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Groundwater Modeling Analysis of Projected Impacts at MLWD Wells IU Willets and N-5099 by the Former Unisys Site TVOC Plume

November 1, 2010

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Introduction

This report presents an updated evaluation of the potential impact of the volatile organic compound (VOC) plume from the former Unisys facility in Great Neck, NY on water quality at two of Manhasset Lakeville Water District's (MLWD) wells: IU Willets and N5099. The IU Willets well is located approximately .75 miles northeast of the former Unisys facility (hereinafter also be referred to as the "site"). The IU Willets well is not in operation yet, but plans to develop it are underway. Well N-5099, also known as the Cumberland Well, is a currently active well located approximately 1.5 miles north of the site.

TVOC Transport Analysis

The Remedial Investigation (RI) study for the offsite (OU-2) area for the former Unisys facility was recently completed. The study included mapping the limits of the existing total volatile organic compound (TVOC) plume based on late 2009 and early 2010 groundwater quality data and conducting transport simulations of the site related TVOC plume under different remediation pumping conditions.

The primary site-related VOCs are tetrachloroethene (PCE), trichloroethene (TCE), cis 1,2-dichloroethene (cis-1, 2-DCE), and Freon 113. For the predictive transport analysis, solute transport of the TVOC plume, consisting of the compounds listed above, was simulated. TVOC is defined primarily as the sum of the concentrations of PCE, TCE, cis-1, 2-DCE**,** and Freon 113 concentrations.

Figure 1, Figure 2, Figure 3 and **Figure 4** show the estimated TVOC plume extent and concentration distribution for the Upper Glacial, upper Magothy, middle Magothy and basal Magothy, respectively**.** The plume limits are defined by the estimated limit of TVOC concentrations greater than 5 µg/L. The TVOC plume distributions shown in these figures were used as the starting condition for simulating future plume migration. Additionally, groundwater concentrations between 1 and 5 µg/L were initialized in the Magothy aquifer in the area between N-5099 and the northern extent of the 5 µg/L isoline. These concentrations were added to reflect the low level VOCs that have been detected at N-5099, and the understanding that the site TVOC plume is migrating towards the well.

The initial groundwater concentrations for the simulations are consistent with measurements collected at monitoring well clusters 51 and 30. Well clusters 51 and 30 are the closest monitoring wells to well N-5099 and the IU Willets well, respectively. Well cluster 51, which contains an upper Magothy and a basal Magothy well, has

been sampled on a quarterly basis in 2010. All results were non-detect with the exception of one low level, J-qualified cis-1,2 DCE detection (0.16J µg/L) in June 2010. At well cluster 30, the TVOC sum of the primary site contaminants listed above is less than 5 µg/L (0, 2.8 µg/L and 3.3 µg/L for wells 30GL, 30MI and 30ML, respectively). Recent 2009/2010 groundwater quality data and earlier measurements in 2008 and 2006 do not indicate that the site plume extends to well cluster 30. This is because of the prevailing north/northwestward groundwater flow direction from the site. In addition to the prevailing north/northwestward flow direction the operation of the diffusion wells further limits the potential for eastward flow of groundwater in the vicinity of cluster 30.

Simulated remediation steady-state flow fields with average water supply pumping based on 2007-2008 records at N-5099 (600 gallons per minute) and projected pumping at the IU Willets location (1,380 gallons per minute) were used to simulate the migration of the TVOC plume for a period of 30 years. Two scenarios which incorporate currently installed remediation systems were evaluated:

- Operation of onsite OU-1 remediation system;
- Operation of the onsite OU-1 remediation system and the offsite OU-2 Interim Remedial Measure (IRM) system

The 30-year simulation results indicate that the IU Willets well will not be impacted, even at very low levels, by the site-related TVOC plume under the remediation scenarios referenced above. Simulated concentrations at the IU Willets well were zero during the course of the 30-year simulation period.

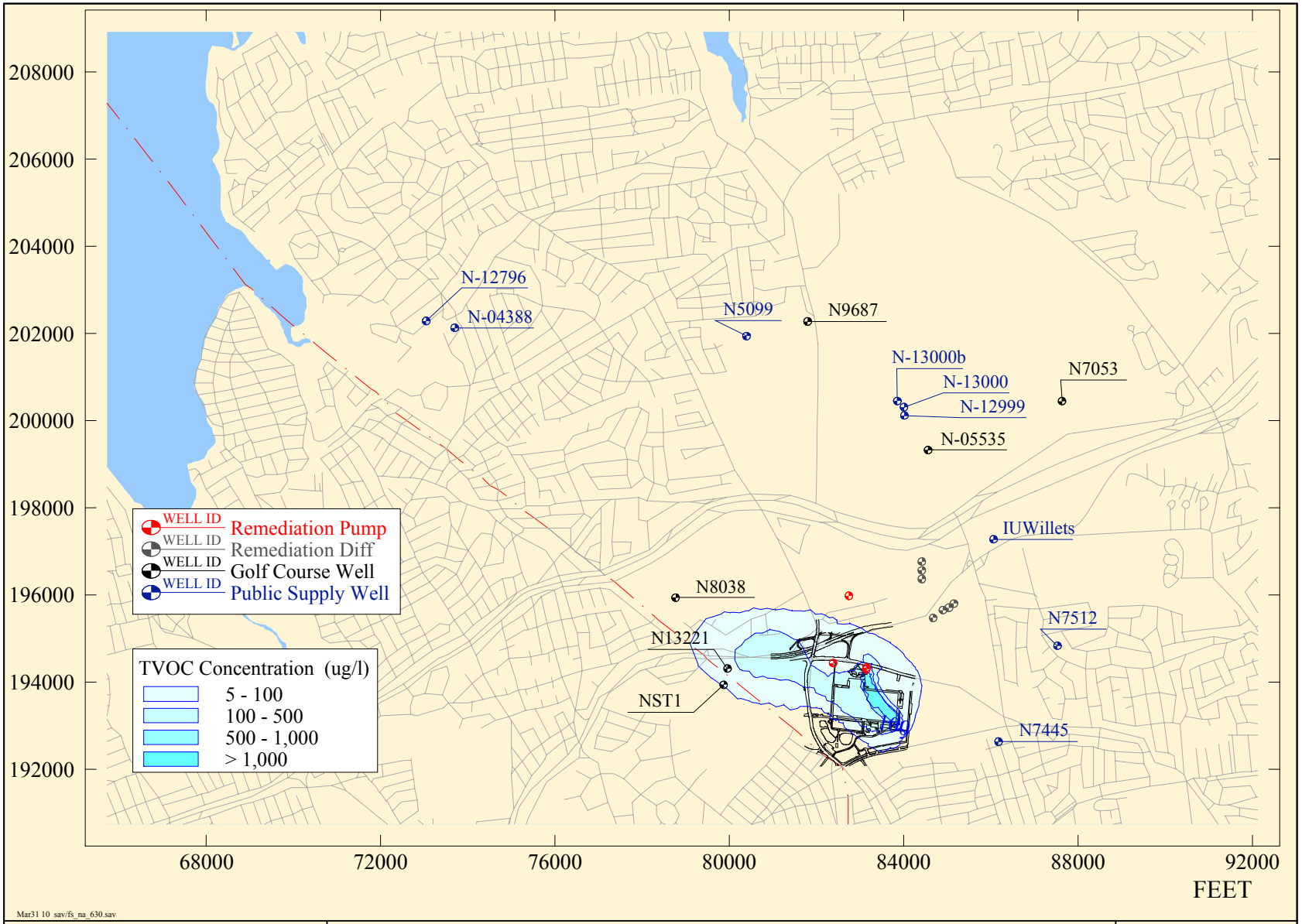
At well N-5099, simulation results indicate that pumped groundwater concentrations (based on late 2009/2010 initialized plume conditions) will be at approximately 1 µg/L during the first year, will exceed 5 µg/L after 5 years, and will remain above 5 µg/L for the remainder of the 30-year simulation period. The maximum simulated TVOC concentration over the 30-year period is approximately 160 µg/L.

Summary

An updated analysis was performed to evaluate the potential impact of the site-related TVOC plume from the former Unisys facility in Great Neck, NY on water quality at a proposed new water supply well MLWD IU Willets and at existing water supply well MLWD N-5099, the Cumberland Well. Two scenarios which incorporate currently installed remediation systems were evaluated: 1) operation of the onsite OU-1 remediation system, and 2) operation of the OU-1 remediation system in conjunction with the OU-2 IRM.

Plume transport simulation results, which used initial plumes developed from 2009/2010 TVOC data, indicate that the IU Willets well will not be impacted under these scenarios. Simulated concentrations at the IU Willets well were zero during the

course of the 30-year simulation period. At N-5099, simulation results indicate that pumped groundwater concentrations (based on late 2009/2010 initialized plume conditions) will be approximately 1 µg/L during the first year, will exceed 5 µg/L after 5 years, and will remain above 5 µg/L for the remainder of the 30-year simulation period. The maximum simulated TVOC concentration at N-5099 over the 30-year period is approximately 160 µg/L.



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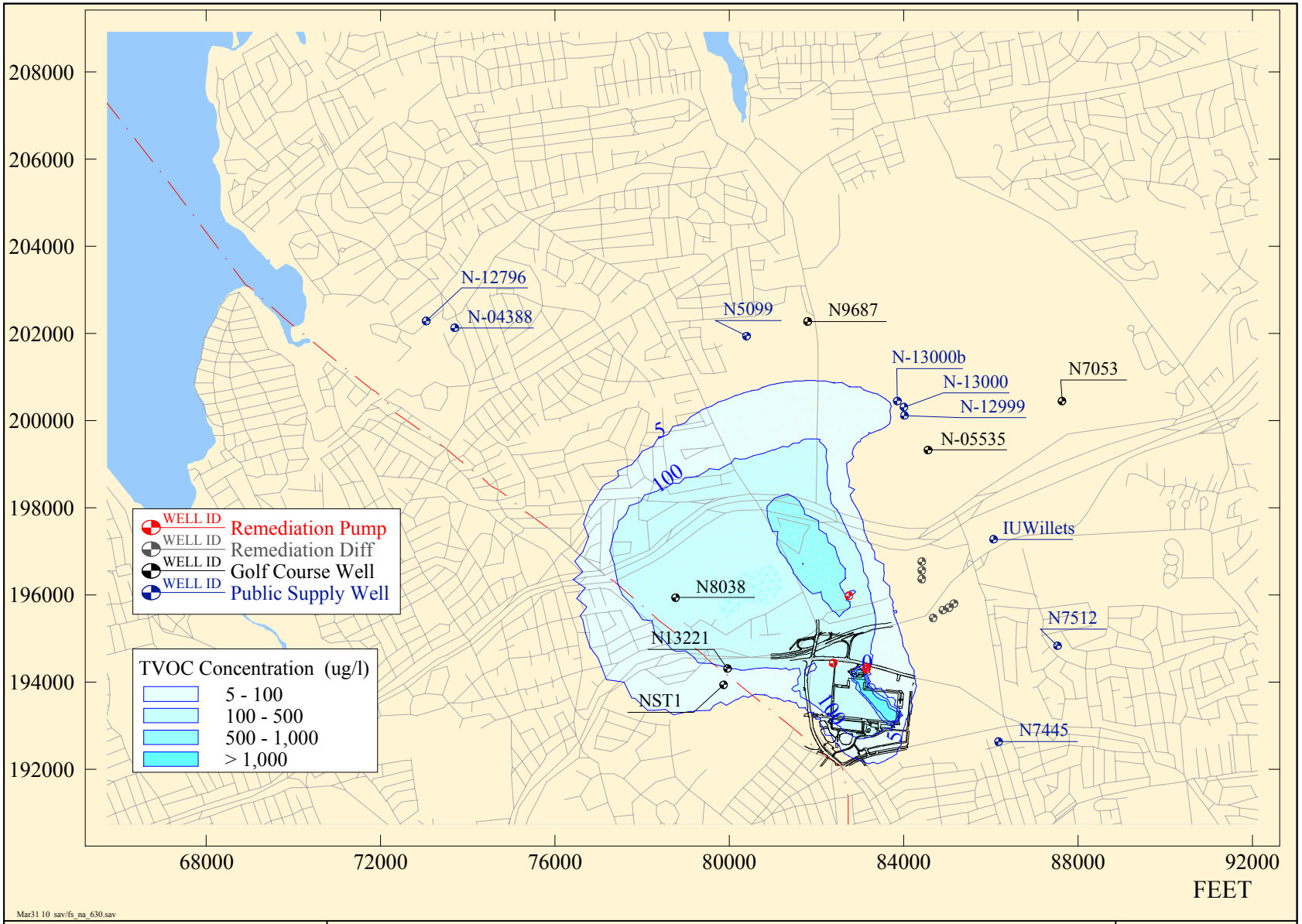
Starting Plume Extent - Upper Glacial Aquifer
Former Unisys Site, Great Neck, NY

FIGURE
1



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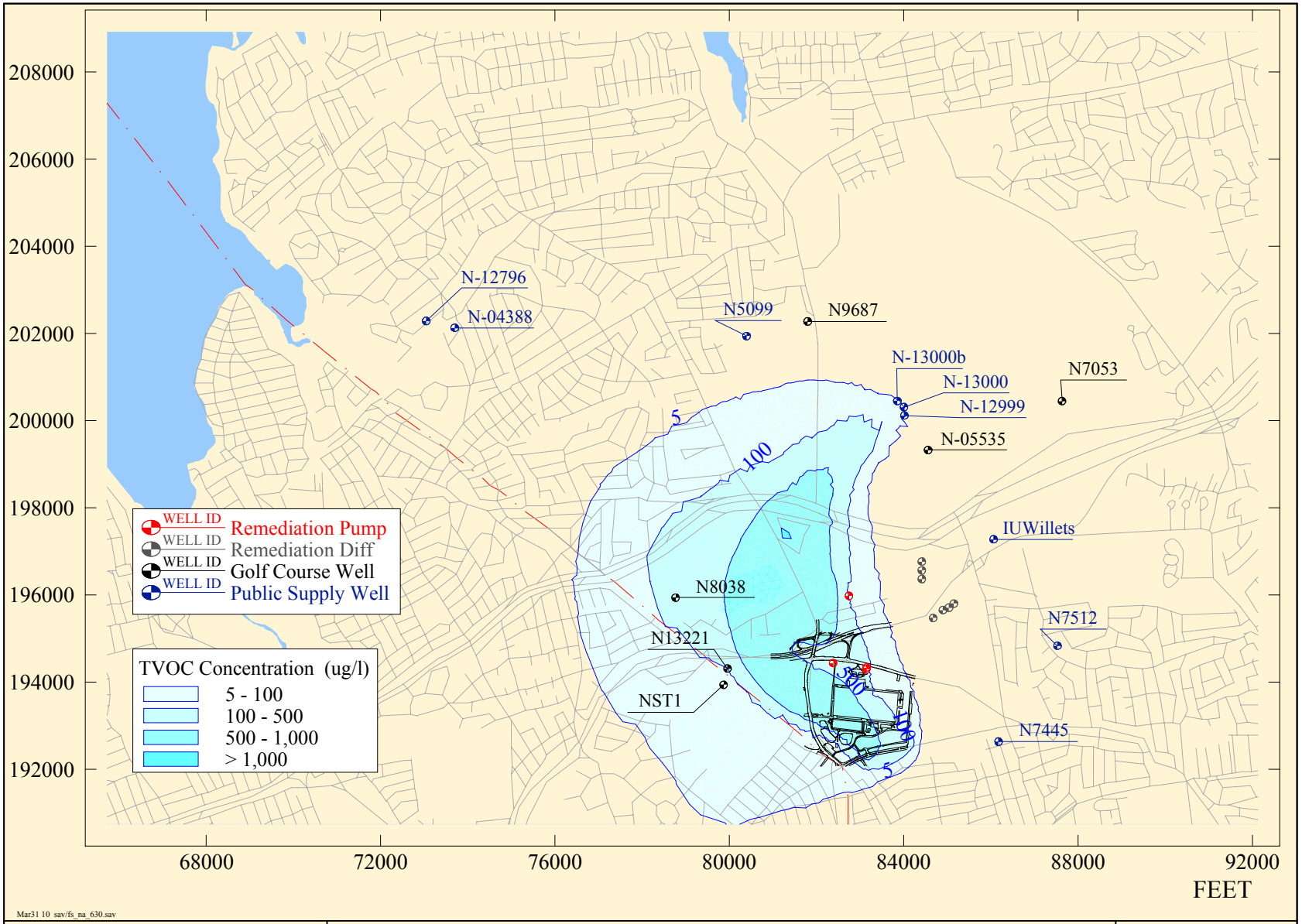
Starting Plume Extent - Upper Magothy Aquifer
Former Unisys Site, Great Neck, NY

FIGURE
2



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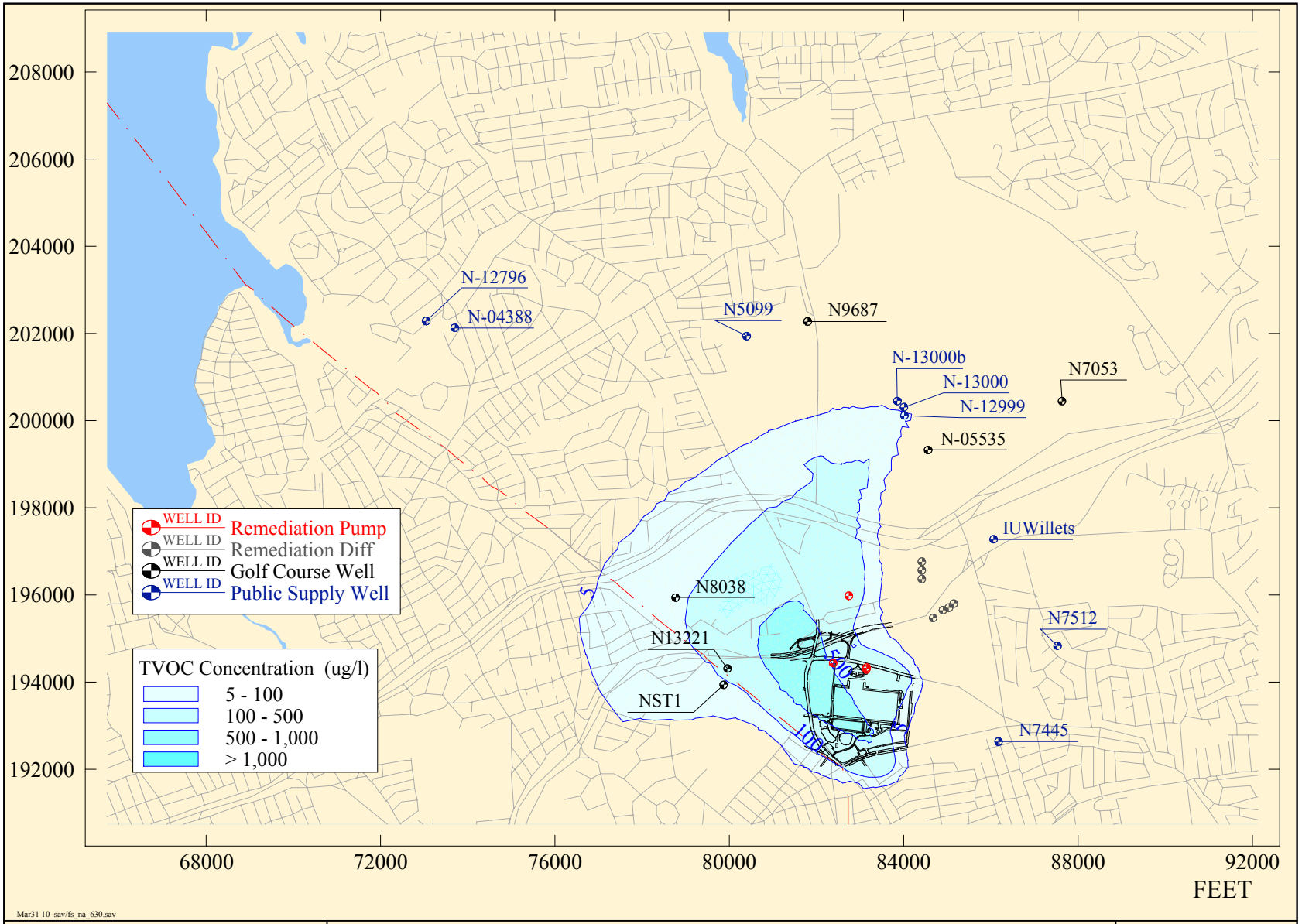
Starting Plume Extent - Middle Magothy Aquifer
Former Unisys Site, Great Neck, NY

FIGURE
3



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Starting Plume Extent - Basal Magothy Aquifer
Former Unisys Site, Great Neck, NY

FIGURE
4