ROD File

GENERAL INSTRUMENT SHERBURNE

Inactive Hazardous Waste Site

Sherburne, Chenango County, New York
Site No. 7-09-010

RECORD OF DECISION

December 1994

Prepared by:

New York State Department of Environmental Conservation
Division of Hazardous Waste Remediation

DECLARATION STATEMENT - RECORD OF DECISION

General Instrument Sherburne Site
Village of Sherburne, Chenango County, New York
Site No. 7-09-010

Statement of Purpose and Basis

The Record of Decision (ROD) presents the selected remedial action for the General Instrument Sherburne Inactive Hazardous Waste Site which was chosen in accordance with the New York State Environmental Conservation Law (ECL). The remedial program selected is not inconsistent with the National Oil and Hazardous Substances Pollution Contingency Plan of March 8, 1990 (40CFR300).

This decision is based upon the Administrative Record of the New York State Department of Environmental Conservation (NYSDEC) for the General Instrument Sherburne Inactive Hazardous Waste Site and upon public input to the Proposed Remedial Action Plan (PRAP) presented by the NYSDEC. A bibliography of the documents included as a part of the Administrative Record is included in Appendix B of the ROD.

Assessment of the Site

Actual or threatened release of hazardous waste constituents from this site will be addressed by remedial construction activities to be completed as specified in this ROD.

Description of the Selected Remedy

The selected remedial action provides for the protection of human health and the environment by reducing the volume of hazardous waste at the site, and by eliminating potential exposures to contaminants remaining at the site. The Remedial Plan is technically feasible and it complies with statutory requirements. Briefly, the selected remedial action plan includes the following:

- In-situ treatment of contaminated soils in the waste area by Soil Vapor Extraction (SVE).
- Low permeability cover over treatment area to enhance SVE and prevent short-circuiting.
- After initial extraction, low rate operation of SVE system over a longer term to promote bioremediation of additional compounds.

- Short-term pumping wells to remove floating product, with on-site treatment of groundwater.

- Remediation of fuel-contaminated soils in West Field, and mitigation of possible impacts of fuel product in West Field subsurface soils on reactive iron medium.

- Pilot test of innovative in-situ "Funnel and Gate" hydraulic controls to direct contaminated groundwater through an in-situ groundwater treatment zone.

- Pilot test to finalize evaluation of treatment media for in-situ groundwater treatment zone (permeable reaction wall). Reactive iron filings are expected to be applied if pilot testing proves this media is effective. Air sparging may also be used within the remediation zone to supplement the reactive iron if necessary.

- Full scale implementation of funnel and gate hydraulic system and permeable reaction wall, if supported by results of the pilot test.

- If the in-situ funnel and gate system and permeable reaction wall innovative technology does not prove effective, either in pilot scale or full scale, the off-site groundwater pumping and treatment option of Alternative 3 will be implemented.

- A long term monitoring program will be instituted to evaluate the rate and effectiveness of natural attenuation of the plume area that is not subject to active remediation. Institutional controls are recommended on- and off-site to prevent potential risks to human health until groundwater standards are met.

New York State Department of Health Acceptance

The New York State Department of Health concurs with the remedy selected for this site as being protective of human health.

Declaration

The selected remedy is protective of human health and the environment, complies with State and Federal requirements that are legally applicable or relevant and appropriate to the remedial action to the extent practicable, and is cost effective. This remedy utilizes permanent solutions and alternative treatment or resource recovery technologies to the maximum extent practicable, and satisfies the statutory preference for remedies that reduce toxicity, mobility, or volume as a principal element.

12/28/94
Date

Ann Hill DeBarbieri
Ann Hill DeBarbieri
Deputy Commissioner

RECORD OF DECISION

GENERAL INSTRUMENT SHERBURNE
Sherburne, Chenango County, New York
Site No. 709010
December 1994

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) has selected a remedy for the General Instrument inactive hazardous waste site located in the Village of Sherburne, Chenango County, New York. The remedy consists of in-situ soil vapor extraction to treat soils in the waste area, an in-situ permeable reaction wall to address groundwater contamination in the field west of the site, and free product recovery from the waste area using removal and treatment technologies. Groundwater that is already beyond the reaction wall will be allowed to attenuate naturally. A long-term, comprehensive monitoring program will be part of the remedial plan.

The in-situ permeable reaction wall is an innovative technology comprised of below ground "funnels and gates" which direct contaminated groundwater through a reactive medium for treatment in place. A pilot study for the in-situ permeable reaction wall will be undertaken to determine its applicability at this site for full scale groundwater treatment. If the reaction wall ultimately is not successful, a groundwater extraction and treatment system using conventional technology will be installed in the field west of the site.

SECTION 2: SITE LOCATION AND DESCRIPTION

The General Instrument Corporation Sherburne site, Site # 709010, is located on Kenyon Press Drive (formerly Taco Street), just west of Route 12 in the Village of Sherburne, Chenango County. This 5.5 acre site consists of several buildings, concrete slabs and foundations of former buildings, and open grassy areas. The majority of the property is surrounded by a chain link fence. It is bounded on the north, east, and south by residential and commercial properties, and on the west by a field used for agricultural purposes.

Potash Creek flows southward along the eastern edge of the property. This small drainageway follows the alignment of the abandoned and filled Chenango Canal. The section along the site has been enclosed in an underground culvert since the General Instrument facility closure in the mid-1980's. A railroad track follows the western property line.

The Chenango River flows from north to south approximately 2,000 feet west of the site. Maps showing the site location and site buildings are presented as Figures 1 and 2.

SECTION 3: SITE HISTORY

3.1: Operational/Disposal History

1947: Technical Appliance Corporation of America (TACO) began manufacturing antennas.

1962: Jerrold Electronic Corporation purchased the facility from TACO.

1968: General Instrument Corporation (GIC) purchased the facility. The plant was used for design and manufacture of aluminum antennas and other electronic equipment. Associated processes included: painting, degreasing, plating, and etching.

1983: GIC ceased manufacturing processes.

1989: GIC sold the property to a third party. The present owner was not involved in the disposal of the hazardous wastes found at the site. As part of the transfer of ownership, GIC assumed all responsibility for the inactive hazardous waste site characterization and remediation.

3.2: Remedial History

1983: Pursuant to the Resource Conservation and Recovery Act (RCRA), GIC implemented a closure work plan. The purpose of the closure plan was to decontaminate buildings and decommission manufacturing processes, as well as to identify the presence of any hazardous wastes in site soil and/or groundwater.

1985: Additional soil and groundwater data were obtained by GIC.

1987: Listed as a Class 2 site in the New York State Registry of Inactive Hazardous Waste Sites due to presence of hazardous waste below ground and in groundwater.

1989: GIC and NYSDEC signed a Consent Order that required GIC to conduct the Remedial Investigation/Feasibility Study (RI/FS) and implement Remedial Design and Remedial Action (RD/RA) for an appropriate site remedy.

SECTION 4: CURRENT STATUS

The NYSDEC, under the Environmental Conservation Law, required General Instrument to initiate a Remedial Investigation/ Feasibility Study (RI/FS) in September, 1989 to address the contamination at the site.

4.1: Summary of the Remedial Investigation

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

The RI was conducted in two phases. The first phase was conducted between September 1989 and March 1991 and the second phase during July 1992. A report entitled **Remedial Investigation Report for General Instrument Corporation, Sherburne, New York,** dated January, 1993 has been prepared which describes the field activities and findings of the RI in detail.

The RI activities consisted of the following:

1. Surficial and subsurface soil sampling to delineate soil contamination and soil characteristics.

2. Test pits: a) to investigate the old Chenango Canal and Potash Creek bed as possible source areas or as pathways for contaminant migration; b) to characterize soils beneath and in the vicinity of plating building and northern property boundary.

3. Monitoring Wells: To characterize groundwater conditions, nine new monitoring wells were installed to supplement the nine installed during the RCRA closure activities.

4. Groundwater sampling: a) on-site to confirm results from previous sampling event; b) off-site to identify extent of off-site contaminant migration.

5. Soil gas survey to characterize soils in south field and in the vicinity of the plating building.

6. Risk Assessment to characterize and quantify the potential risk to human health posed by site contamination.

A Habitat-Based Assessment was also completed as part of the RI to provide information on the ecology of the site and its surroundings.

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 General Instrument Sherburne site were based on NYSDEC Ambient Water Quality Standards and Guidance Values and Part V of 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 remedial investigation and comparison to the SCGs and potential public health and environmental exposures, certain areas and media of the site require remediation.

Site Geology and Hydrogeology

The site is underlain by a layer of fill, mostly a sandy gravel, up to 5 feet thick. A native brown-gray sandy silt varying from 1 to 4 feet thick lies beneath the fill. The base of the sandy silt grades into a coarse gravel that ranges up to ten feet thick. Below the gravel is a thick deposit of very fine grained clay-silt. The top of the clay-silt ranges from 13 feet to 26 feet below ground surface. Borings and monitoring wells installed as part of the RI did not extend through this unit. However, information from other wells in the Sherburne area indicates the clay-silt deposit is approximately 150' thick. A cross section of the site from east to west is shown as Figure 3.

The groundwater table was encountered from 3 feet to 6 feet below ground surface, in the coarse gravel unit. Groundwater flow is predominantly east to west across the site in this gravel unit. Permeability of this unit is high, due to the coarse-sized grains. The gradient, or slope of the water table, is very low.

The aquifer from which the Village of Sherburne obtains its water lies below the 150' thick clay-silt. This layer has very low permeability which, combined with its thickness, prevents site groundwater from impacting the underlying aquifer being used for the public water supply approximately one-half mile away.

Soil Contamination

Soil contamination at the GIC Sherburne site is found primarily at the north end of the site, beneath and adjacent to the plating building.

Volatile Organic Compounds (VOCs)

The predominant VOCs occurring in site soils are: trichloroethane, dichloroethene, trichloroethene, and xylene. VOCs were detected in four surface samples, in total amounts of 5, 125, 297, and 6,650 parts per billion (ppb), respectively.

VOC concentrations are generally greater at 5 feet to 7 feet below ground surface than at the surface. The highest subsurface soil total VOC concentration at this depth was 75,117 ppb, detected west of the plating building.

Semi-Volatile Organic Compounds (SVOCs)

SVOCs were also identified in site soils. Compounds detected were mostly polynuclear aromatic hydrocarbons commonly associated with combustion of fossil fuels.

Concentrations of total semi-volatiles in on-site soils ranged from 8 ppb to 27,000 ppb. Total semi-volatile concentrations in off-site soils ranged up to 90,000 ppb. It is believed the source of at least some of these compounds is coal ash disposal by adjacent residents when homes were heated with coal.

Other semi-volatile compounds found in the vicinity of the plating building may be related to releases associated with plating room activities.

Metals

Metals concentrations in on-site soils varied but were generally comparable to background and off-site levels. One soil sample taken from near the plating building showed elevated levels of cadmium, cyanide, zinc, silver, and copper. Sporadic elevated concentrations of these metals were also identified in other on-site soil samples.

Pesticides and PCBs

Low levels of pesticides were identified in seven soil samples, both on-site and off-site. Concentrations ranged from 7 ppb to 80 ppb. It is likely that their presence is due to residential and agricultural use in the vicinity.

Aroclor 1254, a polychlorinated biphenyl (PCB), was measured in three soil samples at levels of 210 ppb, 970 ppb, and 1,900 ppb. All three soil samples were obtained in the vicinity of MW-5. The soil material in that area is not native to the site and may have been transported there during previous construction activities.

Groundwater Contamination

Volatile Organic Compounds (VOCs)

Groundwater beneath the northern half of the site is contaminated with the same VOCs found in soils, primarily dichloroethene, trichloroethene, and trichloroethane. Total VOC concentrations on-site were greatest in MW-8, at the northwest corner of the main building, with over 8,000 parts per billion (ppb). Total VOCs in other on-site monitoring wells ranged from non-detect to 76 ppb.

A total of six monitoring wells have been installed off-site and downgradient (west) of the site. Analysis of samples from these wells indicate the presence of a dissolved organics plume in the field west of the site. Total VOC concentrations found off-site ranged from 50 ppb to 820 ppb.

Semi-Volatile Organic Compounds (SVOCs)

During RI activities, a free-phase petroleum product was discovered floating on the surface of the groundwater table in the vicinity of MW-8 and MW-18. It is believed to be the result of a reported release of a petroleum product near the loading dock of the main building. Semi-volatile compounds associated with this product were found dissolved in groundwater samples obtained from MW-8 and MW-18 at 7,186 ppb and 54 ppb, respectively. SVOCs were not seen above the detection limit in any other site wells.

Metals

With the exception of iron, manganese, magnesium and sodium, metals in groundwater were below groundwater standards in most of the site wells. However, chromium was identified above the groundwater standard of 50 ppb in five wells, with levels ranging from 56 ppb to 219 ppb. Lead values ranged from 28 ppb to 55 ppb in five wells, above the groundwater standard of 25 ppb. Cyanide exceeded the groundwater standard of 100 ppb in two wells, at 118 ppb and 206 ppb. No discernable source area for metals was identified.

Pesticides and PCBs

No pesticides or PCBs were detected in groundwater samples.

Figures 4 and 5 show locations of on-site and off-site monitoring wells. Figure 5 also shows the off-site contaminated groundwater plume.

4.2 Interim Removal Measures:

During sampling activities, a free-phase petroleum product was discovered below ground, floating on the groundwater surface in MW-8. It is believed to be the result of a reported release of a petroleum product near the loading dock of the main building.

In mid-1992, GIC voluntarily implemented a three month removal program to remove the free petroleum product from the groundwater surface at MW-8. Because significant quantities were not recovered, this removal program has been suspended until implementation of the remedial action when it can be integrated with a groundwater removal program.

4.3 Summary of Human Exposure Pathways:

As part of the RI Report, GIC submitted a Baseline Risk Assessment to characterize the risk to human health posed by the site. Potential exposure pathways evaluated in the Risk Assessment are shown on Table 1.

Although this table lists five potential pathways, the only potential exposure pathway for which an excess carcinogenic risk was identified is the ingestion of contaminated groundwater. Because there are no current groundwater users on site or downgradient of the site, there is no excess human carcinogenic risk at the present time. However, there is a concern for potential future exposures to contaminated groundwater.

4.4 Summary of Environmental Exposure Pathways:

As required by the Remedial Investigation Work Plan, GIC conducted a Habitat-Based Assessment for the site. Due to the industrial character of the site, there is little suitable habitat for wildlife within the property boundaries. Most of the property is enclosed with a chain-link fence which limits access for a majority of animal species. No surface waters exist on-site, however runoff from the site eventually enters Potash Creek through the storm sewer. Samples taken from the creek show no currently occurring adverse impacts. Previously, the creek had been dredged and enclosed in a culvert next to the site to correct past concerns. Because of the distance, the site is not considered to pose a current threat to the Chenango River or its inhabitants. However, with enough time the groundwater plume may extend as far as the River and threaten to impact the River environs.

SECTION 5: ENFORCEMENT STATUS

The NYSDEC and the General Instrument Corporation entered into a Consent Order on September 5, 1989. The Order obligates the responsible parties to implement a full remedial program.

Date	Index No.	Subject of Order
9/5/89	A701578810	RI/FS/RD/RA

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 standards, criteria, and guidelines (SCGs) and protecting human health and the environment.

At a minimum, through the proper application of scientific and engineering principles, 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.

The goals selected for this site are:

- *Reduce, control, or eliminate the contamination present within the soils on site*
- *Eliminate the potential for direct human or animal contact with the contaminated soils on site.*
- *Mitigate the impacts of contaminated groundwater to the environment.*
- *Prevent, to the extent possible, migration of contaminants in the soil to groundwater.*
- *Provide for attainment of SCGs for groundwater quality at the limits of the area of concern (AOC).*

SECTION 7: SUMMARY OF THE EVALUATION OF ALTERNATIVES

Potential remedial alternatives for the General Instrument Sherburne site were identified, screened and evaluated in a Feasibility Study. This evaluation is presented in the report entitled **Final Report, Feasibility Study for the General Instrument Corporation in Sherburne, New York, July, 1994.**

The FS presented sixteen individual alternatives for each specific area/medium of concern: contaminated soils associated with plating room activities, contaminated soils along the northern property boundary, and groundwater. These individual alternatives could be combined into over 100 comprehensive site alternatives. In preparation of this PRAP, the most feasible and effective individual alternatives were integrated into four comprehensive alternatives, each of which addresses all areas and media of concern. A summary of the detailed analysis follows.

7.1: Description of Alternatives

The Feasibility Study evaluated remedies for three specific areas/media of the facility: 1) soil in the vicinity of the plating building (waste area), 2) soil north of the wooden shed adjacent to the northern property boundary, and 3) off-site groundwater. To develop a plant-wide remedy that address both soils and groundwater, selected alternatives presented in the FS have been combined into four potential remedial alternatives.

No Action

The No Action alternative is evaluated as a procedural requirement and as a basis for comparison. It requires continued monitoring only, allowing the site to remain in an unremediated state.

The No Action alternative is proposed for the soils north of the wooden shed, adjacent to the northern site boundary. This is a very small area with low levels of contamination that have been decreasing with time. It is expected that through this natural attenuation, contaminant levels will continue to decrease. This soil does not present a threat to human health or the environment, and it has not contributed to groundwater contamination.

For contaminated groundwater and contaminated soils in the vicinity of the plating building (waste area), No Action is an unacceptable alternative, as human health and the environment would not be adequately protected.

Alternative 1: Excavation of Contaminated Soil "Hot Spots" and Capping, On-site Groundwater Pump and Treat, and Free Product Recovery

Total Present Worth:	$ 2,335,000
Capital Cost:	805,000
Present Worth O&M:	1,530,000
Time to Implement:	One year

Soils in the waste area:

- Excavate approximately 250 cubic yards of hot spot soils
- Transport soils off-site for treatment/disposal
- Backfill with clean soil
- Cover entire area

Groundwater:

- Short term pumping/extraction wells to remove floating product
- Line of long-term pumping wells along western property boundary to remediate groundwater in the source area.
- On-site treatment for contaminated groundwater
- Natural attenuation of the groundwater plume in the area beyond the facility boundary.

This alternative would consist of excavating the most heavily contaminated soil, or "hot spots," down to the depth of the water table (approximately six feet) in the vicinity of the plating building. Approximately 250 cubic yards of soil would be removed. Contaminated soil would be loaded into roll-offs and trucked off-site to a permitted hazardous waste facility for treatment/disposal. Clean fill would be brought in to replace the excavated soil. The entire area around the plating building, including that which is not affected by the removal, would be paved to isolate any remaining low level contaminated soils. Contaminated soils beneath the plating building would not be removed.

Pumping wells would be installed along the western property boundary to intercept contaminated groundwater and prevent further off-site migration. The number and placement of wells would be determined during remedial design. The water would be treated to appropriate standards on-site, and discharged. The treatment method and discharge point would be determined during remedial design.

Contaminated groundwater which has already migrated off-site would not be remediated. Through natural attenuation, the levels of contaminants would decrease. A long term monitoring program would be developed for periodic groundwater monitoring and evaluation of possible new receptors.

A free product recovery system would be included in this alternative. Groundwater would be pumped in the vicinity of MW-8/MW-18 to create a cone of depression on the surface of the groundwater table in this area. Once a depression is created, recovery of the free product would be possible. It is anticipated that two groundwater pumping wells would be required to produce the groundwater depression. Groundwater would be treated on site to appropriate standards and discharged. The free product would be recovered with a second pump and disposed of appropriately. When all of the free product has been recovered, pumping these wells would discontinue.

<u>Alternative 2</u>: <u>Excavation of Contaminated Soils with Off-Site Treatment, On-site Groundwater Pump and Treat, and Free Product Recovery</u>

Total Present Worth:	$ 2,780,000
Capital Cost:	1,250,000
Present Worth O&M:	1,530,000
Time to Implement:	One year

Soil in the waste area:

- Excavate approximately 1,000 cubic yards of soils
- Transport off-site for treatment/disposal
- Backfill with clean soil
- Cover entire area

Groundwater:

- Short term pumping/extraction wells to remove floating product

- Line of long-term pumping wells along the western property boundary to remediate groundwater in the source area.

- On-site treatment for contaminated groundwater

- Natural attenuation of the groundwater plume in the area beyond the facility boundary.

This alternative would involve excavation of all soil containing contaminants above cleanup goals. Approximately 1,000 cubic yards of soil adjacent to the plating building would be removed. The contaminated soil would be transported off-site to a permitted hazardous waste facility for treatment/disposal. Clean fill would be brought to the site to fill excavated areas. The method of treatment to destroy the contaminants would most likely be thermal destruction, although this would be determined during remedial design.

The groundwater extraction wells located along the western property line, groundwater treatment system, and free product recovery elements of Alternative 2 are identical to Alternative 1.

<u>Alternative 3:</u> <u>Soil Vapor Extraction, with Bioventing Soils, Off-site Groundwater Pump and Treat, and Free Product Recovery</u>

Total Present Worth:	$ 4,180,000
Capital Cost:	1,280,000
Present Worth O&M:	2,900,000
Time to Implement:	One year

Soil in the waste area:

- In-situ treatment of contaminated soils by Soil Vapor Extraction (SVE)

- Low permeablity cover over treatment area to enhance SVE

- After initial extraction, low rate operation of SVE system over a longer term to promote bioremediation of additional compounds

Groundwater:

- Short-term pumping wells to remove floating product

- Series of pumping wells located in the field west of the property to collect/immobilize contaminated plume

- On-site treatment for collected groundwater

This alternative would include in-situ soil vapor extraction to remove soil contaminants in the waste area. A series of horizontal extraction wells or their performance equivalent would be installed in trenches within the sand and gravel unit above the water table. A vacuum applied to the extraction wells would produce an air flow through the unsaturated soils, resulting in volatilization of contaminants into the air flow. The air stream would then be treated as necessary to remove contaminants prior to discharge to the atmosphere. The ground surface in the treatment area would be capped to prevent short-circuiting and minimize water infiltration.

Monitoring would be required to determine the area of influence of the SVE trenches. If the influence does not extend below the plating building, additional trenches or extraction wells would be required beneath the building to remove contaminants still remaining beneath the floor.

During initial operation, the SVE system would remove the VOC contaminants. When VOC soil cleanup levels have been reached or continued high rate operation is no longer effectively removing contaminants, the extraction rate would be decreased and the system would operate as a bioventing system to remove semi-volatile contaminants to soil cleanup levels.

The free product recovery system described in Alternative 1 would be included in this alternative.

A series of pumping wells would be installed in the field west of the property to collect contaminated groundwater that has moved off-site. Approximately twenty wells would be required, with the initial number to be determined during remedial design. This alternative would address a larger portion of the plume than Alternative 1 or 2. The extracted water would be treated to appropriate standards and discharged. The treatment method and discharge point would be determined during remedial design.

Contaminated groundwater which has already migrated beyond the line of pumping wells would not be remediated. Through natural attenuation, the levels of contaminants would decrease. Long term groundwater monitoring would be performed to evaluate the rate and effectiveness of natural attenuation. A periodic, long term groundwater users survey to identify possible new receptors in the plume area would also be implemented.

<u>Alternative 4:</u> <u>Soil Vapor Extraction, with Bioventing Soils, In-situ Treatment of Off-site Groundwater, and Free Product Recovery</u>

Total Present Worth:	$3,580,000
Capital Cost:	2,680,000
Present Worth O&M:	900,000
Time to Implement:	*One year*

Soil in the waste area:

- In-situ treatment of contaminated soils by Soil Vapor Extraction (SVE)
- Low permeability cover over treatment area to enhance SVE and prevent short-circuiting
- After initial extraction, low rate operation of SVE system over a longer term to promote bioremediation of additional compounds

Groundwater:

- Short-term pumping wells to remove floating product, with on-site treatment of groundwater
- In-situ groundwater treatment system utilizing "Funnel and Gate" hydraulic controls to direct contaminated groundwater through the reactive media treatment zone
- Pilot test to finalize evaluation of reactive iron media for groundwater treatment zone
- Application of iron media, possibly enhanced with air sparging, as the treatment zone technology
- Natural attenuation of groundwater in the plume area that is not subject to active remediation.

This alternative would include soil vapor extraction as described in Alternative 3 to remediate contaminated soils in the vicinity of the plating building.

The free product recovery described in Alternative 1 would be included in this alternative.

An in-situ groundwater treatment system would be installed in the field west of the site to intercept and treat contaminated groundwater. The system would be a series of "funnels" to direct groundwater through a series of "gates." The gates would contain a treatment zone filled with a permeable reactive material, iron filings, which would degrade the VOCs. A schematic drawing of one "gate" of the funnel and gate concept is shown in figure 6. A full scale reaction wall would consist of several funnels and gates installed side-by-side in the plume, perpendicular to the groundwater flow direction. Figure 7 shows the conceptual location of a full scale in-situ permeable reaction wall in the field west of the site. Because this technology is still in the development stage, a pilot study would be required prior to full scale implementation. Air sparging may be used within the "gates" to supplement the reactive media to improve contaminant reduction in groundwater, if deemed necessary.

Contaminated groundwater which has already migrated beyond the treatment zone would not be remediated. By cutting off the source contributing to the plume and through natural attenuation, the levels of contaminants would decrease. Long term groundwater monitoring would be performed to evaluate the rate and effectiveness of natural attenuation. A periodic, long term groundwater users survey to identify possible new receptors in the plume area would also be implemented.

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 (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. <u>Compliance with New York State Standards, Criteria, and Guidance (SCGs)</u>. Compliance with SCGs addresses whether or not a remedy will meet applicable environmental laws, regulations, standards, and guidance. Tables 2, 3, and 4 list SCGs for the site.

<u>No Action</u>

The No Action Alternative would not comply with SCGs. Soils and groundwater contaminated at levels above regulatory standards and guidance values would remain on site. Groundwater would continue to become contaminated as it passes through the waste area, and contaminated groundwater would continue to migrate beyond the property boundary west of the site.

<u>Alternative 1:</u>

Excavation of hot spots in the vicinity of the plating building above the groundwater table would remove grossly contaminated soils. It is likely that some contaminated soil above SCGs would remain in place. Contaminated soil below the groundwater table would remain in place.

The free-product recovery would contribute to improving groundwater quality and decrease the length of time required to meet SCGs.

The groundwater pump and treat system would remove and remediate on-site contaminated groundwater to SCGs. Further off-site migration of contaminated groundwater would be eliminated. Contaminated groundwater already downgradient of the site and not within the influence of the pumping wells would not meet groundwater standards. However, it is expected that this portion of the plume would naturally attenuate to eventually meet SCGs. Regular monitoring would be performed to evaluate the progress of natural attenuation in meeting SCGs. Institutional controls would be recommended to prevent future potential human health risks until groundwater meets SCGs.

<u>Alternative 2:</u>

Excavation of all soil above the groundwater table contaminated at levels above cleanup goals, as determined by NYSDEC Technical and Administrative Guidance Memorandum (TAGM) 4046, would partially comply with SCGs. Contaminated soil below the groundwater table would remain in place.

The free-product recovery would contribute to improving groundwater quality and decrease the length of time required to meet SCGs.

Groundwater pump and treat would remove and remediate contaminated groundwater to meet SCGs. Further off-site migration of contaminated groundwater would be eliminated. Contaminated groundwater already downgradient of the site and not within the influence of the pumping wells would not meet groundwater standards. However, it is expected that this portion of the plume would naturally attenuate to eventually meet SCGs. Regular monitoring would be performed to evaluate the progress of natural attenuation in meeting SCGs. As with Alternative 1, institutional controls would be recommended to prevent human health risks until groundwater meets SCGs.

Alternative 3:

In-situ soil vapor extraction/bioventing would remediate soils above the groundwater table in the vicinity of the plating building to cleanup goals as determined by TAGM 4046. Contaminated soil below the groundwater table would remain in place.

The free-product recovery would contribute to improving groundwater quality and decrease the length of time required to meet SCGs. This effort would also enhance the SVE by locally increasing the unsaturated zone and the volume of soil expected to meet SCGs.

Contaminated groundwater migrating off-site would be captured by a series of pumping wells located in the west field. Long-term groundwater pumping would be required until SCGs are met. As with Alternative 1, institutional controls would be recommended to prevent human health risks until groundwater meets SCGs.

Alternative 4:

In-situ soil vapor extraction/bioventing would remediate soils above the groundwater table in the vicinity of the plating building to cleanup goals as determined by TAGM 4046. Contaminated soil below the groundwater table would remain in place.

The free-product recovery would contribute to improving groundwater quality and decrease the length of time required to meet SCGs. This effort would also enhance the SVE by locally increasing the unsaturated zone and the volume of soil expected to meet SCGs.

Contaminated groundwater migrating off-site would be expected to meet SCGs as it passes through the permeable reaction wall located in the field west of the site. Contaminated groundwater already located downgradient of the permeable reaction wall would not be treated and hence would not meet SCGs until natural attenuation eventually reduces contaminant levels to these standards. Regular monitoring would be performed to evaluate the progress of natural attenuation in meeting SCGs. As with Alternative 1, institutional controls would be recommended to prevent human health risks until groundwater meets SCGs.

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.

No Action

Contaminated soil beneath and in the vicinity of the plating building would not be treated or removed. Contaminants would continue to leach into the groundwater, continuing to pose a potential threat to human health.

Contaminated groundwater on site and migrating to the field west of the site would continue to pose a potential threat to human health if ingested, or if organic vapors entering structures built into the plume were inhaled. Although there are no current receptors, future exposures are possible if there is future property development.

Alternative 1:

Excavation of contaminated soil "hot spots" above the groundwater table in the vicinity of the plating building would remove some of the residual soils above the water table and the source of groundwater contamination. Contaminated soil below the groundwater table left in place would continue to contaminate groundwater. The groundwater pumping wells installed along the western property boundary would intercept contaminated groundwater and prevent future off-site migration. Institutional controls would be recommended on-site and off-site to prevent potential human health risks until groundwater meets SCGs. Once natural attenuation has reduced contaminant levels in the off-site plume to groundwater standards, the potential future threat to human health would be eliminated.

The free product recovery would also contribute to groundwater remediation and would help eliminate potential future human health threats.

Alternative 2:

Excavation of all contaminated soil above the groundwater table in the vicinity of the plating building would remove a large portion of the source of groundwater contamination. Contaminated soil left in place below the groundwater table would continue to contaminate groundwater.

The groundwater pumping wells installed along the western property boundary would intercept contaminated groundwater and prevent future off-site migration. Institutional controls would be recommended on- and off-site to prevent potential human health risks until groundwater meets SCGs. Once natural attenuation has reduced contaminant levels in the off-site plume to groundwater standards, the potential future threat to human health would be eliminated.

The free product recovery would also contribute to groundwater remediation and would help eliminate potential future human health threats.

Alternative 3:

Soil vapor extraction in the vicinity of the plating building would remove soil contamination above the water table and a large portion of the source of groundwater contamination. The SVE would also address some soils now located beneath the water table in the area where the free product recovery would occur. However, some contaminated soil would remain below the groundwater table and would continue to leach contaminants into the groundwater.

The groundwater pumping system installed in the field west of the site would extract groundwater from the contaminated plume area. The groundwater would be treated on-site to groundwater standards and discharged appropriately. Pumping and treating off-site contaminated groundwater would eliminate the potential future threat to human health caused by continued off-site migration of contaminated groundwater. Institutional controls would be recommended on- and off-site to prevent potential human health risks until groundwater meets SCGs. Once natural attenuation has reduced contaminant levels in the off-site plume to groundwater standards, the potential future threat to human health would be eliminated.

The free product recovery would also contribute to groundwater remediation and would help eliminate potential future human health threats.

Alternative 4:

Soil vapor extraction in the vicinity of the plating building would remove soil contamination above the water table and a large portion of the source of groundwater contamination. The SVE would also address some soils now located beneath the water table in the area where free product recovery would occur. Some contaminated soil would remain below the groundwater table and would continue to leach contaminants into the groundwater.

The in-situ groundwater treatment system installed in the field west of the site would remediate groundwater as it flows off-site and through the reaction wall, eliminating the potential future threat to human health caused by continued off-site migration of contaminated groundwater. Institutional controls would be recommended on- and off-site to prevent potential human health risks until groundwater meets SCGs. Once natural attenuation has reduced contaminant levels in the off-site plume to groundwater standards, the potential future threat to human health would be eliminated.

The free product recovery would also contribute to groundwater remediation and would help eliminate potential future human health threats.

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 implementation are evaluated. The length of time needed to achieve the remedial objectives is also estimated and compared with the other alternatives.

No Action

Since no additional action would be taken, there are no construction activities which would impose any added short term risk to the community, the workers, or the environment.

Alternative 1:

Potential short term risks to the community, the workers, and the environment during the excavation and handling of hot spots would need to be addressed. Risks would include dust generation and volatile emissions during excavation. Mitigative measures would be required to minimize impacts. Implementation of this alternative - hot spot excavation, replacement with clean fill, paving, pumping well installations, construction of treatment process - would take one year.

Alternative 2:

Potential short term risks to the community, the workers, and the environment during the soil excavation and handling would need to be addressed. Risks would include dust generation and volatile emissions during excavation. Mitigative measures would be required to minimize impacts. Implementation of this alternative - excavation, replacement with clean fill, pumping well installations, construction of treatment process - would take one year.

Alternative 3:

Temporary risks associated with installation of the SVE trenches due to dust generation and vapor releases could be easily controlled. There would be no significant short term risks to the community, the workers, or the environment. Installation of this alternative would take one year. Risks associated with installation of the off-site pumping wells would be minimal.

Alternative 4:

Temporary risks associated with installation of the SVE trenches due to dust generation and vapor releases could be easily controlled. There would be no significant short term risks to the community, the workers, or the environment. Installation of this alternative would take one year. Risks associated with installation of the in-site permeable reaction wall would be minimal.

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.

No Action

Because no remedial activities would take place, there would be no long-term effectiveness or permanence associated with the no action alternative. There would continue to be a future potential human health risk associated with off-site contaminated groundwater.

Alternative 1:

Excavation of "hot spots" would permanently remove some of the contaminated soil above the groundwater table. Although the Risk Assessment identified no excessive risk associated with direct contact with soil, contact with any remaining low-level contaminated soil would be prevented by capping unexcavated areas. Regular maintenance of the cap would be required.

Contaminated soil below the water table would be left in place and would continue to leach contaminants into groundwater. However, pumping wells located along the western property boundary would be effective over the long-term to prevent contaminated groundwater from leaving the site. Contaminated groundwater which has already left the site would not be addressed. Through natural attenuation, off-site groundwater contaminant levels would be permanently decreased.

Alternative 2:

Excavation of contaminated soil above the water table is a permanent remedy that would decrease the volume of contaminants which could contribute to groundwater contamination.

All contaminated soil below the water table would be left in place and would continue to leach contaminants into groundwater. However, pumping wells located along the western property boundary would be effective over the long-term to prevent contaminated groundwater from leaving the site. Contaminated groundwater which has already left the site would not be addressed. Through natural attenuation, off-site groundwater contaminant levels would be permanently decreased.

Alternative 3:

SVE with bioventing would be an in-situ, permanent treatment of hazardous wastes above, and to some extent below, the water table. Some of the contaminated soil below the water table would continue to leach contaminants into the groundwater. However, pumping wells located in the field west of the site would be effective over the long-term to collect and treat the contaminated plume area as well as contaminated groundwater leaving the site.

Alternative 4:

SVE with bioventing would be an in-situ, permanent treatment of hazardous wastes above, and to some extent below, the water table. Some of the contaminated soil below the water table would continue to leach contaminants into the groundwater. Installation of an in-situ permeable reaction wall in the field west of the site would likely be effective in remediating contaminated groundwater that migrates from the site. However, this is an innovative technology which has not been implemented and as such, its long-term effectiveness has not been proven.

Contaminated groundwater which has already migrated beyond the reaction wall would not be addressed. Through natural attenuation, off-site groundwater contaminant levels would slowly and permanently decrease.

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.

No Action

The No Action Alternative does not permanently or significantly reduce the toxicity or mobility of the hazardous waste. Through natural attenuation and degradation, the volume of contaminants would slowly decrease.

Alternative 1:

Excavation of "hot spots" and the free product recovery would permanently decrease the volume of hazardous waste at the site. Off-site treatment of contaminated soils would permanently decrease the volume and toxicity of the soil. Groundwater extraction wells located along the western property boundary and groundwater treatment would permanently decrease the volume and toxicity of contaminated groundwater. The free product recovery and the associated groundwater extraction and treatment would decrease the volume and toxicity of contaminated groundwater.

Alternative 2:

Excavation of contaminated soils and the free product recovery would permanently decrease the volume of hazardous waste at the site. This alternative would produce more soil removal and would result in an increased reduction in volume and mobility of hazardous waste remaining at site. Off-site treatment of contaminated soils would permanently decrease the volume and toxicity of the soil. Groundwater extraction wells located along the western property boundary and groundwater treatment would permanently decrease the volume and toxicity of contaminated groundwater. The free product recovery and the associated groundwater extraction and treatment would also decrease the volume and toxicity of contaminated groundwater.

Alternative 3:

Soil vapor extraction and free product recovery would permanently reduce the volume and mobility of hazardous waste at the site. On-site treatment of the extracted contaminants would permanently reduce the toxicity of the contaminants. Off-site groundwater extraction wells in the field west of the property boundary and groundwater treatment would permanently decrease the volume and toxicity of contaminated groundwater. The free product recovery and the associated groundwater extraction and treatment would also decrease the volume and toxicity of contaminated groundwater.

Alternative 4:

Soil vapor extraction and free product recovery would permanently decrease the volume and mobility of hazardous waste. On-site treatment of the extracted contaminants would permanently reduce the toxicity of the contaminants. The permeable reaction wall would degrade groundwater contaminants as groundwater passes through, permanently reducing the volume and toxicity of hazardous waste. The free product recovery and associated groundwater extraction and treatment would decrease the volume and toxicity of contaminated groundwater.

6. Implementability. The technical and administrative feasibility of implementing each alternative is evaluated. Technically, this includes the difficulties associated with 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, permits, access for construction, etc..

No Action

This alternative would be easy to implement because it requires no further action.

Alternative 1:

Excavation of "hot spots" would not be difficult. It would require locating an appropriate treatment/disposal facility, and coordination with a licensed excavator and a hauler, and procurement of clean fill. Implementation of the free product recovery, groundwater pumping and treatment, and construction of treatment facility would not be difficult.

Alternative 2:

Excavation of all contaminated soil above the water table would entail the same coordination as Alternative 1. As with Alternative 1, implementation of the free product recovery, groundwater pumping and treatment, and construction of the treatment facility would not be difficult.

Alternative 3:

Design and construction of an SVE system is reliable and not technically difficult. Services and materials required for implementation would be readily available. Some coordination would be required. As with Alternatives 1 and 2, implementation of the free product recovery, groundwater pumping and treatment, and construction of the treatment facility would not be difficult. However, it would be more difficult to provide piping from and maintain the pumping wells located in the field west of the site.

Alternative 4:

Design and construction of an SVE system is reliable and not technically difficult. The in-situ groundwater treatment system is an innovative technology that has not been implemented full scale. However, no difficulties would be anticipated constructing the funnel and gate system and the associated permeable reaction wall. As stated in the description of the alternative, a pilot study would be required to determine its applicability to full scale implementation. As with the other alternatives, implementation of the free product recovery would not be difficult.

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 5.

This final criterion is considered a modifying criterion and is taken into account after evaluating those above. It is focused upon 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 were evaluated. A "Responsiveness Summary" that describes public comments received and the Department responses is included as Appendix A.

SECTION 8: SUMMARY OF THE SELECTED ALTERNATIVE

Based upon the results of the RI/FS, and the evaluation presented in Section 7, the NYSDEC selected Alternative 4 as the remedy for this site and was in the process of making this selection a final agency action. Just prior to finalizing this action, additional fuel product was observed in the west field area during predesign subsurface sampling for the pilot test of the in-situ groundwater treatment system. The source of this product is believed to be the reported fuel release at the north end of the former General Instrument Main Building. Previous investigation sampling did not detect the presence of this subsurface plume in the West Field area, adjacent to and along the south side of the known chlorinated solvent groundwater plume. The presence of this fuel product prompted the NYSDEC to revisit its evaluation of the effectiveness of Alternative 4. It is possible that if the iron medium within the reactive gate should become coated with the fuel product, the iron would not effectively remediate the chlorinated solvent contaminated groundwater plume.

General Instrument has agreed to take appropriate measures to remediate soils contaminated with the fuel product, and to prevent the fuel product from adversely affecting the iron medium. A field effort will be undertaken to complete identification of the extent of the fuel product. Based on information currently available, General Instrument is considering a fuel recovery effort, to be applied if a recoverable volume of fuel product is identified as well as possibly removing fuel contaminated soil in the vicinity of the funnel and gate system. Once final field data are available, a determination will be made for the appropriate soil remedial effort to be implemented.

After evaluating the possible effects of the fuel product, and General Instrument's approach to remediating this problem, the NYSDEC has determined that the selected remedy, Alternative 4, will be implementable, and remains the selected Alternative. Additional measures to remediate contaminated soils and to prevent fuel product contamination of the iron medium will be implemented as appropriate. It has been determined that no substantive changes to the evaluations for the remedy against the selection criteria were necessary.

The remedy selection is based upon the following:

Alternative 1 would not adequately comply with SCGs for soils or off-site groundwater.

Alternatives 1 and 2 would present unnecessary potential short term risks to the community during soil removal activities.

Alternatives 3 and 4 both would effectively remediate soils to SCGs with no significant short term impacts.

Alternatives 3 and 4 also address the off-site groundwater plume. Alternative 3 would be expected to effectively remediate groundwater to SCGs over the long term. While the in-situ permeable reaction wall of Alternative 4 is a unproven technology, laboratory studies and FS evaluations indicate that with natural attenuation it should be effective in remediating groundwater to SCGs at a lower cost than Alternative 3.

The site location, hydrogeology, and type and level of contaminants make it a good candidate for a pilot-scale study of the in-situ groundwater treatment technology. If the pilot scale implementation is effective, additional funnels and gates would be installed to increase the plume treatment area. If, however, this innovative approach ultimately does not prove effective, the off-site pump and treat option of Alternative 3 would be implemented. Any decision to abandon the in-situ permeable reaction wall alternative would be made by NYSDEC after review of data from the pilot study or full-scale implementation.

The estimated present worth cost to implement the remedy is $ 3,580,000. The cost to construct the remedy is estimated to be $ 2,680,000 and the estimated present worth operation and maintenance costs for 30 years is $ 900,000.

The elements of the selected remedy are as follows:

1. 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. Uncertainties identified during the RI/FS will be resolved.

2. *In-situ treatment* of contaminated soils in the waste area by Soil Vapor Extraction (SVE). Initially, the SVE system will be operated at a high rate until VOC soil cleanup objectives are met or until continued high rate operation is no longer effectively removing contaminants. Soil cleanup goals for individual compounds will be determined using NYSDEC TAGM 4046.

3. Low permeability cover over treatment area to enhance SVE and prevent short-circuiting.

4. After initial extraction, low rate operation of SVE system over a longer term to promote bioremediation of additional compounds.

5. Short-term pumping wells to remove floating product, with on-site treatment of groundwater.

6. Remediation of fuel-contaminated soils in West Field as appropriate, and mitigation of possible impacts of fuel product on reactive iron medium.

7. Pilot test of innovative in-situ "Funnel and Gate" hydraulic controls to direct contaminated groundwater through an in-situ groundwater treatment zone.

8. Pilot test to finalize evaluation of treatment media for in-situ groundwater treatment (permeable reaction wall). Reactive iron filings are expected to be applied if pilot testing proves this media is effective. Air sparging may also be used within the remediation zone to supplement the reactive iron if appropriate.

9. Full scale implementation of funnel and gate hydraulic system and permeable reaction wall, if supported by results of the pilot test.

10. If the in-situ funnel and gate system and permeable reaction wall innovative technology does not prove effective, either in pilot scale or full scale, the off-site groundwater pumping and treatment option of Alternative 3 will be implemented. Figure 9 shows approximate locations of pumping wells to be installed if the innovative technology system is not successful.

11. A long term monitoring program will be instituted to evaluate the rate and effectiveness of natural attenuation of the plume area that is not subject to active remediation. There would also be a periodic, long term groundwater survey to identify possible new groundwater users in the field area west of the site. Institutional controls are be recommended on- and off-site to prevent potential risks to human health until groundwater standards are met.

SECTION 9: HIGHLIGHTS OF COMMUNITY PARTICIPATION

Document repositories were established at the following location for public review of project related material:

Village of Sherburne Clerk's Office
15 West State Street
Sherburne, New York 13460
(607) 674-2300
Ms. Kathy Ellis, Village Clerk

NYSDEC Central Office
50 Wolf Road, Room 222
Albany, New York 12233-7010
(518) 457-5636
Ms. Karen Maiurano, Project Manager

NYSDEC Region 7 Office
615 Erie Boulevard West
Syracuse, New York 13204
(315) 426-7400
Mr. Neil Driscoll, Citizen Participation Specialist

The following citizen participation activities were conducted:

- Citizen Participation Plan prepared April 9, 1992
- June 1992: Fact sheet distributed describing results of first phase RI and additional field activities to take place in summer 1992
- July 13, 1994: Fact sheet distributed describing results of RI
- July 26, 1994: Public meeting to present RI results
- September 7, 1994: PRAP issued
- September 12, 1994 to October 14, 1994: Public comment period
- September 22, 1994: Public meeting to present PRAP

APPENDIX A

GENERAL INSTRUMENT SHERBURNE SITE
RESPONSIVENESS SUMMARY

Questions raised during the public meeting of September 22, 1994

Q: Why is the groundwater plume beneath the field west of the site going to be remediated? No one is using the water, and the owner has been told by NYS that the corn grown there does not absorb the compounds and is safe to eat.

The NYSDEC has the responsibility to protect the quality of our natural resources. There are hazardous constituents in the groundwater that significantly exceed groundwater standards and that are directly attributable to the former GIC facility. The contaminated groundwater is a high yield aquifer system that is also a valued natural resource. In cases where the release of hazardous waste has contaminated groundwater, ideally remediation would restore groundwater quality to pre-release conditions. Because this is seldom possible, the goal of the DEC becomes remediation of the groundwater when feasible to meet groundwater standards that have been established to be protective of human health and the environment.

The groundwater plume that has migrated off of the General Instrument site to the field west of the site contains compounds that exceed groundwater standards. Feed corn currently grown in the field is safe for human or animal consumption. It is also accurate that no one is currently using groundwater from within the contaminated plume. However, it is possible that someone could build a residence and install a well for private use in that area in the future. The Risk Assessment performed for the site indicated that there could be health concerns if this were to happen. Neither the NYSDEC nor the NYSDOH can prohibit installation of private wells, and therefore cannot guarantee against future exposures. Furthermore, without active remediation, there are no assurances that the existing plume will not ultimately impact the Chenango River.

The location and characteristics of the contaminated plume due to the GI site are such that a successful remediation can reasonably be achieved, but not quickly. The contaminated groundwater is in a sand and gravel aquifer approximately 20 feet thick. This aquifer lies on top of a thick layer of clay which acts as a "floor" to the plume. The affected area is level, easily accessible, and without obstructions such as buildings, foundations, overhead or buried utilities that would make implementation difficult. The concentrations of the compounds of concern are well within levels that could be remediated to groundwater standards. However, the extent of the plume and the high yield nature of the aquifer makes it difficult, and exorbitantly expensive, to pursue a quick return to groundwater standards. Because of this, the selected remedy is focussed on separating the West Field plume area, where lower contaminant levels are found, from the high levels of the waste source area. Once cut-off from the source area, the West Field area would be expected to attenuate to groundwater standards much more quickly than under a "no action" groundwater approach. The in-situ groundwater treatment will also accelerate natural attenuation of West Field by allowing clean, treated water to flush into the West Field.

Q: How long will it take to know if the in-situ permeable reaction wall will work? How big will the sides (funnels) of the wall be? What will the material in the gate be? Will the iron be clean and not contribute to groundwater contamination? How long will the wall be in the ground?

The in-situ permeable reaction wall pilot study is scheduled to begin this fall, and will take approximately six months to complete. At the end of that time, we should know if the technology can be implemented full-scale in Sherburne.

The pilot study will consist of installing one section of the funnel and gate system: two impermeable side walls (the funnel) on either side of a permeable section filled with reactive material (the gate). The funnel and gate will be emplaced in the plume, perpendicular to the direction of groundwater flow. This first funnel and gate will be located in the vicinity of monitoring well 19, in the field west of the site. Each side wall section of the funnel will be constructed of sheet pile about 15 feet wide, and will guide groundwater to flow through the center gate. The gate is the permeable portion of the wall, and will be about 10 feet wide. Overall, the first funnel and gate of the pilot study will be about 40 feet wide.

The gate portion of the wall will be about seven to ten feet from front to back: this is the distance that the contaminated groundwater will flow through the reactive material. The material inside the gate will be sand-sized particles of iron which have been washed so they will not contribute to groundwater contamination. Gravel will be placed at the entrance and exit openings of the gate to assist groundwater flow.

If the pilot study proves successful, additional funnels and gates will be installed across the width of the plume for full-scale remediation.

Results from the pilot study should indicate how long the wall will need to operate. It is possible that after five to eight years the material within the gate will need to be replaced, due to clogging of the pore spaces within the reactive iron. It is anticipated that the reaction wall will need to operate ten to twenty years to remediate groundwater to groundwater standards.

If the study shows that the permeable reaction wall will not successfully remediate the contaminated plume, a series of groundwater extraction wells will be installed in the same general location as the wall. In that event, contaminated groundwater would be pumped out of the ground and over to the former GIC facility for treatment prior to discharge.

Q: The plating building is believed to be the source of the solvents that contaminate the soil, yet the diagram showing the soil vapor extraction lines doesn't show anything near the building.

The influence of the soil vapor extraction (SVE) trenches extends beyond the trenches themselves. As part of the Remedial Action, General Instrument will be required to show that the influence of the trenches extends beneath the plating building. If there is no evidence that SVE is taking place beneath the building, GI will be required to install additional SVE trenches or wells beneath the building.

A comment was made by telephone to the NYSDEC project manager:

Q: Would the NYSDEC consider requiring GIC to purchase property development rights from the owner of the field west of the site in lieu of groundwater remediation? This would prevent future property development and therefore, future human exposure to contaminated groundwater. Through natural attenuation without active remediation, the groundwater will eventually reach groundwater standards anyway, at a significant cost savings over the cost of remediation.

The NYSDEC inactive hazardous waste program, under authority of the federal and state Superfund programs, is responsible for remediation of contaminated natural resources. GIC signed a Consent Order with the NYSDEC on August 1, 1989 in which GIC agreed to implement a complete remedial investigation/feasibility study, remedial design, and remedial action for the Sherburne site.

The groundwater plume which has moved beneath this field has contaminated a natural resource. The remedial program selected by the NYSDEC and supported by the NYSDOH is expected to remediate this contaminated groundwater to acceptable standards within a reasonable time period. If this plume were not to be remediated, the contamination would remain at levels unacceptable to the NYSDEC and NYSDOH for decades.

Two letters were received during the public comment period and are included in this appendix. One letter, dated October 6, 1994, supports the selected remedy; responses to the other letter, dated October 14, 1994, are as follows:

1. The selection within the ROD of both a remedy and a contingent remedy should the preferred remedy fail does have precedent. This approach is especially appropriate where the preferred remedy is an innovative (i.e., unproven) one. Although the preferred technology for the GIC Sherburne site appears promising, it is necessary to select a fall-back alternative to assure that appropriate groundwater remediation will take place.

In response to GIC's claim that the plume would need re-evaluation if the innovative system fails, it is not expected that the plume would be significantly different at the time of such failure than it is at present. If the innovative system does not work, this should be known soon since the pilot study is for this purpose. Moreover, the design of the alternate groundwater extraction system would need to be based on plume conditions at the time of design. This would necessitate pre-design field sampling which would identify any changes from the present plume characteristics. In the unlikely event that failure of the innovative system somehow improves or alters aquifer conditions enough from current conditions to warrant reevaluation of the more conventional groundwater alternative, the State would be willing to review the situation and possibly revise the ROD if appropriate at that time.

2. The NYSDEC has met its citizen participation responsibilities by structuring the PRAP and ROD to include description of the fall-back remedy. When the PRAP was published, fact sheets summarizing the PRAP were prepared and distributed to the mailing list of interested parties. Additionally, it was made clear at the public meeting held on September 22, 1994, that a fall-back technology was part of the NYSDEC preferred remedy, and the fall-back technology was described.

The "community opposition" which is referred to in this letter consisted of one property owner. He expressed concern over the cost of the remediation, and the potential loss of active farmland if the alternate groundwater extraction system becomes necessary. Given the probable restrictions on farm activities due to the in-situ permeable reaction wall system, it is unlikely that a groundwater extraction system installed in the same area would be any more restrictive to those activities.

The NYSDEC is well aware that GIC is of the opinion that this contaminated groundwater "does not merit remediation." In fact, the Remedial Investigation was delayed for about a year while GIC argued with the NYSDEC against investigating and evaluating remediation of the off-site plume. The fact remains that hazardous constituents in this groundwater are directly attributed to the former GIC facility, that the contaminants significantly exceed NYSDEC groundwater standards, and that the aquifer is a high yield system and a valued natural resource. The groundwater does "merit remediation."

3. GIC's current interpretation of the Order on Consent #A701578810 regarding its obligation to implement the ROD is inaccurate. The aforesaid Order on Consent obligates GIC to implement a complete Remedial Design and Remedial Action as selected by the NYSDEC in the ROD. If GIC does not agree, it has the right to pursue this matter in court.

4. 6 NYCRR Part 375-1.10 (c) clearly states that remedy selection is based, in part, on "Standards, criteria, and ***guidance*** (emphasis added)." The NYSDEC TAGM 4046, Soil Cleanup Goals, is one of many guidance documents that are applied with best engineering judgement on a case-specific basis. This TAGM clearly states that these numbers are to be used as goals upon which remediation should be based, and recognizes that in certain cases they may not be achieved.

5. The NYSDEC disagrees that not recording the public meeting impairs the public comment process. All comments received during the public meeting were responded to at that time, and these comments along with responses have accurately been incorporated into this responsiveness summary. The meeting was sparsely attended and in response, both the State and GIC's consultants elected to reduce formality in favor of extended, more informal discourse with those who made the effort to attend. Both the State and GIC's consultants were prepared to record the meeting but did not as part of this reorientation of the meeting. GIC will recall that very open and extended dialog resulted from this effort. In response to GIC's offer to preview the Responsiveness Summary, it is not necessary for GIC to preview responses. GIC will be provided a copy of the completed Responsiveness Summary.

CHENANGO COUNTY ENVIRONMENTAL MANAGEMENT COUNCIL
5 Court Street, Norwich, N.Y. 13815 (607) 337-1640 Fax (607) 336-6551
Cassie L. Stevenson-Rose, Director
Co-Chairpersons: Laura Price, Deborah Whitman

October 6, 1994

Ms. Karen Maiurano, Project Manager
NYSDEC Central Office
50 Wolf Road, Room 222
Albany, NY 12233-7010

Dear Ms. Maiurano:

On behalf of the Chenango County Environmental Management Council, I would like to submit the following comments on the Proposed Remedial Action Plan for the General Instrument Corporation inactive hazardous waste disposal site in Sherburne, NY.

- Even though some comments at the public meeting on September 26 were favorable in terms of the "no action" alternative, I agree with DEC in that the contamination on this site does present a potential health hazard and should be remediated.

- Assuming the pilot study is successful, the idea of a technology that remediates groundwater in-situ, without producing toxic waste products that must then be dealt with, is very appealing.

- I also feel that since EPA is willing to help fund the pilot study, Alternative 4 should be undertaken. Innovative technologies should be explored whenever possible in an attempt to find better, more effective methods of treating hazardous compounds.

In summary, we concur with DEC's preferred remedy. If, as a result of public comment, this decision is modified, we would appreciate being informed of such change. Thank you.

Sincerely,

Cassie Stevenson-Rose

Cassie Stevenson-Rose
Director, CCEMC

GENERAL INSTRUMENT

General Instrument Corporation
2200 Byberry Road
Hatboro PA 19040
215/957-8345
Fax 215/956-6408

FAX, (hard copy to follow)

Barbara A. Curtis
Corporate Director of
Environment, Health & Safety

October 14, 1994

Ms. Karen Maiurano
Project Manager
NYSDEC Division of Hazardous Waste Remediation
50 Wolf Road-Room 222
Albany, New York 12233-7010

Re: Comments to NYSDEC Proposed Remedial Action Plan for the General Instrument Sherburne Inactive Hazardous Waste Site

Dear Ms. Maiurano:

This letter is in response to the New York Department of Environmental Conservation's (NYSDEC) invitation for public comment on the proposed remedial action plan (PRAP) for the General Instrument (GI) Sherburne Hazardous Waste Site (Site). GI appreciates NYSDEC's generally helpful and cooperative approach to this project and welcomes this opportunity to comment on the PRAP. Furthermore, we applaud NYSDEC's willingness to use innovative remedial technology in the PRAP.

In general, GI agrees with and supports the PRAP. In the spirit of cooperation and with the intent of preserving our rights on the administrative record, GI offers the following comments on the PRAP.

1. As GI understands the PRAP, NYSDEC intends that in the event the innovative technology fails to reduce groundwater contamination to NYSDEC standards, conventional pump and treat technology would be required for the off-site plume on the Howard property. GI has no objection to NYSDEC's reservation of its right to pursue an alternative, conventional, remedial approach should the innovative in-situ groundwater treatment system (innovative system) proposed for the Howard property fail. However GI does not consent to implement any alternative remedy chosen by NYSDEC in the event of a failure of the innovative system. At this time, it is impossible to predict whether and to what extent the plume will be remediated by the innovative system. Accordingly, GI contends that,

should the innovative system fail, the NYSDEC must evaluate the extent of plume remediation at the time of failure before determining whether further remediation is necessary. In summary, GI believes that NYSDEC can do no more than reserve its rights and express its present intention to seek conventional remediation in the event of technology failure. In the event of actual failure, NYSDEC should first determine whether the then-existing conditions warrant any further action, and if so, what action.

2. There is a second and largely legal reason for asserting, as GI does, that it would be inappropriate to determine now that conventional pump and treat technology will be required off-site in the event of a failure of the innovative system. Implementation of such a remedy must be preceded by appropriate public comment; to do otherwise would violate the citizen participation requirements for remedy selection at Inactive Hazardous Waste sites in 6 NYCRR §375-1.5. GI has questioned the need for extending the plume treatment as far as the Howard property. While we agree with the PRAP as a practical accommodation of the differences of opinion between NYSDEC and GI regarding the plume on the Howard property, we believe we are entitled to be heard in opposition to any required conventional technology based on conditions as they may exist at the time. Moreover, community opposition to conventional pump and treat has already been expressed. At the September 22, 1994 public hearing on this PRAP, Mr. Howard, the owner of the off-site farm property subject to this remedial proposal, objected to the implementation of a conventional groundwater treatment system in the event of a failure of the innovative system since installation and use of extraction wells would further interfere with the use of his land for farming. Mr. Howard also testified during the public hearing that the risks posed by the contamination on his property do not appear to merit remediation at all, as the conditions are of long standing, have not and will not affect his crops or cattle, and the property itself has no residential development potential due in part to its location within a flood plain of the Chenango River. The risks posed by the contamination on his property, Mr. Howard asserted, could more reasonably be addressed through a contractual arrangement that would bar the owners from using groundwater for potable uses. These comments, and possibly others, would have to be considered before any decision could be made in the future on the use of conventional remedial technology for the off-site plume.

3. GI does not view the scope of our responsibility under the 1989 Administative Order on Consent (OAC) as requiring that we perform the PRAP and then subsequently perform whatever other remedy is selected. GI reads the OAC as obligating us to perform the innovative technology (and on-site treatment) as set forth in the PRAP. In the event of a technology failure, NYSDEC would be free to negotiate an amendment, or enforce its rights directly against GI (i.e. we do not

contend that implementation of the innovative technology relieves GI of legal responsibility regardless of the success or failure of the technology). Nor does GI question the validity of the present OAC. However, we do maintain that the OAC contemplates a single remedy, and not successive or conditional remedies, and we contend further that we are always free to question arbitrary, capricious decisions or those not in accordance with law.

4. While GI acknowledges NYSDEC's use of TAGM 4046 for the purposes of guidance in developing soil cleanup objectives under the PRAP, we take issue with any attempt to characterize TAGM 4046 as a legally enforceable standard. TAGM 4046 is no more than a guidance document; it is not a promulgated standard and criteria under 6 NYCRR §375-1.10(c) or pertinent case law. Washington County Lease Inc. v. Persico, 473 N.Y.S.2d 610 (3d. Dept 1984), aff'd 488 N.Y.S.2d 630(1984).

5. Finally GI notes that it was unfortunate that the September 22, 1994 public hearing was not recorded. The absence of an official record impairs the public comment process. GI requests that NYSDEC make an attempt to place in the administrative record as accurate as possible a summary of the comments made at the hearing. GI would be willing to review any proposed summary that NYSDEC prepares.

Respectfully submitted,

B. Curtis

Barbara A. Curtis
Corporate Director
Environment, Health & Safety

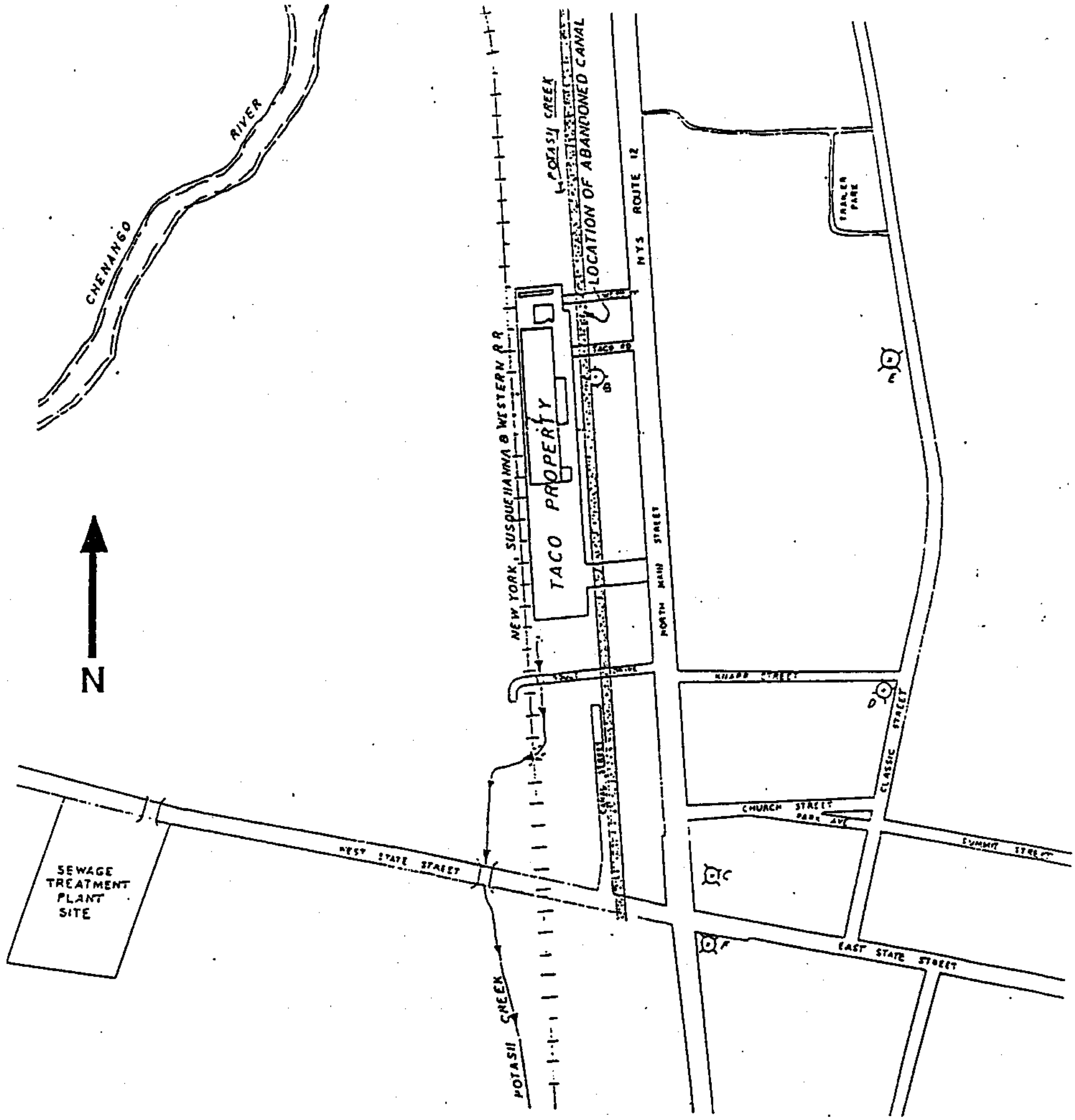
BAC/kamm

cc: C. Jackson, NYSDEC
L. Hineline, Stearns & Wheler

APPENDIX B

ADMINISTRATIVE RECORD

- Remedial Investigation/Feasibility Study Workplans for General Instrument Corporation, Sherburne, New York, prepared by Stearns & Wheler, September 1989.
- Remedial Investigation Report for General Instrument Corporation, Sherburne, New York, Volumes I-IV, prepared by Stearns & Wheler, January 1993.
- Feasibility Study Report for General Instrument Corporation, Sherburne, New York, prepared by Stearns & Wheler, July 1994.
- Order on Consent, Index #A701578810, September 5, 1989.
- Citizen Participation Plan, prepared by NYSDEC, April 8, 1992.
- NYSDEC, Division of Hazardous Waste Remediation Technical and Administrative Guidance Memoranda 4000-4053.
- NYSDEC, Division of Water Technical and Operational Guidance Series
- New York State Environmental Conservation Law 6 NYCRR Part 375, May, 1992.
- National Oil and Hazardous Substance Pollution Contingency Plan, 40 CFR Part 300, 1990.
- Laboratory Evaluation Report: Treatability Test of the EnviroMetal Process at the General Instrument Facility, Sherburne, New York, prepared by EnviroMetal Technologies, Inc., April 1994.



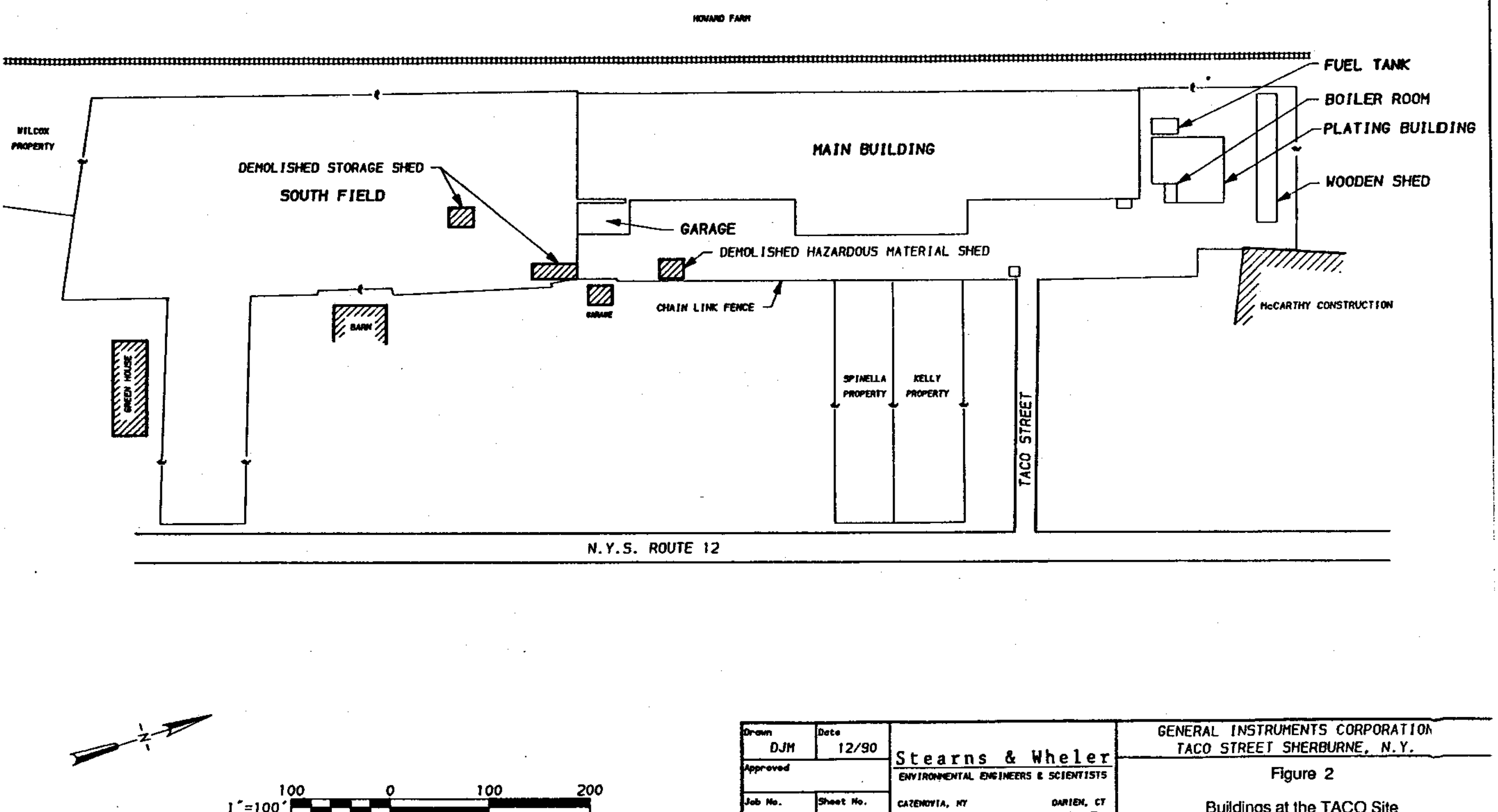
General Instrument, Sherburne

Site Location

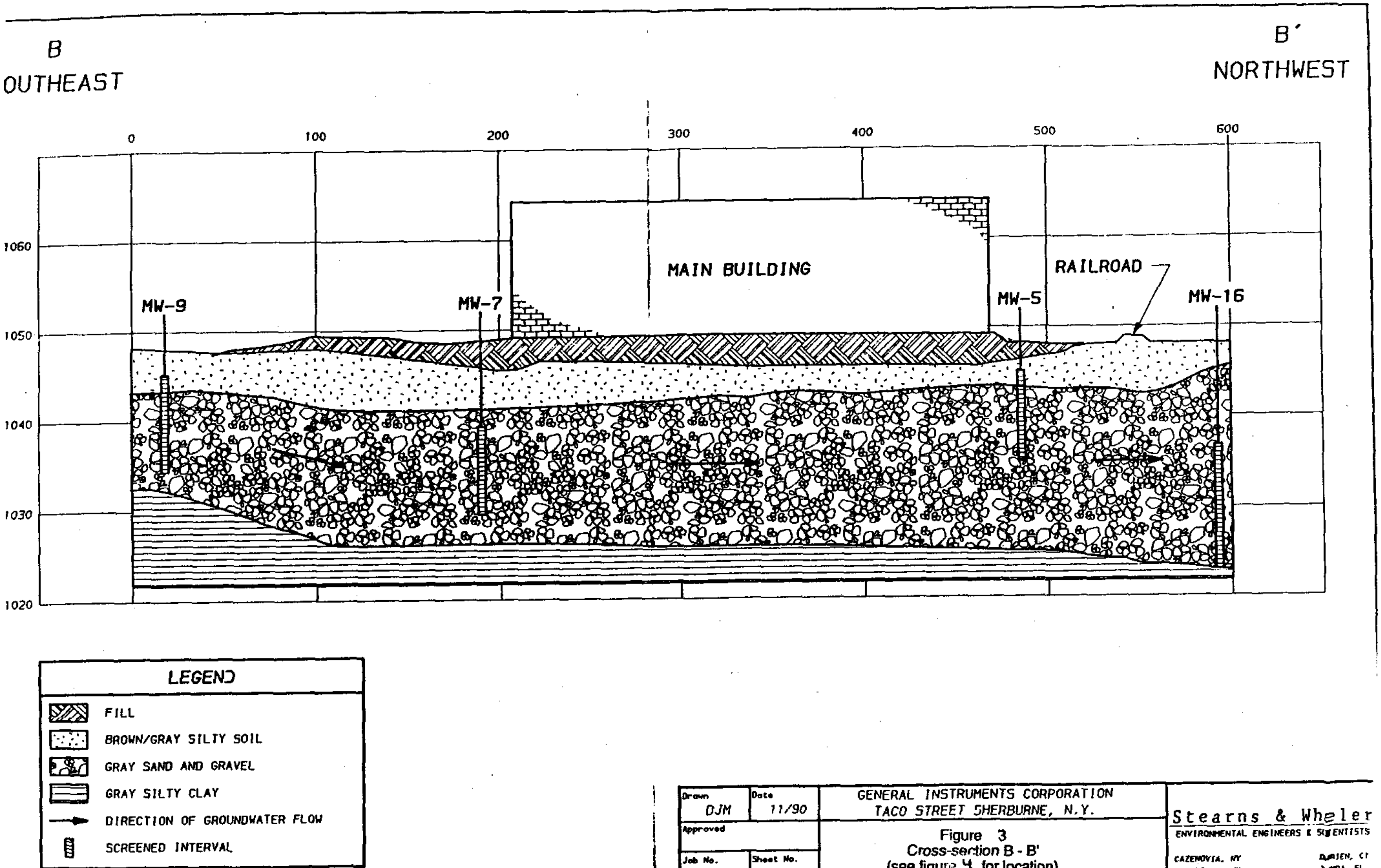
Figure 1

0 100 200

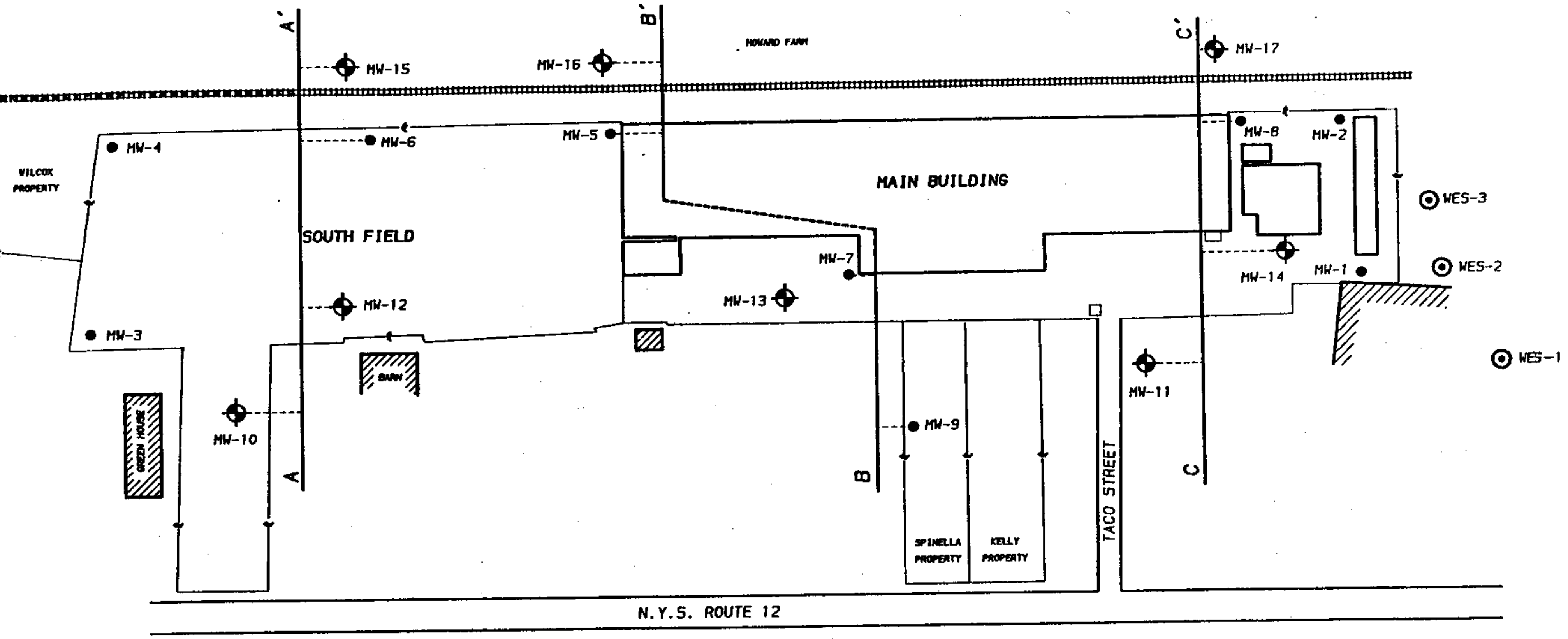
Approximate Scale: 1 inch = 200 feet



Drawn DJM	Date 12/90	Stearns & Wheler ENVIRONMENTAL ENGINEERS & SCIENTISTS	GENERAL INSTRUMENTS CORPORATION TACO STREET SHERBURNE, N.Y.
Approved			Figure 2
Job No. 1587	Sheet No.	CAZENOVIA, NY DARIEN, CT WATERTOWN, NY TAMPA, FL	Buildings at the TACO Site



Drawn DJM	Date 11/90	GENERAL INSTRUMENTS CORPORATION TACO STREET SHERBURNE, N.Y.	Stearns & Wheler ENVIRONMENTAL ENGINEERS & SCIENTISTS
Approved		Figure 3 Cross-section B - B' (see figure 4 for location)	CAZENOVIA, NY DARIEN, CT WATERTOWN, NY TAMPA, FL
Job No. 1587	Sheet No.		



● EXISTING PRIOR TO RI/FS

NEW MONITOR WELL

MONITOR WELLS ON WESCAR PROPERTY

N

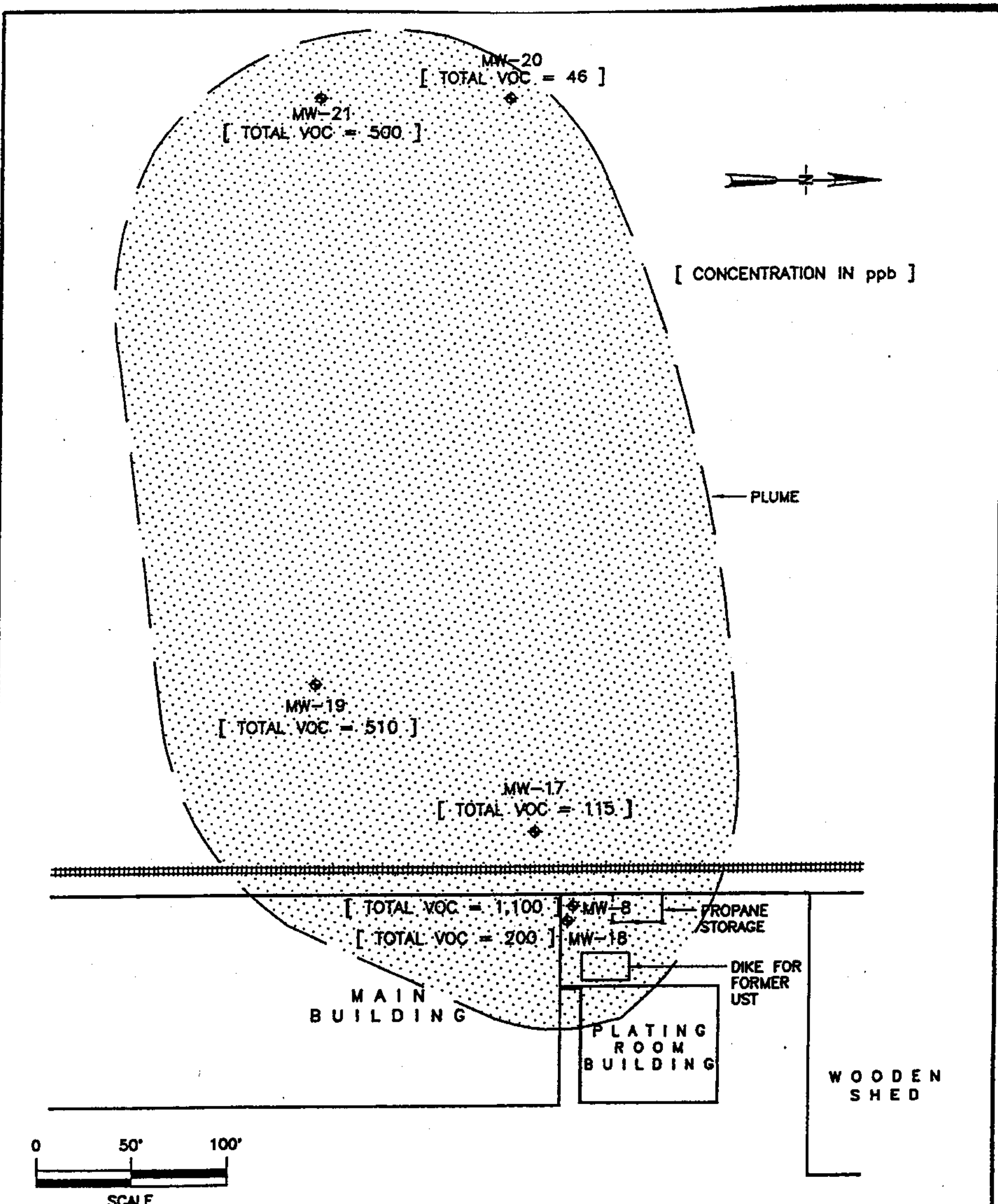
100 0 100 200

1"=100'

Drawn	Date	Stearns & Wheler
DJM	12/90	ENVIRONMENTAL ENGINEERS & SCIENTISTS
Approved		
Job No. 1587	Figure No.	CAZENOVIA, NY; WATERTOWN, NY; DARIEN, CT; TAMPA, FL

GENERAL INSTRUMENTS CORPORATION
TACO STREET SHERBURNE, N.Y.

Figure 4
Location of Monitoring Wells



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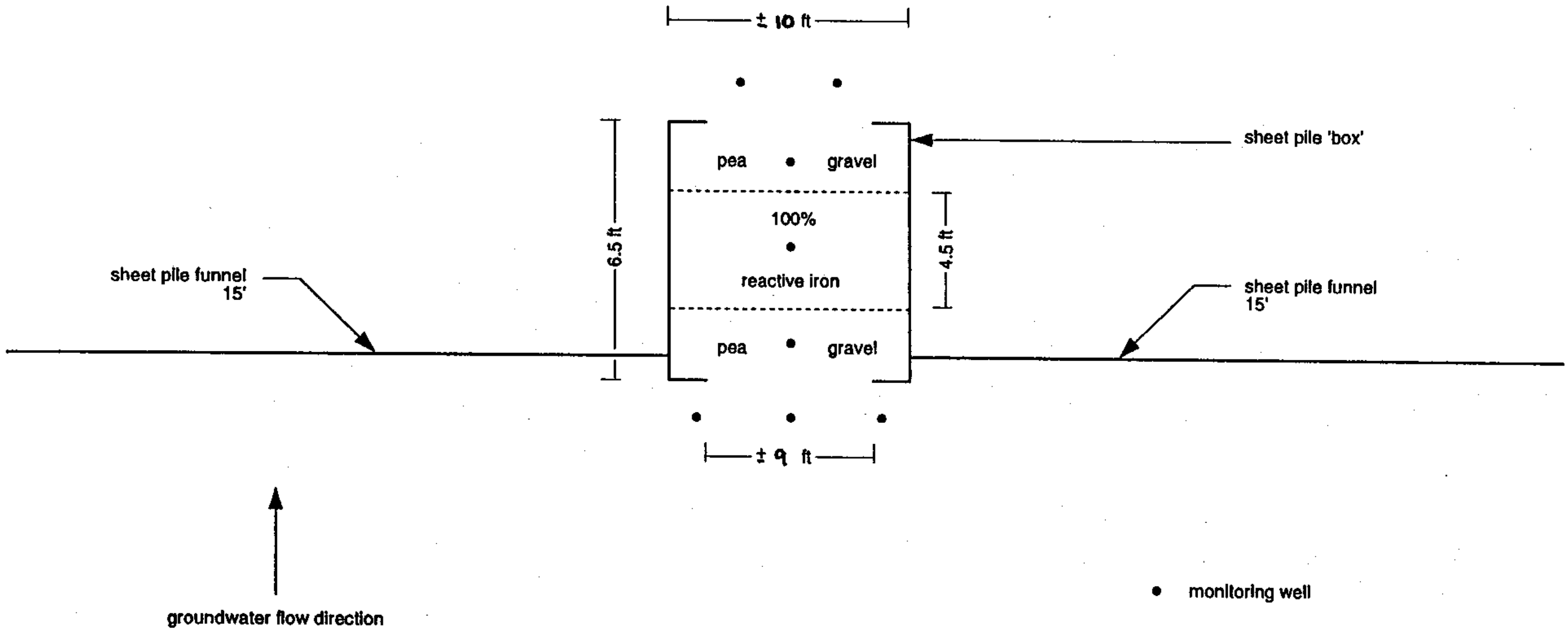
ENVIRONMENTAL ENGINEERS & SCIENTISTS

DATE: 9/94 JOB No.: 1587

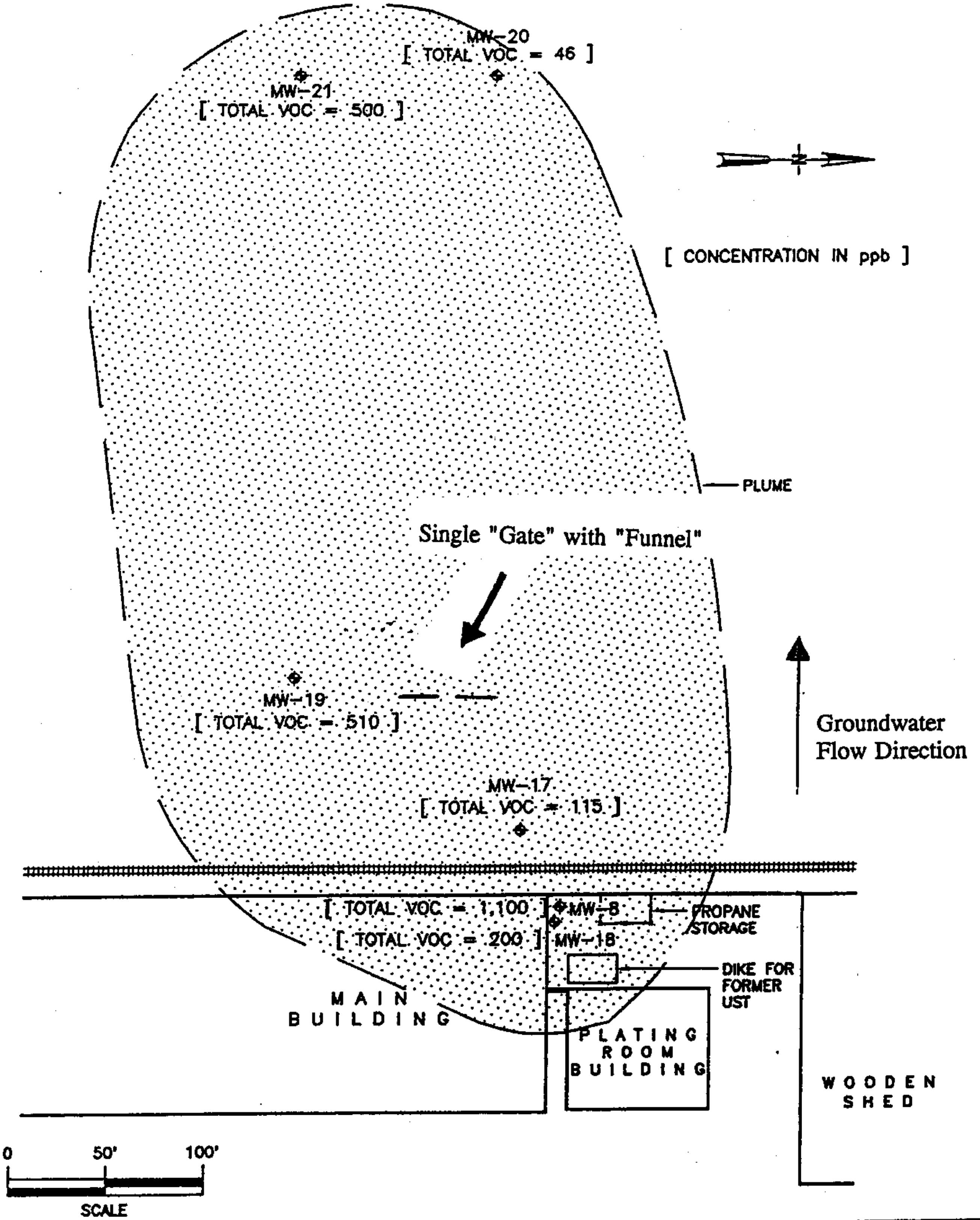
GENERAL INSTRUMENT CORPORATION
SHERBURNE. NEW YORK
FEASIBILITY STUDY

FIGURE 5

Off-site wells and groundwater plume in the field west of the former GI facility



Schematic of Funnel and Gate Design of In-Situ Permeable Reaction Wall		
envirometal technologies Inc.	Figure 6	March 1994 Rev. 00



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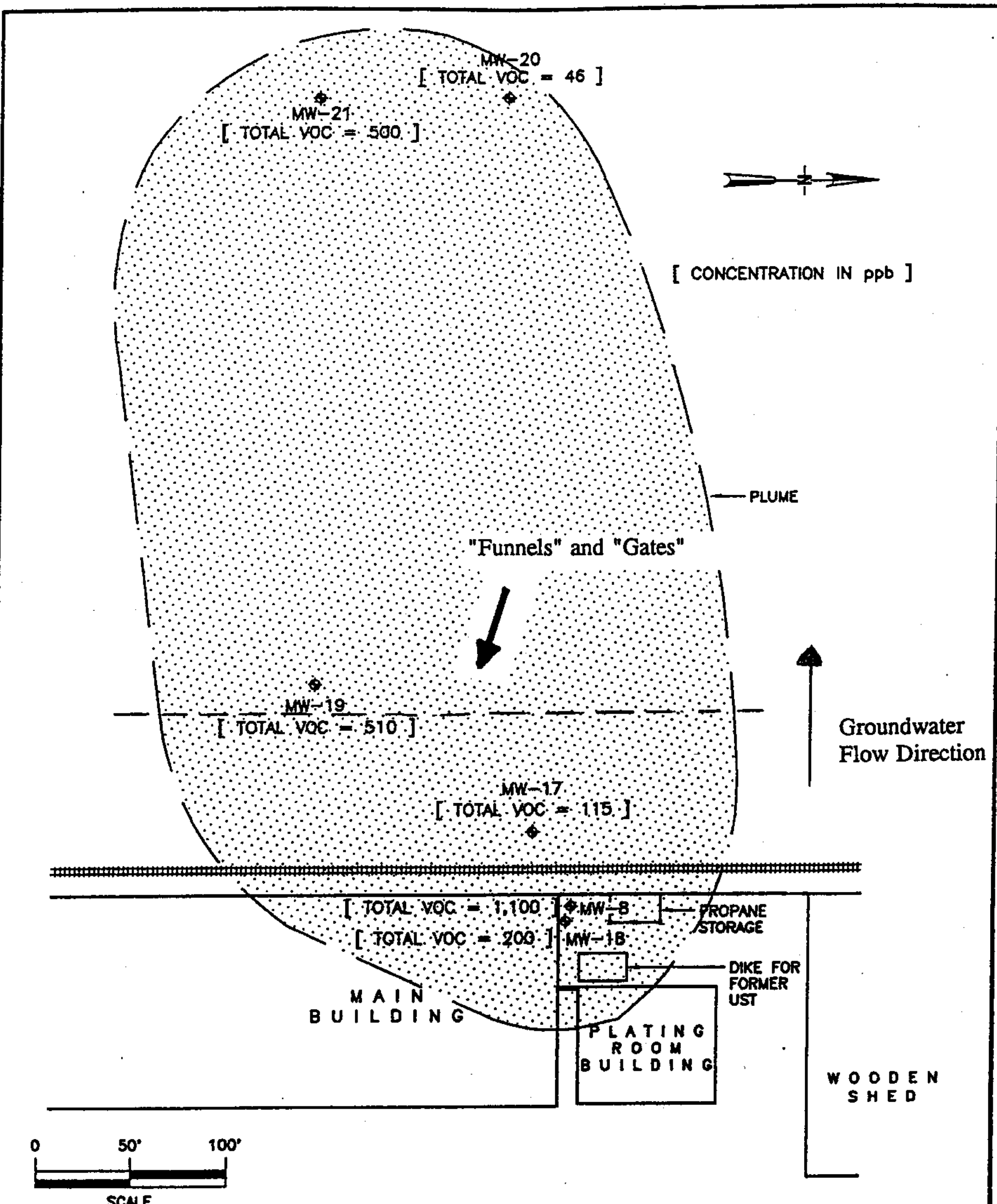
ENVIRONMENTAL ENGINEERS & SCIENTISTS

DATE: 9/94 JOB No.: 1587

GENERAL INSTRUMENT CORPORATION
SHERBURNE. NEW YORK
FEASIBILITY STUDY

FIGURE 7
Conceptual Location of Pilot Study In-situ Permeable Reaction Wall

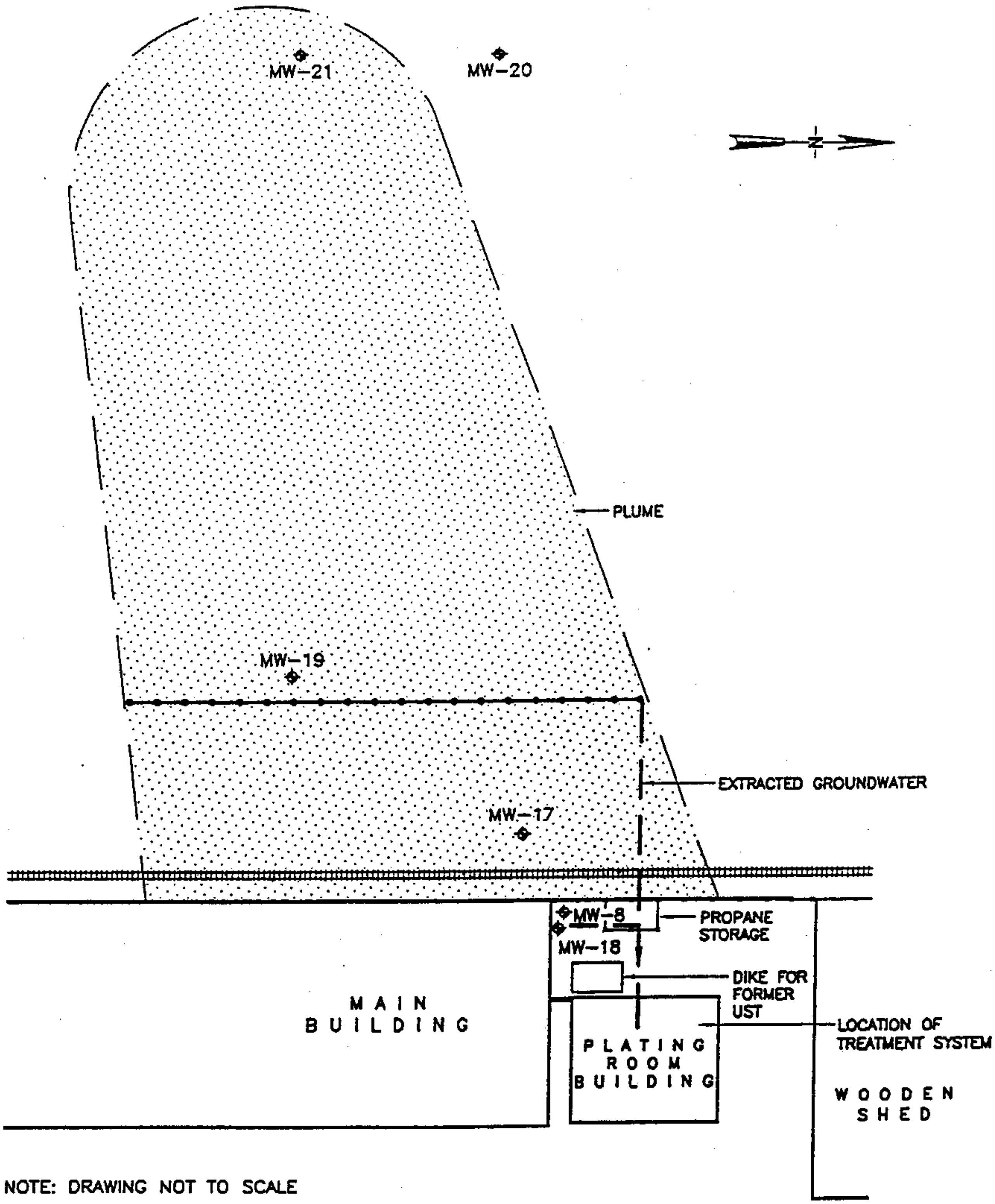


Stearns&Wheler
ENVIRONMENTAL ENGINEERS & SCIENTISTS

DATE: 9/94 JOB No.: 1587

GENERAL INSTRUMENT CORPORATION
SHERBURNE, NEW YORK
FEASIBILITY STUDY

FIGURE 8
Conceptual Location of
In-situ Permeable Reaction Wall



NOTE: DRAWING NOT TO SCALE

Stearns&Wheler ENVIRONMENTAL ENGINEERS & SCIENTISTS	GENERAL INSTRUMENT CORPORATION SHERBURNE, NEW YORK FEASIBILITY STUDY
DATE: 7/94 JOB No.: 1587	FIGURE 9 GROUNDWATER EXTRACTION SYSTEM USING RECOVERY WELLS

TABLE 1

EXPOSURE PATHWAYS EVALUATED FOR
GENERAL INSTRUMENT CORPORATION SITE
SHERBURNE, NEW YORK

SOURCE	PATHWAY	RECEPTOR
Surface soils with elevated concentrations of volatile organics	Volatilization to air, transport to receptors	On-site industrial Off-site residential
Surface soils with elevated concentrations of target compounds	Incidental ingestion	Off-site residential trespassers On-site industrial
Groundwater with elevated concentrations of target compounds	Transport downgradient	Future residential users with private wells
Groundwater with elevated concentrations of volatile organics	Volatilization into soil vapor	Downgradient future residents
Groundwater with elevated concentrations of target compounds	Transport in groundwater to Chenango River	Chenango River users

TABLE 2

REVIEW OF LOCATION SPECIFIC ARARs

General Instrument Corporation
Feasibility Study

ACTIVITIES AFFECTING:	REGULATION	CITATION	
		Federal	State
Rivers and Streams	Wild and Scenic Rivers Act	40 CFR 6.302	6 NYCRR 608
Floodplain	Floodplain Management	40 CFR 6., Appendix A	6NYCRR 500
100 Year Floodplain	RCRA	40 CFR 264.18	6 NYCRR 373-2.2
Fish and Wildlife	Fish and Wildlife Coordination Act	16 USC 661 et seq	

TABLE 3

REVIEW OF CHEMICAL-SPECIFIC ARARs AND TO BE CONSIDERED CRITERIA

General Instrument Corporation
Feasibility Study

MEDIA	TITLE OF REGULATION	CITATION Federal	CITATION State	TBC
SOIL	NYS Soil Clean up Objectives *Petroleum-Contaminated Soil Guidance Policy*		NYSDEC TAGM 4046 NYSDEC STARS Memo 1	X X
GROUNDWATER	Water Quality Regulations		6 NYCRR 700-705	
	Groundwater Classifications & Quality Standards		6 NYCRR 703 10 NYCRR 5-1 10 NYCRR 170	
	Standards, Limitations for Discharge to Class GA Waters	NPDES	6 NYCRR 703 TOGS 1.1.1	
	Federal & State DOH Sanitary Codes for Drinking Water	SDWA MCLs SDWA MCLGs	10 NYCRR 5-1,5-3	X
	Ambient Water Quality Standards and Guidance Values		TOGS 1.1.1	
	SDWA	40 CFR 141, 143 PL 93-523		
	EPA Health Advisories & NAS SNARLS			X
SURFACE WATER	NYSPDES/ NPDES	NPDES	6 NYCRR 750-757 6 NYCRR 701.5	
	Ambient Water Quality Standards and Guidance Values		TOGS 1.1.1	
	Water Quality Regulations , Surface Water Classifications, & Standards	FWQC CWA Sect. 303,304	6 NYCRR 700-705	
AIR	NYS Air Guide NYS Air Pollution Control Regulations Particulate Emissions	 40 CFR 50	6 NYCRR 212 6 NYCRR 201,202 6 NYCRR 219	

TABLE 4

REVIEW OF REMEDIAL ACTION-SPECIFIC ARARs

General Instrument Corporation
Feasibility Study

ACTION/RESPONSE	ACTIVITY TO MEET RESPONSE ACTION	CITATION	
		Federal	State
No Action	Monitoring		6 NYCRR 373 6 NYCRR 360
Containment	Cap	40 CFR 264	6NYCRR 373 6NYCRR 360
	Vertical Barriers	40 CFR 268	
Collect/Treat/Discharge	Discharge to Surface Waters	NPDES	6 NYCRR 751
	Discharge to POTW	40 CFR 403	
	Discharge to Groundwater	40 CFR 144	6 NYCRR 703
	Monitor	40 CFR 122, 125	6 NYCRR 751
Off-Site Treatment	Transportation of Contaminated Soil		Title 17, NYTL Part 507
	Manifest, Record keeping requirements		6 NYCRR 372
All work on site	OSHA Regulations	29 CFR 1926	

TABLE 5: ALTERNATIVE COST COMPARISON
GENERAL INSTRUMENT SHERBURNE SITE

	Present Worth	Capital Costs	Annual Operation & Maintenance
No Action			
Soil	$ 90,000	$ 0	$ 6,000 - 30 years
Groundwater	300,000	0	19,040 - 30 years
Total	390,000	0	
Alternative 1			
Hot Spot Soil Removal	$ 655,000	$ 625,000	$ 4,000 - 10 years
*Groundwater On-site Pump and Treat	1,680,000	180,000	194,000 - years 1-10 8,000 - years 11-30
Total	2,335,000	805,000	
Alternative 2			
Soil Excavation	$1,100,000	$1,070,000	$ 6,000 - 5 years
*Groundwater On-site Pump and Treat	1,680,000	180,000	194,000 - years 1-10 8,000 - years 11-30
Total	2,780,000	1,250,000	
Alternative 3			
Soil Vapor Extraction	$ 880,000	$ 280,000	$310,000 - year 1 100,000 - years 2-5
*Groundwater Off-site Pump and Treat	3,300,000	1,000,000	289,000 - years 1-10 8,000 - years 11-30
Total	4,180,000	1,280,000	
Alternative 4			
Soil Vapor Extraction	$ 880,000	$ 280,000	$310,000 - year 1 100,000 - years 2-5
*In-situ Permeable Reaction Wall	2,700,000	2,400,000	140,000 - year 1 30,000 - years 2-5 5,000 - years 6-30
Total	3,580,000	2,680,000	

* All groundwater alternative cost figures include free product recovery