Department of Environmental Conservation

Division of Environmental Remediation

PROPOSED REMEDIAL ACTION PLAN

Leica, Incorporated Site

Town of Cheektowaga, Erie County
Registry Number 915156

February 1997

New York State Department of Environmental Conservation
GEORGE E. PATAKI, *Governor* JOHN P. CAHILL, *Acting Commissioner*

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LEICA INC. SITE

Town of Cheektowaga, Erie County, New York
Site No. 915156
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SECTION 1: 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 that **Integrated dual vacuum extraction combined with pneumatic fracturing be used to treat contaminated soil and groundwater extraction and treatment be used to treat bedrock ground water** at the Leica Site. This remedy is proposed to address the threat to human health and the environment created by the presence of soil and ground water contamination at the site.

This Proposed Remedial Action Plan (PRAP) identifies the preferred remedy, summarizes the other alternatives considered, and discusses the rationale for this preference. The NYSDEC will select a final remedy for the site only after careful consideration of all comments submitted during the public comment period.

This PRAP is issued by the NYSDEC as an integral component of the citizen participation plan responsibilities provided by the New York State Environmental Conservation Law (ECL), and 6 NYCRR Part 375 (a State regulation). This document is a summary of the information that can be found in greater detail in the Remedial Investigation (RI) and Feasibility Study (FS) reports (described below) on file at the document repositories.

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

To better understand the site and the investigations conducted there, you are encouraged to review the documents at the following repositories:

Reinstein Branch Library
2580 Harlem Road
Cheektowaga, New York 14227

New York State Department of Environmental Conservation
270 Michigan Avenue
Buffalo, New York 14203-2999
(716)851-7220
(Appointment Only)

Written comments on the PRAP can be submitted to Mr. Gregory P. Sutton, P.E., Project Manager, at the address given above.

DATES TO REMEMBER:

Comment Period: ???????????????

Public comment period on the RI/FS Report, PRAP, and preferred alternative.

Date/Time: 7:00 PM - February ?, 1997
Public meeting at the Town of Cheektowaga, Town Hall, Council Chambers

SECTION 2: SITE LOCATION AND DESCRIPTION

The Leica Inc. Site is located on approximately 24 acres at the intersection of Eggert Road and Sugar Road in the Town of Cheektowaga, Erie County, New York. The west boundary of the Site abuts the eastern boundary of the City of Buffalo.(Figure 1) The site is located in a generally commercial/residential area and is bounded by open land and public housing to the west, Cemetery property to the north and east and residential property to the south. There are no surface water bodies in the general vicinity of the site. Stormwater water run-off is collected by the municipal storm water system and conveyed to Scajaquada Creek approximately one mile south of the site. Groundwater is not used for a source of drinking water. Drinking water is supplied by the Erie County Water Authority and is supplied from the Niagara River. The manufacturing facility was built on the Site in 1938 by the Spencer Lens Company for the manufacture of scientific instruments and high quality optical devices. The property has been owned and operated by various other firms manufacturing similar optical related products. There are three permanent buildings on-Site, including the brick multi-story Main Building of approximately 360,000 square feet, a single story metal storage building of approximately 3,100 square feet, and a one story brick fire protection system pump house of 325 square feet. The Main Building was constructed in segments from 1938 to 1967. The remainder of the Site is either paved for parking use or landscaped. The buildings are all constructed with concrete slab on grade foundations. The site is listed on the New York Registry of Inactive Hazardous Waste Sites (#915156) as a Class 2 site. A class 2 designation indicates the property poses a significant threat to public health and/or the environment.

SECTION 3: SITE HISTORY

3.1: Operational/Disposal History

Spencer Lens operated at the Site from 1938 to 1945. American Optical Corporation owned and operated the Site from 1945 to 1986, manufacturing the same type of products. From 1986 to 1990, Cambridge Instruments Inc. owned and occupied the Site for the manufacture of similar optical products. In 1990, Cambridge Instruments Inc. merged with Leica Inc. and operated under the Leica name at this Site until 1993. In July 1993, Leica Inc. ceased manufacturing operations at the Site. In October 1993 the facility and most of the land was sold to Samson Distribution Corporation/Calypso Development Corporation for use as a distribution warehouse. Leica retained title to a 100 x 390 foot area in the southeast corner of the property which contains the majority of the contamination. Until about 1956, ash, resulting from the use of coal as a boiler fuel, was landfilled on Site in a low area in the southeast corner of the Site. After 1956, the ash was disposed off-site by the Town of Cheektowaga. This area was covered with soil and was subsequently paved for use as an employee parking area in the late 1950s. The buildings and asphalt parking areas occupy approximately 65 percent of the Plant Site (Figure 2).

Prior to 1993, the owners and operators of the facility had all been involved in the manufacture of scientific instruments and optical devices. This involved two primary production processes: a metals operation and a lens production operation. In the metals operation, metal parts were machined and/or manufactured, cleaned, coated, and assembled. The production of optical lenses involved the shaping, grinding, polishing, and coating of glass lenses for use in ophthalmic instruments, microscopes, refractometers, and other optical instruments.

Numerous chemicals were stored and used at the facility for use in or as part of the manufacturing processes. These materials have included paints, solvents (such as acetone, xylene, methanol, methylene chloride, 2-butanone, and chloromethane), degreasers (such as trichloroethene [TCE] and 1,1,1-trichloroethane [1,1,1-TCA]), hydraulic oils, fuel oils, cutting oils, refraction oils, cyanide, acid based plating baths, and metals (cadmium, chromium, nickel, zinc, and copper).

A paint storage room and a flammable storage room were both tributary to a subsurface dry well which acted as receivers for the floor drains installed in these rooms. The dry well was located outside the building in the parking lot, directly east of the shipping area (figure 2).

Six storage tanks are or were present on-Site as follows: i) one 110-gallon steel aboveground diesel fuel tank located inside the fire protection system pump house to fuel the diesel pump motor; ii) one 100-gallon steel aboveground diesel fuel tank formerly located south of the boiler room. This tank was closed and removed in July 1993; iii) two aboveground steel solvent storage tanks, (one 750-gallon and one 250-gallon, for storage of TCE and 1,1,1-TCA) formerly located on the concrete dock area north of the boiler room. These two tanks were removed from service in 1987 and removed from the Site in July 1991. No documentation exists of the disposal of the above noted chemicals at the site. However, based on the proximity of the dry well to the paint room and the disposal of ash in the southeast area of the property, it is likely that these two areas were the most convenient areas for disposal to occur.

3.2: Remedial History

The following is a summary of the investigations completed or in progress at the Leica Site. Several environmental studies of the property have been previously conducted to determine if hazardous waste was present and if the site posed a significant threat to public health and/or the environment. The major investigative activity conducted at an inactive hazardous waste site is a Remedial Investigation/Feasibility Study (RI/FS). During the RI, the nature and extent of the contamination at the site is determined. This information is then used during the FS to determine an appropriate remedial action that effectively eliminates any threat posed by the site.

- July 1990: Leica contracted with Recra Environmental to complete a Environmental Audit of the property. The audit consisted of a site inspection, staff interview, records search etc. The results of the audit is contained in the report entitled **"Real Property Environmental Assessment Report"**, dated August 14, 1990.
- November 1990: Leica implemented a Phase II Site Investigation at the site entitled "**Site Investigation, Leica Inc**". dated November 1990. The investigation consisted of limited soil and groundwater samples.
- July 1991: Leica's consultant Conestoga-Rovers & Associates, conducted additional investigative activities at the site with the installation of additional groundwater monitoring wells and the collection of additional groundwater and soil samples. The results of the investigation are presented in the report entitled, **"Site Investigation Work Plan"**, dated October 25, 1991.
- November 4, 1992: Site listed on the New York State Registry of Inactive Hazardous Waste Site as a Class 2 site.
- October 8, 1993: Leica entered into Consent Order (legal agreement) with NYSDEC to conduct a Remedial Investigation/Feasibility Study and also the Remedial Design/Remedial Action at site. This order required the company to: investigate the site, propose a clean-up method, prepare design specifications, build, and construct the appropriate clean-up method at the site.
- October 1994: Leica submitted the completed **"Remedial Investigation Report"**, dated October 3, 1994 and revised February 16, 1995.
- May 1995: Leica submitted a draft **"Final Feasibility Study Report"** dated May 1, 1995. Subsequent revisions to the report were submitted dated July 25, 1995 and March 1996.
- December 1996: Leica submitted the results of a pilot study to determine the effectiveness of Dual vacuum extraction/pneumatic

fracturing technology in a report entitled, **"Integrated Dual Vacuum Extraction/Pneumatic Fracturing Pilot Study"** dated December 1996.

- January 1997: Leica submitted a **"Supplemental Feasibility Study Report"** dated January 1997.

3.3 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 NYSDEC and Leica, Inc. entered into a Consent Order on October 8, 1993. The Order obligates the responsible parties to carry out a full remedial program, which includes an investigation to determine the extent and location of site contaminants, determine the appropriate remedial method, prepare design document and implement that design.

The following is a chronological enforcement history of this site.

Date	**Index No.**	**Subject of Order**
10/8/93	B9-0396-92-01	RI/FS-RD/RA

SECTION 4: CURRENT STATUS

Leica Inc., under the supervision of the NYSDEC, initiated a Remedial Investigation/Feasibility Study (RI/FS) in November 1993 to address the contamination at the site. The RI was completed in October 1994. A FS was submitted in May 1995 with subsequent revisions in July 1995, March 1996 and January 1997. Upon issuance of a Record of Decision (ROD), the NYSDEC will authorize Leica to begin design activities necessary to implement the chosen remedial alternative at the site.

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 completed in three phases. The first phase was completed between November 1993 and December 1993. The second phase was carried out between March 1994 and May 1994. A report entitled **"Remedial Investigation Report, Leica, Inc., Cheektowaga, New York"** dated October 3, 1994 and revised February 16, 1995 has been prepared describing the field activities and findings of the RI in detail.

The RI activities consisted of the following:

- Site mapping, including a review of aerial photos, topographic maps, property boundary surveys and the delineation of all structures on site.
- Investigation of underground utilities and storage tanks.
- Installation of soil borings and monitoring wells on site to delineate the extent of contamination in site soils and groundwater.
- Surface water and sediment sampling in the Cemetery property adjacent to the site.
- Conducted a Air Pathways Analysis through the monitoring of air around the plant site.
- Performed a biota (vegetation, fish and wildlife) survey.
- A Health Risk Assessment.

The analytical data obtained from the RI was compared to applicable Standards, Criteria, and Guidance (SCGs) in determining remedial alternatives. Groundwater, drinking water and surface water SCGs identified for the Leica site were based on NYSDEC Ambient Water Quality Standards and Guidance Values and Part V of the NYS Sanitary Code. For the evaluation and interpretation of soil and sediment analytical results, NYSDEC soil cleanup guidelines for the protection of groundwater, background conditions, and risk-based remediation criteria, were used to develop remediation goals for soil.

Based upon the results of the RI, in comparison to the SCGs and potential public health and environmental exposure rates, certain areas and media (ie. soil, groundwater, air, sediments, etc.) of the site have been determined to require remediation. The following discussions summarize the extent of the contamination at the site.

Site Geology and Hydrology

The general geology consists of the following five specific geologic units beneath the site:

i) fill material overlying;

ii) native lake sediments, primarily silts and clays, overlying;

iii) saturated silty-sand zone soils, primarily sands and silts, overlying;

iv) till, primarily compacted sand and gravel, overlying;

v) bedrock (Onondaga Formation limestone).

Overburden Geology

The overburden soil (soil above bedrock) at the Site consists of a thin layer of fill material (0.5 to 6.2 feet thick) overlying native soils. The total overburden thickness ranges from 8.1 to 16.0 feet. The overburden is generally thickest along the east side and southeast corner of the Main Building (13 to 15.5 feet) which appears to correspond with the higher ground elevations observed in these areas. The fill encountered at the Site consists of disturbed native soils; imported topsoil in the grassed areas; sand, gravel and asphalt underlying the parking lot areas; and assorted fill, including brick, glass, slag, ash, coal, clinkers, metal, gravel, wood and other materials in the area southeast of the Main Building. This area was a low area which was filled with coal ash. The fill layer ranges in thickness from 0.5 feet to 6.2 feet. The fill layer is thickest in the areas east and southeast of the southeast corner of the Main Building, where it is in excess of three feet deep. The fill thins toward the south and west. The water in the fill concurs seasonably from the infiltration of precipitation. The water is prevented from percolating down through the soil because it is restricted by the underlying lake sediment layer.

The native soils at the Site consist of a lake sediment layer overlying a gray silty-sand layer overlying a thin till overlying bedrock. The thickness of the native soil ranges from 5.4 feet to 12.9 feet. The overall thickness of the native soils averages 9.7 feet, and is thickest in the east parking area and the west part of the south parking area. The native soils are thinnest in the southeast portion of the Site; correlating to the thickest fill areas.

The lake sediment layer is the result of deposition of fine grained soils by preglacial lakes which preceded present-day Lake Erie. The lake sediment layer at the Site is a varied, red-brown clay, and silt with minor amounts of sand and fine gravel. This layer would act as a aquitard (groundwater barrier), unless disturbed or breached. The lake sediment layer ranges in thickness from 2.4 feet to 9.4 feet and averages 5.6 feet thick. This layer was present in all borings completed at the Site. The lake sediments were described as being dry to moist.

Beneath the lake sediments is a saturated silty-sand layer (sandy zone), which is primarily sand and silt with minor amounts of clay and gravel. This sandy zone ranges in thickness from 1.9 feet to 9.7 feet and averages 4.1 feet thick. Included with this sandy zone is a thin densely compacted till layer which lies directly above the bedrock. This till layer ranged in thickness from 0.3 to 3.0 feet, with an average thickness of 1.1 feet. The till layer was notably drier than the overlying silty sands. The sandy zone is the only overburden water-producing interval other than the seasonal perch water zone in the fill. The 22 overburden wells at the Site were installed to monitor this zone. The direction of ground water flow in this zone varies across the site but is generally in a southeast direction (Figure 3).

Bedrock Geology

The bedrock encountered beneath the Site is the Onondaga Formation. The uppermost member encountered is the Moorehouse Member, a fine to medium grained, light to medium gray, massive limestone with coral and brachiopod fossils. This member is noted to be up to 55 feet thick in the Buffalo Area. The actual thickness under the Site is unknown as the bedrock wells penetrate a maximum of 32 feet of bedrock. In general, the bedrock surface is highest toward the northwest corner of the Site and drops toward the southeast. A total relief of 10.1 feet was observed across the Site, with highest elevations observed to the east and the lowest elevations occurring at the southwest end of the site. Bedrock groundwater flow varies across the site but it generally flows in a southwest direction (Figure 4).

The five classes of media sampled during the various investigations at the site are: groundwater; surface water; sediment; surface soils and subsurface soil. Selected results of the organic and inorganic analyses are summarized below for each media. A detailed discussion of the analytical results for each area can be found in the Remedial Investigation Report.

In addition to the various media investigated the site was broken into five areas. These areas were designated based on information provided by the company that showed that they may have been the site of chemical disposal or usage and thus may be contaminated to some degree. The following areas are:

Eastern Off-Site Parcel

The area referred to as the Eastern Off-Site Parcel is a six acre property owned by the St. Johns Cemetery Association. This area is located immediately east of the southern part of the Site and was at one time intended as a northward extension of Preston Road from Rowan Road to Sugar Road. A gravel road base and sanitary and storm sewers were installed, however, the roadway was never completed.

East Side Dry Well Area

Multiple potential contaminant sources are present within close proximity of each other in this area, located east of the Main Building. A stone-filled pit (dry well) functioned as the drainage sump for the trench and floor drains in the former flammable liquids storage room. Outside this room, two aboveground solvent storage tanks (TCE and 1,1,1-TCA) were formerly located on an elevated concrete loading dock. To the southeast, two Underground Storage Tanks (USTs) were used to store #5 and #6 fuel oil and one Above Ground Storage Tank(AST) stored diesel fuel. The east side dry well is located on the east side of the main plant building, approximately 25 feet east of the AST area. This dry well consists of a 4 foot by 4 foot hole about six feet deep which was backfilled with stones, covered with soil, and paved over.

West Side Dry Well

The west side dry well is located west of the Main Building and north of the building entrance. It received drainage from floor drains in the former paint storage room that was located in the northwest part of the Main Building. This dry well consists of a 2 ft. x 2 ft. x 4 ft. dug hole, filled with stone and covered with topsoil.

Southern Area

The southern area includes the entire southern portion of the Site and the area between the Main Building and the storage building. Historical research has shown that a portion of this area was filled with coal ash prior to 1956. This filled area lies in the southeast part of the this area and is shown in the aerial photograph on Figure 2.

Former Drum Storage Area

This area, located at the northeast corner of the Main Building, consists of a 40 foot by 70 foot concrete pad surrounded by asphalt parking areas. This area was used to stage drums of various chemicals and waste materials prior to off-Site disposal. The pad is no longer used for the storage or handling of drummed wastes and chemicals.

GROUNDWATER

Two specific groundwater zones below the site, were evaluated during the investigations. The two zones are the Overburden Aquifer, located in the silty-sand zone, and the Bedrock Aquifer located in the Onondaga Limestone formation.

Overburden Ground water

Groundwater samples collected and analyzed from the Overburden Aquifer were found to be contaminated with several volatile organic compounds (VOCs). These VOCs primarily consisted of trichloroethene, 1,2-dichloroethene, ethylbezene, xylene, and vinyl chloride. Several other VOCs, which are degradation (breakdown) products of TCE, Semi-volatile compounds (SVOCs) and metals were detected in low concentration. The primary contaminants detected in the Overburden Aquifer are:

Contaminant	Concentration Range (ppb)	Groundwater Stds.(1)
trichloroethene	ND-250,000	5
1,2-dichloroethene	ND-470,000	5
vinyl chloride	ND-110,000	2
toluene	ND-2,700	5
xylenes	ND-7,000	5
ethylbenzene	ND-2,000	5

ND-Non-detectable
(1)- Clean-up Goals from NYSDEC TOGS 1.1.1 (10/22/93)

The highest concentrations of contaminants were detected in two separate areas of the property. In an area of the "East Dry Well", the primary contaminant, trichloroethylene, was detected in MW-16A at 6,800 parts per billion (ppb). 1,2-dichloroethene, 1,1-dichloroethene and 1,1-dichloroethane were also detected at maximum concentrations of 4,200ppb, 630ppb and 6,500ppb respectively. The groundwater standard for these volatile organic compounds (VOCs) is 5ppb. In addition to the above chlorinated VOCs, several non-chlorinated chemicals were detected. Ethylbenzene, toluene and xylenes were also detected at maximum concentrations of 2,000ppb, 1,100ppb and 5,200ppb, respectively, These compounds are generally associated with the spillage of petroleum products such as fuel oils or gasoline. The general flow of the groundwater from the site is to the southwest. Analysis of samples from MW-15, which is located approximately 300 feet downgradient of MW-16, did not detect any of the above VOCs above the analytical detection limit of 10 ppb.

In the Southeast Area contamination was considerable higher than the dry well area, with TCE detected at concentrations of 250,000ppb(MW-11), 71,000ppb(MW-8) and 110,000ppb(MW-4). Non-Aqueous Phased Liquid (NAPL) was also detected in MW-11 with a TCE concentration of 330,000,000ppb or 33%. Several other compounds were also detected in the NAPL, 1,2-dichloroethene (22,000,000ppb), vinyl chloride (1,400,000ppb) and xylenes(6,600,000ppb) as well as in the groundwater itself. Ground water contamination was determined to extend approximately 250 feet to the Southeast from the ash fill area. A visual representation of the extent of groundwater contamination can be found in Figure 5.

Bedrock Aquifer

The general areas of bedrock contamination correspond to the areas of overburden contamination noted above. Groundwater samples collected and analyzed from the Bedrock Aquifer were found to be contaminated with several volatile organic compounds (VOCs). These VOCs primarily consisted of trichloroethene, 1,2-dichloroethene, 1,1,1-trichloroethane, ethylbenzene, xylene, and vinyl chloride. Several other VOCs, which are degradation (breakdown) products of TCE, Semi-volatile compounds (SVOCs) and metals were detected in low concentration. The primary contaminants detected in the Bedrock Aquifer are:

Contaminant	Concentration Range (ppb)	Groundwater Stds.(1)
trichloroethene	ND-88,000	5

1,2-dichloroethene	ND-390,000	5
1,1,1-trichloroethane	ND-110,000	5
vinyl chloride	ND-110,000	2
xylenes	ND-15,000	5
ethylbenzene	ND-3,000	5

ND-Non-detectable
(1)- Clean-up Goals from NYSDEC TOGS 1.1.1 (10/22/93)

The highest concentrations of contaminants were detected in two separate areas of the property. In an area of the "East Dry Well", the primary contaminants, trichloroethylene and 1,2-dichloroethene were detected in MW-16A at 88,000 ppb and 34,000 ppb, respectively. 1,1,1-trichloroethane (110,000 ppb) and xylenes (15,000 ppb) were also detected in the bedrock groundwater. It was noted that the bedrock contamination was higher than the contamination in the overburden aquifer. This may be due to the fact that the "Dry Well" allowed for the direct discharge of contaminants to the top of the bedrock. Analysis of samples from MW-15A, which is located approximately 300 feet from MW-16A, detected trichloroethene (14 ppb), 1,2-dichloroethene (490 ppb) and vinyl chloride (200 ppb) at concentration substantially lower than in the area where the drywell was located.

In the "Southeast Area" contamination in the bedrock was also consistent with the overburden area overlying it. Bedrock monitoring wells were not installed directly through the waste during the Remedial Investigation due to the high concentration of contaminants in the overburden soils. Bedrock wells were placed within the contaminant plume. The results of the sampling of these wells showed that 1,2-dichloroethene and vinyl chloride were the most predominant chemical detected at a maximum concentrations of 390,000 ppb and 110,000ppb at monitoring well, MW-6A. Only low concentrations of TCE and other VOCs found in the overburden soils were detected in the bedrock. Ground water contamination was determined to extend approximately 250 feet to the Southeast from the ash fill area. Monitoring wells MW-13A and MW-14A, downgradient of the fill area, show significant decrease of contaminants such as 1,2-dichloroethene of 25 ppb and 46 ppb, respectively. Vinyl chloride was detected at concentrations of non-detectable and 28ppb. A visual representation of the extent of groundwater contamination can be found in Figure 6.

SOIL

Eastern Off-Site Parcel (Cemetery Property)

Several soil samples were collected of shallow soil and sediment directly adjacent to the plant site. The largest number of detected compounds and the highest reported concentration of these compounds from this area (545 ppb total VOCS) were from the shallow sample collected at BH-3-93. The primary contaminants of this sample were xylenes and 1,2-DCE. This location is closest to the on-site area near MW-4/MW-8/MW-12, which exhibits elevated contaminant levels on the site. The remainder of the soil samples showed very low or non-detectable levels of contaminants that did not exceed clean-up goals for the site.

Contaminant	Concentration Range (ppb)	Clean-up Goal(1)
acetone	ND-49J	200
trichloroethene	ND-150J	700
1,2-dichloroethane	ND-160J	200
xylenes	ND-190D	1,200
toluene	ND-39	1,500
ethylbenzene	ND-42	5,500
vinyl chloride	ND-42	200

ND-Non-detectable
D-Result after sample dilution
J- Result is estimated
(1)- Clean-up Goals from NYSDEC TAGM 4046 (1/24/94)

East Side Dry Well Area (Area B)

This area was investigated through the collection of shallow (silt and clay) and deep (sandy soils) samples from beneath the pavement at the foot of the elevated concrete loading dock area and in the area of the former dry well. The shallow soil samples showed 1,2-DCE and TCE at maximum concentrations of 660 ppm and 859 ppm respectively. TPHs were detected in the samples at a maximum level 522 ppb.

Deep Soil samples showed 1,1,1-TCA (21,000D ppb), TCE (1,700JD ppb), toluene (1,800JD ppb), ethylbenzene (17,000D ppb), and xylene (92,000D). No SVOCs were detected.

Soil Contaminant	Concentration Range (ppb)	Clean-up Goal(1)
1,1,1-trichloroethane	ND-21,000D	800
1,2-dichloroethene	ND-570D	300
trichloroethene	ND-1,700JD	700
ethylbenzene	ND-17,000D	5,500
toluene	ND-1,800JD	1,500
xylenes	ND-92,000D	1,200

ND-Non-detectable
D-Result after sample dilution
J- Result is estimated
(1)- Clean-up Goals from NYSDEC TAGM 4046 (1/24/94)

TPHs were detected in the majority of all soil samples from this area. TPH concentrations detected ranged from 54.4 ppb to 7,370 ppb. TPH levels are higher to the north and east of the USTs., and lower to the south.

West Side Dry Well

One borehole was completed to 4.0 feet below the ground surface (BGS) in native lake sediment soils approximately one foot west of the dry well location and an additional soil boring was located within the well material. No visible signs of contaminants were observed (e.g., discoloration). A low PID reading of up to 1.0 ppm was observed at the 1.0 to 1.5 foot interval, no other PID readings were recorded above background levels. A soil sample was collected and analyzed. No VOCs were detected in the sample. Beryllium, calcium, copper, magnesium, and zinc were detected within the range of United States soil background concentration ranges. No TPHs were detected at this location.

Southern Area (Area C)

In shallow soil, 14 volatile organic chemicals were detected. Soil cleanup objectives were exceeded for six of these compounds: vinyl chloride (840J ppb); acetone (1800JB ppb); toluene (5100 ppb); 1,2-DCE (9100J ppb); TCE (320,000 ppb); and xylenes (29,000J ppb). The contaminants were generally found in the area of MWs-4,8 &11 in the area where documented ash disposal had occurred.

Analysis of two shallow soil samples collected during the RI at MW-5A and BH-6-93, near the residences to the south did not show any site related contaminants in the soil. Low concentrations of acetone were detected at concentrations of 73J ppb and 14J ppb.

Seventeen SVOCs were detected in shallow soil samples from the southern area. The compounds detected and their reported concentrations can be found in the RI. Of the 17 parameters detected, only 2-methylphenol (570 ppb) exceeded the soil cleanup objective (100 ppb) at one location.

In the deeper sandy zone soil samples, 12 VOC compounds were detected. Of these 12 compounds, three exceeded soil cleanup objectives.

TCE was detected in the sandy zone soil in the vicinity of MW-8, MW-11, and MW-12 at concentrations of 410 ppb (at MW-8) to 18,000 ppb (at MW-12). Higher levels of TCE were detected in soil from BH-S (deep- 12') (2,000,000 ppb) and MW-11(570,000 ppb), where NAPL was present in the soil. Additionally, high levels of total 1,2-DCE (up to 37,000J ppb) and total xylenes (up to 64,000J ppb) were detected in this area. Away from this area, the concentration of contaminants decline rapidly, reaching non-detect levels within the distance of 150 feet. The area along the south property line is not filled and exhibits low levels (e.g, less than 75 ppb total VOCS) of Site related contaminants in MW-5A and BH-6-93 soil samples.

Soil Contaminant	Concentration Range (ppb)	Clean-up Goal(1)
vinyl chloride	ND-840J	200
1,2-dichloroethene	ND-37,000J	300
trichloroethene	ND-2,000,000	700
benzene	ND-62	60
toluene	ND-5,100	1,500
xylenes	ND-64,000J	1,200

ND-Non-detectable
J- Result is estimated
(1)- Clean-up Goals from NYSDEC TAGM 4046 (1/24/94)

Former Drum Storage Area (Area A)

Soil samples were collected from beneath the pad and along its edges. In general only trace or low levels of VOC contaminants were detected as shown below. Of the compounds detected, 1,1,1-trichloroethane was the most predominant, at a maximum concentration of 16,000 ppb, in a shallow soil sample (0.5-3.0 ft.) collected from below the pad. No other compounds detected exceeded the clean-up goals. Total Petroleum Hydrocarbons (TPHs) concentrations reported ranged from ND(37) to 4,170 ppb. Associated benzene, toluene, ethylbenzene, and xylene concentrations do not exceed the TAGM 4046 soil cleanup objectives. The deep soil sample, also showed only a trace organic chemical presence.

Soil Contaminant	Concentration Range (ppb)	Clean-up Goal[1]
1,1,1-trichloroethane	ND-16,000	800
trichloroethene	ND-47	700
1,1-dichloroethane	ND-19	200
methylene chloride	ND-93	100
xylenes	ND-560	1,200

ND-Non-detectable
(1)- Clean-up Goals from NYSDEC TAGM 4046 (1/24/94)

The horizontal and vertical extent of contaminants around the pad is very limited, as exhibited by the low concentration of 1,1,1-TCA detected in the adjacent boreholes and the deeper soil sample.

PONDED WATER AND ASSOCIATED SOIL

One water and one surface soil sample were collected from a small low area on the eastern off-site parcel. This area contained seasonal standing water that was evident only during periods of precipitation and snow melt. No VOCs were detected above the clean-up goals for the site in soil samples. Several SVOCs (shown below) were detected in the soil.

Soil Contaminant	Concentration (ppb)	Clean-up Goal[1]
Naphthalene	ND-2,700	13,000
2-Methylnapthalene	ND-3,500	36,400
Dibenzofuran	ND-1,200	6,200
Phenanthrene	ND-13,000D	50,000
Anthracene	ND-1,500	50,000
Fluoranthene	ND-25,000D	50,000
Pyrene	ND-18,000D	50,000
Benzo(a)anthracene	ND-8,400JD	224
Chrysene	ND-8,100	400
Benzo(b)fluoranthene	ND-24,000D	1,100
Benzo(a)pyrene	ND-12,000D	61
Ideno(1,2,3-cd)pyrene	ND-4,700	3,200
Benzo(g,h,i)perylene	ND-4,400	50,000

D-Result after sample dilution
J-Result is estimated
(1)- Clean-up Goals from NYSDEC TAGM 4046 (1/24/94)

No VOCs or SVOCs were detected in the ponded water above the quantifiable detection limit.

Air Pathway Analysis

An Air Pathway Analysis was performed to determine if contaminants volatilizing off of surface soils could create levels of concern in the ambient air around the site. After making conservative assumptions (one hundred percent volatilization from the soil to the air), it was determined by modeling that exposures to contaminants in the air is not a significant concern. This was confirmed by actual air monitoring at the site.

4.2 Summary of Human Exposure Pathways:

This section describes the types of human exposure that may present added health risks to persons at or around the site. A more detailed discussion of the health risks associated with the site can be found in the section of the Remedial Investigation Report, dated February 16, 1995, entitled "Risk Assessment". An exposure pathway is the process by which an individual comes into contact with a contaminant. The five elements of an exposure pathways are 1) the source of contamination; 2) the environmental media and transport mechanism (e.g. air); 3) the point of exposure and uptake mechanism; 4) the route of exposure (e.g. inhalation, ingestion, etc.); and 5) the receptor population. These elements of an exposure pathway may be based on past, present, or future events.

Completed pathways (ie. ways in which people come in contact with contaminants) which are known to, or may, exist at the site include:

- Dermal (skin) contact or ingestion (eating) of surface soil,
- Dermal contact or ingestion of surface soil in the lowland areas,
- Ingestion or dermal contact of ponded water in the lowlands area,
- Ingesting (drinking) of groundwater in the Water Table Aquifer,
- Ingestion or dermal contact of excavated subsurface soils,
- Inhalation (breathing) of contaminants by on-site workers during excavation of subsurface soils.

The Risk Assessment selected 60 chemicals of concern (COCs) to be evaluated as part if the Risk Assessment for the Site. These chemical included 16 volatile organic compounds (VOCs), 23 semi-volatile organic compounds (SVOCs), 5 Acid Extractable compounds, and 16 metal parameters in the various medias (groundwater, soil, sediment and surface water). A summary of the COCs is found in Table 1.

The results of the Risk Assessment concluded that the current risks associated with exposure to soils, groundwater, sediments and surface water for current and future land uses and the exposure pathways previous discussed, are below the accepted 1×10^{-6} to 1×10^{-4} range as established by USEPA. The hazard indices associated with exposures to surficial soils, sediment and surface water are also all below the level of concern of 1.0. This risk assessment was based on the premise that there is limited or no routes of exposure to contamination on the site because the significant contamination is beneath the ground surface. Groundwater is also not used as a potable water source because the area is supplied with potable water by the local municipality. Future risk could be associated with the off-site migration of contaminated groundwater into the residential area to southeast of the site. Exposure pathways could be produced from the ingestion of contaminated groundwater or the inhalation of volatile compounds through exposure from basements or other below grade structures. However, since the area is served by a public drinking water supply, ingestion of groundwater is highly unlikely. Risk calculations for the various medias can be found in the Remedial Investigation Report.

4.3 Summary of Environmental Exposure Pathways:

This section summarizes the types of environmental exposure which may be presented by the site. The Ecological Assessment included in the RI was performed in accordance with requirements of the NYSDEC guidance document, "Fish and Wildlife Impact Analysis for Inactive Hazardous Waste Sites", dated June 18, 1991, and presents a more detailed discussion of the potential impacts from the site to fish and wildlife resources.

The general area surrounding the site is urban. There are no major natural resources within two miles of the plant site.

SECTION 6: SUMMARY OF THE REMEDIATION GOALS

Goals for the remedial program have been established through the remedy selection process stated in 6NYCRR 375-1.10. These goals are established under the guideline of meeting all standard, criteria, and guidance (SCGs) and protecting human health and the environment.

At a minimum, the remedy selected should eliminate or mitigate all significant threats to the public health and to 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:

General:

- Provide for the attainment of Remedial Action Objectives (RAOs) (Table 2) for groundwater, surface and subsurface soil, surface water and sediment.

Groundwater:

- To restore groundwater to the maximum extent practicable, in the Overburden and Bedrock Aquifers to applicable standards and/or guidance values (Table 2).

- To eliminate contaminant migration via the groundwater so that potential releases of and contact with, contaminated groundwater does not present a human or environmental threat.

Soil:

- To prevent or mitigate the leaching and /or migration of contaminants in the soil (Table 2) that would cause groundwater and/or surface water contamination above standards.

- Eliminate, to the maximum extent practicable, the potential for direct human or animal contact with contaminated soil.

Air:

- To prevent or mitigate the release and inhalation of airborne contaminants above acceptable standards.

SECTION 7: SUMMARY OF THE EVALUATION OF ALTERNATIVES

Potential remedial alternatives for the Leica Inc. Site were identified, screened and evaluated in a Feasibility Study. This evaluation is presented in the report entitled Feasibility Study, Leica Inc. Cheektowaga, New York, Site No.915156, dated May 1, 1995 and revised dated March, 1996 and the Feasibility Study Addendum, Leica Inc. Cheektowaga, New York, Site No.915156 dated January 1997. A summary of the detailed analysis follows.

7.1: Description of Alternatives

Alternative 1

No Action

Present Worth:	$ 598,000
Capital Cost:	$ 0
Annual O&M:	$ 56,500
Time to Construct	0 years

The "No Action" alternative would provide no active remedial measures to improve the environmental conditions at the site be taken.

This is an unacceptable alternative as the site would remain in its present condition, and human health and the environment would not be adequately protected. Natural attenuation (dilution) and biodegradation would be the only action that would reduce VOC levels in site soil and groundwater. This alternative would require implementation of a groundwater monitoring program. This program would be used to monitor groundwater conditions and provide a data base for periodically reevaluating the risks and assessing whether future remedial actions may be required. However, contaminated groundwater would continue to impact the lowland area and off-site groundwater.

Alternative 2

Institutional Controls and Monitoring

Present Worth:	$ 614,000
Capital Cost:	$ 16,300
Annual O&M:	$ 56,500
Time to Construct	0.25 year

Alternative 2 is the **Institutional Controls and Monitoring** alternative. This alternative includes the implementation of institutional controls to restrict exposure to contaminated soil and groundwater. Institutional controls may consist of fencing, deed restrictions, and paving of exposed soil areas. This alternative would also require implementation of a groundwater monitoring program. This program would be used to monitor groundwater conditions and provide a data base for periodically reevaluating the risks and assessing whether future remedial actions may be required. However, contaminated groundwater would continue to impact the lowland area and off-site groundwater.

Alternative 3

Groundwater Containment and Treatment

Present Worth:	$ 3,200,000
Capital Cost:	$ 1,190,000
Annual O&M:	$ 177,000
Time to Construct	2 years

Alternative 3 consists of the installation of groundwater collection trenches in the overburden soil. The system would be designed to intercept the flow of groundwater and prevent the movement of contaminated groundwater from moving off the property. In conjunction with the collection trenches, a series of groundwater extraction wells would be installed in the bedrock layer to collect contaminated groundwater within this zone. All groundwater collected within the trench and extraction well systems would be subject to treatment by a technology acceptable to the Department such as air stripping with catalytic oxidation, UV oxidation or granular activated carbon, prior to discharge to the municipal sewer system. Applicable discharge limits would be provided by the local municipality prior to designing the treatment system. The combined flow rate from the overburden collection trenches and bedrock extraction wells is estimated to be 20 gallons per minute (gpm) during high water table conditions. In addition to the groundwater extraction systems, a Non-Aqueous Phase Liquid (NAPL) collection system would be installed in areas in the southeastern portion of the property where NAPL has been detected during the remedial activities. This system would be used to remove the highly concentrated NAPL from the soil and groundwater to expedite attainment of RAO's for the site. All NAPL collected, would be disposed off site at a permitted disposal facility. Deed restrictions would be placed on the property noting that contamination exists in subsurface soil and groundwater.

Alternative 4

Groundwater Containment and treatment, Soil excavation and on-site treatment

Present Worth:	$5,887,000
Capital Cost:	$2,190,000
Annual O&M:	$ 172,000
Time to Construct	4 years

Alternative 4 consists primarily of the excavation of soil on-site that exceeds the clean-up goals established for the site. The soil would be treated on site using either a Mechanical Volatilization System for soil contaminated with low levels of VOCs or Ex-situ Soil Vapor Extraction (SVE), for soils contaminated with high levels of VOCs and NAPL. The soil from the southeastern area with be treated first. After treatment and upon confirmation that clean-up goals have been attained, the northern area will be excavated for treatment and the southern area soil used to backfill this area.

In conjunction with the excavation and treatment, a series of groundwater extraction wells would be installed in the bedrock layer to collect contaminated groundwater within this zone. All groundwater collected within the trench and extraction well systems would be subject to treatment by a technology acceptable to the Department such as air stripping with catalytic oxidation, UV oxidation or granular activated carbon, prior to discharge to the municipal sewer system. Applicable discharge limits would be provided by the local municipality prior to designing the treatment system.

Alternative 5

Dual Vacuum Extraction/Pneumatic Fracturing and Groundwater Extraction and Treatment.

Present Worth:	$ 3,522,983
Capital Cost:	$ 1,564,553
Annual O&M:	$ 432,775
Time to Construct	1 year

Alternative 5, consists of the use of Integrated Dual Vacuum Extraction/Pneumatic Fracturing and Groundwater Extraction and Treatment. Dual Vacuum Extraction/Pneumatic Fracturing depresses the groundwater table by removing groundwater and extracts vapors from the unsaturated zone which removes the VOCs. The pneumatic soil fracturing portion of this system involves the injection of air at high pressures to create fractures in the clay-like soil around the injection point. The injected air provides additional airflow paths which increases the transfer of VOCs by diffusion. As air continues to flow through the fractures the clay material becomes drier and more fractures are produced which provides more surface area for remediation of the contamination within the clay. Emission control devices such as activated carbon or catalytic oxidation units would be installed to treat extracted air prior to discharge.

In conjunction with the vacuum extraction system, a series of groundwater extraction wells would be installed in the bedrock layer to collect contaminated groundwater within this zone. All groundwater collected within the extraction well system would be subject to treatment by a technology acceptable to the Department such as air stripping with catalytic oxidation, UV oxidation or granular activated carbon, prior to discharge to the municipal sewer system. If an air stripper is used, vapor recovery and treatment would be required on the air stream prior to discharge. Applicable discharge limits would be provided by the local municipality prior to designing the treatment system.

As part of this alternative, attempts would be made to recover NAPL to extent practicable. This may occur through the dual vacuum extraction system or by the addition of NAPL recovery wells. The particular approach will be determined during design of the remedy.

A treatability study has been conducted on site that has demonstrated the effectiveness of this treatment technology.

6.2 EVALUATION OF REMEDIAL ALTERNATIVES

The criteria used to compare the potential remedial alternatives are defined in the inactive hazardous waste sites in New York State Regulation (6NYCRR 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 contained in the Feasibility Study.

1. COMPLIANCE WITH NEW YORK STATE STANDARDS, CRITERIA AND GUIDANCES (SCGs). Compliance with SCGs addresses whether or not a remedy will meet applicable environmental laws, regulations, standards, and guidance.

Chemical-specific SCGs would continue to be exceeded for Alternatives 1 and 2.

Implementation of groundwater containment/source removal for Alternative 3 would result in the eventual remediation of the soil on the site through natural dilution and degradation of the contaminants. SCGs would continue to be exceeded in overburden and bedrock groundwater and soil until that time.

Chemical-specific SCGs for soils would immediately be achieved for Alternative 4 upon excavation and treatment of soils. Chemical-specific SCGs for overburden and bedrock groundwater would also be achieved in less time than Alternatives 1, 2 and 3 by elimination of the source areas. Extensive air controls (enclosures etc.) would be required to be maintained during the excavation of soil to prevent the release of fugitive VOC emissions that exceed SCGs

Chemical-specific SCGs would also be achieved for Alternative 5 upon the conclusion of the treatment of the overburden soils (2 - 4 years). Chemical-specific SCGs for overburden and bedrock groundwater would also be achieved in less time than Alternatives 1, 2 and 3 by elimination of the source areas. The only air emission controls necessary would be that for the discharge from the soil treatment units.

2. PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT This criterion is an overall evaluation of the health and environmental impacts to assess whether each alternative is protective.

The *No Action* Alternative (Alternative 1) would not reduce risks to human health associated with the potential future groundwater use scenario on Site and at the Site perimeter. The implementation of institutional controls for Alternative 2 would eliminate the risk associated with future on-Site groundwater use but the residual risk for future off-Site groundwater use at the Site perimeter would continue to exceed an acceptable risk level.

Alternative 3 would reduce all risks to human health by implementation of institutional controls and the construction of a groundwater containment system which would prevent the off-Site migration of chemicals.

Alternative 4 would be somewhat more effective than Alternatives 1, 2 and 3 in reducing all risks to human health by removing and treating soils and the majority of overburden groundwater with chemical concentrations exceeding applicable SCGS. In addition, bedrock groundwater residual contamination would be contained on-Site by the bedrock groundwater containment system. this would reduce or eliminate the risk associated with the migration of contaminated groundwater into adjacent residential basement drainage systems.

Alternative 5 would achieve the same degree of protection as outlined in Alternative 4 above by containing groundwater within the boundary of the site and treating soil in place.

The range of protectiveness of the five alternatives range from no protection provided by Alternative 1, to maximum protection provided by Alternatives 4 & 5.

3. SHORT-TERM IMPACTS AND EFFECTIVENESS The potential short-term adverse impacts of the remedial action upon the community, the workers, and the environment during the construction and implementation are evaluated. The length of time needed to achieve the remedial objectives is also estimated and compared with the other alternatives.

As Alternatives 1 and 2 do not involve the disturbance of any of the soils at the Site, there would be no additional short-term impacts to the community workers or the environment as a result of implementation of these alternatives.

The construction of the groundwater containment and collection systems for Alternative 3 could be completed within one year. Minimal disturbance of contaminated soils would be required, resulting in no additional short-term impacts.

The extensive excavation, handling and treatment of soils for Alternative 4 would result in significant chemical emissions to the atmosphere resulting in potential short-term risks to the community that would have to be addressed through the use of enclosures or other control methods. It is estimated that Alternative 4 would be completed within one year.

There would be limited short term impacts from the installation and operation of Alternative 5. Minimal excavation of low level soils would be required in areas where dual vapor extraction/pneumatic fracturing was not practical. The treatment systems could be installed in the remaining areas of the site, with minimal disturbance of contaminated soils required, resulting in no additional short-term impacts.

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

Alternative 1 would not reduce long-term risks beyond what would occur through natural attenuation and degradation. The implementation of institutional controls for Alternatives 2 and 3 is considered to be a reliable method to limit access and to restrict future land uses at the Site. Permanent long-term effectiveness would be achieved by groundwater containment and treatment for Alternative 3. However, soil on the site would remain contaminated and could pose a threat if disturbed.

Long-term effectiveness and permanence would be greatest for Alternatives 4 & 5 as the source would be removed by the treatment of soil and the majority of groundwater with chemical concentrations exceeding SCGS. Once remediation of the soil had been completed a review of the selected remedial alternative would be conducted every 5 years to ensure that human health and the environment are being protected.

5. REDUCTION OF TOXICITY, MOBILITY AND VOLUME Preference is given to alternatives that permanently and significantly reduce the toxicity, mobility or volume of the wastes at the site.

Alternatives 1 and 2 provides no additional reduction in the toxicity, mobility or volume of chemicals beyond what would be achieved beyond natural attenuation.

Implementation of Alternative 3 would provide a reduction in the mobility and volume of chemicals contained in both the soils and groundwater by groundwater containment and treatment and the removal and off-Site treatment of NAPL.

Alternative 4 and 5 would provide a greater reduction in the volume and mobility of chemicals than Alternatives 1, 2 and 3 by the treatment of the majority of chemicals in both the soil and overburden groundwater.

6. IMPLEMENTABILITY The technical and administrative feasibility of implementing each alternative is evaluated. Technically, this includes the difficulties associated with the construction, the reliability of the technology, and the ability to monitor the effectiveness of the remedy. Administratively, the availability of the necessary personnel and material is evaluated along with potential difficulties in obtaining specific operating approvals, access for construction, etc..

Alternatives 1 and 2 are easily implemented.

Implementation of alternatives 3 and 4 would involve common construction procedures, services and materials. Dual vacuum extraction and pneumatic fracturing are somewhat innovative techniques but the services are readily available and pilot testing has shown that the approach is implementable at this site. Predesign studies would be required for these Alternatives for the design of the groundwater containment and treatment system (Alternatives 3, 4 & 5), and the soil treatment system, Alternative 4. Due to the high concentration of contaminants, treatment of vapor emissions would require the use of catalytic oxidation unit to destroy the contaminants. The resulting emissions from this unit may also require subsequent treatment to remove hydrochloric acid (produced during the breakdown of the organic chemicals) prior to discharge to the atmosphere. Activated carbon can be used at a latter date once contaminant reduction in the overburden soils has reached a suitable level. Excavation activities for Alternative 4 would have to be extended if the results of confirmatory sidewall sampling indicate that the area to be remediated is beyond original estimates. Controls would also need to be implemented to control the release of fugitive emissions during excavation activities. The controls would need to address both worker and resident safety.

7. COSTS 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 cost associated with the implementation of the remedial alternatives are lowest for the "No Action" alternative and increase successively for Alternatives 2, 3, 4, and 5. Table 3 presents a comparison of the estimated capital and Operation

& Maintenance cost for each of the remedial alternatives evaluated.

Long-term operation and maintenance costs are based on 30 years of groundwater extraction and treatment, five years of SVE operation and 30 years of groundwater monitoring. The estimated net present worth ranges from $598,000 for Alternative 1 to approximately $5,887,000 for Alternative 4.

8. COMMUNITY ACCEPTANCE Concerns of the community regarding the RI/FS report and the Proposed Remedial Action Plan (PRAP) will be evaluated. A "Responsiveness Summary" will be prepared that describes public comments received and how the Department would address the concerns raised. If the final remedy selected differs significantly from the proposed remedy, notices to the public will be issued describing the differences and the reason for the changes.

7.0 PREFERRED REMEDIAL ALTERNATIVE

Based upon the results of the RI/FS, and the evaluation presented in Section 7, **the NYSDEC is proposing that Dual Vacuum Extraction/Pneumatic Fracturing be utilized to address the upper groundwater table and contaminated soil and Groundwater Extraction/Treatment be utilized to address bedrock groundwater contamination.** Limited excavation and disposal may be necessary in areas where vacuum extraction may not be effective (such in the former drum storage area).

Selection of Recommended Remedial Alternative

The No Action alternative (Alternative 1) provides no reduction in risks to human health and the environment and is therefore rejected as a viable alternative.

Alternative 2 would reduce the risks associated with all exposure scenarios with the exception of the potential off-Site future groundwater use scenario. However, chemical-specific SCGs would continue to be exceeded for Alternative 2. Therefore Alternative 2 was rejected.

Alternative 3 would reduce the risks to human health for all exposure scenarios by providing overburden and bedrock groundwater containment and treatment. However soil contamination would not be address and the long term effectiveness of the remediation would be minimal. There would be little reduction in the volume or toxicity of the soil except through natural attenuation. Alternative 3 was therefore rejected.

Alternative 4, which includes soil source removal and treatment, would also remove the majority of the chemicals in the overburden groundwater and would likely reduce the time required to achieve chemical-specific SCGs in the bedrock groundwater in comparison to Alternative 3. The residual chemicals remaining in the soil and groundwater following soil source removal and treatment for Alternative 4 would require bedrock groundwater containment and treatment for a much shorter duration than would be required for Alternative 3. Alternative 4 relies on the excavation of a significant amount of soil so that treatment of the soil can be performed. Excavation of soil would require extensive controls to be implemented to prevent release of fugitive vapors to comply with regulatory SGCs for air. The effectiveness of Alternative 4 would be monitored by implementation of the groundwater monitoring program. The bedrock groundwater containment and treatment system could be extended or reduced as required based upon the results of the monitoring program.

Alternative 5, performs treatment of the source and groundwater containment and treatment without the excavation of soil required in Alternative 4. Alternative 5 would also remove the majority of the chemicals in the overburden groundwater and would likely reduce the time required to achieve chemical-specific SCGs in the bedrock groundwater in comparison to Alternative 3. The residual chemicals remaining in the soil and groundwater following soil source removal and treatment for Alternative 5 would require bedrock groundwater containment and treatment for a much shorter duration than would be required for Alternative 3. Alternative 5 uses vacuum extraction technology combined with pneumatic fracturing to enhance the release of contaminants from "tight" soils. Treatment of groundwater and air would be required to be conducted prior to discharge to obtain regulatory SCGs which can be performed using standard technologies available. The effectiveness of Alternative 5 would be monitored by implementation of the groundwater monitoring program. The bedrock groundwater containment and treatment system could be extended or reduced as required based upon the results of the monitoring program. Although the degree of confidence of achieving the soil cleanup goals would be greater with Alternative 4, the Department believes that Alternative 5 would also achieve a protective result.

Accordingly, **Alternative 5 is recommended for implementation at the site.**

The estimated present worth cost to implement the remedy is $3,522,983. The cost to construct the remedy is estimated to be $1,564,553 and the estimated average annual operation and maintenance cost for 30 years is $432,775. The time period of 30 years was chosen for cost comparison purposes only. It is expected that the preferred remedy to address contaminated soil, would be completed in much less time (perhaps two to four years). Removal and treatment of contaminated groundwater within the bedrock unit may extend an unspecified duration.

Elements of the of the proposed remedy are as follows:

Soils And Upper Groundwater Table:

- Installation of a Dual Vacuum Extraction/ Pneumatic Fracturing/Air Injection system to remove groundwater within the overburden (soil) groundwater zone. NAPL would be recovered to the extent practicable.

- Implementation of a long term monitoring program which would allow the effectiveness of the selected remedy to be monitored. This long-term program would be a component of the operation and maintenance for the site and would be developed in accordance with the Remedial Design.

Bedrock Groundwater:

- Installation of a Groundwater Extraction and Treatment System. The system would be designed to collect groundwater using recovery wells and prevent the movement of contaminants off the property.

- Treat recovered groundwater to meet discharge standards and discharged to the local sanitary sewer system. Treatment would be by thermal oxidation, granular carbon or other acceptable method.

- Implementation of a long term monitoring program which would allow the effectiveness of the selected remedy to be monitored. This long-term program would be a component of the operation and maintenance for the site and would be developed in accordance with the Remedial Design.

It has been estimated that the following volumes of soil require remediation.

Area A - 250 yd^3 requiring remediation, average depth of 3 feet (1,250 square feet)
Area B - 8,500 yd^3 requiring remediation, average depth of 13 feet (17,500 square feet)
Area C - 16,250 yd^3 requiring remediation, average depth of 12.5 feet (33,750 square fee)

Total Volume to be treated - 25,000 yd^3 (52,500 square feet)

In addition, the soils in the secondary southeast area may also require treatment if contaminant values exceed clean-up goals. The volume of soil in this area is estimated to be 12,000 yd^3. The exact boundaries of the remediated areas would be determined during the design of the remedial technology.

Air monitoring would be conducted on a regular basis.

A treatability study has been conducted and has demonstrated the effectiveness of the Dual vacuum extraction/ pneumatic fracturing treatment process and groundwater extraction and treatment of bedrock.

Dual vacuum extraction/ pneumatic fracturing well points would be installed at the appropriate intervals to ensure remediation of subsurface soils. The intervals would depend on the type of soil to be treated and the degree of contamination present.

Bedrock extraction wells would be installed in the northeastern and southeastern areas of the Site concurrent with the installation of the DVE/PF System.

Groundwater monitoring would be conducted to ensure the protection of human health and the environment. Periodic monitoring of the effluent concentrations from both the vapor extraction system and the treated water would also be conducted. Institutional controls would be implemented to restrict groundwater usage beneath the Site until it is demonstrated through groundwater monitoring that unrestricted groundwater usage is appropriate.

A cost analysis is required to determine the feasibility of installing DVE/PF wells in Area A. The other alternative is to excavate the area and backfill with clean fill. The excavated material would be treated as described in Alternative 4 or disposed of site at an approved disposal facility. Alternative 4 is a feasible alternative option for this area because only the shallow fill zone is contaminated which can be treated ex-situ easily. DVE/PF also may not be effective in such shallow soils.

SECTION 8. CITIZEN PARTICIPATION ACTIVITIES

As part of the Remedial Investigation and Feasibility Study development, the following Citizen Participation activities were conducted:

- October 10, 1992 - Leica Inc. property listed on the NYS Registry of Inactive Hazardous Waste Sites.
- January 1993 - NYSDEC prepared and issued the **"Citizen Participation Plan"** for the Leica Site.
- November 17, 1993 Public Meeting - To discuss the proposed Remedial Investigation and feasibility Study to be conducted at the Leica Site.
- June 1994 Fact Sheet providing the status of the Remedial Investigation.
- February 1995 Fact Sheet providing the status of the Remedial Investigation and overview of the findings and conclusions.
- February 1995 - RI/FS Summary Report - provided a brief summary of the remedial investigation regarding the degree and extent of contamination from the site towards the residential areas.
- March 23,1995 - Held an informational meeting at Cheektowaga Town Hall to discuss the status of the remedial project at the Leica Site.

Figure 1
Site Location Map

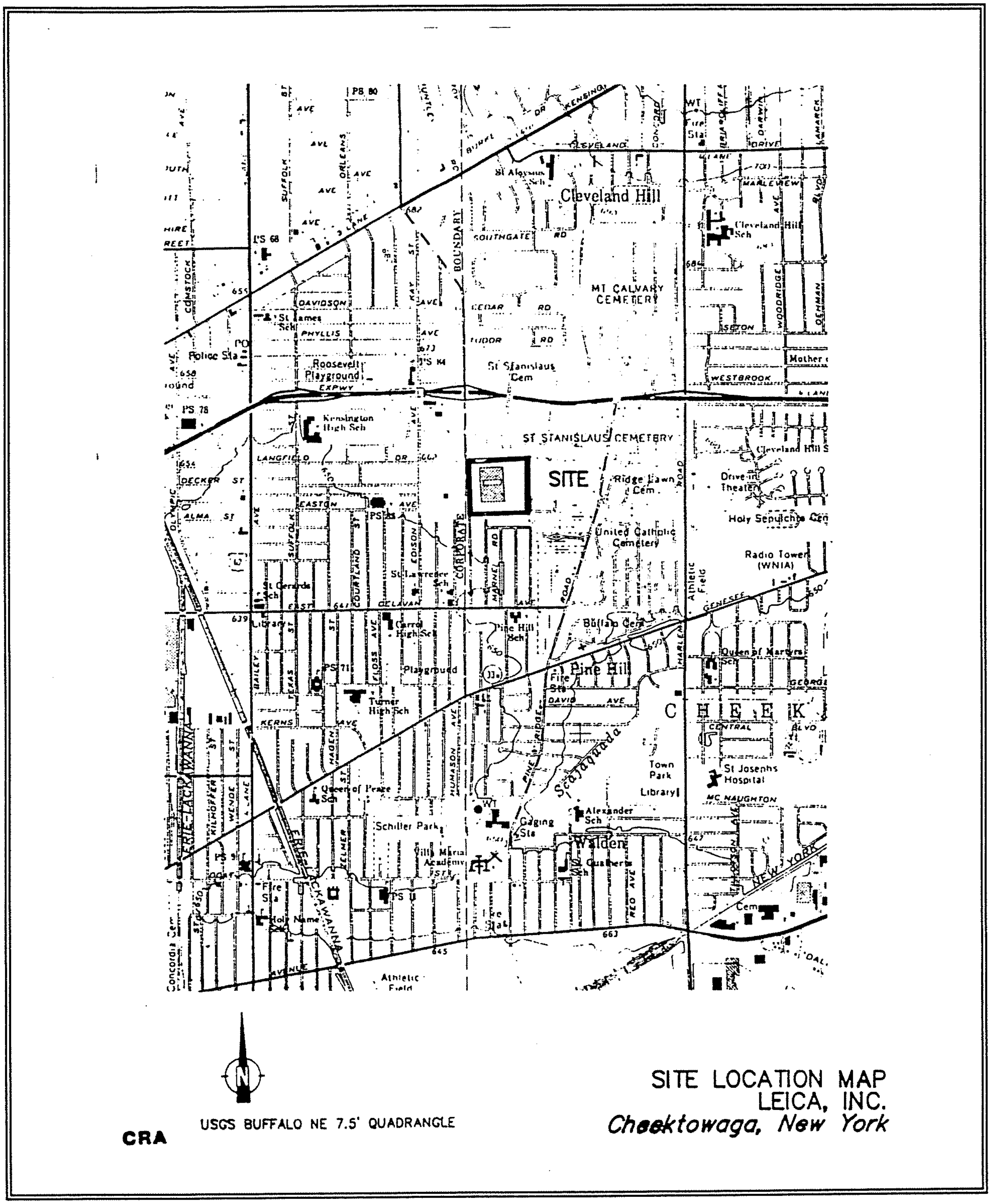

Figure 2
Site Map

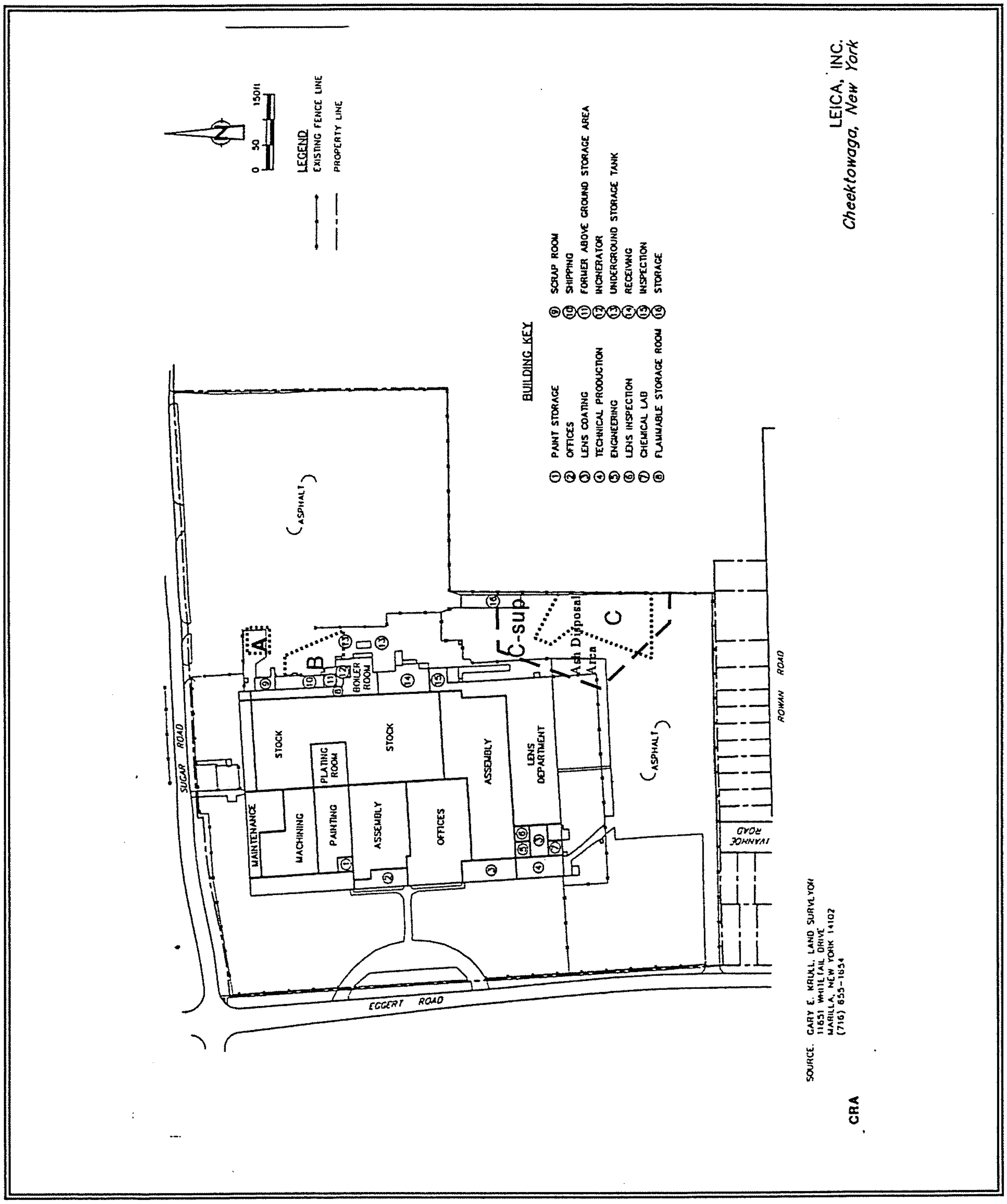

Figure 3
Overburden Ground Water Monitoring Well Locations and Flow Direction

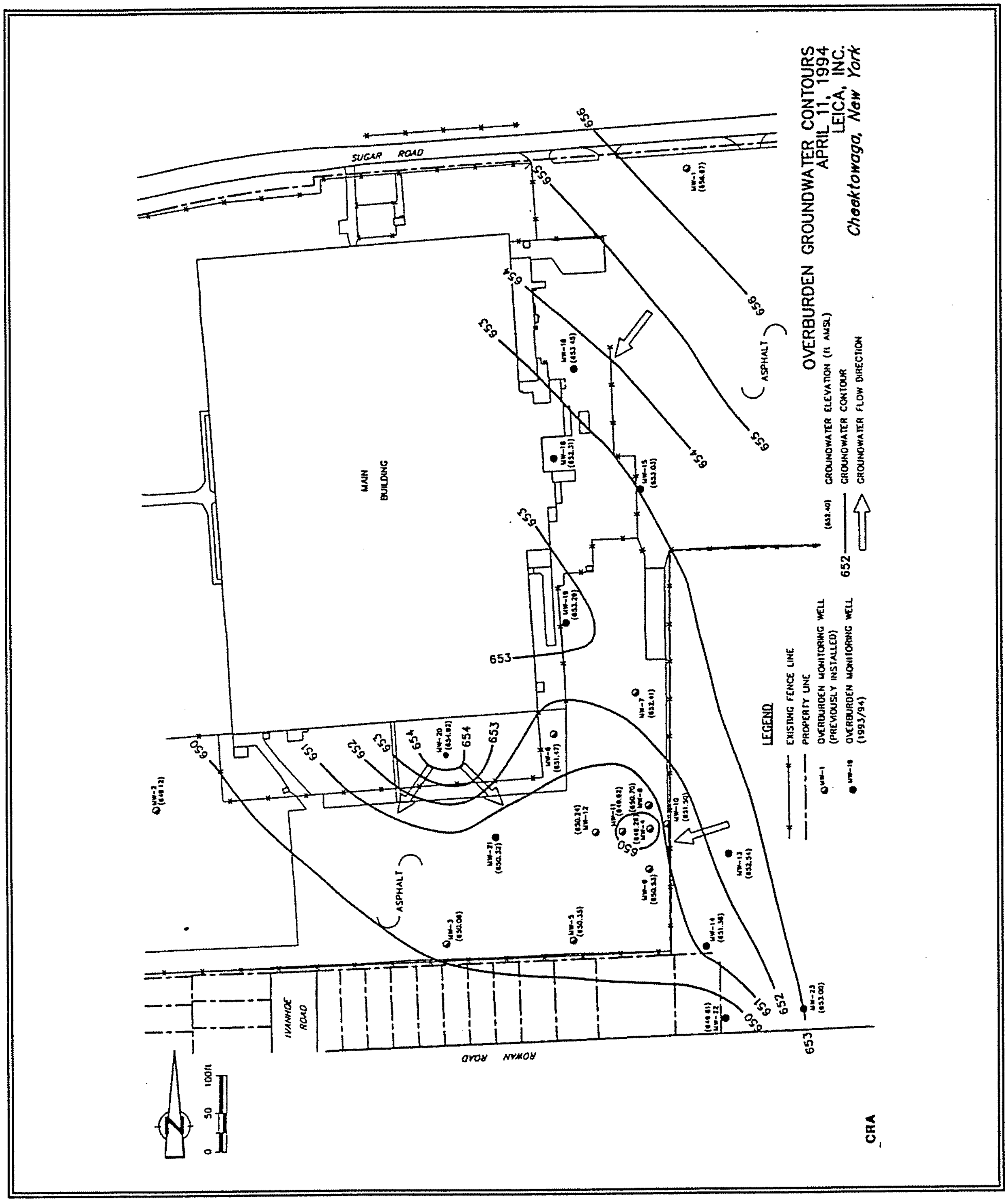

Figure 4
Bedrock Ground Water Monitoring Well Locations and Flow Direction

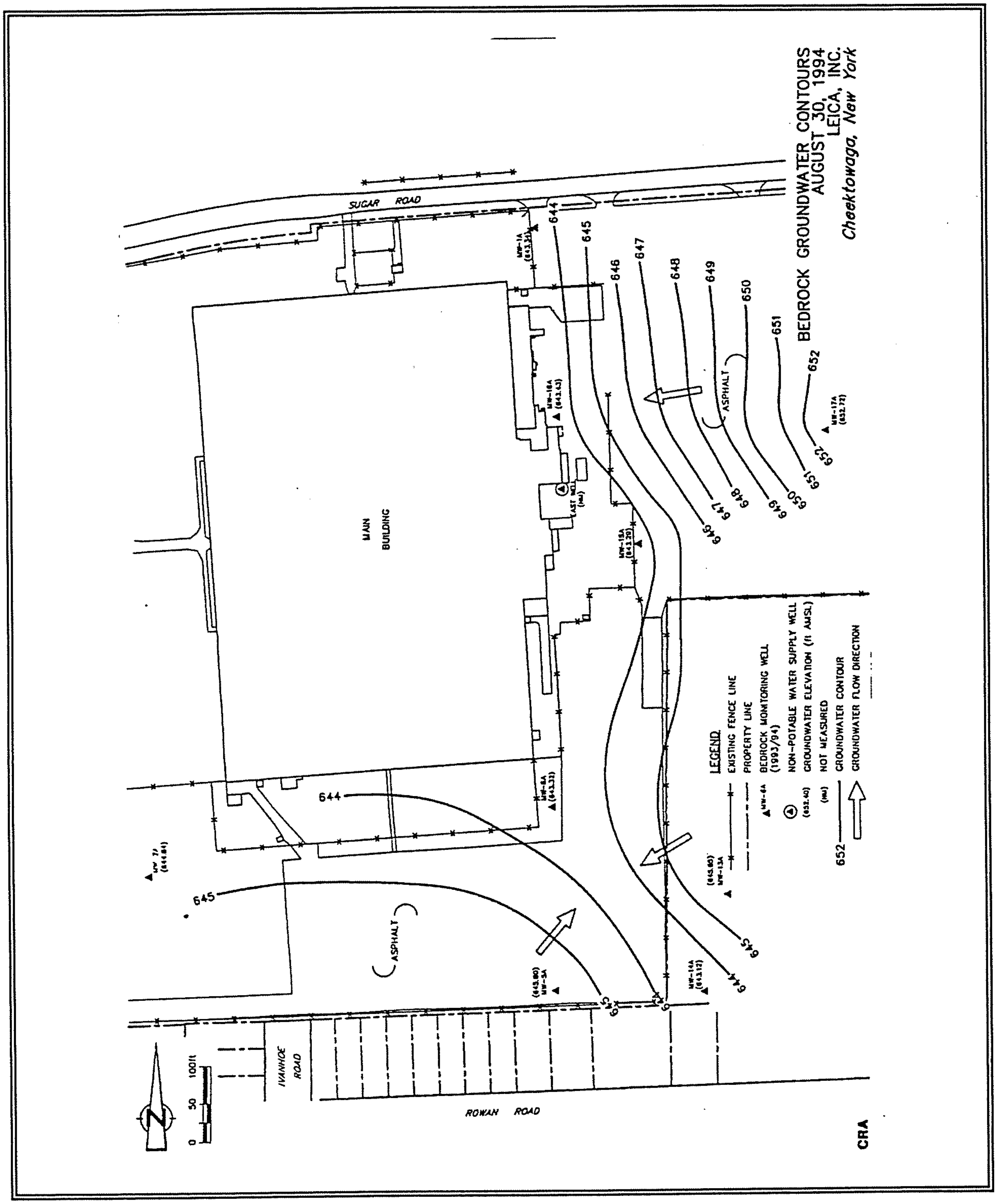

Figure 5
Overburden Chloroethene Contamination Contours

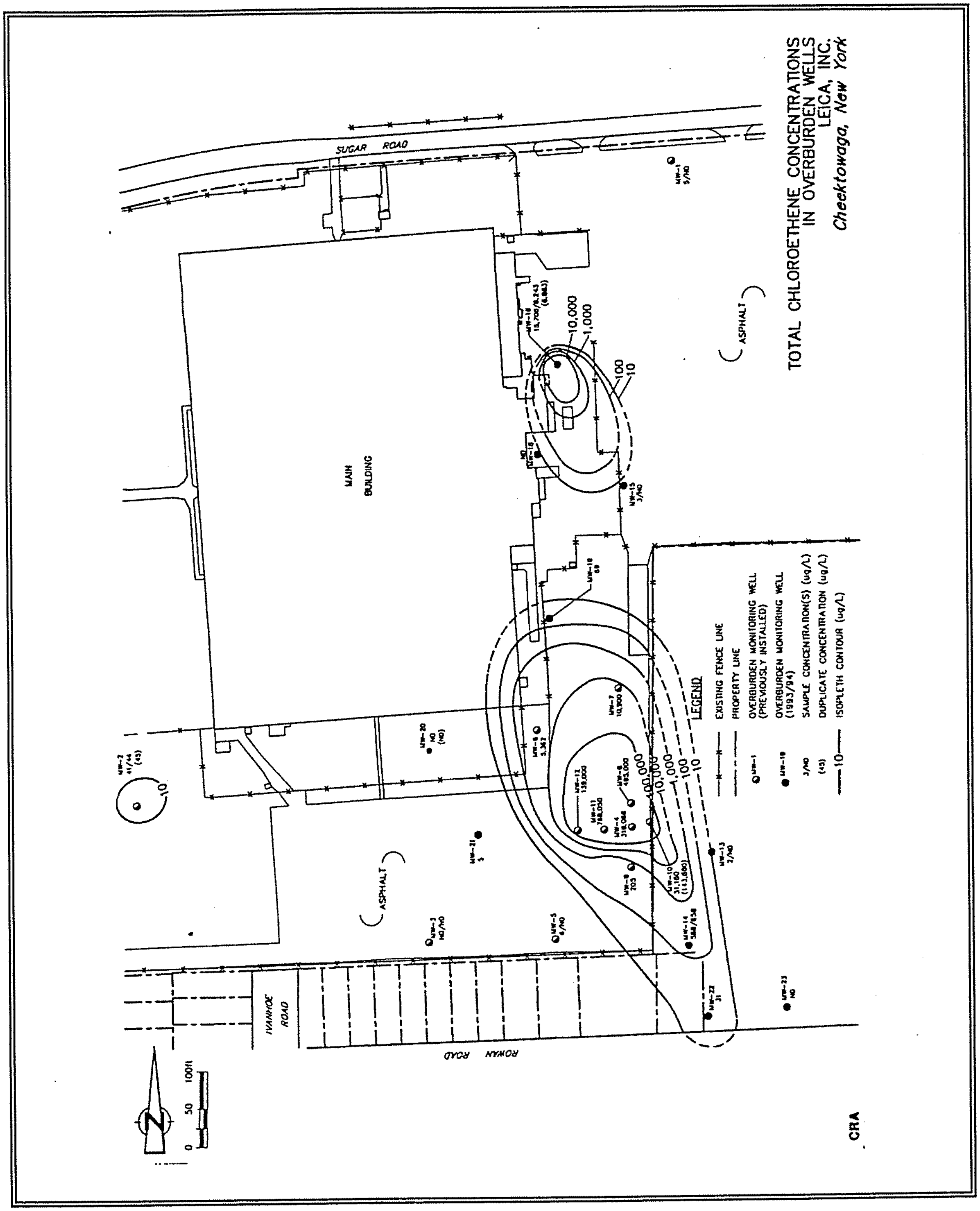

Figure 6
Bedrock Chloroethene Contamination Contours

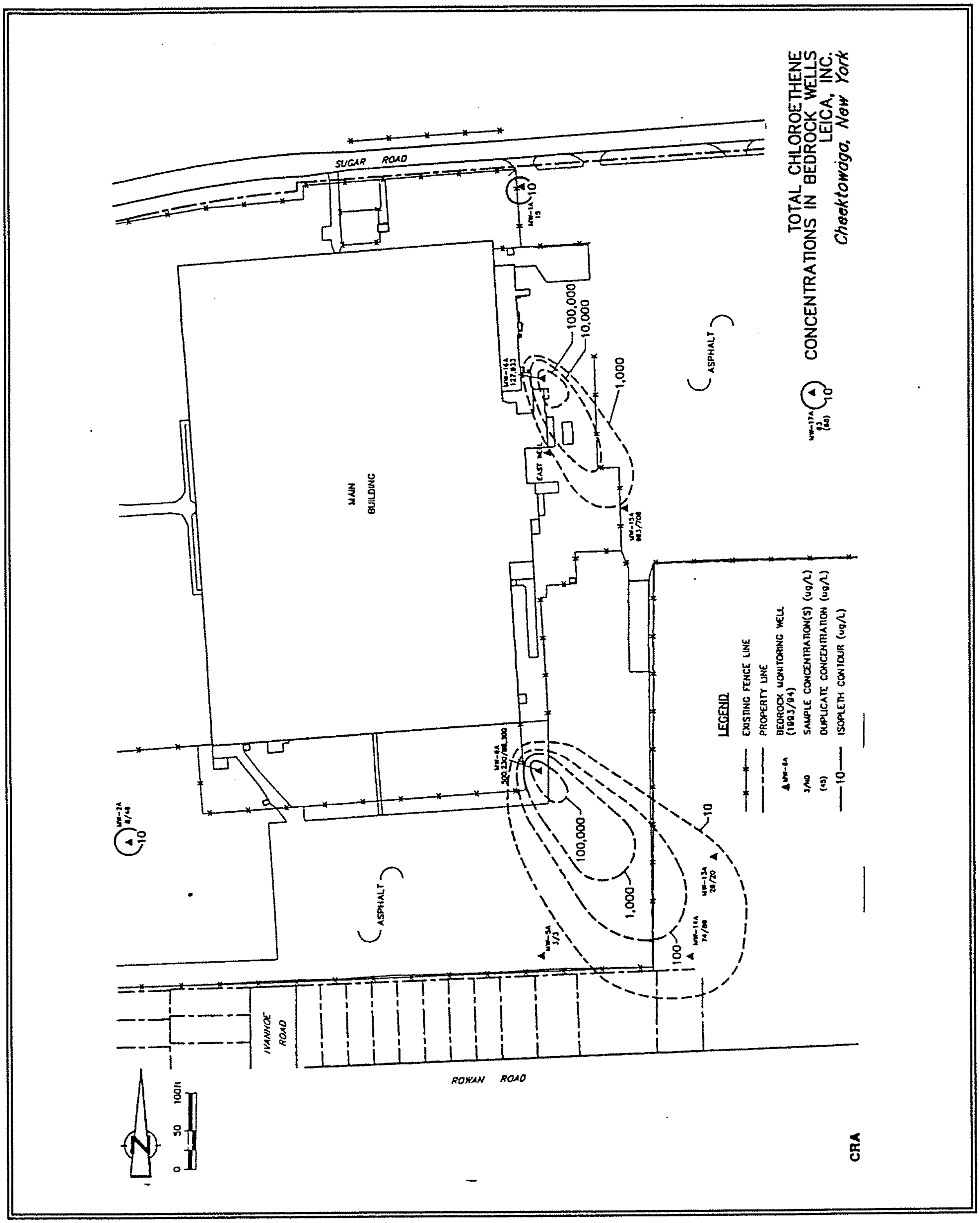

Figure 7
Alternative 5 - System Components

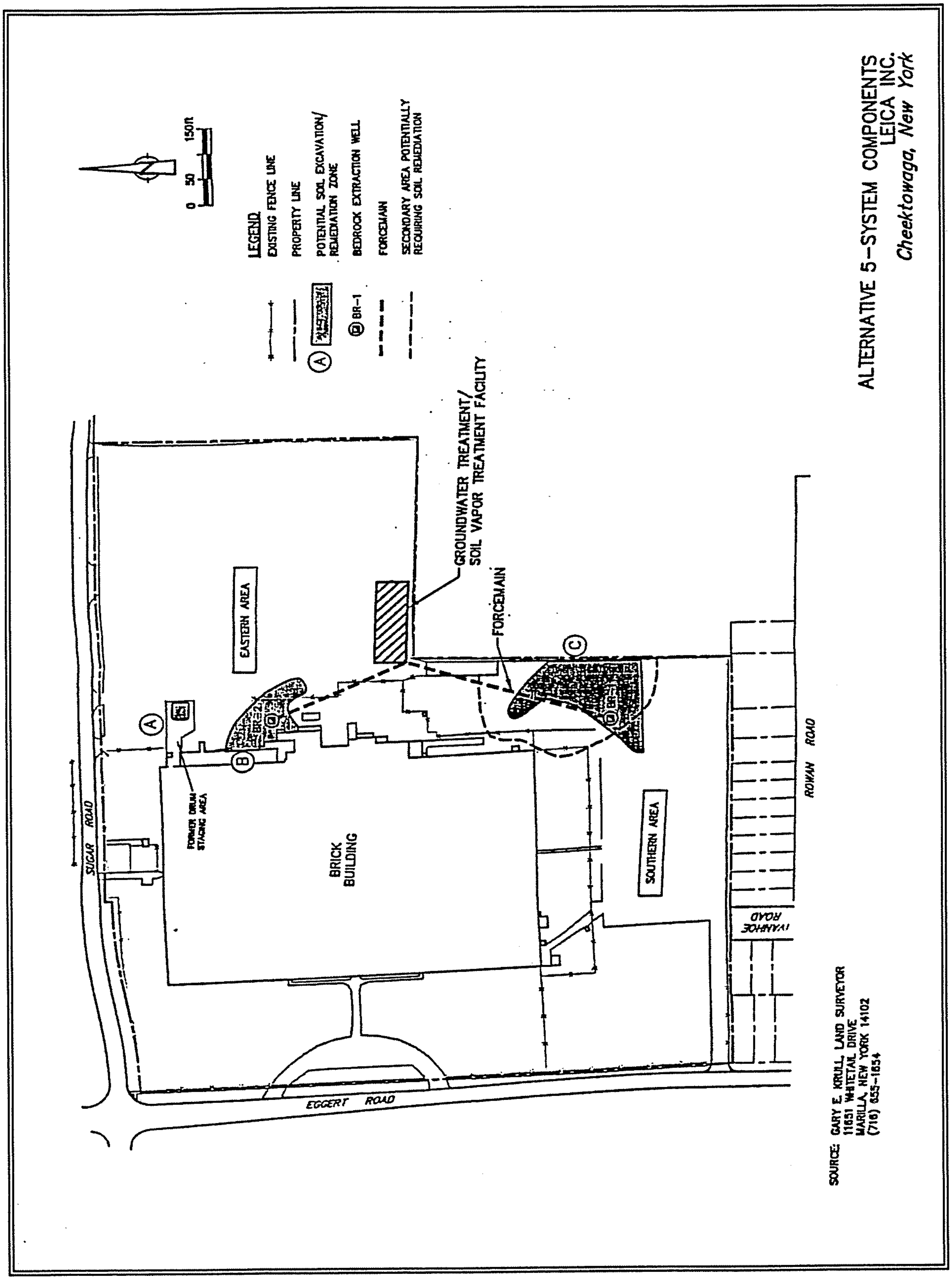

TABLE 1

Chemicals of Concern
Leica Site

Volatile Organic Compounds(VOCs)
Acetone
Benzene
Bromomethane
2-Butanone
Carbon Disulfide
1,1-Dichloroethane
1,1-Dichloroethene
1,2-Dichloroethene(total)
Ethylbenzene
Methylene Chloride
Tetrachloroethene
Toluene
1,1,1-Trichloroethane
Trichloroethene
Vinyl Chloride
Xylenes(total)

Semi-Volatile Organic Compounds(SVOCs)
Acenaphthene
Acenaphthylene
Anthracene
Benzo(a)anthracene
Benzo(b)fluoranthene
Benzo(k)fluorathene
Benzo(g,h,i)perylene
Benzo(a)pyrene
Bis(2-ethylehexyl)phthalate
Butyl benzyl phthalene
Carbazole
Chrysene
Dibenzo(a,h)anthracene
Dibenzofuran
Di-n-butyl phthalate
1,2-Dichlorobenzene
Di-n-octyl-phthalate
Fluoranthene
Hexachloroethane
2-Methylnaphthalene
Naphthalene
Phenanthrene
Pyrene

Acid Extractables
4-Chloro-3-methylphenol
2,4-Dimethylphenol
2-Methylphenol
4-Methylphenol
Phenol

Metals
Aluminum
Arsenic
Barium
Cadmium
Chromium
Cobalt
Copper
Iron
Lead
Magnesium
Manganese
Nickel
Potassium
Sodium
Vanadium
Zinc

TABLE 2

REMEDIAL ACTION OBJECTIVES

Media	Remedial Goal
Groundwater	**Concentration Range (ppb)**
trichloroethene	5
1,2-dichloroethene	5
vinyl chloride	5
1,1,1-trichloroethane	5
toluene	5
xylene	5
ethylbenzene	5
Soil	**Concentration Range (ppm)**
trichloroethene	1.0
1,1,1-trichloroethane	0.8
1,1-dichloroethane	0.2
1,2-dichloroethene	0.1
methylene chloride	0.2
vinyl chloride	0.2
xylene	1.2
benzene	0.06
ethylbenzene	5.5
toluene	1.5

TABLE 3

SUMMARY OF PRELIMINARY COST ESTIMATES

Alternative No.	Description	Capital Cost	Annual O&M Cost	Estimated Present Worth
1	- No Action	$0	$0	$0
2	- Institutional Controls - Long Term Monitoring	$16,300	$56,500	$614,000
3	- Groundwater Containment & Treatment	$1,190,000	$177,000	$3,200,00
4	- Soil Excavation & On-site treatment by Soil Vapor Extraction - Groundwater Containment & Treatment	$2,190,000	$172,000	$5,887,000
5	- Dual Soil Vapor Extraction/ Pneumatic Fracturing of Soil - Groundwater Containment & Treatment	$1,564,553	$432,775	$3,522,983

APPENDIX A

ADMINISTRATIVE RECORD

1. **"Real Property Environmental Assessment Report", Leica Inc.,**dated August 14, 1990,

2. **"Site Investigation, Leica, Inc."**, dated November 1990.

3. **"Site Investigation Work Plan", Leica, Inc.** dated October 25, 1991, Conestoga-Rovers & Associates.

4. Leica entered into **Order on Consent** (legal agreement) with NYSDEC on October 8, 1993 to conduct a Remedial Investigation/Feasibility Study and Remedial Design and Remedial .

5. "**RI/FS Work Plan", Leica, Inc.** dated June 1993

6. "**Remedial Investigation Report", Leica, Inc.,** dated October 1994 (revised dated February 16, 1995), Conestoga-Rovers & Assoc.

7. **"RI/FS Preliminary Remedial Action Objectives", Leica, Inc.** dated January 6, 1995

8. "Final **Feasibility Study Report", Leica, Inc., dated** March 1996.

9. **"Remedial Predesign Work Plan", Leica, Inc.,** dated August 1995.

10. "**Pre-Design Investigation Report**", Leica Inc., dated 1996.

11. "**Supplemental Soil Vapor Extraction Evaluation**", Leica Inc., dated 1996.

12. "**Proposed Remedial Action Plan**", dated April 1996

13. **"Integrated Dual Vacuum Extraction/Pneumatic Fracturing Pilot Study"** dated December 1996.

APPENDIX B

GLOSSARY OF TERMS

AST:	Above Ground Storage Tank
COCs:	Chemicals of Concern
CAMU:	Corrective Action Management Unit
DCE:	Dichloroethylene
ECL:	Environmental Conservation Law
IRM:	Interim Remedial Measure
NAPL:	Non-Aqueous Phase Liquid
NYCRR:	New York Codes, Rules, and Regulations
NYSDEC:	New York State Department of Environmental Conservation
NYSDOH:	New York State Department of Health
O&M:	Operation and Maintenance
ppb:	Parts per billion (equivalent to 1 second in 31.7 years) also can be represented as ug/l (as measured in a liquid) and ug/kg (as measured in a solid)
ppm:	Parts per million (equivalent to 1 second in 11.6 days) also be represented as mg/l (as measured in a liquid) and mg/kg (as measured in a solid)
PRAP:	Proposed Remedial Action Plan
PRP:	Potential Responsible Party
RAOs:	Remedial Action Objectives
RCRA:	Resource, Conservation, Recovery Act
RI/FS:	Remedial Investigation/Feasibility Study
ROD:	Record of Decision
SCG:	Standards, Criteria and Guidances
SVE:	Soil Vapor Extraction
SVOCs:	Semi-Volatile Organic Compounds
TCE:	Trichloroethylene or Trichloroethene
UST:	Underground Storage Tank
USEPA:	United States Environmental Protection Agency
VC:	Vinyl Chloride
VOCs:	Volatile Organic Compounds