ARCADIS Design & Consultancy for natural and built assets

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ENVIRONMENT

Subject:

2018 First Quarter Operation Maintenance and Monitoring Report,
Operable Unit 2, Northrop Grumman Systems Corporation and Naval Weapons Industrial Reserve Plant (NWIRP) Sites, Bethpage, New York.
(NYSDEC Site #s 1-30-003A and B)

Date:
May 30, 2018

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David E. Stern

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Our ref:
NY001496.22TM.RPTI4
NY001496.22TM.NAVI4

Dear Jason:

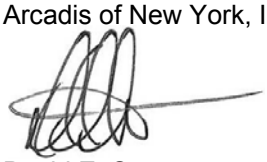
On behalf of Northrop Grumman Systems Corporation (Northrop Grumman), Arcadis is providing the NYSDEC with the 2018 First Quarter Operation Maintenance and Monitoring Report (Report). This Report was prepared to document the operation, maintenance, and monitoring (OM&M) activities conducted for the on-site 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).

Table 1 summarizes OU2 remedial system performance operational data, total mass removal, and water balance. Tables 2 and 3 provide the analytical results for remedial system water and vapor samples for this period, respectively. 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 provides a summary of percent mass emittance of TCE from first quarter 2017 through first quarter 2018. Table 6 provides the validated analytical results of groundwater monitoring for this period. Figures 1 through 3 show the Locations of Wells and Onsite Groundwater Remedy, ONCT Groundwater Extraction and Treatment System Site Plan, and the ONCT Groundwater Extraction and Treatment System Schematic, respectively.

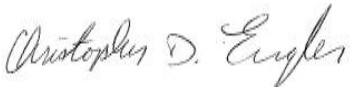
Please contact us if you have any questions or comments.

Sincerely,

Arcadis of New York, Inc.



David E. Stern
Senior Hydrogeologist



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John Reinhardt, Town of Hempstead Water District
Michael Boufis, Bethpage Water District
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TABLES

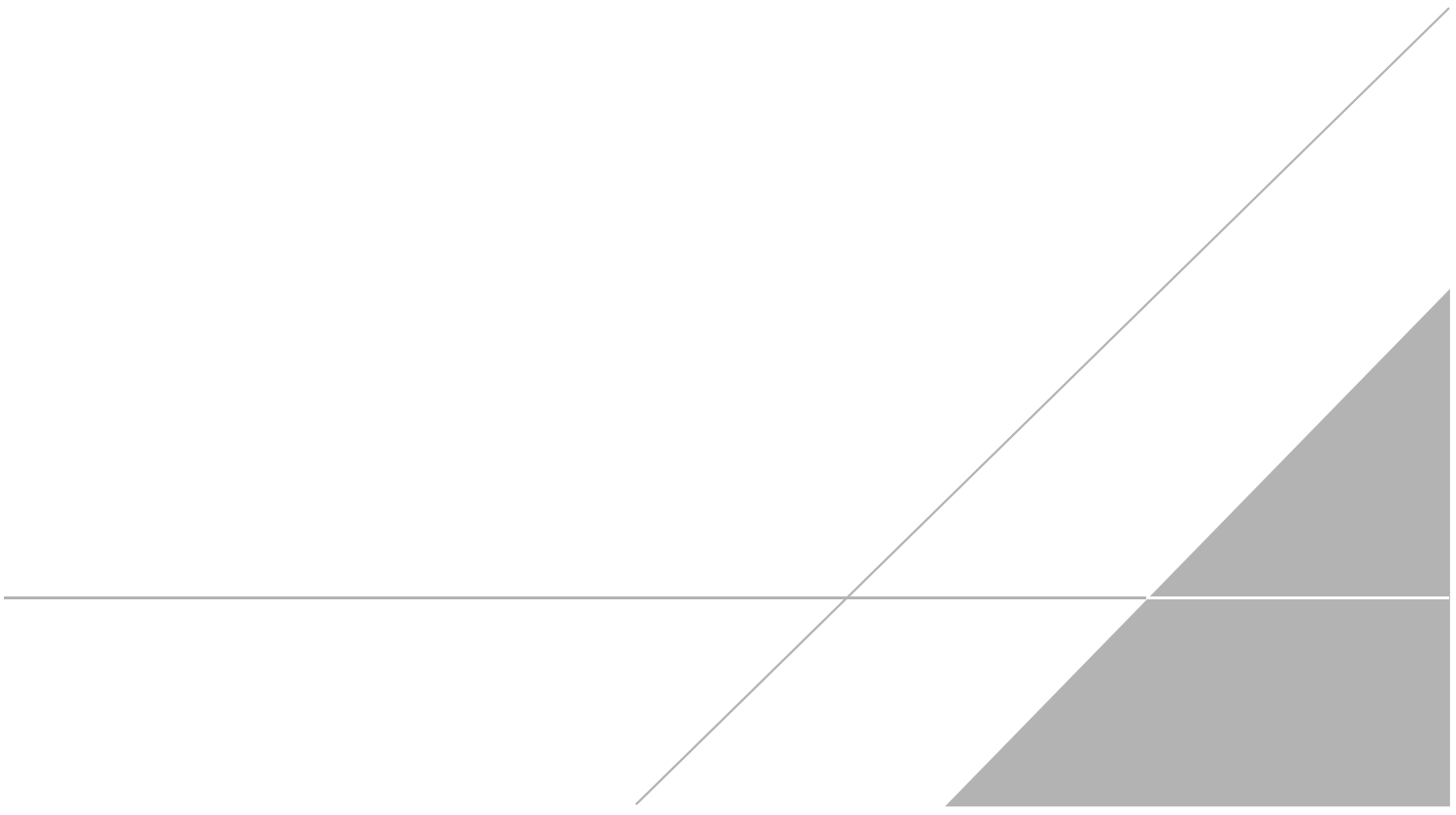

Table 1
Operational Summary for the On-Site Portion of the OU2 Groundwater Remedy, First Quarter 2018[1] Reporting Period
Operable Unit 2, Northrop Grumman Systems Corporation,
Bethpage, New York

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	Quarterly Flow Rates (gpm)		Quarterly Flow Volumes (MG)			Quarterly VOC Concentrations (µg/L)		VOC Mass Removed (lbs) [7]		
	Design [2]	Average [3,4]	Design [2]	Actual [3,4]	% of Design	TCE [5]	TVOC [5,6]	Quarterly	Annual	Cumulative
Influent Groundwater										
Well 1 [11]	800	806	103.7	101.0	97%	558	592	500	500	46,479
Well 3R [11]	700	704	90.7	91.0	100%	306	347	264	264	90,853
Well 17 [11,12]	1,000	968	129.6	125.0	96%	106	134	140	140	53,167
Well 18 [11,12]	600	821	77.8	106.0	136%	44	67	59	59	6,428
Well 19 [11,12]	700	449	90.7	58.0	64%	115	139	67	67	8,447
Total [13]	**3,800**	**3,748**	**493**	**481**	**98%**	**--**	**--**	**1,030**	**1,030**	**205,374**
Effluent Groundwater [8]										
Calpine	100 - 400	65	--	8.6	--	--	--	--	--	--
OXY Biosparge [10]	2 - 42	0	--	0	--	--	--	--	--	--
West Recharge Basins	1,112 - 1,455	2,539	--	329.0	--	--	0.5	--	--	--
South Recharge Basins [12]	2,231	1,103	289.1	143.0	49%	--	1.0	--	--	--
Total [14]	**--**	**3,707**	**--**	**481**	**--**					
Additional Flow to South Recharge Basins										
Storm Water Runoff Contributing to South Recharge Basins Flow Volume [14]	--	--	--	22.1	--	--	--	--	--	--
Total Flow Volume to South Recharge Basins [12,14,15]			**289**	**165**	**57%**					

Treatment Efficiencies [9]	
Tower 96 System:	>99.9%
Tower 102 System:	>99.9%

Notes and abbreviations on last page.

Table 1
Operational Summary for the On-Site Portion of the OU2 Groundwater Remedy, First Quarter 2018[(1)] Reporting Period
Operable Unit 2, Northrop Grumman Systems Corporation,
Bethpage, New York

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Notes and Abbreviations:

(1) Quarterly reporting period: January 03, 2018 through April 03, 2018
(2) "Design" flow rates were determined for the five remedial wells and for the South Recharge Basins based on computer modeling (ARCADIS G&M, Inc. 2003c, modified in April 2005). Flow rates for Calpine, OXY Biosparge and West Recharge Basins are typical flow rates and are provided for reader information. "Design" flow volumes represent the volume of water that should be pumped/discharged during the reporting period and is calculated by multiplying the design rate by the reporting period duration.
(3) "Average" 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. During this quarterly reporting period, the remedial wells operated for the following percentage of the time: Well 1 (96.6%), Well 3R (99.7%), Well 17 (99.7%), Well 18 (99.6%), and Well 19 (99.7%). "Actual" volumes are determined via totalized values computed by SCADA using the instantaneous flow rates transmitted from local flow meters.
(4) "Average" flow rates for the system discharges represent the average flow rate during the entire reporting period and are determined by dividing the total flow during the reporting period by the reporting period duration. The Calpine and South Recharge Basins flow volumes are determined via totalized values computed by SCADA using the instantaneous flow rates transmitted from local flow meters. The West Recharge Basin flow is calculated by subtracting the cumulative flow to the other discharges from the total influent flow. Actual flow to the recharge basins is greater, as shown, because storm water combines with the plant effluent prior to discharge to the recharge basins.
(5) The TCE and TVOC concentrations for the remedial wells are from the quarterly sampling event performed during this reporting period on February 28, 2018.
(6) The TVOC concentration for the two sets of recharge basins are their respective average monthly SPDES concentration for the current quarter.
(7) TVOC mass removed for the reporting period is calculated by multiplying the TVOC concentration from the quarterly sampling event and the quantity of water pumped during the reporting period.
(8) There are four discharges for the effluent groundwater: South Recharge Basins, West Recharge Basins, Calpine and OXY Biosparge system. Treated water is continuously discharged to the south and west recharge basins, and is available "on-demand" to both the Calpine Power Plant (Calpine) for use as make-up water, and the biosparge remediation system operated by Occidental Chemical (OXY Biosparge).
(9) 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.
(10) Occidental Chemical has not reported any water usage for the OXY Biosparge system since May 2016.
(11) The downtime during First Quarter 2018 was minor and due to typical operation and maintenance. See Note 12 for detail on reduced percent design flow values.
(12) As reported in an email to the NYSDEC dated September 29, 2017, during the first quarter the pumping rates continued to be adjusted at Wells 17 through 19 to accommodate for a basin infiltration study at the western most of the South Basins. Rainfall events would dictate the increase or decreases in pumping needed to maintain draining of the western most of the South Basins. Average pumping rates and modified South basin recharge rates are shown above.
(13) Total pumpage/recharge rates are accurate to ±15% due to limitations in metering.
(14) Storm Water Runoff Volume is calculated by multiplying the adjusted tributary area and NOAA precipitation data for the reporting periods. The adjusted tributary area is tributary area that 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.
(15) Total Flow Volume to South Recharge Basins is estimated as a sum of flow volumes contributed from the Effluent Groundwater to South Recharge Basins and from Storm Water Runoff to South Recharge Basins.

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

Table 2
Concentrations of Constituents in Remedial Wells and Treatment System Effluents, First Quarter 2018, Operable Unit 2, Northrop Grumman Systems Corporation, Bethpage, New York

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Constituents[1] (units in µg/L)	Location ID: Sample ID: Sample Date:	WELL 1 WELL 1 2/28/2018	WELL 3R WELL 3R 2/28/2018	96 EFFLUENT 96 EFFLUENT 2/28/2018	WELL 17 WELL 17 2/28/2018
Volatile Organic Compounds (VOCs)[2]					
1,1,1-Trichloroethane		< 0.50	**0.60**	< 0.50	< 0.50
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
1,1-Dichloroethane		**0.69 J**	**1.3**	< 1.0	**0.83 J**
1,1-Dichloroethene		**1.6**	**3.7**	< 0.50	**1.5**
1,2-Dichloroethane		< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane		**4.0**	< 1.0	< 1.0	< 1.0
2-Butanone (MEK)		< 10	< 10	< 10	< 10
2-Hexanone (MBK)		< 5.0	< 5.0	< 5.0	< 5.0
4-methyl-2-pentanone (MIK)		< 5.0	< 5.0	< 5.0	< 5.0
Acetone		< 10	< 10	< 10	< 10
Benzene		< 0.50	< 0.50	< 0.50	< 0.50
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
Chloroethane		< 1.0	< 1.0	< 1.0	< 1.0
Chloroform		**0.34 J**	< 0.50	< 0.50	< 0.50
Chloromethane		< 1.0	< 1.0	< 1.0	< 1.0
cis-1,2-Dichloroethene		**5.0**	**3.9**	< 0.50	**2.7**
cis-1,3-Dichloropropene		< 1.0	< 1.0	< 1.0	< 1.0
Dibromochloromethane		< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene		< 1.0	< 1.0	< 1.0	< 1.0
Methylene Chloride		< 0.50	< 0.50	< 0.50	< 0.50
Styrene		< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene		**18.4**	**25.6**	< 0.50	**19.8**
Toluene		< 1.0	< 1.0	< 1.0	< 1.0
trans-1,2-Dichloroethene		< 0.50	< 0.50	< 0.50	< 0.50
trans-1,3-Dichloropropene		< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethylene		**558**	**306**	< 0.50	**106**
Trichlorotrifluoroethane (Freon 113)		**3.5**	**3.3**	< 0.50	**3.4**
Vinyl Chloride		< 0.50	**2.2**	< 0.50	< 0.50
Xylene-o		< 1.0	< 1.0	< 1.0	< 1.0
Xylene-m,p		< 1.0	< 1.0	< 1.0	< 1.0
Total VOCs[3]		**590**	**350**	**0**	**130**
1,4-Dioxane[2]		**10.2**	**15.0**	**12.5**	**8.85**

Notes and abbreviations on last page.

Table 2
Concentrations of Constituents in Remedial Wells and Treatment System Effluents, First Quarter 2018, Operable Unit 2, Northrop Grumman Systems Corporation, Bethpage, New York

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Constituents[1] (units in µg/L)	Location ID: Sample ID: Sample Date:	WELL 17 REP-022818-JJC-1 2/28/2018	WELL 18 WELL 18 2/28/2018	WELL 19 WELL 19 2/28/2018	102 EFFLUENT 102 EFFLUENT 2/28/2018
Volatile Organic Compounds (VOCs)[2]					
1,1,1-Trichloroethane		< 0.50	**0.45 J**	< 0.50	< 0.50
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
1,1-Dichloroethane		**0.83 J**	**1.3**	**0.59 J**	< 1.0
1,1-Dichloroethene		**1.5**	**3.5**	**1.5**	< 0.50
1,2-Dichloroethane		< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane		< 1.0	< 1.0	< 1.0	< 1.0
2-Butanone (MEK)		< 10	< 10	< 10	< 10
2-Hexanone (MBK)		< 5.0	< 5.0	< 5.0	< 5.0
4-methyl-2-pentanone (MIK)		< 5.0	< 5.0	< 5.0	< 5.0
Acetone		< 10	< 10	< 10	< 10
Benzene		< 0.50	< 0.50	< 0.50	< 0.50
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
Chloroethane		< 1.0	< 1.0	< 1.0	< 1.0
Chloroform		< 0.50	< 0.50	**0.41 J**	< 0.50
Chloromethane		< 1.0	< 1.0	< 1.0	< 1.0
cis-1,2-Dichloroethene		**2.5**	**2.7**	**15.0**	< 0.50
cis-1,3-Dichloropropene		< 1.0	< 1.0	< 1.0	< 1.0
Dibromochloromethane		< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene		< 1.0	< 1.0	< 1.0	< 1.0
Methylene Chloride		< 0.50	< 0.50	< 0.50	< 0.50
Styrene		< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene		**20.3**	**13.5**	**6.3**	< 0.50
Toluene		< 1.0	< 1.0	< 1.0	< 1.0
trans-1,2-Dichloroethene		< 0.50	< 0.50	< 0.50	< 0.50
trans-1,3-Dichloropropene		< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethylene		**107**	**44.1**	**115**	< 0.50
Trichlorotrifluoroethane (Freon 113)		**3.5**	**1.6**	< 0.50	< 0.50
Vinyl Chloride		< 0.50	< 0.50	< 0.50	< 0.50
Xylene-o		< 1.0	< 1.0	< 1.0	< 1.0
Xylene-m,p		< 1.0	< 1.0	< 1.0	< 1.0
Total VOCs[3]		**140**	**67**	**140**	**0**
1,4-Dioxane[2]		**9.12**	**6.89**	**6.05**	**8.39 J**

Notes and abbreviations on last page.

Table 2
Concentrations of Constituents in Remedial Wells and Treatment System Effluents, First Quarter 2018, Operable Unit 2, Northrop Grumman Systems Corporation, Bethpage, New York

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Notes and Abbreviations:

(1) Results for the program are validated at 20% frequency, per protocols specified in OU2 Groundwater Monitoring Plan (Arcadis 2016c).

(2) VOC samples analyzed using USEPA Method 8260C. 1,4-dioxane samples analyzed using using USEPA Method 522.

(3) Total VOC results rounded to two significant figures.

	Compound detected in exceedance of NYSDEC SCG Criteria.
558	Bold value indicates a detection.
< 5.0	Compound is not detected above its laboratory quantification limit.
J	Constituent value is estimated.
µg/L	micrograms per liter
NS	None Specified
NYSDEC	New York State Department of Conservation
OU2	Operable Unit 2
REP	blind replicate sample
SCG	Standards, Criteria and Guidance value
TOGs	Technical and Operational Guidance Series
USEPA	United States Environmental Protection Agency
VOC	volatile organic compound

Table 3
Vapor Sample Analytical Results for Treatment Systems, First Quarter 2018,
Northrop Grumman Systems Corporation,
Operable Unit 2, Bethpage, New York

Location ID: / Sample ID: / Constituents (Units in µg/m^3)	96 MID-EFFLUENT T96 MIDTRAIN (AA) 1/31/2018	96 SUP MIDTRAIN T96 SUP MIDTRAIN (AA) 1/31/2018	96 EFFLUENT T96 EFFLUENT (AA) 1/31/2018
Volatile Organic Compounds (VOCs)[1]			
1,1,1-Trichloroethane	< 11	**4.8**	< 1.1
1,1,2,2-Tetrachloroethane	< 14	< 2.7	< 1.4
1,1,2-Trichloroethane	< 11	< 2.2	< 1.1
1,1-Dichloroethane	**27**	**28**	**13**
1,1-Dichloroethene	**94.0**	**114**	**91.2**
1,2-Dichloroethane	< 16	< 3.2	< 1.6
1,2-Dichloropropane	**14 J**	**5.5**	< 1.8
Benzene	< 13	**2.2 J**	< 1.3
Bromodichloromethane	< 13	< 2.7	< 1.3
Bromoform	< 8.3	< 1.7	< 0.83
Bromomethane	< 16	< 3.1	< 1.6
Carbon Disulfide	< 12	< 2.5	< 1.2
Carbon Tetrachloride	< 5.0	< 1.0	< 0.50
Chlorobenzene	< 18	< 3.7	< 1.8
Chloroethane	< 11	**3.4**	**3.2**
Chloroform	< 20	**6.8**	**2.0**
Chloromethane	< 8.3	**1.2 J**	**1.7**
cis-1,2-Dichloroethene	**117**	**113**	**36**
cis-1,3-Dichloropropene	< 18	< 3.6	< 1.8
Dibromochloromethane	< 17	< 3.4	< 1.7
Ethylbenzene	< 17	< 3.5	< 1.7
Methylene Chloride	< 14	**1.1 J**	< 1.4
Styrene	< 17	< 3.4	< 1.7
Tetrachloroethene	**47**	< 1.1	**0.75**
Toluene	< 15	**208**	**160**
trans-1,2-Dichloroethene	< 16	< 3.2	< 1.6
trans-1,3-Dichloropropene	< 18	< 3.6	< 1.8
Trichloroethylene	**3510**	**2710**	**17**
Trichlorotrifluoroethane (Freon 113)	**64**	**54**	**4.8**
Vinyl Chloride	**41.4**	**42.4**	**40.4**
Xylene-o	< 17	< 3.5	< 1.7
Xylene-m,p	< 17	< 3.5	< 1.7
Total VOCs [2]	**3,914**	**3,294**	**370**

Notes and abbreviations on last page.

Table 3
Vapor Sample Analytical Results for Treatment Systems, First Quarter 2018,
Northrop Grumman Systems Corporation,
Operable Unit 2, Bethpage, New York

ARCADIS Design & Consultancy for natural and built assets

Location ID: / Sample ID: / Constituents (Units in µg/m^3)	96 INFLUENT T96 INFLUENT (AA) 2/28/2018	96 MID-EFFLUENT T96 MIDTRAIN (AA) 2/28/2018	96 SUP MIDTRAIN T96 SUP MIDTRAIN (AA) 2/28/2018	96 EFFLUENT T96 EFFLUENT (AA) 2/28/2018
Volatile Organic Compounds (VOCs)[1]				
1,1,1-Trichloroethane	**19**	< 11	< 11	**0.60**
1,1,2,2-Tetrachloroethane	< 14	< 14	< 14	< 0.55
1,1,2-Trichloroethane	< 11	< 11	< 11	< 0.44
1,1-Dichloroethane	**40.9**	**29**	**36**	**25**
1,1-Dichloroethene	**124**	**99.5**	**115**	**107**
1,2-Dichloroethane	< 16	< 16	< 16	< 0.65
1,2-Dichloropropane	**91.0**	**18 J**	< 18	< 0.74
Benzene	< 13	< 13	< 13	< 0.51
Bromodichloromethane	< 13	< 13	< 13	< 0.54
Bromoform	< 8.3	< 8.3	< 8.3	< 0.33
Bromomethane	< 16	< 16	< 16	< 0.62
Carbon Disulfide	< 12	< 12	< 12	< 0.50
Carbon Tetrachloride	< 5.0	< 5.0	< 5.0	< 0.20
Chlorobenzene	< 18	< 18	< 18	< 0.74
Chloroethane	< 11	< 11	< 11	**2.5**
Chloroform	**13 J**	< 20	**10 J**	**4.9**
Chloromethane	< 8.3	< 8.3	< 8.3	**2.5**
cis-1,2-Dichloroethene	**186**	**129**	**154**	**95.6**
cis-1,3-Dichloropropene	< 18	< 18	< 18	< 0.73
Dibromochloromethane	< 17	< 17	< 17	< 0.68
Ethylbenzene	< 17	**< 17**	< 17	< 0.69
Methylene Chloride	< 14	< 14	< 14	**1.2**
Styrene	< 17	< 17	< 17	< 0.68
Tetrachloroethene	**1010**	**62**	< 5.4	**1.4**
Toluene	< 15	< 15	**170**	**98.0**
trans-1,2-Dichloroethene	< 16	< 16	< 16	**1.2**
trans-1,3-Dichloropropene	< 18	< 18	< 18	< 0.73
Trichloroethylene	**13000**	**2860**	**3930**	**86.5**
Trichlorotrifluoroethane (Freon 113)	**122**	**67**	**75**	**21**
Vinyl Chloride	**45.5**	**40.9**	**41.9**	**30.4**
Xylene-o	< 17	< 17	< 17	< 0.69
Xylene-m,p	< 17	< 17	< 17	< 0.69
Total VOCs [2]	**14,651**	**3,305**	**4,532**	**478**

Notes and abbreviations on last page.

Table 3
Vapor Sample Analytical Results for Treatment Systems, First Quarter 2018,
Northrop Grumman Systems Corporation,
Operable Unit 2, Bethpage, New York

Location ID:	102 INFLUENT	102 EFFLUENT
Sample ID:	T102 INFLUENT (AA)	T102 EFFLUENT (AA)
Constituents (Units in µg/m^3)	2/28/2018	2/28/2018
Volatile Organic Compounds (VOCs)[1]		
1,1,1-Trichloroethane	**17**	< 0.44
1,1,2,2-Tetrachloroethane	< 14	< 0.55
1,1,2-Trichloroethane	< 11	< 0.44
1,1-Dichloroethane	**53.0**	**16**
1,1-Dichloroethene	**109**	**82.5**
1,2-Dichloroethane	< 16	< 0.65
1,2-Dichloropropane	< 18	< 0.74
Benzene	< 13	< 0.51
Bromodichloromethane	< 13	< 0.54
Bromoform	< 8.3	< 0.33
Bromomethane	< 16	< 0.62
Carbon Disulfide	< 12	< 0.50
Carbon Tetrachloride	< 5.0	< 0.20
Chlorobenzene	< 18	< 0.74
Chloroethane	< 11	< 0.42
Chloroform	**16 J**	**2.1**
Chloromethane	< 8.3	**1.2**
cis-1,2-Dichloroethene	**420**	**19**
cis-1,3-Dichloropropene	< 18	< 0.73
Dibromochloromethane	< 17	< 0.68
Ethylbenzene	< 17	< 0.69
Methylene Chloride	< 14	**2.2**
Styrene	< 17	< 0.68
Tetrachloroethene	**423**	< 0.22
Toluene	< 15	< 0.60
trans-1,2-Dichloroethene	< 16	**0.37 J**
trans-1,3-Dichloropropene	< 18	< 0.73
Trichloroethylene	**2970**	**3.8**
Trichlorotrifluoroethane (Freon 113)	**107**	**26**
Vinyl Chloride	< 2.0	**0.41**
Xylene-o	< 17	< 0.69
Xylene-m,p	< 17	< 0.69
Total VOCs [2]	**4,115**	**154**

Notes and abbreviations on last page.

Table 3
Vapor Sample Analytical Results for Treatment Systems, First Quarter 2018,
Northrop Grumman Systems Corporation,
Operable Unit 2, Bethpage, New York

ARCADIS Design & Consultancy for natural and built assets

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)	Total VOCs represents the sum of individual concentrations of compounds detected rounded to the nearest whole number.
--	Not Analyzed
3.4	bold value indicates a detection
J	Compound detected below its reporting limit; value is estimated.
µg/m^3	micrograms per cubic meter
ELAP	Environmental Laboratory Approval Program
NYSDOH	New York State Department of Health
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compound

Table 4A
Summary of AERMOD Air Quality Impact Analysis
Tower 96 Treatment System, Operable Unit 2,
Northrop Grumman Systems Corporation,
Bethpage, New York

Constituent	CAS#	T96 Effluent (ug/m^3)	Emission Rate[1]			Scaled Impact Hourly [2] (ug/m^3)	Scaled Impact Annual [2] (ug/m^3)	SGC [3] (ug/m^3)	AGC[3] (ug/m^3)	%SGC	% AGC
		2/28/2018	lb/yr	lb/hr	g/s						
1,1,1 - Trichloroethane	00071-55-6	**0.6**	0.09	1.08E-05	1.36E-06	2.02E-04	5.93E-06	9,000	5.00E+03	0.00%	0.00%
1,1 - Dichloroethane	00075-34-3	**13**	2.06	2.35E-04	2.96E-05	4.38E-03	1.28E-04	--	6.30E-01	--	0.02%
1,1 - Dichloroethene	00075-35-4	**107**	16.92	1.93E-03	2.43E-04	3.60E-02	1.06E-03	--	200	--	0.00%
Tetrachloroethene	00127-18-4	**1.4**	0.22	2.53E-05	3.18E-06	4.71E-04	1.38E-05	300	4	0.00%	0.00%
Trichloroethene[4]	00079-01-6	**86.5**	13.67	1.56E-03	1.97E-04	2.91E-02	8.55E-04	20	2.00E-01	0.15%	0.43%
Vinyl Chloride[4]	00075-01-4	**30.4**	4.81	5.49E-04	6.91E-05	1.02E-02	3.00E-04	180,000	1.10E-01	0.00%	0.00%
cis 1,2-Dichloroethene	00156-59-2	**95.6**	15.11	1.73E-03	2.17E-04	3.22E-02	9.44E-04	--	63	--	0.00%
trans 1,2-Dichloroethene	00156-60-5	**1.2**	0.19	2.17E-05	2.73E-06	4.04E-04	1.19E-05	--	63	--	0.00%
Toluene	00108-88-3	**98**	15.49	1.77E-03	2.23E-04	3.30E-02	9.68E-04	37,000	5,000	0.00%	0.00%
Chloroethane	00075-00-3	**2.5**	0.40	4.51E-05	5.68E-06	8.42E-04	2.47E-05	--	10,000	--	0.00%
Chloroform	00067-66-3	**4.9**	0.77	8.84E-05	1.11E-05	1.65E-03	4.84E-05	150	14.7	0.00%	0.00%
Chloromethane	00074-87-3	**2.5**	0.40	4.51E-05	5.68E-06	8.42E-04	2.47E-05	22,000	90	0.00%	0.00%
Dichloromethane	00075-09-2	**1.2**	0.19	2.17E-05	2.73E-06	4.04E-04	1.19E-05	14,000	60	0.00%	0.00%
Trichlorotrifluoroethane (Freon 113)	00076-13-1	**21**	3.32	3.79E-04	4.77E-05	7.07E-03	2.07E-04	960,000	180,000	0.00%	0.00%

Notes and Abbreviations:

(1) Emission rate calculated based on effluent concentration and a stack air flow rate of 4,785 cfm. The stack air flow rate (in acfm) is taken from the actual stack air flow rate on 2/28/2018. Effluent temperature used in the model was 92°F from direct read in-line gauge.
Trichloroethene (lb/hr) = (10 ug/m^3) x (4,840 ft^3/min) x (1 m^3/35 ft^3) x (60 min/hr) x (0.000001 g/1 ug) x (0.0022 lb/g)
lb/yr = lb/hr x 8,760 hrs/yr
g/s = lb/hr x 1 hr/3,600 sec x 453.59 g/1 lb

(2) 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, and a stack which is 55 feet high and 20 inches in diameter. The maximum impact from all the years was used for the calculations.
Scaled hourly impact (ug/m^3) = AERMOD predicted hourly ambient impact at 1 g/s ([ug/m^3]/[g/s]) x Actual emission rate (g/s)
Scaled annual impact (ug/m^3) = AERMOD predicted annual ambient impact at 1 g/s ([ug/m^3]/[g/s]) x Actual emission rate (g/s)

AERMOD Normalized Ambient Impact at 1 g/s	
Hourly ([ug/m^3]/[g/s])	Annual ([ug/m^3]/[g/s])
148.05	4.35

(3) Short-term and annual guideline concentrations for air toxic pollutants specified in the NYSDEC DAR-1 AGC/SGC tables revised August 10, 2016.

(4) Vinyl Chloride and Benzene potential emission rates are less than 0.1 lb/hr and therefore below the trigger emissions for degree of air cleaning requirement (6 CRR-NY 212-2.3). TCE potential emissions are above the trigger limit and require a 12 month rolling average of annual emission to be maintained (see Table 5C) to demonstrate compliance with the 6 CRR-NY 212-2.2 500 lb/year requirement.

AGC	Annual Guideline Concentration	**10**	bold value indicates a detection
CAS #	Chemical Abstracts Service Registry Number	acfm	actual cubic feet per minute
CRR-NY	New York Codes, Rules and Regulations	g/s	grams per second
DAR-1	Division of Air Resources-1	$\mu g/m^3$	micrograms per cubic meter
--	None Specified	lb/yr	pounds per year
NYSDEC	New York State Department of Environmental Conservation	lb/hr	pounds per hour
SGC	Short-term Guideline Concentration	J	Value is estimated

Table 4B
Summary of AERMOD Air Quality Impact Analysis
Tower 102 Treatment System, Operable Unit 2,
Northrop Grumman Systems Corporation,
Bethpage, New York

Constituent	CAS#	T102 Effluent (ug/m^3)	Emission Rate[1]			Scaled Impact - Hourly [2] (ug/m^3)	Scaled Impact - Annual [2] (ug/m^3)	SGC [3] (ug/m^3)	AGC[3] (ug/m^3)	%SGC	% AGC
		2/28/2018	lb/yr	lb/hr	g/s						
1,1 - Dichloroethane	00075-34-3	**16.0**	4.09	4.67E-04	5.88E-05	2.05E-02	1.34E-04	--	6.30E-01	--	0.02%
1,1 - Dichloroethene	00075-35-4	**82.5**	21.07	2.41E-03	3.03E-04	1.06E-01	6.93E-04	--	200	--	0.00%
Trichloroethene[4]	00079-01-6	**3.80**	0.97	1.11E-04	1.40E-05	4.87E-03	3.19E-05	20	2.00E-01	0.02%	0.02%
Vinyl Chloride[4]	00075-01-4	**0.41**	0.10	1.20E-05	1.51E-06	5.25E-04	3.44E-06	180,000	1.1E-01	0.00%	0.00%
cis 1,2-Dichloroethene	00156-59-2	**19**	4.85	5.54E-04	6.98E-05	2.43E-02	1.59E-04	--	63	--	0.00%
trans 1,2-Dichloroethene	00156-60-5	**0.37 J**	0.09	1.08E-05	1.36E-06	4.74E-04	3.11E-06	--	63	--	0.00%
Chloroform	00067-66-3	**2.1**	0.54	6.12E-05	7.71E-06	2.69E-03	1.76E-05	150	14.7	0.00%	0.00%
Chloromethane	00074-87-3	**1.20**	0.31	3.50E-05	4.41E-06	1.54E-03	1.01E-05	22,000	90	0.00%	0.00%
Dichloromethane	00075-09-2	**2.2**	0.56	6.41E-05	8.08E-06	2.82E-03	1.85E-05	14,000	60	0.00%	0.00%
Trichlorotrifluoroethane (Freon 113)	00076-13-1	**26**	6.64	7.58E-04	9.55E-05	3.33E-02	2.18E-04	960,000	180000	0.00%	0.00%

Notes and Abbreviations:

(1) Emission rate calculated based on effluent concentration and a stack air flow rate of 7,731 cfm. The stack air flow rate (in acfm) is taken from the actual stack air flow rate on 2/28/2018. Effluent temperature used in the model was 80°F from direct read in-line gauge.
Trichloroethene (lb/hr) = (5.3 ug/m^3) x (7,590 ft^3/min) x (1 m^3/35 ft^3) x (60 min/hr) x (0.000001 g/1 ug) x (0.0022 lb/g)
lb/yr = lb/hr x 8,760 hrs/yr
g/s = lb/hr x 1 hr/3,600 sec x 453.59 g/1 lb

(2) Ambient impact based on AERMOD modeling using noramalized 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, and a stack which is 69.52 feet high and 24 inches in diameter. The maximum impact from all the years was used for the calculations.
Scaled hourly impact (ug/m^3) = AERMOD predicted hourly ambient impact at 1 g/s ([ug/m^3]/[g/s]) x Actual emission rate (g/s)
Scaled annual impact (ug/m^3) = AERMOD predicted annual ambient impact at 1 g/s ([ug/m^3]/[g/s]) x Actual emission rate (g/s)

AERMOD Normalized Ambient Impact at 1 g/s	
Hourly ([ug/m^3]/[g/s])	Annual ([ug/m^3]/[g/s])
348.85	2.29

(3) Short-term and annual guideline concentrations for air toxic pollutants specified in the NYSDEC DAR-1 AGC/SGC tables revised August 10, 2016.
(4) Vinyl Chloride and Benzene potential emission rates are less than 0.1 lb/hr and therefore below the trigger emissions for degree of air cleaning requirement (6 CRR-NY 212-2.3). TCE potential emissions are above the trigger limit and require a 12 month rolling average of annual emission to be maintained (see Table 5D) to demonstrate compliance with the 6 CRR-NY 212-2.2 500 lb/year requirement.

AGC	Annual Guideline Concentration
CAS #	Chemical Abstracts Service Registry Number
CRR-NY	New York Codes, Rules and Regulations
DAR-1	Division of Air Resources-1
--	None Specified
NYSDEC	New York State Department of Environmental Conservation
SGC	Short-term Guideline Concentration

21	bold value indicates a detection
acfm	actual cubic feet per minute
g/s	grams per second
$\mu g/m^3$	micrograms per cubic meter
lb/yr	pounds per year
lb/hr	pounds per hour

Table 5A
Summary of TCE Mass Removal, Tower 96 Treatment System,
First Quarter 2018, Northrop Grumman Systems Corporation,
Operable Unit 2, Bethpage, New York[1,2,3]

	Date		TCE Concentration (µg/m^3)				TCE Mass Emission[6]	Percent of Allowable TCE Emissions[7]
			T96 INFLUENT	T96 MIDTRAIN	T96 SUP MIDTRAIN	T96 EFFLUENT	(lbs)	12 Month Rolling Average
PILOT STUDY	*2/14/2017*	*(2)*	24,300	NS	142	42	0.8	2.2%
PILOT STUDY	*3/21/2017*		23,800	NS	2,580	1,280	20	6.1%
PILOT STUDY	*4/14/2017*	*(3,4)*	18,200	NS	NS	16,600	184	43.5%
	5/11/2017	*(8)*	21,600	4,800	NS	4,800	55	55.2%
	6/27/2017	(5,9)	19,700	4,030	NS	591	13	55.1%
	7/18/2017		NS	NS	NS	3,360	30	63.4%
	8/18/2017	(10)	NS	NS	NS	4,745	66	76.7%
	9/19/2017		12,100	6,610	3,670	6,130	87	92.4%
	12/13/2017		18,600	6,610	95	10	0.1	91.4%
	1/31/2018		NS	3,510	2,710	17	0.4	91.3%
	2/28/2018		13,000	2,860	3,930	86.5	1.0	91.4%

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) System transitioned from a regenerative VPGAC to once-through VPGAC (Supplemental Bed 1) system with PPZ polishing bed (Supplemental Bed 2) on 1/30/2017. Northrop Grumman performed pilot testing on this operational modification as discussed with NYSDEC on January 26, 2017.

(3) PPZ media was removed from the Supplemental Bed 2 on 3/23/2017 by OXY and was left empty.

(4) A system operation pilot study was initiated on 1/30/2017 and ended on 5/3/2017 (ref. email from Steven Scharf (NYSDEC) to Roger Smith (OXY) on January 26, 2017 2:17 PM "Air Treatment on NGC OU 2 ONCT System").

(5) A carbon change out was performed in Supplemental Bed 1 and new carbon was placed in the previously empty Supplemental Bed 2 on May 18, 2017.

(6) 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.
TCE (lb) = TCE Concentration [µg/m^3] x Days x Flow Rate [ft^3/min] x (1 m^3/35 ft^3) x (60 min/hr) x (24 hr/day) x (0.000001 g/1 ug) x (0.0022 lb/g)

(7) Percent of allowable TCE emissions to date is a time-weighted annual rolling average based on the 500 lb/year emission limit specified in the CRR-NY 212-2.2 Table 2. High Toxicity Air Contaminant List, revised April 1, 2017.

(8) For calculation purposes, the T96 MIDTRAIN concentration was used for the T96 Effluent result for May 11, 2017 as the T96 Effluent sample results were validated and rejected based on the use of non-dedicated sample collection fittings.

(9) T96 Influent sample collected on 6/30/2017.

(10) Sampling not conducted in August, the average of July and September effluent data and actual average air flow rate for the time period were used for estimated calculations for August 18, 2017.

italics	dates of pilot test using once through carbon treatment operation.
µg/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
NA	not applicable
NS	not sampled
NYSDOH	New York State Department of Health
PPZ	potassium permanganate coated zeolite
SUP	supplemental
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 2018, Northrop Grumman Systems Corporation,
Operable Unit 2, Bethpage, New York[1,2,3]

Date	TCE Concentration (µg/m^3)		TCE Mass Emission[2]	Percentage of Allowable TCE Emissions[3]	
	T102 INFLUENT	T102 EFFLUENT	(lbs)	Period	12 Month Rolling Average
2/14/2017	7,150	20	0.9	1.1%	1.7%
6/30/2017	5,480	15	1.5	0.8%	1.1%
10/17/2017	3,990	40	3.0	2.0%	1.3%
12/21/2017	2,340	5	0.2	0.3%	1.1%
2/28/2018	2,970	4	0.2	0.2%	0.9%

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 [µg/m^3] x Days x Flow Rate [ft^3/min] x (1 m^3/35 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 emission limit specified in the CRR-NY 212-2.2 Table 2. High Toxicity Air Contaminant List, revised April 1, 2017.

µg/m^3 micrograms per cubic meter
lbs pounds
CRR-NY New York Codes, Rules and Regulations
ELAP Environmental Laboratory Approval Program
NA Not Applicable
NYSDOH New York State Department of Health
T102 Tower 102
TCE Trichloroethene
USEPA United States Environmental Protection Agency
VOC Volatile Organic Compound

Table 6.
Concentrations of Volatile Organic Compounds and 1,4-Dioxane in Monitoring Wells [1]
BPOW 2-1, BPOW 2-2 and BPOW 2-3, First Quarter 2018
Operable Unit 2 (Groundwater),
Bethpage, New York

CONSTITUENT Units (ug/L)	Sample ID: Date:	BPOW 2-1 BPOW 2-1 2/26/2018	BPOW 2-2 BPOW 2-2 2/26/2018	BPOW 2-3 BPOW 2-3 2/26/2018
Volatile Organic Compounds (VOCs) [2,3]				
1,1,1-Trichloroethane		< 0.50	< 0.50	< 0.50
1,1,2,2-Tetrachloroethane		< 0.50	< 0.50	< 0.50
1,1,2-trichloro-1,2,2-trifluroethane		< 1.0	< 1.0	< 1.0
1,1,2-Trichloroethane		< 0.50	< 0.50	< 0.50
1,1-Dichloroethane		< 0.50	< 0.50	< 0.50
1,1-Dichloroethene		< 0.50	< 0.50	< 0.50
1,2-Dichloroethane		< 0.50	< 0.50	< 0.50
1,2-Dichloropropane		< 0.50	< 0.50	< 0.50
2-Butanone (MEK)		< 5.0	< 5.0	< 5.0
2-Hexanone		< 2.0	< 2.0	< 2.0
4-methyl-2-pentanone (MIK)		< 2.0	< 2.0	< 2.0
Acetone		< 5.0	< 5.0	< 5.0
Benzene		< 0.50	< 0.50	< 0.50
Bromodichloromethane		< 0.50	< 0.50	< 0.50
Bromoform		< 0.50	< 0.50	< 0.50
Bromomethane		< 0.50	< 0.50	< 0.50
Carbon Disulfide		< 0.50	< 0.50	< 0.50
Carbon tetrachloride		< 0.50	< 0.50	< 0.50
Chlorobenzene		< 0.50	< 0.50	< 0.50
Chloroethane		< 0.50	< 0.50	< 0.50
Chloroform		< 0.50	< 0.50	< 0.50
Chloromethane		< 0.50	< 0.50	< 0.50
cis-1,2-dichloroethene		< 0.50	< 0.50	< 0.50
cis-1,3-dichloropropene		< 0.50	< 0.50	< 0.50
Dibromochloromethane		< 0.50	< 0.50	< 0.50
Ethylbenzene		< 0.50	< 0.50	< 0.50
Methylene Chloride		< 0.50	< 0.50	< 0.50
Styrene		< 0.50	< 0.50	< 0.50
Tetrachloroethene		< 0.50	< 0.50	< 0.50
Toluene		< 0.50	< 0.50	< 0.50
trans-1,2-dichloroethene		< 0.50	< 0.50	< 0.50
trans-1,3-dichloropropene		< 0.50	< 0.50	< 0.50
Trichloroethylene		< 0.50	< 0.50	< 0.50
Vinyl Chloride		< 0.50	< 0.50	< 0.50
Xylene-o		< 0.50	< 0.50	< 0.50
Xylenes - m,p		< 0.50	< 0.50	< 0.50
Total VOCs [4]		0	0	0
1,4-Dioxane [2,3]		**2.60**	**0.510**	**4.88**

See last page for Notes and Abbreviations.

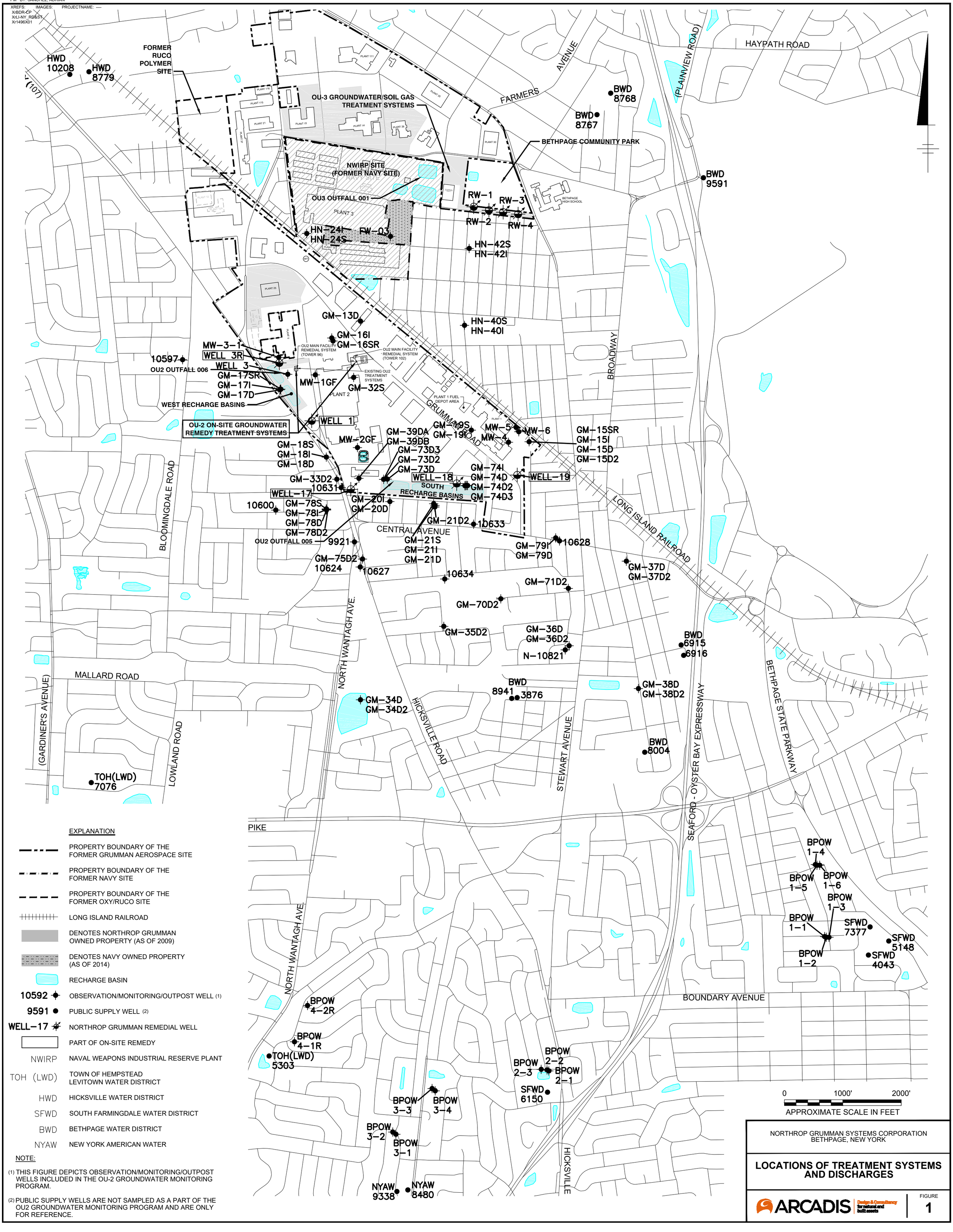
Table 6.
Concentrations of Volatile Organic Compounds and 1,4-Dioxane in Monitoring Wells [(1)]
BPOW 2-1, BPOW 2-2 and BPOW 2-3, First Quarter 2018
Operable Unit 2 (Groundwater),
Bethpage, New York

Notes and Abbreviations:

(1)	These outpost wells have been recently 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
(2)	Samples were analyzed for VOCs using USEPA Method 524.2; samples were analyzed for 1,4-Dioxane using USEPA Method 522
(3)	Results for the program are validated at 20% frequency, per protocols specified in the OU2 Groundwater Monitoring Plan (Arcadis 2016)
(4)	Total VOCs are rounded to two significant figures
4.88	Bold value indicates constituent detected at or above its reporting limit
TVOCs	Total Volatile Organic Compounds
VOC	Volatile Organic Compound
µg/L	micrograms per liter
<0.5	Compound not detected above its laboratory quantification limit

FIGURES

CITY:(Reqd) DIV/GROUP:(Reqd) DB:(Reqd) LD:(Opt) PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
C:\Users\alsanchez\OneDrive - ARCADIS\BIM 360 Docs\NORTHROP GRUMMAN\OU2 ONCT OM&M PROGRAM\2018\NGC-BP-OU2-F-ONSITE GW REMEDY.dwg LAYOUT: 1 SAVED: 3/28/2018 12:13 PM ACADVER: 21.0S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: ---- PLOTTED: 3/28/2018 12:22
PM BY: SANCHEZ, ADRIAN
XREFS: IMAGES: PROJECTNAME: ----
XrBDR-CP
XrLI-NY_RD&ST
Xr1496X01



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)
- 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 SYSTEMS CORPORATION
BETHPAGE, NEW YORK

LOCATIONS OF TREATMENT SYSTEMS AND DISCHARGES

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FIGURE 1

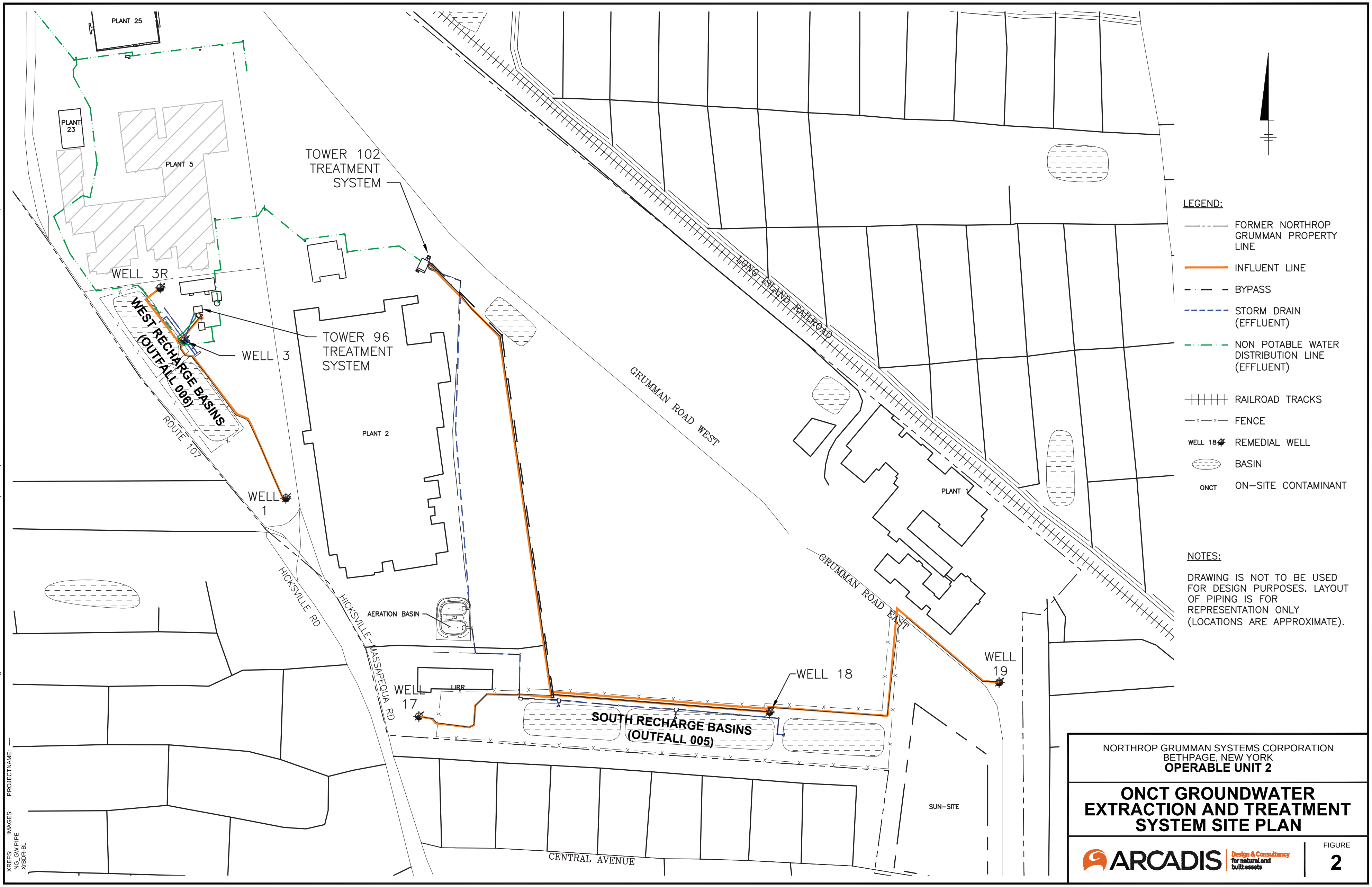
PLANT 25
PLANT 23
PLANT 5
PLANT 2
PLANT 1
TOWER 102 TREATMENT SYSTEM
TOWER 96 TREATMENT SYSTEM
WELL 3R
WELL 3
WELL 1
WELL 17
WELL 18
WELL 19
WEST RECHARGE BASINS (OUTFALL 006)
SOUTH RECHARGE BASINS (OUTFALL 005)
AERATION BASIN
LIRR
ROUTE 107
HICKSVILLE RD
HICKSVILLE–MASSAPEQUA RD
CENTRAL AVENUE
GRUMMAN ROAD WEST
GRUMMAN ROAD EAST
LONG ISLAND RAILROAD
SUN–SITE
LEGEND:
FORMER NORTHROP GRUMMAN PROPERTY LINE
INFLUENT LINE
BYPASS
STORM DRAIN (EFFLUENT)
NON POTABLE WATER DISTRIBUTION LINE (EFFLUENT)
RAILROAD TRACKS
FENCE
WELL 18 REMEDIAL WELL
BASIN
ONCT ON–SITE CONTAMINANT
NOTES:
DRAWING IS NOT TO BE USED FOR DESIGN PURPOSES. LAYOUT OF PIPING IS FOR REPRESENTATION ONLY (LOCATIONS ARE APPROXIMATE).
NORTHROP GRUMMAN SYSTEMS CORPORATION
BETHPAGE, NEW YORK
OPERABLE UNIT 2
ONCT GROUNDWATER EXTRACTION AND TREATMENT SYSTEM SITE PLAN
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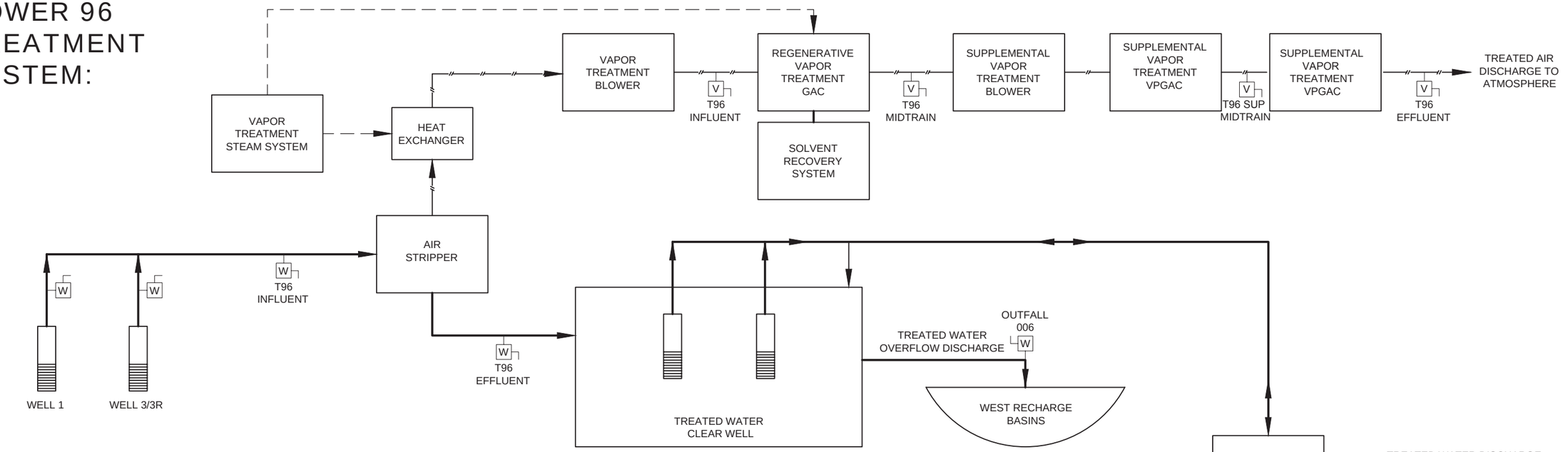
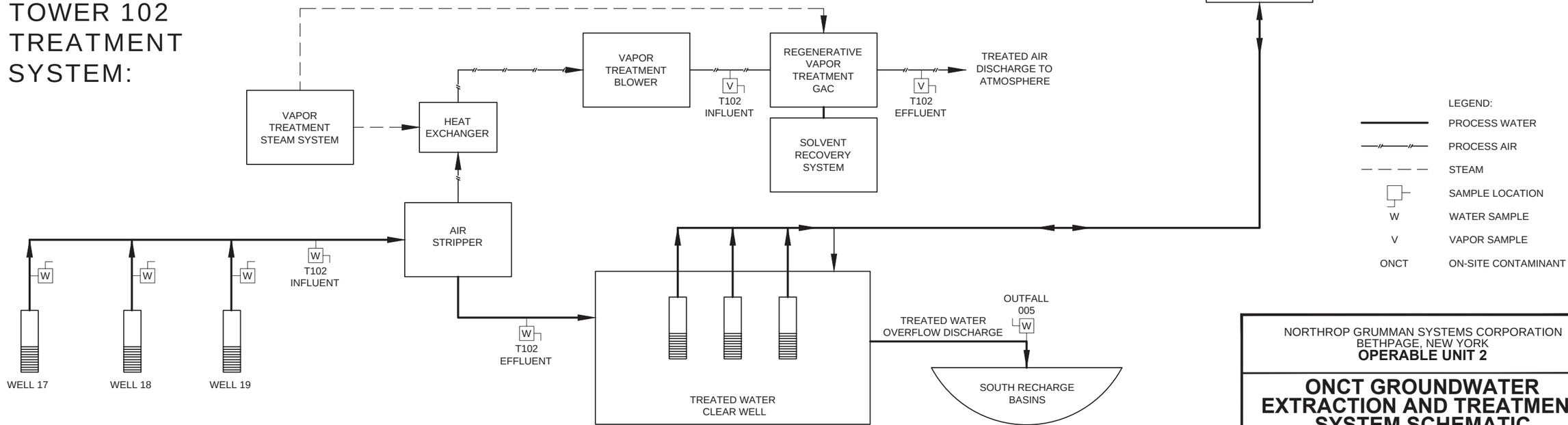
FIGURE
2

TOWER 96 TREATMENT SYSTEM:



TOWER 102 TREATMENT SYSTEM:



NORTHROP GRUMMAN SYSTEMS CORPORATION
BETHPAGE, NEW YORK
OPERABLE UNIT 2

ONCT GROUNDWATER EXTRACTION AND TREATMENT SYSTEM SCHEMATIC

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FIGURE 3