PROPOSED REMEDIAL ACTION PLAN

Richard L. Hanson, Jr., Fire Training Center

Environmental Restoration Project

Town of Mohawk, Montgomery County, New York
Site No.: B00138-4

January 2003

Prepared by:
Division of Environmental Remediation
New York State Department of Environmental Conservation

A 1996 Clean Water/Clean Air Bond Act
Environmental Restoration
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SECTION 1: SUMMARY AND PURPOSE OF THE PROPOSED PLAN

The New York State Department of Environmental Conservation (NYSDEC) in consultation with the New York State Department of Health is proposing a remedy to address the threat to human health and/or the environment created by the presence of hazardous substances at the Richard L. Hanson, Jr., Fire Training Center brownfield project.

The 1996 Clean Water/ Clean Air Bond Act provides funding to municipalities for the investigation and cleanup of brownfields. Brownfields are abandoned, idled or under-used properties where redevelopment is complicated by real or perceived environmental contamination. They typically are former industrial or commercial properties where operations may have resulted in environmental contamination. Brownfields often pose not only environmental, but legal and financial burdens on communities. Under the Environmental Restoration (Brownfields) Program, the State provides grants to municipalities to reimburse up to 75 percent of eligible costs for site investigation and remediation activities. Once remediated the property can then be reused.

The site is situated in a rural/residential setting along Route 5 in the Town of Mohawk (Hamlet of Yosts). Private homes exist to the north, west and east of the site. A pond is situated immediately north of the site and beyond that is a vacant wooded hillside. The Mohawk River is located South of this site.

As more fully described in Sections 3 and 4 of this document, leaking underground storage tanks and possibly other spillage have resulted in the disposal of a number of hazardous substances including petroleum and other fuels oils. Some of these hazardous substances may have migrated from the site via the groundwater to the surrounding areas, mostly to the south of the site. The type of contaminants were mostly volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs). These hazardous substances have contaminated the subsurface soils and groundwater and have resulted in:

- a threat to human health associated with the potential for exposure to contaminated groundwater.

- an environmental threat associated with the impacts of contaminants to surrounding water bodies.

In order to eliminate or mitigate the threats to the public health and/or the environment that the hazardous substances disposed at the Richard L. Hanson, Jr., Fire Training Center brownfield site have caused, a remedy has been proposed to address environmental and health threats. The proposed remedy will allow for the continued use of the property as a fire training facility. The facility will be used by local volunteer fire departments.

The proposed remedy for the site includes the following:

- Excavation and off-site disposal of soils contaminated with petroleum and semi-volatile organic compounds in the areas identified to contain such materials east of the Fire Training Center facility;

- Dewatering and treatment of the contaminated groundwater that enters the excavation.

- Imposition of institutional controls including deed restrictions related to the future use of the site.

- Long term groundwater monitoring.

The proposed remedy, discussed in detail in Section 8 of this document, is intended to attain the remediation goals discussed in Section 6 of this Proposed Remedial Action Plan (PRAP) in conformity with applicable standards, criteria, and guidance (SCGs).

This PRAP identifies the preferred remedy, summarizes the other alternatives considered, and discusses the reasons for this preference. The NYSDEC will select a final remedy for the site only after careful consideration of all comments received during the public comment period.

The NYSDEC has issued this PRAP as a component of the citizen participation plan developed pursuant to the New York State Environmental Conservation Law and 6 NYCRR Part 375. This document is a summary of the information that can be found in greater detail in the Site Investigation (SI) and Remedial Alternatives Report (RAR) available at the document repositories.

To better understand the site and the investigations conducted, the public is encouraged to review the project documents at the following repositories:

Mr. Ralph T. Keating
NYSDEC Central Office
625 Broadway, 12th Floor
Albany, NY 12233-7016
Phone (518) 402-9775
Hours: Mon. through Fri., 8:30 to 4:45

NYSDEC Region 4 Office
1150 Westcott Road
Schenectady, NY 12306-2014
Phone (518) 357-2234
Hours: Mon. through Fri., 8:30 to 4:45

Paul Clayburn
Deputy Commissioner of Public Works
Montgomery County
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Park Street, P. O. Box 1500
Fonda, NY 12068-1500

518-853-3814
Hours: Mon. through Fri., 9:00 to 4:00

Frothingham Free Library
Attn: Reference Desk
28 Main Street
Fonda, NY 12068
Phone (518) 853-3016
Hours:
Mon. 12-7; Tues. 10-7; Wed. 11-7;
Thurs. closed; Fri. 12-7; Sat. 9-1

The NYSDEC seeks input from the community on all PRAPs. A public comment period has been set from January 15, 2003 to March 1, 2003 to provide an opportunity for public participation in the remedy selection process for this site. A public meeting is scheduled for January 27, 2003 at the Richard L. Hanson, Jr., Fire Training Center classroom beginning at 6:00 pm.

At the meeting, the results of the SI/RAR will be presented along with a summary of the proposed remedy. After the presentation, a question-and-answer period will be held, during which you can submit verbal or written comments on the PRAP.

The NYSDEC may modify the preferred alternative or select another of the alternatives presented in this PRAP, based on new information or public comments. Therefore, the public is encouraged to review and comment on all of the alternatives identified here.

Comments will be summarized and responses provided in the Responsiveness Summary section of the Record of Decision. The Record of Decision is the NYSDEC's final selection of the remedy for this site. Written comments may be sent to Mr. Keating at the above address through March 1, 2003.

SECTION 2: SITE LOCATION AND DESCRIPTION

The County of Montgomery applied for a State assistance application for the Richard L. Hanson, Jr., Fire Training Center site. This Environmental Restoration Project was approved by the NYSDEC on October 25, 2001. This consists of 3.12 acres in the hamlet of Yosts and is located along State Route 5 about five miles west of the Village of Fonda. The total area of the County owned Richard L. Hanson, Jr., Fire Training Center is 12.7 acres, but only 3.12 acres of the property qualified for a Brownfields grant and is the subject of this PRAP. Figure 1A is a location map for the site and Figure 1B is a County tax map that shows the parcel owned by the County (parcel 19) and the portion of this parcel that is eligible for this PRAP.

This site was used by the New York Central & Hudson Railroad for gravel mining and as a railroad fueling area, and later by Gulf Oil and Peters Oil Co., Inc. as a truck and automotive/truck maintenance garage. Montgomery County took ownership of the site in 1970 and converted the property into a fire training center for local volunteer fire departments. The site history as well as the soil and groundwater contamination are discussed in three reports prepared by J. Kenneth Fraser and Associates and two previous reports prepared by Precision Environmental Services, Inc. that are discussed in Section 4.

SECTION 3: SITE HISTORY

3.1: Operational/Disposal History

In 1891, the New York Central and Hudson River Railroad purchased this property. The site was reportedly used as a mining operation for sand and gravel fill for the construction of their railroad nearby. The railroad may have had a refueling station on this site as well.

A partial transfer of this property occurred on July 17, 1933 from the railroad to Montgomery County apparently to widen the highway right-of-way for Route 5 and Prame Road. The railroad sold the property to Arthur and Agnes Peters in 1940. On January 16, 1948, the property was transferred by Authur and Agnes Peters to the Peters Oil Co., Inc. On July 9, 1948, the property was leased to the Gulf Oil Corporation which carried a 10 year lease.

Under ownership by the Peters and the lease to the Gulf Oil Corporation, the site was used as a fueling station, truck stop and a diner. Several underground storage tanks were installed during this period. On August 22, 1970, the property was transferred to Montgomery County. The County still maintains ownership of this property. The original use by the County was for highway truck storage and maintenance. The County had the Richard L. Hanson, Jr., Fire Training Center built on this site and the other buildings removed. Today it is still being used as a fire training facility.

3.2: Remedial History

During the time of ownership by Peters Oil Co., Inc. and the lease by Gulf Oil Corp., a number of petroleum bulk storage tanks were installed on site. These tanks included two 20,000 gallon petroleum and one 12,000 gallon petroleum above ground tanks. The underground storage tanks included one 500 gallon heating oil tank by the former maintenance garage and one 12,000 gallon solvent based liquid tank. Previous reports indicated that other petroleum tanks may have existed on this site. The County attempted to have all known tanks removed from the site. During the recent site investigation of November 2001, a 1,000-gallon petroleum tank (underground storage tank) was discovered which was thought to be a heating oil tank. This tank was removed from the site under this Brownfields program as an interim remedial measure (IRM).

From the known uses of the property, there were at least two known types of spills: petroleum based and solvent based. The solvent spill was determined to be caused while the County owned this property and this area, therefore, could not be included in the Brownfields grant. Of the 12.7 acres owned by the County, the area eligible for this Brownfields grant is 3.12 acres and will be used to address the areas of petroleum contamination caused by previous owners of this site. The cause of the petroleum based contamination was from leaking storage tanks and spillage over the years of operation of the fueling facilities. The remaining area owned by the County could be considered as a potential inactive hazardous waste site and investigated at a later date to determine if hazardous waste exists.

SECTION 4: SITE CONTAMINATION

To determine the nature and extent of any contamination by hazardous substances of this environmental restoration site, the County of Montgomery has recently completed a Site Investigation/Remedial Action Report (SI/RAR).

4.1: Summary of the Site Investigation

The purpose of the SI was to define the nature and extent of any contamination resulting from previous activities at the site. The SI began on November 13, 2001 and included soil borings and the installation of monitoring wells on site. Field work was completed in January 2002 when the field survey was completed. A report entitled "Site Investigation / Remedial Alternatives Report - Richard L. Hanson, Jr., Fire Training Center" dated August 9, 2002 has been prepared which describes the field activities and findings of the SI in detail.

The SI included the following activities:

- Geophysical survey to locate possible underground storage tanks and buried drums;
- Installation of soil borings and monitoring wells for analysis of soils and groundwater as well as physical properties of soil and hydrogeologic conditions;
- Monitoring well sampling;
- Surface soil sampling;
- Fish and wildlife impact analysis to determine possible environmental impacts of contaminants;
- Background soil sampling.

These investigation activities were conducted to determine which media (soil, groundwater, etc.) are contaminated at levels of concern. The SI analytical data was compared to environmental standards, criteria, and guidance values (SCGs). Groundwater, drinking water and surface water SCGs identified for the Richard L. Hanson, Jr., Fire Training Center site are based on NYSDEC Ambient Water Quality Standards and Guidance Values and Part 5 of New York State Sanitary Code. For soils, NYSDEC Technical and Administrative Guidance Memorandum (TAGM) 4046 provides soil cleanup guidelines for the protection of groundwater, background conditions and health-based exposure scenarios. In addition, for soils, background concentration levels can be considered for certain categories of contaminants. Guidance values for evaluating contamination in surface water sediments are provided by the NYSDEC Technical Guidance for Screening Contaminated Sediments.

Based on the Site Investigation results in comparison to the SCGs and potential public health and environmental exposure routes, certain media and areas of the site require remediation. These are summarized below. More complete information can be found in the SI Report.

Chemical concentrations are reported in parts per billion (ppb) and parts per million (ppm). For comparison purposes, where applicable, SCGs are provided for each medium.

4.1.1: Site Geology and Hydrogeology

The overburden geology beneath the site consists of recent alluvial deposits, fluvial gravels and/or undifferentiated drift complex. The site's soils also consist of cut and fill soils. During the SI, the type of soils encountered were fine to medium sand with lesser occurrences of course sand, fine to course gravel, silt and clay. The silt and clay content increases with depth and is typically interbedded into discreet layers with the sands. These layers of overburden materials could be up to 30 feet thick.

The bedrock formations consist of limestone, dolostone, sandstone, and shale. Bedrock was not encountered during the subsurface investigation. The rocky cliffs located north of the site reveal bedrock outcrops of interbedded limestone and sandstone.

The unconfined groundwater gradient at this site indicates that a hydraulic divide occurs through the center of the site. This groundwater divide causes the predominant groundwater flow direction within the established contaminant plume to flow toward the south-southeast. The remainder of this overburden groundwater flows to the north. The depth to groundwater from the surface was shallow varying from 1 to 6 feet below ground level. The investigation was limited to the groundwater encountered in the overburden.

There are surface water resources located north and south of the site. To the north, there are three unnamed ponds within 300 feet of the site. The Mohawk River is approximately 1,350 feet south of the site and flows west to east.

4.1.2: Nature of Contamination

As described in the SI report, many surface and subsurface soil tests and groundwater tests were conducted to characterize the nature and extent of contamination that may be present at this site. The soil tests indicate that contamination occurred due to petroleum based products from the former fueling station that existed at the site. The sources of this contamination are from: 1) leaks from the above and below ground petroleum storage tanks; 2) leaks from the associated distribution piping; 3) spills from vehicle and equipment maintenance; and 4) surface releases from spillage during fueling operations. Also, minor releases at the end of the culvert outlet that originates at the fire training tower indicate other releases of petroleum based products.

These releases resulted in several VOCs and SVOCs being detected during the course of the investigation. The groundwater beneath this site showed the presence of widespread VOC and SVOC contamination. Groundwater samples were taken from the monitoring wells that were installed at the same locations that the direct push soil boring samples were taken. In the course of this investigation and the previous spills investigation, a total of 26 monitoring wells were installed.

The groundwater sample results revealed 6 of 26 samples with six different VOC compounds and 4 of 26 samples with four different SVOC compounds. Since there are drinking water wells located near this site and widespread contamination was found, exposure to contaminants in groundwater is a concern. Also, since surface water exists north of this site, the possibility of groundwater contaminating this resource is a concern.

4.1.3: Extent of Contamination

Tables 1, 2 and 3 summarize the extent of contamination for the contaminants of concern in the soils and groundwater and compares the data with the SCGs for the site. The investigation was conducted from November 13, 2001 through December 3, 2001. An additional round of groundwater sampling was conducted on December 13, 2002. The following are the media which were investigated and a summary of the findings of the investigation.

Geophysical Survey

The geophysical survey was conducted on November 13 and 14, 2001 to locate possible underground storage tanks (USTs) and related piping at this site. Two complementary geophysical methods were used: a time domain electromagnetic induction survey and a ground penetrating radar (GPR) method. The electromagnetic survey detects and outlines areas containing buried metals. This instrument does not distinguish the type of metal found. The ground penetrating radar, conducted over the areas where the electromagnetic survey anomalies were found, better defined locations of underground buried objects.

During the geophysical survey, a 1,000-gallon UST was located that was not removed from the earlier cleanup operation. (An IRM was done during this investigation to remove this tank as described in Section 4.2.) Also located were buried piping and underground utilities that may be related to the former USTs. Several areas of other buried objects were identified, but none indicated buried drums or other USTs. These other objects may have been construction debris or other buried metal objects.

Soil

Soil samples were collected from the 13 new monitoring well borings installed during this investigation and from 18 soil boring locations. This work was done from November 13-16, 2001. (Table 2 shows the results of these soil samples.) From these locations, 6 of the 30 subsurface soil samples showed levels of VOCs that were above the TAGM 4046 guidelines for recommended soil cleanup objectives. For SVOCs, of the 30 samples taken, five showed levels that were above TAGM 4046 guidelines. Table 2 shows the types of compounds found and the frequency of occurrence of the compound for both the VOCs and SVOCs. No PCB levels were found to be above the TAGM guideline levels. Figures 4 and 5 show the concentrations of the VOCs and SVOCs, respectively found in soils across the site. The concentrations shown on Table 2 and on Figures 4 and 5 are in parts per million (ppm).

The highest levels were found in the areas nearest Route 5 tending toward the south side of the site. These were the areas where the former USTs were located and the likely areas of the former fuel station. Soil samples were also collected from the excavation pit after the removal of the UST and from the two outfall locations that drain toward the ponds. The levels of VOCs and SVOCs found around the tank were also high, but only low levels of these compounds were found at the outfall locations.

Groundwater

A total of 13 monitoring wells were installed as part of this investigation and 13 monitoring wells existed from the previous spills investigation. These 26 wells were sampled on December 3, 2001 and analyzed for VOCs, SVOCs, and PCBs. For VOCs, of the 26 monitoring wells sampled, seven showed levels that were above the groundwater standard for benzene, toluene, ethylbenzene and xylenes (BTEX). For SVOCs, 6 of the 26 samples showed levels of SVOCs that were above the groundwater standard. One of the 26 wells showed a PCB level of 0.12 ppb that slightly exceeded the groundwater standard of 0.09 ppb. Table 1 shows the types of compounds and the frequency of occurrence of these compounds.

The corresponding maps on Figures 2 and 3 show the concentrations of VOCs and SVOCs, respectively in the groundwater. The highest groundwater contamination levels were found beneath the locations where the highest soil concentrations of similar compounds were found. As with the highest soil concentrations, these groundwater samples were found to contain VOCs and SVOCs in the areas nearest Route 5 tending toward the south side of the site. The groundwater flow direction of the overburden aquifer tends to slope to the south as well. As mentioned before, these were the areas where the USTs were previously located and the likely area of the former fuel station.

Prior to this investigation, the New York State Department of Health (NYSDOH) collected domestic water samples from three properties immediately adjacent to the site on July 12 and 20, 2001 and on August 2, 2001. None of these wells revealed the presence of VOCs; however, MTBE was found in one homeowner's well at 38 ppb that exceeded the groundwater standard of 10 ppb. Another homeowner's well had a result of 0.5 ppb.

An additional round of groundwater sampling was done on December 13, 2002. Ten monitoring wells were selected from around the perimeter of the site and two from the interior of the site. The two in the interior of the site were monitoring wells MW-5 and MW-13 which had the highest detected VOC results from the initial round of sampling. These monitoring wells were sampled for VOCs as well as MTBE. None of these monitoring wells revealed the presence of MTBE contamination leading to the conclusion that the MTBE contamination at the homeowner's wells is from another source not related to the site. An additional investigation (not associated with this Brownfield's grant) may be done to identify the source of the MTBE contamination in the area.

Surface Water

Although no surface water samples were taken as part of this investigation from the ponds located north of the site, there were samples taken from the outfall locations that drain into the ponds. The two outfall drainage structures seem to come from the fire-training center and the fire tower and drain toward the ponds to the north. The results of these soil samples showed no levels of contaminants above TAGM 4046. This indicates that the site is not likely to cause any adverse impact to the ponds.

Air

Air sampling was performed to test the ambient air quality during the drilling activities. Also, Photo Ionization Detector (PID) readings were taken from the monitoring well holes. The recorded levels indicated that a potential exposure exists, as well as airborne migration during site activities that significantly disturb or expose subsurface soils.

4.2: Interim Remedial Measures

An Interim Remedial Measure (IRM) is conducted at a site when a source of contamination or exposure pathway can be effectively addressed before completion of the SI/RAR. As mentioned previously, during the geophysical survey in November 2001, a 1,000-gallon UST was located southeast of the fire-training center. Figure 2 shows approximately where this tank was located. A week after this tank was located, the excavation, removal, and disposal of this tank took place. UST fluids and tank bottom sludge were removed by vacuum truck and properly disposed of off-site. Approximately 762 gallons of residual heating oil and/or contaminated water were removed from the UST. This UST was assumed to be from a heating oil storage tank that was not removed during the earlier removal operation.

The soils that were exposed around this tank were observed to be stained with oily material. Several small holes were observed in the tank from a visual inspection of the tank and an odor of petroleum was noticed. During this UST closure procedure, no additional releases occurred. Approximately, 25-30 cubic yards of petroleum contaminated soils were excavated from the tank grave and remain on-site covered by a plastic cover. Since the anticipated remedy across the whole site would likely involve contaminated soil removal above the Technical and Administrative Guidance Memorandum 4046 (TAGM 4046) levels, these soils were left on the site. They will be removed at a later date as part of the bigger removal operation. Three samples were taken from the sidewalls and below this tank during the IRM and the results are presented in Table 3. These results show that BTEX contamination remains and will be removed as part of the remedy of the site.

4.3: Summary of Human Exposure Pathways

This section describes the types of human exposures that may present added health risks to persons at or around the site. A more detailed discussion of the health risks can be found in Section 6 of the SI report.
An exposure pathway describes the means by which an individual may be exposed to contaminants originating from a site. An exposure pathway has five elements: [1] a contaminant source, [2] contaminant release and transport mechanisms, [3] a point of exposure, [4] a route of exposure, and [5] a receptor population.

The source of contamination is the location where contaminants were released to the environment (any waste disposal area or point of discharge). Contaminant release and transport mechanisms carry contaminants from the source to a point where people may be exposed. The exposure point is the location where actual or potential human contact with a contaminated medium may occur. The route of exposure is the manner in which a contaminant actually enters or contacts the body (e.g., ingestion, inhalation, or direct contact) . The receptor population is the people who are, or may be, exposed to contaminants at a point of exposure.

An exposure pathway is complete when all five elements of an exposure pathway exist. An exposure pathway is considered a potential pathway when one or more of the elements currently does not exist, but could in the future.

Pathways which are known to or may exist at this site include ingestion and inhalation. There is a possibility of an exposure via groundwater transport to domestic water supply wells and of vapor exposure to workers on-site during an excavation operation. No site related contaminant has currently effected the nearby homeowner's wells. The domestic well sampling that revealed MTBE in these wells appears to be from another source and is not related to present site contaminants. The potential exists for worker exposure during soil excavation or drilling operations at the site. In that case, dermal and respiratory protection would be used to maintain safe working conditions for the worker and the public would be kept a safe distance from work areas.

4.4: Summary of Environmental Exposure Pathways

This section summarizes the existing and potential future environmental impacts presented by the site. Environmental impacts include existing and potential future exposure pathways to fish and wildlife receptors, as well as damage to natural resources such as aquifers and wetlands.

The Fish and Wildlife Impact Assessment, which is included as part of the SI, presents a detailed discussion of the potential impacts from the site to fish and wildlife resources. A separate document contains the results of this assessment. No known environmental exposure or ecological risks were identified by this site contamination, however, a potential pathway exists from the groundwater migrating to surface water near the site. The ponds that are located north of the site could receive contaminated groundwater over time. Presently, the northern-most wells around the site were all non detectable for all contaminants.

SECTION 5: ENFORCEMENT STATUS

Potentially Responsible Parties (PRPs) are those who may be legally liable for contamination at a site. This may include past owners and operators, waste generators, and haulers.

Legal action may be initiated at a future date by the State to recover State response costs should PRPs be identified. The County of Montgomery will assist the State in its' efforts by providing all information to the State which identifies PRPs. The County of Montgomery will also not enter into any agreement regarding response costs without the approval of the NYSDEC. Since this is a Brownfields grant, the County of Montgomery was eligible for only the areas of contamination on this site for which they were not responsible.

SECTION 6: SUMMARY OF THE REMEDIATION GOALS AND THE PROPOSED USE OF THE SITE

Goals for the remedial program have been established through the remedy selection process stated in 6 NYCRR Part 375-1.10. The overall remedial goal is to meet all standards, criteria, and guidance (SCGs) and be protective of human health and the environment. At a minimum, the remedy selected must eliminate or mitigate all significant threats to the public health and to the environment presented by the hazardous substances disposed at the site through the proper application of scientific and engineering principles.

The proposed future use for the Richard L. Hanson, Jr., Fire Training Center would be to continue the current use of the site as a fire training center.

The goals selected for this site are:

- *Reduce, control, or eliminate to the extent practicable the contamination present within the soils on site.*
- *Eliminate the threat to surface waters by eliminating any future contaminated surface run-off from the contaminated soils on site.*
- *Eliminate the potential for direct human or animal contact with the contaminated soils on site.*
- *Mitigate the impacts of contaminated groundwater to the environment.*
- *Provide for attainment of SCGs for groundwater quality at the limits of the area of concern (AOC), to the extent practicable.*

SECTION 7: SUMMARY OF THE EVALUATION OF ALTERNATIVES

The selected remedy must be protective of human health and the environment, be cost effective and comply with other statutory requirements. Potential remedial alternatives for the Richard L. Hanson, Jr., Fire Training Center site were identified, screened and evaluated in a Remedial Alternatives Report. This evaluation is presented in the report entitled *Site Investigation/Remedial Alternatives Report: Richard L. Hanson, Jr. - Fire Training Center* dated August 2002.

A summary of the detailed analysis follows. As presented below, the time to implement reflects only the time required to implement the remedy, and does not include the time required to design the remedy or procure contracts for design and construction.

7.1: Description of Remedial Alternatives

The potential remedies are intended to address the contaminated soils and groundwater at the site.

Alternative 1: No Action

The No Action alternative is typically evaluated as a procedural requirement and as a basis for comparison. It would require continued monitoring only, allowing the site to remain in an unremediated state. This alternative would leave the site in its present condition and would not provide any additional protection to human health or the environment.

Alternative 2: High Vacuum with Total Fluid Extraction (HV/TFE) coupled with Air Sparging (AS)

This remedy would be comprised of two phases. The HV/TFE phase would involve installing 4" or 6" well screens to the contaminated depth. The vapor and fluids would be extracted under vacuum through horizontal subsurface lines to a treatment unit. The treatment unit would be either an air stripper and/or activated carbon filtration. The AS phase would involve inducing air into the contaminated groundwater thereby treating both the soils and the groundwater.

Present Worth:	*$ 1,124,252*
Capital Cost:	*$ 917,000*
Annual O&M for Treatment Facility:	*$ 45,450*
Annual Well Sampling Cost:	*$ 12, 000*
Time to Implement	1 year
Duration for:	
Operation Treatment Facility:	4 years
Monitoring of Wells:	5 years

Alternative 3: Bioremediation

This remedial technology would utilize a variety of technologies designed to enhance the subsurface environment by providing oxygen, water and nutrients to create conditions favorable for microbial population growth. The increased microbial population would in turn metabolize the hydrocarbons in the contaminated soils and break down this contamination. An Oxygen Releasing Compound (ORC) would be injected into the source area through the voids created by soil borings. The ORC will be released at a ratio of 3 parts oxygen to 1 part hydrocarbon over time to effectively mitigate the hydrocarbons in the subsurface soils. Multiple applications of the ORC may be required maintain this optimal ratio. This remedy will also require periodic groundwater monitoring to keep track of the progress of this remedial alternative.

Present Worth:	*$ 1,944,580*
Capital Cost:	*$ 1,891,900*
Annual O&M:	*$ 12,000*
Time to Implement	6 months-1 yr.
Duration of Operation	5 years

Alternative 4: Soil Excavation and Disposal

Soil excavation is a frequently used remedy for petroleum contaminated sites. This method would remove soils contaminated above established SCG levels and transport this material off-site to a permitted disposal facility. Water encountered during construction would be treated to remove contamination during the dewatering process.

Present Worth:	*$ 1,049,680*
Capital Cost:	*$ 997,000*
Annual O&M:	*$ 12,000*
Time to Implement	6 months
Duration of Operation	1 year

7.2 Evaluation of Remedial Alternatives

The criteria used to compare the potential remedial alternatives are defined in the regulation that directs the remediation of environmental restoration project sites in New York State (6 NYCCR Part 375). For each of the criteria, a brief description is provided followed by an evaluation of the alternatives against that criterion. A detailed discussion of the evaluation criteria and comparative analysis is included in the Remedial Alternatives Report.

The first two evaluation criteria are termed threshold criteria and must be satisfied in order for an alternative to be considered for selection.

1. Compliance with New York State Standards, Criteria, and Guidance (SCGs). Compliance with SCGs addresses whether or not a remedy will meet applicable environmental laws, regulations, standards, and guidance.

With Alternative 1, the no action alternative, the problems with the site would continue to persist. Nothing would be gained toward achieving compliance with SCGs under this alternative.

Alternatives 2 and 3, HV/TFE and bioremediation, respectively, could achieve the soil cleanup goals over a five year time period, but it would be difficult to determine exactly how long. Future rounds of subsurface soils boring samples would need to be done to assure that TAGM 4046 cleanup levels are met.

Alternative 4, the excavation and removal alternative, would assure compliance with the TAGM 4046 goals since the source would be excavated and removed off site for permanent disposal. Confirmatory sampling would assure that the removal operation is effective.

All three alternatives will have an O&M program associated with them involving sampling the monitoring wells to determine the long term effectiveness of the remedy. Alternative 2 is the only remedy that directly addresses the groundwater as part of the remedy. Alternative 4, in the process of dewatering the soils, will treat groundwater to a degree, but the primary intent is to remove the water from saturated soils prior to off-site disposal. In all these cases, the monitoring wells would have to be sampled to determine trends in contaminant concentration levels. If contaminated soils were sufficiently removed, these trends should decline.

2. Protection of Human Health and the Environment. This criterion is an overall evaluation of each alternative's ability to protect public health and the environment.

Alternative 1 clearly would provide no protection to the human health and the environment.

Alternative 2, HV/TFE, would provide some protection to human health and the environment since the process would substantially reduce the contaminate mass within three to five years. Minor concentrations (within SCGs) of hydrocarbon vapors might be released to the atmosphere during these operations. Over time, the groundwater contaminant concentrations would return to levels within SCGs.

Alternative 3, bioremediation, would also provide protection to human health and the environment. This process takes place in-situ and exposure to workers or the public would be very limited. The by-products of this process would only water and carbon dioxide, thus eliminating most residual public health and environmental risks that were possible under Alternative 2.

Alternative 4, excavation and removal, would provide the best protection to the public health and the environment. Excavation of petroleum contaminated soils would result in an immediate removal of risks posed by exposure to contaminated soils. The resulting source removal would eliminate the contamination source to the underlying groundwater and thus the groundwater contamination would start to decrease. The site will be secured during excavation and removal action to prevent the public from having access to contaminated soils. Clean backfill would be used to fill the voids created by the excavation when all the contaminated soils above SCG levels were removed.

The next five "primary balancing criteria" are used to compare the positive and negative aspects of each of the remedial strategies.

3. Short-term Effectiveness. The potential short-term adverse impacts of the remedial action upon the community, the workers, and the environment during the construction and/or implementation are evaluated. The length of time needed to achieve the remedial objectives is also estimated and compared against the other alternatives.

Alternative 1 clearly would provide no protection to the human health and the environment.

With Alternative 2, HV/TFE, workers would be exposed to contaminated soils during the drilling and trenching phase of the system installation. The air discharges could potentially present an exposure to workers or the community, but these gases would be continually monitored and corrective action taken if a problem occurs. The ground work and remedial facilities construction would be expected to be completed in one construction season. After four years of operation, the majority of the contaminants would be removed. After that, monitoring at the site would continue for five more years.

Alternative 3, bioremediation, would reduce the hydrocarbons in the subsurface soils with optimal site conditions. The duration would be typically 3 to 5 years. The potential exists for continued contaminant migration through the groundwater during the remediation. This situation could be rectified if a downgradient ORC barrier is installed, however, that would add considerable costs to this remedy.

Alternative 4, excavation and removal, would provide the fastest remedy as this can be completed in one construction season. During the excavation, exposure would be possible to workers and the public and proper safety barriers and worker protection would be considered before commencing any work. The airway around the work site as well in the excavation void would be continually monitored to determine proper worker and community protection.

4. Long-term Effectiveness and Permanence. This criterion evaluates the long-term effectiveness of the remedial alternatives after implementation. If wastes or treated residuals remain on site after the selected remedy has been implemented, the following items are evaluated: 1) the magnitude of the remaining risks, 2) the adequacy of the controls intended to limit the risk, and 3) the reliability of these controls.

Alternative 1 clearly would provide no protection to the human health and the environment.

With Alternative 2, HV/TFE, the complete remediation would take from 3 to 5 years. This alternative has been effective at removing VOCs at sites with similar contamination, but is not effective at removing residual SVOCs. The SVOCs would represent a risk after this remedial technology is complete. Groundwater monitoring would need to be continued after this system removes the contaminants found in the soils.

Alternative 3, bioremediation, would reduce hydrocarbon contamination from the source area to levels below TAGM cleanup objectives. The time frame for this technology is at least 5 years making this the longest of the remedial technologies. Groundwater monitoring would need to be continued after this system removes the contaminants found in the soils.

Alternative 4, excavation and removal, would provide the most permanent solution to this problem since the source wold be removed from this site. Some low levels of contamination (below TAGM 4046 guidelines) are expected to remain on the site and would be degraded by natural attenuation. As with the other three remedies, continued groundwater monitoring would need to be done to show that the plume is stable and ground water contamination is diminished.

5. Reduction of Toxicity, Mobility or Volume. Preference is given to alternatives that permanently and significantly reduce the toxicity, mobility or volume of the substances at the site.

Alternative 1 clearly would provide no protection to the human health and the environment.

Alternative 2, HV/TFE, would remove the hydrocarbons in the soils and would provide treatment of groundwater. The volume of contamination found in these two media types would be reduced over time.

Alternative 3, bioremediation, would metabolize the hydrocarbon contaminants within the source area to concentrations below TAGM levels. Since this technology completely destroys these hydrocarbons, the volume and toxicity is diminished. The mobility in the groundwater would not be addressed unless a down gradient ORC barrier is installed.

Alternative 4, excavation and removal, would significantly reduce the volume of contaminated soils at this site. The mobility in the soils would also be reduced and eliminated at concentrations above TAGM 4046 levels. Toxicity would be reduced or eliminated when the contaminated soils are treated at an approved disposal facility and the contaminants are physically removed from the soils.

6. Implementability. The technical and administrative feasibility of implementing each alternative are evaluated. Technical feasibility includes the difficulties associated with the construction and the ability to monitor the effectiveness of the remedy. For administrative feasibility, the availability of the necessary personnel and material is

evaluated along with potential difficulties in obtaining specific operating approvals, access for construction, etc..

Based on site geology, Alternative 2, HV/TFE, is a technology that could be implemented. Also, this site is open and does not receive much traffic. These conditions would also make it possible to install this remedy.

Alternative 3, bioremediation, may not work well at this site since there is a heterogeneity of soils and high concentration of SVOCs. This technology would make it difficult to use this site when the remedy is on going as well.

Alternative 4, excavation and removal, is a feasible technology to perform at this site. Several treatment and disposal facilities are located within reasonable trucking distance from this site. Parts of the site would not be usable during construction, but the duration of the project would be short term.

7. Cost. Capital and operation and maintenance costs are estimated for each alternative and compared on a present worth basis. Although cost is the last balancing criterion evaluated, where two or more alternatives have met the requirements of the remaining criteria, cost effectiveness can be used as the basis for the final decision. The costs for each alternative are presented in Table 4.

This final criterion is considered a modifying criterion and is taken into account after evaluating those above. It is evaluated after public comments on the Proposed Remedial Action Plan have been received.

Alternative 2, HV/TFE, would involve installing approximately 100 wells as part of the process and various other remedial equipment. The capital cost for this remedy is $917,000. There would be a high O&M cost of $45,450 per year to run this treatment facility for four years. After that, groundwater monitoring would be done for five additional years to determine the effectiveness of the treatment facility for an additional cost of $12,000 per year. The present worth of this alternative is $1,124,252. The cost of this technology is second highest of the three.

Alternative 3, bioremediation, has been estimated to be the most expensive of the remedies. The capital cost is $1,891,900 and the annual O&M cost of $12,000 per year, the present worth of this alternative is $1,944,580. This technology involves installing 600 soil borings to inject the ORC into the subsurface soils.

Alternative 4, excavation and removal, is the least expensive of the remedies. The capital cost is $997,000 and the annual O&M cost of $12,000 per year, the present worth of this alternative is $1,049,680. This technology will remove approximately 17,500 tons of soils from the site for disposal at a permitted disposal facility.

8. Community Acceptance - Concerns of the community regarding the SI/RAR reports and the Proposed Remedial Action Plan are evaluated. A "Responsiveness Summary" will be prepared that describes public comments received and the manner in which the Department will address the concerns raised. If the selected remedy differs significantly from the proposed remedy, notices to the

public will be issued describing the differences and reasons for the changes.

SECTION 8: SUMMARY OF THE PROPOSED REMEDY

Based on the results of the SI/RAR, and the evaluation presented in Section 7, the NYSDEC is proposing Alternative 4 as the remedy for this site.

This selection is based on the evaluation of the four alternatives developed for this site. With the exception of the No Action alternative, each of the alternatives would comply with the threshold criteria. In addition, all three alternatives are similar with respect to the majority of the balancing criteria.

Alternatives 2 (HV/TFE) and 3 (bioremediation) are the highest cost remedies. Alternative 4 (excavation and removal) is the lowest cost remedy. Alternative 4 would be the most immediate remedy to implement and since it physically removes the source of the contamination from this site, an immediate reduction groundwater contaminants should result. Alternative 2 is the only alternative that directly treats groundwater. The other alternatives indirectly address groundwater by source removal.

Also, both Alternatives 2 and 3 would require an evaluation of the remedies as the systems are implemented to determine if they are working properly. A pilot test was recommended by the consultant for these alternatives. Alternative 4 would provide for the removal of the source materials from the ground, allowing a visual and analytical inspection to ensure that all of the soil contaminants in excess of TAGM 4046 guidelines were removed and properly disposed of at a permitted disposal facility.

The estimated present worth cost to implement the remedy is $1,049,680. The cost to construct the remedy is estimated to be $997,000 and the estimated average annual operation and maintenance cost for 5 years is $12,000.

The elements of the proposed remedy are as follows:

1. A remedial design program would be implemented to provide the details necessary for the construction, operation, maintenance, and monitoring of the remedial program.

2. Excavation of approximately 17,500 tons of soils contaminated above TAGM 4046 levels. For soils below the groundwater table, the saturated soils removed would be dewatered on a liner arranged around a berm-sided collection area adjacent to the excavation. The groundwater will be treated and drained back into the excavation, as long as the treated water is within the established SCG's.

3. These contaminated soils would be characterized and determined whether they are hazardous or not and hazardous waste will be transported to a permitted disposal facility.

4. The site would be restored by grading, placement of topsoil, and seeding of excavated and/or filled areas.

5. An institutional control (deed restriction) would also be imposed in the form of existing use and development restrictions preventing the use of groundwater as a source of potable or process water without

necessary water quality treatment as determined by the New York State Department of Health.

The property owner would complete and submit to the NYSDEC an annual certification until the NYSDEC notifies the property owner in writing that this certification is no longer needed. This submittal would contain certification that the deed restrictions put in place, pursuant to the Record of Decision, are still in place, have not been altered, and are still effective.

6. Since the remedy results in untreated hazardous substances remaining in the groundwater at the site, a long term groundwater monitoring program would be instituted. Monitoring wells around the site will be sampled semi-annually. This program would allow the effectiveness of the remedy to be monitored and would be a component of the operation, maintenance, and monitoring for the site.

Table 1
Nature and Extent of Groundwater Contamination

MEDIUM	CATEGORY	CONTAMINANT OF CONCERN	CONCENTRATION RANGE (ppb)	FREQUENCY of Exceeding SCGs or Background	SCG/ Bkgd. (ppb)
Groundwater	Volatile Organic Compounds (VOCs)	Methylene Chloride	ND (5) to 45	6 of 26	5
		Benzene	ND (5) to 970	5 of 26	1
		Toluene	ND (5) to 100	6 of 26	5
		Ethylbenzene	ND (5) to 530	6 of 26	5
		m,p-Xylenes	ND (5) to 330	6 of 26	5
		o-Xylene	ND (5) to 320	6 of 26	5
Groundwater	Semivolatile Organic Compounds (SVOCs)	Naphthalene	ND (10) to 160	6 of 26	10
		2-Methylnaphthalene	ND (10) to 180	5 of 26	50
		Phenanthrene	ND (10) to 56	1 of 26	50
Groundwater	Polychlorinated biphenyls (PCBs)	Aroclor-1260	ND (0.066) to 0.12	1 of 26	0.09
Groundwater	Other	MTBE	ND	0 of 12	10*

Notes:

* The New York State Part 5 drinking water standard for MTBE is 50 ppb.

All the concentrations listed in this table are individual results and the frequency of occurrence for the specific contaminant. The corresponding Figures 2 and 3 show the total concentrations for VOCs and SVOCs at specific sampling points.

Table 2
Nature and Extent of Soil Contamination Across Site

MEDIUM	CATEGORY	CONTAMINANT OF CONCERN	CONCENTRATION RANGE (ppm)	FREQUENCY of Exceeding SCGs or Background	SCG/ Bkgd. (ppm)
Soils	Volatile Organic Compounds (VOCs)	Benzene	ND to 15.0	4 of 30	0.06
		Toluene	ND to 7.8	3 of 30	1.5
		Ethylbenzene	ND to 52.0	5 of 30	5.5
		m,p-Xylenes	ND to 220.0	6 of 30	1.2
		o-Xylenes	ND to 8.3	4 of 30	1.2
Soils	Semi-Volatile Organic Compounds (SVOCs)	Naphthalene	ND to 62.0	4 of 30	13.0
		2-Methylnaphthalene	ND to 130.0	3 of 30	36.4
		Benzo(a)pyrene	ND to 64.0	1 of 30	0.061
Soils	Polychlorinated biphenyls (PCBs)	Any Aroclor	ND	0 of 26	1.0

Notes:

All the concentrations listed in this table are individual results and the frequency of occurrence for the specific contaminant. The corresponding Figures 4 and 5 show the total concentrations for VOCs and SVOCs at specific sampling points.

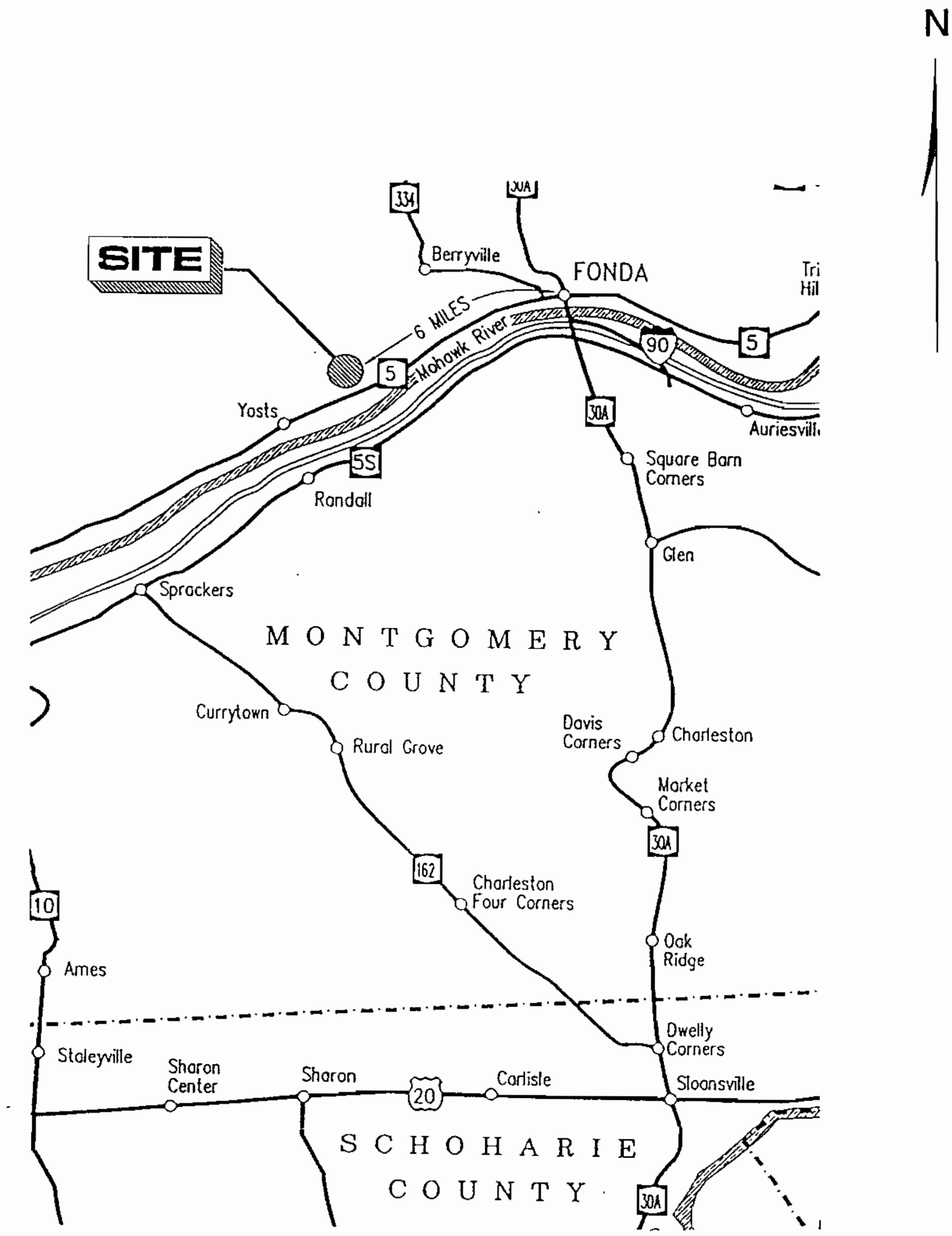
Table 3
Nature and Extent of Soil Contamination from Tank Excavation (B-1, SW-1&2, and SW-3-4)

MEDIUM	CATEGORY	CONTAMINANT OF CONCERN	CONCENTRATION RANGE (ppm)	FREQUENCY of Exceeding SCGs or Background	SCG/ Bkgd. (ppm)
Soils	Volatile Organic Compounds (VOCs)	Benzene	ND	0 of 3	0.06
		Toluene	ND	0 of 3	1.5
		Ethylbenzene	ND to 7.5	1 of 3	5.5
		m,p-Xylenes	ND to 20.0	2 of 3	1.2
		o-Xylenes	ND to 1.6	1 of 3	1.2
Soils	Semi-Volatile Organic Compounds (SVOCs)	Naphthalene	ND to 50.0	2 of 3	13.0
		2-Methylnaphthalene	0.092 to 130.0	2 of 3	50.0
		Benzo(a)pyrene	ND to 0.045	0 of 3	0.061

Table 4
Remedial Alternative Costs

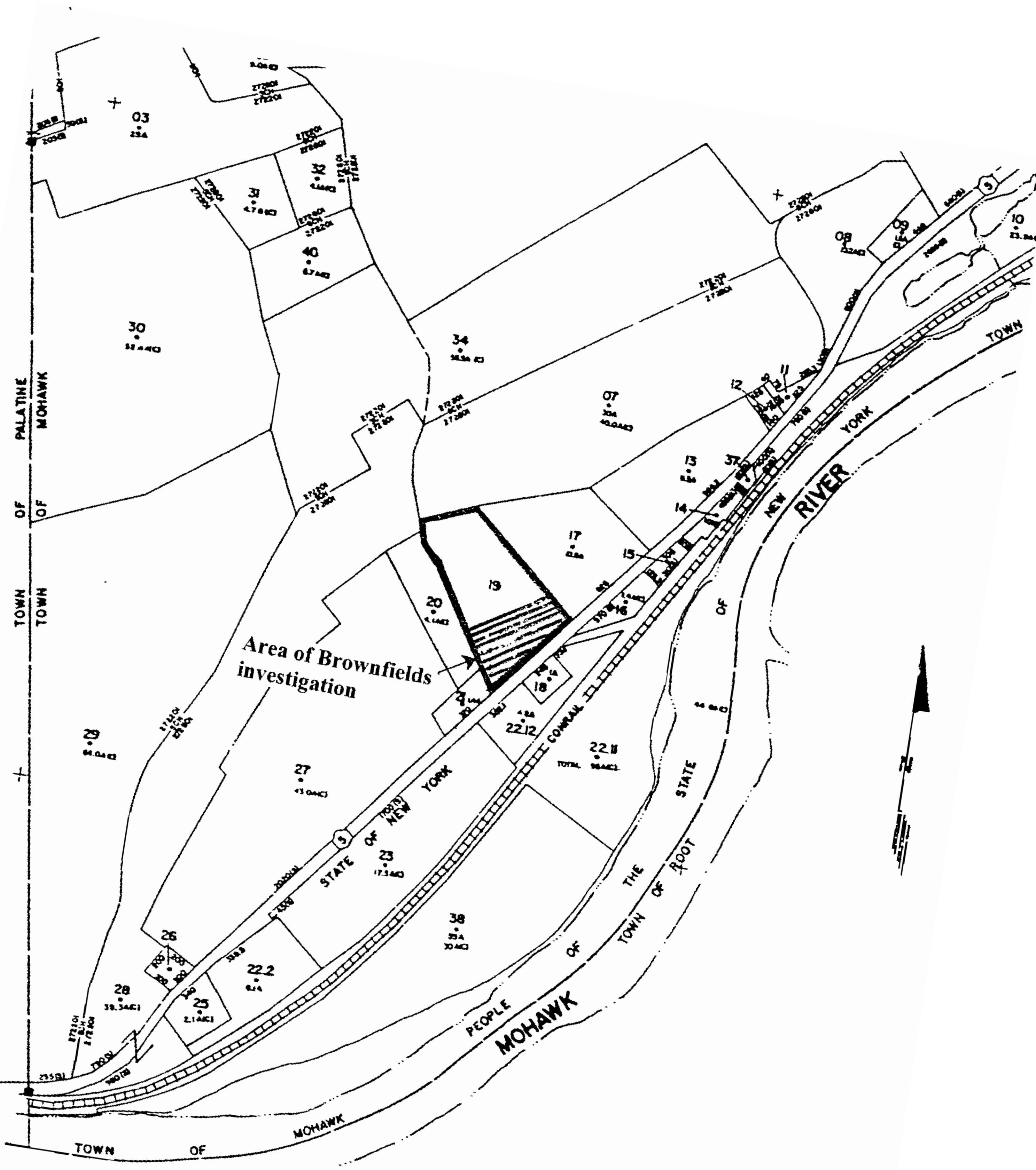
Remedial Alternative	Capital Cost	Annual O&M	Total Present Worth
No Action	$0	$0	$0
HV/TFE/AS	$917,000	** (4 years treatment facility operation at $45,450/year and then 5 years of sampling the monitoring wells at: $12,000/year)	$1,124,252
Bioremediation	$1,891,900	** 5 years of sampling of the monitoring wells at: $12,000/year	$1,944,580
Excavation/Dewatering	$997,000	** 5 years of sampling of the monitoring wells at: $12,000/year	$1,049,680

** Assumes a 4.5% interest rate in determining the present worth of the annual O&M costs.



Source: Fraser & Associates 10/96 Report.

PRECISION ENVIRONMENTAL SERVICES, INC.	Date: 7-1998	Project No: MC/HFTA/PES
Site Location Map	Scale: NA	**Figure 1A**
	Drawn By: NA	



Area of Brownfields investigation
TOWN OF PALATINE
TOWN OF MOHAWK
STATE OF NEW YORK
CONRAIL
MOHAWK RIVER
STATE OF NEW YORK
PEOPLE OF THE STATE
TOWN OF ROOT
TOWN OF MOHAWK
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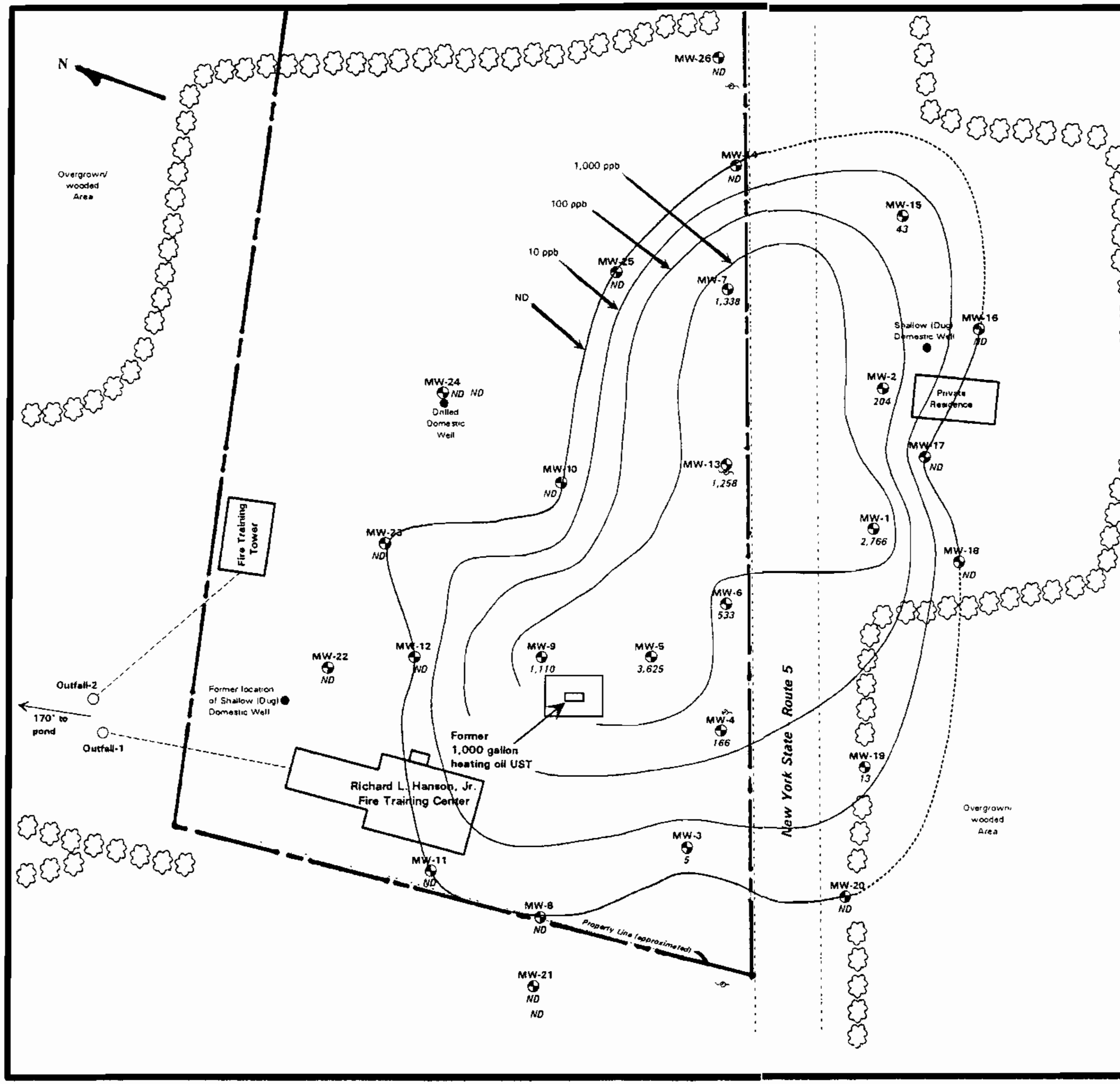
Figure 1B



LEGEND

SCALE 0 60

Title: Groundwater Quality Map - VOC's

Site: Richard L. Hanson, Jr. Fire Training Center Yosts, New York.

Client: Montgomery County

- 1" Geoprobe Monitor Well.
- Domestic Supply Well.

2,766 - Total VOCs with TICS dissolved in water via EPA Method 8260 (ppb).

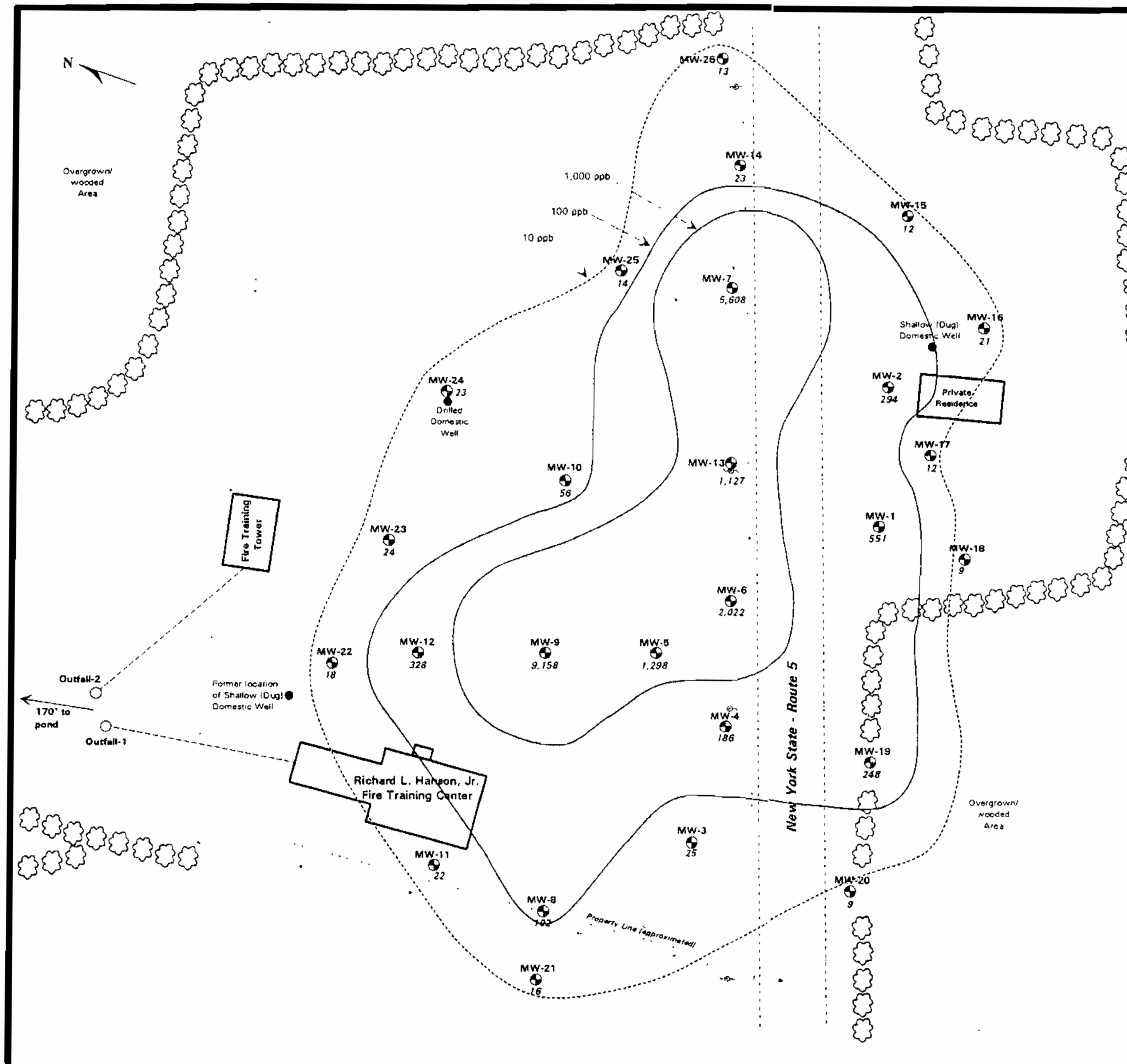
2,000 (inferred) - Groundwater Quality Contour Line ppb).

ND - None Detected.

PES

Figure: 2

Date: 12/3/01



LEGEND

SCALE 0 60

Title: Groundwater Quality Map - SVOC's

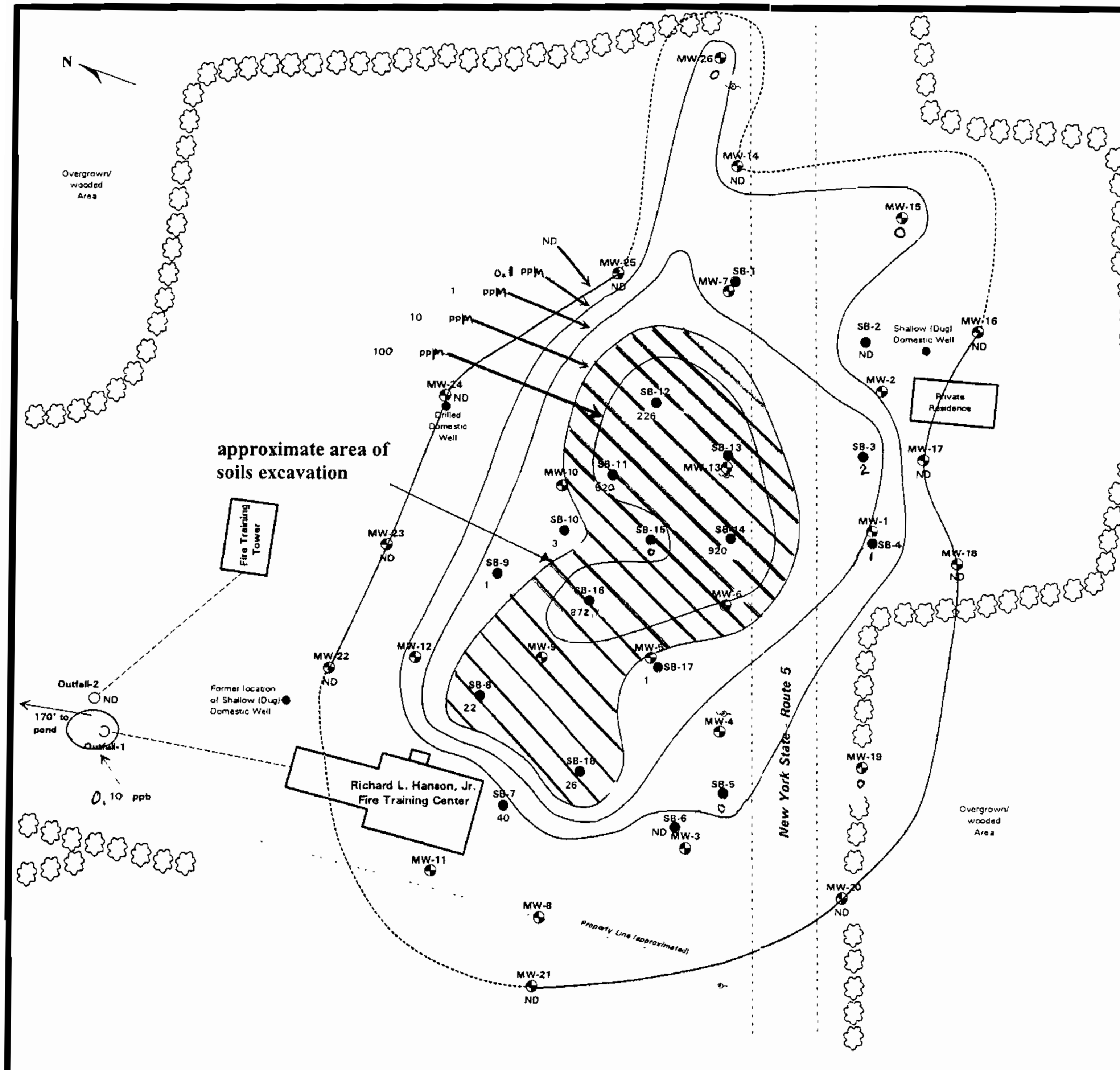
Site: Richard L. Hanson, Jr. Fire Training Center Yosts, New York.

Client: Montgomery County

- 1" Geoprobe Monitor Well.
- Domestic Supply Well.
- 2,766 - Total SVOCs with TICS dissolved in water via EPA Method 8270 (ppb).
- 2,000 ---/— - Groundwater Quality Contour Line ppb). (inferred)
- ND - None Detected.

PES

Figure: 3 | **Date:** 12/3/01



LEGEND

SCALE 0 — 60

Title: Soil Quality Map - VOC's

Site: Richard L. Hanson, Jr. Fire Training Center Yosts, New York.

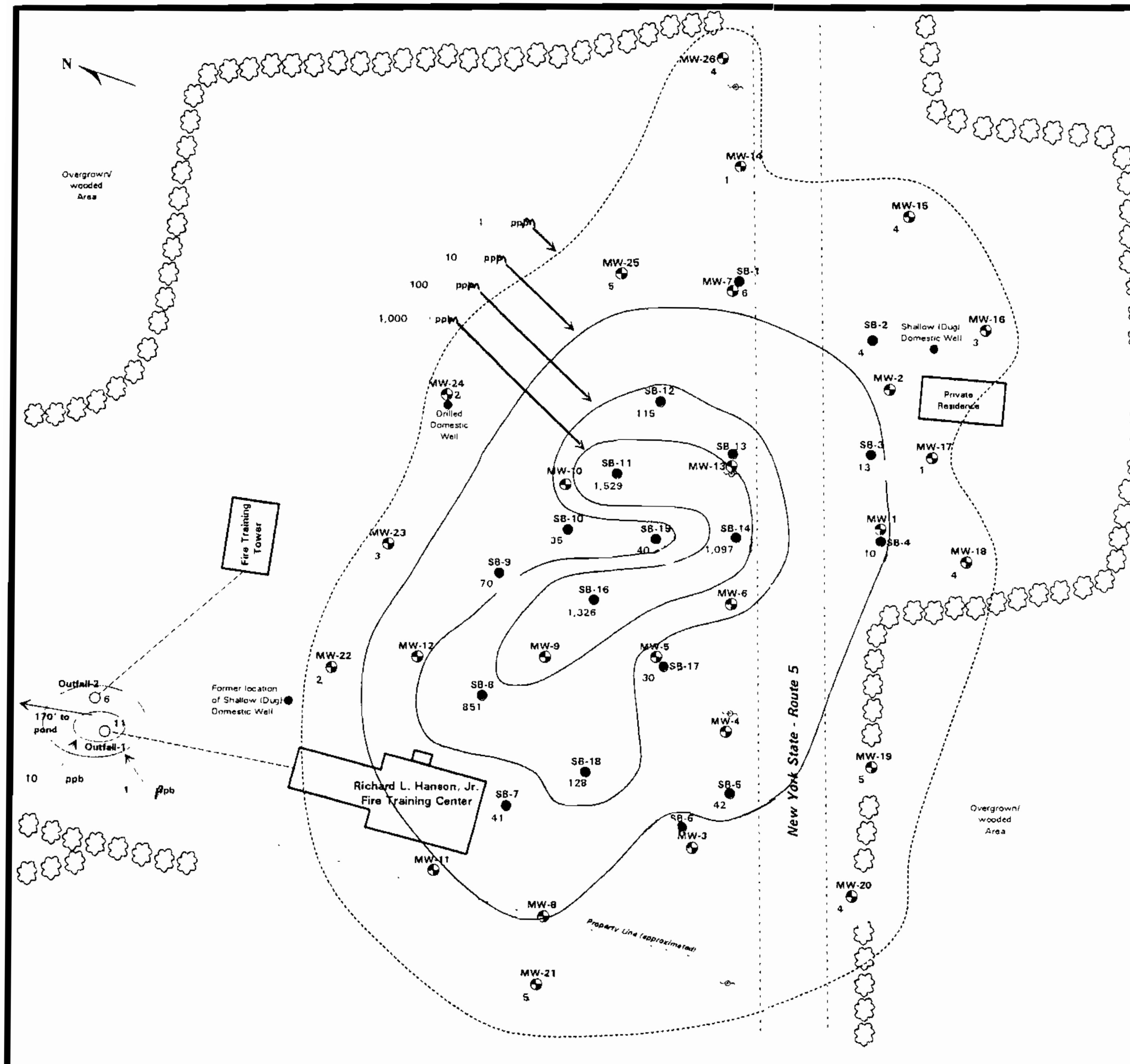
Client: Montgomery County

- 1" Geoprobe Monitor Well.
- Domestic Supply Well.
- Soil Boring 2".
- 2.76 - Total VOCs with TICS in soil via EPA Method 8260 (ppm)
- 2.00 ---- / —— - Soil Quality Contour Line (ppm) (Inferred)
- ND - None Detected.

PES

Figure: 4

Date: 11/20/01



LEGEND	SCALE 0 — 60

Title: Soil Quality Map - SVOC's

Site: Richard L. Hanson, Jr. Fire Training Center Yosts, New York.

Client: Montgomery County

- 1" Geoprobe Monitor Well.
- Domestic Supply Well.
- Soil Boring 2".

2,766 - Total SVOCs with TICS in soil via EPA Method 8270 (ppm)

2,000 ----/—— - Soil Quality Contour Line (ppm) (Inferred)

ND - None Detected.

PES

Figure: 5 | **Date: 11/20/01**