BRIEFING DOCUMENT

LIBERTY INDUSTRIAL FINISHING SITE

PREPARED FOR
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

BY
MASSAPEQUA WATER DISTRICT AND
SOUTH FARMINGDALE WATER DISTRICT

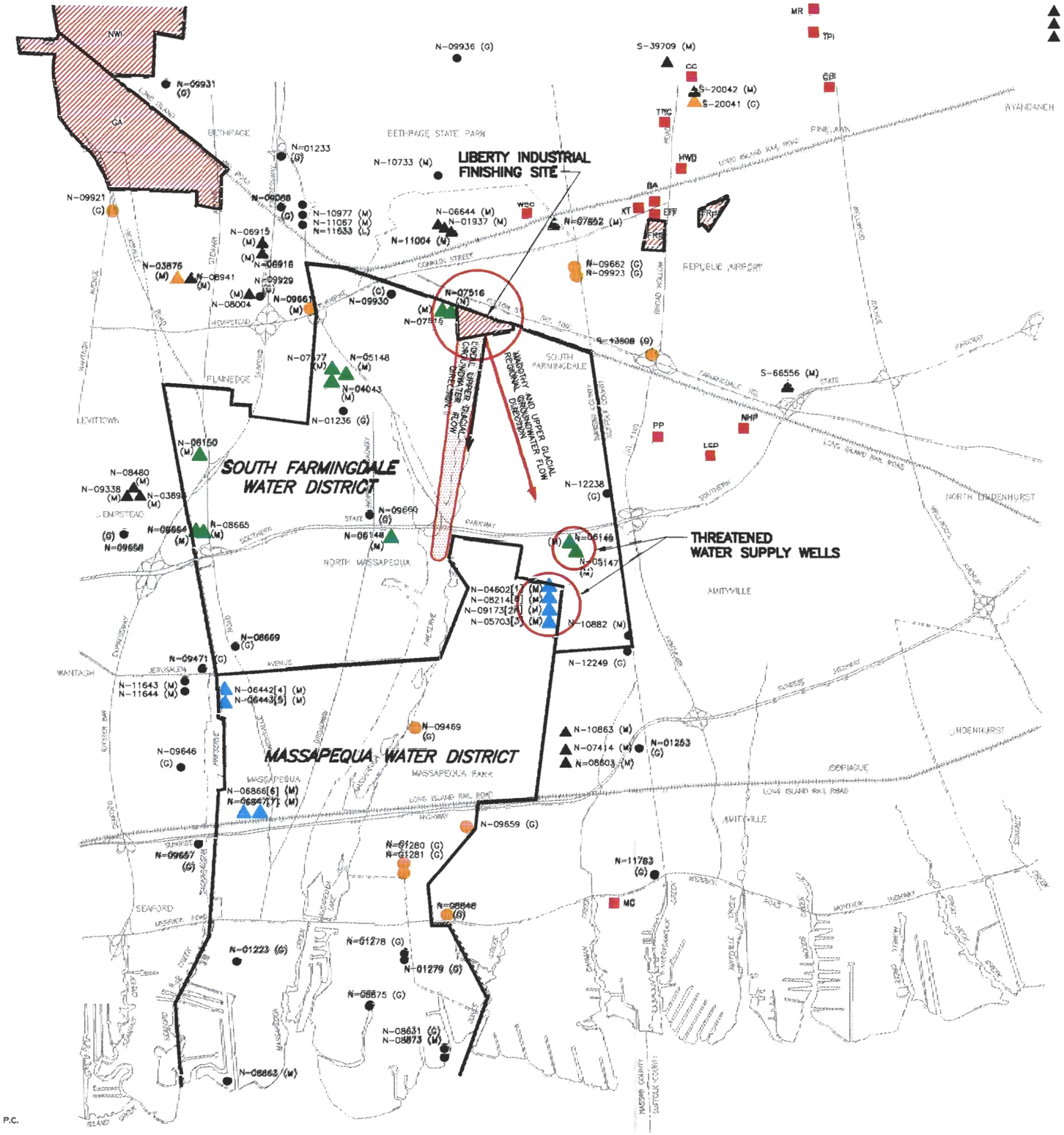
MARCH 1997

Purpose

The purpose of this Briefing Document is to request that the United States Environmental Protection Agency modify and expedite the Supplemental Remedial Investigation at the Liberty Industrial Finishing Site to address deep groundwater contamination downgradient of the site and the threat to the public water supply wells in the Massapequa and South Farmingdale Water Districts.

These public water supply wells, which comprise six wells in two well fields and supply water to approximately 32,000 residents in the Massapequa and South Farmingdale Water Districts, are threatened by contaminants migrating from the Liberty Site based on the results of groundwater modeling performed by the Nassau County Department of Public Works on behalf of the two Water Districts. These modeling results indicate that the six wells could be impacted in the next several years by a plume of contaminated groundwater from the Liberty Site. The locations of the threatened water supply wells relative to the Liberty Site are illustrated in Figure A.

A description of background information regarding the Liberty Site, more detailed discussion with regard to the modeling results, and recommendations for modification of the Supplemental Remedial Investigation are provided below.



ABBREVIATIOIN	SUPERFUND SITE
BA	BRANDT AIRFLEX
CBI	CANTOR BROTHERS, INC.
CC	CIRCUITRON CORPORATION
EFF	EAST FARMINGDALE FIRE DEPARTMENT
FRP	FAIRCHILD REPUBLIC AIRCRAFT – MAIN PLANT
FRS	FAIRCHILD REPUBLIC AIRCRAFT – OLD SUMP
GA	GRUMMAN AEROSPACE CORP., BETHPAGE FACILITY
HWD	HAZARDOUS WASTE DISPOSAL
KT	KENMARK TEXTILE
LIF	LIBERTY INDUSTRIAL FINISHING
LSP	LOUIS SORRENTINO PROPERTY
MC	MINUTEMAN CLEANERS
MR	MINMILT REALTY (HYGRADE METAL MOULDING)
NHP	NATIONAL HEATSET PRINTING COMPANY
NWI	NAVAL WEAPONS INDUSTRIAL RESERVE PLANT
PP	PREFERRED PLATING CORPORATION
TPI	TRONIC PLATING CO., INC.
TRC	TARGET ROCK CORPORATION
WSC	WAGNER SEED COMPANY

LEGEND:

- MONITORING WELL
- WATER SUPPLY WELL
- SUPERFUND SITE
- APPROXIMATE DIRECTION OF GROUNDWATER FLOW
- LIBERTY SITE UPPER GLACIAL PLUME
- EXCEEDS STANDARDS
- MASSAPEQUA WATER DISTRICT SUPPLY WELL
- SOUTH FARMINGDALE WATER DISTRICT SUPPLY WELL
- [1] LOCAL WELL NUMBER
- (G) UPPER GLACIAL AQUIFER
- (M) MAGOTHY AQUIFER
- (L) LLOYD AQUIFER

0 2000 4000
SCALE IN FEET

MASSAPEQUA WATER DISTRICT
MASSAPEQUA, NEW YORK

LOCATION OF SUPERFUND SITES, CONTAMINATED WATER SUPPLY AND MONITORING WELLS, AND LIBERTY SITE CONTAMINANT PLUME

FIGURE A

DVIRKA AND BARTILUCCI
CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

Background

The Liberty Industrial Finishing Site is located in the unincorporated portion of the community of Farmingdale, Town of Oyster Bay, New York. The site comprises 30 acres and is bordered by the Long Island Rail Road tracks to the north, Main Street to the east, a park to the west and Motor Avenue to the south.

According to the documents compiled by the USEPA, the site was developed by Kirkham Engineering and Manufacturing Corporation in 1934. This company manufactured gear boxes, vacuum cylinders, shock struts, propeller hubs and various aircraft related equipment. In 1940, Kirkham Engineering and Manufacturing Corporation changed its name to Liberty Aircraft Products Corporation. In 1941, Liberty Aircraft Products Corporation sold six acres of the site to the Defense Plant Corporation, which was a government-owned corporation that assisted the United States government during World War II. Sanitary wastewater was disposed of via six septic tanks feeding 40 leaching chambers, and two leaching chambers were used for the disposal of industrial waste.

In 1947, the Nassau County Department of Health (NCDOH) documented Liberty Aircraft discharging chromic acids onto the ground and reported the presence of chromium in a well adjacent to the disposal location. Additional testing by the NCDOH indicated downgradient groundwater contamination from the Liberty Aircraft Site, including chromium, cadmium and aluminum.

In 1949, Liberty Products Corporation (formerly Liberty Aircraft) constructed an industrial wastewater treatment plant for the precipitation of chromium.

In December 1955, a Delaware company, Liberty Products Corporation (Liberty Products II), acquired Liberty Products Corporation (Liberty Products I) as a subsidiary and purchased the site. The site was sold to Glickman Corporation who, three months later, sold the land to Dalecraft Realty Company. Liberty Aircraft phased out operations in November 1957. Liberty

Industrial Finishing Corporation (Liberty Finishing I) commenced operations at the site in November 1958. In the late 1950s, Liberty Products leased a portion of the site to a fiberglass products manufacturer.

NCDOH documentation exists which indicates that Liberty's wastewater treatment facilities were not properly operated and that there were inadequacies with the treatment system resulting in the direct discharge of untreated industrial wastes laden with chromium and cyanide.

Liberty continued to operate during the 1960s. In October 1964, Liberty Industrial Finishing Corporation (Liberty Finishing II) commenced operations at the site. A 1970 report prepared by the United States Geological Survey documented the extent of a plume in the upper Glacial aquifer to be approximately 4,300 feet long, 1,000 feet wide and 70 feet in depth, extending from the Liberty Site to Massapequa Creek, consisting primarily of chromium and detergents.

In 1978, Liberty moved its operations to Brentwood, New York, and signed a consent order with New York State Department of Environmental Conservation (NYSDEC) to clean up the South Farmingdale site. Some cleanup of the site did occur in 1979. Further testing by the NCDOH in 1980, indicated that additional cleanup was required. In December 1980, Liberty Associates sold half of the site and leased the remaining half of the property to Four J's Company, a real estate partnership.

In 1984, an Order on Consent with the NYSDEC was executed by the site owners to conduct a Remedial Investigation and Feasibility Study (RI/FS) by May 1985. The report was submitted in November 1985, but not accepted by the NYSDEC.

In 1986, the Liberty Site was placed on the National Priorities List of federal hazardous substance sites. Ownership of the site changed in 1986 and 1987. The RI/FS activities were initiated in September 1990.

Within the last two years, USEPA has divided the site into two operable units, namely OU1 - the western portion of the site, and OU2 - the eastern portion of the site and an off-site groundwater investigation. The RI/FS has been completed for the western portion of the site, and a Record of Decision is scheduled to be released shortly by EPA.

Subsequent to completion of the RI/FS for the western portion of the Liberty Site, concern was expressed regarding significant contamination of the Magothy aquifer by contaminants released from the site. Because of this concern, a Supplemental Remedial Investigation Work Plan was prepared and approved in January 1995, but due to attempts to negotiate with Potentially Responsible Parties (PRPs), this supplemental investigation has not been implemented to date.

Because of the concern for contamination of its water supply wells from hazardous waste sites, in particular the Liberty Industrial Finishing Site due to lack of site remediation and implementation of the Magothy aquifer investigation, the Massapequa Water District retained Dvirka and Bartilucci Consulting Engineers to evaluate the potential impacts from these sites. This evaluation, which is contained in a report issued in September 1996, entitled "Evaluation of Superfund Site Contamination and Impacts on Public Water Supply Wells in the Massapequa Water District," indicated that while the contaminant plume from the Liberty Site detected in the upper Glacial aquifer is migrating in a south-southwesterly direction toward and discharging to Massapequa Creek, contamination in the Magothy aquifer is expected to migrate more in a regional south-southeasterly direction toward the Massapequa Water District Northeast Well Field, which comprises four wells.

Similarly, the South Farmingdale Water District, in conjunction with their consultants, Holzmacher, McLendon & Murrell, P.C., have taken an active role to determine if impacts from the Liberty Site may or have impacted the Water District's well fields. This effort has included additional water supply well sampling and analyses, aquifer pumping tests, an ongoing review of documents generated during the Liberty Site RI/FS and participation in public meetings.

Modeling Results

As a result of significant levels of volatile organic compounds being detected in the Magothy aquifer in which the Massapequa Water District's water supply wells are screened, regional groundwater flow in the Magothy aquifer being in a south-southeast direction toward the water supply wells and the resulting potential threat to the wells, the Nassau County Department of Public Works was requested by the Water District to utilize their regional groundwater model to determine the potential impact of the Liberty Site on these wells.

The results of the model, which are documented in a report entitled "Preliminary Assessment of the Impact of Liberty Site Contamination on Public Supply Wells in the South Farmingdale and Massapequa Water Districts," and included as an Appendix to this Briefing Document, indicate that contamination released from the Liberty Site would migrate readily into the Magothy aquifer, travel in a southerly direction and impact not only the Massapequa Water District wells, but also two South Farmingdale Water District water supply wells (Plant No. 2). Based on the assumption that contaminants were released at the site in the late 1940s and a retardation factor of "2," at which the contaminants would migrate at one-half the rate of groundwater, the model predicted that the plume may reach the water supply wells possibly in the very near future. (Based on previous modeling efforts conducted on Long Island for volatile organic compounds, a retardation factor of 2 is considered to be representative and applicable to contaminant transport in the vicinity of the Liberty Site.)

The results of the model are illustrated in Figures 1 and 2. The model results indicate that the South Farmingdale Water District supply wells would be impacted first, followed shortly thereafter by the Massapequa Water District wells. If the South Farmingdale Water District terminated use of their wells because of potential contamination, the wells in the Massapequa Water District would be impacted sooner.

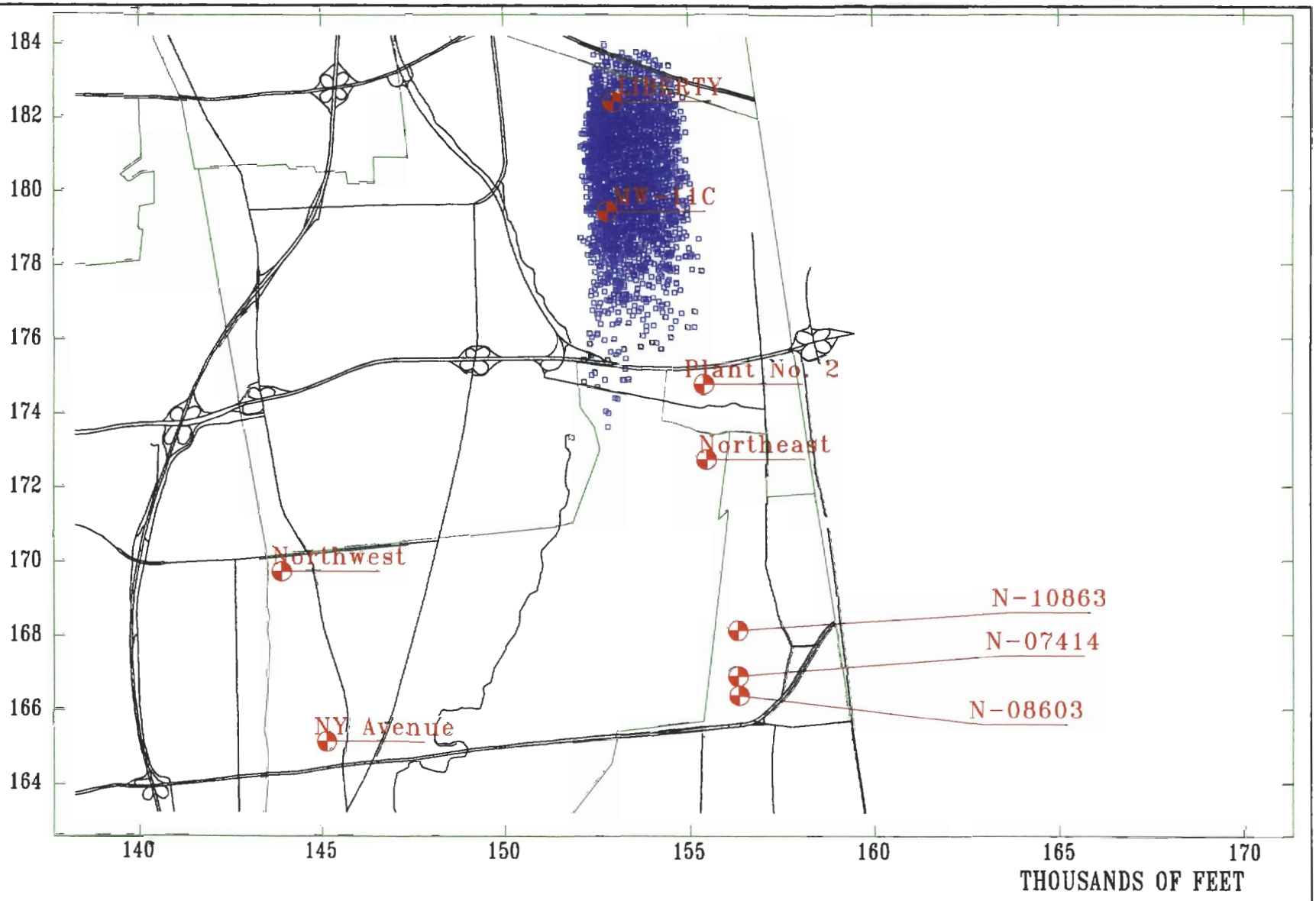


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Figure 1
PRELIMINARY ASSESSMENT OF LIBERTY SITE CONTAMINATION
PRESENT DAY USING MODIFIED REGIONAL MODEL
RETARDATION FACTOR = 2.0

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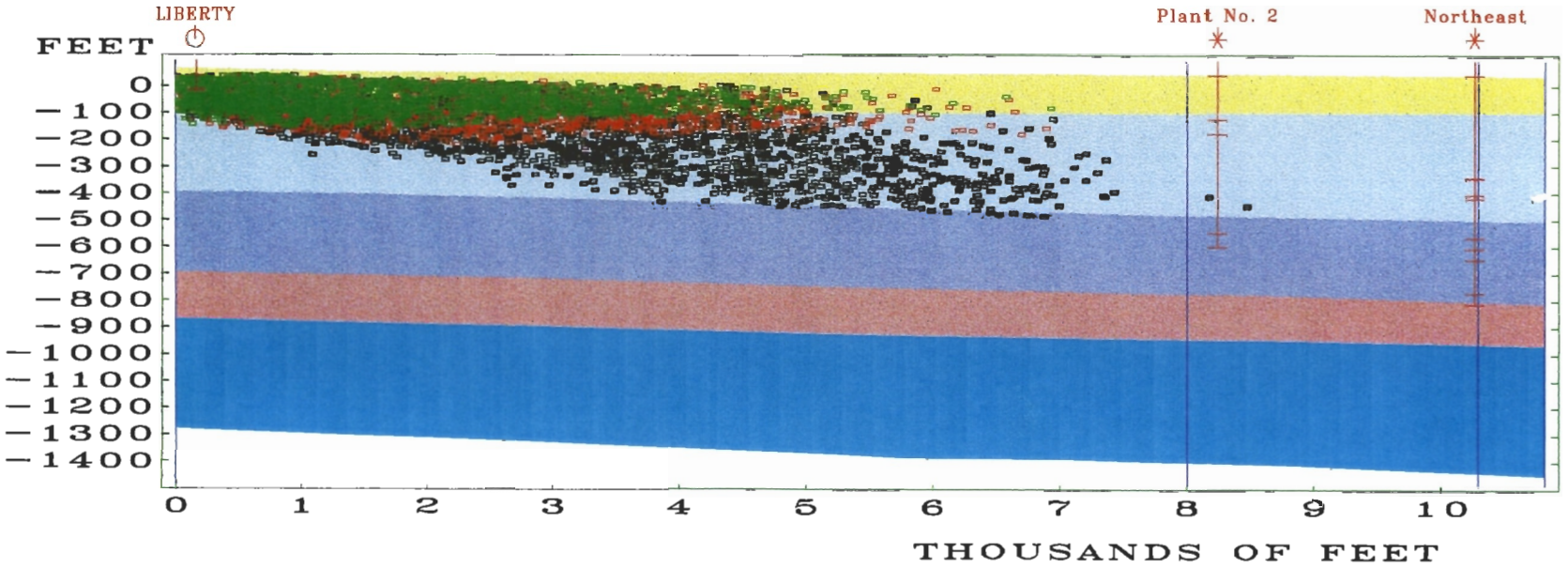

MATERIALS CROSS-SECTION AA

- UPPER GLACIAL
- MAGOTHY AQUIFER
- BASAL MAGOTHY
- RARITAN CLAY
- LLOYD AQUIFER

Retardation Factor

- 1.0
- 2.0
- 3.0

CROSS SECTION AA

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Figure 2
PRELIMINARY ASSESSMENT OF LIBERTY SITE CONTAMINATION
PRESENT DAY USING MODIFIED REGIONAL MODEL
CROSS SECTION WITH VARIOUS RETARDATION FACTORS

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Recommendations

Because of this demonstrated concern and the need for the Massapequa and South Farmingdale Water Districts to plan for treatment or alternate water supply to provide an adequate and safe supply of water to the residents they are responsible to serve, the following is recommended.

1. The groundwater sampling locations proposed for the Supplemental Remedial Investigation should be oriented more in the south-southeast direction relative to the Liberty Site and in line with the South Farmingdale and Massapequa Water District wells in the direction of the predicted Magothy plume.

2. The downgradient extent of the groundwater sampling locations should be sufficient to determine the horizontal extent of the contaminant plume predicted by the model.

3. The depth of the samples to be obtained from these groundwater sampling locations should be sufficient to determine the vertical extent of the contaminant plume predicted by the model.

4. Because of the predicted potentially imminent threat to the Massapequa and South Farmingdale Water District wells, the initial sample locations should be placed immediately upgradient of these wells, and early warning monitoring wells installed to provide sufficient advance warning of water supply well contamination in order to adequately plan for treatment or alternate water supply.

5. Again, because of the predicted potentially imminent threat to the public water supply wells, the Supplemental Remedial Investigation should commence ***immediately***.

6. A Technical Advisory Committee involving interested parties, including representatives of the Massapequa and South Farmingdale Water Districts, should be formed to review, comment and make recommendations during the Supplemental Remedial Investigation, as well as for development of a Remedial Plan for the Liberty Site.

Preliminary Assessment of the Impact of Liberty Site Contamination on Public Supply Wells In the South Farmingdale and Massapequa Water Districts

Prepared By The Nassau County
Department of Public Works
Water Management Unit

James F. Mulligan, P.E.
Director of Water Management

Michael Labiak
Sanitary Engineer II

March 1997

1. Executive Summary

In response to a request by the Massapequa Water District, Nassau County Department of Public Works (NCDPW), assisted by Camp Dresser & McKee (CDM), made several contaminant transport simulations using the County's regional groundwater model. The simulations were designed to make a preliminary assessment of the potential for VOC contamination from the Liberty site on the South Farmingdale Water District Plant No. 2 (Wells N-05147 and N-06149). and the Massapequa Water District Northeast Well Field (Wells N-04602, N-05703, N-8214,N-09173).

The contaminant transport simulations indicate that both the South Farmingdale and Massapequa Water District wells are directly down gradient of the Liberty site. The flow field shows that there is a distinct, downward movement of groundwater as it leaves the site, and horizontal flow is primarily south, with a slight bend eastward as the public supply wells are approached. Contamination introduced at the Liberty site moves southward with the groundwater flow, and also moves from the Upper Glacial aquifer down into the Magothy aquifer. The shape of the plume matches what little data is available from monitoring wells, and the simulations indicate that the plume has already reached well into the Magothy aquifer.

The model results indicate that both South Farmingdale WD and Massapequa WD wells screened in the Magothy aquifer are vulnerable to contamination coming from the Liberty site. **It is entirely possible that the South Famingdale W.D. Plant No. 2 will be impacted in the next several years, with the Massapequa W.D. Northeast Well field being impacted shortly thereafter**. This assumes that there is relatively low retardation of the contaminants, which we believe to be the actual condition based on soil properties in the aquifers. Little existing data is available regarding the plume in the Magothy aquifer. It is important that further studies are initiated specifically in the Magothy aquifer. At a minimum, the extent and depth of the present contamination should be better defined. These data could then be used to better calibrate a contaminant flow model specifically designed to model the site and nearby public supply wells. The model could then be used to help identify and quantify the risk to the public supply wells, and to develop a remedial action plan or appropriate response to protect public health.

2. Modeling Analysis

The Nassau County regional groundwater model has a node spacing of approximately 5000 feet in the area of concern. This was too wide a spacing for the required contaminant transport simulations. In order to improve the accuracy of the model in this area, additional nodes and elements were added to the model in the vicinity of the Liberty site and the down gradient wells of both the Massapequa and South Farmingdale Water Districts (see figure 1). The additional elements and nodes reduced the average node spacing to 2000 feet in the vicinity of the expected contaminant plume, and allowed the public supply wells to be more accurately located within the model than was possible with the unmodified, regional model. The regional model boundary

conditions of the early 1990s were left unmodified, and pumping across the county was representative of present day average pumping rates in all areas except within the Massapequa Water District, the South Farmingdale Water District, and the New York Water Service Area. Pumping in Suffolk County was left as it was in the regional model, representative of pumping in Suffolk around 1990.

The following, site specific modeling assumptions were made in the contaminant transport simulations.

Pumping and Boundary Conditions

Pumping in the above mentioned water service areas was averaged on a decade by decade basis. The 1990 to 1997 average water use in these wells was assumed to continue into the 21st century for projection simulations. The heads in the model outside the area of interest were left at equilibrium levels for 1990s pumping, even during the 1940s through 1980s part of the simulation. This had little effect on the localized area of interest. The regional model boundary conditions were left in place. These boundaries are so far from the area of interest, that they do not influence the results.

Recharge

Recharge was set at 24 inches per year in the area of concern. Elsewhere, recharge (including cesspool and water line leakage, recharge basin effects, and drainage to streams) was taken directly from the regional model, 1990s conditions.

Effect of Streams on Flow Field

The flow direction in the Upper Glacial aquifer in the area of interest has been affected by the presence of Massapequa Creek. The creek served as a discharge zone for the shallow groundwater system north of Southern State Parkway through the 1970s and into the 1980s. Since the contamination has migrated below the shallow flow system, the creek currently has little influence on the movement of the contamination.

Contaminant Transport Parameters

Metals tend to adsorb to the soil particles, which has the effect of retarding or slowing the movement of dissolved metals through the groundwater system. Retardation factors for metals can be quite high, often in excess of 10. Retardation factors for VOCs are lower, often in the range of 1.5 to 7, depending on the percentage of organic material in the soil and the specific volatile organic compound under consideration. In the simulations made, one simulation included no retardation (factor of 1), and the others included retardation factors of 2 and 3. We believe a retardation factor of 2 best represents the actual retardation based on experience by others on Long Island.

Simulation of Contaminants

Very little information on the source of contaminants, the present extent of contamination, and the present depth of the contaminant plume is available. For these simulations, a very simple assumption regarding the contamination was made. Contaminants were simulated as thousands of individual particles, each particle representing a discreet mass of VOCs. The particles were

introduced at the water table in the model at the location of the Liberty site, and moved with the simulated movement of groundwater. The assumed start date for the contamination to reach the water table at the site was 1947, and simulations were made of the period 1947 - 1997, followed by projection simulations of the period 1997 - 2020. The source was modeled as a continuous source, with a steady concentration of 100 ppb. This allows for an assessment of the percent dilution and dispersion expected down gradient of the site.

Model Flow Field Calibration

No flow field calibration was performed, and therefore, no assessment of the accuracy of the simulations can be made. It is important to realize that, although the local flow field contains reasonably accurate pumping for the wells near the site, the effect of inaccuracies in Suffolk County pumping is difficult to assess. As pumping increased locally, the flow field shifted from due south to south-southeast. This shift is noticeable in the simulations, starting in the 1970s,

3. Simulation Results

The contaminant transport simulations indicate that both the South Farmingdale and Massapequa Water District wells are directly down gradient of the Liberty site. The flow field shows that there is a distinct, downward movement of groundwater as it leaves the site, and flow is primarily south, with a slight bend eastward as the public supply wells are approached.

Contamination introduced at the Liberty site moves southward with the groundwater flow, and also moves from the Upper Glacial aquifer down into the Magothy aquifer. The shape of the plume matches what little data is available from monitoring wells, and the simulations indicate that the plume has already reached well into the Magothy aquifer.

If no retardation is assumed to occur, the downward movement of the contaminants is more pronounced. The simulation indicates that contaminants would have reached the South Farmingdale wells sometime in the mid-1990s, or perhaps earlier. The model also indicates that Massapequa WD wells, are vulnerable to eventual contamination from the Liberty site.

If some degree of retardation of the VOCs is assumed, then the time of impact is later, however, South Farmingdale supply wells and those wells of the Massapequa WD Northeast well field are still vulnerable to contamination. The eventual date of impact, in both cases, depends on the degree of adsorption of contaminants that is occurring.

Figures 1 and 2 illustrates the approximate present day location of the plume emanating from the Liberty site. Figure 1 is a plan view of the plume reflecting a retardation factor of 2, which is a reasonable value for VOC contamination on Long Island. In figure 2, the plume is shown in a cross-sectional view, from the Liberty site in the north, down through the Northeast well field in the south. It is important to note that in this figure, the degree of retardation ranges from 1(no retardation) to a value of 3. It is evident that the greater the retardation, the longer it takes for the plume to reach the well fields.

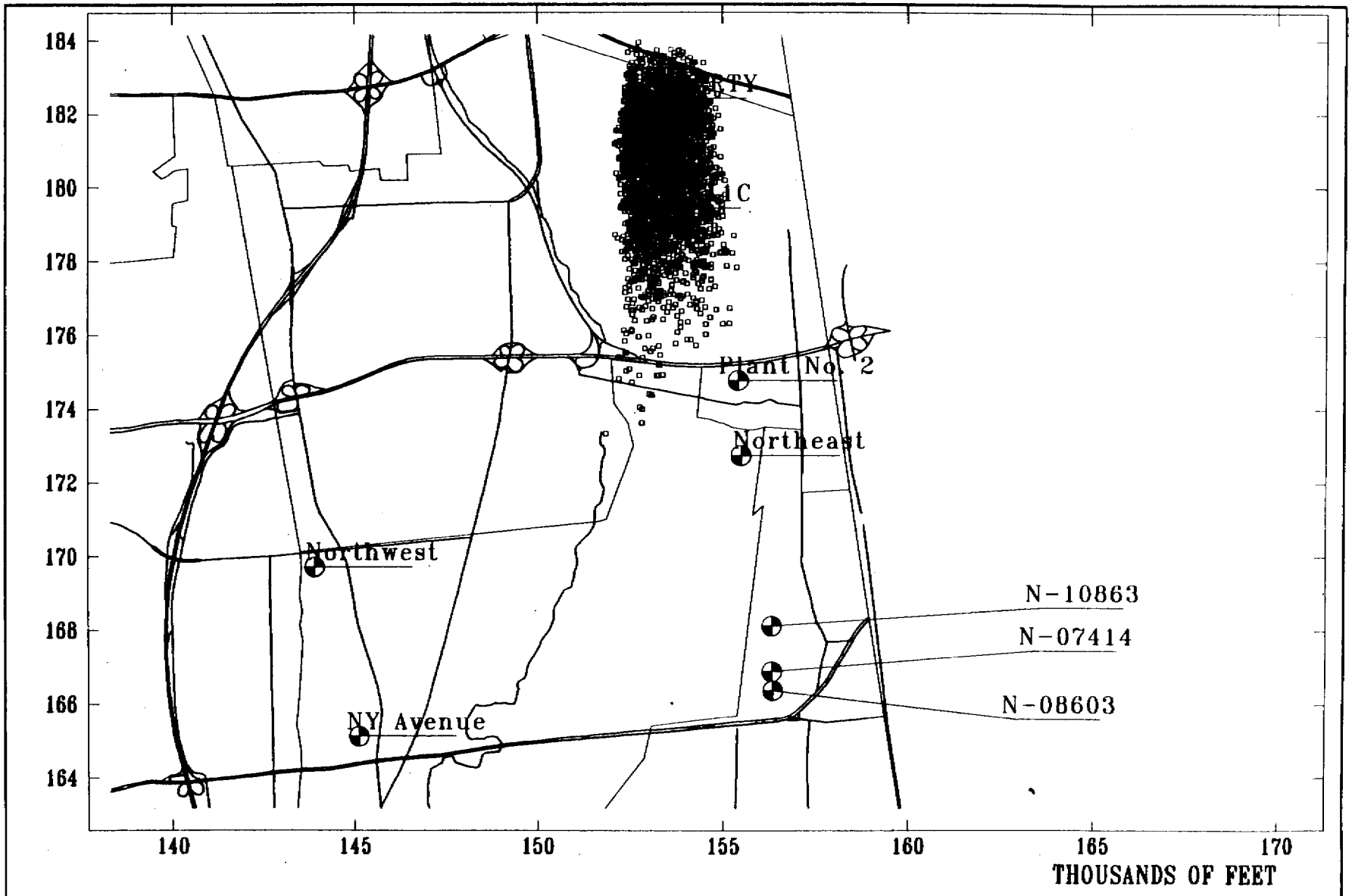

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Figure 1
PRELIMINARY ASSESSMENT OF LIBERTY SITE CONTAMINATION
PRESENT DAY USING MODIFIED REGIONAL MODEL
RETARDATION FACTOR = 2.0

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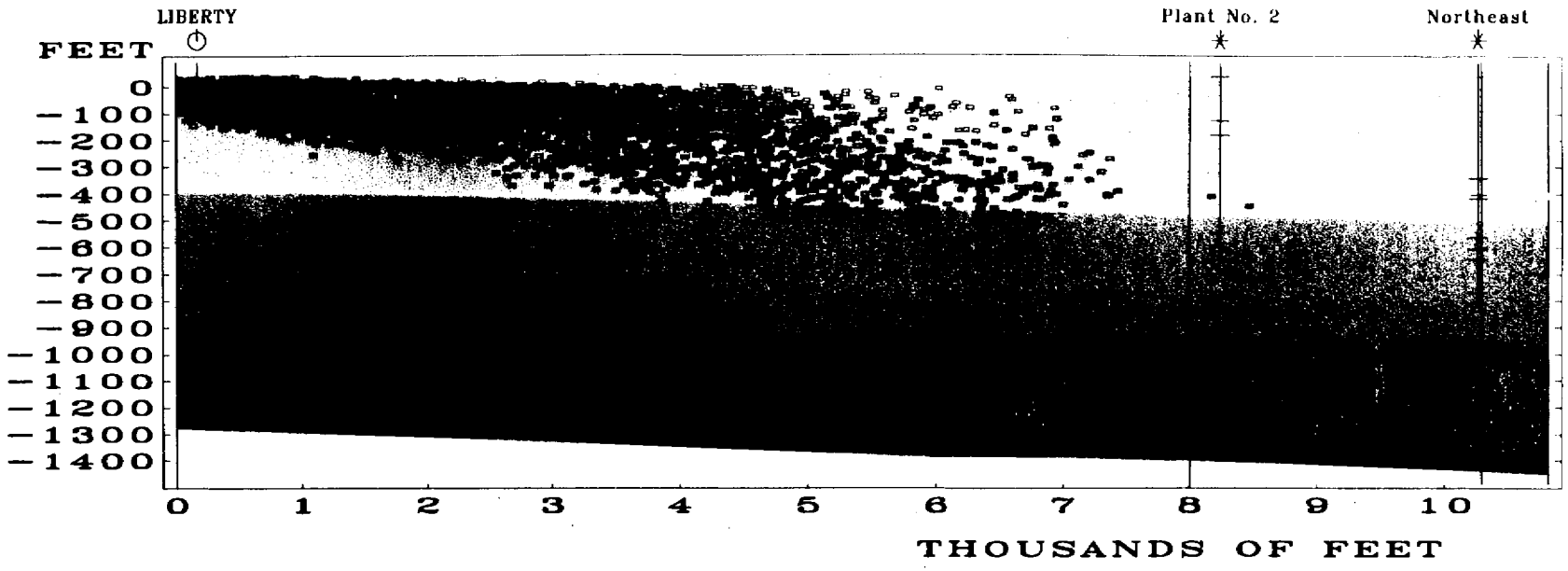

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CROSS SECTION AA

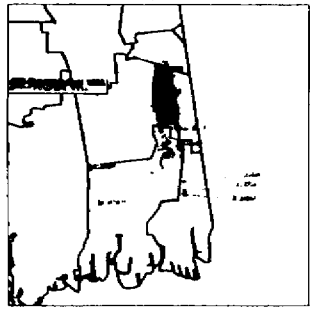

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Figure 2
PRELIMINARY ASSESSMENT OF LIBERTY SITE CONTAMINATION
PRESENT DAY USING MODIFIED REGIONAL MODEL
CROSS SECTION WITH VARIOUS RETARDATION FACTORS

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