



Mr. Henry Wilkie, P.E.
New York State Department of Environmental Conservation (NYSDEC)
Division of Environmental Remediation
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Subject:

Groundwater Monitoring Plan Addendum,
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)

ENVIRONMENT

Dear Mr. Wilkie:

On behalf of Northrop Grumman Systems Corporation (Northrop Grumman), ARCADIS is submitting the enclosed proposed Addendum to the Groundwater Monitoring Plan in accordance with the Administrative Order on Consent for Operable Unit 2 (OU2 Consent Order, effective on May 1, 2015). Northrop Grumman previously submitted a Groundwater Monitoring Plan to NYSDEC in May 2014 (ARCADIS, May 2014) as part of the ONCT OM&M Plan (i.e., Appendix A). NYSDEC has accepted the existing OM&M plan as satisfying one of the deliverable requirements under the OU2 Consent Order, as confirmed in Dan Riesel's May 6, 2015 email to NYSDEC. We are requesting NYSDEC approval of this proposed addendum, consisting of enclosed Tables A1, A2, A3, and Figure 1, which updates the Groundwater Monitoring Plan previously submitted to NYSDEC (Note: updates are highlighted in the enclosed tables and figure):

Date:

June 23, 2015

Contact:

Michael F. Wolfert

Phone:

631-391-5238

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mike.wolfert@arcadis-us.com

Our ref:

NY001496.1514.COSA5

- Supplements the OU2 groundwater monitoring program by adding six monitoring wells (Monitoring Wells MW 3-1, GM-21D2, GM-78D, GM-78D2, GM73D3, and GM-74D3) to the semiannual hydraulic and groundwater quality monitoring rounds. These changes were previously recommended in the 2013 Period Review Report (ARCADIS, October 2014), 2014 Annual Report (ARCADIS, March, 2015), and incorporated into the most recently submitted Groundwater Monitoring Plan (ARCADIS, May 2014; Appendix A of the OM&M Manual).
- Changes the sampling frequency from quarterly to semiannually for the original nine outpost wells (Public Water Supply Contingency Plan [PWSCP],

Imagine the result


ARCADIS G&M Inc. 2003) and the six outpost wells subsequently added in 2012. Those wells are no longer needed as outpost wells and are, therefore, being repurposed as plume monitoring wells. Accordingly, their monitoring frequency will be made consistent with the other VOC plume monitoring wells. In addition, the VOC analytical method is changed to USEPA Method 8260C, which is consistent with the method used for the other VOC plume monitoring wells. These changes (including the associated rationale for repurposing these wells from outpost to plume monitoring) were previously recommended in the 2013 Periodic Review Report (ARCADIS, October 2014).

- In cooperation with the Navy, adds seven new outpost wells (associated with BPOW 5 cluster and BPOW 6 cluster) to the program at a quarterly monitoring frequency (standard for outpost wells) and adds two new plume monitoring wells (TT-102D and TT-102D2) to the program at a semi-annual monitoring frequency. These wells were installed by Navy and will be sampled by ARCADIS following the Navy's protocols that were approved by the NYSDEC (UFP SAP Addendum Ground Water Sampling Using Low Stress [Low Flow] Purging and Sampling Protocol, Resolution Consultants, November 2013). The Navy will complete the reporting requirements and data distribution associated with these wells.

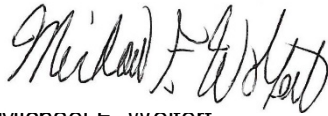
As always, if you have any questions or comments, please feel free to contact us.

Sincerely,

ARCADIS of New York, Inc.



Carlo San Giovanni
Project Manager



Michael F. Vogert
Project Director

Enclosures

Copies:

Rosalie Rusinko, Esq. – NYSDEC
Steven Scharf – NYSDEC
Krista Anders – NYSDOH
Ed Hannon – Northrop Grumman
Fred Weber – Northrop Grumman
Mark Chertok, Esq. – Sive Paget & Riesel
Art Zahradnik – ARCADIS
File

**Table A-1
Groundwater Monitoring Well Network and Purpose
Northrop Grumman OU2 ONCT
Bethpage, New York**

Well Identification	Hydrogeologic Zone ⁽¹⁾	MONITORING ACTIVITY				
		Water Levels ⁽²⁾	Water Quality		Vapor VOCs ⁽³⁾	Water Quality Monitoring Frequency ⁽³⁾
			VOCs ⁽³⁾	Cd/Cr ⁽³⁾⁽⁴⁾		
MONITORING WELLS						
MW-1GF	Shallow	---	---	Cd/Cr	---	Semiannually
MW-2GF	Shallow	---	---	Cd/Cr	---	Semiannually
PLT1MW-04	Shallow	---	---	Cr	---	Semiannually
PLT1MW-05	Shallow	---	---	Cr	---	Semiannually
PLT1MW-06	Shallow	---	---	Cr	---	Semiannually
GM-13D	Deep	X	X	---	---	Annually
GM-15S	Shallow	X	X	Cr	---	Semiannually
GM-15I	Shallow	X	X	---	---	Semiannually
GM-15D	Deep	X	X	---	---	Semiannually
GM-15D2	Deep 2	X	X	---	---	Semiannually
GM-16SR	Shallow	X	---	---	---	Semiannually
GM-16I	Intermediate	X	---	---	---	Semiannually
GM-17SR	Shallow	X	---	---	---	Semiannually
GM-17I	Shallow	X	X	---	---	Semiannually
GM-17D	Deep	X	X	---	---	Semiannually
GM-18S	Shallow	X	---	---	---	Semiannually
GM-18I	Shallow	X	X	---	---	Semiannually
GM-18D	Deep	X	X	---	---	Semiannually
GM-19S	Shallow	X	---	---	---	Semiannually
GM-19I	Intermediate	X	---	---	---	Semiannually
GM-20I	Shallow	X	X	---	---	Annually
GM-20D	Deep	X	X	---	---	Annually
GM-21S	Shallow	X	X	---	---	Annually
GM-21I	Intermediate	X	X	---	---	Annually
GM-21D	Deep	X	X	---	---	Annually
GM-21D2	Deep 2	X	X	---	---	Semiannually
GM-33D2	Deep 2	X	X	---	---	Semiannually
GM-34D	Deep 2	X	X	---	---	Semiannually
GM-34D2	Deep 2	X	X	---	---	Semiannually
GM-35D2	Deep 2	X	X	---	---	Semiannually
GM-36D	Deep	X	X	---	---	Annually
GM-36D2	Deep 2	X	X	---	---	Annually
GM-37D	Deep	X	X	---	---	Annually
GM-37D2	Deep 2	X	X	---	---	Annually
GM-38D	Deep	X	X	---	---	Semiannually
GM-38D2	Deep 2	X	X	---	---	Semiannually
GM-39D _A	Deep	X	X	---	---	Semiannually
GM-39D _B	Deep 2	X	X	---	---	Semiannually
GM-70D2	Deep	X	X	---	---	Annually
GM-71D2	Deep 2	X	X	---	---	Annually
GM-73D	Deep 2	X	X	---	---	Semiannually
GM-73D2	Deep 2	X	X	---	---	Semiannually
GM-73D3	Deep 3	X	X	---	---	Semiannually

**Table A-1
Groundwater Monitoring Well Network and Purpose
Northrop Grumman OU2 ONCT
Bethpage, New York**

Well Identification	Hydrogeologic Zone ⁽¹⁾	MONITORING ACTIVITY				
		Water Levels ⁽²⁾	Water Quality		Vapor VOCs ⁽³⁾	Water Quality Monitoring Frequency ⁽³⁾
			VOCs ⁽³⁾	Cd/Cr ⁽³⁾⁽⁴⁾		
MONITORING WELLS						
GM-74I	Shallow	X	X	---	---	Semiannually
GM-74D	Deep	X	X	---	---	Semiannually
GM-74D2	Deep 2	X	X	---	---	Semiannually
GM-74D3	Deep 3	X	X	---	---	Semiannually
GM-75D2	Deep 2	X	X	---	---	Semiannually
GM-78S	Shallow	X	X	Cd/Cr	---	Annually
GM-78I	Shallow	X	X	Cd/Cr	---	Annually
GM-78D	Deep 2	X	X	---	---	Semiannually
GM-78D2	Deep 2	X	X	---	---	Semiannually
GM-79S	Shallow	X	---	---	---	Semiannually
GM-79I	Deep	X	X	---	---	Semiannually
GM-79D	Deep	X	X	---	---	Semiannually
FW-03	Shallow	X	X	---	---	Annually
HN-24S	Shallow	X	---	---	---	Semiannually
HN-24I	Intermediate	X	X	---	---	Annually
HN-40S	Shallow	X	X	---	---	Annually
HN-40I	Shallow	X	X	---	---	Annually
HN-42S	Shallow	X	X	---	---	Annually
HN-42I	Intermediate	X	X	---	---	Annually
N-10624	Deep	X	X	---	---	Annually
N-10627	Deep	X	X	---	---	Annually
N-9921	Shallow	X	---	---	---	Semiannually
N-10597	Shallow	X	---	---	---	Semiannually
N-10600	Shallow	X	---	---	---	Semiannually
N-10631	Shallow	X	X	Cd/Cr	---	Semiannually
N-10633	Shallow	X	---	---	---	Semiannually
N-10634	Shallow	X	---	---	---	Semiannually
N-10821	Shallow	X	---	---	---	Semiannually
MW-3-1	Deep 2	X	X	---	---	Semiannually
TT-101D	Deep 2	X	X	---	---	Semiannually
TT-101D1	Deep 2	X	X	---	---	Semiannually
TT-101D2	Deep 3	X	X	---	---	Semiannually
TT- 102D ⁽⁵⁾	Deep 2	X	X	---	---	Semiannually
TT- 102D2 ⁽⁵⁾	Deep 3	X	X	---	---	Semiannually
OUTPOST WELLS						
BPOW 1-1 ⁽⁶⁾	Deep	X	X	---	---	Semiannually
BPOW 1-2 ⁽⁶⁾	Deep	X	X	---	---	Semiannually
BPOW 1-3 ⁽⁶⁾	Deep 2	X	X	---	---	Semiannually
BPOW 1-4 ⁽⁶⁾	Deep 2	X	X	---	---	Semiannually
BPOW 1-5 ⁽⁶⁾	Deep 3	X	X	---	---	Semiannually
BPOW 1-6 ⁽⁶⁾	Deep 3	X	X	---	---	Semiannually
BPOW 2-1 ⁽⁶⁾	Deep 2	X	X	---	---	Semiannually
BPOW 2-2 ⁽⁶⁾	Deep 2	X	X	---	---	Semiannually
BPOW 2-3 ⁽⁶⁾	Deep 2	X	X	---	---	Semiannually
BPOW 3-1 ⁽⁶⁾	Deep 2	X	X	---	---	Semiannually
BPOW 3-2 ⁽⁶⁾	Deep 2	X	X	---	---	Semiannually
BPOW 3-3 ⁽⁶⁾	Deep 2	X	X	---	---	Semiannually
BPOW 3-4 ⁽⁶⁾	Deep 3	X	X	---	---	Semiannually

**Table A-1
Groundwater Monitoring Well Network and Purpose
Northrop Grumman OU2 ONCT
Bethpage, New York**

Well Identification	Hydrogeologic Zone ⁽¹⁾	MONITORING ACTIVITY				
		Water Levels ⁽²⁾	Water Quality		Vapor VOCs ⁽³⁾	Water Quality Monitoring Frequency ⁽³⁾
			VOCs ⁽³⁾	Cd/Cr ⁽³⁾⁽⁴⁾		
BPOW 4-1R ⁽⁶⁾	Deep 3	X	X	---	---	Semiannually
BPOW 4-2R ⁽⁶⁾	Deep 3	X	X	---	---	Semiannually
BPOW 5-1 ⁽⁵⁾	Deep 2	X	X	---	---	Quarterly
BPOW 5-2 ⁽⁵⁾	Deep 2	X	X	---	---	Quarterly
BPOW 5-3 ⁽⁵⁾	Deep 2	X	X	---	---	Quarterly
BPOW 6-1 ⁽⁵⁾	Deep 2	X	X	---	---	Quarterly
BPOW 6-2 ⁽⁵⁾	Deep 3	X	X	---	---	Quarterly
BPOW 6-3 ⁽⁵⁾	Deep 3	X	X	---	---	Quarterly
BPOW 6-4 ⁽⁵⁾	Deep 2	X	X	---	---	Quarterly
REMEDIAL WELLS/TREATMENT SYSTEMS						
Well 1	Deep 2	X	X	---	---	Quarterly
Well 3/3R ⁽⁷⁾	Deep 2	X	X	---	---	Quarterly
Tower 96 EFFLUENT	---	---	X	---	X ⁽⁸⁾	Quarterly
Well 17	Deep 2	X	X	---	---	Quarterly
Well 18	Deep 2	X	X	---	---	Quarterly
Well 19	Deep 2	X	X	---	---	Quarterly
Tower 102 EFFLUENT	---	---	X	---	X ⁽⁸⁾	Quarterly

Notes and Definitions:

- (1) Well identification (e.g., GM-73D) does not necessarily designate the actual hydrogeologic zone. Determination of the hydrogeologic zones is based on the well screen interval and the regional model layering.
 - (2) Water levels will be obtained semi-annually from all above-specified wells in the spring and fall of each year.
 - (3) See Table A-2 for a summary of analytical specifications and Quality Assurance Project Plan for complete analytical specifications.
 - (4) Samples analyzed for total and dissolved cadmium and/or chromium.
 - (5) Wells installed by Navy and sampled by Northrop Grumman following initial sampling by Navy. Navy is responsible for data distribution/reporting.
 - (6) Monitoring frequency modified as described and recommended in 2013 Periodic Review Report (October 2014) and 2014 Annual Groundwater Monitoring Report (March 30, 2015), frequency changed from quarterly to semi-annually.
 - (7) Well 3R was brought online in December 2013 to replace Well 3.
 - (8) Effluent vapor sample from Tower 96 and Tower 102 collected from the total system effluent.
- Cd Cadmium
 Cr Chromium
 VOCs Volatile Organic Compounds
 --- Not Applicable
BPOW 6-2 Yellow highlight indicates changes to the plan

Table A-2
Summary of Analytical Specifications and Associated Well Construction Details
Northrop Grumman OU2 ONCT
Bethpage, New York

Well Identification	Measuring Point Elevation (ft msl)	Casing/Screen Diameter (inches)	Screened	Screened Interval (ft bls)	Top of Screen Elevation (ft msl)	Bottom of Screen Elevation (ft msl)	Analytical Method(s) ⁽¹⁾⁽²⁾
MONITORING WELLS							
MW-1GF	112.86	4	48	48 - 58	64.86	54.86	USEPA 6010
MW-2GF	111.41	4	49	49 - 59	62.41	52.41	USEPA 6010
PLT1MW-04	NA	2	41.5	41.5 - 56.5	NA	NA	USEPA 6010
PLT1MW-05	NA	2	38	38 - 58	NA	NA	USEPA 6010
PLT1MW-06	NA	2	47	47 - 62	NA	NA	USEPA 6010
GM-13D	113.97	4	200	200 - 210	-86.03	-96.03	USEPA 8260C
GM-15S	109.35	4	70	70 - 80	39.35	29.35	USEPA 8260C / USEPA 6010
GM-15I	109.13	4	95	95 - 105	14.13	4.13	USEPA 8260C
GM-15D	109.66	4	332	332 - 342	-222.34	-232.34	USEPA 8260C
GM-15D2	109.59	4	536	536 - 556	-426.41	-446.41	USEPA 8260C
GM-17I	115.83	4	100	100 - 120	15.83	-4.17	USEPA 8260C
GM-17D	115.68	4	278	278 - 298	-162.32	-182.32	USEPA 8260C
GM-18I	109.03	4	95	95 - 105	14.03	4.03	USEPA 8260C
GM-18D	108.88	4	290	290 - 300	-181.12	-191.12	USEPA 8260C
GM-20I	103.88	4	95	95 - 105	8.88	-1.12	USEPA 8260C
GM-20D	103.92	4	216	216 - 226	-112.08	-122.08	USEPA 8260C
GM-21S	105.81	2	63	63 - 67	42.81	38.81	USEPA 8260C
GM-21I	105.72	4	130	130 - 140	-24.28	-34.28	USEPA 8260C
GM-21D	105.66	4	210	210 - 230	-104.34	-124.34	USEPA 8260C
GM-21D2	105.88	4	516	516 - 526	-410.12	-420.12	USEPA 8260C
GM-33D2	106.85	4	500	500 - 520	-393.15	-413.15	USEPA 8260C
GM-34D	71.19	2	309	309 - 319	-237.81	-247.81	USEPA 8260C
GM-34D2	71.19	4	510	510 - 520	-438.81	-448.81	USEPA 8260C
GM-35D2	96.28	4	510	510 - 530	-413.72	-433.72	USEPA 8260C
GM-36D	91.63	4	204	204 - 214	-112.37	-122.37	USEPA 8260C
GM-36D2	91.60	4	520	520 - 540	-428.40	-448.40	USEPA 8260C
GM-37D	97.26	4	242	242 - 262	-144.74	-164.74	USEPA 8260C
GM-37D2	97.17	4	370	370 - 390	-272.83	-292.83	USEPA 8260C
GM-38D	91.75	4	320	320 - 340	-228.25	-248.25	USEPA 8260C
GM-38D2	91.56	4	475	475 - 495	-383.44	-403.44	USEPA 8260C
GM-39D _A	102.23	4	262	262 - 282	-159.77	-179.77	USEPA 8260C
GM-39D _B	102.08	4	410	410 - 420	-307.92	-317.92	USEPA 8260C
GM-70D2	99.58	4	310	310 - 330	-210.42	-230.42	USEPA 8260C

Table A-2
Summary of Analytical Specifications and Associated Well Construction Details
Northrop Grumman OU2 ONCT
Bethpage, New York

Well Identification	Measuring Point Elevation (ft msl)	Casing/Screen Diameter (inches)	Screened	Screened Interval (ft bls)	Top of Screen Elevation (ft msl)	Bottom of Screen Elevation (ft msl)	Analytical Method(s) ⁽¹⁾⁽²⁾
MONITORING WELLS							
GM-71D2	98.45	4	444	444 - 464	-345.55	-365.55	USEPA 8260C
GM-73D	104.87	4	401	401 - 411	-296.13	-306.13	USEPA 8260C
GM-73D2	104.62	4	532	532 - 552	-427.38	-447.38	USEPA 8260C
GM-73D3	104.64	4	635	635 - 650	-530.36	-545.36	USEPA 8260C
GM-74I	107.42	4	94	94 - 114	13.42	-6.58	USEPA 8260C
GM-74D	107.43	4	295	295 - 305	-187.57	-197.57	USEPA 8260C
GM-74D2	107.36	4	542	542 - 562	-434.64	-454.64	USEPA 8260C
GM-74D3	107.58	4	625	625 - 645	-517.42	-537.42	USEPA 8260C
GM-75D2	93.63	4	505	505-525	-411.37	-431.37	USEPA 8260C
N-10624	93.61	2	190	190 - 194	-96.39	-100.39	USEPA 8260C
N-10627	93.70	4	290	290 - 295	-196.30	-201.30	USEPA 8260C
GM-78S	104.94	4	60	60 - 70	44.94	34.94	USEPA 8260C / USEPA 6010
GM-78I	105.06	4	90	90 - 110	15.06	-4.94	USEPA 8260C / USEPA 6010
GM-78D	105.04	4	354	354 - 364	-248.96	-258.96	USEPA 8260C
GM-78D2	105.05	4	459	459 - 479	-353.95	-373.95	USEPA 8260C
GM-79I	100.88	4	170	170 - 180	-69.12	-79.12	USEPA 8260C
GM-79D	101.25	4	280	280 - 290	-178.75	-188.75	USEPA 8260C
FW-03	124.30	2	49	49 - 64	75.3	60.3	USEPA 8260C
HN-24I	125.78	4	148	148 - 158	-22.22	-32.22	USEPA 8260C
HN-40S	116.35	4	49	49 - 59	67.35	57.35	USEPA 8260C
HN-40I	115.91	4	108	108 - 118	7.91	-2.09	USEPA 8260C
HN-42S	120.32	4	50	50 - 60	70.32	60.32	USEPA 8260C
HN-42I	119.61	4	100	100 - 110	19.61	9.61	USEPA 8260C
N-10631	103.47	2	63	63 - 67	40.47	36.47	USEPA 8260C / USEPA 6010
MW-3-1	103.4	4	476	476 - 496	-372.6	-392.6	USEPA 8260C
TT-101D	80.89	4	325	325 - 345	-244.11	-264.11	USEPA 8260C
TT-101D1	80.92	4	570	570 - 590	-489.08	-509.08	USEPA 8260C
TT-101D2	80.89	4	740	740 - 760	-659.11	-679.11	USEPA 8260C
TT-102D	49.96	4	560	560 - 600	-510.04	-550.04	USEPA 524.2
TT-102D2	44.12	4	740	740 - 770	-695.88	-725.88	USEPA 524.2

Table A-2
Summary of Analytical Specifications and Associated Well Construction Details
Northrop Grumman OU2 ONCT
Bethpage, New York

Well Identification	Measuring Point Elevation (ft msl)	Casing/Screen Diameter (inches)	Screened	Screened Interval (ft bls)	Top of Screen Elevation (ft msl)	Bottom of Screen Elevation (ft msl)	Analytical Method(s) ⁽¹⁾⁽²⁾
OUTPOST WELLS							
BPOW 1-1	73.65	4	196	196 - 236	-122.35	-162.35	USEPA 8260C
BPOW 1-2	73.54	4	274	274 - 314	-200.46	-240.46	USEPA 8260C
BPOW 1-3	73.37	4	369	369 - 409	-295.63	-335.63	USEPA 8260C
BPOW 1-4	56.68	4	340	340 - 400	-283.32	-343.32	USEPA 8260C
BPOW 1-5	56.75	4	600	600 - 650	-543.25	-593.25	USEPA 8260C
BPOW 1-6	57.06	4	700	700 - 750	-642.94	-692.94	USEPA 8260C
BPOW 2-1	60.06	4	350	350 - 390	-289.94	-329.94	USEPA 8260C
BPOW 2-2	59.96	4	436	436 - 476	-376.04	-416.04	USEPA 8260C
BPOW 2-3	57.98	4	564	564 - 594	-506.02	-536.02	USEPA 8260C
BPOW 3-1	63.19	4	436.5	436.5 - 476.5	-373.31	-413.31	USEPA 8260C
BPOW 3-2	63.72	4	604.5	604.5 - 644.5	-540.78	-580.78	USEPA 8260C
BPOW 3-3	60.64	4	580	580 - 620	-519.36	-559.36	USEPA 8260C
BPOW 3-4	62.44	4	640	640 - 690	-577.56	-627.56	USEPA 8260C
BPOW 4-1R	67.34	4	652	652 - 692	-584.66	-624.66	USEPA 8260C
BPOW 4-2R	67.18	4	725	725 - 765	-657.82	-697.82	USEPA 8260C
BPOW 5-1	56.12	4	480	480 - 510	-423.88	-453.88	USEPA 524.2
BPOW 5-2	56.32	4	540	540 - 580	-483.68	-523.68	USEPA 524.2
BPOW 5-3	56.04	4	620	620 - 660	-563.96	-603.96	USEPA 524.2
BPOW 6-1	43.61	4	550	550 - 575	-506.4	-531.4	USEPA 524.2
BPOW 6-2	43.58	4	755	755 - 780	-711.4	-736.4	USEPA 524.2
BPOW 6-3	40.34	4	750	750 - 775	-709.7	-734.7	USEPA 524.2
BPOW 6-4	40.40	4	545	545 - 570	-504.6	-529.6	USEPA 524.2

Table A-2
Summary of Analytical Specifications and Associated Well Construction Details
Northrop Grumman OU2 ONCT
Bethpage, New York

Well Identification	Measuring Point Elevation (ft msl)	Casing/Screen Diameter (inches)	Screened	Screened Interval (ft bls)	Top of Screen Elevation (ft msl)	Bottom of Screen Elevation (ft msl)	Analytical Method(s) ⁽¹⁾⁽²⁾
REMEDIAL WELLS							
Well 1	116.78	12	519	519 - 570	-402.22	-453.22	USEPA 8260C
Well 3/3R ⁽³⁾	104	16	421	421 - 437	-317	-333	USEPA 8260C
		16	471	471 - 497	-471	-497	
		16	511	511 - 531	-511	-531	
Well 17	104.1	18/12	480	480 - 563	-375.9	-458.9	USEPA 8260C
Well 18	110.00	18/12	466	466 - 570	-356.00	-460	USEPA 8260C
Well 19	108.7	18/12	465	465 - 617	-356.3	-508.3	USEPA 8260C
TREATMENT SYSTEMS							
TOWER 96 EFFLUENT	---	---	--	---	---	---	USEPA 8260C
TOWER 102 EFFLUENT	---	---	--	---	---	---	USEPA 8260C

Notes and Definitions:

⁽¹⁾ As of August 2014, New York State no longer maintains certification for Analytical Services Protocol (ASP) OLM methods. Therefore, the applied analytical method has been updated to USEPA 8260C, with the exception of certain Outpost Wells (i.e., BPOW-5 and BPOW-6 Well Clusters) and certain Monitoring Wells (i.e., TT102 Well Cluster) which are analyzed using USEPA 524.2, which offers lower detection limits than USEPA 8260C, consistent with VOC analyses conducted by local water purveyors.

⁽²⁾ VOCs will be reported under the New York State Contract Laboratory Protocols (NYSCLP) using site-specific revised Contract Required Quantitation Limits (CRQLs), with the exception of benzene and vinyl chloride monomer (VCM), which will be reported to the method detection limits (MDLs) of 0.7, and 2 µg/L, respectively. The revised CRQL will include reporting ketones at 10 µg/L and most other compounds to 5 ug/L. The slash, where used, separates different analytical methods.

⁽³⁾ Well 3R was brought online in December 2013 to replace Well 3. Screen zones are for Well 3R.

DEC New York State Department of Environmental Conservation

USEPA U.S. Environmental Protection Agency

--- Not Applicable

ft bls feet below land surface

ft msl feet relative to mean sea level

NA Data not available

BPOW 6-2 Yellow highlight indicates changes to the plan

Table A-3
Supporting Information for Environmental Effectiveness and
Remedial System Performance/Compliance Monitoring Programs
Northrop Grumman OU2 ONCT
Bethpage, New York

Well Identification	Screened Interval (ft bls)	Estimated Depth to Water (ft bmp)	Dedicated Pump Type	Non-Dedicated Pump Type	Purge Method ⁽¹⁾
MONITORING WELLS					
MW-1GF	48 - 58	NM	---	2" Ø Rediflo Pump	3 SWV
MW-2GF	49 - 59	NM	---	2" Ø Rediflo Pump	3 SWV
PLT1MW-4	48 - 58	NM	---	2" Ø Rediflo Pump	3 SWV
PLT1MW-5	49 - 59	NM	---	2" Ø Rediflo Pump	3 SWV
PLT1MW-6	40 - 55	NM	---	2" Ø Rediflo Pump	3 SWV
GM-13D	200 - 210	53.46	2" Ø Bladder	---	MP/LF
GM-15S	70 - 80	51.39	---	2" Ø Rediflo Pump	3 SWV
GM-15I	95 - 105	51.05	2" Ø Bladder	---	3 vol. below packer
GM-15D	332 - 342	53.93	2" Ø Bladder	---	MP/LF
GM-15D2	536 - 556	56.85	2" Ø Bladder	---	MP/LF
GM-17I	100 - 120	55.35	2" Ø Bladder	---	MP/LF
GM-17D	278 - 298	57.31	2" Ø Bladder	---	MP/LF
GM-18I	95 - 105	49.87	2" Ø Bladder	---	3 vol. below packer
GM-18D	290 - 300	52.58	2" Ø Bladder	---	MP/LF
GM-20I	95 - 105	42.23	2" Ø Bladder	---	3 vol. below packer
GM-20D	216 - 226	44.79	2" Ø Bladder	---	3 vol. below packer
GM-21S	63 - 67	40.50	--	2" Ø Rediflo Pump	3 SWV
GM-21I	130 - 140	43.04	2" Ø Bladder	--	3 vol. below packer
GM-21D	278 - 288	49.65	2" Ø Bladder	--	MP/LF
GM-21D2	516-526	45.33	--	2" Ø Bladder	MP/LF
GM-33D2	500-520	57.12	2" Ø Bladder	---	MP/LF
GM-34D	309 - 324	21.83	---	2" Ø Bladder	MP/LF
GM-34D2	510 - 525	24.70	---	2" Ø Bladder	MP/LF
GM-35D2	500 - 520	48.24	2" Ø Bladder	---	3 vol. below packer
GM-36D	210 - 214	42.50	2" Ø Bladder	---	3 vol. below packer
GM-36D2	520 - 540	46.13	2" Ø Bladder	---	3 vol. below packer
GM-37D	242 - 262	46.31	2" Ø Bladder	---	3 vol. below packer
GM-37D2	370 - 390	47.23	2" Ø Bladder	---	3 vol. below packer
GM-38D	320 - 340	45.89	2" Ø Bladder	---	3 vol. below packer
GM-38D2	475 - 495	48.65	2" Ø Bladder	---	3 vol. below packer
GM-39D _A	320 - 340	45.42	2" Ø Bladder	---	MP/LF
GM-39D _B	475 - 495	48.46	2" Ø Bladder	---	MP/LF
GM-70D2	310 - 330	48.46	2" Ø Bladder	---	3 vol. below packer
GM-71D2	444 - 464	49.46	2" Ø Bladder	---	3 vol. below packer
GM-73D	532 - 552	50.54	2" Ø Bladder	---	MP/LF
GM-73D2	532 - 552	53.44	2" Ø Bladder	---	MP/LF
GM-73D3	635-650	43.29	---	2" Ø Bladder	MP/LF

Table A-3
Supporting Information for Environmental Effectiveness and
Remedial System Performance/Compliance Monitoring Programs
Northrop Grumman OU2 ONCT
Bethpage, New York

Well Identification	Screened Interval (ft bls)	Estimated Depth to Water (ft bmp)	Dedicated Pump Type	Non-Dedicated Pump Type	Purge Method ⁽¹⁾
MONITORING WELLS					
GM-74I	94 - 114	44.55	2" Ø Bladder	---	MP/LF
GM-74D	295 - 305	51.79	2" Ø Bladder	---	MP/LF
GM-74D2	542 - 562	58.63	2" Ø Bladder	---	MP/LF
GM-74D3	625-645	47.04	---	2" Ø Bladder	MP/LF
GM-75D2	505-525	33.40	2" Ø Bladder	---	MP/LF
N-10624	190 - 194	31.16	---	2" Ø Bladder	MP/LF
N-10627	290 - 295	39.44	---	2" Ø Bladder	MP/LF
GM-78S	60 - 70	48.10	---	2" Ø Rediflo Pump	MP/LF
GM-78I	90 - 110	48.44	---	2" Ø Rediflo Pump	MP/LF
GM-78D	354-364	40.93	---	2" Ø Bladder	MP/LF
GM-78D2	459-479	42.81	---	2" Ø Bladder	MP/LF
GM-79I	175 - 195	47.05	2" Ø Bladder	---	MP/LF
GM-79D	300 - 320	48.59	2" Ø Bladder	---	MP/LF
FW-03	49 - 64	54.82	---	2" Ø Rediflo Pump	3 SWV
HN-24I	148 - 158	62.83	---	2" Ø Rediflo Pump	MP/LF
HN-40S	49 - 59	55.87	---	2" Ø Rediflo Pump	3 SWV
HN-40I	108 - 118	55.34	---	2" Ø Rediflo Pump	MP/LF
HN-42S	50 - 60	58.31	---	2" Ø Rediflo Pump	3 SWV
HN-42I	100 - 110	57.15	---	2" Ø Rediflo Pump	MP/LF
N-10631	63 - 67	45.59	---	2" Ø Rediflo Pump	3 SWV
MW-3-1	476-496	55.37	2" Ø Bladder	---	MP/LF
TT 101D	325 - 345	30.74	2" Ø Bladder	---	MP/LF
TT 101D1	570 - 590	33.13	2" Ø Bladder	---	MP/LF
TT101D2	740 - 760	33.85	2" Ø Bladder	---	MP/LF
TT-102D⁽²⁾	560-600	18.29	2" Ø Bladder	---	MP/LF
TT-102D2⁽²⁾	740-790	12.69	2" Ø Bladder	---	MP/LF

Table A-3
Supporting Information for Environmental Effectiveness and
Remedial System Performance/Compliance Monitoring Programs
Northrop Grumman OU2 ONCT
Bethpage, New York

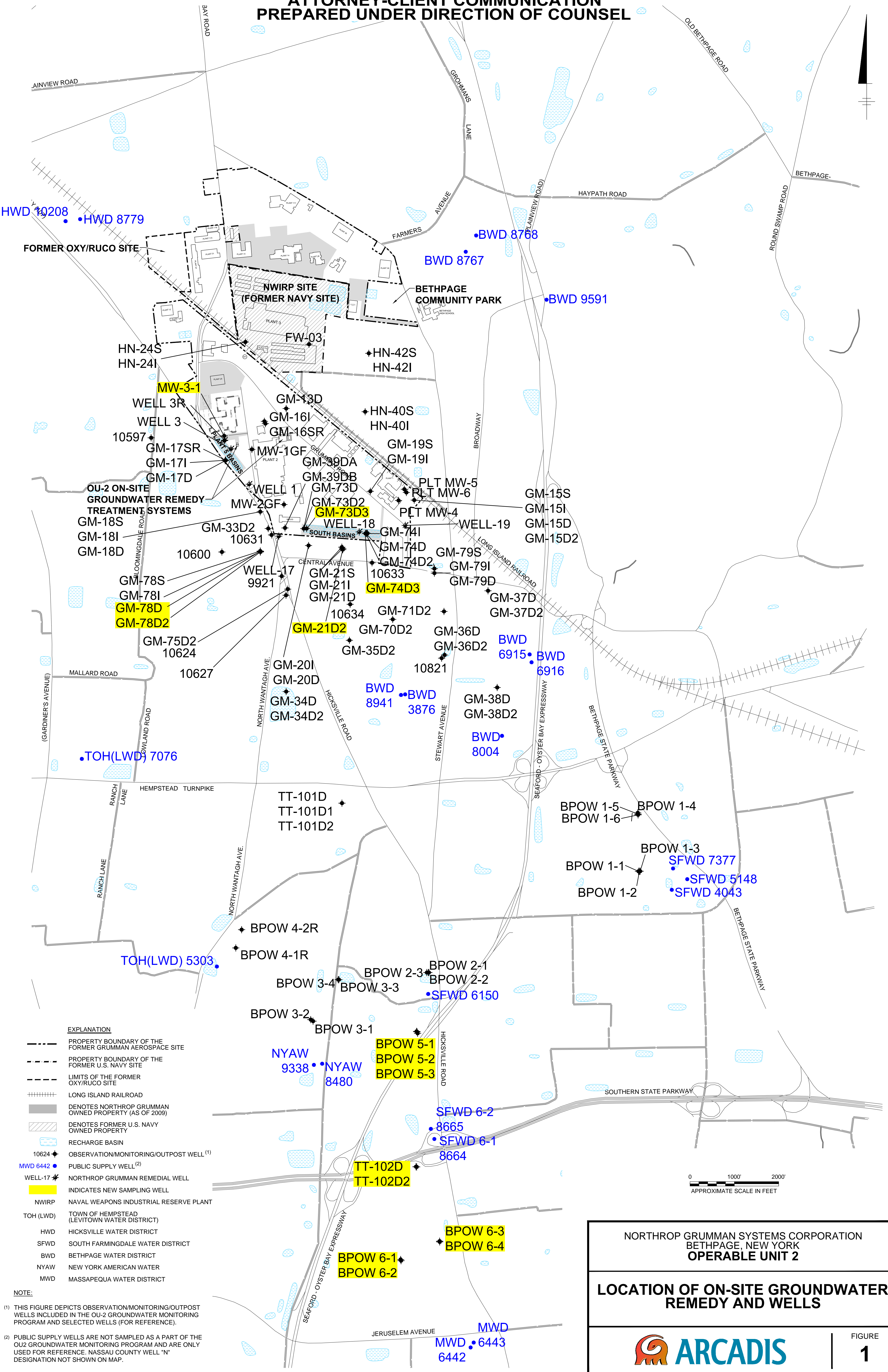
Well Identification	Screened Interval (ft bls)	Estimated Depth to Water (ft bmp)	Dedicated Pump Type	Non-Dedicated Pump Type	Purge Method ⁽¹⁾
OUTPOST WELLS					
BPOW1-1	196 - 236	28.14	3"Ø Sub. Pump	---	3 vol. below packer
BPOW1-2	274 - 314	29.57	3"Ø Sub. Pump	---	3 vol. below packer
BPOW1-3	369 - 409	29.57	2"Ø Sub. Pump	---	3SWV
BPOW1-4	340 - 400	12.36	3"Ø Sub. Pump	---	3 vol. below packer
BPOW1-5	600 - 650	13.14	3"Ø Sub. Pump	---	3 vol. below packer
BPOW1-6	700 - 750	13.65	3"Ø Sub. Pump	---	3 vol. below packer
BPOW2-1	350 - 390	20.62	2"Ø Sub. Pump	---	3SWV
BPOW2-2	436 - 476	22.70	---	2" Ø Rediflo Pump	3SWV
BPOW2-3	564 - 594	19.15	3"Ø Sub. Pump	---	3 vol. below packer
BPOW3-1	436.5 - 476.5	26.29	3"Ø Sub. Pump	---	3 vol. below packer
BPOW3-2	604.5 - 644.5	27.50	3"Ø Sub. Pump	---	3 vol. below packer
BPOW3-3	580 - 620	23.47	3"Ø Sub. Pump	---	3 vol. below packer
BPOW3-4	640 - 690	25.51	3"Ø Sub. Pump	---	3 vol. below packer
BPOW4-1R ⁽²⁾	652 - 692	25.85	---	2" Ø Bladder	MP/LF
BPOW4-2R ⁽²⁾	725 - 765	25.55	---	2" Ø Bladder	MP/LF
BPOW 5-1 ⁽²⁾	480 - 510	20.38	---	2" Ø Bladder	MP/LF
BPOW 5-2 ⁽²⁾	540 - 580	20.60	---	2" Ø Bladder	MP/LF
BPOW 5-3 ⁽²⁾	620 - 660	20.96	---	2" Ø Bladder	MP/LF
BPOW 6-1 ⁽²⁾	550 - 575	NA	---	2" Ø Bladder	MP/LF
BPOW 6-2 ⁽²⁾	755 - 780	NA	---	2" Ø Bladder	MP/LF
BPOW 6-3 ⁽²⁾	750 - 775	NA	---	2" Ø Bladder	MP/LF
BPOW 6-4 ⁽²⁾	545 - 570	NA	---	2" Ø Bladder	MP/LF
REMEDIAL WELLS/TREATMENT SYSTEMS					
Well 1	519 - 570	95.00	GRAB SAMPLE (water)		
Well 3/3R ⁽³⁾	421-437 471-497 511-531	53.56	GRAB SAMPLE (water)		
TOWER 96 EFFLUENT	---	---	GRAB SAMPLES (water and vapor)		
Well 17	480 - 563	74.25	GRAB SAMPLE (water)		
Well 18	466 - 570	70.66	GRAB SAMPLE (water)		
Well 19	465 - 617	71.37	GRAB SAMPLE (water)		
TOWER 102 EFFLUENT	---	---	GRAB SAMPLE (water and vapor)		

Notes and Definitions:

- ⁽¹⁾ Purge water will be containerized and discharged to the Nassau County Sanitary Sewer without additional analysis.
- ⁽²⁾ As specified by Navy, sampling methodology consistent with UFP SAP Addendum, Groundwater Sampling Using Low Stress (Low Flow) Purging and Sampling Protocol, NWIRP, Bethpage, New York. (November 2013)
- ⁽³⁾ Well 3R was brought online in December 2013 to replace Well 3. Screen zones are for Well 3R.
- NM Depth to water not measured
- SWV Standing Well Volumes
- MP/LF U.S. Environmental Protection Agency Micropurge/LowFlow Methodology
- Not Applicable
- NA Data not available
- Ø Diameter
- BPOW 6-2** Yellow highlight indicates changes to the plan

XREFS: IMAGES: PROJECTNAME: ----
 Xr1496X01
 Xr1496Xsp

**PRIVILEGED AND CONFIDENTIAL
 ATTORNEY-CLIENT COMMUNICATION
 PREPARED UNDER DIRECTION OF COUNSEL**



- EXPLANATION**
- PROPERTY BOUNDARY OF THE FORMER GRUMMAN AEROSPACE SITE
 - PROPERTY BOUNDARY OF THE FORMER U.S. NAVY SITE
 - LIMITS OF THE FORMER OXY/RUCO SITE
 - ||||| LONG ISLAND RAILROAD
 - DENOTES NORTHROP GRUMMAN OWNED PROPERTY (AS OF 2009)
 - ▨ DENOTES FORMER U.S. NAVY OWNED PROPERTY
 - RECHARGE BASIN
 - 10624 ◆ OBSERVATION/MONITORING/OUTPOST WELL (1)
 - MWD 6442 ● PUBLIC SUPPLY WELL (2)
 - WELL-17 ★ NORTHROP GRUMMAN REMEDIAL WELL
 - INDICATES NEW SAMPLING WELL
 - 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
 - MWD MASSAPEQUA WATER DISTRICT

0 1000' 2000'
 APPROXIMATE SCALE IN FEET

NORTHROP GRUMMAN SYSTEMS CORPORATION
 BETHPAGE, NEW YORK
OPERABLE UNIT 2

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

ARCADIS

NOTE:

(1) THIS FIGURE DEPICTS OBSERVATION/MONITORING/OUTPOST WELLS INCLUDED IN THE OU-2 GROUNDWATER MONITORING PROGRAM AND SELECTED WELLS (FOR REFERENCE).

(2) PUBLIC SUPPLY WELLS ARE NOT SAMPLED AS A PART OF THE OU2 GROUNDWATER MONITORING PROGRAM AND ARE ONLY USED FOR REFERENCE. NASSAU COUNTY WELL "N" DESIGNATION NOT SHOWN ON MAP.