line with expectations and an effluent TCE concentration of only 7.4 ug/m3. Vapor-phase contaminant concentrations, specifically effluent concentrations, will be closely monitored during upcoming sample rounds.
- (5) The system was reconfigured to bypass the regenerative vapor-phase GAC components and treat air stripper effluent directly through the exterior GAC beds on 3/15/22.

40	Bold value indicates a detection
< 0.22	Compound is not detected above its laboratory quantification limit
µg/m ³	micrograms per cubic meter
J	Compound detected below its reporting limit; value is estimated
ELAP	Environmental Laboratory Approval Program
NYSDOH	New York State Department of Health
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compound

Table 3B
Vapor Sample Analytical Results
Tower 102 Treatment System
First Quarter 2022⁽¹⁾ Reporting Period
Operable Unit 2
Northrop Grumman
Bethpage, New York



Constituents (units in µg/m ³)	Location ID: Sample ID: Sample Date:	102 INFLENT T102 INFLENT (AA) 2/16/2022	102 EFFLENT T102 EFFLENT (AA) 2/16/2022
<u>Volatile Organic Compounds (VOCs)</u> ⁽²⁾	CAS #		
1,1,1-Trichloroethane	00071-55-6	6.5	< 0.44
1,1,2,2-Tetrachloroethane	00079-34-5	< 0.55	< 0.55
1,1,2-Trichloroethane	00079-00-5	8.2	< 0.44
1,1-Dichloroethane	00075-34-3	34	22
1,1-Dichloroethene	00075-35-4	63	40.8
1,2-Dichloroethane	00107-06-2	1.9	< 0.65
1,2-Dichloropropane	00078-87-5	129	< 0.74
Benzene	00071-43-2	1.2	< 0.51
Bromodichloromethane	00075-27-4	1.3	< 0.54
Bromoform	00075-25-2	< 0.33	< 0.33
Bromomethane	00074-83-9	< 0.62	< 0.62
Carbon Disulfide	00075-15-0	< 0.50	0.24 J
Carbon Tetrachloride	00056-23-5	3.5	< 0.20
Chlorobenzene	00108-90-7	< 0.74	< 0.74
Chloroethane	00075-00-3	< 0.42	< 0.42
Chloroform	00067-66-3	8.3	3.1
Chloromethane	00074-87-3	1	1.5
cis-1,2 Dichloroethene	00156-59-2	228	29
cis-1,3-Dichloropropene	10061-01-5	< 0.73	< 0.73
Dibromochloromethane	00124-48-1	< 0.68	< 0.68
Ethylbenzene	00100-41-4	< 0.69	< 0.69
Dichloromethane	00075-09-2	9.7	1.5
Styrene	00100-42-5	< 0.68	< 0.68
Tetrachloroethene	00127-18-4	315	1.3
Toluene	00108-88-3	5.3	1.8
trans-1,2-Dichloroethene	00156-60-5	3.3	0.44 J
trans-1,3-Dichloropropene	10061-02-6	< 0.73	< 0.73
Trichloroethylene	00079-01-6	3,510	11
Trichlorotrifluoroethane (Freon 113)	00076-13-1	41	26
Vinyl Chloride	00075-01-4	< 0.082	0.26
Xylene-o	00095-47-6	< 0.69	< 0.69
Xylene-m,p	179601-23-1	< 0.69	0.61 J
Total VOCs ⁽³⁾		4,370	140

Notes and abbreviations on last page.

Table 3B
Vapor Sample Analytical Results
Tower 102 Treatment System
First Quarter 2022⁽¹⁾ Reporting Period
Operable Unit 2
Northrop Grumman
Bethpage, New York



Notes and Abbreviations:

- (1) Quarterly reporting period: January 1, 2022 through March 31, 2022.
- (2) 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.
- (3) TVOC concentrations are rounded to the number of decimal places of the individual VOC with the least numerical precision (decimal place), including whole numbers with no decimal place.

43	Bold value indicates a detection
< 11	Compound is not detected above its laboratory quantification limit
µg/m ³	micrograms per cubic meter
J	Compound detected below its reporting limit; value is estimated
ELAP	Environmental Laboratory Approval Program
NYSDOH	New York State Department of Health
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compound

Table 4A
 Rule 212 Applicability and Evaluation
 Tower 96 Treatment System
 First Quarter 2022⁽¹⁾ Reporting Period
 Operable Unit 2
 Northrop Grumman
 Bethpage, New York



Project VOCs	CAS#	HTAC ²	Tower 96 Treatment System Maximum Effluent Conc. (ug/m3) ^{3,10,11}	Tower 96 Emissions (lb/yr) ⁴	Rule 212 Limit (lb/yr) ⁵	Rule 212 Applicability ⁶	Further evaluation Required? ⁶	Tower 96 Emissions (g/s) ⁷	Total Scaled Impact - Short-Term (Hourly) (ug/m3) ⁸	Total Scaled Impact - Annual (ug/m3) ⁸	SGC (ug/m3) ⁹	AGC (ug/m3) ⁹
1,1,1-Trichloroethane	71-55-6	No	2.8	0.450	100	Less than limit, Rule 212 compliant	N	--	--	--	9,000	5,000
1,1-Dichloroethane	75-34-3	No	9.3	1.496	100	Less than limit, Rule 212 compliant	N	--	--	--	--	0.63
1,1-Dichloroethene	75-35-4	No	25	4.021	100	Less than limit, Rule 212 compliant	N	--	--	--	--	200
1,2-Dichloroethane	107-06-2	Yes	0.53	0.085	100	Less than limit, Rule 212 compliant	N	--	--	--	--	0.038
1,2-Dichloropropane	78-87-5	No	45	7.238	100	Less than limit, Rule 212 compliant	N	--	--	--	--	4
Benzene	71-43-2	Yes	0.42	0.068	100	Less than limit, Rule 212 compliant	N	--	--	--	27	0.13
Carbon Tetrachloride	56-23-5	Yes	0.69	0.111	100	Less than limit, Rule 212 compliant	N	--	--	--	1,900	0.17
Chloroethane	75-00-3	No	0.71	0.114	100	Less than limit, Rule 212 compliant	N	--	--	--	--	10000
Chloroform	67-66-3	Yes	3.30	0.531	100	Less than limit, Rule 212 compliant	N	--	--	--	150	14.7
Chloromethane	74-87-3	No	1.2	0.193	100	Less than limit, Rule 212 compliant	N	--	--	--	22000	90
cis-1,2 Dichloroethene	156-59-2	No	38	6.112	100	Less than limit, Rule 212 compliant	N	--	--	--	--	63
Methylene Chloride	75-09-2	No	20	3.217	100	Less than limit, Rule 212 compliant	N	--	--	--	14,000	46
Tetrachloroethene	127-18-4	Yes	2.0	0.322	1,000	Less than limit, Rule 212 compliant	N	--	--	--	300	3.8
Toluene	108-88-3	No	44.8	7.205	100	Less than limit, Rule 212 compliant	N	--	--	--	37,000	5000
trans-1,2-Dichloroethene	156-60-5	No	0.44	0.071	100	Less than limit, Rule 212 compliant	N	--	--	--	--	63
Trichloroethylene	79-01-6	Yes	10,900	1753.103	500	Subject to Rule 212 Requirement	Y	2.5E-02	3.73	0.110	20	0.2
Trichlorotrifluoroethane (Freon 113)	76-13-1	No	21	3.378	100	Less than limit, Rule 212 compliant	N	--	--	--	960,000	180,000
Vinyl Chloride	75-01-4	Yes	8.9	1.431	100	Less than limit, Rule 212 compliant	N	--	--	--	180,000	0.11

Flowrates and Normalized Modeling Impacts

Description	Flow (cfm)	AERMOD Normalized Ambient Impact at 1 g/s	
		Hourly (ug/m ³)(g/s)	Annual (ug/m ³)(g/s)
Tower 96	4,912	148.1	4.3

Notes:

- Quarterly reporting period: January 1, 2022 through March 31, 2022.
- High toxicity air contaminant (HTAC) based on 6 CRR-NY Rule 212-2.2, Table 2 – High Toxicity Air Contaminant List.
- Maximum effluent concentrations based on sampling performed in 2022. Compounds not detected above the laboratory reporting limit are excluded from the air quality impact analysis summary.
- Emission rate calculated based on maximum effluent concentration and maximum air flow rates measured during the sampling events. Emission rate standardized at 70 °F and 1 atm.

$$\text{Trichloroethylene (lb/yr)} = \text{Trichloroethylene } [\mu\text{g}/\text{m}^3] \times \text{Air Flow Rate } [\text{ft}^3/\text{min}] \times (1 \text{ m}^3/35.3147 \text{ ft}^3) \times (60 \text{ min}/\text{hr}) \times (0.000001 \text{ g}/1 \mu\text{g}) \times (0.0022 \text{ lb}/\text{g}) \times 8,760 \text{ hrs}/\text{yr}$$
- 100 lb/yr for non-HTACs, and mass emission limits based on Rule 212-2.2, Table 2 for HTACs.
- For HTACs, no further demonstration is required if the actual emissions are less than mass emission limit. For non-HTACs, no further demonstration is required if the actual emissions are less than 100 lbs/yr.
- $$\text{g/s} = \text{Concentration } [\mu\text{g}/\text{m}^3] \times \text{Air Flow Rate } [\text{ft}^3/\text{min}] \times (1 \text{ m}^3/35.3147 \text{ ft}^3) \times (60 \text{ min}/\text{hr}) \times (0.000001 \text{ g}/1 \mu\text{g}) \times (0.0022 \text{ lb}/\text{g}) \times \text{hr}/3,600 \text{ sec} \times 453.59 \text{ g}/\text{lb}$$
- Ambient impact based on AERMOD modeling using normalized rate of 1 g/s is scaled to the actual emission rate of the pollutant. Modeling was performed using the representative meteorological data from the nearest station (Farmingdale, NY) for the years 2011 through 2015. The maximum impact from all the years was used for the calculations.

$$\text{Scaled hourly impact } (\mu\text{g}/\text{m}^3) = \text{AERMOD predicted hourly ambient impact at 1 g/s } ((\mu\text{g}/\text{m}^3)/[\text{g/s}]) \times \text{Actual emission rate (g/s)}$$

$$\text{Scaled annual impact } (\mu\text{g}/\text{m}^3) = \text{AERMOD predicted annual ambient impact at 1 g/s } ((\mu\text{g}/\text{m}^3)/[\text{g/s}]) \times \text{Actual emission rate (g/s)}$$
- Example for total scaled hourly for Trichloroethylene:

$$\text{Trichloroethylene scaled hourly impact } (\mu\text{g}/\text{m}^3) = (\text{T96 hourly ambient impact at 1 g/s } ((\mu\text{g}/\text{m}^3)/[\text{g/s}]) \times \text{Actual emission rate (g/s)})$$

$$\text{Trichloroethylene scaled hourly impact } (\mu\text{g}/\text{m}^3) = 148.1 (\mu\text{g}/\text{m}^3)/(\text{g/s}) \times 1.2\text{E-}02 (\text{g/s})$$
- Short-term and annual guideline concentrations specified in the NYSDEC DAR-1 AGC/SGC tables revised February 12, 2021.
- The system was reconfigured to bypass the regenerative vapor-phase GAC components and treat air stripper effluent directly through the exterior GAC beds on 3/15/22.
- Given that other contaminants in the sample set generally show an expected decline from influent, to midfluent, to effluent concentrations, it is unclear why the effluent TCE concentration is markedly higher than influent and midfluent TCE concentrations. Following the collection of the Q1 2022 sample, the system was reconfigured to bypass the regenerative vapor-phase GAC components and treat air stripper effluent directly through the exterior GAC beds. A follow-up vapor-phase sample was collected in April 2022, as part of enhanced monthly monitoring activities following system reconfiguration in March 2022, and following change-out of the exterior GAC in April 2022. As will be reported in the Q2 Report, this sample exhibited contaminant concentrations more in-line with expectations and an effluent TCE concentration of only 7.4 ug/m3. Vapor-phase contaminant concentrations, specifically effluent concentrations, will be closely monitored during upcoming sample rounds.

SGC Short-Term Guideline Concentrations
 AGC Annual Guideline Concentrations

Table 4B
Rule 212 Applicability and Evaluation
Tower 102 Treatment System
First Quarter 2022⁽¹⁾ Reporting Period
Operable Unit 2
Northrop Grumman
Bethpage, New York

Project VOCs	CAS#	HTAC ²	Tower 102 Treatment System Maximum Effluent Conc. (ug/m3) ³	Tower 102 Emissions (lb/yr) ⁵	Rule 212 Limit (lb/yr) ⁶	Rule 212 Applicability ⁷	Further evaluation Required? ⁷	Tower 102 Emissions (g/s) ⁸	Total Scaled Impact - Short-Term (Hourly) (ug/m3) ⁹	Total Scaled Impact - Annual (ug/m3) ⁹	SGC (ug/m3) ¹⁰	AGC (ug/m3) ¹⁰
1,1-Dichloroethane	75-34-3	No	22	5.979	100	Less than limit, Rule 212 compliant	N	--	--	--	--	0.63
1,1-Dichloroethene	75-35-4	No	40.8	11.088	100	Less than limit, Rule 212 compliant	N	--	--	--	--	200
Carbon Disulfide	75-15-0	No	0.24	0.065	100	Less than limit, Rule 212 compliant	N	--	--	--	6200	700
Chloroform	67-66-3	Yes	3.1	0.842	100	Less than limit, Rule 212 compliant	N	--	--	--	150	14.7
Chloromethane	74-87-3	No	1.5	0.408	100	Less than limit, Rule 212 compliant	N	--	--	--	22000	90
cis-1,2 Dichloroethene	156-59-2	No	29	7.881	100	Less than limit, Rule 212 compliant	N	--	--	--	--	63
Methylene Chloride	75-09-2	No	1.5	0.408	100	Less than limit, Rule 212 compliant	N	--	--	--	14,000	46
Tetrachloroethene	127-18-4	Yes	1.3	0.353	1,000	Less than limit, Rule 212 compliant	N	--	--	--	300	3.8
Toluene	108-88-3	No	1.8	0.489	100	Less than limit, Rule 212 compliant	N	--	--	--	37,000	5000
trans-1,2-Dichloroethene	156-60-5	No	0.44	0.120	100	Less than limit, Rule 212 compliant	N	--	--	--	--	63
Trichloroethylene	79-01-6	Yes	11	2.989	500	Less than limit, Rule 212 compliant	N	--	--	--	20	0.2
Trichlorotrifluoroethane (Freon 113)	76-13-1	No	26	7.066	100	Less than limit, Rule 212 compliant	N	--	--	--	960,000	180,000
Vinyl Chloride	75-01-4	Yes	0.26	0.071	100	Less than limit, Rule 212 compliant	N	--	--	--	180,000	0.11
Xylenes (Total) ⁽⁴⁾	1330-20-7	No	0.61	0.166	100	Less than limit, Rule 212 compliant	N	--	--	--	22,000	100

Flowrates and Normalized Modeling Impacts			
Description	Flow (cfm)	AERMOD Normalized Ambient Impact at 1 g/s	
		Hourly ((ug/m ³)/[g/s])	Annual ((ug/m ³)/[g/s])
Tower 102	8,300	348.9	2.3

Notes:

- Quarterly reporting period: January 1, 2022 through March 31, 2022.
- High toxicity air contaminant (HTAC) based on 6 CRR-NY Rule 212-2.2, Table 2 – High Toxicity Air Contaminant List.
- Maximum effluent concentrations based on sampling performed in 2022. Compounds not detected above the laboratory reporting limit are excluded from the air quality impact analysis summary.
- Total for xylenes m, o, and p.
- Emission rate calculated based on maximum effluent concentration and maximum air flow rates measured during the sampling events. Emission rate standardized at 70 °F and 1 atm.

$$\text{Trichloroethylene (lb/yr)} = \text{Trichloroethylene } [\mu\text{g}/\text{m}^3] \times \text{Air Flow Rate } [\text{ft}^3/\text{min}] \times (1 \text{ m}^3/35.3147 \text{ ft}^3) \times (60 \text{ min}/\text{hr}) \times (0.000001 \text{ g}/1 \mu\text{g}) \times (0.0022 \text{ lb}/\text{g}) \times 8,760 \text{ hrs}/\text{yr}$$
- 100 lb/yr for non-HTACs, and mass emission limits based on Rule 212-2.2, Table 2 for HTACs.
- For HTACs, no further demonstration is required if the actual emissions are less than mass emission limit. For non-HTACs, no further demonstration is required if the actual emissions are less than 100 lbs/yr.
- $\text{g/s} = \text{Concentration } [\mu\text{g}/\text{m}^3] \times \text{Air Flow Rate } [\text{ft}^3/\text{min}] \times (1 \text{ m}^3/35.3147 \text{ ft}^3) \times (60 \text{ min}/\text{hr}) \times (0.000001 \text{ g}/1 \mu\text{g}) \times (0.0022 \text{ lb}/\text{g}) \times \text{hr}/3,600 \text{ sec} \times 453.59 \text{ g}/\text{lb}$
- Ambient impact based on AERMOD modeling using normalized rate of 1 g/s is scaled to the actual emission rate of the pollutant. Modeling was performed using the representative meteorological data from the nearest station (Farmingdale, NY) for the years 2011 through 2015. The maximum impact from all the years was used for the calculations.

$$\text{Scaled hourly impact } (\mu\text{g}/\text{m}^3) = \text{AERMOD predicted hourly ambient impact at 1 g/s } ([\mu\text{g}/\text{m}^3]/[\text{g/s}]) \times \text{Actual emission rate (g/s)}$$

$$\text{Scaled annual impact } (\mu\text{g}/\text{m}^3) = \text{AERMOD predicted annual ambient impact at 1 g/s } ([\mu\text{g}/\text{m}^3]/[\text{g/s}]) \times \text{Actual emission rate (g/s)}$$
- Example for total scaled hourly for Trichloroethylene:

$$\text{Trichloroethylene scaled hourly impact } (\mu\text{g}/\text{m}^3) = (\text{T102 hourly ambient impact at 1 g/s } ([\mu\text{g}/\text{m}^3]/[\text{g/s}]) \times \text{Actual emission rate (g/s)})$$

$$\text{Trichloroethylene scaled hourly impact } (\mu\text{g}/\text{m}^3) = (348.9 (\mu\text{g}/\text{m}^3)/(\text{g/s}) \times 1.0\text{E}-03 (\text{g/s}))$$
- Short-term and annual guideline concentrations specified in the NYSDEC DAR-1 AGC/SGC tables revised February 12, 2021.

SGC Short-Term Guideline Concentrations
 AGC Annual Guideline Concentrations

Table 5A
Summary of TCE Mass Removal
Tower 96 Treatment System
First Quarter 2022 Reporting Period
Operable Unit 2
Northrop Grumman
Bethpage, New York

Date	TCE Concentration ($\mu\text{g}/\text{m}^3$) ⁽¹⁾			TCE Mass Emission ⁽²⁾	Percent of Allowable TCE Emissions ⁽³⁾
	T96 INFLUENT ⁽⁴⁾	T96 MIDTRAIN	T96 EFFLUENT ⁽⁵⁾	(lbs)	12 Month Rolling Average
5/13/2021 ⁽⁶⁾	11,600	1,430	514	12.6	55.2%
8/31/2021	18,100	14,800	5,250	256.0	88.1%
11/11/2021	10,000	8,650	81	2.6	57.2%
2/16/2022 ^(7,8)	5,430	2,580	10,900	466.9	147.7%

Notes and Abbreviations:

⁽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.

⁽²⁾ TCE Mass Emission calculated based on the exhaust air flow rate on the day of sampling and the period of time since the preceding day of sampling. $\text{TCE (lb)} = \text{TCE Concentration } [\mu\text{g}/\text{m}^3] \times \text{Days} \times \text{Flow Rate } [\text{ft}^3/\text{min}] \times (1 \text{ m}^3/35 \text{ ft}^3) \times (60 \text{ min}/\text{hr}) \times (24 \text{ hr}/\text{day}) \times (0.000001 \text{ g}/1 \text{ ug}) \times (0.0022 \text{ lb}/\text{g})$

⁽³⁾ Percent of allowable TCE emissions to date is a time-weighted annual rolling average based on the 500 lb/year mass emission limit specified in the CRR-NY 212-2.2 Table 2. High Toxicity Air Contaminant List, revised February 15, 2021.

⁽⁴⁾ Given that Q3 2021 TCE aqueous-phase influent concentrations are comparable to typical concentration ranges observed over the last two years, it is unclear what caused this elevated vapor-phase concentration. Northrop Grumman inspected the GAC units and determined that they were functional.

⁽⁵⁾ Based on vapor-phase effluent contaminant concentrations, GAC within the supplemental GAC beds was replaced on March 3, 2021 and again on October 13, 2021. On both occasions, Northrop Grumman inspected the RVPGAC components and identified no malfunctions/issues. Vapor-phase effluent contaminant concentrations will be monitored during upcoming sample rounds.

⁽⁶⁾ Revised from Q2 and Q3 2021 reported values.

⁽⁷⁾ The system was reconfigured to bypass the regenerative vapor-phase GAC components and treat air stripper effluent directly through the exterior GAC beds on 3/15/22.

⁽⁸⁾ Given that other contaminants in the sample set generally show an expected decline from influent, to midfluent, to effluent concentrations, it is unclear why the effluent TCE concentration is markedly higher than influent and midfluent TCE concentrations.

Following the collection of the Q1 2022 sample, the system was reconfigured to bypass the regenerative vapor-phase GAC components and treat air stripper effluent directly through the exterior GAC beds.

A follow-up vapor-phase sample was collected in April 2022, as part of enhanced monthly monitoring activities following system reconfiguration in March 2022, and following change-out of the exterior GAC in April 2022. As will be reported in the Q2 Report, this sample exhibited contaminant concentrations more in-line with expectations and an effluent TCE concentration of only 7.4 $\mu\text{g}/\text{m}^3$. Vapor-phase contaminant concentrations, specifically effluent concentrations, will be closely monitored during upcoming sample rounds.

$\mu\text{g}/\text{m}^3$	micrograms per cubic meter
lbs	pounds
CRR-NY	Codes, Rules and Regulations of the State of New York
ELAP	Environmental Laboratory Approval Program
NYSDOH	New York State Department of Health
TCE	Trichloroethylene
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compound
VPGAC	vapor phase granular activated carbon

Table 5B
Summary of TCE Mass Removal
Tower 102 Treatment System
First Quarter 2022 Reporting Period
Operable Unit 2
Northrop Grumman
Bethpage, New York

Date	TCE Concentration ($\mu\text{g}/\text{m}^3$) ⁽¹⁾		TCE Mass Emission ⁽²⁾		Percentage of Allowable TCE Emissions ⁽³⁾	
	T102 INFLUENT	T102 EFFLUENT	lbs	lbs/day	Period	12 Month Rolling Average
5/13/2021 ⁽⁴⁾	2,670	20	1.1	0.01	1.0%	31.4%
8/18/2021	2,720	288	19.4	0.20	14.6%	33.9%
11/11/2021	2,610	15	0.9	0.01	0.7%	12.1%
2/16/2022	3,510	11	0.8	0.01	0.6%	4.2%

Notes and Abbreviations:

⁽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.

⁽²⁾ TCE Mass Emission calculated based on the exhaust air flow rate on the day of sampling and the period of time since the preceding sampling day. TCE (lb) = TCE Concentration [$\mu\text{g}/\text{m}^3$] x Days x Flow Rate [ft^3/min] x (1 $\text{m}^3/35 \text{ ft}^3$) x (60 min/hr) x (24 hr/day) x (0.000001 g/1 ug) x (0.0022 lb/g)

⁽³⁾ Percent of allowable TCE emissions to date is a time-weighted annual rolling average based on the 500 lb/year mass emission limit specified in the CRR-NY 212-2.2 Table 2. High Toxicity Air Contaminant List, revised February 15, 2021.

⁽⁴⁾ Revised from Q2 2021 reported values.

- $\mu\text{g}/\text{m}^3$ Micrograms per cubic meter
- lbs Pounds
- CRR-NY Codes, Rules and Regulations of the State of New York
- ELAP Environmental Laboratory Approval Program
- NYSDOH New York State Department of Health
- TCE Trichloroethene
- USEPA United States Environmental Protection Agency
- VPGAC Vapor phase granulated activated carbon

Table 6
Concentrations of Volatile Organic Compounds
and 1,4-Dioxane in Monitoring Wells
First Quarter 2022⁽¹⁾ Reporting Period
Operable Unit 2
Northrop Grumman
Bethpage, New York



Constituents units (µg/L)	Location ID: Sample ID: Sample Date:	BPOW 2-1 ⁽²⁾ BPOW 2-1 3/9/2022	BPOW 2-2 ⁽²⁾ BPOW 2-2 3/9/2022	BPOW 2-3 ⁽²⁾ BPOW 2-3 3/9/2022	GM-21D2 ⁽³⁾ GM-21D2 3/10/2022
<u>Volatile Organic Compounds (VOCs)</u> ^(5,6)					
1,1,1-Trichloroethane		< 0.50	< 0.50	< 0.50	< 1.0
1,1,2,2-Tetrachloroethane		< 0.50	< 0.50	< 0.50	< 1.0
1,1,2-trichloro-1,2,2-trifluoroethane		< 1.0	< 1.0	< 1.0	< 5.0
1,1,2-Trichloroethane		< 0.50	< 0.50	< 0.50	< 1.0
1,1-Dichloroethane		< 0.50	< 0.50	< 0.50	< 1.0
1,1-Dichloroethene		< 0.50	< 0.50	< 0.50	< 1.0
1,2-Dichloroethane		< 0.50	< 0.50	< 0.50	< 1.0
1,2-Dichloropropane		< 0.50	< 0.50	< 0.50	< 1.0
2-Butanone (MEK)		< 5.0	< 5.0	< 5.0	< 10
4-Methyl-2-Pentanone		< 2.0	< 2.0	< 2.0	< 5.0
Acetone		< 5.0	< 5.0	< 5.0	< 10
Benzene		< 0.50	< 0.50	< 0.50	136
Bromodichloromethane		< 0.50	< 0.50	< 0.50	< 1.0
Bromoform		< 0.50	< 0.50	< 0.50	< 1.0
Bromomethane		< 0.50	< 0.50	< 0.50	< 2.0
Carbon Disulfide		< 0.50	< 0.50	< 0.50	< 2.0
Carbon Tetrachloride		< 0.50	< 0.50	< 0.50	< 1.0
Chlorobenzene		< 0.50	< 0.50	< 0.50	< 1.0
Chlorodibromomethane		< 0.50	< 0.50	< 0.50	< 1.0
Chloroethane		< 0.50	< 0.50	< 0.50	< 1.0
Chloroform		< 0.50	< 0.50	< 0.50	< 1.0
Chloromethane		< 0.50	< 0.50	< 0.50	< 1.0
cis-1,2-Dichloroethene		< 0.50	< 0.50	< 0.50	< 1.0
cis-1,3-Dichloropropene		< 0.50	< 0.50	< 0.50	< 1.0
Dichloromethane		< 0.50	< 0.50	< 0.50	< 2.0
Ethylbenzene		< 0.50	< 0.50	< 0.50	< 1.0
m&p-Xylenes		< 0.50	< 0.50	< 0.50	< 1.0
Methyl N-Butyl Ketone (2-Hexanone)		< 2.0	< 2.0	< 2.0	< 5.0
o-Xylene		< 0.50	< 0.50	< 0.50	< 1.0
Styrene (Monomer)		< 0.50	< 0.50	< 0.50	< 1.0
Tetrachloroethene		< 0.50	< 0.50	< 0.50	< 1.0
Toluene		< 0.50	< 0.50	< 0.50	3.8
trans-1,2-Dichloroethene		< 0.50	< 0.50	< 0.50	< 1.0
trans-1,3-Dichloropropene		< 0.50	< 0.50	< 0.50	< 1.0 J
Trichloroethene		< 0.50	< 0.50	< 0.50	4.7
Vinyl chloride		< 0.50	< 0.50	< 0.50	< 1.0
Total VOCs ⁽⁶⁾		ND	ND	ND	145
1,4-Dioxane ^(4,5)		0.864	0.741	3.29	4.4

See last page for Notes and Abbreviations.

Table 6
Concentrations of Volatile Organic Compounds
and 1,4-Dioxane in Monitoring Wells
First Quarter 2022⁽¹⁾ Reporting Period
Operable Unit 2
Northrop Grumman
Bethpage, New York

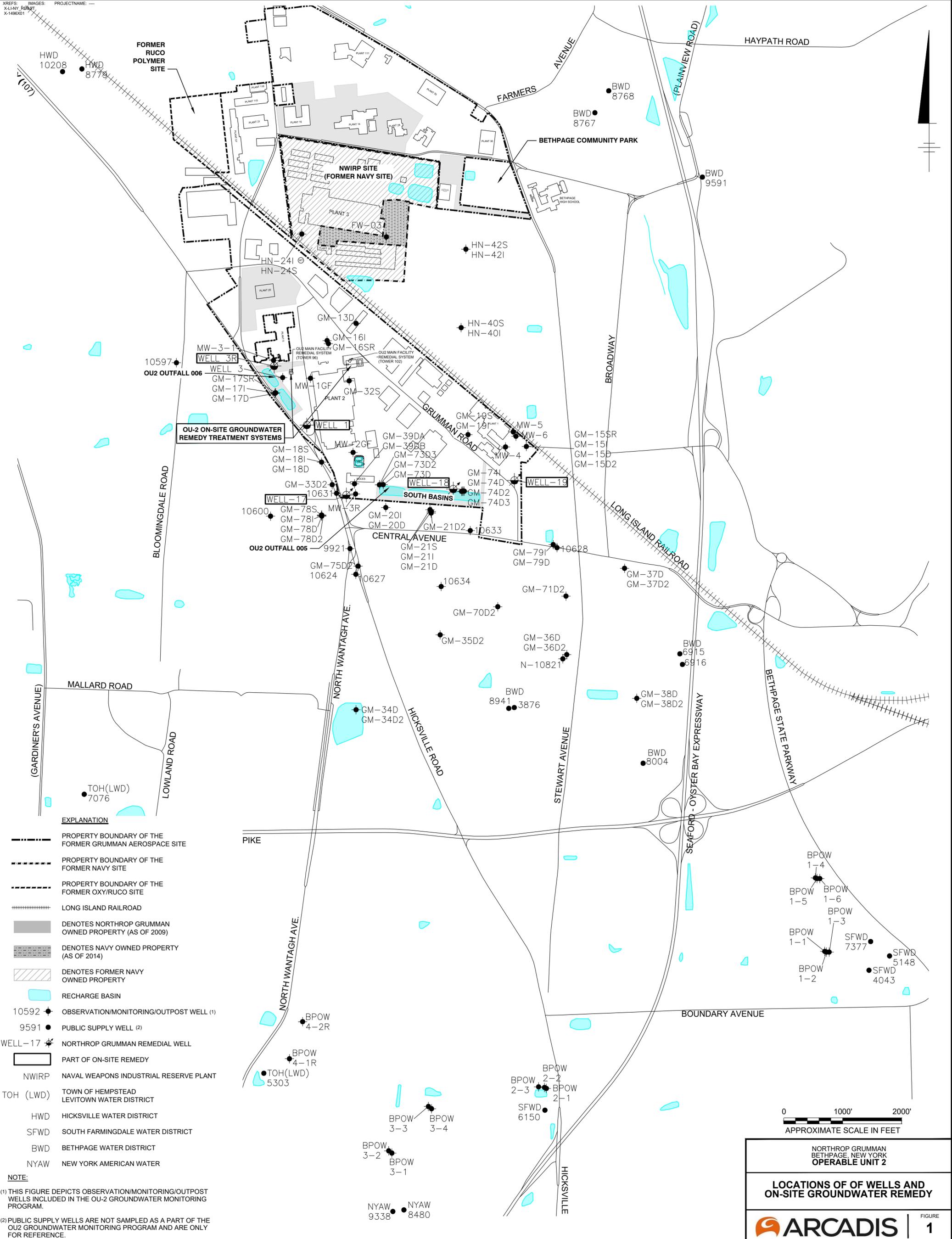


Notes and Abbreviations:

- (1) Quarterly reporting period: January 1, 2022 through March 31, 2022.
- (2) These outpost wells have been repurposed for use as plume monitoring wells per the June 2015 Groundwater Monitoring Plan Addendum (ARCADIS of New York, Inc., 2015), as conditionally approved by the NYSDEC (August 25, 2015). Therefore, TVOC trigger levels that may have been previously established are no longer shown.
- (3) The elevated concentration of Benzene was isolated to the Q1 2022 sampling event and did not persist as confirmed by the analytical data from Q2 2022, when Benzene was detected at a low concentration of 2.8 ppb. Benzene also was not detected in GM-21D2 in 2021. The primary OU2 site-related constituent, TCE, did not exhibit such short-term variability for GM-21D2.
- (4) BPOW samples were analyzed for VOCs using USEPA Method 524.2, and 1,4-dioxane using USEPA Method 522. The GM-21D2 sample was analyzed for VOCs by USEPA Method 8260C and 1,4-dioxane using USEPA Method 8270D SIM.
- (5) Results for the program are validated at 20% frequency, per protocols specified in the OU2 Groundwater Monitoring Plan (Arcadis 2016).
- (6) TVOC concentrations are rounded to the number of decimal places of the individual VOC with the least numerical precision (decimal place), including whole numbers with no decimal place.

136	Bold value indicates a detection
VOC	Volatile Organic Compound
ND	Not detected
µg/L	micrograms per liter
J	Compound detected below its reporting limit; value is estimated
<0.5	Compound not detected above its laboratory quantification limit

Figures



EXPLANATION

- PROPERTY BOUNDARY OF THE FORMER GRUMMAN AEROSPACE SITE
- PROPERTY BOUNDARY OF THE FORMER NAVY SITE
- PROPERTY BOUNDARY OF THE FORMER OXY/RUCO SITE
- ==== LONG ISLAND RAILROAD
- DENOTES NORTHROP GRUMMAN OWNED PROPERTY (AS OF 2009)
- DENOTES NAVY OWNED PROPERTY (AS OF 2014)
- ▨ DENOTES FORMER NAVY OWNED PROPERTY
- RECHARGE BASIN
- 10592 ● OBSERVATION/MONITORING/OUTPOST WELL (1)
- 9591 ● PUBLIC SUPPLY WELL (2)
- WELL-17 ● NORTHROP GRUMMAN REMEDIAL WELL
- ▭ PART OF ON-SITE REMEDY
- NWIRP NAVAL WEAPONS INDUSTRIAL RESERVE PLANT
- TOH (LWD) TOWN OF HEMPSTEAD LEVITOWN WATER DISTRICT
- HWD HICKSVILLE WATER DISTRICT
- SFWD SOUTH FARMINGDALE WATER DISTRICT
- BWD BETHPAGE WATER DISTRICT
- NYAW NEW YORK AMERICAN WATER

NOTE:
 (1) THIS FIGURE DEPICTS OBSERVATION/MONITORING/OUTPOST WELLS INCLUDED IN THE OU-2 GROUNDWATER MONITORING PROGRAM.
 (2) PUBLIC SUPPLY WELLS ARE NOT SAMPLED AS A PART OF THE OU2 GROUNDWATER MONITORING PROGRAM AND ARE ONLY FOR REFERENCE.



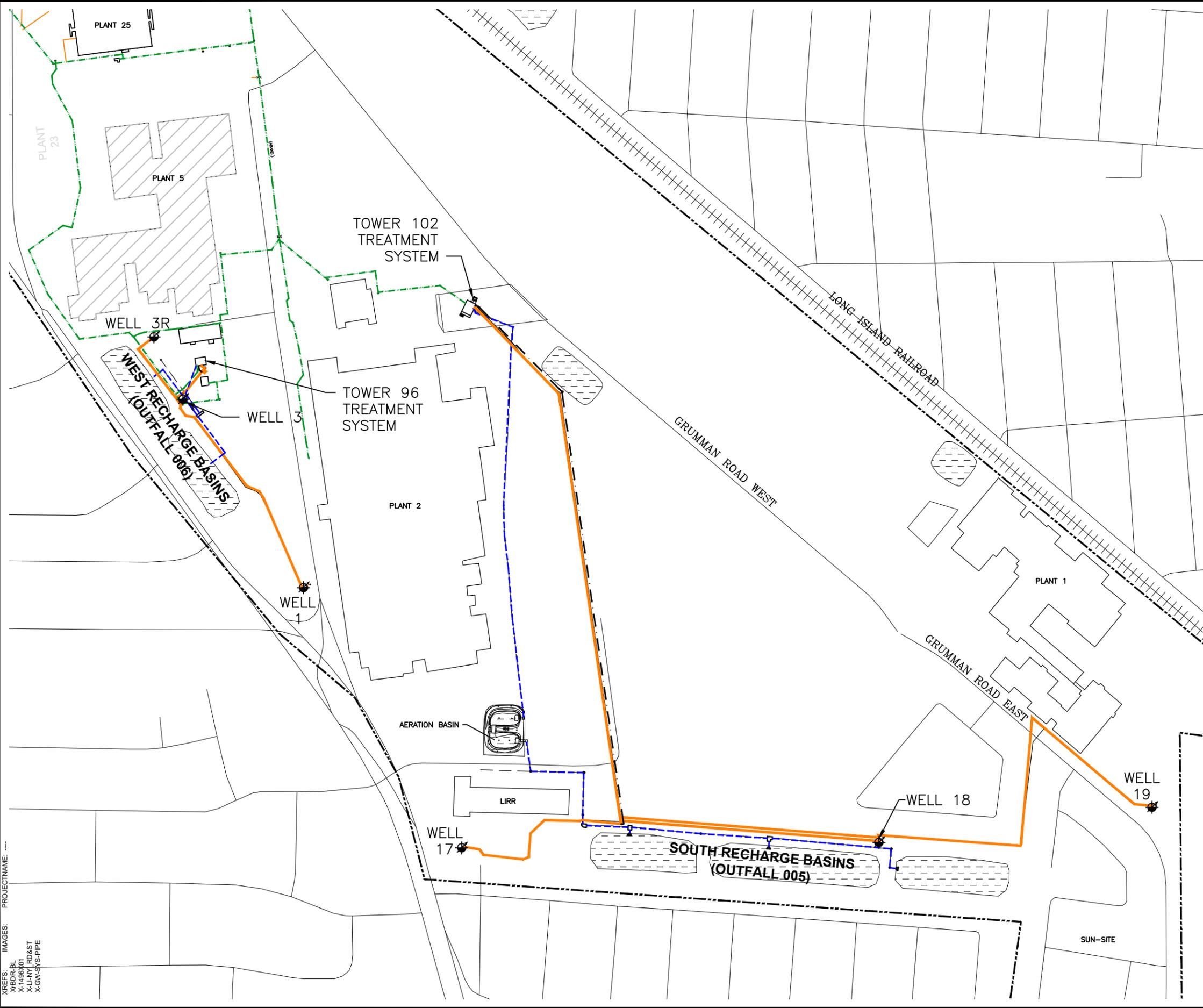
NORTHROP GRUMMAN
 BETHPAGE, NEW YORK
OPERABLE UNIT 2

**LOCATIONS OF OF WELLS AND
 ON-SITE GROUNDWATER REMEDY**

FIGURE
1

CITY:SYRACUSE,NY DIV:GROUPEFENY DBA:SANJHEZ LD:ALS PFC:(G) PM:(R) TM:(G) LVR:(G)ON:CFE:REF: C:\Users\schilling\OneDrive\Documents\Projects\2021\01\Progress\01-DWG\GEN-ONCT-GW-ETS-SITEPLAN.dwg LAYOUT: 2 SAVED: 11/12/2021 2:47 PM ACADVER: 24.1S (LMS TECH) PAGES: 24 PAGES SETUP: --- PLOT STYLE TABLE: --- PLOTTED: 11/12/2021 2:48 PM BY: SCHILLING, ADAM

PROJECT NAME: ---
 XREFS: IMAGES: ---
 XBD:R-BL
 X-1466(K)
 X-LIN:LRD&ST
 X-GW:ST-S-PIPE



LEGEND:

- FORMER NORTHROP GRUMMAN PROPERTY LINE
- INFLUENT LINE
- BYPASS
- STORM DRAIN (EFFLUENT)
- NON POTABLE WATER DISTRIBUTION LINE (EFFLUENT)
- +++++ RAILROAD TRACKS
- x-x-x- FENCE
- WELL 18 REMEDIAL WELL
- BASIN
- ONCT ON-SITE CONTAMINANT

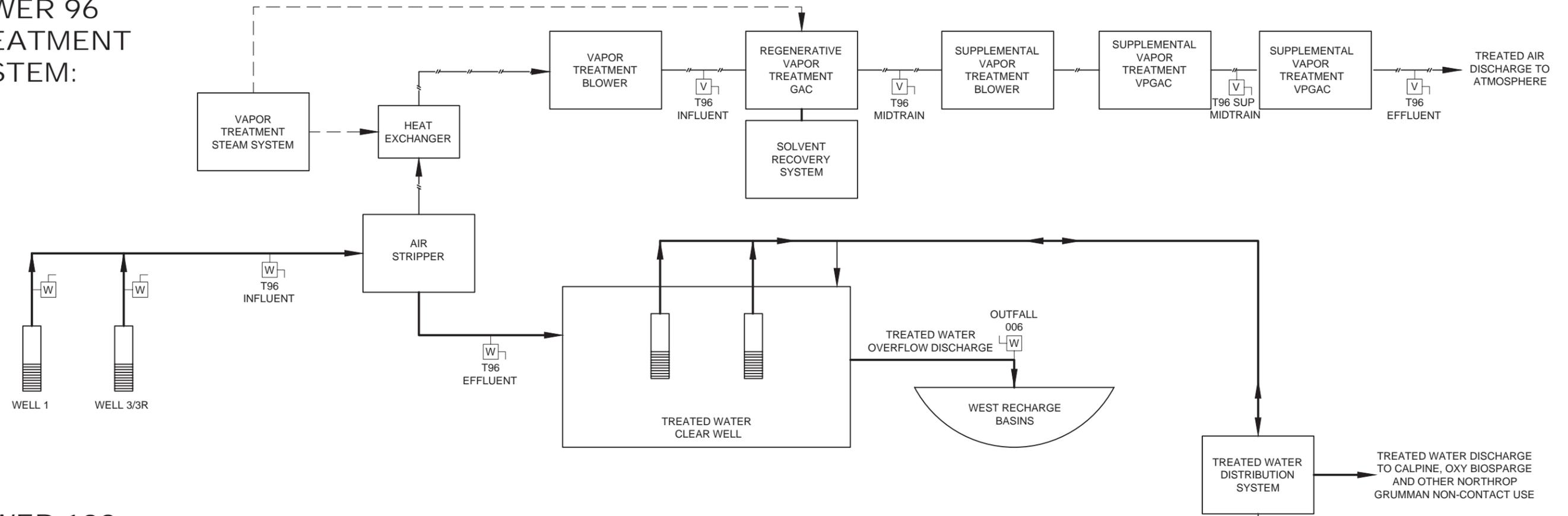
NOTES:

1. DRAWING IS NOT TO BE USED FOR DESIGN PURPOSES. LAYOUT OF PIPING IS FOR REPRESENTATION ONLY (LOCATIONS ARE APPROXIMATE).
2. THE PIPING REPRESENTED IN THIS DRAWING MAY BE CONSTRUCTED OF CAST IRON PIPE (CIP), DUCTILE IRON PIPE (DIP), ASBESTOS CEMENT PIPE (ACP) OR TRANSITE, OR A COMBINATION OF THESE PIPE TYPES.

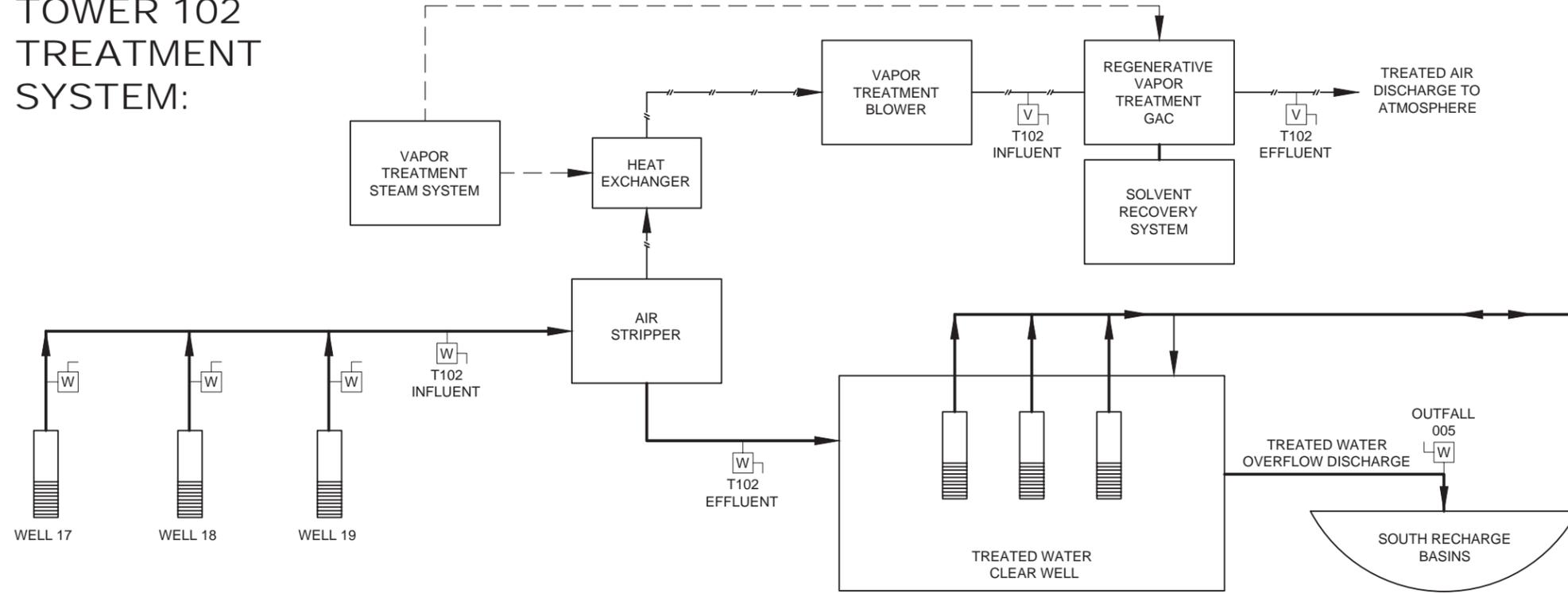
NORTHROP GRUMMAN BETHPAGE, NEW YORK OPERABLE UNIT 2	
ONCT GROUNDWATER EXTRACTION AND TREATMENT SYSTEM SITE PLAN	
	FIGURE 2

CITY:SYRACUSE-NY DIV:GROUP:ENV DB:A,SANCHEZ LD:ALS PIC:(Regd) TM:(Opt) LYR:(Opt)ON="OFF=REF" (PATRICIA RICHE PDF CHANGES SUP BED TEXT and extra VSP-10.26.17)
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 XREFS: IMAGES: PROJECTNAME:

TOWER 96 TREATMENT SYSTEM:



TOWER 102 TREATMENT SYSTEM:



NOTES
 SCHEMATIC REPRESENTS SYSTEM CONFIGURATION AT THE TIME OF SAMPLE COLLECTION EVENTS, PRIOR TO ITS RECONFIGURATION TO BYPASS THE REGENERATIVE VAPOR-PHASE GAC COMPONENTS

- LEGEND:**
- PROCESS WATER
 - - - PROCESS AIR
 - - - - STEAM
 - W SAMPLE LOCATION
 - W WATER SAMPLE
 - V VAPOR SAMPLE
 - ONCT ON-SITE CONTAMINANT

**NORTHROP GRUMMAN
 BETHPAGE, NEW YORK
 OPERABLE UNIT 2**

**ONCT GROUNDWATER
 EXTRACTION AND TREATMENT
 SYSTEM SCHEMATIC**

3

FIGURE 3