SPECTRUM FINISHING CORPORATION

Town of Babylon, Suffolk County, New York
Site No. 1-52-029

PROPOSED REMEDIAL ACTION PLAN

February 2003

Prepared by:

Division of Environmental Remediation
New York State Department of Environmental Conservation

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Town of Babylon, Suffolk County, New York
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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 (NYSDOH) is proposing a remedy to address the significant threat to human health and/or the environment created by the presence of hazardous waste at the Spectrum Finishing Corporation (Spectrum) Site, a Class 2 inactive hazardous waste disposal site. As more fully described in Sections 3 and 4 of this document, discharges to onsite drainage structures have resulted in the disposal of a number of hazardous wastes, including 1,2-dichloroethene, trichloroethene, tetrachloroethene, copper, cadmium, chromium and nickel, at the site, some of which were released or have migrated from the site to surrounding areas, including the area south of the Spectrum Site, which consists of industrial buildings and paved parking lots. These disposal activities have resulted in the following significant threats to the environment:

- a significant threat to human health associated with potential exposure to the site's soil and groundwater.
- a significant environmental threat associated with the impacts of contaminants to the site's groundwater.

In order to eliminate or mitigate the significant threats to the public health and/or the environment that the hazardous wastes disposed at the Spectrum Site have caused, the following remedy is proposed:

- For soil, the remedy proposed would consist of the excavation and off-site disposal of contaminated soil from source areas such as the alleyway south of the building, cesspools and drainage structures located in the parking lot, sump pit within the building, and the hot-spot area adjacent to the sump pit. The excavation and off-site disposal would permanently remove the contaminated soil. Following excavation, the alleyway and parking lot would be paved with asphalt while the concrete floor above the sump pit area would be replaced;

- A soils management plan would be developed to address residual contaminated soils that may be excavated from the site during future redevelopment.

- Since subsurface soil contamination two feet below ground surface exceeds cleanup objectives, an institutional control with deed restriction on the site would be implemented to limit excavation onsite.

- For groundwater, a remedy consisting of the installation and monitoring of outpost monitoring wells for the Suffolk County Water District Wells at Tenth Street, along with monitoring of an existing monitoring well cluster, is proposed. The new outpost monitoring wells and existing monitoring well cluster are located about 3,000 - 3,900 feet and 400 feet, respectively, downgradient from the site and would be sampled for volatile organic compounds and metals. Sampling frequency and monitoring during would be determined during the remedial design phase.

- Institutional controls would 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 Suffolk County Department of Health Services.

- A notification would be sent to the county clerk for filing, to notify future owners of the residual contaminants remaining in the soil on the site.

The proposed remedy, discussed in detail in Section 7 of this document, is intended to attain the remediation goals selected for this site 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 Remedial Investigation (RI), Feasibility Study (FS) and other relevant reports and documents, 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:

Ms. Champanine Saviengvong
Project Manager
NYS Dept. of Environmental Conservation
625 Broadway, 11th Floor
Albany, New York 12233-7015
(518) 402-9621
Hours: 8:15 a.m. - 4:15 p.m.

NYSDEC - Region 1 Office
Loop Road, Building 40
Stony Brook, New York 11790-2356
(516) 444-0354
Hours: 8:30 a.m. - 4:45 p.m.
Attn: Mark Lowery

West Babylon Public Library
211 Route 109
West Babylon, New York 11735
(631) 669-5445
Hours: Monday to Thursday, 10 a.m. - 9 p.m.
Friday to Saturday, 10 a.m. - 5 p.m.

The NYSDEC seeks input from the community on all PRAPs. A public comment period has been set from {DATES} to provide an opportunity for public participation in the remedy selection process for this site. A public meeting is scheduled for (DATE} at the {LOCATION} beginning at {TIME}.

At the meeting, the results of the RI/FS 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 Ms. Saviengvong at the above address through {add date comment period closes}.

SECTION 2: <u>SITE LOCATION AND DESCRIPTION</u>

The Spectrum Finishing Corporation Site (Spectrum), Site No. 1-52-029, is located in the Pinelawn Industrial Area in the Town of Babylon, Suffolk County, New York. Please refer to Figure 1. The Pinelawn Industrial Area is a high density industrial area bounded by cemeteries and open land on the north, south, and west side, and a residential area lies to the east. The Pinelawn Industrial Area includes the Babylon Landfill which is an Inactive Hazardous Waste Disposal Site (Site No.1-52-039) located about 1,500 feet east of Spectrum. [A leachate-enriched groundwater plume extends about 11,000 feet downgradient south of the landfill. The plume is reportedly about 1,900 feet wide.] Also within this industrial area is the U.S. Electroplating Site (Site No. 1-52-027), located two blocks east of the Spectrum Site, and the Pride Solvents Site (Site No. 1-52-025), which lies eight blocks east of the Spectrum Site. [The groundwater plume migrating from Pride Solvents consists of VOCs such as PCE and 1,1,1-TCA. This plume has been found to extend about 1,100 feet long and 400 feet wide, with the deepest exceedances found at 84 feet bgs.] Northwest of the Spectrum Site lies the Main Plant of Fairchild Republic Aircraft (Site No. 1-52-130). The Main Plant Site is the source of a 1,000 parts per billion (ppb) total VOC groundwater plume south of the Main Plant Site which extends at least 1.5 miles and 150 feet deep. Please refer to Figure 2 for the locations of the above-mentioned sites.

The Spectrum Site is about 0.67 acre in size and consists of one concrete block building and the parking lot north of the Spectrum building. The Spectrum Site is situated between Cabot Street on the west side and Dale Street on the east side. To the north is the property located at 60 Dale Street, a former Class 2a inactive hazardous waste disposal site known as the NTU Circuits Site. Since the NTU Circuits Site and the Spectrum Site have the same owner, the parking lot between the two sites was added to the Spectrum Site when the NTU Circuits Site was de-listed.

SECTION 3: SITE HISTORY

3.1: Operational/Disposal History

The Spectrum Finishing Corporation (Spectrum) operated at this site from 1968 to 1994. The company specialized in electroplating high strength alloys and descaling titanium alloys for the aerospace industry. The industrial operations took place mostly in the eastern section of the building. After Spectrum ceased operations, the building was subdivided into three units. The east end of the building is used to store automobiles, refrigerators, and other equipment. The center and west end of the building contain a machine shop and a door manufacturer, respectively.

The site and surrounding area are provided with public water. However, storm and sanitary sewage are discharged into stormwater dry wells and sanitary septic systems, respectively. Site inspections and sampling from 1970 to 1975, by the Suffolk County Department of Health Services (SCDHS) revealed discharges of hazardous wastes into storm drains and leaks from holding tanks. High levels of heavy metals were noted from sediment samples taken from a leaching tank, the storm drains and site runoff. Analysis revealed the presence of cadmium at a concentration of 12,000 parts per million (ppm), copper at 340 ppm, and nickel at 83 ppm.

3.2: Remedial History

The NYSDEC issued a Phase 1 - Preliminary Investigation Final Report for the Spectrum Finishing Corporation Site in 1984. The report reviewed past sampling data and recommended a Phase 2 investigation with additional sampling. The Phase 1 noted that in May 1983, high levels of toluene and methyl-ethyl-ketone were found in samples taken from the cesspool located on the north side of the building.

The NYSDEC completed a Phase 2 Investigation Report in March 1988. During the investigation, eight monitoring wells were installed and soil and groundwater samples were collected. Analysis of the soil revealed that cadmium, chromium, copper, iron, and zinc exceeded cleanup objectives. Analysis of the groundwater detected exceedances of the NYS groundwater standards for cadmium, copper, lead, and trichloroethene (TCE), a volatile organic compound (VOC).

Subsequently the site became listed as a Class 2 site in 1990.

The NYSDEC requested that the United States Environmental Protection Agency (EPA) perform a Time Critical Removal Action in November 1997 to address the presence of drums, vats, sumps and other waste containers left on the site. EPA removed 25,767 gallons and 77 cubic feet of various hazardous wastes from the building. The wastes were disposed at a permitted disposal facility. All process vessels were also removed. The floors were scraped and the floors and walls were pressure washed. Post removal sampling showed no residual contamination in the building.

Since potentially responsible parties were unable/unwilling to perform the work, the NYSDEC began a state-funded Remedial Investigation (RI) in 1999 to determine the extent of soil and groundwater contamination. Sampling activities were completed between June 1999 - May 2001.

The NYSDEC conducted an Interim Remedial Measure in 2000 to remove contaminated soil from 11 contaminated storm water dry wells and septic leaching pools. About 12,000 gallons of liquid waste and 40 cubic yards of contaminated soil were removed from the underground drainage structures and disposed at a permitted disposal facility.

SECTION 4: SITE CONTAMINATION

To evaluate the contamination present at the site and to evaluate alternatives to address the significant threat to the environment posed by the presence of hazardous waste, the NYSDEC has recently conducted a Remedial Investigation/ Feasibility Study (RI/FS).

4.1: Summary of the Remedial Investigation

The purpose of the RI was to define the nature and extent of any contamination resulting from previous activities at the site.

The RI was conducted in three phases. The initial phase was conducted between June 1999 and July 1999; the second phase in July 2000; the third phase between April 2001 and May 2001. A report entitled Focused Remedial Investigation - Spectrum Finishing Corporation Site, dated December 2001, has been prepared which describes the field activities and findings of the RI in detail.

The RI included the following activities:

- A geophysical survey to determine the location of two cesspools, CP-3 and CP-4;
- Excavation of test pits in ten areas to evaluate the location and size of buried cesspools, underground storage tanks (USTs), and sump structures;
- Water supply well inventory;
- Hydraulic conductivity testing;
- Previously installed monitoring well assessment to evaluate the geologic and groundwater flow conditions;
- Water levels were measured within the newly installed wells, existing wells, and temporary piezometers;

- Installation of forty-six Geoprobe® soil borings to identify any remaining source areas;

- Installation of nine shallow (about 18 feet below grade surface), eight intermediate (about 50 feet below grade surface), and five deep (about 90 feet below grade surface) monitoring wells to determine the extent of groundwater contamination across the site and to evaluate the geologic and groundwater flow conditions;

- Collection and analysis of fifty-one Geoprobe® groundwater samples and sixty-one monitoring well groundwater samples;

- Collection and analysis of ten water samples from drainage structures, one water sample from an interior sump, and four cesspool water samples;

- Collection and analysis of six UST liquid samples;

- Collection and analysis of nine surface soil and one hundred and twenty subsurface soil samples;

- Collection and analysis of sixteen soil samples from drainage structures, two soil samples from interior sumps, and eighteen soil samples from cesspools and;

- Collection and analysis of one soil sample from a potential former well.

To determine which media (soil, groundwater, etc.) are contaminated at levels of concern, the RI analytical data was compared to environmental Standards, Criteria, and Guidance values (SCGs). Groundwater, drinking water and surface water SCGs identified for the Spectrum 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, site specific background concentration levels can be considered for certain classes of contaminants. Guidance values for evaluating contamination in sediments are provided by the NYSDEC "Technical Guidance for Screening Contaminated Sediments".

Based on the RI 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 RI 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 deposits encountered at the site consists of fill materials, underneath which is glacial outwash underlain by a confining clay layer. The prevalent overburden material is the glacial outwash which consists of fine to coarse sands and gravel and is referred to as the Upper Glacial

Aquifer. The Upper Glacial Aquifer was observed to extend about 90 feet below grade surface (bgs), however, aquifer thickness does vary throughout the site. The sands in the Upper Glacial Aquifer are continuous across the site and is the predominant water-bearing unit investigated at the site. The confining clay layer, referred to as Gardiners Clay, was encountered in deep monitoring well borings. The depth to the confining clay layer is 90 feet bgs. The Gardiners Clay is considered relatively impermeable and appears to act as a barrier to the downward movement of water because of its low hydraulic conductivity. The water table is observed at about 18 feet bgs at the Spectrum Site.

A contour map representing groundwater elevations was prepared from groundwater elevations measured in the monitoring wells during June 1999, July 2000 and May 2001. Based on the groundwater contour map, the groundwater flow direction is southeasterly. Please refer to Figure 3 for the shallow (about 18 feet bgs) and intermediate (about 50 feet bgs) groundwater flow directions.

Surface water bodies do not exist near the site. Pavement and gravel areas surrounding the building direct surface water run-off. The horizontal gradient across the study area is low, thus the site is relatively flat, sloping gently to the south. The stormwater from the parking areas, which includes run-off from the building roof, collects mostly in the storm water drainage structures located in the parking lot directly north of the building.

4.1.2: Nature of Contamination

As described in the RI report, soil, groundwater, and underground storage tank (UST) product samples were collected at the site to characterize the nature and extent of contamination. The main categories of contaminants which exceed their SCGs are inorganics (metals), and volatile organic compounds (VOCs).

The inorganic contaminants of concern are cadmium, copper, nickel, and chromium based on the distribution, toxicity, and number of exceedances of cleanup guidelines.

The primary VOC of concern is tetrachloroethene (PCE). Other chemical classes, including semi-volatile organic compound (SVOCs), polychlorinated biphenyls (PCBs), and pesticides were analyzed for and detected at the site, but are not the main contaminants of concern.

4.1.3: Extent of Contamination

Table 1 summarizes the extent of contamination for the contaminants of concern in soil and groundwater and compares the data with the SCGs for the site. The following are the media which were investigated and a summary of the findings of the investigation.

Surface Soil

Surface soil samples used to evaluate surficial exposure pathways are usually collected from 0-2 inches below grade surface. The Spectrum Site is essentially all paved and is situated in an industrial area where it is not likely for the public to come in contact with the surface soil. Because of these site specific attributes, soil samples that were collected from 0-1 foot bgs within unconfined areas or collected from 0-6 inches below the pavement are considered to be surface soil samples.

Surface soil samples were taken in the alleyway and parking lot. All of the cleanup objective exceedances were found within the alleyway. Please refer to Table 1 for surface soil analytical results for inorganics (metals) and organics and also Figure 4 to view the areas with surface and subsurface soil contamination.

In the alleyway south of the Spectrum building, two VOCs, 1,1-dichloroethane (DCA) and 1,1,1-trichloroethane (TCA), were detected in surface soils above their respective cleanup objectives of 0.2 ppm and 0.8 ppm. DCA was found at a concentration of 2.2 ppm and TCA was found ranging from 0.84 ppm - 2.4 ppm.

Six out of the eight surface soil samples contained metals above cleanup objectives with metals. Various inorganics were detected, including cadmium at a concentration range of 1.8 ppm - 1,670 ppm, chromium at a range of 10.1 ppm - 3,130 ppm, copper at a range of 12 ppm - 1,970 ppm, and nickel at a range of 6.4 ppm - 21,100 ppm. These contaminant concentrations suggest surficial deposition of wastes because the ranges are very high. The cleanup objectives for cadmium, chromium, copper and nickel are 1 ppm, 10 ppm, 25 ppm, 13 ppm, respectively. Most samples in exceedance of the cleanup objectives by a factor of 100 are from surface soil and drainage and cesspool structure samples. Please refer to the following page for contaminant exceedances within the cesspools and drainage structures.

Polychlorinated-biphenyls (PCBs) were detected above cleanup objectives (cleanup objective is 1 ppm at 0-1 feet below grade surface) within the alleyway at concentrations ranging from 1 ppm - 6.1 ppm at locations designated as AP-1, AP-6, AP-8. Please refer to Figure 4 for these locations.

Subsurface Soil

The primary contaminant type exceeding cleanup objectives in the subsurface soils are inorganics. The main inorganic (metals) contaminated areas are the cesspools and the drainage structures, the alleyway and the area within and surrounding the sump inside the building. Please refer to Table 1 for subsurface soil analytical results from samples which were collected from the parking lot, alleyway, and area within and surrounding the sump inside the building.

The areas with the highest levels of metals contamination do not show any trend of increasing or decreasing concentration levels with depth. For example, Geoprobe® point GP-47, which is located in the alleyway, contained the highest concentrations of metals at deep depths (cadmium at 599 ppm from 16-18 feet bgs and chromium at 435 ppm from 14-16 feet bgs). Test pitting (TP-1) which was performed within the sump pit inside the building revealed that metal concentrations in the unsaturated zone were highest near the surface and decreased with depth. Within TP-1 at a depth of 1 foot bgs, cadmium, chromium, copper and nickel were found at concentrations of 5500 ppm, 19,600 ppm, 3,610 ppm, and 4,900 ppm, respectively, while at the same location from a depth of 6 feet bgs, cadmium, chromium, copper and nickel were found at concentrations of 111 ppm, 220 ppm, 54.3 ppm, and 115 ppm, respectively. Shallow subsurface soil adjacent to the sump pit was found to have high metal concentrations. At 0 - 2 feet bgs, cadmium was found at a concentration of 1,360 ppm in GP-40 and chromium was found at a concentration of 766 ppm in GP-49. In summary, the average depth of soil contaminated with metals varies. Please refer to Figure 4 for the locations of GP-47, TP-1, GP-40, and GP-49.

Cesspools & Drainage Structures

The cesspools and drainage structures are located in the parking lot area north of the building, with the exception of three cesspools located in the grassy areas proximate to Dale Street (two structures) and Cabot Street (one structure). The drainage structures have perforated walls and, in most cases, no bottoms. Below is a description of the contamination before an Interim Remedial Measure (IRM) was performed. Please refer to Section 4.2 for details concerning the contamination within the cesspools and drainage structures after the IRM was performed.

Soil from four cesspools (CP) and drainage structures (DS) had VOC concentrations above the cleanup levels. For example, CP-5 contained chlorobenzene at 46 ppm (cleanup objective is 1.7 ppm) and CP-10 contained acetone at 2.3 ppm (cleanup objective is 0.2 ppm), 2-butanone at 0.44 ppm (cleanup objective is 0.3 ppm), and xylenes (total) at 3.8 ppm (cleanup objective is 1.2 ppm). For inorganics, cesspool CP-3 contained cyanide at a concentration of 514 ppm (site background concentration is 0.35 ppm), chromium at 1180 ppm, cadmium at 530 ppm, and nickel at 766 ppm. Mercury was also detected at a concentration of 20.4 ppm in CP-4, above the cleanup level of 0.1 ppm. The only PCB detection of 20 ppm was in DS-5, exceeding the cleanup objective of 10 ppm. For semi-volatile organic compounds (SVOCs), CP-10 contained the following exceedances: naphthalene was found at 27 ppm (cleanup objective is 13 ppm), 2-methylnapthalene at 200 ppm (cleanup objective is 36.4 ppm), phenanthrene at 56 ppm (cleanup objective is 50 ppm), bis(2-ethylhexyl)phthalate at 73 ppm (cleanup objective is 50 ppm).

Groundwater

The overburden groundwater underlying the site is contaminated by VOCs, metals, and pesticides, but the pesticide exceedances are less significant. Two pesticides, aldrin (0.03 ppb - 0.034 ppb) and heptachlor epoxide (0.05 ppb - 0.18 ppb), exceeded their groundwater standards of 0.002 ppb and 0.03 ppb, respectively. Please refer to Table 1 for shallow and intermediate groundwater analytical results.

Eight VOCs were detected in exceedance of the groundwater standards. PCE, which has a groundwater standard of 5 ppb, was detected most frequently in the groundwater and at the highest concentration of 610 ppb at GP-12, located near the eastern edge of the parking lot. Please refer to Figure 5A which depicts the PCE groundwater plume. In general, the higher levels of PCE were found in the eastern portion of the site. At one of the furthest downgradient clusters of monitoring wells, MW-12, the PCE concentrations increase with depth; the shallow monitoring well shows a PCE concentration of 80 ppb while the intermediate monitoring well at the same location shows PCE at 560 ppb.

The PCE plume contours indicate that upgradient groundwater is contaminated. During the third phase of the RI, sampling at monitoring well MW-9S, which is located upgradient of the site, revealed a PCE concentration of 130 ppb. Thus, a potential source area exists north and/or east of the site. Other potential sources of PCE appear onsite. For example, CP-6 contained 12,000 ppb of PCE in the soil sample.

Eleven metals exceeded groundwater standards. Out of the eleven metals, cadmium, chromium, copper and nickel exceeded guidance values most frequently.

Cadmium was detected above the groundwater standard of 5 ppb at thirty-one locations, and it is prevalent in the groundwater south of the cesspools and drainage structures which are located in the parking lot. The highest level of cadmium contamination, at 1,940 ppb, is found within the shallow groundwater at MW-6S. Please refer to Figure 5B which depicts the cadmium groundwater plume. Generally, cadmium concentrations have decreased over time with the exception of the 1,940 ppb found at MW-6S.

Nickel was detected at concentrations exceeding the groundwater standard of 100 ppb at twenty locations. Although the upgradient groundwater contained nickel concentrations in excess of the groundwater standards, the nickel concentrations are significantly higher at several onsite and downgradient locations such as: GP-9 (1,770 ppb) in 1999, MW-4S (916 ppb) in 1999, GP-2 (999 ppb) in 1999 and MW-6S (547 ppb) in 2000. Please refer to Figure 5C which depicts the nickel groundwater plume. Concentrations have significantly decreased except at MW-6S where it increased from 547 ppb to 981 ppb.

The cesspools and drainage structures are on-site sources which contain soil with high concentration levels of the contaminants of concern (VOCs, cadmium, chromium, copper and nickel). These on-site sources are proposed to be remediated as a part of the proposed remedy.

4.2: <u>**Interim Remedial Measures**</u>

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 Remedial Investigation/ Feasibility Study (RI/FS).

During April 2000, an IRM was conducted to remove contaminated soil and water from 11 cesspools and drainage structures. The IRM was conducted after the first phase RI fieldwork and prior to the second phase RI fieldwork. Approximately 12,000 gallons of non-hazardous water, 4,000 gallons of contaminated water, and 43 tons of soil identified as hazardous waste were removed and disposed at a permitted disposal facility.

The pre-IRM results from the cesspools and drainage structures indicated that volatile organic compounds (VOCs), metals, semi-volatile organic compound (SVOCs) and polychlorinated biphenyls (PCBs) exceeded soil cleanup objectives in one or more of the structures. Post-IRM results indicate that soil containing VOCs, PCBs, and SVOCs above cleanup objectives have been removed. Soil containing high concentrations of metals were also removed; however, residual metals concentrations (cadmium, chromium, copper, and nickel) are above the cleanup objectives in soil remaining in three drainage structures and seven cesspools. The cesspools and drainage structures were not backfilled during the IRM. Please refer to Table 2 for a comparison of the metals contamination pre- and post-IRM. All pre-IRM concentrations are gathered from the initial phase. All post-IRM concentrations are from confirmatory samples unless otherwise noted in the table.

Cesspool and drainage structures that were not part of the IRM and contain exceedances with respect to the main metal contaminants of concern (cadmium, chromium, copper, nickel) include the following two cesspools and eight drainage structures: CP-9, CP-11, DS-1, DS-2, DS-3, DS-6, DS-7, DS-9, DS-10, DS-12.

4.3: <u>Summary of Human Exposure Pathways</u>

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 6.1 of the RI report.

An exposure pathway is the manner by which an individual may come in contact with a contaminant. The five elements of an exposure pathway are 1) the source of contamination; 2) the environmental media and transport mechanisms; 3) the point of exposure; 4) the route of exposure; and 5) the receptor population. These elements of an exposure pathway may be based on past, present, or future events.

Pathways which are known to or may exist at the site include using groundwater from the site as a water supply or excavating soils at the site from:

- ingestion of groundwater
- dermal contact

Although the ingestion of groundwater is a potential pathway, the ingestion of groundwater is not expected because the surrounding area is serviced by public water. In addition, cemeteries surround the site to the north, south and west. The Babylon Landfill is located immediately to the east. Although contaminated groundwater was detected on-site, no site-related contamination has been detected in the Suffolk County Department of Health Services water supply well located within one mile south of the site on 10th St. or in any of the production wells associated with the three cemeteries. Institutional controls will prevent the use of groundwater as a source of potable or process water on-site.

Dermal contact with surface soil contamination is possible, but not likely since the site is mostly paved and the only surface soils are located in the alleyway which has restricted access. Dermal contact to subsurface soil contamination is possible during future development or utility repair involving excavation, however, institutional controls with deed restriction on-site will be implemented with a soils management plan to address residual contaminated soils.

4.4: <u>Summary of Environmental Exposure Pathways</u>

This section summarizes the types of environmental exposures and ecological risks which may be presented by the site. The following pathways for environmental exposure and/or ecological risks have been identified:

No surface water bodies exist near the site, therefore no samples were taken at any surface water bodies. The nearest surface water feature to the site, Santapogue Creek, is approximately two miles southeast and does not receive drainage from the site.

SECTION 5: ENFORCEMENT STATUS

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

The Potential Responsible Parties (PRP) for the site, documented to date, include: Spectrum Finishing Corporation, Mr. Joseph Vazzana Jr., Mr. Joseph Vazzana Sr., Pudge Corp., and Pudge Realty Corp.

The PRPs declined to implement the RI/FS at the site when requested by the NYSDEC. After the remedy is selected, the PRPs will again be contacted to assume responsibility for the remedial program. If an agreement cannot be reached with the PRPs, the NYSDEC will evaluate the site for further action under the State Superfund. The PRPs are subject to legal actions by the State for recovery of all response costs the State has incurred.

SECTION 6: SUMMARY OF THE REMEDIATION GOALS

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 public health and/or the environment presented by the hazardous waste disposed at the site through the proper application of scientific and engineering principles.

The goals selected for this site are:

- Eliminate, to the extent practicable, the leaching of contaminants into the groundwater.
- Clean and/or closeout all of the cesspools, drainage structures, and sump pit within the building interior in accordance to the USEPA's Underground Injection Control (UIC) Program and any other Suffolk County regulations.
- Eliminate soils, to the extent practicable, in exceedance of applicable environmental quality cleanup objectives.
- Eliminate, to the extent practicable, surface soil exposure.
- Protect public supply wells and potential receptors from exposure to contaminated groundwater.
- Eliminate, to the extent practicable, the risk of exposure to groundwater.

SECTION 7: SUMMARY OF THE EVALUATION OF ALTERNATIVES

The selected remedy must be protective of human health and the environment, be cost effective, comply with other statutory laws and utilize permanent solutions, alternative technologies or resource recovery technologies to the maximum extent practicable. Potential remedial alternatives for the Spectrum Finishing Corporation Site were identified, screened and evaluated in the report entitled March 2002 Focused Feasibility Study-Spectrum Finishing Corporation Site.

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, procure contracts for design and construction or to negotiate with responsible parties for implementation of the remedy.

7.1: Description of Remedial Alternatives

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

Alternative S1: No Action

The No Action alternative is 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.

Present Worth:	*$ 0*
Capital Cost:	*$ 0*
Annual O&M:	*$ 0*
Time to Implement:	*none*

Alternative S2: Limited Soil Excavation and Off-site Disposal

Soil excavation would be completed in several areas of the site including; the western, the eastern and southern alleyways, sump pit within the building interior, area adjacent to the sump pit, cesspools, and drainage structures. Please refer to Figure 6 for areas that would be remediated by this alternative.

The existing building would not be demolished or altered during the remediation. Therefore, prior to the start of the remedial activities associated with Alternative S2, Limited Soil Excavation and Off-site Disposal, a pre-construction building survey would be completed.

This alternative would excavate approximately 1000 cubic yards (cy) of metal contaminated soils for off-site disposal. Surface and subsurface soils would be remediated by excavation of contaminated soils using conventional excavation equipment and standard construction methods.

The soil within the area adjacent to the sump pit and within the alleyways would be excavated to a depth of 2 feet in order to eliminate potential surface soil exposures. The excavation depth of 2 feet would be sufficient in precluding human contact with contaminated soils. Due to the limited access for excavation equipment (e.g., narrowness and existing utility pole) and limited space between the building structures, small excavation equipment (e.g., mini-excavator, motorized wheelbarrows) would be required to complete the remediation in the alleyways. Deeper excavation would require alternative equipment and methods which would not be feasible to implement in the alleyways. The western, eastern, and southern alleyway are 5 feet, 8 feet, and 20 feet wide, respectively. The excavation may extend to depths deeper than 2 feet if confirmatory sampling reveals that hazardous waste does exist; confirmatory samples collected from the bottom of the excavated areas would be analyzed by the toxicity characteristic leaching procedure (TCLP). This alternative would also include the placement of asphalt pavement in the alleyways also the replacement of the concrete in the area adjacent to the sump pit to reduce the potential for direct contact to remaining contaminated soil.

Because the underground injection control (UIC) features on the site are highly contaminated, they will be properly closed. UIC features include the cesspools, drainage structures, and sump pit located inside the building. Closing the UIC features would involve excavation, confirmatory sampling, and sealing (sump pit would be sealed with concrete and the cesspools and drainage structures would be sealed with asphalt pavement). The excavation depth for the sump pit would be 14 feet below grade surface (bgs). During the investigation, metal exceedances were found at 6 feet bgs. The cesspools and drainage structures would be excavated to the water table depth, which is 18 feet bgs. The excavation depths of the sump pit and cesspools and drainage structures are approximate which may be modified based on confirmatory sampling results. Confirmatory samples collected from the bottom of the excavated areas would be analyzed by the (TCLP) method to ensure that hazardous waste is not present at the site.

Prior to backfilling the excavation areas with clean fill material, snow fencing or another appropriate material as determined during the remedial design phase would be placed on the bottom of all of the excavation areas to demarcate the clean fill material from existing soil.

Western Alleyway: Soils would be excavated from this alleyway, approximately 750 square feet, to a depth of 2 feet below grade surface (bgs). A total volume of approximately 50 cy of soil would be excavated for off-site disposal.

Eastern and Southern Alleyway: The eastern alleyway, approximately 1,360 square feet, would be excavated to a depth of 2 feet bgs. A total volume of approximately 100 cy of soil would be excavated for off-site disposal. The southern alleyway, approximately 500 square feet, would be excavated to a depth of 2 feet bgs. A total volume of approximately 40 cy of soil would be excavated for off-site disposal.

Interior of Building: The remedial action for the interior portion of the building would include excavation of the sump area to about 8 feet below the bottom of the sump. A total volume of about 70 cy would be excavated for off-site disposal. The sump pit would be backfilled with clean fill and covered with a concrete cap.

Cesspool and Drainage Structures: Twenty-three cesspools (CP) and drainage structures (DS) are located on site, which would be remediated by excavating soils to the top of the groundwater table (about 18 feet bgs). After excavation, the cesspools and drainage structures would be backfilled with clean soils to the original elevation.

Since soil contamination two feet below ground surface exceeds cleanup objectives, an institutional control with deed restriction on the site would be implemented. In addition, to address future construction or excavation, a soil management plan would be submitted to NYSDEC for approval.

Present Worth:	*$ 675,000*
Capital Cost:	*$ 660,000*
Annual O&M:	*$ 1,000*
Time to Implement	*4-5 months*

Alternative S3: Extensive Soil Excavation and Off-site Disposal

Surface and subsurface soils would be remediated by excavation of contaminated soils using conventional excavation equipment and standard construction methods with consideration toward using additional means to address deeper soils (e.g., sheeting, soil borings). An approximate total of 4,900 cy of metal contaminated soil would be excavated for off-site disposal. Please refer to Figure 6 for areas that would be remediated by this alternative.

Soil excavation would be completed in areas including: the western alleyway, the eastern and southern alleyway, inside the eastern portion of the building, and the cesspools and drainage structures in addition to a few other select locations. Following the excavations, snow fencing or another appropriate material as determined by the remedial design would be placed on the bottom of the excavation areas to demarcate clean fill material from the existing soil.

The existing building would not be demolished or altered during the remediation. Prior to the start of the remedial activities associated with Alternative S3, Extensive Soil Excavation and Off-site Disposal, a pre-construction building survey would be completed.

This alternative includes the placement of asphalt pavement. An asphalt pavement would be installed in the remediated alleyway areas and currently paved site areas (e.g., parking lot) to reduce the infiltration of precipitation and potential for direct contact to remaining contaminated soil.

Western Alleyway: Soil would be excavated to a depth of four feet. An approximate volume of 100 cubic yards would be disposed.

Eastern and Southern Alleyway: To address deeper soils in these areas, more extensive construction activities would be conducted e.g., a drill rig equipped with an 18-inch diameter auger would be used to remove metals contaminated soils and replaced by a cement/bentonite grout. Excavation would be completed to a depth of 18 feet bgs. The volume of soils excavated for off-site disposal from the eastern alleyway is approximately 400 cy and from the southern alleyway is approximately 250 cy.

Interior of Building: The area requiring remediation as part of Alternative S3, Extensive Soil Excavation and Off-site Disposal, is the same as Alternative S2, Limited Soil Excavation and Off-site Disposal. Sheet piling would be installed to ensure that the remediated area does not collapse. Soils within the sheeted area would be excavated to 18 feet bgs. The excavated area would be backfilled and compacted to the original elevation. A new reinforced concrete floor would be installed at completion. The volume of soils excavated for off-site disposal from the building interior is approximately 2,000 cy.

Cesspool and Drainage Structures: A total of 14 of the 23-cesspool/drainage structures would be remediated similar to those described in Alternative S2, Limited Soil Excavation and Off-site Disposal. Approximately 140 cy of contaminated soils would be excavated and disposed off site as hazardous soils from these 14 structures.

The remaining 9 structures have metal contaminated soils outside of the structures in addition to the interior of the structures. The excavation limit would include soils to a distance of approximately 5 feet surrounding the structures. For these areas, sheet piling would be installed. Approximately 2,000 cy would be disposed off site.

Contaminated soil located in inaccessible areas would remain onsite indefinitely and continue to impact the groundwater. Therefore, an institutional control with deed restriction on the site would be implemented. In addition, to address future construction or excavation, a soil management plan would be submitted to NYSDEC for approval.

Present Worth:	*$5,315,400*
Capital Cost:	*$5,300,400*
Annual O&M:	*$ 1,000*
Time to Implement	*1 year*

Alternative G1: No Action

The No Action alternative is 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.

Present Worth:	*$ 0*
Capital Cost:	*$ 0*
Annual O&M:	*$ 0*
Time to Implement:	*none*

Alternative G2: Groundwater Monitoring of Outpost Wells

This alternative would leave the site in its present condition. The work done under this alternative would be the installation and monitoring of three outpost wells at a location about 3,000 - 3,900 feet downgradient from the site. Please refer to Figure 2 for the proposed area in which the outpost wells would be installed. The remedial design would evaluate and determine the final number of and locations for the outpost wells. In addition, this alternative includes the monitoring of an existing well cluster (MW-12S, MW-12D1, and MW-12D2) located about 400 feet downgradient from the site along Edison Avenue.

Off-site groundwater samples would be obtained from both the outpost wells and the existing monitoring well cluster. These well samples would be analyzed to determine if the groundwater at the location of the outpost wells have been impacted by the Spectrum tetrachloroethene (PCE) or metals groundwater plume. Significant migration of the Spectrum Site PCE or metals plume to the location of the outpost wells would indicate the potential for the PCE or metals plume to migrate even further downgradient and impact the Suffolk County public water supply wells No. 2 & 3 at Tenth Street. Wells No. 2 & 3 located approximately 1.5 miles from the site and are the closest downgradient public water supply wells, however, they are currently not used. Suffolk County public water supply wells in this area of West Babylon typically extract groundwater from about 300 - 600 feet bgs. Therefore, a threat to these wells from contamination at the Spectrum Site is not expected.

One outpost well would be screened at the intermediate level, approximately 50 feet bgs, because the highest groundwater concentration of 560 parts per billion (ppb) was detected in an intermediate depth monitoring well during the Remedial Investigation. The other two outpost wells would be screened at deeper groundwater levels in case the PCE plume at the Spectrum Site plunged to deeper depths. Groundwater sampling events would include analysis for volatile organic compounds (VOCs) and metals.

VOC migration rates are expected to range between 500 - 650 feet per year. It is estimated that the VOC plumes would take more than 11 years to reach the public supply wells No. 2 & 3. The rate of metals migration through the groundwater of 15 to 30 feet per year was calculated from the distance the plume has already traveled. Based on this calculation, it is estimated that the metals groundwater plume would take more than 250 years to travel to the public water supply wells No. 2 & 3. The monitoring is to detect early signs of contamination at the outpost wells. Since the VOC plume moves at a faster rate than the metals plume, the monitoring duration would be based upon the VOC migration rate. The remedial design would evaluate and determine the number of years of groundwater monitoring.

Institutional controls would be imposed upon groundwater use at the site which would comply with the Suffolk County Department of Health Services' use and development restrictions limiting the utilization of groundwater as potable or process water without necessary water quality treatment.

Present Worth:	*$ 130,000*
Capital Cost:	*$ 40,000*
Annual O&M:	*$ 7,500*
Time to Implement:	*1-2 weeks*

Alternative G3: Monitored Natural Attenuation of Groundwater

Monitored Natural Attenuation (MNA) refers to natural attenuation processes, within the framework of a controlled and monitored site cleanup approach, to achieve proposed cleanup goals within a reasonable time. Natural attenuation processes include a variety of physical, chemical and biological processes that, under favorable conditions, act without human intervention to reduce the mass, toxicity, mobility, volume or concentration of contamination in groundwater. These processes include biodegradation, dispersion, dilution, sorption, volatilization, and/or chemical or biological stabilization, transformation, or destruction of constituents in groundwater.

In this alternative, MNA would consist of groundwater sampling and testing. It is assumed that a combination of existing and new wells, installed at shallow, intermediate and deep depths, would be sampled annually as described below. Two new well triplets (shallow, intermediate and deep) would be installed, one upgradient and one downgradient. These new well triplets would provide information regarding upgradient and downgradient contamination and would be needed to properly evaluate natural attenuation processes.

The initial annual groundwater sampling event would include the most extensive list of analytical laboratory test parameters (primarily VOCs, metals, cations and anions). Down hole natural attenuation parameters (including dissolved oxygen, pH, conductivity, oxidation reduction potential) would also be measured in the first groundwater sampling event.

The first sampling event would be followed by a comprehensive evaluation to determine if natural attenuation is occurring. Subsequent data evaluations and reports would be completed on an annual basis as the natural attenuation processes are monitored.

It is anticipated that the analytical parameter list can be reduced by about 25% following the first annual sample round. This alternative assumes that annual groundwater monitoring would be conducted for 30 years.

Similar to Alternative G2, Groundwater Monitoring of Outpost Wells, institutional controls would be imposed upon groundwater use at the site which would comply with the Suffolk County Department of Health Services' use and development restrictions.

Present Worth:	*$ 368,000*
Capital Cost:	*$ 91,000*
Annual O&M:	*$ 18,000*
Time to Implement:	2 weeks

<u>Alternative G4: Groundwater Extraction & Ex situ Treatment</u>

Groundwater extraction and *ex situ* treatment would be the primary components of this alternative. A series of extraction wells located downgradient of the site would be operated to remove the shallow and intermediate groundwater with VOC concentrations greater than 5 ppb and metals that exceed their respective SCGs (primarily chromium, cadmium, copper and nickel). Please refer to Figure 7 for the positioning of the extraction wells. One shallow extraction well would be installed near well MW-6S and would be operated to remove groundwater from the area noted to generally have the highest level of contamination. The three downgradient extraction wells would extract water at approximately 20 to 30 gallons per minute (gpm) each, and the shallow extraction well near MW-6S would extract water at about 10 to 15 gpm, for a total extraction flow rate of approximately 90 to 120 gpm. It is estimated that the extraction wells would operate for about 30 years. This estimate is based on the assumption that on-site contaminated soil would not be fully remediated resulting in continued leaching of metals to the groundwater (e.g., precipitation entering the unsaturated zones via cesspools, drainage structures) and due to the presence of an upgradient VOC and metals contamination source that is contributing to site contamination.

Extracted groundwater would be pumped from the extraction wells via underground pipes to a treatment system on site. The extracted groundwater would be treated for VOCs and metals. The extracted groundwater would first be treated for metals by means of chemical precipitation. Following treatment of the groundwater for metals the extracted water would be treated for VOCs using granular activated carbon. Finally, the treated groundwater would be stored in a temporary tank where it could be sampled prior to discharge. Treated water would be discharged to a nearby storm water management basin.

Portions of the groundwater treatment system would be installed inside a building to be erected at the site. The building would include a concrete floor and curbing to provide secondary containment. An internal sump would also be installed for liquid removal (if needed).

Groundwater monitoring would also be performed as part of Alternative G4 to monitor the progress and effectiveness of the remediation. Three additional groundwater monitoring wells would be installed downgradient of the groundwater extraction wells. The proposed wells would consist of a triplet consisting of a shallow, an intermediate and a deep aquifer screened monitoring well (i.e., approximately 30, 50 and 90 feet below grade surface, respectively). Annual groundwater monitoring would be conducted in existing and proposed off-site wells for 30 years. During each monitoring event, 13 existing wells and 3 proposed wells would be purged and sampled. Water levels from 30 existing site wells and the 3 proposed wells would be measured. However, it is assumed that quarterly (i.e., four times per year) groundwater monitoring would be conducted in site monitoring wells in years 1 and 2; and annual monitoring in years 3 through 30.

Similar to Alternative G2, Groundwater Monitoring of Outpost Wells, institutional controls would be imposed upon groundwater use at the site which would comply with the Suffolk County Department of Health Services' use and development restrictions.

Present Worth:	*$ 7,872,000*
Capital Cost:	*$ 1,835,000*
Annual O&M:	*$ 393,000*
Time to Implement:	*6 months*

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 inactive hazardous waste sites in New York State (6 NYCRR 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 Feasibility Study.

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.

The relevant cleanup objectives for soil at the Spectrum site are the NYSDEC recommended soil cleanup objectives for metals, which are 1 parts per million (ppm) for cadmium, 10 ppm for chromium, 25 ppm for copper, and 13 ppm for nickel. These values are defined in the TAGM 4046 and are determined based on direct human exposures, the protection of groundwater and background levels. Groundwater, drinking water and surface water SCGs identified for the Spectrum Site are based on NYSDEC Ambient Water Quality Standards and Guidance Values and Part 5 of New York State Sanitary Code. For groundwater, the SCG for tetrachloroethene (PCE) is 5 parts per billion (ppb).

For soil, Alternative S1, No Action, would not meet the cleanup objectives for the contaminated soil.

It is expected that Alternative S2, Limited Excavation & Off-site Disposal, and Alternative S3, Extensive Excavation & Off-site Disposal, would meet the cleanup objectives for the portion of the site (shallower soil) where contaminated soil would be removed. However, cleanup objectives would not be met for inaccessible soil that would not be removed under certain areas of the building and around utilities.

For groundwater, Alternative G1, No Action, Alternative G2, Groundwater Monitoring of Outpost Wells, and Alternative G3, Monitored Natural Attenuation, would not be expected to meet the SCGs for the contaminated groundwater, as treatment would not be part of these alternatives. Although these three alternatives would not meet SCGs, the evaluations of Alternative G2 and Alternative G3 are not excluded because the protection of human health will still be addressed. Alternative G2, Groundwater Monitoring of Outpost Wells, would achieve the same level of performance that is required to protect the public drinking water as Alternative G3, Monitored Natural Attenuation. The installation and monitoring of the outpost wells are precautionary measures included in Alternative G2 which would foretell any threats from the site-impacted groundwater to downgradient public water wells. Review of the groundwater monitoring results would determine the effectiveness of the remedy. Alternative G2 may be considered protective of the environment because the VOC groundwater plume is expected to naturally attenuate.

It is expected that Alternative G4, Groundwater Extraction & *Ex situ* Treatment, would meet the SCGs for the treated groundwater. However, due to the presence of suspected upgradient contaminant sources and considering the downgradient plume (south of Edison Ave) would not be captured for treatment, this alternative may not meet the SCGs for the overall project in a reasonable and predictable time (i.e., less than 30 years).

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

For soil, Alternative S1, No Action, would not provide for adequate protection of human health and the environment with regard to contaminated soil, because the site would remain contaminated for an indefinite period of time.

Alternative S2, Limited Excavation & Off-site Disposal, and Alternative S3, Extensive Excavation & Off-site Disposal, would be moderately protective of the environment in terms of affecting habitat or vegetation. Residual contamination would be expected to remain onsite which could continue to impact the groundwater. Alternative S3 would be more protective of the environment than Alternative S2 because less residual contamination would remain that could provide an ongoing source of contamination to the groundwater. Alternative S2 and Alternative S3 would be protective of human health. The excavation depths from both alternatives would be sufficient in protecting human health because potential surface soil exposures would be eliminated. The installation of a surficial asphalt cap in the alleyway and parking lot and the replacement of the concrete cap in the sump pit area would reduce the potential for contact with remaining subsurface contaminated soil. Although these alternatives would not meet the cleanup objectives due to remaining contamination, they are considered to be protective of human heath since the shallow contaminated soil would be excavated and disposed of off site.

For groundwater, Alternative G1, No Action, is not expected to be protective of human health because the groundwater contamination plumes would not be monitored. Alternative G2, Groundwater Monitoring of Outpost Wells, Alternative G3, Monitored Natural Attenuation, and Alternative G4, Groundwater Extraction & *Ex situ* Treatment, would be protective of human health. The site and surrounding area are provided with public water. The potential for exposure to overburden groundwater is low, except during the period of intrusive construction activities involved with the installation of extraction wells for Alternative G4 whereby proper health and safety procedures would be followed.

One concern is the exposure to overburden groundwater if used as a water supply. There is sufficient overburden groundwater to serve as a water supply source as evidenced by the former usage of the groundwater supply wells located 1.2 miles southeast of the site. These water supply wells reportedly extract groundwater from greater than 500 feet below ground surface. Therefore, the threat to these wells from contamination at the site is not expected. The monitoring included in Alternative G2, Groundwater Monitoring of Outpost Wells, is considered protective of the supply wells.

Another concern was the potential exposure for cemetery workers to site-impacted overburden groundwater. Based on information from the Suffolk County Department of Health Services, active irrigation supply wells are located near and in the New Montefiore Cemetery, downgradient of the site. These extraction wells are reportedly located in the Upper Glacial aquifer and are used to irrigate the cemetery and for other maintenance activities. These extraction wells are not located directly downgradient of the site. There are no known irrigation extraction wells in the plume area. Therefore, the potential of exposure for the cemetery workers to site-impacted overburden groundwater is expected to be low.

Alternative G2 and Alternative G3 would be slightly protective of the environment in that the groundwater would be expected to naturally attenuate. In addition, there are no surface water bodies, fish, or wildlife in danger of being affected by the groundwater. Alternative G4 is considered to be protective of the environment in terms of affecting habitat or vegetation. Implementation of this alternative would result in a significant volume reduction of contaminated groundwater. Downgradient contaminated groundwater that would not be captured for treatment would be expected to naturally attenuate.

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.

For soil, Alternative S1, No Action, is not expected to generate contaminant releases. Alternative S2, Limited Excavation & Off-site Disposal, and Alternative S3, Extensive Excavation & Off-site Disposal, involve intrusive construction work, which could cause releases of contamination during excavation activities. Alternative S2 and Alternative S3 are expected to pose significant disruptions to current Site activities and operations. Alternative S3 would be considered more disruptive to current site activities than Alternative S2 due to the greater excavation work proposed. Alternative S2 would be completed in about 4 to 5 months and Alternative S3 would require about one year to complete.

Alternative S1 is not expected to achieve remedial action objectives in a reasonable time because the contaminated soil would remain in its present condition. Alternative S2 and Alternative S3 are expected to achieve the remedial action objectives for a significant portion of site areas. Remaining soil contamination would continue to naturally attenuate, since Alternative S2 and Alternative S3 would not remediate the entire area of contaminated soil. Some areas could not be excavated (such as under building footings). Alternative S2 and Alternative S3 would remove and cover surface contaminated soil, thus reducing the potential for human exposures to contamination.

For groundwater, Alternative G1, No Action, Alternative G2, Groundwater Monitoring of Outpost Wells, and Alternative G3, Monitored Natural Attenuation, would not be expected to generate contaminant releases. For groundwater, Alternative G4, Groundwater Extraction & *Ex situ* Treatment, involves intrusive construction work which could cause releases of contamination during excavation activities.

Alternative G2 and Alternative G3 would be expected to potentially pose minor disruptions to off-site areas (installation of outpost and monitoring wells). Alternative G4 would be expected to pose significant disruptions to current site activities and operations.

Alternative G2 and Alternative G3 would not be effective for remediation of contaminated groundwater, as groundwater treatment is not part of these alternatives. However, they would be effective for meeting the remedial goals. Alternative G3 would monitor the natural attenuation processes and evaluate the changes over an extended period of time. Alternative G2 would indicate if selected downgradient locations have been impacted by the contaminated groundwater over an extended period of time.

Alternative G4 is expected to achieve the remedial action objectives for a significant portion of the contaminated groundwater. However, volatile organic compound (VOC) and metal contamination from potential upgradient sources and from metal contamination leaching from site soil is expected to provide an ongoing source of groundwater contamination. Additionally, it is assumed that groundwater contamination located downgradient of Edison Ave would not meet SCGs as they would not be captured for remediation and would continue to naturally attenuate.

4. <u>Long-term Effectiveness and Permanence.</u> 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.

For soil, Alternative S1, No Action, is not considered an adequate, reliable, or permanent long-term site remedy for contaminated soil. The risks involved with the migration of and direct contact with contaminants would remain essentially the same.

Alternative S2, Limited Excavation & Off-site Disposal, and Alternative S3, Extensive Excavation & Off-site Disposal, are considered to be adequate, reliable and permanent remedies for site contaminated soil as a significant portion of the metals contaminated soil would be removed from the site. These alternatives are both considered adequate and reliable remedies for mitigating human health due to the soil excavation coupled with paving. Contaminated soil located in inaccessible areas would remain onsite indefinitely and continue to impact the groundwater. Therefore, they are only moderately adequate and reliable remedies for mitigating environmental impacts associated with subsurface soil contamination.

An institutional control with deed restriction on the site would be implemented for Alternative S2 and Alternative S3 to limit the risks associated with the contaminated soil left onsite. Also with respect to Alternative S2 and Alternative S3, to address future construction or excavation, a soil management plan would be submitted to NYSDEC for approval.

For groundwater, Alternative G1, No Action, Alternative G2, Groundwater Monitoring of Outpost Wells, and Alternative G3, Monitored Natural Attenuation, would not be considered a permanent long-term site remedy for contaminated groundwater because the groundwater would not be actively remediated. Despite this, Alternative G2 would provide controls that would monitor the presence of VOCs and metals in the groundwater in the vicinity of the Suffolk County public water supply wells No. 2 & 3. Alternative G3 would include monitoring the progress (effectiveness over time) of natural attenuation including the contamination levels, the extent of contamination and the natural processes.

Alternative G4, Groundwater Extraction & *Ex situ* Treatment, would be considered an adequate, reliable and permanent remedy for site-contaminated groundwater and an adequate and reliable remedy for mitigating human health and environmental impacts (in terms of affecting habitat or vegetation) due to groundwater. Alternative G4 would establish long term effectiveness for the shallow and intermediate portion of the aquifer related to VOC and metals because those areas of the plume would be captured and treated. Portions of the downgradient contaminant plume that would not be captured for treatment would continue to naturally attenuate.

For Alternatives G2, G3, and G4, institutional controls would be imposed upon groundwater use at the site which would comply with the Suffolk County Department of Health Services' use and development restrictions.

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

For soil, Alternative S1, No Action, would not reduce the toxicity, mobility and volume of soil contaminants, as metal contaminated soil would remain onsite indefinitely.

Alternative S2, Limited Excavation & Off-site Disposal, and Alternative S3, Extensive Excavation & Off-site Disposal, provide for the greatest reduction of toxicity, mobility and volume of contaminants in soil, as a significant portion of the contamination would be removed from the site (Alternative S3 more so than Alternative S2). Additionally, the closure of the cesspools and drainage structures would assist in the reduction of additional leaching of contaminants to the groundwater.

For groundwater, Alternative G1, No Action, Alternative G2, Groundwater Monitoring of Outpost Wells, and Alternative G3, Monitored Natural Attenuation, would not reduce the toxicity, mobility and volume of groundwater contaminants, as treatment of the contaminants is not part of these alternatives.

Alternative G4, Groundwater Extraction & *Ex situ* Treatment, provides for the greatest reduction of toxicity, mobility and volume of contaminants in groundwater, as a significant portion of the contamination would be captured and treated. Additionally, any residual waste generated on site as part of the treatment process would be disposed of offsite.

6. <u>Implementability.</u> 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.

For soil, Alternative S1, No Action, is administratively implementable and does not require technical implementation.

Alternative S2, Limited Excavation & Off-site Disposal, and Alternative S3, Extensive Excavation & Off-site Disposal, are implementable on a technical basis, although they are complicated by the limited space available for equipment to remove the contaminated soil. Alternative S2 and Alternative S3 would remediate surface and subsurface soil by excavation of contaminated soil using conventional excavation equipment and standard construction methods. However, Alternative S3 would also utilize additional methods to excavate deeper soil (e.g., sheeting). Technically implementing Alternative S3 would be much more difficult than Alternative S2. The excavation depth of Alternative S3 within the 8 feet wide eastern alleyway is 18 feet below grade surface (bgs), the depth at which metals exceedances were detected. The materials and services necessary for this remediation are readily available. Operation in spaces with limited access such as the alleyway and inside the site building are expected to be difficult and result in slow work progress. With regard to operation and maintenance, the materials and services required for paved surfaces are also readily available.

Technically implementing Alternative S3 would be complicated by the close proximity of buildings adjacent to the site, underground utilities, overhead utilities, etc. The extent of remediation would be limited. Workers' safety might be compromised during the operation and oversight of the drilling vehicle within the narrow alleyway.

In terms of administrative concerns, these alternatives are also considered to be implementable. Implementation of these alternatives would require coordination and approval by Town of Babylon and Suffolk County agencies (e.g., Building Department) and utility companies as well as site occupants. An institutional control with deed restriction on the site would be implemented to preclude contact with remaining contaminated media under Alternative S2 and Alternative S3. There are no anticipated, specific problems associated with obtaining permits or approvals from the various agencies and other concerns.

For groundwater, Alternative G1, No Action, is administratively implementable and does not require technical implementation.

Alternative G2, Groundwater Monitoring of Outpost Wells, Alternative G3, Monitored Natural Attenuation, and Alternative G4, Groundwater Extraction & *Ex situ* Treatment, are implementable on a technical basis. The implementability of Alternative G4, Groundwater Extraction & *Ex situ* Treatment, would be more complicated than Alternative G2 and Alternative G3 due to the limited space on site. The materials and services necessary for these remedial alternatives are readily available. With regard to operation and maintenance, the materials and services required for Alternative G2, Alternative G3 and Alternative G4 are readily available.

In terms of administrative concerns, these alternatives are also considered to be implementable through the required coordination and approval by numerous Town of Babylon and Suffolk County agencies (e.g., Sewer Department, Building Department) and utility companies. For Alternatives G2, G3, and G4, there are no anticipated problems from the various agencies associated with obtaining permits or approvals and imposing institutional controls upon groundwater use at the site to comply with Suffolk County Department of Health Services' use and development restrictions.

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 3.

Alternative S1, No Action, does not include remedial actions for soil, thus the cost for this Alternative is $0.

Alternative S2, Limited Excavation & Off-site Disposal, which includes soil excavation of contaminated soil using conventional excavation equipment and standard construction methods, is estimated to cost approximately $675,000. This total present worth estimate assumes a 30-year period and a discount rate of five percent.

Alternative S3, Extensive Excavation & Off-site Disposal, which also includes excavation of contaminated soil using conventional excavation equipment and standard construction methods with consideration toward using additional means to address deeper soil (e.g., sheeting, soil borings), is estimated to cost approximately $5,315,400. This total present worth estimate assumes a 30-year period and a discount rate of five percent.

Alternative G1, No Action, does not include remedial actions for groundwater, thus the cost for this Alternative is $0.

Alternative G2, Groundwater Monitoring of Outpost Wells, which includes the monitoring of three outpost wells and an existing monitoring well cluster is estimated to cost $130,000. This cost was calculated from an approximation of the monitoring period being at least twenty years.

Alternative G3, Monitored Natural Attenuation, which includes a monitored natural attenuation evaluation/study of site groundwater and the installation of nine groundwater-monitoring wells (to monitor upgradient and downgradient (south of Edison Ave) contamination), is estimated to cost approximately $368,000. This total present worth estimate assumes a 30-year period and a discount rate of five percent.

Alternative G4, Groundwater Extraction & *Ex situ* Treatment, which includes groundwater extraction and *ex situ* treatment in addition to the installation of six groundwater-monitoring wells (to monitor upgradient and downgradient (south of Edison Ave) contamination), is estimated to cost approximately $7,872,000. This total present worth estimate assumes a 30-year period and a discount rate of five percent.

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.

8. **Community Acceptance.** Concerns of the community regarding the RI/FS 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 upon the results of the RI/FS and the evaluation presented in Section 7, the NYSDEC is proposing Alternative S2, Limited Soil Excavation and Off-site Disposal, and Alternative G2, Groundwater Monitoring of Outpost Wells. The elements of Alternative S2 are excavation and off-site disposal of soil from source areas such as the alleyway located south of the building, cesspools and drainage structures located in the parking lot, and sump pit inside the building. In addition, asphalt capping would be installed in the alleyway and parking lot, while the concrete floor above the sump pit would be replaced. The parking lot area and alleyways would be maintained to extend the longevity of the asphalt pavement to continue limiting surface soil exposure. To address the groundwater contamination, NYSDEC proposes Alternative G2, which would require the installation and monitoring of outpost wells.

These two selections are based on the evaluation of the six alternatives developed for this site. Alternative S2 was chosen because it would actively and permanently remove source area soil from the site and reduce the toxicity and volume of the contaminated soil. Alternative S2 would meet the cleanup objectives for the shallower contaminated soil which would be removed. Due to the combination of shallow soil excavation, confirmatory sampling and analysis using the toxicity characteristic leaching procedure (TCLP) method, and asphalt pavement installation or concrete cap replacement, Alternative S2 is considered an adequate remedy for mitigating human health exposure because it would greatly minimize the potential for human contact with the remaining subsurface contaminated soil. Alternative S2 differs from Alternative S3, Extensive Excavation & Off-site Disposal, in that Alternative S3 would remove a greater volume of contaminated soil through a more aggressive excavation technique. However, the implementation of Alternative S3 would be extremely complicated by the narrowness of the alleyway and limited space within the interior of the building. Due to the risk of compromising the Spectrum building and also the adjacent building within the alleyway, Alternative S2 is the preferred remedy even though it does not remove contaminated soils at deeper depths. The only other major difference between Alternative S2 and Alternative S3 is the cost. Alternative S2 is less expensive than Alternative S3.

The proposed groundwater remedy is Alternative G2, because there are no existing human health exposure problems and groundwater monitoring of outpost wells would adequately address future human health concerns. No human or ecological receptors have been identified immediately downgradient or further downgradient from the site. Although the groundwater is contaminated, the people in the area are connected to a public water supply system.

The closest water supply well, which is not currently in use, is about 1.2 miles from the site. Human exposure to contaminated groundwater is highly unlikely. Samples from the outpost wells would be taken at a frequency determined during the remedial design to ensure that site-impacted groundwater does not reach any public water supply wells. However, it is not expected that site-impacted groundwater will migrate to the outpost wells; over time, the concentrations of cadmium and nickel have generally decreased except in the area where it is believed that there may be another source of metals contamination. Although SCGs would not be attained in the groundwater through the use of Alternative G2, Alternative G2 would achieve the same level of effectiveness in reaching the remediation goals as compared to Alternative G3, Monitored Natural Attenuation, and Alternative G4, Groundwater Extraction & *Ex situ* Treatment.

Alternative G2, Groundwater Monitoring of Outpost Wells, and Alternative G3, Monitored Natural Attenuation, are different essentially because Alternative G2 would monitor the potential contamination of receptors, whereas Alternative G3 would monitor the progress of natural attenuation.

For Alternative S2 and Alternative G2, the estimated present worth cost to implement the remedy is $675,000 and $130,000, respectively. The cost to construct the remedy is estimated to be $660,000 and $40,000, respectively. The estimated average annual operation and maintenance cost is $1,000 for Alternative S2. For Alternative G2, the estimated average annual operation and maintenance cost is $7,500.

The elements of the proposed remedy are as follows:

- A remedial design program to verify the components of the conceptual design and provide the details necessary for the construction, operation and maintenance, and monitoring of the remedial program. Any uncertainties identified during the RI/FS would be resolved.

Soil remedy:

- Excavation to about 18 feet bgs within the cesspools and drainage structures, 2 feet bgs in the alleyway, 8 feet below the bottom of the sump pit, and 2 feet bgs within the area adjacent to the sump pit. Excavated material would be characterized by TCLP analysis and disposed off site appropriately. The alleyway and parking lot (area that has the cesspools and drainage structures) would be paved with asphalt. The concrete flooring within the sump pit area inside the building would be replaced. Prior to sealing the excavated areas, confirmatory samples would collected and analyzed by the TCLP method.

- A soils management plan would be developed to address residual contaminated soils that may be excavated from the site during future redevelopment. The plan would require soil characterization and, where applicable, disposal/reuse in accordance with NYSDEC regulations.

- A deed restriction would be imposed that would require compliance with the soils management plan, to address subsurface soil contamination two feet below ground surface which exceeds cleanup objectives. 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 institutional controls and engineering controls put in place, pursuant to the Record of Decision, are still in place, have not been altered, and are still effective.

Groundwater remedy:

- Installation of three outpost wells (2 deep wells and 1 intermediate depth well) at a location downgradient of the site.

- Institutional controls would 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 Suffolk County Department of Health Services.

- A notification would be sent to the county clerk for filing, to notify future owners of the residual contaminants remaining in the groundwater on the site.

Since the remedy results in untreated hazardous waste remaining at the site, a long term maintenance and monitoring program would be instituted:

- Outpost wells and an existing monitoring well cluster would be sampled for VOCs and metals. Sample analyses would be reviewed to ensure that no site-impacted contaminants may reach potential receptors. Sampling frequency and monitoring duration would be determined during the remedial design.

This program would allow the effectiveness of the outpost wells to be monitored and would be a component of the operation and maintenance for the site.

TABLE - 1
Nature and Extent of Contamination

Medium	Category	Contaminant of Concern	Concentration Range	SCG
Surface Soil (ppm)	Inorganic Compounds	Cadmium	1.8 to 1,670	1
		Chromium	10.1 to 3,130	10
		Copper	12 to 1,970	25
		Nickel	6.4 B to 21,100	13
	Volatile Organic Compounds (VOCs)	1,1-Dichloroethane	0.1 to 2.2	0.2
		1,1,1-Trichloroethane	0.84 to 2.4	0.8
	PCBs	PCB-1254	0.027 to 6.1	1
		PCB-1260	0.037 to 1.6	1
Subsurface Soil (ppm)	Inorganic Compounds (ppm)	Cadmium	0.11 to 5,500	1
		Chromium	1 to 19,600	10
		Copper	1.2 to 3,610	25
		Nickel	0.29 to 4,900	13
Shallow Groundwater 18' bgs - 20' bgs, (ppb)	VOCs	Tetrachloroethene	1 to 610	5
	Inorganic Compounds (Filtered)	Cadmium	0.58 to 672	5
		Chromium	1.8 to 48.1	50
		Copper	1.6 to 1,910	200
		Nickel	2.4 to 1,770	100
	Inorganic Compounds (Unfiltered-Initial phase; Low Flow-Second & Third phases)	Cadmium	0.33 to 17,200	5
		Chromium	1.4 to 123,000	50
		Copper	2 to 9,520	200
		Nickel	2.7 to 7,310	100

TABLE - 1 (Continued)
Nature and Extent of Contamination

Medium	Category	Contaminant of Concern	Concentration Range	SCG
Intermediate Groundwater 45' bgs - 60' bgs, (ppb)	VOCs	Tetrachloroethene	1 to 560	5
	Inorganic Compounds (Filtered)	Cadmium	0.79 to 9.7	5
		Chromium	1.8 to 5.4	50
		Copper	1.5 to 18.8	200
		Nickel	3.5 to 18.4	100
	Inorganic Compounds (Unfiltered-Initial phase; Low Flow-Second & Third phases)	Cadmium	0.39 to 42.2	5
		Chromium	2 to 822	50
		Copper	3.2 to 556	200
		Nickel	1.2 to 292	100

Notes:

1. ppm = parts per million; ppb = parts per billion
2. Shallow Groundwater - Screened interval intercepts the groundwater table, which is approximately at 18 feet bgs.
3. Deep Groundwater - Monitoring well samples obtained from 45-50 feet bgs; geoprobe samples obtained from 60 feet bgs.
4. Low flow indicates that the groundwater samples were collected via low flow sampling techniques. The remaining groundwater samples were collected via traditional groundwater sampling methods with a bailer.

Table - 2
Pre- and Post-IRM Soil Data

Location	Category	Contaminant of Concern	Pre-IRM Concentration Initial phase (1999)	Post-IRM Concentration Second phase (2000)	SCG
CP-3[1]	Inorganic Compounds (ppm)	Cadmium	19,500	589	1
		Chromium	120,000	1,340	10
		Copper	26,900	1,150	25
		Nickel	54,500	1,790	13
		Cyanide	866	950	NV[3]
CP-4	Inorganic Compounds (ppm)	Cadmium	10,700	66.9	1
		Chromium	84,100	278	10
		Copper	19,000	157	25
		Nickel	32,200	0.52	13
		Mercury	0.57	20.4	0.1
CP-5	Inorganic Compounds (ppm)	Cadmium	328	0.65	1
		Chromium	84.9	2.9	10
		Copper	6,190	84.7	25
		Nickel	215	2.2	13
	VOCs (ppm)	Chlorobenzene	46	ND	1.7
CP-6	Inorganic Compounds (ppm)	Cadmium	1,640	188	1
		Chromium	924	11.1	10
		Copper	923	5.7	25
		Nickel	401	17.8	13
	Volatile Organic Compounds (VOCs) (ppm)	Tetrachloroethene	12	ND	1.4
		1,1,1-Trichloroethane	23	ND	0.8
		Toluene	34	ND	1.5
		Chloroethane	34	ND	1.9
		1,1-Dichloroethane	52	ND	0.2
CP-7	Inorganic Compounds (ppm)	Cadmium	10,300	167	1
		Chromium	4,980	189	10
		Copper	3,650	55.2	25
		Nickel	5,810	135	13
CP-8	Inorganic Compounds (ppm)	Cadmium	719	15.5	1
		Chromium	4,080	261	10
		Copper	8,230	284	25
		Nickel	3,890	309	13

Table - 2 (Continued)
Pre- and Post-IRM Soil Data

Location	Category	Contaminant of Concern	Pre-IRM Concentration Initial phase (1999)	Post-IRM Concentration Second phase (2000)	SCG
CP-10[2]	Inorganic Compounds (ppm)	Cadmium	56.3	See Footnote 2	1
		Chromium	301	See Footnote 2	10
		Copper	972	See Footnote 2	25
		Nickel	170	See Footnote 2	13
		Arsenic	13.9	See Footnote 2	1
	VOCs (ppm)	Acetone	2.3	See Footnote 2	0.2
		2-Butanone	0.44	See Footnote 2	0.3
		Xylenes (total)	3.8	See Footnote 2	1.2
	Semi-Volatile Organic Compounds (SVOCs) (ppm)	Naphthalene	27	See Footnote 2	13
		2-Methylnapthalene	200	See Footnote 2	36.4
		Phenanthrene	56	See Footnote 2	50
		Bis(2-ethylhexyl)phthalate	73	See Footnote 2	50
DS-4	Inorganic Compounds (ppm)	Cadmium	67.4	0.42	1
		Chromium	253	2.4	10
		Copper	1,970	2.8	25
		Nickel	150	1.6	13
	VOCs (ppm)	Toluene	2.3	ND	1.5
DS-5	Inorganic Compounds (ppm)	Cadmium	4,350	13.3	1
		Chromium	1,220	144	10
		Copper	1,010	40	25
		Nickel	369	40.8	13
DS-8	Inorganic Compounds (ppm)	Cadmium	496	2.6	1
		Chromium	1,630	119	10
		Copper	362	9.4	25
		Nickel	956	11.5	13
DS-10	Inorganic Compounds (ppm)	Cadmium	246	62.8	1
		Chromium	5,280	25.4	10
		Copper	665	26.5	25
		Nickel	476	31.2	13

Footnotes:

[1]Three confirmatory samples were collected from CP-3. For each contaminant of concern, the highest detected concentrations are listed in this table. The following are the associated depths: 13'-13.5' for cadmium, chromium, copper, and nickel and 13.5'-14.5' for cyanide.

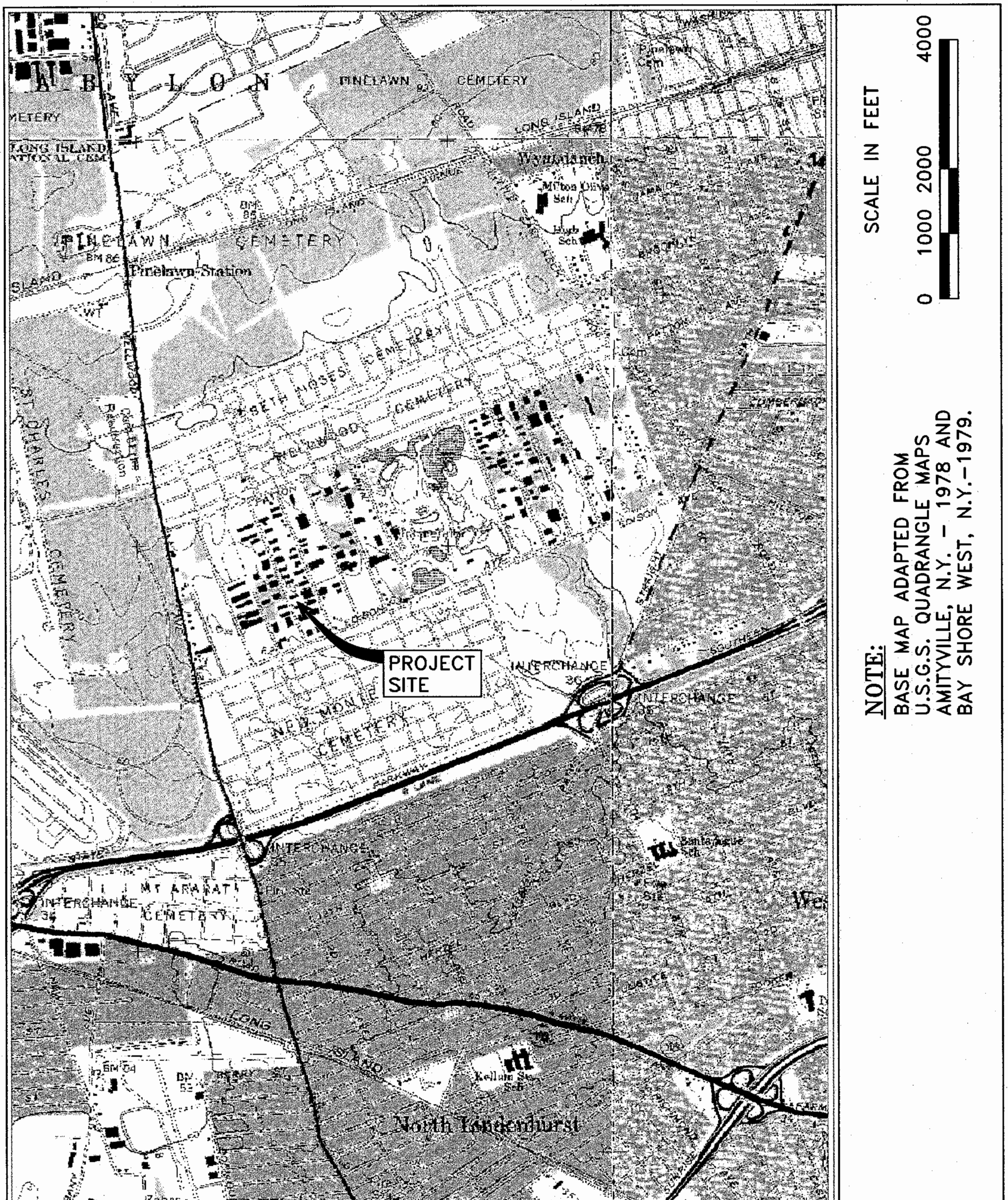
[2]No confirmatory samples were taken from CP-10 due to the concrete bottom in the cesspool.

[3]NV indicates no value is listed as a recommended soil cleanup objective, however the site background level is 0.35 ppm.

ppm = parts per million; ppb = parts per billion

Table - 3
Remedial Alternative Costs

Remedial Alternative	Capital Cost	Annual O&M	Total Present Worth
S1) No Action	$0	$0	$0
S2) Limited Excavation & Off-Site Disposal	$660,000	$1,000	$675,000
S3) Excavation & Off-Site Disposal	$5,300,400	$1,000	$5,315,400
G1) No Action	$0	$0	$0
G2) Groundwater Monitoring of Outpost Wells	$40,000	$7,500	$130,000
G3) Monitored Natural Attenuation	$91,000	$18,000	$368,000
G4) Groundwater Extraction & Ex-Situ Treatment	$1,835,000	$393,000	$7,872,000



SPECTRUM FINISHING CORPORATION
50 DALE STREET
WEST BABYLON, NEW YORK

SITE LOCATION MAP

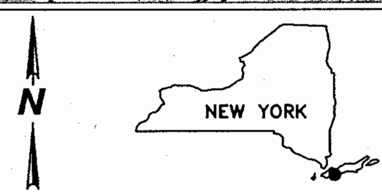
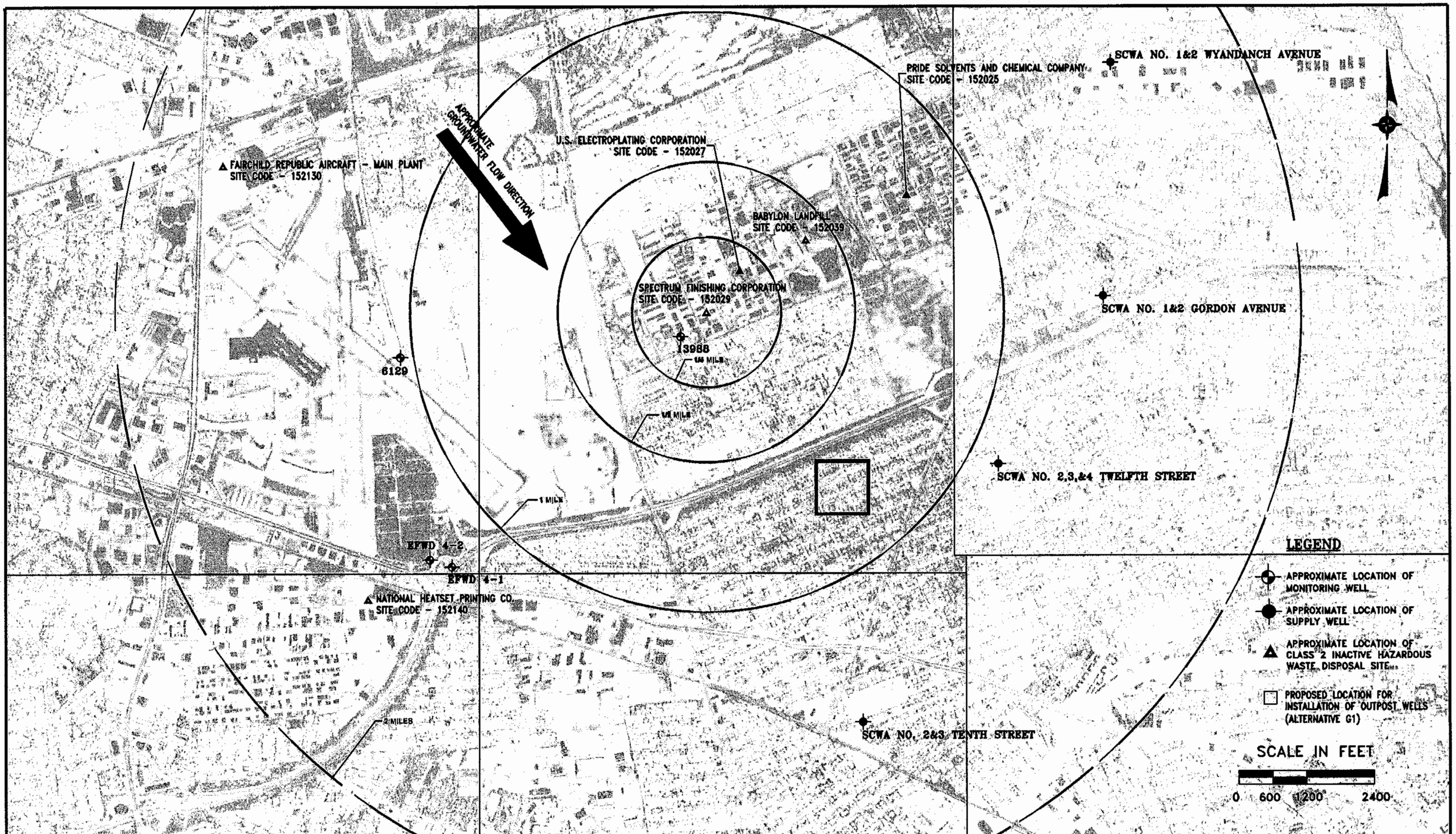


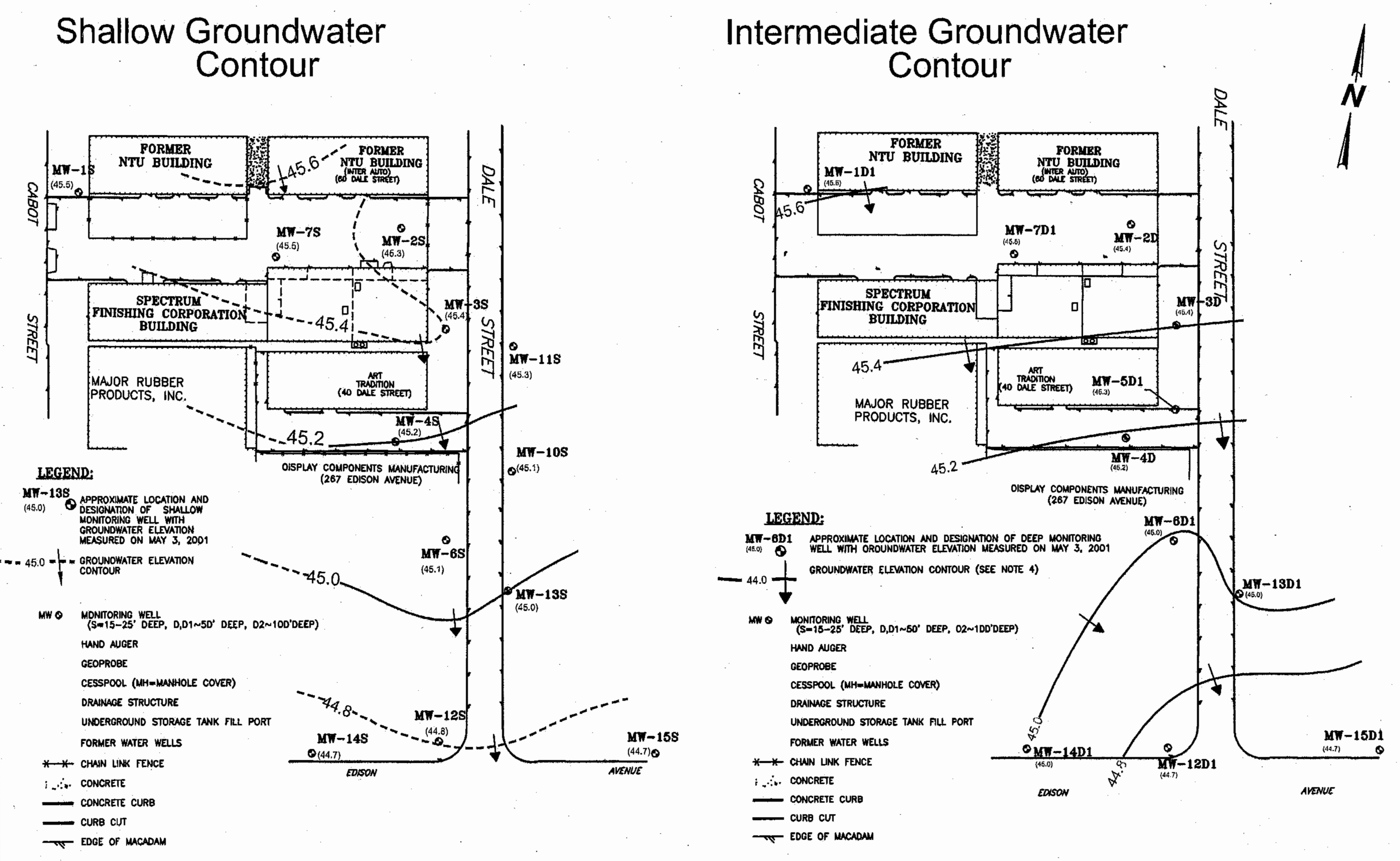
FIGURE No. 1



Spectrum Finishing Corporation Site, ID#1-52-029
West Babylon, Suffolk County, New York

Inactive Hazardous Waste Sites & Public Supply Wells Near Spectrum Site

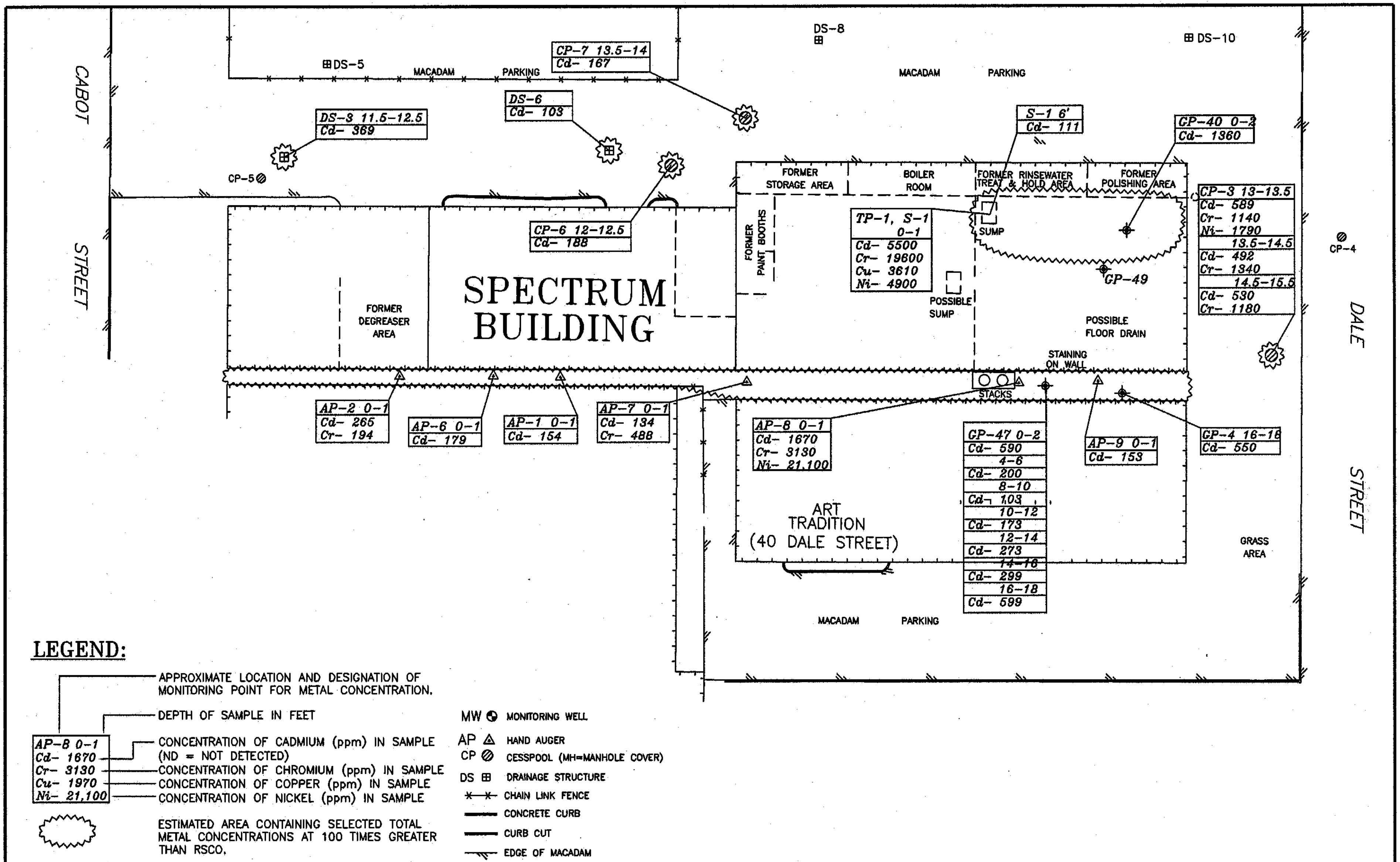
FIGURE 2



SPECTRUM FINISHING CORPORATION SITE, ID# 1-52-029
WEST BABYLON, SUFFOLK COUNTY, NEW YORK

GROUNDWATER FLOW DIRECTIONS

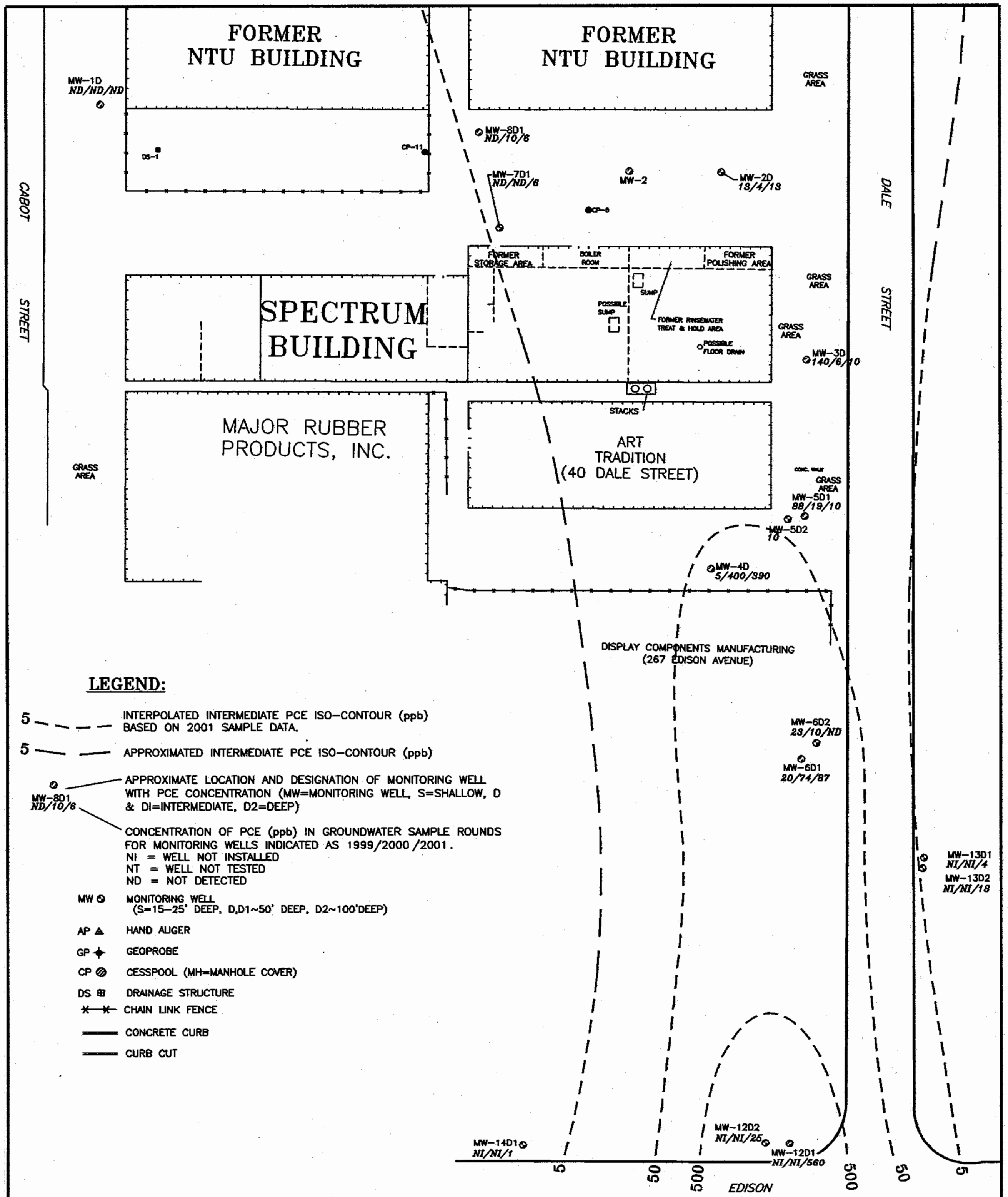
FIGURE 3



SPECTRUM FINISHING CORPORATION SITE, ID# 1-52-029
WEST BABYLON, SUFFOLK COUNTY, NEW YORK

METALS CONTAMINATED SOIL DISTRIBUTION MAP - 100 TIMES EXCEEDANCE OF RSCO

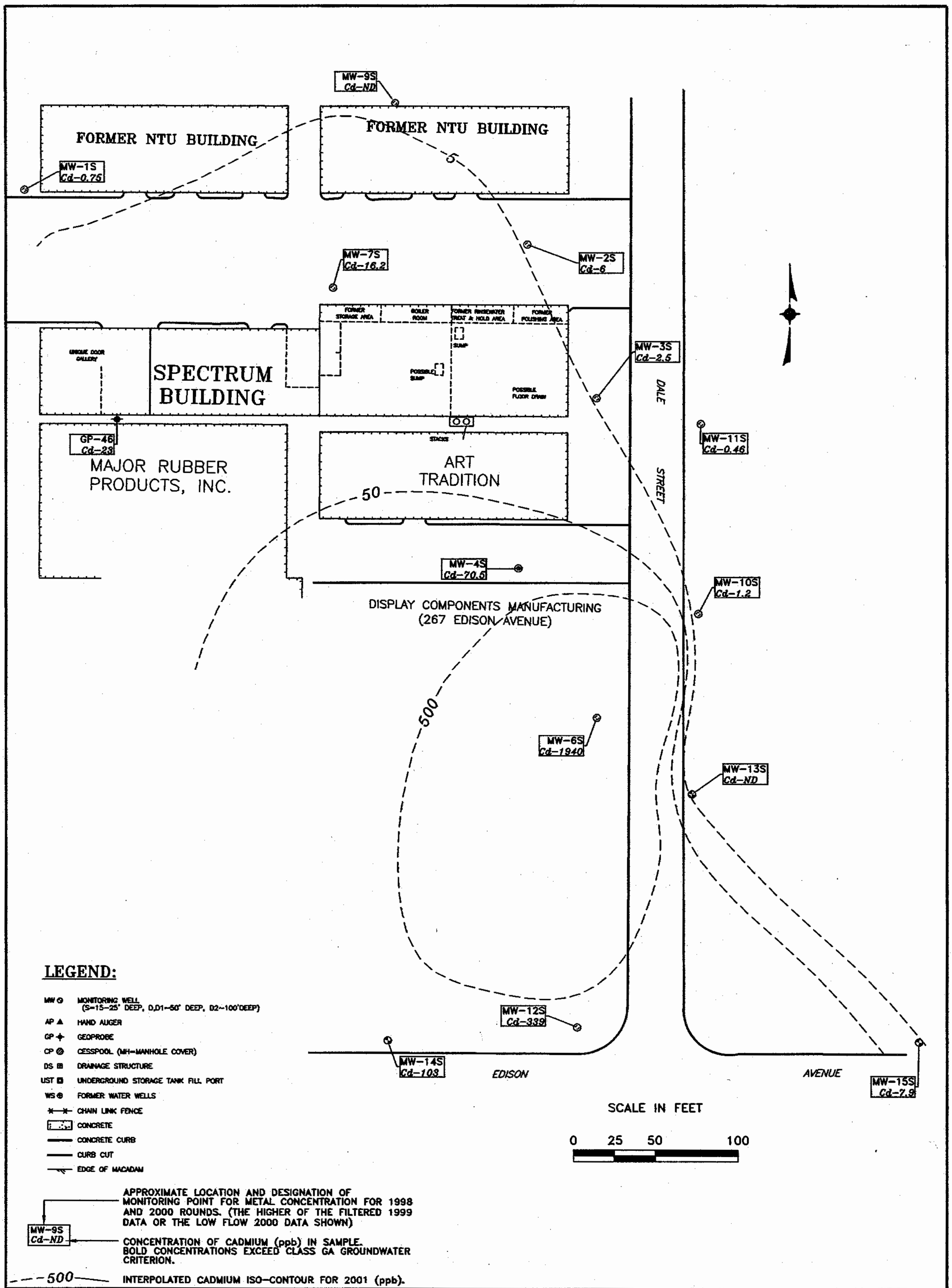
FIGURE 4



SPECTRUM FINISHING CORPORATION SITE, ID# 1-52-029
WEST BABYLON, SUFFOLK COUNTY, NEW YORK

PCE GROUNDWATER PLUME - INTERMEDIATE DEPTH

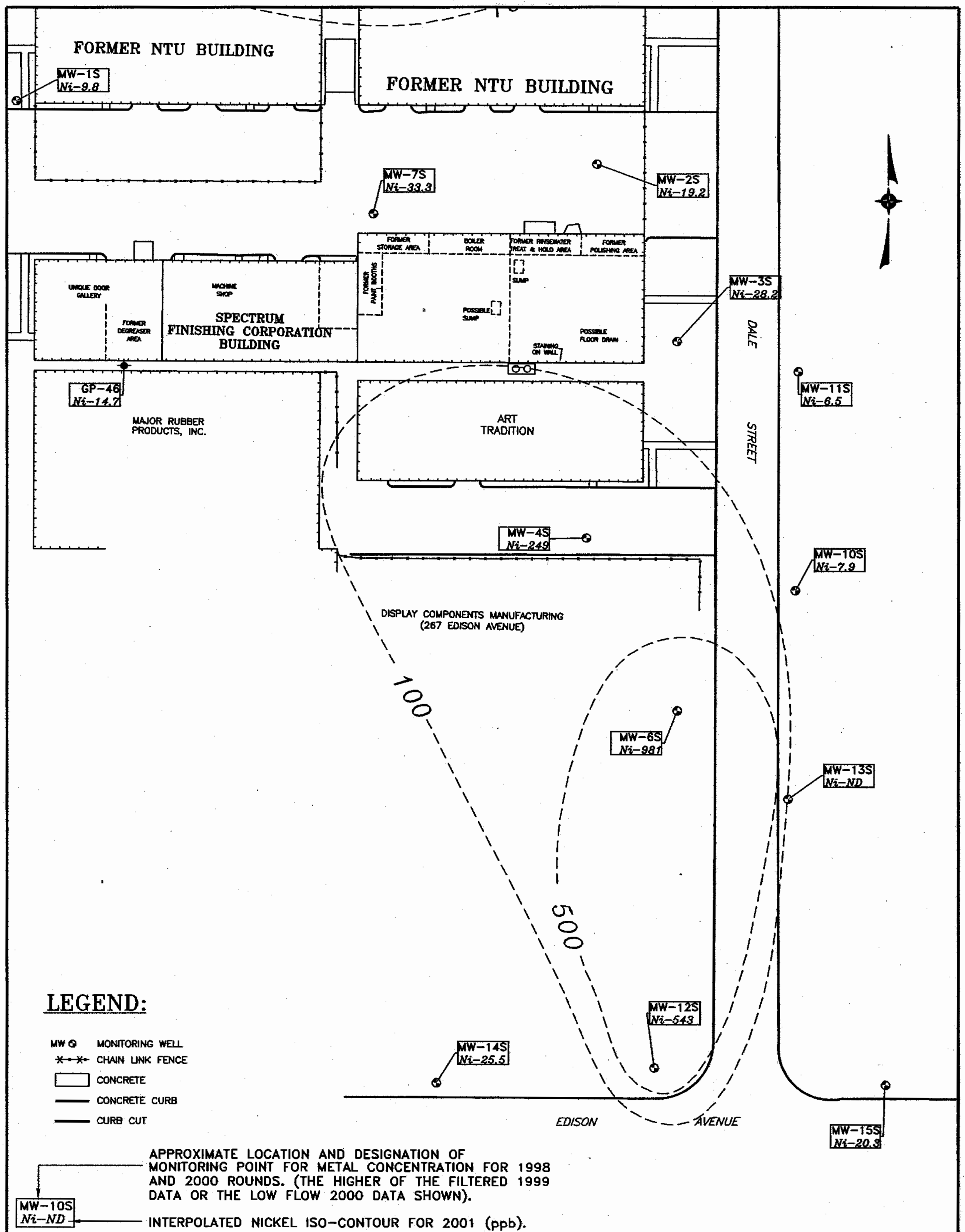
FIGURE 5A



Spectrum Finishing Corporation Site, ID# 1-52-029
West Babylon, Suffolk County, New York

Cadmium Groundwater Plume - Shallow Depth

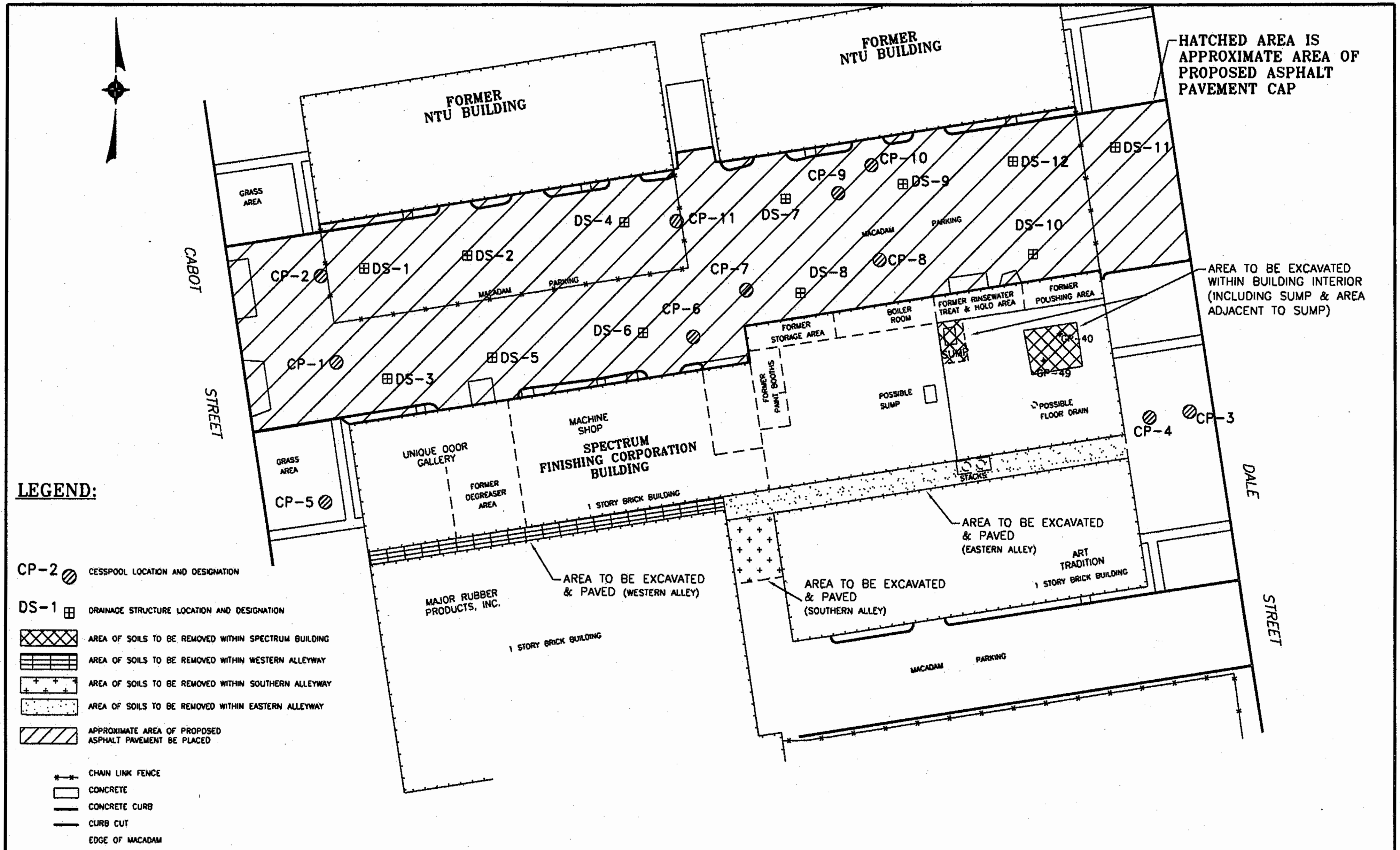
FIGURE 5B



SPECTRUM FINISHING CORPORATION SITE, ID#1-52-029
WEST BABYLON, SUFFOLK COUNTY, NEW YORK

NICKEL GROUNDWATER PLUME - SHALLOW DEPTH

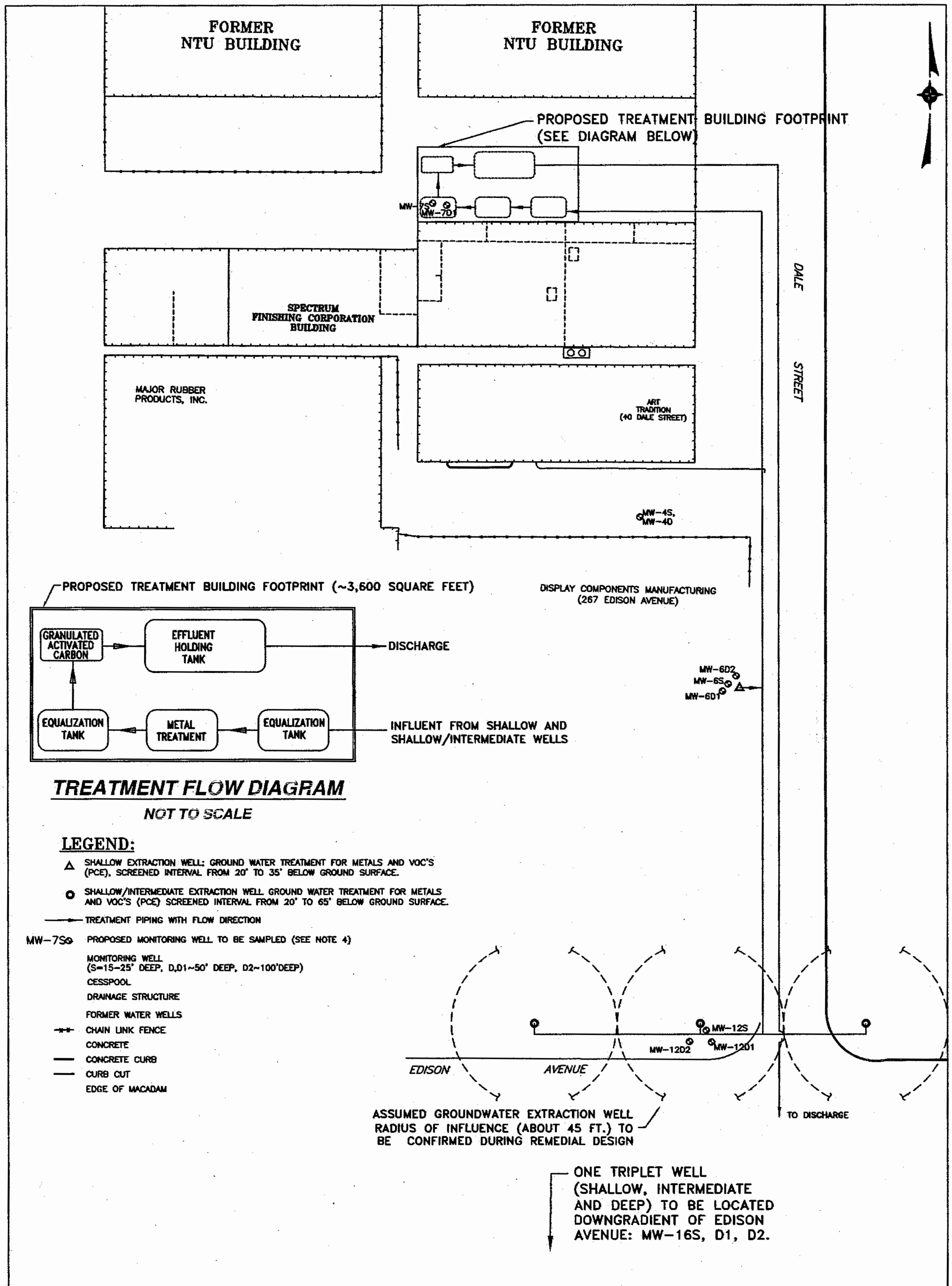
FIGURE 5C



SPECTRUM FINISHING CORPORATION SITE, ID#1-52-029
WEST BABYLON, SUFFOLK COUNTY, NEW YORK

FEATURES OF SOIL ALTERNATIVES S1 AND S2

FIGURE 6



SPECTRUM FINISHING CORPORATION SITE, ID#1-52-029
WEST BABYLON, SUFFOLK COUNTY, NEW YORK
ALTERNATIVE G3,
GROUNDWATER EXTRACTION AND EX-SITU TREATMENT

FIGURE 7