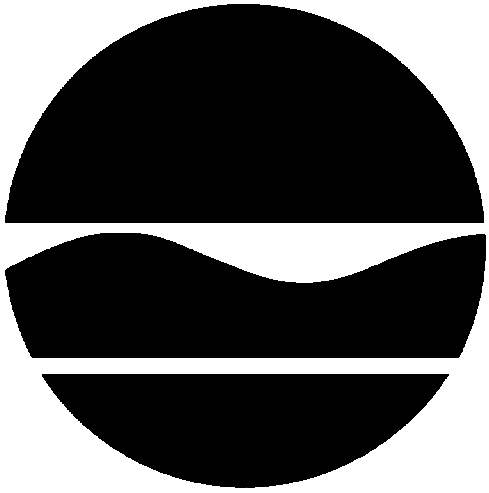
PROPOSED REMEDIAL ACTION PLAN
FORMER HETTLING FARM SITE
Environmental Restoration Project
Town of Clermont, Columbia County, New York
Site No. E411015

February 2008



Prepared by:

Division of Environmental Remediation
New York State Department of Environmental Conservation

A 1996 Clean Water/Clean Air Bond Act
Environmental Restoration Project

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SECTION 1: SUMMARY AND PURPOSE OF THE PROPOSED PLAN

The New York State Department of Environmental Conservation (the Department), in consultation with the New York State Department of Health (NYSDOH), is proposing a remedy for the Former Hettling Farm Site, which encompasses approximately 20.5 acres. The presence of hazardous substances has created threats to human health and/or the environment that are addressed by this proposed remedy.

The 1996 Clean Water/ Clean Air Bond Act provides funding to municipalities for the investigation and cleanup of brownfields. Brownfields are abandoned, idled, or under-used properties where redevelopment is complicated by real or perceived environmental contamination. They typically are former industrial or commercial properties where operations may have resulted in environmental contamination. Brownfields often pose not only environmental, but legal and financial burdens on communities. Under the Environmental Restoration Program, the state provides grants to municipalities to reimburse up to 90 percent of eligible costs for site investigation and remediation activities. Once remediated, the property can then be reused.

As more fully described in Sections 3 and 5 of this document, the actual and possible dumping of unidentified waste materials on and adjacent to the property and the use of the site for agricultural purposes, which included row crops, vegetables, vineyards and fruit orchards have resulted in the disposal of hazardous substances, including inorganic arsenic based pesticides. These hazardous substances have contaminated the soils at the site, and have resulted in:

- a significant threat to human health associated with the potential exposure to contaminated site soils.

To eliminate or mitigate this threat, the Department proposes a soil cover (containment), institutional controls, and management / monitoring for the site.

The proposed remedy, discussed in detail in Section 8, is intended to attain the remediation goals identified for this site in Section 6. The remedy must conform with officially promulgated standards and criteria that are directly applicable, or that are relevant and appropriate. The selection of a remedy must also take into consideration guidance, as appropriate. Standards, criteria and guidance are hereafter called SCGs.

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

The Department has issued this PRAP as a component of the Citizen Participation Plan developed pursuant to the New York State Environmental Conservation Law and Title 6 of the Official Compilation of Codes,

Rules and Regulations of the State of New York (6 NYCRR) Part 375. This document is a summary of the information that can be found in greater detail in the November 2007 "Remedial Investigation (RI) Report", the November 2007 "Alternatives Analysis (AA) Report", and other relevant documents. The public is encouraged to review the project documents, which are available at the following repositories:

Town of Clermont
Town Clerk's Office
1795 Route 9
Clermont, NY 12526
(518) 537-6668
Hours: Thurs. 6:00 - 8:00 pm
Sat. 10:00 am-12:00 pm

NYSDEC Region 4 Office
1150 N. Westcott Road
Schenectady, NY 12306
(518) 357-2234
Hours: M-F, 8:30 - 4:45

NYSDEC Central Office
625 Broadway, 12th Floor
Albany, NY 12233-7013
(518) 402-9767
Hours: M-F, 8:30 - 4:00
Contact Randy Hough, Project Manager.

The Department seeks input from the community on all PRAPs. A public comment period has been set from February 1 to March 17, 2008 to provide an opportunity for public participation in the remedy selection process. A public meeting is scheduled for March 3, 2008 at the Town of Clermont, Town Hall beginning at 7:30 p.m..

At the meeting, the results of the SI/AAR will be presented along with a summary of the proposed remedy. After the presentation, a question-and-answer period will be held, during which verbal or written comments may be submitted on the PRAP. Written comments may also be sent to Mr. Hough at the above address through March 17, 2008.

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

Comments will be summarized and addressed in the responsiveness summary section of the Record of Decision (ROD). The ROD is the Department's final selection of the remedy for this site.

SECTION 2: SITE LOCATION AND DESCRIPTION

The Former Hettling Farm site is located in the Town of Clermont, in Columbia County (Figure 1). The site consists of 20.5 acres and is located along the western side of U.S. Route 9, approximately 1,100 feet north of this Route's intersection with County Route 6. The site is identified as a subdivision of portions of the Hettling Farm, and was conveyed to the Town of Clermont in 2003.

The site's general location is in a rural setting, and presently consists of vacant land which has historically been utilized for agricultural purposes. The site is bordered on the west and north by other lands of Hettling, by private property and a cemetery to the southeast, and by private and Town lands to the south. The site rises gradually from its eastern border with Route 9, to the property boundary on the west side. An artificial

ditch and intermittent stream, constructed for drainage and/or irrigation, roughly bisects the site flowing south to north.
The overburden soils at the site consist of sand, gravel and varying percentages of silt and cobbles. Distinct clay layers consisting of greyish-brown and/or blueish-grey clay of various thicknesses were encountered at different areas around the site. Bedrock at the site is composed of shale and was encountered at depths ranging from 6.5 feet below ground surface up on the west side of the site, to greater than 20 feet below ground surface on the east side of the site. Overburden groundwater occurs at the site at depths ranging from 3.5 to 16 feet below the ground surface. Overburden groundwater flow is generally in a east-southeasterly direction on the west side of the artificial ditch and intermittent stream, and in a easterly direction on the eastern portion of the site, generally following the site topography.

SECTION 3: SITE HISTORY

3.1: Operational/Disposal History

Most of the 20.5 acres of the site were historically utilized for agricultural purposes. Generally, the lands to the west of the artificial ditch and intermittent stream were primarily utilized as apple orchards and the lands on the eastern portion were utilized for the cultivation of row crops, vegetables and/or vineyards and orchards. The use of persistent inorganic and organic pesticides as well as the application of fertilizers resulted in the deposition of these hazardous substances in the site media. In addition, there was evidence that waste material may have been disposed on the surface and in the subsurface at and adjacent to the site. A large stockpile of railroad ties and poles, which may have been treated with coal tar creosote and/or chromated copper arsenate (CCA) for preservation, were disposed on the surface, in the north central section of the site.

3.2: Remedial History

There is no remedial history associated with the 20.5 acre site.

SECTION 4: ENFORCEMENT STATUS

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

Since no viable PRPs have been identified, there are currently no ongoing enforcement actions. However, legal action may be initiated at a future date by the state to recover state response costs should PRPs be identified. The Town of Clermont will assist the state in its efforts by providing all information to the state which identifies PRPs. The Town of Clermont will also not enter into any agreement regarding response costs without the approval of the Department.

SECTION 5: SITE CONTAMINATION

The Town of Clermont has recently completed a remedial investigation/alternatives analysis report (RI/AAR) to determine the nature and extent of any contamination by hazardous substances at this environmental restoration site.

5.1: Summary of the Site Investigation

The purpose of the RI was to define the nature and extent of any contamination resulting from previous activities at the site. The RI was conducted between October 2006 and April 2007. The field activities and findings of the investigation are described in the RI report.

The initial phase of the RI involved an Interim Remedial Measure (IRM) to remove and dispose of treated railroad ties and poles that were stockpiled on-site. Subsequent phases of the RI included an electromagnetic

(EM) survey, exploratory test pitting, test borings and monitoring well installations, the collection and analysis of; subsurface and surface soils, groundwater, surface water and sediment samples. In addition a private well survey, Fish and Wildlife Impact Analysis and a site survey were conducted.

5.1.1: Standards, Criteria, and Guidance (SCGs)

To determine whether the soil, groundwater, surface water and sediments contain contamination at levels of concern, data from the investigation were compared to the following SCGs:

- Groundwater, drinking water, and surface water SCGs are based on the Department's "Ambient Water Quality Standards and Guidance Values" and Part 5 of the New York State Sanitary Code.

- Soil SCGs are based on the Department's Soil Cleanup Objectives ("6NYCRR Part 375, Environmental Remediation Programs, Subpart 375-6").

- Sediment SCGs are based on the Department's "Technical Guidance for Screening Contaminated Sediments."

Based on the SI results, in comparison to the SCGs and potential public health and environmental exposure routes, certain media and areas of the site require remediation. These are summarized in Section 5.1.2. More complete information can be found in the SI report.

5.1.2: Nature and Extent of Contamination

This section describes the findings of the investigation for all environmental media that were investigated.

As described in the SI report, many soil, groundwater, surface water and sediment samples were collected to characterize the nature and extent of contamination. As seen in Figure 3 the main categories of contaminants that exceed their SCGs are inorganic pesticide residues in the form of metals. For comparison purposes, where applicable, SCGs are provided for each medium.

Chemical concentrations are reported in parts per billion (ppb) for water and parts per million (ppm) for soil, and sediment.

Figures 3 through 6 summarize the degree of contamination for the contaminants of concern and compares the data with the SCGs for the site. The following are the media which were investigated and a summary of the findings of the investigation.

Waste Materials

Waste materials in the form of scattered railroad ties and poles, reportedly part of a former dock structure were present on the site. These material were consolidated into a stockpile by the Town. These stockpiled wastes identified prior to the RI/AAR were addressed during the IRM described in Section 5.2.

An electromagnetic (EM) survey was performed in order to detect and delineate potentially buried waste containers, underground storage tanks (USTs), or other metallic structures beneath the site. The EM survey detected eight anomalous areas that displayed response values characteristic of buried metallic materials, which corresponded to drum-size or larger items. These eight areas and two additional areas where smaller anomalies were detected, were further investigated through the use of test pits. At four of the ten locations investigated, no buried objects were found. Buried metallic items were found at all of the other six locations. These items ranged from a 3 foot metal fence stake, to barbed wire, and a buried washing machine. None of the subsurface anomalies investigated were found to include the presence of hazardous substances. Figure 2 shows the extent of the electromagnetic survey and the numbered locations of the detected anomalies.

Surface Soil

Surface soil samples on-site were collected from grade to 2 inches deep, if the area was not vegetated and from a depth of 0 to 2 inches below the root zone in those areas where vegetation existed. Ten of twenty-eight surface soil samples and both IRM near-surface soil samples exceeded the Part 375, Soil Cleanup Objective (SCO) for arsenic of 16 ppm for the Protection of Public Health - Restricted Use Commercial. One of the two IRM near-surface soil samples exceeded the Part 375, SCO for three individual polynuclear aromatic hydrocarbon (PAHs) compounds. The primary contaminant of concern at the site in the surface and near-surface soils is arsenic. The surface soil contamination area of concern (AOC) encompasses approximately 7.5 acres on the eastern side of the site.

Figure 3 shows the locations of the surface and IRM near-surface soil samples, along with the corresponding arsenic concentrations for those samples which exceeded the SCO.

Surface soil contamination identified during the SI/AAR will be addressed in the remedy selection process.

Subsurface Soil

Subsurface soil samples were collected from test pits excavated at specific locations where metallic anomalies were detected during the electromagnetic survey and from soil borings completed during the installation of the groundwater monitoring wells. Three of the fifteen subsurface soil samples exceeded the Part 375, Soil Cleanup Objective (SCO) for arsenic of 16 ppm for the Protection of Public Health - Restricted Use Commercial.

Figure 3 shows the locations of the subsurface soil samples along with the corresponding arsenic concentrations and the sampling depth for those samples which exceeded the SCO.

Subsurface soil contamination identified during the SI/AAR will be addressed in the remedy selection process.

Groundwater

Seven groundwater monitoring wells were installed, developed and sampled during the RI. Groundwater flow at the site is generally in a easterly direction. The contaminant of concern, arsenic was not detected in any of the groundwater samples indicating that it most likely exists in the arsenate, As(V) form, in the site soils, as opposed to the more soluble arsenite, As(III). Arsenate is typically fixed to the soils, especially in the presence of iron and is relatively immobile. Iron was detected above SCGs in five of the seven groundwater samples collected and appears to represent naturally occurring levels, considering the concentrations found in the site soils. Sodium was detected above SCGs in one monitoring well located along Route 9. The sodium is most likely attributable to the use of road salt. Five semi-volatile organic compounds (SVOCs), in the form of individual polynuclear aromatic hydrocarbons (PAHs) were detected above SCGs in one well (MW-4), located in the north central portion of the site, next to the manmade bridge over the drainage ditch. These compounds were not detected in the soils collected from the same boring during monitoring well construction and were not detected in the downgradient wells. Figure 4 shows the location of the on-site monitoring wells.

No significant site-related groundwater contamination at levels of concern was identified during the SI/AAR. Therefore, no remedial alternatives need to be evaluated for the overburden groundwater.

Surface Water

Surface water collects in a drainage swale off-site to the southwest and flows into an artificial farm pond located just to the south of the central part of the site. Surface water then flows on-site into the manmade drainage/irrigation ditch (artificial intermittent stream) which roughly bisects the site. Surface water exits the site through a culvert on the north side. One surface water sample was collected from the farm pond and two were collected from the on-site drainage ditch. Figure 5 shows the locations of the surface water sampling points and the contaminants found.

Two related SVOCs, methylphenol (creosols) and phenol, along with five metals were detected in the pond upgradient and off-site. Creosols may have been utilized in the pond impoundment structure and phenol may be a breakdown product of these. These componds were not detected on-site. The metals concentrations found in the on-site surface water samples are comparable to those detected in the off-site pond. This along with the Fish and Wildlife Impact Analysis, indicates that the site has had minimal impact on the artificial stream.

No significant site-related surface water contamination at levels of concern was identified during the SI/AAR. Therefore, no remedial alternatives need to be evaluated for surface water.

Sediments

The SCGs for sediments are divided into two categories, Lowest Effect Level (LEL) and the Severe Effect level (SEL). The LEL represents the level of contamination that can be tolerated by the majority of benthic organisms and the SEL represents the concentrations at which pronounced disturbance to the sediment dwelling community can occur.

Five sediment samples were collected at the site and surrounding area. Two from the off-site farm pond (inlet and outlet) and three from the on-site drainage ditch. Metals were detected in all five of the sediments samples collected. Sediment metals contamination levels in the upstream off-site pond are generally comparable to those found in the ditch, with the exception of one location. Nickel and zinc were detected above the SEL in the sediment sample located at the point where the drainage ditch exits the north side of the site. Comparing the nickel and zinc results here to the upstream results seems to indicate a localized impact possibly associated with the bridge/culvert area.

All of the other sediment results greater than the SCGs were typically just above the LEL. These sediment results are in the same concentration ranges for the metals, which exist in the surrounding soils. Thus it appears that an equilibrium between the metals concentrations in the site soils and sediments has been established. These items, along with the Fish and Wildlife Impact Analysis, indicates that the site has had minimal impact on the sediments. Figure 6 shows the locations of the sediment sampling points and the contaminants found.

No significant site-related sediment contamination at levels of concern was identified during the SI/RAR. Therefore, no remedial alternatives need to be evaluated for sediment.

Soil Vapor

Due to the nature of the contaminants found in the on-site soils and groundwater, and their low potential for volatility, the soil vapor media is not expected to be a concern at this site.

5.2: Interim Remedial Measures

An interim remedial measure (IRM) is conducted at a site when a source of contamination or exposure pathway can be effectively addressed before completion of the SI/RAR.

Prior to the beginning of the SI, the stockpiled wastes in the form of railroad ties and poles, which may have been treated with coal tar creosote and/or chromated copper arsenate (CCA) for preservation, were addressed by instituting a non-emergency IRM. Approximately 116 tons of this solid waste material was removed and disposed of in a permitted facility.

5.3: Summary of Human Exposure Pathways:

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

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

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

On-site soil is contaminated with inorganic metals and semi-volatile organic compounds. Currently, dermal contact exposure is a completed exposure pathway for trespassers entering the property.

On-site groundwater is contaminated above drinking water standards with naturally occurring inorganic compounds and in one area, semi-volatile organic compounds that may be a result of on-site telephone pole storage. Currently there is not a completed ingestion exposure pathway as no on-site potable groundwater wells exist. However, there is a potential for ingestion exposure in the future if a potable groundwater well was installed on the site.

5.4: Summary of Environmental Assessment

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

The Fish and Wildlife Impact Analysis (FWIA), which is included in the RI report, presents a detailed discussion of the existing and potential impacts from the site to fish and wildlife receptors.

The FWIA indicates that the contamination has had minimal impacts on the drainage/irrigation ditch that bisects the property and the other ecological communities at and around the site . Thus, viable exposure pathways to fish and wildlife receptors are not present.

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

Goals for the remedial program have been established through the remedy selection process stated in 6 NYCRR Part 375. At a minimum, the remedy selected must eliminate or mitigate all significant threats to public health and/or the environment presented by the hazardous substances disposed at the site through the proper application of scientific and engineering principles. The proposed use of the site is commercial, which includes passive recreational use and also would allow industrial use, consistent with local zoning.

The remediation goals for this site are to eliminate or reduce to the extent practicable:

- exposures of persons at or around the site to metals in the surface and near-surface soils;

Further, the remediation goals for the site include attaining to the extent practicable:

- the Department's Soil Cleanup Objectives (SCOs) for the Protection of Public Health: Restricted Use - Commercial ("NYSDEC Regulations 6NYCRR Subpart 375-6, Remedial Program Soil Cleanup Objectives")

SECTION 7: SUMMARY OF THE EVALUATION OF ALTERNATIVES

The selected remedy must be protective of human health and the environment, be cost-effective, comply with other statutory requirements. Potential remedial alternatives for the Former Hettling Farm site were identified, screened and evaluated in the AA report which is available at the document repositories established for the site.

A remedial alternative which would restore the site to pre-disposal conditions was considered by the Department as part of the review of the Alternatives Analysis report. The remedial alternative evaluated to was; complete excavation and removal of all contaminated soils from the site above the Part 375, Unrestricted Use SCOs. This would involve the excavation, transport and disposal of approximately 1 foot of soil over the whole 20.5 acres of area, plus the removal of the soils at locations where contaminants were present at depth. The volume of soil that would have to be removed and disposed of in order to restore the site to pre-disposal conditions is estimated at greater than 33,000 yd^3. Base upon this, the contemplated use of the site, and the evaluation of this remedial approach against applicable criteria, including protectiveness and costs, this option was screened out from further consideration. The development of the preferred remedial action was thus focused on the alternatives presented in the AA report in terms of the contemplated use of the site as commercial property, including passive recreational uses.

A summary of the remedial alternatives that were considered for this site is discussed below. The present worth represents the amount of money invested in the current year that would be sufficient to cover all present and future costs associated with the alternative. This enables the costs of remedial alternatives to be compared on a common basis. As a convention, a time frame of 30 years is used to evaluate present worth costs for alternatives with an indefinite duration. This does not imply that operation, maintenance, or monitoring would cease after 30 years if remediation goals are not achieved.

7.1: Description of Remedial Alternatives

The following potential remedies were considered to address the contaminated soils at the site.

Alternative 1: No Further Action

The No Further Action alternative recognizes remediation of the site conducted under a previously completed IRM. To evaluate the effectiveness of the remediation completed under the IRM, only continued monitoring is necessary.

This alternative would leave the site in its present condition and would not provide any additional protection to human health or the environment.

Present Worth: *$38,000*
Capital Cost: *$0.00*
Annual Costs:
(Years 1-5 Monitoring): *$8,500*

Alternative 2: Institutional Controls, Site Management Plan and Long-Term Monitoring

Present Worth: *$130,000*

Capital Cost: $15,000
Annual Costs:
(Years 1-5 Site Management & Monitoring): $13,000
(Years 5-30 Site Management): $4,800

Under this alternative the site contamination would not be actively addressed and the site conditions would remain the same. Institutional controls in the form of an environmental easement would be put in place on the property. The environmental easement would require continued commercial use of the property, which includes passive recreation and industrial use and development and compliance with an approved site management plan (SMP). The SMP would: restrict soil excavations at the site, requires continued long-term monitoring of the site media, as well as biannual site inspections. This alternative is readily implementable and would be completed in 12 months after remedy selection.

Alternative 3: Placement of Soil Cover, Institutional Controls, Site Management Plan and Long-Term Monitoring

Present Worth: $680,000
Capital Cost: $570,000
Annual Costs:
(Years 1-5 Site Management & Monitoring): $13,000
(Years 5-30 Site Management): $4,800

Under this alternative a twelve inch soil cover would be placed over the area of concern where arsenic is present in the surface and near-surface soils above 16 ppm. The area to be covered is approximately 7.5 acres in size and would include a demarcation layer beneath the clean soils utilized for the cover. The top six inches of soil would be capable of supporting plant growth and the covered area would be hydro-seeded and protected until establishment of the vegetation.

Institutional controls in the form of an environmental easement would be put in place on the property. The environmental easement would require continued commercial use of the property which includes passive recreation and development and compliance with an approved site management plan (SMP). The SMP would include; properly maintaining the soil cover barrier and demarcation layers, restricting soil excavations at the site, require continued long-term monitoring of the site media, as well as biannual site inspections. Figure 7 shows the area of the soil cover. This alternative is readily implementable and would be completed in 12 to 24 months after remedy selection.

Alternative 4: Excavation and Disposal of Impacted Soils, Replacement with Clean Fill, Institutional Controls and Long-Term Monitoring

Present Worth: $2,020,000
Capital Cost: $1,980,000
Annual Costs:
(Years 1-5 Site Management & Monitoring): $13,000
(Years 5-30 Site Management): $4,800

Under this alternative all soils in the area of concern, where arsenic is present in the surface and near-surface soils above the Protection of Public Health - Commercial SCO of 16 ppm would be excavated and disposed of off-site. The area to be excavated is approximately 7.5 acres in size and would be backfilled with clean soils. The top six inches of soil would be capable of supporting plant growth and the backfilled area would be hydro-seeded and protected until establishment of the vegetation.

Institutional controls in the form of an environmental easement would be put in place on the property. The environmental easement would require continued commercial use of the property, development and compliance with an approved site management plan (SMP), which includes properly maintaining the

remediated area, requires continued long-term monitoring of the site media, as well as biannual site inspections. Figure 7 shows the area of the excavation. This alternative is readily implementable and would be completed in 12 to 24 months after remedy selection.

7.2 Evaluation of Remedial Alternatives

The criteria to which potential remedial alternatives are compared are defined in 6 NYCRR Part 375, which governs the remediation of environmental restoration projects in New York A detailed discussion of the evaluation criteria and comparative analysis is included in the RA report.

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

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

2. Compliance with New York State Standards, Criteria, and Guidance (SCGs). Compliance with SCGs addresses whether a remedy will meet environmental laws, regulations, and other standards and criteria. In addition, this criterion includes the consideration of guidance which the Department has determined to be applicable on a case-specific basis.

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

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

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

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

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

7. Cost-Effectivness. Capital costs and annual operation, maintenance, and monitoring costs are estimated for each alternative and compared on a present worth basis. Although cost-effectiveness is the last balancing criterion evaluated, where two or more alternatives have met the requirements of the other criteria, it can be used as the basis for the final decision. The costs for each alternative are presented in Table 1. This final criterion is considered a "modifying criterion" and is taken into account after evaluating those above. It is evaluated after public comments on the Proposed Remedial Action Plan have been received.

8. Community Acceptance - Concerns of the community regarding the SI/AAR reports and the PRAP are evaluated. A responsiveness summary will be prepared that describes public comments received and the manner in which the Department will address the concerns raised. If the selected remedy differs significantly

from the proposed remedy, notices to the public will be issued describing the differences and reasons for the changes.

SECTION 8: SUMMARY OF THE PROPOSED REMEDY

The Department is proposing Alternative 3, Placement of Soil Cover, Institutional Controls, Site Management Plan and Long-Term Monitoring as the remedy for this site. The elements of this remedy are described at the end of this section.

The proposed remedy is based on the results of the RI and the evaluation of alternatives presented in the AAR.

Alternative 3is being proposed because, as described below, it satisfies the threshold criteria and provides the best balance of the primary balancing criteria described in Section 7.2. It would achieve the remediation goals for the site, by containing the soils that create the most significant risk to public health. The use of a soil cover as a containment system would limit direct contact exposure of humans to the arsenic contaminated surface, near-surface and sub-surface soils. Alternative 4, excavation and disposal, would also comply with the threshold criteria in that the arsenic contaminated soils in the area of concern would be removed from the site. Although the magnitude of the residual public health risks after remediation would be less with excavation and off-site disposal of the contamination under Alternative 4, proper placement and maintenance of the soil cover system in Alternative 3 would minimize the residual public health risks to an acceptable level for the contemplated site use.

Alternatives 1 and 2 (the No Further Action and Institutional Controls / SMP/ Long-term Monitoring Alternatives) do not include actions to contain, remove, or treat the contaminants that pose a current or potential threat to human health. While Alternatives 1 and 2 would monitor the site media and Alternative 2 would additionally provide some measure of reduction of the potential for direct contact exposure through institutional controls, it would not meet the threshold criteria for the site.

Because Alternatives 3 and 4 satisfy the threshold criteria, the five balancing criteria are particularly important in selecting a final remedy for the site.

Alternatives 3 (soil cover) and 4 (excavation and removal) both have short-term on-site impacts which can be controlled and/or minimized through the use of engineering controls. Short-term impacts for the on-site area and surrounding community include increased construction traffic and it's associated noise and potential dust generation. Based upon the volume of materials to be excavated under Alternative 4, and the corresponding volume of backfill materials required, this action would have greater short-term impacts than Alternative 3.The time needed to implement the remedy and to achieve the remediation goals would be approximately the same for both Alternatives 3 and 4.

Achieving long-term effectiveness and permanence is best accomplished by excavation and removal of the contaminated overburden soils using Alternatives 4. However, Alternative 3, the placement of a soil cover with re-vegetation and the implementation of institutional controls would provide adequate and reliable controls for the residual human exposure risks.

Alternative 4 would provide an on-site reduction in the volume of contamination and the associated reductions in mobility and toxicity. Alternative 3, would not reduce toxicity or volume, but would reduce the on-site mobility of the contaminants through containment.

Alternatives 3 and 4 are both implementable on a technical basis. Alternative 4 relies on the availability of permitted and operating waste disposal facilities to accept contaminated soils from the site which are generally available. There would be no waste disposal requirements associated with Alternative 3. Alternative 4 involves off-site transport of contaminated soils, which may pose a limited risk of exposure

during handling and transport. The administrative feasibility of developing and implementing the institutional controls are the same for both Alternatives 3 and 4.

The costs of the Alternatives considered to remediate the site vary significantly. Alternative 4 (excavation) is the most expensive followed by Alternative 3 (soil cover). Alternatives 3 and 4 both include costs associated with the institutional controls and continued monitoring, thus the costs for these aspects of the remedies are roughly the same for each. The transportation and disposal requirements associated with Alternative 4 represent a substantial portion of the remedy costs. There are no waste disposal costs associated with Alternative 3. Although containment (Alternative 3) is not a permanent remedy, it is significantly less expensive than excavation (Alternatives 4) and will be protective of human health at the site. Thus, consideration is given to the cost differential in utilizing Alternative 3 for remediating the site.

The estimated present worth cost to implement the remedy is $680,000. The cost to construct the remedy is estimated to be $570,000 and the estimated average annual costs for years 1 through 5 is $13,000 and years 5 through 30 is $4,800.

The elements of the proposed remedy are as follows:

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

2. A soil cover would be constructed over all vegetated areas to prevent exposure to contaminated soils. The one-foot thick cover would consist of clean soil underlain by an indicator such as orange plastic snow fence to demarcate the cover soil from the subsurface soil. The top six inches of soil would be of sufficient quality to support vegetation. Clean soil would constitute soil that meets the Division of Environmental Remediation's criteria for backfill or local site background. If any portion of the property is developed for active recreational use, a two-foot thick soil cover would be required in order to meet the Part 375 Protection of Public Health, Restricted -Residential SCOs, which would allow this use. Non-vegetated areas (buildings, roadways, parking lots, etc.) would be covered by a paving system or concrete at least 6 inches thick.

3. Imposition of an institutional control in the form of an environmental easement that would require (a) limiting the use and development of the property to commercial use, which would also permit industrial use. The easement may be amended in the future to allow for development of portions of the property for active recreational uses, contingent upon meeting the Part 375 Protection of Public Health, Restricted-Residential SCOs in these areas; (b) compliance with the approved site management plan; and (c) the property owner to complete and submit to the Department a periodic certification of institutional and engineering controls.

4. Development of a site management plan which would include the following institutional and engineering controls: (a) management of the final cover system to restrict excavation below the soil cover's demarcation layer, pavement, or buildings. Excavated soil would be tested, properly handled to protect the health and safety of workers and the nearby community, and would be properly managed in a manner acceptable to the Department; (b) monitoring of groundwater and requiring water quality testing in accordance with local and County requirements for any use of groundwater as a potable water source; (c) identification of any use restrictions on the site; (d) provisions for the continued proper operation and maintenance of the components of the remedy.

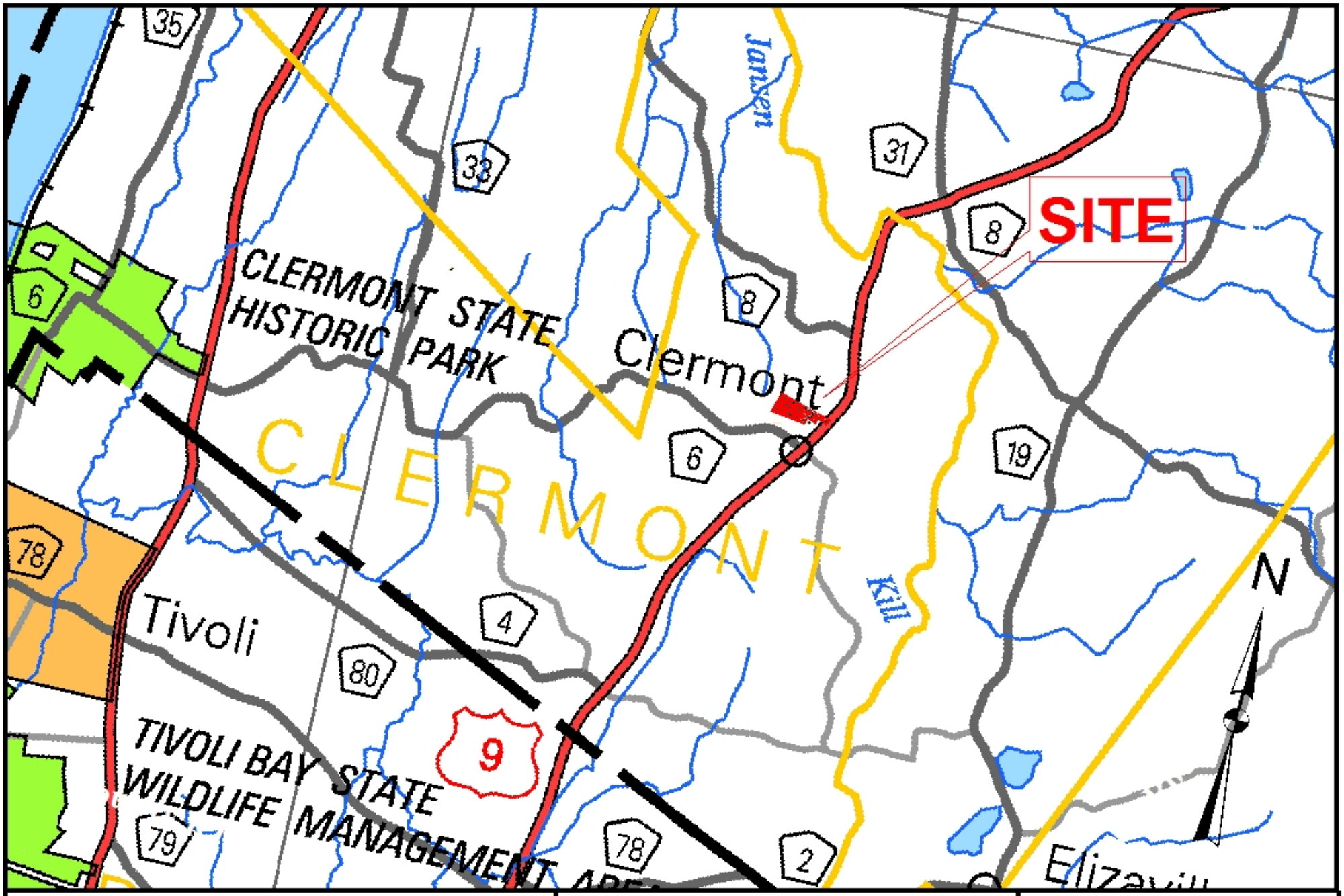
5. The property owner would provide a periodic certification of institutional and engineering controls, prepared and submitted by a professional engineer or such other expert acceptable to the Department, until the Department notifies the property owner in writing that this certification is no longer needed. This submittal would: (a) contain certification that the institutional controls and engineering controls put in place are still in place and are either unchanged from the previous certification or are compliant with Department-approved modifications; (b) allow the Department access to the site; and (c) state

that nothing has occurred that would impair the ability of the control to protect public health or the environment, or constitute a violation or failure to comply with the site management plan unless otherwise approved by the Department.

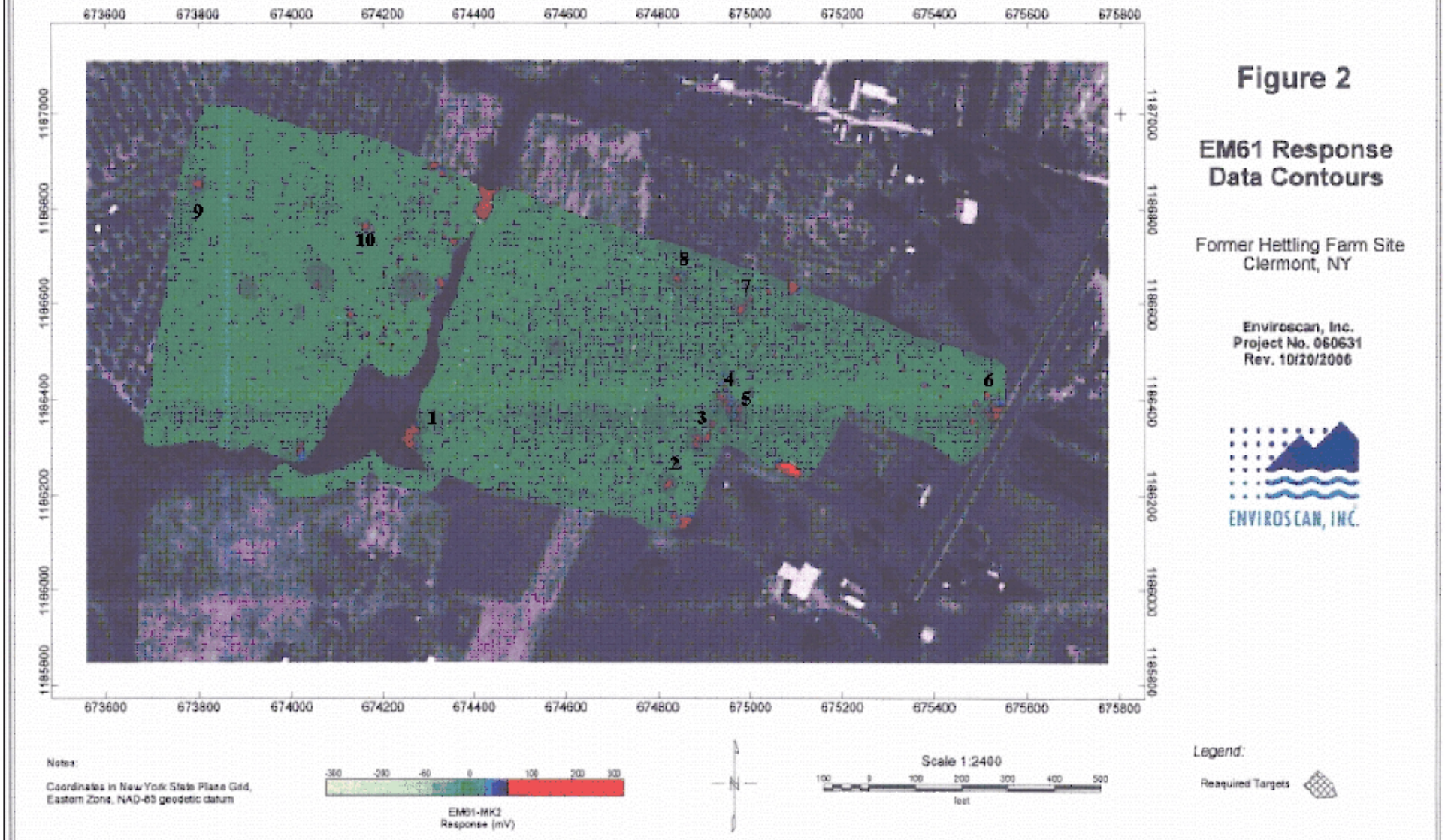
Since the remedy results in untreated hazardous substances remaining at the site, a long-term monitoring program would be instituted. The site groundwater would be monitored to insure that the contaminants of concern are not being mobilized from beneath the soil cover. This program would allow the effectiveness of the soil cover system to be monitored and would be a component of the long-term management for the site.

Table 1
Remedial Alternative Costs

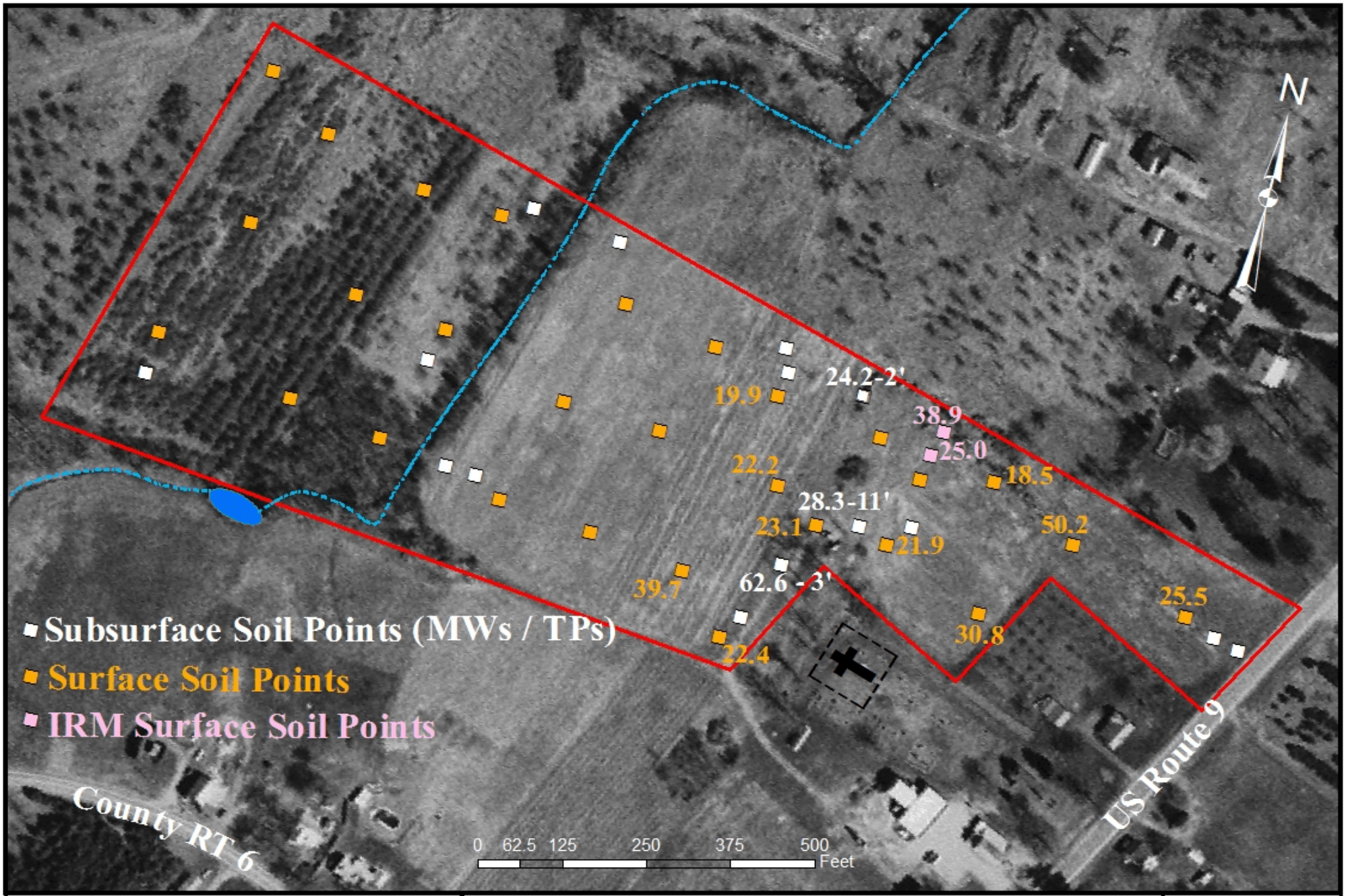
Remedial Alternative	Capital Cost ($)	Annual Costs ($)	Total Present Worth ($)
#1 No Further Action	$0	Years 1-5 $8,500	$38,000
#2 Institutional Controls, Site Management Plan and Long-term Monitoring	$15,000	Years 1-5 $13,000 Years 5-30 $ 4,800	$130,000
#3 Placement of a Soil Cover, Institutional Controls, Site Management Plan and Long-term Monitoring	$570,000	Years 1-5 $13,000 Years 5-30 $ 4,800	$680,000
#4 Excavation and Disposal of Impacted Soils, Replacement with Clean Fill, Institutional Controls, and Long-term Monitoring	$1,980,000	Years 1-5 $13,000 Years 5-30 $ 4,800	$2,020,000



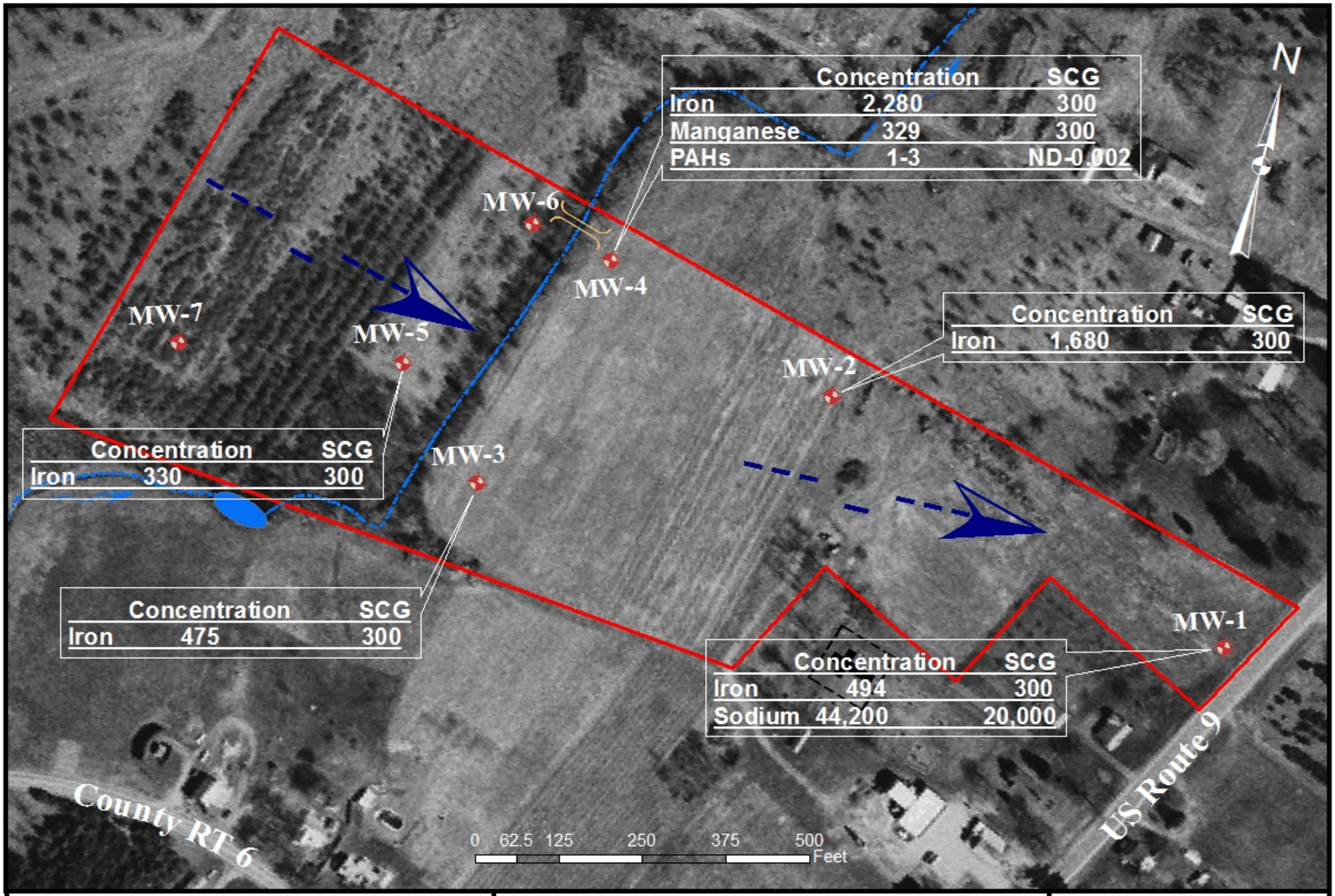
Former Hettling Farm Site **E411015**	**Site Location**	**Figure 1**



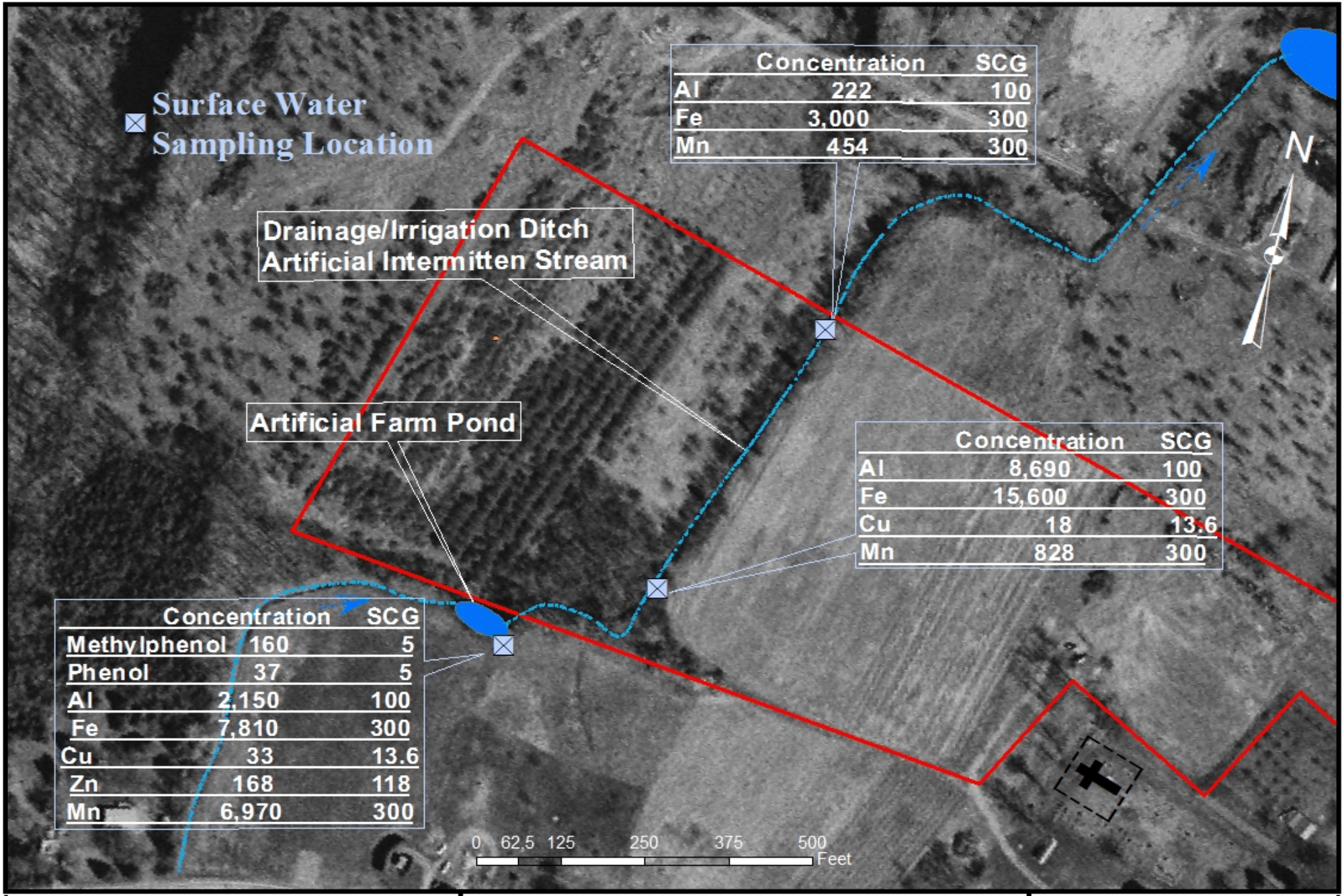
Former Hettling Farm Site **E411015**	**EM Survey**	**Figure 2**



Former Hettling Farm Site E411015	Nature and Extent of Contamination Arsenic in Surface and Subsurface Soils (ppm - mg/kg) SCO = 16 ppm	Figure 3



Former Hettling Farm Site E411015	Nature and Extent of Contamination Groundwater (ppb-ug/l)	**Figure 4**

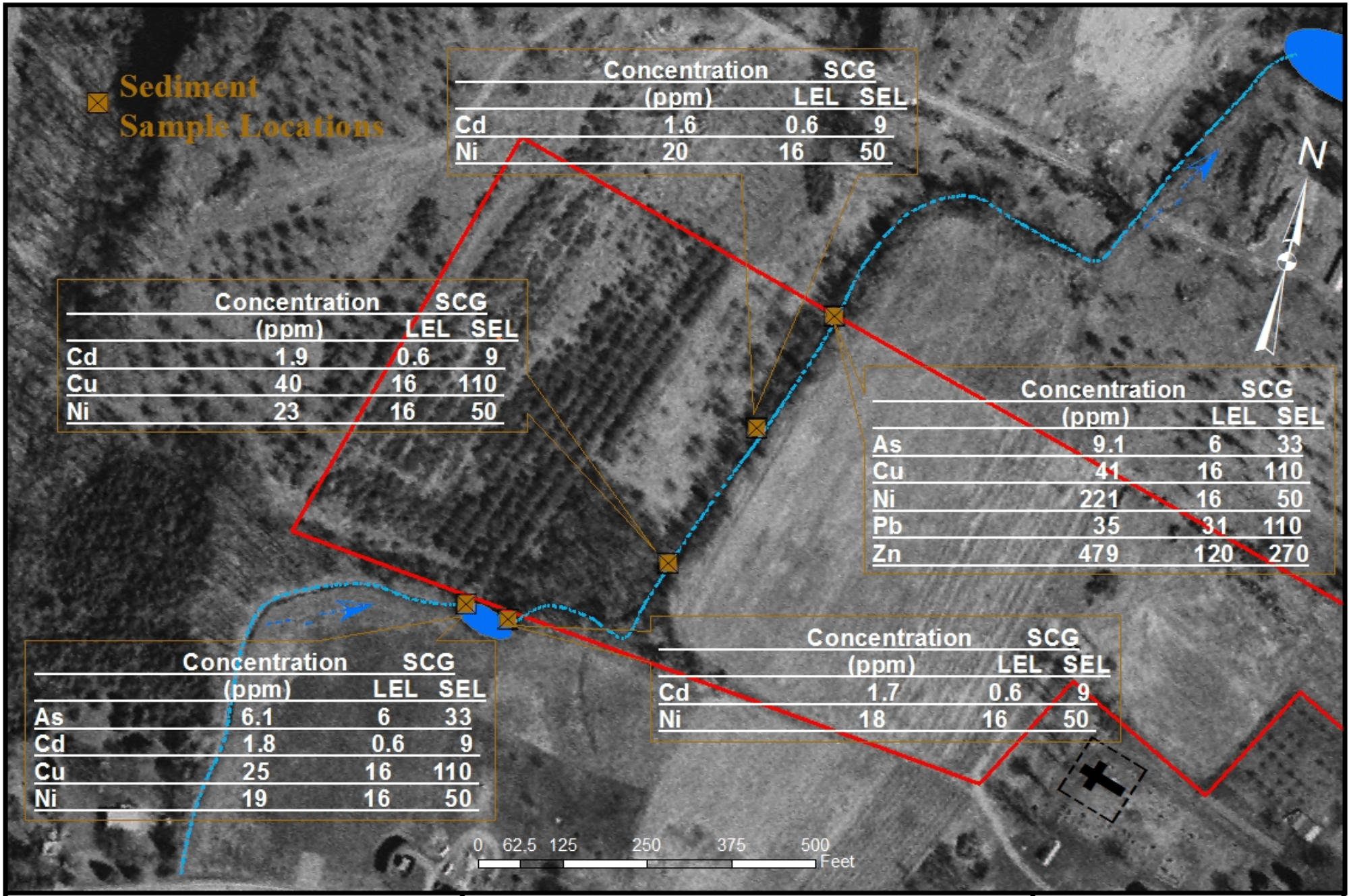


	Concentration	SCG
Al	222	100
Fe	3,000	300
Mn	454	300

	Concentration	SCG
Al	8,690	100
Fe	15,600	300
Cu	18	13.6
Mn	828	300

	Concentration	SCG
Methylphenol	160	5
Phenol	37	5
Al	2,150	100
Fe	7,810	300
Cu	33	13.6
Zn	168	118
Mn	6,970	300

Former Hettling Farm Site E411015	Nature and Extent of Contamination Surface Water (ppb - ug/l)	**Figure 5**



	Concentration (ppm)	SCG LEL	SCG SEL
Cd	1.6	0.6	9
Ni	20	16	50

	Concentration (ppm)	SCG LEL	SCG SEL
Cd	1.9	0.6	9
Cu	40	16	110
Ni	23	16	50

	Concentration (ppm)	SCG LEL	SCG SEL
As	9.1	6	33
Cu	41	16	110
Ni	221	16	50
Pb	35	31	110
Zn	479	120	270

	Concentration (ppm)	SCG LEL	SCG SEL
As	6.1	6	33
Cd	1.8	0.6	9
Cu	25	16	110
Ni	19	16	50

	Concentration (ppm)	SCG LEL	SCG SEL
Cd	1.7	0.6	9
Ni	18	16	50

Former Hettling Farm Site E411015	Nature and Extent of Contamination Sediments (ppm - mg/kg)	**Figure 6**

Former Hettling Farm Site E411015	Alternative 3 - Soil Cover Alternative 4 - Excavation Area	**Figure 7**