3

Former Binghamton Plastics

Binghamton(C),Broome County, New York
Site No. 7-04-024

PROPOSED REMEDIAL ACTION PLAN

February 2000

Prepared by:

Division of Environmental Remediation
New York State Department of Environmental Conservation

PROPOSED REMEDIAL ACTION PLAN

Former Binghamton Plastics
Binghamton (C), Broome County, New York
Site No. 7-04-024
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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 Former Binghamton Plastics Site. As more fully described in Sections 3 and 4 of this document, past handling practices have resulted in the disposal of hazardous wastes, including trichloroethane (TCA) and trichloroethene (TCE). Over time, some of the TCA/TCE has undergone natural degradation which has resulted in the presence of dichloroethane (DCA) and dichloroethene (DCE), respectively, primarily in the on-site, perched groundwater. The contamination present at the site is limited to the immediate vicinity of the site. These disposal activities have resulted in the following significant threats to the public health and/or the environment:

- A significant threat to human health associated with disturbance/regrading/excavation in areas where contamination is present would create the potential for exposure to contaminated soil, groundwater, and/or vapors.
- A significant environmental threat exists from on-site perched groundwater that is acting as a continuing source of contamination to the groundwater which could migrate to off-site areas.

In order to restore the Former Binghamton Plastics inactive hazardous waste disposal site to predisposal conditions to the extent feasible and authorized by law, but at a minimum to eliminate or mitigate the significant threats to the public health and/or the environment that the hazardous waste disposed at the site has caused, the following remedy is proposed:

- Groundwater Extraction and Treatment to address the on-site contaminated groundwater and lower groundwater elevations to below the elevation of the utilities present under Chambers Street, thus preventing migration of contaminated groundwater via these utilities;
- A soil vapor extraction pilot study would be performed to determine if the amount of contaminants that could be removed would warrant the implementation of a full scale SVE system for the subsurface soils under the southwest corner of the on-site building;
- O&M and long-term monitoring; and

- Pursuit of deed restrictions if residual contamination remains after the remediation.

The proposed remedy, discussed in detail in Section 7 of this document, is intended to attain the remediation goals selected for this site (as presented 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 (ECL) 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:

Broome County Public Library
78 Exchange Street
Binghamton, NY 13901
Hours: Mon-Thurs., 9:00 a.m.-9:00p.m. Fri-Sat, 9:00 a.m.-5:00 p.m.

NYS Dept. of Environmental Conservation - Region 7 Headquarters
615 Erie Boulevard West
Syracuse, NY 13204
Hours: Mon-Fri 8:30-4:45
Contact: Mr. Kevin Delaney
315-426-7400

Mr. James A. Moras
Project Manager
NYS Dept. of Environmental Conservation
50 Wolf Road
Albany, NY 12233-7010
518-457-0315

The NYSDEC seeks input from the community on all PRAPs. A public comment period has been set from **February 15, 2000 - March 16, 2000** to provide an opportunity for public participation in the remedy selection process for this site. A public meeting is scheduled for **February 28, 2000** at the **Benjamin Franklin Elementary School Cafeteria, 262 Conklin Avenue** beginning at **7:00 PM**.

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 Mr. Moras at the above address.

SECTION 2: SITE LOCATION AND DESCRIPTION

The Former Binghamton Plastics site (Site No. 7-04-024) is located at 498 Conklin Avenue, Binghamton, Broome County (see Figure 1). The site property is approximately 2 acres in size and is located in a light-industrial/residential area at the eastern end of Binghamton (just south of the river).

The site is owned by the DII Group, Inc. (the responsible party) and is currently leased to McIntosh Laboratories. Originally constructed in 1956 by Binghamton Plastics, the facility has undergone many structural modifications over the years. Building additions were constructed in 1963, 1974, and 1982 (see figure 2).

The site consists of a large industrial building (44,800 square feet) with associated parking located to the south and the east of the building. A 1000-gallon underground storage tank was located on the west side of the building, just west of the southwestern corner of the building. The tank was used to store hydraulic oil contaminated with 1,1,1-trichloroethane (1,1,1-TCA) and trichloroethene (TCE) and was removed in 1986.

The site is surrounded by: the main McIntosh Laboratories facility to the west; Conklin Avenue, railroad tracks, a small park and the Susquehanna River to the north; parking lots and a residential area to the south and the east. The site elevation ranges from approximately 870 to 880 feet above Mean Sea Level. The property is relatively flat sloping gently to the north in the area of the building. The parking lot to the south side of the building is approximately four feet higher than the ground level at the south side of the building. North of Conklin Avenue and the railroad tracks, the ground surface slopes steeply down to the public park. The slope is much gentler across the park to the river, located slightly less than 1000 feet north of the site.

SECTION 3: SITE HISTORY

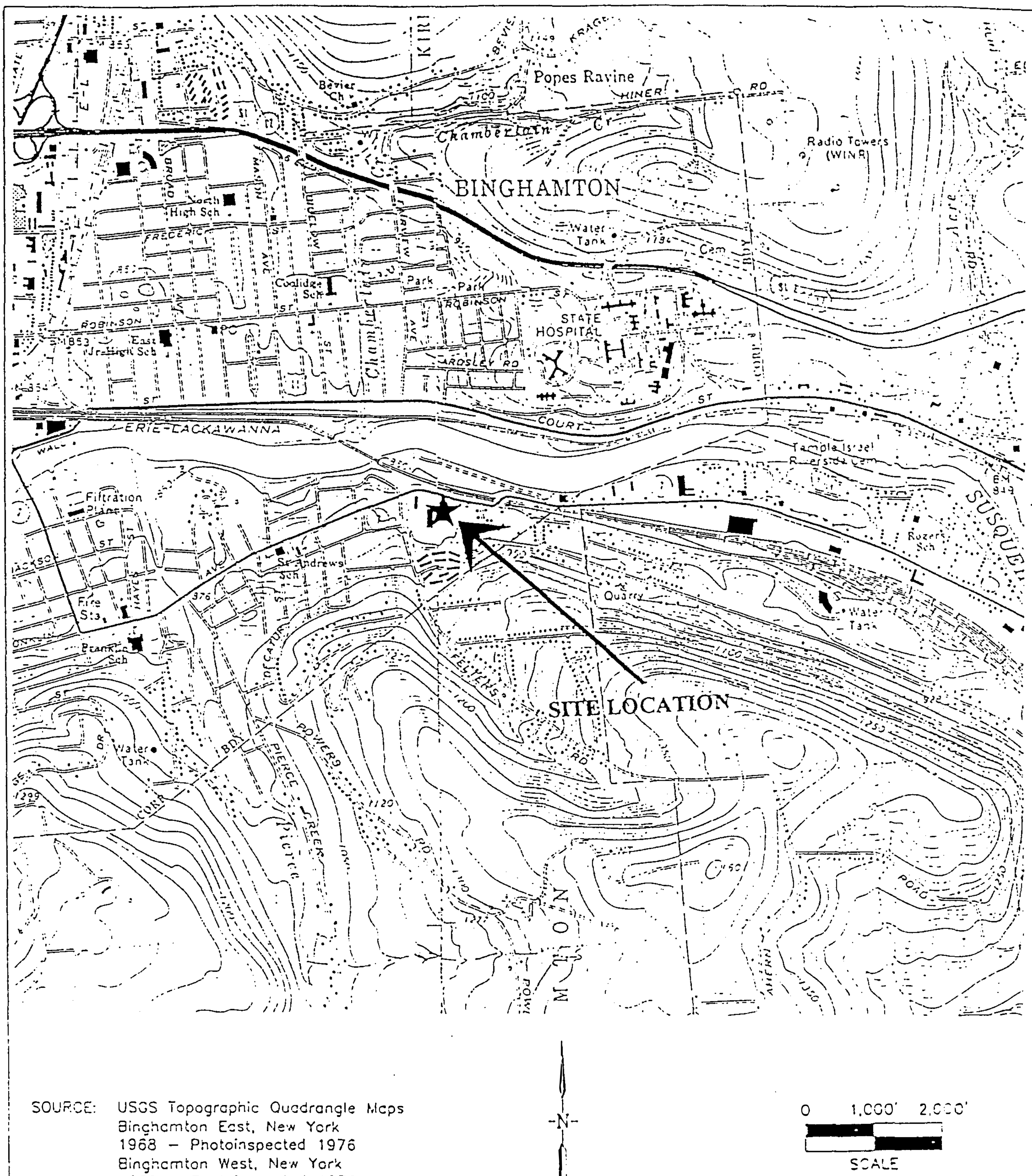
3.1: Operational/Disposal History

Binghamton Plastics constructed the facility at this site in 1956. As discussed above, additions were constructed in 1963, 1974, and 1982. Binghamton Plastics operated the facility until the early 1980's when Universal Instruments Corporation purchased the property and converted the facility into a circuit board manufacturing plant. Universal Instruments operated the facility until they were taken over by Dover Electronics Corporation in the late 1980's. In 1993, Dover Electronics was separated from Dover as a stand-alone corporation named Dovatron, Inc. In 1996 Dovatron changed its name to the DII Group. The building has been leased to, and occupied by McIntosh Laboratories since the early 1990's. The building is currently operated as an electronics repair facility.

On-site contamination has been observed, and is attributed to (at least partially) leakage from a 1000 gallon underground storage tank which had been left in place by Binghamton Plastics. The tank was removed in 1986 (approximate location shown on Figure 2). It had been used as a hydraulic oil reservoir and contained 650 gallons of oil contaminated with 1,1,1-TCA and TCE. Although there is no documentation available to detail the work that was performed during the tank-pull, it is possible that contaminated soil around the tank was removed during the operation.

3.2: Remedial History

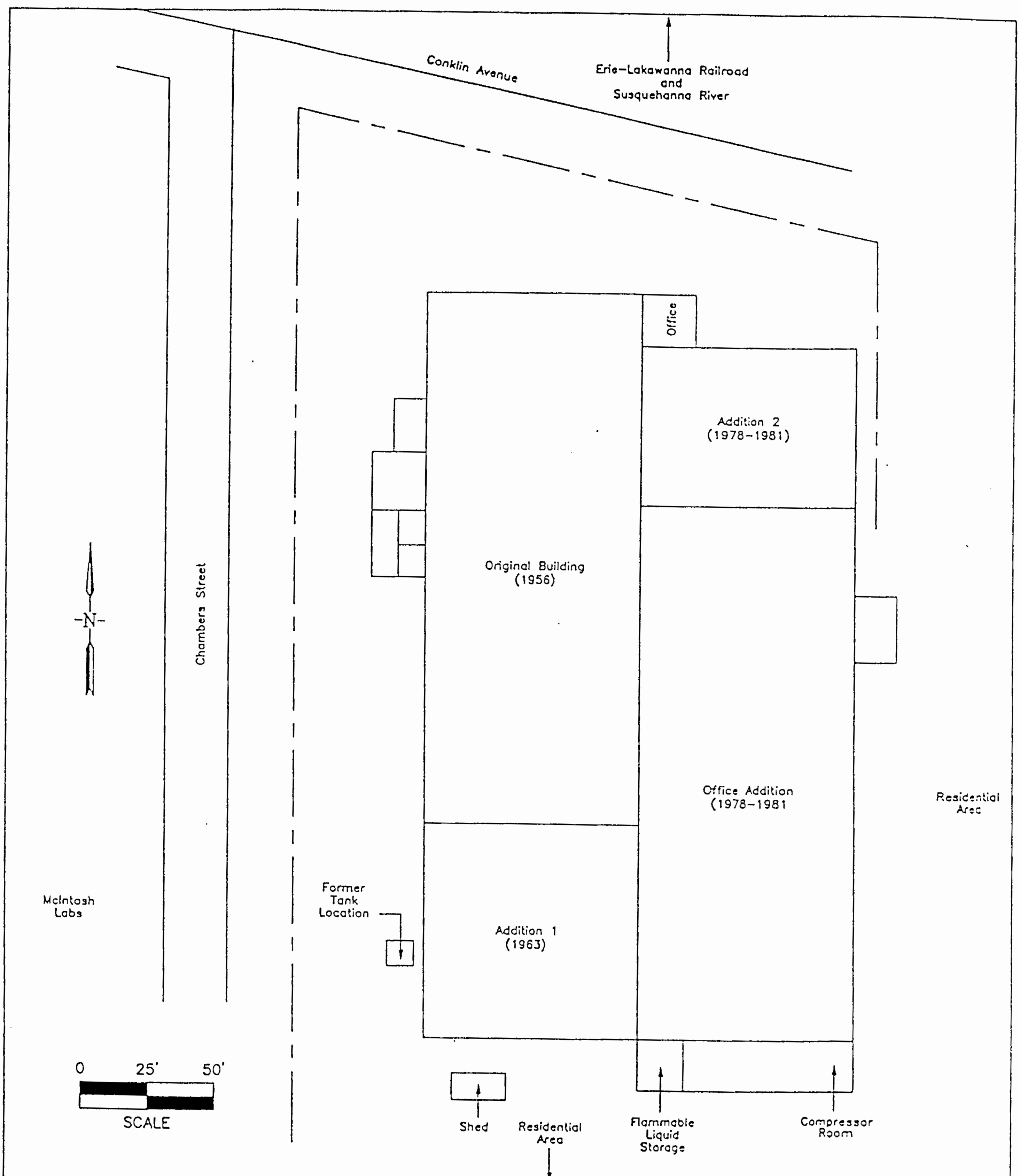
Starting in 1986, several environmental consultants have conducted environmental work/investigations at the former Binghamton Plastics facility (prior to the responsible party



SOURCE: USGS Topographic Quadrangle Maps
Binghamton East, New York
1968 – Photoinspected 1976
Binghamton West, New York
1968 – Photoinspected 1976

DATE: 8/11/99	FIGURE 1	SHIELD ENVIRONMENTAL ASSOCIATES, INC.
DRAWN BY: P.D.H.	SITE LOCATION MAP	
APPROVED BY: M.M.	DII – BINGHAMTON PLASTICS BINGHAMTON, NEW YORK	LEXINGTON, KY
CLIENT NO.: 396-0460		

60160-1



DATE: 8/11/99

DRAWN BY: P.D.H.

APPROVED BY: M.M.

CLIENT NO.: 396-0460

60460-2

FIGURE 2

MAP SHOWING HISTORICAL SITE FEATURES AND SURROUNDING PROPERTIES
DII – BINGHAMTON PLASTICS
BINGHAMTON, NEW YORK

SHIELD
ENVIRONMENTAL ASSOCIATES, INC.
LEXINGTON, KY

(PRP) entering into Consent Order with NYSDEC in June 1998). In 1986, the 1000 gallon underground storage tank was removed. From the period of 1990-1995, various environmental investigations were conducted by the following consultants: Hagopian Engineering Associates (Hagopian), Stetson-Harza, and Harza Northeast. The Responsible Party's current environmental consultant (Shield Environmental Associates) has been involved at this site since 1996. The following is a summary of the historical work/investigations performed at the site.

- 1986 Tank Removal - A 1000 gallon hydraulic oil tank was reportedly removed from the area just west of the southwest corner of the on-site building in 1986. No documentation was prepared. The Phase III Report indicated that when the tank was removed, approximately 650 gallons of 1,1,1-TCA/TCE contaminated hydraulic oil was found in the tank.

- Phase I Investigation (Hagopian) - Consisted of a limited amount of soil sampling, as well as the collection of six concrete cores from areas inside the building (*Environmental Site Investigation for Dover Electronics Company,* October 1990).

- Phase II Investigation (Hagopian) - Consisted of the installation of four groundwater monitoring wells, as well as the collection of soil gas, soil, and groundwater samples (*Phase II Environmental Site Investigation for Dover Electronics,* August 1991).

- Phase III Investigation (Stetson-Harza) - This investigation (initiated in 7/92) consisted of four additional soil borings, the collection of soil samples, as well as the re-development and sampling of the four previously installed monitoring wells.

- Groundwater Interim Remedial Measure - Prior to the execution of the Consent Order (between the Responsible Party and NYSDEC) the Responsible Party initiated a groundwater recovery and treatment system as an interim remedial measure (IRM). The system started to operate in October 1993. Over a 450 day period approximately 50,000 gallons of water were treated (relatively small amount). The system has not been operated continuously and has been periodically shut down for maintenance.

<u>Shield Investigations</u>

Shield Environmental Associates (Shield) has undertaken a series of site investigations since 1996. These investigations were summarized in the report, submitted to NYSDEC, entitled *"Baseline Summary Report and Baseline Summary Report Addendum."*

The following is a summary of field work/sampling performed by Shield at the site prior to the initiation of the RI/FS:

<u>Soil Sampling Events</u>

- October 1997 - Three soil borings (later converted to MW-5, MW-6 & MW-7) were advanced and sampled.

- January-February 1998 - Twelve soil borings were installed (MW-8 through MW-13 and SB-1 through SB-6) with soil samples collected.

<u>Groundwater Sampling Events</u>

- October 1996 - Three wells installed by Hagopian in 1991 were sampled (DMW-1, DMW-3, and DMW-4); DMW-2 was not sampled because it was covered/became inaccessible when Chambers Street was widened.

- October 1997 - Three additional wells were installed and sampled (MW-5, MW-6, and MW-7).

- January-February 1998 - Six additional groundwater monitoring wells were installed (MW-8 through MW-13) and all of the wells were sampled.

SECTION 4: SITE CONTAMINATION

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

4.1: Summary of the Remedial Investigation (See Figures 3, 4, & 5 for sample locations)

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 multiple phases. The first phase was conducted in November 1998. As a part of the initial phase of the RI eleven test trenches were dug, four soil borings were advanced, two additional groundwater monitoring wells were installed, and environmental samples were collected and submitted for analysis. This work was conducted from November 1998 through February 1999. In May 1999 a passive soil gas survey was conducted under the floor in the southwest corner of the building (see Figure 4); based on the results (see Figure 5), soil samples were collected below the floor in the southwest corner of the building in July 1999 (see Figure 6). Also in July 1999, two test trenches were dug along subsurface utilities in Chambers Street (see Figure 3). The Remedial Investigation Report, dated *February 2000*, has been prepared which describes the field activities and findings of the RI in detail.

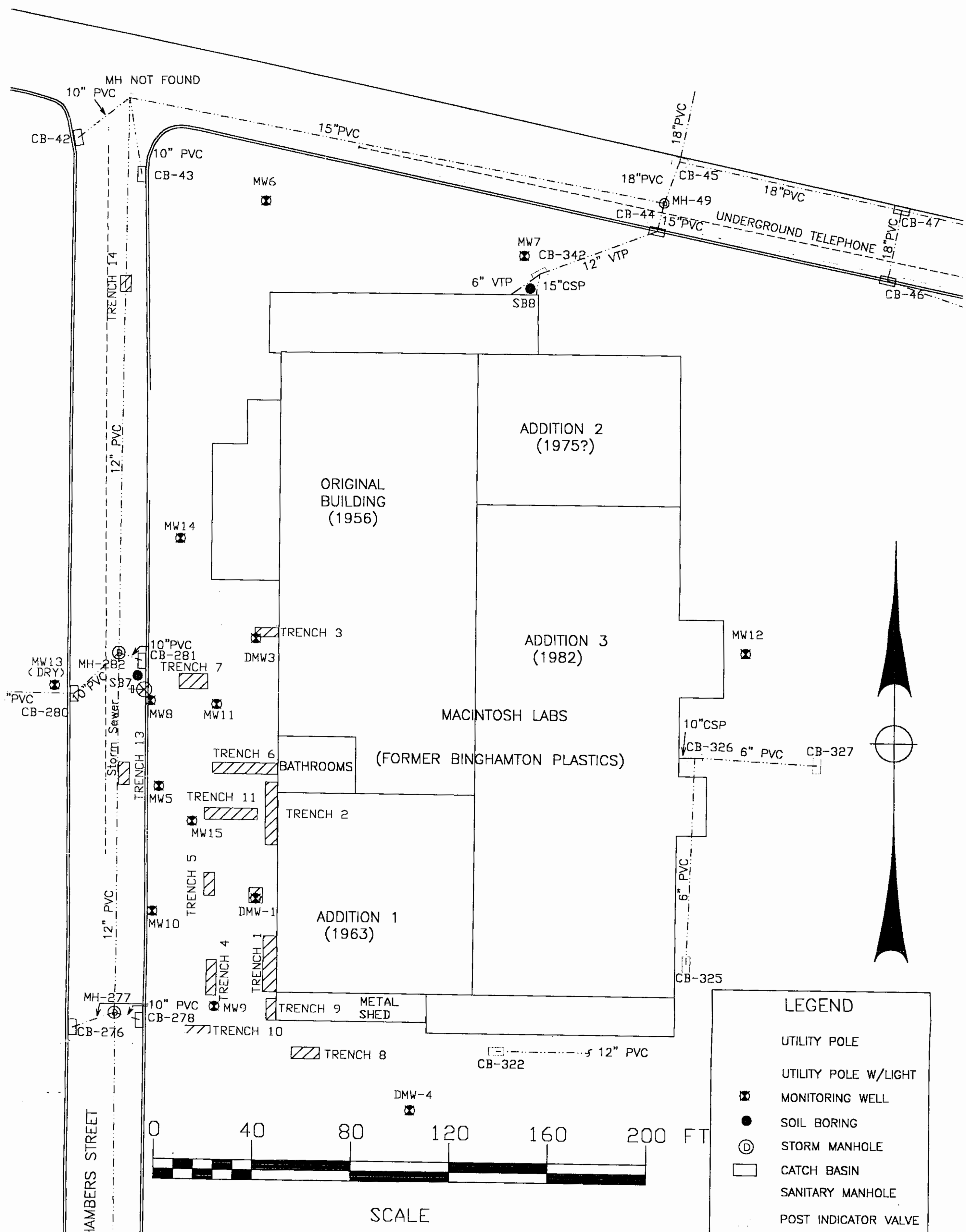
The RI included the following activities:

- Advancement of test trenches;
- Installation of exploratory soil borings;
- Monitoring well installation;
- Well development and limited pump testing;
- Sub-floor soil gas survey;
- Sub-floor soil sampling;
- Collection of environmental samples;

To determine which media (soil, groundwater, etc.) are contaminated at levels of concern, the RI analytical data were compared to environmental Standards, Criteria, and Guidance values (SCGs). Groundwater, drinking water and surface water SCGs identified for the Former Binghamton Plastics site are based on NYSDEC Ambient Water Quality Standards and Guidance Values and Part V 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.

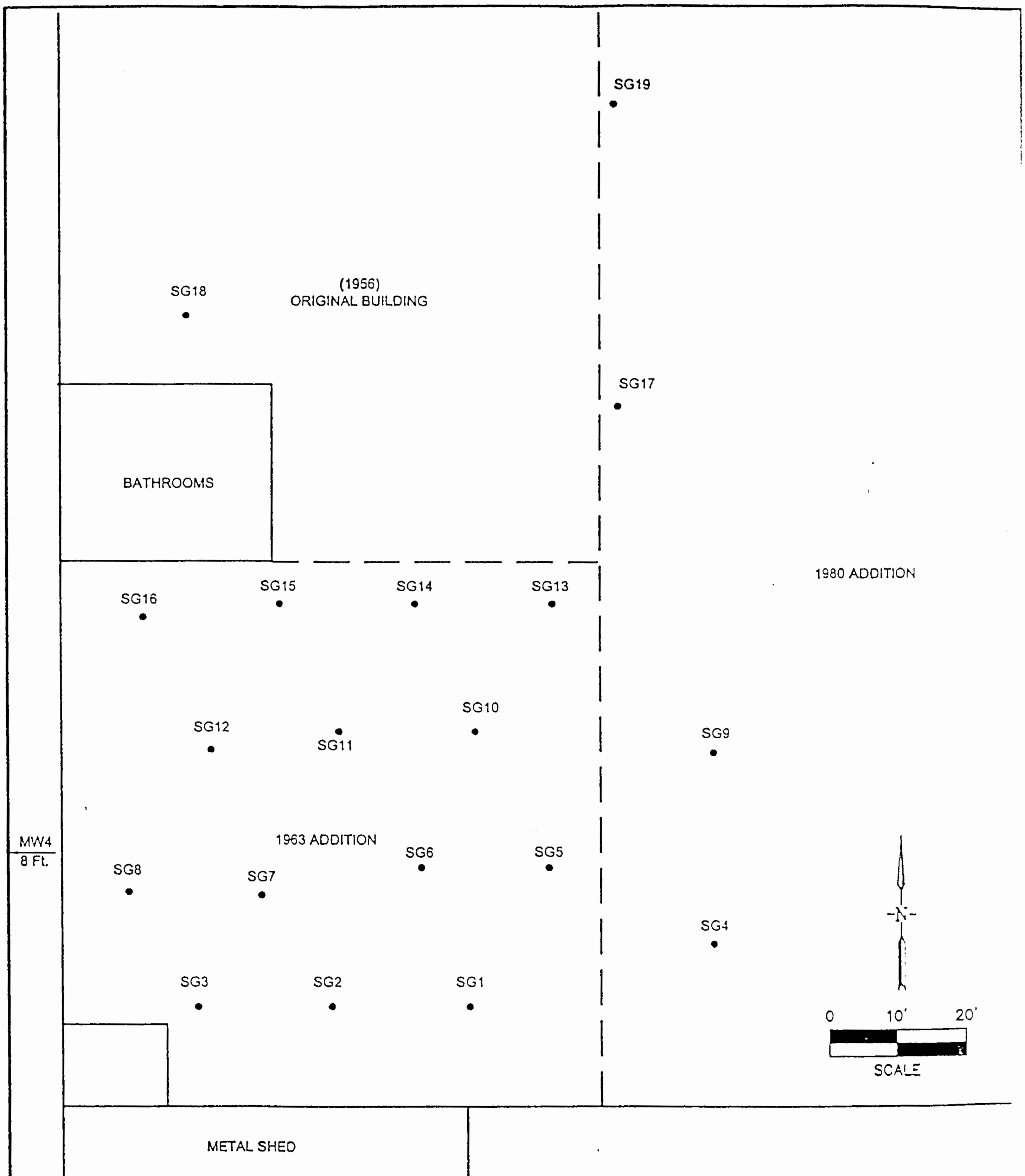
Based on the RI results, in comparison to the SCGs and potential public health and environmental exposure routes, certain media and areas of the site require remediation. These are summarized below. More complete information can be found in the RI Report.

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



MH NOT FOUND
10" PVC
CB-42
15"PVC
10" PVC
CB-43
MW6
18"PVC
18"PVC
CB-45
18"PVC
MH-49
CB-47
CB-44
15"PVC
UNDERGROUND TELEPHONE
18"PVC
MW7
CB-342
12" VTP
6" VTP
15"CSP
SB8
CB-46
TRENCH 14
12" PVC
ADDITION 2
(1975?)
ORIGINAL
BUILDING
(1956)
MW14
ADDITION 3
(1982)
MW12
TRENCH 3
DMW3
10"PVC
CB-281
MW13
(DRY)
MH-282
TRENCH 7
10"PVC
SB7
"PVC
CB-280
MW8
MW11
MACINTOSH LABS
10"CSP
CB-326
6" PVC
CB-327
Storm Sewer
TRENCH 13
TRENCH 6
BATHROOMS
(FORMER BINGHAMTON PLASTICS)
MW5
TRENCH 11
TRENCH 2
MW15
TRENCH 5
6" PVC
12" PVC
DMW-1
MW10
ADDITION 1
(1963)
TRENCH 4
TRENCH 1
CB-325
MH-277
10" PVC
CB-278
MW9
TRENCH 9
METAL
SHED
CB-276
TRENCH 10
TRENCH 8
12" PVC
CB-322
DMW-4
CHAMBERS STREET
0
40
80
120
160
200 FT
SCALE
LEGEND
UTILITY POLE
UTILITY POLE W/LIGHT
MONITORING WELL
SOIL BORING
STORM MANHOLE
CATCH BASIN
SANITARY MANHOLE
POST INDICATOR VALVE
HYDRANT
WATER VALVE
GAS VALVE

FIGURE 3



DATE: 8/11/99	FIGURE 4	SHIELD
DRAWN BY: P.D.H.	PASSIVE SOIL GAS POINTS	ENVIRONMENTAL ASSOCIATES, INC.
APPROVED BY: M.M.	DII – BINGHAMTON PLASTICS	
CLIENT NO.: 396–0460	BINGHAMTON, NEW YORK	LEXINGTON, KY

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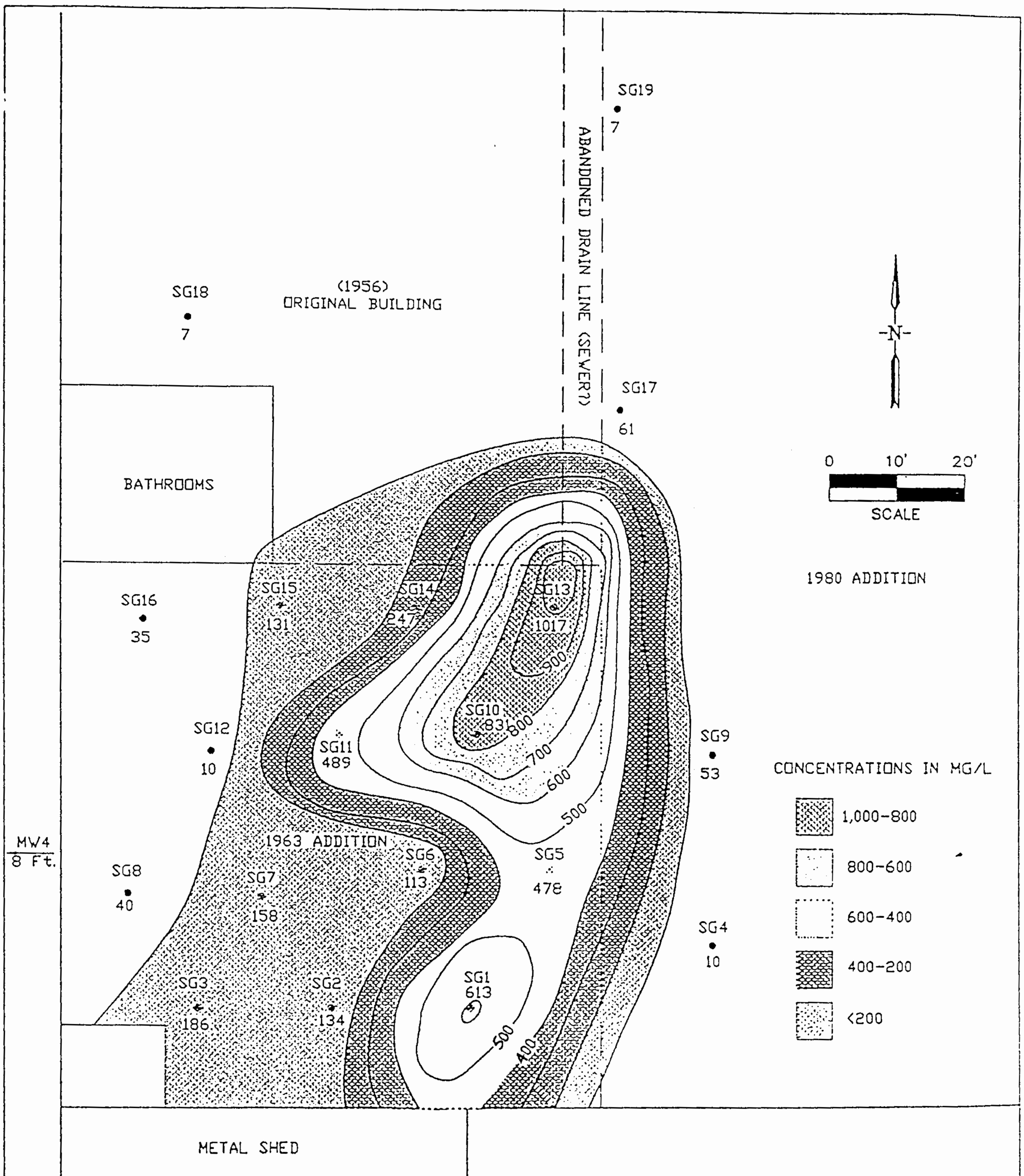
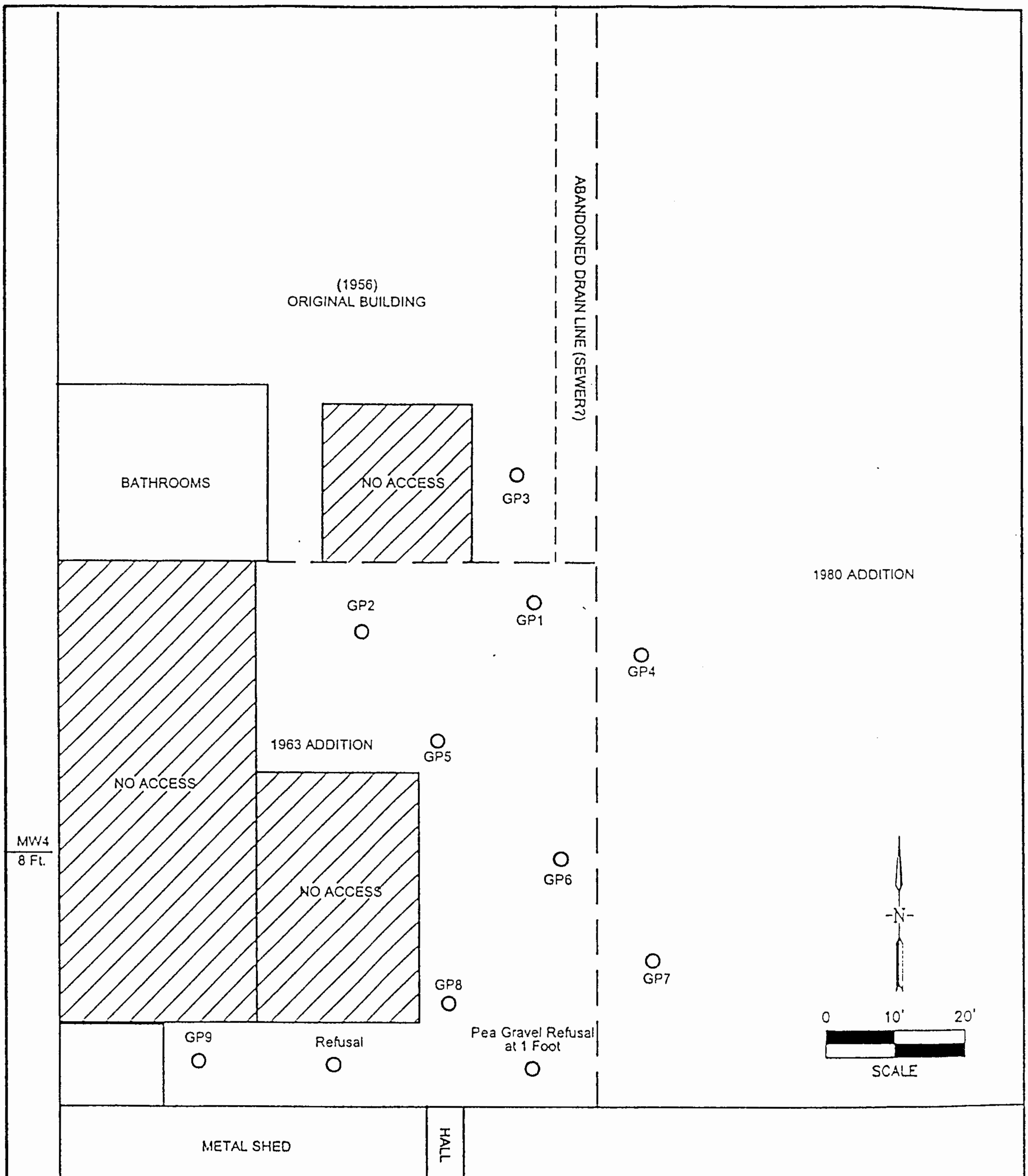


DATE: 8/12/99	FIGURE 5
DRAWN BY: P.D.H.	SOIL GAS CONCENTRATION MAP
APPROVED BY: M.M.	DII – BINGHAMTON PLASTICS
CLIENT NO.: 396-0460	BINGHAMTON, NEW YORK

SHIELD
ENVIRONMENTAL ASSOCIATES, INC.
LEXINGTON, KENTUCKY

396-C



DATE: 8/12/99

DRAWN BY: P.D.H.

APPROVED BY: M.M.

CLIENT NO.: 396-0460

FIGURE 6

GEOPROBE BORING POINTS

DII – BINGHAMTON PLASTICS
BINGHAMTON, NEW YORK

SHIELD
ENVIRONMENTAL ASSOCIATES, INC.
LEXINGTON, KY

60460-

are provided for each medium.

4.1.1: Site Geology and Hydrogeology

The shallowest soils at the site consist of brown, poorly sorted (contains various particle sizes), weathered, glacial till and are found at depths ranging from 0 to 25 feet below the ground surface. The weathered till is unstratified and contains clays, silts, sands, gravels and cobbles. The upper weathered till is a brown clay that contains poorly sorted (contains various particle sizes) gravel.

Below the weathered brown till lies the unweathered till. These sediments are similar to the weathered till and consist of clay, silt, sand, gravel and cobbles. However, the color grades from light-brown to olive-gray and contains fewer cobbles.

The main regional aquifer in the area is the Five-Mile Point aquifer. The aquifer is in the general area of the site (but located deeper than the aquifers monitored at this site) and is used as a potable water supply. However, the limit of the groundwater contamination at the site has been defined, and is limited to the shallow perched aquifer, and is not currently impacting the Five-Mile Point aquifer.

The shallow groundwater underlying the site appears to be separated into two water-bearing units (see Table 3, at end of document, for well depths/monitored intervals). There appears to be a shallow, perched water zone, in the weathered till on the southwestern side of the property in the vicinity of the former underground storage tank. This groundwater is found in an area of more permeable soils, possibly consisting of backfill from the historical removal of the underground storage tank and/or re-worked (disturbed by potential construction activities in the past) weathered till. This shallow water zone was not encountered on the northern and eastern sides of the property.

The perched groundwater on the southwest side of the property (MW1, MW4, MW5, MW8, MW9, MW10, and MW11) was encountered between approximately 3 and 5 feet below the ground surface. Due to the shallow depth of groundwater in this area and the potential for cross-contamination into the deeper, regional aquifer, wells in this area were not installed below a depth of 20 feet. Based on the first three gauging (measuring groundwater elevations) events, the direction of groundwater flow in the shallow, perched groundwater zone is to the west-northwest towards Chambers Street. Groundwater on the northern and eastern side of the property (MW3, MW6, MW7, and MW12) was encountered between approximately 23 and 32 feet below the ground surface. These wells range from 40 to 48 feet in depth. Groundwater flow in this "deeper" aquifer has been established to be to the east-northeast. Based on three groundwater gauging events, the wells in the deeper aquifer and the wells completed within the shallow perched aquifer do not appear to be hydraulically connected.

4.1.2: Nature of Contamination

As described in the RI report, many soil, groundwater and surface water samples were collected at the site to characterize the nature and extent of contamination. The main category of contaminants which exceed their SCGs are volatile organic compounds (VOCs); Table 1 lists the contaminants of concern for this site.

4.1.3: Extent of Contamination

Table 1 also summarizes the extent of contamination for the contaminants of concern in soil, groundwater and surface water 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.

Table 1
Nature and Extent of Contamination

MEDIUM	CATEGORY	CONTAMINANT OF CONCERN	CONCENTRATION RANGE (ppb)	FREQUENCY of Detected Exceedances	SCG/ Bkgd. (ppb)
Groundwater	Volatile Organic Compounds (VOCs)	1,1-dichloroethane	ND(5) - 220	5/14	5
		1,1-dichloroethene	ND(5) - 560	4/14	5
		1,2-dichloroethene (cis)	ND(2.5) - 1100	7/14	5
		1,2-dichloroethene (trans)	ND(2.5) - 11	3/14	5
		1,1,1-trichloroethane	ND(5) - 1600	5/14	5
		trichloroethene	ND(5) - 17,000	7/14	5
		tetrachloroethene	ND(5) - 14	3/14	5
		vinyl chloride	ND(10) - 140	4/14	2
Subsurface Soil	Volatile Organic Compounds (VOCs)	1,2-dichloroethene (cis)	ND(2.5) - 310	1/32	300
		trichloroethene	ND(5) - 2900	2/32	700
		vinyl chloride	ND(10) - 1200	1/32	200
Surface Water (collected from storm water drainlines)	Volatile Organic Compounds (VOCs)	1,1,1-trichloroethane	3.5 - 6.3	2/3	5
		trichloroethene	ND(5) - 17	1/3	5
		tetrachloroethene	ND(5) - 2.7	1/3	0.7

Soil

A total of 32 subsurface soil samples were taken during the test trenching, soil boring/monitoring well installation, and the sub-floor soil sampling under southwest corner of the building.

Of the 32 subsurface soil samples collected, only two were at concentrations that exceeded SCGs for the particular VOCs detected (TCE at 2.9 ppm compared to an SCG of 0.7 ppm and vinyl chloride at 1.2 ppm vs. and SCG of 0.2 ppm). These two samples were collected under the southwest corner of the building(sample GP6). Soil cleanup goals were not exceeded at the other sampling locations under the building indicating that the contamination under the building is not widespread.

A passive soil gas survey was also conducted under the southwest corner of the building. Since soil gas surveys measure contaminants in soil vapor and not directly on the soil itself, the results (see Figure 5) can only be evaluated qualitatively (contamination is/is not there, not necessarily how much might be in the soil). The results indicated a much greater level and extent of contamination than indicated by the actual soil samples discussed above. This could be because the presence of the building slab is concentrating the vapors making the soil appear worse than it is or the actual soil data may not be extensive enough to be representative of the true conditions.

In summary, significant soil contamination was not found in the area of the former underground tank. Under the building, the data is inconclusive but indicates the potential for soil contamination that may be contributing to the shallow groundwater problem.

Air

As a follow-up to the sub-floor sampling that was conducted under the southwest portion of the on-site building, indoor air samples were collected inside the building. The concentrations found were far below any level of concern.

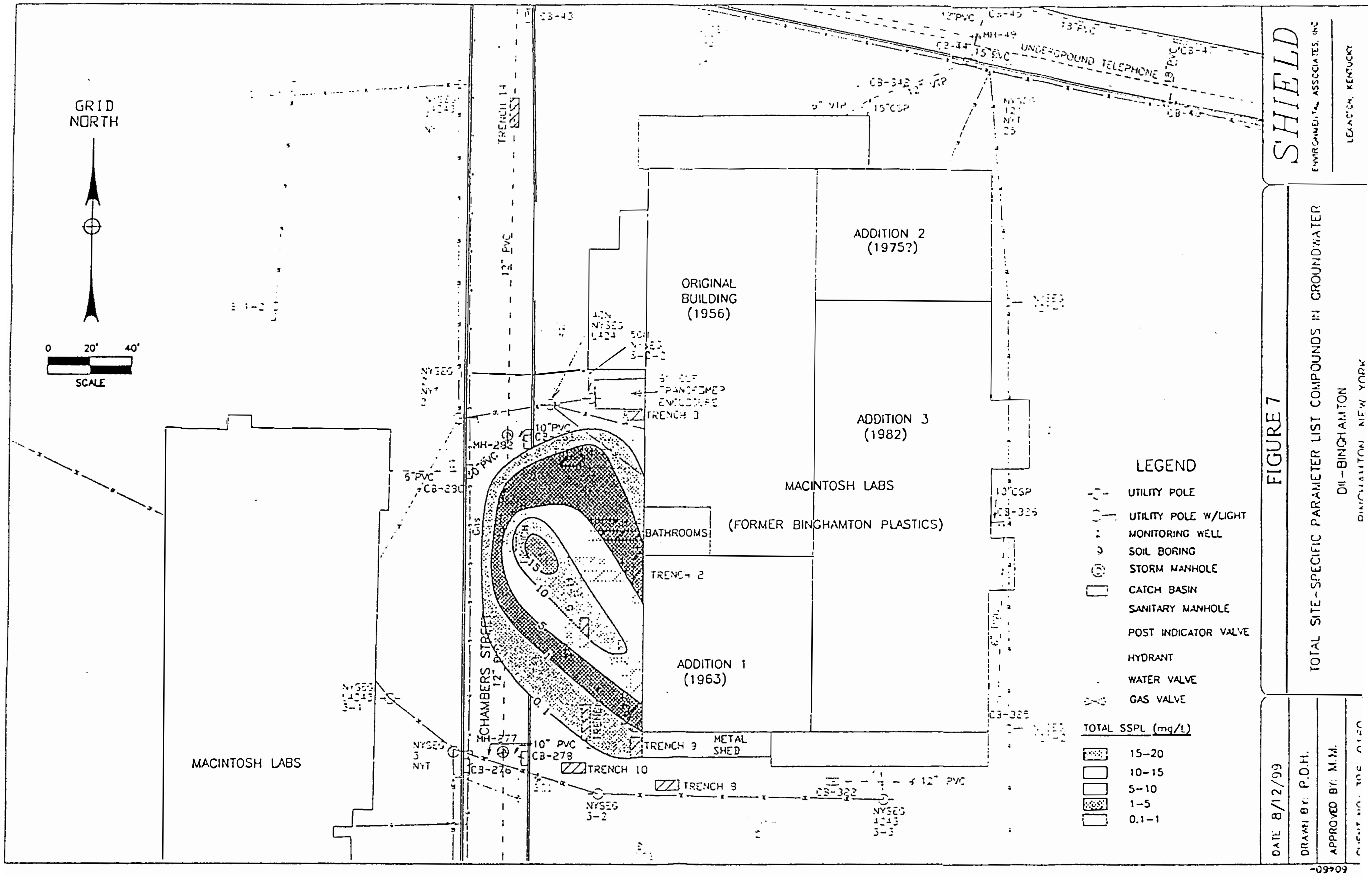
Groundwater

A total of 14 groundwater samples were taken from monitoring wells during the RI. Of the 14 wells sampled, seven indicated the presence of contaminant concentrations above SCG levels. All of these wells were located near the southwest corner of the on-site building and the water samples were taken from the shallow (approximately 10-15 feet below the ground surface) perched aquifer (see Figure 7). This perched aquifer is limited in extent, localized to the southern and western area of the site, and corresponds to an area where the soils have a higher permeability than other soils at the site. Water samples taken from the test trenches in Chambers Street indicate that the contaminated groundwater is present along the utility lines under the street adjacent to the site.

The contaminants with concentrations above SCGs were volatile organic compounds. Those concentrations that exceeded the SCGs were generally in the tens-to-hundreds of parts per billion range (compared to an SCG of 5 ppb for most of the compounds) with the highest concentration being 17,000 ppb for TCE in MW-5.

Storm Water

There are no streams, ponds or other ecologically significant surface water bodies at this site. During the RI, three water samples were taken from catch basins near the site. One of the samples was taken from a catch basin along Chambers Street, to the west of the site, while the other two were taken from catch basins on the north and south sides of Conklin Avenue, just north of the site. The two samples taken adjacent to Conklin Avenue indicated concentrations of site


SHIELD
ENVIRONMENTAL ASSOCIATES, INC
LEXINGTON, KENTUCKY
FIGURE 7
TOTAL SITE-SPECIFIC PARAMETER LIST COMPOUNDS IN GROUNDWATER
OII-BINGHAMTON
BINGHAMTON, NEW YORK
DATE 8/12/99
DRAWN BY: P.D.H.
APPROVED BY: M.M.
GRID NORTH
0 20' 40'
SCALE
ORIGINAL BUILDING (1956)
ADDITION 2 (1975?)
ADDITION 3 (1982)
ADDITION 1 (1963)
MACINTOSH LABS
(FORMER BINGHAMTON PLASTICS)
BATHROOMS
METAL SHED
TRANSFORMER ENCLOSURE
TRENCH 14
TRENCH 3
TRENCH 2
TRENCH 9
TRENCH 10
TRENCH 8
CHAMBERS STREET
12" PVC
10" PVC
8" PVC
15" CSP
10" CSP
UNDERGROUND TELEPHONE
MH-49
MH-292
MH-277
CB-43
CB-44
CB-45
CB-47
CB-273
CB-276
CB-290
CB-322
CB-325
CB-326
CB-342
NYSEG 3-1
NYSEG 3-2
NYSEG 3 NYT
NYSEG 4243 3-3
LEGEND
UTILITY POLE
UTILITY POLE W/LIGHT
MONITORING WELL
SOIL BORING
STORM MANHOLE
CATCH BASIN
SANITARY MANHOLE
POST INDICATOR VALVE
HYDRANT
WATER VALVE
GAS VALVE
TOTAL SSPL (mg/L)
15–20
10–15
5–10
1–5
0.1–1
15
10
5
1
0.1
-09909

related contaminants above SCGs. The level of these exceedances was low, with the highest concentration being 17 ppb for TCE compared to an SCG of 5 ppb.

4.2: Summary of Human Exposure Pathways:

This section describes the types of human exposures that may present added health risks to persons at or around the site. A more detailed discussion of the health risks can be found in Section 6 of the 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:

- Direct contact with groundwater could occur if wells within the contaminant plume are used for irrigation or other non-potable purposes.
- Workers could be exposed during soil excavation or subsurface maintenance activities via dermal contact with contaminated soil, inhalation of vapors and airborne particulates, or incidental ingestion. There also is the potential for exposure via inhalation due to vapors from below the slab moving into the building (Section 4.1.3 discusses the results of indoor air samples collected during the RI).

4.3: Summary of Environmental Exposure Pathways

This section summarizes the types of environmental exposures and ecological risks which may be presented by the site. The Fish and Wildlife Impact Assessment included in the RI presents a more detailed evaluation of the potential impacts from the site to fish and wildlife resources. The contamination is currently localized to the southwest portion of the site. There were certain VOCs detected in surface water samples taken from catch basins at the north end of the site, but the samples were taken in a storm sewer prior to its discharge to the surface and the concentrations were only slightly above the surface water standards. In summary, this site is not currently a significant threat to any fish or wildlife resources.

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 NYSDEC and the DII Group, Inc. entered into a Consent Order on June 23, 1998. The Order obligates the responsible parties to implement the RI/FS at the site. Upon issuance of the Record of Decision the NYSDEC will approach the PRPs to implement the selected remedy under an Order on Consent.

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 on-site presence/ off-site migration of groundwater that does not attain NYSDEC Class GA Ambient Water Quality Criteria.
- Reduce, control, or eliminate, to the extent practical, contamination that may be present in the subsurface and may be acting as a source of releases to the groundwater.
- Eliminate, to the extent practicable, exceedances of applicable environmental quality standards related to releases of contaminants that could eventually impact surface water.

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 Former Binghamton Plastics site were identified, screened and evaluated in the February 2000 Feasibility Study Report.

The EPA has developed policy and procedures for presumptive remedies at sites where commonly encountered characteristics are present. Presumptive remedies are preferred technologies for common categories of sites, based on historical patterns of remedy selection and EPA's scientific and engineering evaluation of performance data on technology implementation. The objective of the presumptive remedies initiative is to use past experience to speed up the evaluation and selection of remedial options, to ensure consistency in remedy selection, and to reduce the time and cost required to clean up similar types of sites. The presumptive remedies directive eliminates the need for the initial step of identifying and screening a variety of alternatives during the Feasibility Study (FS).

The FS for this site used the following presumptive remedy guidance directives: *Presumptive Remedies: Policies and Procedures*; *Presumptive Remedies: Site Characterization and Technology Selection for CERCLA Sites with Volatile Organic Compounds in Soils*; and *Presumptive Response Strategy and Ex-situ Treatment Technologies for Contaminated Groundwater at CERCLA Sites.*

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. Although the soil investigation was somewhat inconclusive, the data indicate that there is an area of soil contamination under the southwest corner of the building. This could be acting as a source of contamination to shallow groundwater. Therefore, an alternative to address soil contamination was developed and is presented below. If pre-design studies show that the contamination under the building is not significant, no action will be needed for soil at the site.

ALTERNATIVES TO ADDRESS SOIL

The presumptive remedies strategy was used for the VOC-contaminated soil at this site. The alternatives originally identified included Excavation & Off-site Disposal and Thermal Desorption. Both alternatives are ex-situ technologies, which would involve the excavation of all contaminated soil. However, any potential soil contamination is present under the on-site building, which is an active commercial facility. In order to excavate the soil, a large part of this active facility would have to be torn down, causing a significant increase in both direct (construction costs) and indirect (loss of business/jobs) costs associated with implementing these alternatives.

For these reasons Excavation & Off-site Disposal and Thermal Desorption, of the soil under the building, were considered "un-implementable" and eliminated from further consideration.

No Action

Present Worth	$ 10,000
Capital Cost	$10,000
Annual O&M	$0
Time to Implement	N/A
Estimated Time to Completion	N/A

The No Action alternative is evaluated as a procedural requirement and as a basis for comparison. It would allow the site soils to remain in their current state. Legal restrictions regarding land usage/deed restrictions would be placed on the property.

Soil Vapor Extraction (Full Scale)

Present Worth	$569,600
Capital Cost	$215,000
Annual O&M	$100,000
Time to Implement	approx. 3-6 months
Estimated Time to Completion	4 years

Soil vapor extraction (SVE) is an in situ unsaturated (vadose) zone soil remediation technology in which a vacuum is applied to the soil to induce the controlled flow of air and remove volatile contaminants from the soil. The gas leaving the soil may be treated to recover or destroy the contaminants, depending on the concentrations that are present.

This alternative would involve the installation of vapor extraction wells under the building in the southwestern portion of the site (the RI data indicates that soils in the area of the former underground storage tank are not significantly contaminated). The SVE treatment unit would be installed, along with all of the associated piping and the air treatment unit, as necessary.

ALTERNATIVES TO ADDRESS GROUNDWATER

Other alternatives were initially considered (air sparging and in-well stripping), but were eliminated because they would not be effective; these alternatives would not lower the groundwater elevations, and thus would not prevent groundwater from entering utility conduits under Chambers Street.

No Further Action/ Monitoring

Present Worth	$121,447
Capital Cost	$ 10,000
Annual O&M	$7,250
Time to Implement	NA

This alternative recognizes the on-site groundwater pump and treat system discussed in Section 3.2. The alternative would leave the site in its present condition and would not provide any additional protection to human health or the environment.

Groundwater Extraction and Treatment (via Air Stripping)

Present Worth	$898,600
Capital Cost	$130,000
Annual O&M	$50,000
Time to Implement	approx. 3-6 months
Estimated Time to Completion	30 years

This alternative would involve the installation of groundwater pumping wells and/or extraction trench on site, installed into the shallow, perched aquifer located in the southwestern portion of the site. This alternative would address on-site contaminated groundwater and would lower groundwater elevations to below the elevation of the utilities present under Chambers Street, preventing the migration of contaminated groundwater along these utilities. Once removed, the groundwater would be treated on site and discharged to either surface water or the sanitary sewers, as necessary and appropriate. It is currently assumed that the groundwater would be treated using an air stripper, but the details of the treatment would be determined during the design of the remedial alternative that is chosen.

Upon completion of the groundwater remediation, if residual contamination remains, the following options may be considered: (1) placement of a cover over the open area near the southwest corner of the building, and/or (2) re-routing roof drains on the west side of the building so they don't discharge to the ground near the southwest corner of the building.

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 more 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.

- 6 NYCRR Part 375, Inactive Hazardous Waste Disposal Site Remedial Program
- NYSDEC Division of Hazardous Waste Remediation Technical and Administrative Guidance Memorandum (TAGM) 4046, Determination of Soil Cleanup Objectives and Cleanup Levels
- 6NYCRR Part 700-705, Water Quality Regulations for Surface Water and Groundwater
- NYSDEC Division of Water TOGS 1.1.1
- Spill Technology and Remediation Series (STARS) MEMO #1 - Petroleum-Contaminated Soil Guidance Policy
- Air Guide 1 - Guidelines for the Control of Toxic Ambient Air Contaminants

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

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.

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

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

6. Implementability. The technical and administrative feasibility of implementing each alternative are evaluated. Technical feasibility includes the difficulties associated with the construction and the ability to monitor the effectiveness of the remedy. For administrative feasibility, the availability of the necessary personnel and material is evaluated along with potential difficulties in obtaining specific operating approvals, access for construction, etc.

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 2.

Comparative Analysis for Soils

The groundwater contamination seems to originate near the location of the former underground storage tank). However, the results of the RI indicate that the remaining soil in the area of the former tank is not significantly contaminated. Based upon the qualitative soil gas survey performed under the building, soils under the building may be acting as a source of contamination to the groundwater. This will be confirmed during pre-design studies.

Overall Protection of Human Health and the Environment: The No Action alternative would not actively address any contamination that may still exist under the building. Soil Vapor Extraction (SVE) would actively address soil contamination under the building (if present) and would help to achieve the remedial objectives.

Compliance with SCGs: The No Action alternative would not meet SCGs for the limited amount of soil that has been confirmed to be present in exceedance of the SCGs. SVE would most likely be able to achieve SCGs for soil in a reasonable time frame.

Short-Term Impacts and Effectiveness: The No Action alternative would cause no increased short-term impacts since no intrusive work would take place. SVE would result in air emissions that would require treatment, posing a short-term risk should the

Table 2
Remedial Alternative Costs

Remedial Alternative	Capital Cost	Annual O&M	Total Present Worth
SOIL ALTERNATIVES			
No Action	$10,000[1]	$0	$10,000
Soil Vapor Extraction[2]	$215,000	$100,000	$569,600
GROUNDWATER ALTERNATIVES			
No Further Action/Groundwater Monitoring[3]	$10,000[1]	$11,000	$179,092
Groundwater Extraction/Treatment via Air Stripper[3]	$130,000	$50,000	$898,600

Notes:
(1) capital cost is for legal fees to implement deed restrictions
(2) Estimate assumes four years of operation
(3) 30 years of O&M is assumed for cost estimate

air emissions control device be breached. This risk would be reduced/eliminated through the proper use of air treatment devices.

Long-Term Effectiveness and Permanence: The No Action alternative would allow the continued migration of contaminants from the soil to the groundwater. SVE would be a permanent remedy that would address most, if not all of the contaminated soils.

Reduction of Toxicity, Mobility, and Volume: With the No Action alternative, reduction in the toxicity, mobility, or volume of waste would occur very slowly through natural attenuation. The SVE alternative would remove/treat most, if not all of the site related contamination, as discussed in the previous section. As a result, SVE would reduce contaminant mobility and volume.

Implementability: The No Action alternative would be the easiest to implement, since no construction would be necessary. SVE normally could be easily implemented, however, there would be some difficulty in using SVE to target soils under the on-site building. The on-site building is an active facility, making it difficult to have enough room inside to install vertical extraction vapor wells; the presence of the till unit (difficult to drill through) would make it relatively difficult to install horizontal vapor extraction wells under the building.

Cost: A summary of the costs is presented in Table 2. The costs are the present worth based on a 5% discount rate over the estimated life of the project.

<u>Comparative Analysis for Groundwater</u>

Overall Protection of Human Health and the Environment: The No Further Action/Groundwater Monitoring alternative would not be protective of human health or the environment. The Groundwater Extraction and Treatment alternative would actively address the on-site groundwater contamination and would help to achieve the remedial objectives by reducing the volume and the mobility of the contamination.

Compliance with SCGs: The No Further Action/ Groundwater Monitoring alternative would not achieve groundwater standards. The Groundwater Extraction and Treatment alternative would actively reduce contaminant concentrations in the groundwater. Although groundwater concentrations would be reduced, it would take quite some time, or may be impossible to achieve groundwater standards.

Short-Term Impacts and Effectiveness: The No Further Action/ Groundwater Monitoring alternative would result in the fewest short-term impacts, as the only action taken would be groundwater monitoring. The Groundwater Extraction and Treatment alternative could incorporate an air emission source and a water discharge, however air emissions and the water discharge would be treated to prevent worker and resident exposure to contaminants.

Long-Term Effectiveness and Permanence: The No Further Action/ Groundwater Monitoring alternative would not provide long-term effectiveness. The Groundwater Extraction and Treatment alternative would permanently remove contaminants from groundwater, with the contaminants captured by the treatment component of this alternative.

Reduction of Toxicity, Mobility, and Volume: The No Further Action/ Groundwater Monitoring alternative would not actively reduce the volume of contaminants already in the groundwater. The Groundwater Extraction and Treatment alternative would remove contaminants from the subsurface and treat them, thereby reducing the mobility and volume of contaminants in the groundwater.

Implementability: The No Further Action/ Groundwater Monitoring alternative would be the easiest to implement. The Groundwater Extraction and Treatment alternative would be straightforward to implement, as the systems are commercially available from several vendors. There would be no anticipated administrative or legal barriers to the implementation of any of the alternatives .

Cost: A summary of the costs are presented in Table 2. The costs are the present worth based on a 5% discount rate over the estimated length of the remedial action.

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 the following remedy for this site:

Groundwater Extraction and Treatment (extraction wells and/or extraction trench for the area of the on-site, perched groundwater plume; the current treatment proposal is via an air stripper, but the treatment option may be modified in design) as the preferred remedy for the contaminated groundwater. This alternative would address the on-site contaminated groundwater and would lower groundwater elevations to below the elevation of the utilities present under Chambers Street, thus preventing migration of contaminated groundwater via these utilities. The groundwater contamination seems to originate near the location of the former underground storage tank. However, the remaining soil in this area does not appear to be significantly contaminated.

A soil vapor extraction pilot study would be performed to determine if the contaminants that could be removed from under the building would warrant the implementation of a full scale SVE system underneath the southwest corner of the building. Also included would be long-term monitoring and the pursuit of deed restrictions if residual contamination remains after the remediation.

The basis for this selection is summarized below:

Groundwater

The alternatives evaluated to address the contamination in the groundwater are No Further Action/ Groundwater Monitoring and Groundwater Extraction & Treatment. The No Further Action/ Groundwater Monitoring alternative was rejected because it would do nothing to address the groundwater contamination and thus would not be protective of human health or the environment.

Some type of action to address the groundwater is necessary because: the perched groundwater contains high concentrations of contamination (up to 17,000 ppb of TCE); this contamination could potentially migrate off site to groundwater that is used as a source of potable water; with no action, the contamination would continue to migrate to utility conduits and eventually create a completed environmental or public health exposure pathway. The Groundwater Extraction & Treatment alternative would be the best course of action because it would effectively dewater the perched aquifer, removing the source of contamination and essentially eliminating contaminant mobility. It would also lower groundwater elevations to below the elevation of the utilities conduits present under Chambers Street, preventing migration via this route.

Soil

Based on the available information, the limited amount of soil contamination that has been identified near the former underground tank does not warrant active remediation of the soils. However, a qualitative soil gas survey and soil analyses under the southwest corner of the building did indicate the presence of VOCs. Although sub-slab soil sampling did not indicate the presence of large quantities of contaminated soil, an SVE pilot study would be performed to determine if there is a recoverable source of VOC contamination present under the building. If warranted by the pilot study, a full scale SVE system would be installed. If not, No Action would then be selected. Selecting No Action, without first performing the pilot study, could leave in place a volume of contaminated soil which could act as a continuing source of contamination to the groundwater.

If the pilot study indicates a recoverable source of contamination under the building, a full scale SVE system would be the best course of action because it would successfully address the VOC contamination under the building, would eliminate the potential source of contamination for indoor air, and it is the only viable, in-situ alternative due to the presence of the active commercial operation in the building.

The estimated present worth cost to implement the remedy is $898,600 ($1,468,200 is a conservative estimate if the SVE pilot study indicates that full scale SVE is warranted). The cost to construct the remedy is estimated to be $130,000 ($345,000 if the SVE pilot study indicates that full scale SVE is warranted) and the estimated overall present worth for the operation and maintenance of $768,600 (since different elements of the program would be operated for different durations, an average annual O&M cost has been replaced by the estimated present worth) [$1,123,200 if the SVE pilot study indicates that full scale SVE is warranted].

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 ;

- Installation of a groundwater extraction system to address the on-site perched contaminated groundwater. The on-site system would include groundwater extraction wells and/or extraction trench on the west side of the southern portion of the on-site building. This component of the remedy would include all associated piping and the water treatment system (current treatment proposal is via an air stripper, but the treatment option may be modified in design).

TABLE 3

MONTIORING WELL/EXTRACTION WELL CONSTRUCTION SUMMARY

DII/Binghamton Plastics
Binghamton, New York

Well Number	Date Drilled	Total Depth (ft)	Diameter (in)	Screened Interval
DMW1	04/91	15.0	4	5.0-15.0
DMW2 (removed)	05/91	34.5	2	24.5-34.5
DMW3	04/91	48.0	2	41.0-48.0
DMW4	05/91	15.0	2	5.0-15.0
MW5	10/97	20.0	2	10.0-20.0
MW6	10/97	40.0	2	30.0-40.0
MW7	10/97	40.0	2	30.0-40.0
MW8	1/98	15.0	2	5.0-15.0
MW9	1/98	15.0	2	5.0-15.0
MW10	1/98	15.0	2	5.0-15.0
MW11	1/98	20.0	2	10.0-20.0
MW12	1/98	45.0	2	45.0-35.0
MW13	2/98	15.0	2	5.0-15.0
MW14	11/98	15.0	2	5.0-15.0
MW15	11/98	15.0	2	5.0-15.0