TOWN OF SALINA LANDFILL

REMEDIAL INVESTIGATION/FEASIBILITY STUDY

SITE I.D. NO. 734036

WORK PLAN
VOLUME I

PREPARED FOR:

TOWN OF SALINA
201 School Road
Liverpool, New York 13088

MAY 15, 1998

PREPARED BY:

CLOUGH, HARBOUR & ASSOCIATES LLP
Engineers, Surveyors, Planners & Landscape Architects
109 South Warren Street, Suite 1300
Syracuse, New York 13202

CHA Project No. 6967

VOLUME I
TABLE OF CONTENTS

TABLE OF CONTENTS (CONT'D)

TABLES

FIGURES

VOLUME II

1.0 INTRODUCTION

1.1 BACKGROUND INFORMATION

Clough, Harbour & Associates LLP (CHA) has been retained by the Town of Salina to conduct a Remedial Investigation and Feasibility Study (RI/FS) of the former Town of Salina Landfill. The landfill has been designated a Class 2 Inactive Hazardous Waste Site by the New York State Department of Environmental Conservation (NYSDEC) and is also considered a subsite to the Onondaga Lake National Priorities List (NPL) site by the United States Environmental Protection Agency (USEPA).

The Town of Salina Landfill is located off of Route 11 in the Town of Salina (Figure 1). It is bounded to the east by Route 11 and to the north by the New York State Thruway. The Onondaga County Transfer Station is located immediately to the west of the landfill. Historically, Ley Creek has historically considered to be the southern boundary of the site, although recent information indicates that landfilled materials may exist south of Ley Creek. Portions of the Ley Creek channel were apparently moved in the early 1970s. The Town of Salina Landfill has previously been defined as approximately 55 acres in size (Figure 2).

The Town of Salina Landfill opened in 1960 and stopped accepting waste in 1975. During the period the landfill was open, in addition to accepting municipal solid waste, the landfill also accepted hazardous wastes include paint sludge, paint thinner, PCB-contaminated wastes, and contaminated sediment dredged from Ley Creek. A soil cover was placed over the landfill in 1982. Since that time, a number of investigations have been performed at the Town of Salina Landfill. The investigations have largely been focused on gathering only enough data to determine whether the landfill was a threat to human health and to the environment. In 1996, the New York State Department of Environmental Conservation (NYSDEC) designated the Town of Salina Landfill as a Class 2 Inactive Hazardous Waste Site.

The investigations previously conducted at the Town of Salina Landfill include:

- *1986 – New York State Department of Environmental Conservation (NYSDEC) and Onondaga County Department of Health (OCDOH):* These agencies collected 3 soil samples adjacent to Ley Creek and 4 surface water samples from Ley Creek. Polychlorinated biphyenl compounds (PCBs) were not detected in the water samples, but were detected in soil samples collected adjacent to Ley Creek

- *1987 - NUS Corporation (for the USEPA):* Five soil samples were collected from the fill area and 3 surface water and sediment samples were collected from Ley Creek. The soil contains polyaromatic hydrocarbon compounds (PAHs), metals, volatile organic compounds (VOCs) and pesticides in low levels, but no PCBs. The surface water and sediment sampling showed that samples collected downgradient from the landfill did not contain higher concentrations of contaminants than the sample collected upgradient from the landfill.

- *1987 - Atlantic Testing Co. (for NYSDEC):* In an attempt to install three groundwater monitoring wells, black oil and petroleum-saturated soil was encountered in 2 boreholes. The soils in these borings contained PCBs, low levels of Semi-volatile organic compounds (SVOCs) and dibenzofuran and elevated levels of cadmium, chromium, nickel and zinc. One upgradient monitoring well installed. The groundwater from this well contained low levels of VOCs and SVOCs, high iron and manganese, but no PCBs.

- *1989 - O'Brien & Gere (for General Motors Corp):* A bioaccumulation study conducted on fish caught in Ley Creek showed that the fish contained up to 6.8 mg/kg PCBs.

- *1991 - Ecology and Environment (for NYSDEC):* During an inspection of the landfill, a leachate outbreak was observed along the bank of Ley Creek.

- *1994- Ecology and Environment: Preliminary Assessment (for NYSDEC):*This investigation included the collection of 10 surface water and sediment samples from Ley Creek and adjacent drainage ways. Additionally, 5 surface soil samples from the landfill and 3 leachate samples along the north bank of Ley Creek were collected. Results indicated low levels of VOCs and SVOCs in the surface water but no PCBs. PCBs, pesticides, VOCs, and SVOCs were detected in the sediment samples, soil samples, and leachate samples.

- *1996 - Ecology and Environment: Preliminary Assessment Addendum (for NYSDEC):* This supplemental investigation was conducted to provide further information on potential groundwater contamination at the landfill. Five new monitoring wells were installed, developed and sampled. The groundwater from most wells contained low levels of VOCs and SVOCs. One PCB compound was detected in only 1 well; in a low concentration. One of the downgradient wells (MW-4) contained almost no organic compounds, but did show elevated levels of a number of metals. Two surface water and

sediment samples collected by NYSDEC from drainage ways on site indicated PCBs were present in the sediment but were absent from the surface water.

- *1997 – NYSDEC: Ley Creek Sampling:* Representatives from NYSDEC collected three sediment samples from the former Ley Creek channel (that lies to the south of the existing channel. The results of that sampling show that volatile organic compounds, semi-volatile organic compounds, PCBs, and metals are present in moderate to high concentrations in the former Ley Creek channel.

1.2 PROJECT OBJECTIVES

The objectives of the project include the following:

- Obtain historical and site data to support cost recovery from potentially responsible parties (PRPs)
- Determine the nature and extent of contamination through a detailed field investigation. The investigation will include verification of current landfill dimensions, soil properties, waste types and obtain other limited design data to support the Feasibility Study.
- Assess human exposure potential and current and potential impacts to flora and fauna.
- Conduct a Feasibility Study, with a presumptive focus on containment, especially construction of a landfill cap.
- Inform the public of investigation activities and their results, responding to concerns as required and appropriate under 6NYCRR Part 375, New York State Regulations for Inactive Hazardous Waste Sites.

CHA will prepare three separate reports for this project including a Remedial Investigation Report, a Risk Assessment Report, and a Feasibility Study Report. The reports will support NYSDEC's selection of a remedy for the Town of Salina Landfill in accordance with 6NYCRR Part 375, and consistent with the most recent National Oil and Hazardous Substances Contingency Plan (NCP) and the Comprehensive Environmental Response Compensation and Liability Act (CERCLA).

2.0 RI/FS PROJECT TASKS

This Work Plan has been prepared in accordance with CHA's initial proposal to the Town of Salina and in accordance with the Consent Order for the site. The Work Plan also describes investigative activities to be performed in the area south of the current Ley Creek channel. These activities were not included in CHA's proposal to the Town of Salina. The plan provides a description of six (7) major tasks, with each task further broken down into a number of subtasks. The major tasks include:

1. Work Plan Development
2. Site Characterization
3. Remedial Investigation Report
4. Second Phase Investigation
5. Risk Assessment
6. Feasibility Study
7. Support Activities

2.1 TASK 1 - WORK PLAN DEVELOPMENT

This task is broken down into five subtasks including information review and project scoping; work plan development; potential responsible party (PRP) search plan preparation; citizen participation plan preparation; and subcontractor procurement. Each subtask will be broken down in detail below.

2.1.1 Subtask 1.1 - Information Review and Scoping Session

Representatives from CHA (and their subconsultant), the Town of Salina, and the NYSDEC visited the site in November 1997 to familiarize all parties with the site. The objective of the site visit was to locate existing wells, identify potential sampling locations, and to examine an area south of Ley Creek where landfilling may have occurred in the past.

Representatives from CHA, the Town, and the NYSDEC participated in a scoping meeting for the RI/FS in December 1997. In preparation for the Scoping Meeting, CHA examined available information about the site, including but not limited to the 1994 Preliminary Site Assessment (PSA) conducted by Ecology and Environment and the 1996 PSA Addendum completed by Ecology and Environment. CHA prepared a Scoping document that formed the basis of discussion at the meeting. The objective of the scoping meeting was to define the specific scope of work to be completed for this project.

2.1.2 Subtask 1.2 - Work Plan Development

CHA has prepared this work plan which includes:

- a conceptual site model
- a description and purpose of the major tasks and subtasks
- a detailed schedule with milestones and deliverables
- a staffing plan
- an MBE/WBE utilization plan

As integral parts of the Work Plan, CHA has prepared under separate cover a Field Sampling Plan (FSP), a Quality Assurance Project Plan (QAPP), and a Health and Safety Plan (HASP). Volume II of this work plan presents the project budget.

The FSP:

- identifies sample locations
- describes sample collection and handling procedures
- discusses decontamination procedures
- describes management of investigative derived wastes

The HASP:

- describes the potential physical, chemical, and biological hazards associated with performing the field work for the project.
- describes the personal protective equipment needed to perform each task
- describes equipment and personnel decontamination
- describes emergency procedures

The QAPP defines Data Quality Objectives (DQOs) and:

- provides a sound basis for comparison of site conditions, especially contaminant levels, to standards, criteria and guidance (SCGs).
- provides the means to collect preliminary engineering data to allow feasibility analysis of potential technologies.
- provides the means to collect data of adequate precision for risk assessment, both human health and ecological.
- Provides the means to collect legally defensible data that may form a basis for cost recovery from potentially responsible parties (PRPs)

2.1.3 Subtask 1.3 - Potentially Responsible Party (PRP) Search Plan

The Town of Salina has been identified as the primary owner of the landfill and is under Consent Order from the NYSDEC to undertake a RI/FS of the landfill. However, the NYSDEC recognizes that there may be other parties responsible for disposing hazardous waste at the landfill. CHA has prepared a PRP Search Plan in accordance with guidance from the NYSDEC. The PRP Search Plan has been submitted under separate cover. The objective of the PRP search will be to identify other parties that may share the cost of this RI/FS and other costs related to remediation of the site. CHA intends to subcontract the PRP search to a minority or women's business enterprise (M/WBE), if possible.

2.1.4 Subtask 1.4 - Citizen Participation Plan

Citizen participation is considered an integral part of this RI/FS. CHA has prepared a Citizen Participation Plan for this project, consistent with NYSDEC guidance. The objective of the plan was to:

- identify interested parties in the site vicinity and develop a site contact list
- describe the method of communication to these parties (fact sheets, meetings, etc.)
- identify the location where copies of all documents will be kept for public review

CHA will coordinate citizen participation activities with the Town and with NYSDEC. The Citizen Participation Plan will draw from, and be consistent with the Citizen Participation Plan that has already been prepared for the Onondaga Lake NPL site.

2.1.5 Subtask 1.5 - Subcontractor Procurement

CHA will subcontract portions of this work to various subconsultants and subcontractors. CHA has already identified Lawler, Matusky and Skelly Engineers LLP (LMS) as a subconsultant that will assist CHA in the preparation of the human health and ecological risk assessments. CHA will retain subcontractors to perform drilling services, excavation of test pits, laboratory analyses, data validation services, copy services, surveying, and electrical contracting. As mentioned above, CHA will also retain a subcontractor to conduct the PRP search. This task has included preparation of Requests for Proposals (RFPs) from qualified firms, evaluation of proposals, and work necessary to sign subcontract agreements.

2.2 TASK 2 - SITE CHARACTERIZATION

As mentioned above, the site is bounded to the south by Ley Creek and has wetlands along its western and northern borders. A conceptual model of the site is included as Figure 3. The contaminated media at the site are known to include surface water and sediment and groundwater. The potential migration pathways include, but are not limited to, leachate seeps and shallow groundwater entering the adjacent surface water bodies, deeper regional groundwater flow, and subsurface utility lines. The potential receptors include people that come in contact with contaminated surface soil; fisherman eating potentially contaminated fish, and migrating waterfowl. Although there are no groundwater users within 3 miles, the regional flow regime for groundwater from deeper hydrologic zones is unknown.

To fully investigate the nature and extent of contamination, CHA proposes the following subtasks:

- site survey
- ecological investigation

- waste area investigation
- groundwater investigation
- surface water/sediment investigation
- surface soil investigation
- multi-media sampling (surface water, sediment, surface and subsurface soil, groundwater)

Each task will be described in greater detail below.

2.2.1 Subtask 2.1 – Site Survey

The first element in the field investigation will be a field survey. Our survey crew will establish a baseline referenced to New York State Plane coordinates (NAD83) and then survey spot elevations around the landfill to develop a topographic map of the site. The map will be plotted using a 2-foot contour interval referenced to National Geodetic Vertical Datum of 1988. Horizontal and vertical control for the survey will be established using global positioning systems (GPS). Field survey data will be gathered using electronic total stations and data collectors. CHA will also locate the horizontal position of all sampling points and will locate the vertical elevation of all wells and piezometers to the nearest 0.01-foot.

All data will be in a format that is compatible with a Geographic Information System (GIS) database. Property boundaries will not be surveyed as part of this task but will be approximated based on tax map information and/or base maps prepared by previous NYSDEC contractors. (Note that because of the type of project, it will not be necessary to pay prevailing wage rates for the field survey.

2.2.2 Subtask 2.2 - Ecological Field Survey

The fieldwork for the ecological assessment will be conducted concurrently with other site characterization activities, to the extent the schedule is appropriate. A full discussion of the field surveys to be conducted as part of the ecological assessment is contained in Section 2.4.2.

2.2.3 Subtask 2.3 – Waste Area Investigation

The waste area investigation will consist of review of historical aerial photographs, a soil gas survey, and excavation of test pits to define the limit of waste. CHA will first compile and review historical aerial photographs to track the development of the landfill over time. Historical aerial photography is available from a number of local sources including the Onondaga County Health Department, the U.S. Soil Conservation Service, and the New York State Thruway Authority, among others.

To determine if the landfill is still producing methane gas and determine whether gas is migrating off site, CHA will perform a soil gas survey. The survey will be performed by advancing a steel probe approximately 3-4 feet into the ground and then using a meter designed to detect methane gas to analyze the soil gas in the hole made by the probe. The survey points will be located around the perimeter of the landfill at approximately 100-foot intervals. Survey points will also be located across the top of the landfill at 200-foot intervals.

Although a soil cover was placed over the landfill in 1982, it is necessary to verify the limit of waste at the landfill. As part of the site investigation conducted by Ecology and Environment under contract to NYSDEC, two test borings were drilled on the eastern side of the landfill. The borings showed that no waste was encountered at these locations. To efficiently determine the limit of waste, CHA proposes to excavate test pits or test trenches around the apparent perimeter of the landfill verifying the position of waste at approximately 100-foot intervals. We will also excavate test pits in the area between the current Ley Creek channel and the former Ley Creek channel to identify the limit of waste in this area. Particular attention will also be paid to investigating the limit of waste under apparent wetlands. A qualified CHA geologist or engineer will oversee this work and will characterize the thickness and soil type for the cover materials and the materials encountered in each test pit or test trench. As a contingency, CHA will collect up to five (5) samples of unusual or suspect materials encountered in test trenches.

To determine if the bedding material surrounding the sewer that crosses the site is acting as a preferred pathway for contaminant migration, we will excavate test pits in this material to facilitate sample collection. We anticipate that a maximum of two samples will be adequate to characterize the chemical contaminants in this material. We will subcontract the excavation work to a qualified excavating contractor.

2.2.4 Subtask 2.4 - Groundwater Investigation

The current monitoring network around the landfill consists of six groundwater monitoring wells. However, given the size of the landfill, the existing well network does not adequately characterize groundwater quality in the area. Therefore, based on our discussions with NYSDEC, we propose to install an additional eight (8) permanent monitoring wells on the project site in the water table aquifer (Figure 4). Five of these eight wells will be installed on the north side of Ley Creek and three wells will be installed on the area between the current Ley Creek channel and the former Ley Creek channel. Currently there is no information on water quality or depth to water in the middle of the landfill. Therefore, based on our discussions with the NYSDEC, we propose to install two of the eight wells in the middle of the landfill. Based on existing information, we are assuming that the wells will be approximately 20 feet deep. CHA will subcontract the drilling work to a qualified drilling contractor.

Because of the importance of characterizing groundwater contaminant transport adjacent to Ley Creek, we propose to install seven (7) temporary wells to an average depth of 20 feet along the southern edge of the Landfill (Figure 5). The temporary wells will be installed using the Geoprobe direct push method or other appropriate methods. These temporary wells will be used to help determine the interaction between groundwater and leachate and whether a leachate collection system would be effective. CHA will retain a qualified contractor to perform this work.

Currently, there is no information on the vertical extent of groundwater contamination. Therefore, we propose to install three (3) permanent "deep" monitoring wells. The wells will be

installed above the bedrock/overburden interface; however, the depth to bedrock is unknown. Review of work by Winkley (1989) in which he compiled existing geological information for Onondaga County shows that the depth to bedrock appears to increase dramatically beneath Onondaga Lake, but is on the order of 50 - 75 feet deep near the site. For the purpose of the workplan budget, we are assuming that the three "deep" wells will be 75 feet deep.

A second objective for installing three deep wells is to identify the subsurface soils beneath the site. To help understand the subsurface transport of contamination, it will be useful to construct cross-sections through the landfill. Therefore, as the borings for the deep wells are drilled, soil samples will be collected continuously from surface grade until bedrock is encountered. A geologist will log the samples. In addition to the three deep wells discussed above, we propose to drill four additional borings to bedrock through the landfill. As with the deep wells, we assume that these borings will each be up to 75 feet deep. To evaluate the potential for subsurface contamination, CHA will submit up to one sample per boring (fifteen samples total) for chemical analysis. The samples will be collected from subsurface soils immediately below landfilled materials, as long as these soils lie above the water table.

It is important to note that Winkley (1989) identified areas of possible sand and gravel deposits buried beneath silt and clay deposits in Onondaga County. Areas beneath Onondaga Lake and Ley Creek were identified as such areas. A flowing artesian well was previously identified to the west of the landfill, near the intersection of Interstate 81 and 7th North Street providing some evidence that this sand and gravel deposit is present near the landfill. If in the course of drilling the deep test borings, we identify this sand and gravel deposit, we will need to ensure that there is no cross-contamination from the upper water table aquifer, into the deeper confined aquifer. To address this potential concern, we have accounted for additional drilling costs to install double cased wells, to separate the shallow aquifer from a deeper aquifer.

After the wells are installed, the wells must be developed to remove silt and clay introduced as part of the drilling process. The drilling contractor will perform this work under CHA's supervision. We will attempt to develop each well until the turbidity is below 50 nephelometric

units (NTUs) or for a maximum of 4 hours per well. We are not proposing to develop the temporary wells.

After the wells are developed, all new wells (11) and all existing wells (6) will be sampled. Note that existing well MW-0 is considered to represent background for the site.

To evaluate groundwater contaminant transport rates, we need to determine the hydraulic conductivity and the hydraulic gradient of the aquifer. We propose to perform falling head and rising head slug tests in each of the newly installed wells to measure the hydraulic conductivity. We will measure water levels in the monitoring well network to evaluate the hydraulic gradient. Water levels will be measured at least twice six months apart to evaluate seasonal changes in water table elevation.

2.2.5 Subtask 2.5 – Surface Water/Sediment Investigation

Previous samples of surface water and sediments collected from Ley Creek and adjacent drainage ways provides baseline data on the nature and extent of contamination in these media. However, because of the importance of Ley Creek in potentially transporting contaminants to Onondaga Lake, we propose to collect samples surface water sediment samples from five (5 new locations during this investigation. The samples will be collected from the stretch of channel located between the bridge over Route 11 and the bridge over Seven North Street (Figure 6). Only one sample location (near the bridge by Route 11) will be considered background for the purpose of the site investigation. Note that sources of contamination have already been documented to exist up gradient of the site. The remaining five locations will be identified in the field and will be located immediately downstream of the confluence of all drainage ways and streams entering Ley Creek between Wolf Street and Seventh North Street. The surface water and sediment samples will be collected from depositional areas within Ley Creek. At each location, should conditions permit, one sediment sample shall be collected from a depth of 0-6 inches, while a second sediment sample shall be collected from a depth of 12-24 inches.

In addition to the surface water samples discussed above, a number of leachate seeps have historically been identified along the bank of Ley Creek. To update information regarding the composition of the leachate and to allow a current comparison with groundwater data, CHA will collect up to six (6) leachate samples along both the north and the south banks of Ley Creek.

2.2.6 Subtask 2.6 – Surface Soil Sampling

As mentioned previously, a soil cap was placed over the landfill in 1982. However, to evaluate the potential risk of contact with potentially contaminated surface soil, we propose to collect seven surface soil samples from the landfill. Four of the samples will be collected from the landfill on the north side of Ley Creek and three samples will be collected from the area located between the current Ley Creek channel and the former Ley Creek channel (Figure 7). One of the seven samples will be collected from a location considered to represent background. Because of historically high detection of metals near the National Plating Inc. property, one sample will be collected near their property boundary. We are limiting the number of samples to be collected to a minimum because the soil cap placed in 1982 is assumed to limit the potential for contact and exposure to subsurface contaminants. Additionally, CHA will use data from the 1993 Preliminary Site Assessment in our evaluation.

2.2.7 Subtask 2.7 - Sample Analysis

All of the samples discussed above will be analyzed for the full Target Compound List of chemical parameters plus cyanide, with the exception of the temporary wells. We propose to sample the 7 temporary wells for leachate indicator parameters only. Additionally, the groundwater samples will be analyzed for both total and dissolved metals, and various leachate indicator parameters. The sediment and soil samples will also be analyzed for total organic carbon and the surface water samples will also be analyzed for hardness. A summary of the sampling and analysis proposed, by media, is included in Table 1.

Based on NYSDEC protocols, we will collect and analyze one set of quality assurance/quality control samples (QA/QC) for every 20 samples collected. All samples will be analyzed by a New York State Department of Health-certified laboratory using Revision 95 of the Analytical Services Protocols (ASP). The laboratory will produce an ASP Category B deliverable package.

At this time, based on guidance from NYSDEC, that a second phase investigation will be performed. The scope of the second phase investigation will depend on, and be determined by the results from the first round of sampling. The parameter list to be analyzed during the second round of sampling will most likely be reduced. CHA has accounted for a second round of sampling in the project schedule, but has not budgeted for this work at this time.

2.3 TASK 3 – REMEDIAL INVESTIGATION REPORT

2.3.1 Subtask 3.1 - Data Validation and Data Evaluation

To ensure that the data is useable and legally defensible, and as per NYSDEC protocols, CHA will retain an independent third party validate the laboratory data.). The criteria used to assess the validity of the sample data included the "USEPA Laboratory Data Validation Functional Guidelines for Evaluating Organic and Inorganic Analyses (1988 revisions), the QA/QC guidance associated with specific analytical methods, and the data reviewer's professional judgement. We assume that all samples collected in the first round of sampling will require validation. If a second round of samples are collected and analyzed, then this data will not be validated unless it is significantly different than the first round of data. For data that is not validated, at a minimum, a Data Usability Summary Report will be prepared.

The data evaluation task includes analysis of all the data collected during the field investigation. In this task, we will describe the physical setting of the site through the use of cross sections, describe the nature and extent of contamination, and we will evaluate the fate and transport of the chemicals of concern.

2.3.2 Subtask 3.2 – Data Summary Report

A Data Summary Report will be prepared and provide a summary of the data generated from the first phase of the field investigation. It is anticipated that this report will be short in length and will focus strictly on the results from the first phase investigation.

2.3.3 SECOND PHASE RI WORK PLAN

As a result of the Data Summary Report, it is anticipated that some data gaps may still exist that need to be addressed. At a minimum, because of the manner in which the ecological risk assessment is being conducted (as described in Section 2.5.1), it will be necessary to conduct additional work associated with this task. It is expected that the NYSDEC will generate comments on the Data Summary Report that will form the basis for preparation of a Second Phase RI Work Plan. CHA and the Town of Salina will meet with NYSDEC to scope out the Second Phase RI and then will prepare a Work Plan that will describe the work to be performed. It is assumed that the Second Phase RI Work Plan will be a very focused document.

2.3.4 REMEDIAL INVESTIGATION REPORT

The RI Report will describe the physical setting of the site, the nature and extent of contamination, and an analysis of contaminant fate and transport. Appendices to the RI report will include boring and test pits logs, laboratory data, soil gas survey results, results of the wetland delineation, etc. The RI Report will be prepared in Draft and Final versions. The final RI Report will contain a certification that all activities that comprised the Remedial Investigation were performed in accordance with the DEC-approved Work Plan.

2.4 SECOND PHASE REMEDIAL INVESTIGATION

2.4.1 Subtask 4.1 – Second Phase Field Investigation

As described above, it is anticipated that a second phase remedial investigation will be performed. The scope of this investigation will not be determined until the second phase work plan is approved by NYSDEC. Therefore, the scope and budget for this task cannot be determined at this time. Time for the second phase field investigation has been scheduled in the project.

2.5 TASK 5 - RISK ASSESSMENT

2.5.1 Subtask 5.1 - Human Health Risk Assessment

A baseline human health risk assessment will be performed in accordance with applicable U.S. Environmental Protection Agency (USEPA) guidance documents, including:

- the 1992 national Oil and Hazardous Substances Contingency Plan (NCP), Supplemental Guidance on Performing Risk Assessments in Remedial Investigations/Feasibility Studies (RI/FSs) conducted by potentially responsible parties (1991)
- Revised Policy on Performance of Risk Assessments During Remedial Investigation/Feasibility Studies (RI/FS) conducted by Potentially Responsible Parties (1996)
- Risk Assessment Guidance for Superfund (RAGS) Volume 1: Human Health Evaluation Manual, Part A (1989).

Information on exposure factors will be obtained from the RAGS Standard Default Exposure Factors (1991) and the Exposure Factors Handbook (1997). Toxicity data for compounds evaluated in the risk assessment will be obtained from USEPA's Integrated Risk Information system (IRIS) database or the Health Effects Assessment Summary Tables (HEAST) annual report. Other appropriate references and guidance documents as recommended by the USEPA and the NYSDEC will also be used where appropriate.

The risk assessment process starts with identification of site contaminants of concern (COCs) based on their frequency of occurrence, concentrations detected, and relative toxicity. The RI results will be used to define the COCs. Based on the results of previous investigations, we anticipate that the COCs for the Town of Salina landfill will include PCBs, volatile organic compounds, and metals. Contaminants of concern will be identified for all media: e.g., leachate, surface water, sediment, groundwater, surface soils.

After the COCs are identified, the exposure routes by which humans may contact the COCs will be identified. Then exposure concentrations will be calculated based on data collected during the RI, and/or, the use of predictive models. The investigations already performed strongly suggest that surface water, sediment, surface soil and subsurface soil will be exposure routes for one or more COCs. The potential for air routes of exposure will also be evaluated and addressed, if appropriate. Although groundwater in the area of the site is not used as a source of potable water, groundwater contaminant concentrations will be compared to federal groundwater maximum contaminant levels (MCLs) in compliance with the requirements of the NCP and compared to New York State Water Quality Standards in 6 NYCRR Part 703 and 10 NYCRR Part 5.

Exposure concentrations will then be combined with toxicity values for the COCs, (i.e., cancer slope factors and noncancer reference doses) to estimate the carcinogenic and noncarcinogenic risks posed by the site both for its current land use, and for other reasonable future land uses. Selection of a realistic future land use is critical to reasonable assessment of future risk. The results of the risk assessment process will then be used to determine if remedial actions are necessary to mitigate unacceptable human health risks.

As per the consent order, within 30 days of completion of the RI Report, a memorandum will be prepared that identifies the contaminants of concern, the potential exposure pathways, assumptions, and exposure point concentrations. After the memorandum is reviewed and approved, a draft Risk Assessment Report shall be prepared followed by a final Risk Assessment Report.

2.5.2 Subtask 5.2 – Ecological Assessment

The goals of the ecological assessment for the Town of Salina Landfill site include: (1) documenting whether actual or potential ecological risks exist, (2) identifying which contaminants pose a risk, and (3) generating data to be used in evaluating remedial alternatives. More specific objectives will be developed when it is known what contaminants, exposure pathways, and receptors are defined. Appropriate screening steps will be conducted prior to proposing additional site-specific objectives.

The species and habitats observed on site currently provide evidence of several potential pathways for contaminants to move through the food chain. These pathways may include:

- Leachate from the landfill to aquatic plants and invertebrates in Ley Creek to fish to fish-eating birds.
- Terrestrial vegetation growing on the landfill to small mammals and birds to predators.
- Terrestrial vegetation, surface water, and leachate from the landfill to deer and other game species.
- Surface water and aquatic plans and animals to breeding amphibians and their larvae to predators.

Because the project area is included in the Onondaga Lake Superfund Site, both the New York State Department of Environmental Conservation (NYSDEC) and the U.S. Environmental Protection Agency (USEPA) protocols will be used in this evaluation. The principal guidance documents to be used include the NYSDEC Fish and Wildlife Impact Analysis for Inactive Hazardous Waste Sites (FWIA) dated October 1994 and the EPA's Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments dated 5 June 1997 (ERAGS). These documents cover both risk assessment and risk management (remediation) aspects of the project, are acceptable to both NYSDEC and USEPA, and provide a focused approach. Scientific management decision points at which regulatory agreement is recommended or required or when termination of the assessment process may take place are built into the processes of both the FWIA and ERAGS. The NYSDEC's Generic Ecological Risk Assessment Guidance for Onondaga Lake Sites dated 7 April 1998 provides a review of the steps involved in conducting a risk assessment using FWIA and ERAGS protocols; this guidance was used in developing the work scope presented here for the Salina Landfill.

LMS will initially perform a combination of FWIA's Step 1 and ERAGS Steps 1 and 2 for the Screening Assessment/Pathway Analysis (see USEPA OSWER Directive No. 9835.15a, memos on contaminants of concern [COCs] and exposure scenarios). The checklists included in FWIA's Appendix D, and ERAGS' Appendix A will be used to help ensure applicable concerns are covered.

The FWIA Step 1 – Site Description and ERAGS' Step 1 and 2 involve gathering all historical ecological data on the site; contacts with local, state, and Federal agencies; and some site visits to assess the ecology of the site if the screening analysis indicates a need for on-site surveys. The extent of the site surveys will depend on available information, the nature of the site, and the potential impact of the contamination. The Salina Landfill has the potential to significantly impact the ecology because: (1) contamination may be leaching to wetlands and waterways that may support fish and wildlife and (2) the site itself may be habitat for wildlife that may be impacted directly by contamination or by remediation measures. It is therefore important that this Step I assessment adequately document the ecology of the site and its surroundings so as to determine the potential impacts of the site and future remediation. The on-site work will include a three-day late spring (June) or early summer (July) survey. The late spring/early summer survey will identify summer residents, including breeding birds, fish and other wildlife. During this survey, LMS will verify on-site wetlands and identifying aquatic and terrestrial habitats.

As early in the site assessment program as possible, a literature search and contacts with interested parties, local educational facilities, and regulatory agencies will be undertaken to document the flora and fauna present or likely to be present in the survey area. The documentation will also include information on listed threatened or endangered species or species or special concern. The species list will be used as a checklist in the field, will provide information on the likely presence or species of concern, and will help to evaluate the landfill's potential for providing critical or significant habitat for these species.

A three-day wildlife survey of mammals, birds, reptiles, and amphibians will be conducted during the late spring or early summer. Bird species and numbers observed along set transects will be recorded during a summer breeding bird survey. We estimate that two or three transects will be run paralleling Ley Creek on the north side and one transects will be run on the south side of Ley Creek. (Transects will be established as appropriate during the first field day's efforts.) This method allows a relatively large area to be sampled in a short time and is an effective way of comparing relative abundance along transects. We will also survey selected areas to locate nests and will observe bird behavior/activity to determine whether nesting is probable. Birds will be identified by direct observation, song or call, nests, or their remains. Mammals will be identified by direct observation,

burrows, tracks, scat, or remains. Reptiles and amphibians will be identified by observation or other evidence of their presence, including calls of frogs and toads, presence of eggs and larvae of amphibians and nests, eggs, and tracks of reptiles. For reptiles and amphibians, some of the debris along a transect under which a reptile or amphibian may reside will be turned over. Any freshwater pond along a transect will be examined for adult and larval amphibians (effort for this consists only of direct observation from along the shore).

Vegetation associations and habitats (including streams and wetlands) will be identified based on descriptions provided in the NYSDEC publication Ecological Communities of New York State (Reschke 1990). Dominant plant species in each stratum (i.e., overstory, understory, shrub layer, ground cover) will be identified along with species that contribute to the area food supply (browse, nuts, seeds, berries). Species dominance will be based on the estimated percent aerial coverage of each species in each vegetative layer or group, such as the canopy, understory, shrub/sapling layer, and ground cover. The locations of habitats will be placed on site base maps and aerial photographs of the site using field overlays. Flora in the survey area will be evaluated and vegetation adjacent to the site will be evaluated based on opportunistic observations made from area roadways and accessible public and private land. The cover type of the land area within 0.8-km (0.5 mile) of the site will be documented from aerial photographs, land use maps, soil conservation maps, and state and Federal wetlands maps. The cover type map will be opportunistically ground-truthed. Habitat types will be noted and that information will be transferred to the site maps.

A stream survey will be conducted in the near vicinity of the site, including up and downstream locations to note and characterize the surface water habitat. At four locations noted in Figure 8, the condition of the stream, including its substrate, fish species observed, and flow rate will be noted. At these locations measurements will be made of water temperature, conductivity, dissolved oxygen, and pH. These measurements and observations will be used to characterize both existing and potential surface water habitats near the site.

On-site wetlands will be verified, described, and located on the site base maps and their approximate area will be estimated. The wetland survey will be conducted during the time of the habitat survey. A two-person crew will inspect the landfill to verify wetland boundaries using a plant community assessment approach developed by the U.S. Army Corps of Engineers (USACE 1987). This criteria will be used to verify on-site wetlands unless acreage or quality trigger state review, then state criteria will also be used. Since the investigation is only at the RI stage, no formal delineation of wetlands will be conducted, but may be included at a later date. The field inspections will confirm the vegetation and hydrology regimes and document the dominant vegetation in each wetland area.

These field surveys will be used to help compile the site's description and provide information on:

- Fish and wildlife resources present on or adjacent to the site
- Habitats (terrestrial and aquatic) on or adjacent to the site
- Fish and wildlife expected to utilize habitats present on and adjacent to the site
- Qualitative observations of stress, if observed, and a semi-qualitative assessment of aquatic stress

Literature and maps, including topographic wetlands maps, aerial photographs, and land use maps, will be used to produce site maps of ecological communities, topography, and drainage. The values of ecological communities to fish and wildlife and the value of these resources to humans will be obtained from the literature and applied to the site. LMS will determine regulatory criteria applicable to fish and wildlife, especially to threatened and endangered species if present on site.

If the site description does not show the presence of significant fish and wildlife resources, or appropriate habitat to support fish and wildlife species that are expected to be present or that should be present, the risk assessment process would stop here. Since preliminary observations indicate the presence of wildlife, including overwintering waterfowl, foraging raptors, game species, fish, and forage species such as small mammals (reptiles and amphibians probably would be evident during the warmer months) the FWIA/ERAGS' process is assumed to continue into the remaining ERAGS' steps.

The ERAGS' Step 2 will include contaminant-specific analysis to determine estimated exposure levels and calculated risk. If this analysis determines that there are no pathways, or if the exposure levels show negligible risk to fish and wildlife, the assessment process will stop here. As part of this pathway analysis, LMS will review the literature or known contaminants, concentrations, and pathways to fish and wildlife species and the effects these chemicals can have on fish and wildlife. After these steps are performed, the evaluation process may end if it is determined that there is no risk or negligible risk at the site. LMS will confer and agree in writing with NYSDEC and USEPA regarding potential exposure pathways, exposure assumptions, and ecotoxicity values at this decision point. For purposes of this work plan it is assumed that some levels of risk will be found to exist and therefore LMS would perform ERAGS' Step 3 (Problem Formulation), which documents assumptions for a baseline ecological risk assessment, including conceptual model, COC list, toxicity evaluation, potential exposure scenarios, and assessment endpoints.

Decision points along the way permit the omission of successive steps based on the presentation of thorough documentation and rationale to the NYSDEC and USEPA.

The baseline risk assessment formulation will be determined at this step, which will lead directly into the ERAGS' Step 4.

The ERAGS' Steps 4, 5, and 6 will include the development of additional field sampling and analysis plans and data quality objectives, field verification of representative organisms, actual field sampling and analysis, data reduction, data reduction, and tabulation. As described in the other sections of this work scope, contaminant analysis will be conducted on groundwater, surface water, leachate, sediment, and soil samples. At this time, no contaminant analysis will be conducted on biological samples of fish, small mammals, or vegetation. However, such biological sampling may be included in subsequent Phase II sampling efforts. Where data on biological organisms does already exist, i.e., fish tissue samples, this information will be included and evaluated in the risk assessment.

In Step 7 of the ERAGS process, data on exposure and effects of contaminants will be integrated to form a statement on the environmental risk(s) identified during the problem formulation. Uncertainties of the risk assessment will be noted. The ecological risk assessment encompassing ERAGS' Steps 1 through 7, and Step 1 of the NYSDEC's FWIA will be presented at the conclusion of the remedial investigation in a separate report.

In the ERAGS' Step 8 (Risk Management) decisions will need to be made and included in a Record of Decision by the USEPA and NYSDEC risk managers. Following this, as part of the feasibility study, the potential for noncontaminant-related impacts of remedial activities and the ability of the remedial alternatives to mitigate contaminant-specific impacts will be evaluated; this step is not included in the current work scope and budget.

2.6 TASK 6 - FEASIBILITY STUDY

2.6.1 Subtask 6.1 - Identify and Screen Potential Technologies

The objective of this task is to identify and screen potential remedial alternatives. After our discussion with NYSDEC, and based on our experience on similar projects, we have identified a

number of potential remedial alternatives. The potential alternatives include but are not limited to:

- landfill capping
- perimeter leachate collection
- leachate treatment and disposal
- groundwater recovery and treatment
- perimeter gas venting
- limiting site access
- removal of soil, waste or sediment "hot spots" as an interim remedial action (IRM)

2.6.2 Subtask 6.2 - Evaluation of Remedial Alternatives

In this step, we will more rigorously evaluate the remedial alternatives that have survived the screening process. CHA will conduct an analysis of each alternative according to the following criteria:

- Overall Protection of Human Health and the Environment
- Compliance with SCGs
- Short-Term Impacts and Effectiveness
- Long-term Effectiveness and Permanence
- Reduction of Toxicity, Mobility and Volume Through Treatment
- Implementability
- Cost.

CHA will also consider the "No Action (Monitoring Only)" Alternative; if minimal impacts are discovered by the RI, or if IRMs can be implemented to eliminate potential impacts.

TAGM 4030 will be consulted, as well as CERCLA RI/FS guidance, for specific factors to consider within each criterion. It is important to note that each alternative will also be evaluated for its potential impact of fish and wildlife.

In addition to individual analysis, the alternatives will be analyzed against one another using the seven criteria above.

2.6.3 Subtask 6.3 - Feasibility Study Report

The Feasibility Study (FS) provides a summary of the remedial alternative screening and evaluation tasks. The information in the FS will help NYSDEC write the Record of Decision (ROD) which will specify the selected remedial alternatives for the site. Within 30 days of DEC's approval of the Risk Assessment Report, CHA will prepare an FS Screening Memorandum that describes the methods, rationale, and results of the screening of the remedial action alternatives for the site. After DEC review and approval of the FS Memorandum, CHA will prepare a Draft and Final version of the FS Report. The report will be consistent with EPA's "Guidance for Conducting Remedial Investigation and Feasibility Studies under CERCLA". The FS Report will be prepared by and have the signature and seal of a professional engineer.

2.7 SUPPORT ACTIVITIES

2.7.1 Subtask 7.1 – Citizen Participation Activities

This task will include implementation of the Citizen Participation Plan discussed in Section 2.1.4. CHA assumes that there will be an initial public informational meeting at the start of the project and an additional public information meeting near the end of the RI/FS to present the proposed remedy for the site. CHA and the Town shall assist the NYSDEC in Citizen Participation activities by preparing visual aids, taking notes and participating in the public meetings, placing documents into the public repositories, and mailing fact sheets.

2.7.2 Subtask 7.2 – PRP Search Activities

This task will include implementation of the PRP Search Plan discussed in Section 2.1.3. CHA will manage and direct the subconsultant who will be performing the PRP Search. CHA has budgeted for a minor amount of effort in this task, including negotiating an agreement with the consultant, providing copies of existing information in CHA's possession, and managing the subconsultant. The PRP Search Activities are expected to take less than 1 year to complete.

3.0 PROJECT STAFFING

CHA will be responsible for overall project technical direction and administration. Staff from LMS, working under CHA, will be responsible for completing the ecological and human health exposure assessments.

3.1 PROFESSIONAL STAFF

The proposed project organization is depicted on Figure 9.

Mr. Richard Loewenstein, P.E. (NSPE Grade 8) from CHA will be the program administrator for this work assignment. Mr. Loewenstein will be directly responsible to the NYSDEC for the overall completion of the project and will provide overall supervision and guidance to project personnel. He will ensure staff resources are available for completion of the project and will approve assignments, work scopes, budgets, and staffing plan, and provide technical advice on project approach.

Christopher Burns, Ph.D., P.G. (NSPE Grade 7) from CHA will serve as the project manager for this work assignment. Dr. Burns' responsibilities will include the technical and administrative management of task managers and subcontractors, personnel and equipment scheduling, tracking and management of the project budget, and technical review of all submittals.

Ms. Margaret Rudzinski (NSPE Grade 7) from CHA will serve as the project Quality Assurance Officer. In this capacity, Ms. Rudzinski will coordinate and preparation of the Quality Assurance Project Plan, provide ongoing monitoring of project activities to ensure conformance with the QAPP, and oversee the Data Validation and Data Evaluation tasks.

Ms. Suzanne Wheatcraft, C.P.G. (NSPE Grade III) of CHA will serve as Task Manager for the Remedial Investigation. She will coordinate the oversight of all field activities and will coordinate scheduling of both personnel and subcontractors. Ms. Wheatcraft will also serve as

the on- site health and safety officer and therefore will be responsible for ensuring compliance with the HASP.

Mr. Michael Quinn, P.E. (NSPE Grade V) of CHA will serve as the Task Manager for the Feasibility Study. Mr. Quinn will be responsible for screening and evaluation of alternatives and will be the primary author of the FS Report.

Ms. Ruth Fritsch (NSPE Grade 8) and Mr. Jack Hecht (NSPE Grade 4) of LMS will be responsible for the human health exposure assessment and the ecological assessment, respectively. Their responsibilities will be to interface with DEC (and EPA when necessary) with respect to the risk assessment.

3.2 SUBCONTRACTORS

CHA proposes to use subcontractors for the following tasks:

- test pit excavation
- drilling and well installation
- laboratory analysis
- data validation
- copy services
- surveying
- electrical hookup
- site trailer
- PRP Search

CHA has prepared Requests for Proposals (RFPs) and obtained cost quotations for all of the above work. For each type of subcontract, CHA developed a list of qualified firms, including MBE and WBE firms. CHA has identified the subcontractors that will perform the work for this project. Details on the selection of subcontractors is contained in Section 4 of Volume II (Budget) of this work plan. CHA will award the laboratory services to RECRA Environmental and rent a trailer from GE Capital Modular. All other subcontracts will go to MBE or WBE firms as described below.

3.3 MBE/WBE UTILIZATION PLAN

Our Minority Business Enterprise/Women's Business Enterprise (MBE/WBE) Utilization Plan has been prepared in accordance with the regulations under 9NYCRR Part 453 entitled "Requirements and Procedures Regarding Business Participation Opportunities for Minorities and Women on State Contracts". CHA will make every effort to meet the goals established by those regulations, i.e., 15% MBE and 5% WBE participation, through implementation of our proposed plan, described below.

CHA is committed to equal opportunity employment, with corporate involvement meeting or exceeding the state regulations referenced in this contract. Evidence of our commitment is reflected in that, CHA employs 2% minorities and 24% women, while our team member LMS employs 8% minorities and 28% women. To ensure full implementation of the equal opportunity employment policy, we will take steps to:

- Recruit, hire, assign, and promote persons without regard to race, religion, marital status, color, sexual orientation, national origin, sex, veteran's status, age, or non job-related disability of any kind.

- Administer all personnel actions including compensation, benefits, transfers, layoffs and recall from layoffs, access to training, education, tuition assistance, and social recreation programs without regard to race, religion, marital status, color, sexual orientation, national origin, sex, veteran's status, age, or non job-related disability of any kind.

To date, CHA has made a good faith effort to identify potential MBE/WBE subcontractors for completion of this work assignment. We have identified the following WBE and MBE firms to provide subcontract services:

WBE FIRMS

TYPE OF SERVICE	NAME OF FIRM	CONTRACT VALUE
Test Pit Excavation	American Auger	$4,040
Drilling Services	American Auger	$37,641
Data Validation	Nancy Potak	$6,062
Copy Services	Liverpool Blueprint	$1,700
PRP Search	GRB Environmental	$35,000
TOTAL		$86,702
% of Contract		14.5%

MBE FIRMS

TYPE OF SERVICE	NAME OF FIRM	CONTRACT VALUE
Surveying	Modi Engineering	$3,675
Electrical Contractor	APW Electric Corp.	$1,681
TOTAL		$5,356
% of Contract		0.9%

4.0 PROJECT DELIVERABLES

The deliverables for this project include:

- Draft Work Plan (including FSP, HASP and QAPP)
- Final Work plan and Budget (including FSP, HASP and QAPP)
- Preliminary RI Report
- Technical Memo 1 (Ecological Work)
- Technical Memo 2 (Ecological Work)
- Second Phase RI Work Plan
- Final RI Report
- Human Health Risk Assessment Memo
- Draft Risk Assessment
- Final Risk Assessment
- FS Memo
- Draft FS Report
- Final FS Report

The due dates for these deliverables are provided in Section 5.0 - Project Schedule. A flow chart summarizing the major steps in the project is included as Figure 10.

CHA will provide copies of these deliverables as follows:

Walter Demick, P.E. Division of Environmental Remediation NYSDEC 50 Wolf Road Albany, NY 12233-7010	4 copies plus 1 electronic copy (1 of 4 unbound)
Charles Branagh NYSDEC Region VII 615 Erie Boulevard Syracuse, NY 13204-2400	1 copy
Henriette Hamel New York State Department of Health 217 South Salina Street Syracuse, NY 13202	1 copy

Alison Hess
Onondaga Lake Project Manager
U.S. EPA Region II
290 Broadway
New York, NY 10007-1866

1 copy

Colleen Gunnip
Town Clerk
Town of Salina
201 School Road
Liverpool, New York 13088

7 copies

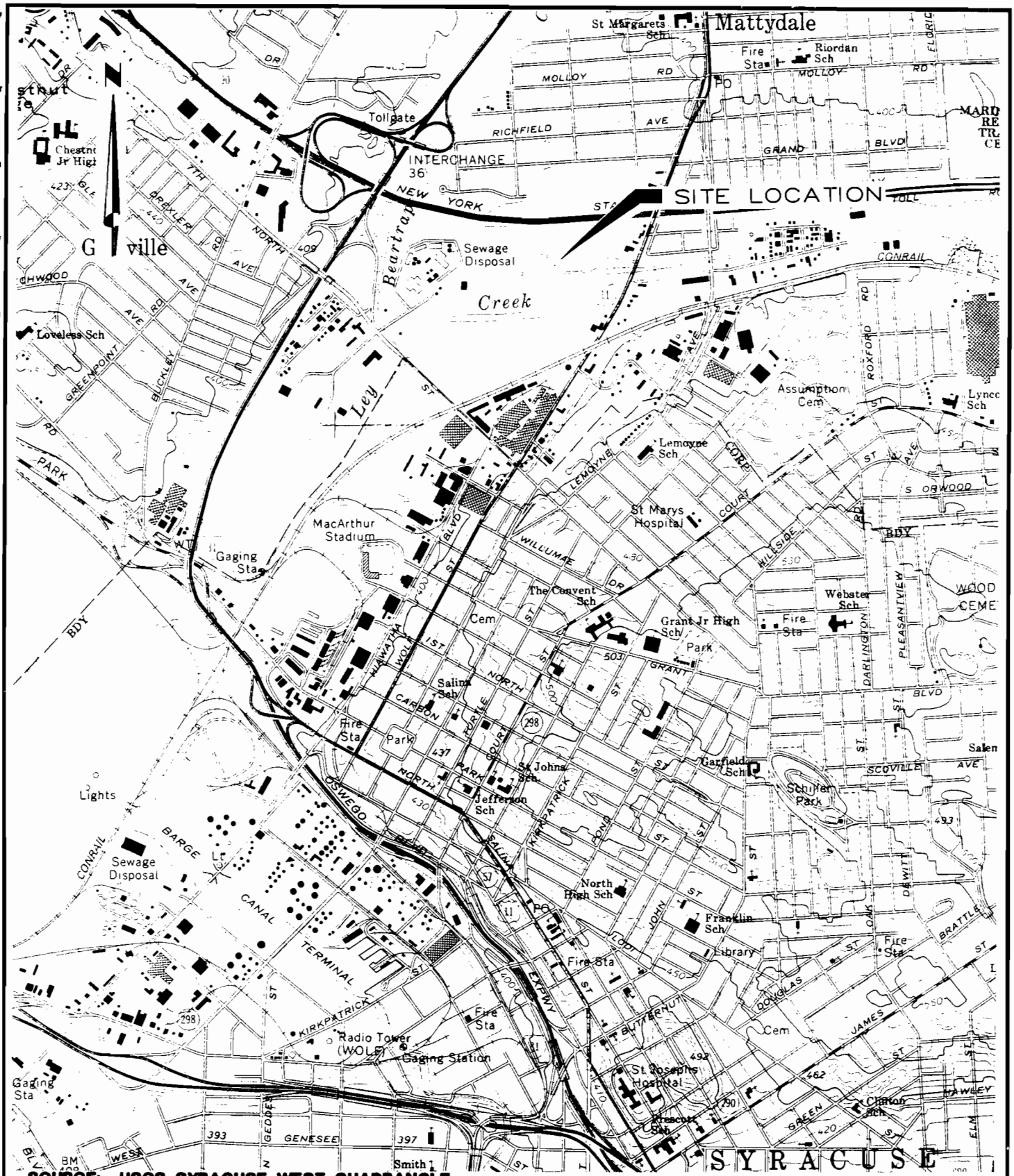
5.0 PROJECT SCHEDULE

The project schedule is summarized below.

TASK NO.	TASK DESCRIPTION	START DATE	END DATE
	Consent Order Signed	November 6, 1997	
1	WORK PLAN PREPARATION		
	Site Visit	November 19, 1997	
	Scoping Meeting	December 16, 1997	
	Preparation of Draft Work Plan	December 16, 1997	February 6, 1998
	Subcontractor Procurement	February 6, 1998	May 15, 1998
	DEC Review of Draft Work Plan	February 6, 1998	April 14, 1998
	Preparation of Final Work Plan	April 6, 1998	May 15, 1998
	DEC Approval of Work Plan	May 18, 1998	June 5, 1998
2	SITE CHARACTERIZATION		
	Field Investigation (Round 1)	June 6, 1998	July 31, 1998
	Laboratory Analysis (Round 1)	July 31, 1998	August 28, 1998
5	RISK ASSESSMENT		
	ERAGS Steps 1-7	June 6, 1998	September 28, 1998
3	REMEDIAL INVESTIGATION RPT		
	Data Validation	August 31, 1998	September 28, 1998
	Prepare Data Summary Report	September 29, 1998	October 30, 1998
	Prepare Second Phase RI Work Plan	November 2, 1998	November 27, 1998
	DEC Review of Work Plan	November 30, 1998	January 8, 1999
5	RISK ASSESSMENT		
	Risk Assessment Memo	November 2, 1997	November 27, 1998
	DEC Review of Memo	November 30, 1998	January 8, 1999
4	SECOND PHASE RI		
	Field Investigation (Round 2)	January 18, 1999	January 29, 1999
	Laboratory Analysis (Round 2)	February 1, 1999	March 1, 1999
3	REMEDIAL INVESTIGATION RPT		
	Data Usability Summary Report	March 1, 1999	April 2, 1999
	Data Evaluation	March 1, 1999	May 3, 1999
	Prepare Draft RI Report	April 2, 1999	May 3, 1999
	DEC Review of Draft RI Report	May 4, 1999	July 1, 1999
	Prepare Final RI Report	July 1, 1999	July 30, 1999
5.0	RISK ASSESSMENT		
	Prepare Draft Risk Assessment Rpt.	March 1, 1999	May 3, 1999
	DEC Review of Draft Report	May 4, 1999	July 1, 1999
	Prepare Final Risk Assessment Rpt.	July 1, 1999	July 30, 1999

6.0	FEASIBILITY STUDY		
	Prepare Screening Memo	August 2, 1999	September 3, 1999
	DEC Review of Memo	September 3, 1999	October 1, 1999
	Draft FS Report	October 4, 1999	November 5, 1999
	DEC Review of Draft FS	November 8, 1999	January 28, 2000
	Prepare Final FS Report	January 31, 2000	March 3, 2000
7.0	SUPPORT ACTIVITIES		
	Citizen Participation	see CP Plan	
	PRP Search	July 1, 1998	July 1, 1999

FIGURES



SOURCE: USGS SYRACUSE WEST QUADRANGLE

CHA

CLOUGH, HARBOUR & ASSOCIATES LLP

ENGINEERS, SURVEYORS, PLANNERS & LANDSCAPE ARCHITECTS

109 SOUTH WARREN STREET SYRACUSE, NEW YORK – 13202

315-471-3920

CHA FILE NO. 6967 | SCALE: 1"=2000'

FIGURE 1
SITE LOCATION MAP
TOWN OF SALINA LANDFILL
SYRACUSE, NEW YORK

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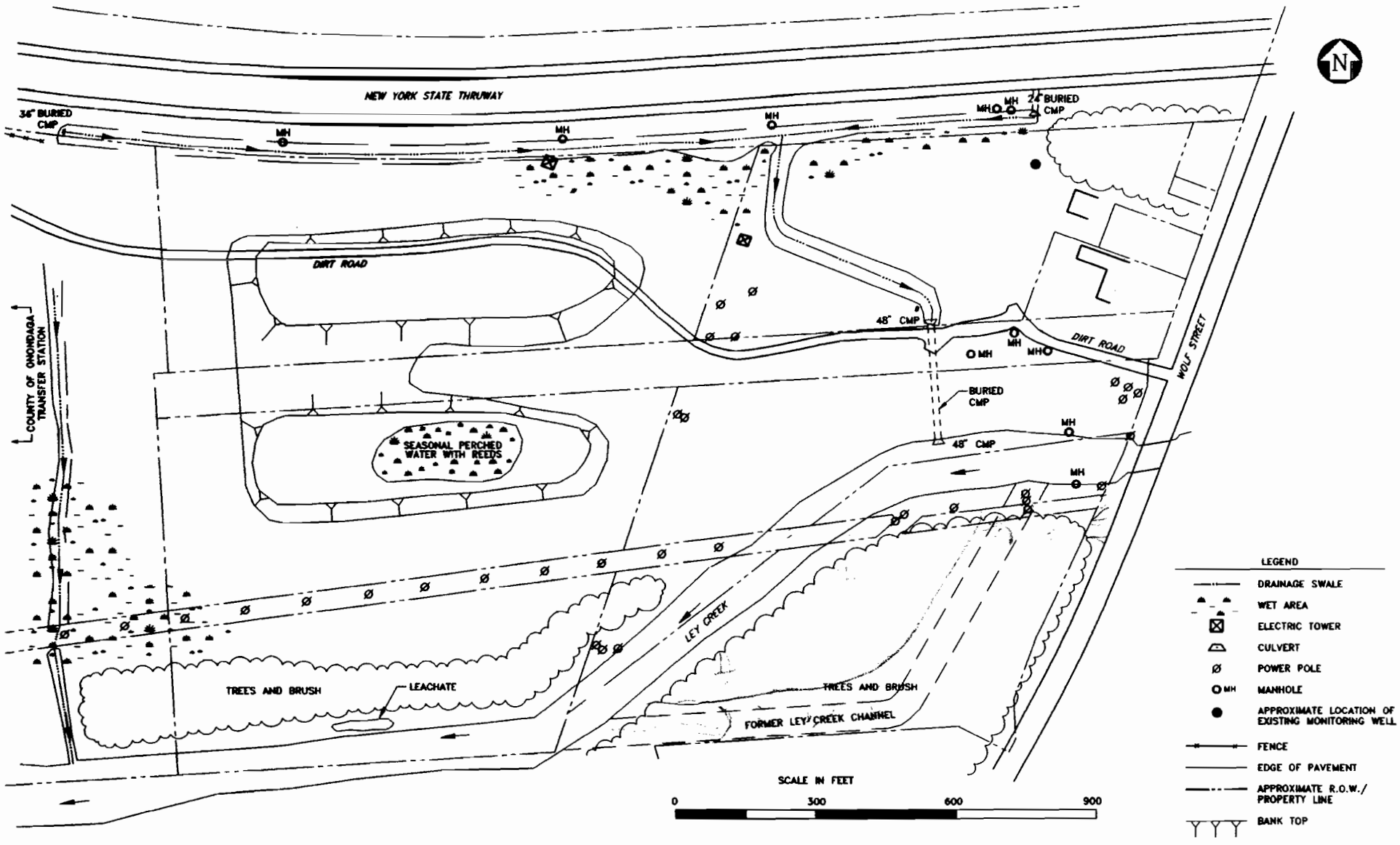
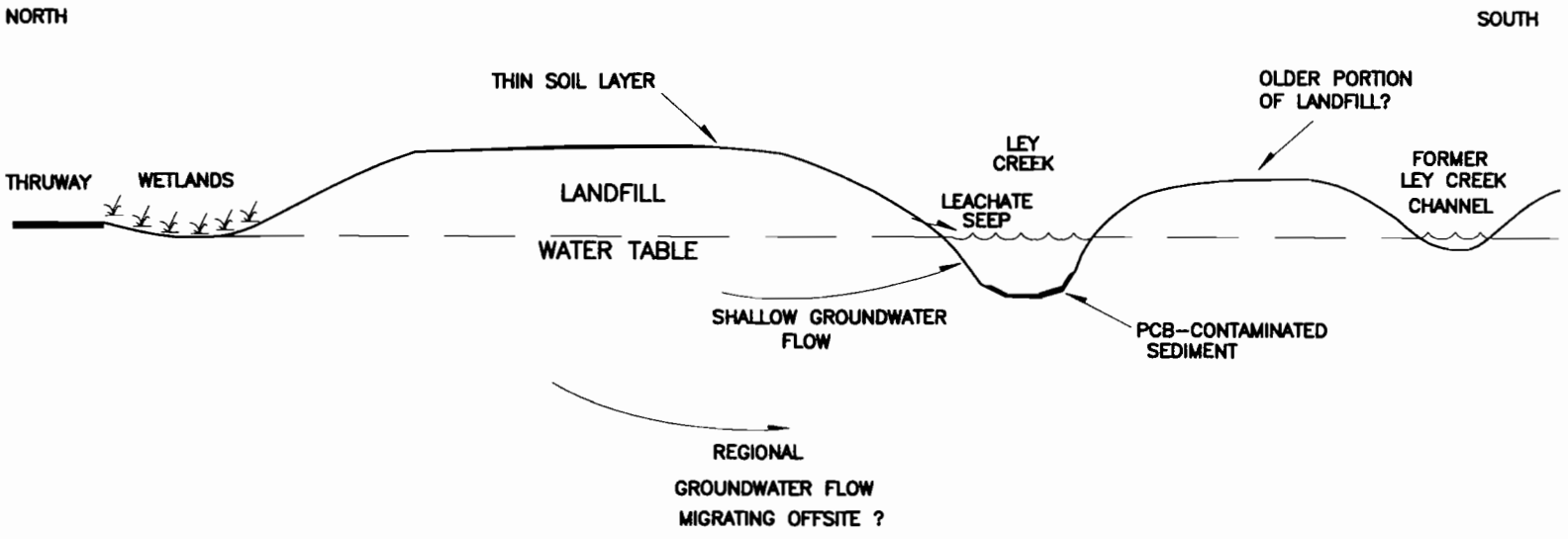


SITE PLAN

FIGURE NO. 2	PROJECT NO. 6967	CLOUGH, HARBOUR & ASSOCIATES ENGINEERS, SURVEYORS, PLANNERS & LANDSCAPE ARCHITECTS 109 SOUTH WARREN STREET SYRACUSE, NEW YORK, 13202	TOWN OF SALINA LANDFILL REMEDIAL INVESTIGATION/FEASIBILITY STUDY SALINA, NEW YORK
SCALE: 1"=300'±	DATE: FEBRUARY 1998		



CONCEPTUAL SITE MODEL

FIGURE NO. 3	PROJECT NO. 6967	CLOUGH, HARBOUR & ASSOCIATES ENGINEERS, SURVEYORS, PLANNERS & LANDSCAPE ARCHITECTS 109 SOUTH WARREN STREET SYRACUSE, NEW YORK 13202	TOWN OF SALINA LANDFILL REMEDIAL INVESTIGATION/FEASIBILITY STUDY SALINA, NEW YORK
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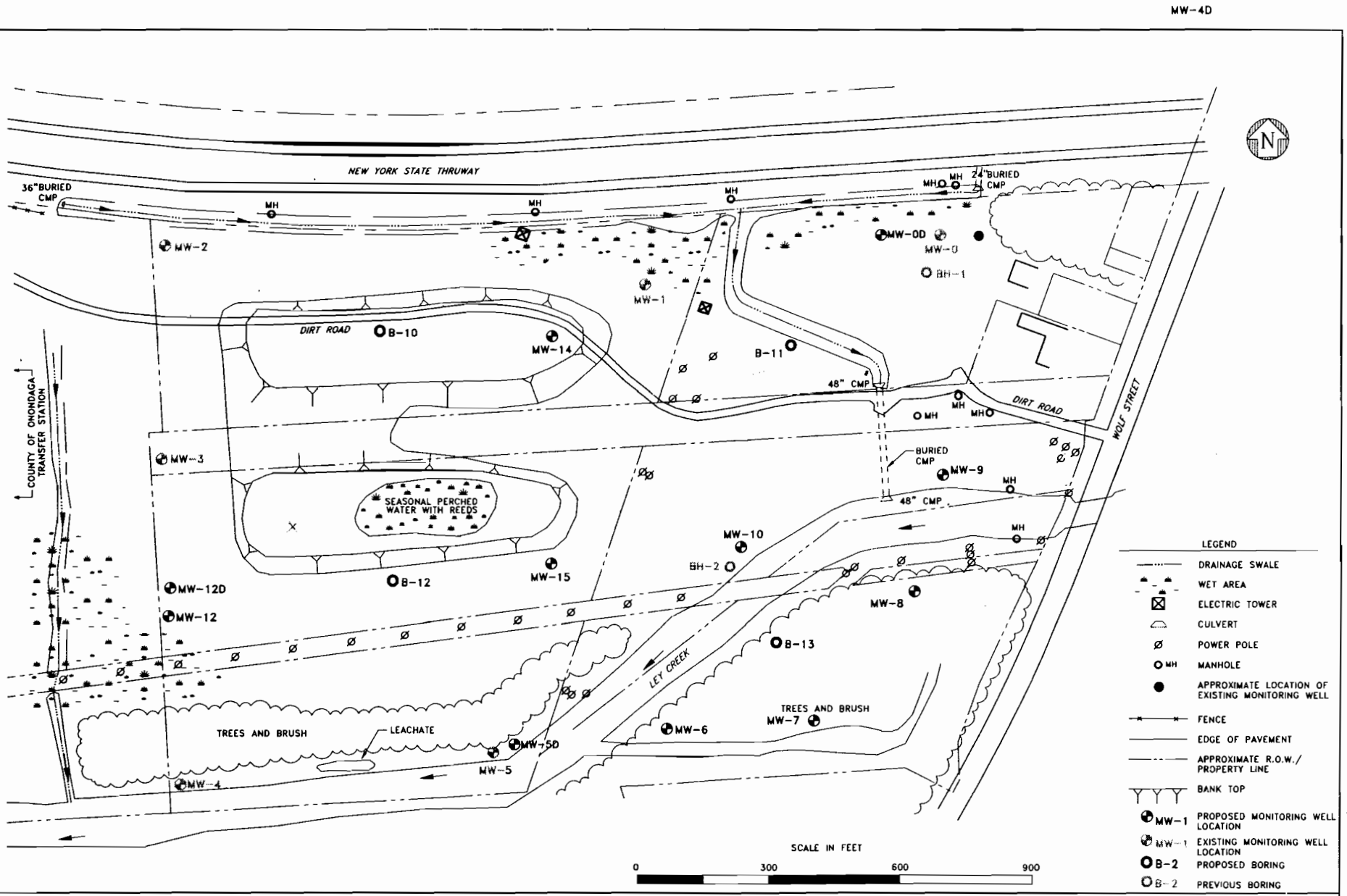

TEST BORING/MONITORING WELL LOCATION MAP

FIGURE NO. 4	PROJECT NO. 6967	CLOUGH, HARBOUR & ASSOCIATES ENGINEERS, SURVEYORS, PLANNERS & LANDSCAPE ARCHITECTS 109 SOUTH WARREN STREET SYRACUSE, NEW YORK 13202	TOWN OF SALINA LANDFILL REMEDIAL INVESTIGATION/FEASIBILITY STUDY SALINA, NEW YORK
SCALE: 1"=300'±	DATE: MAY 1998		

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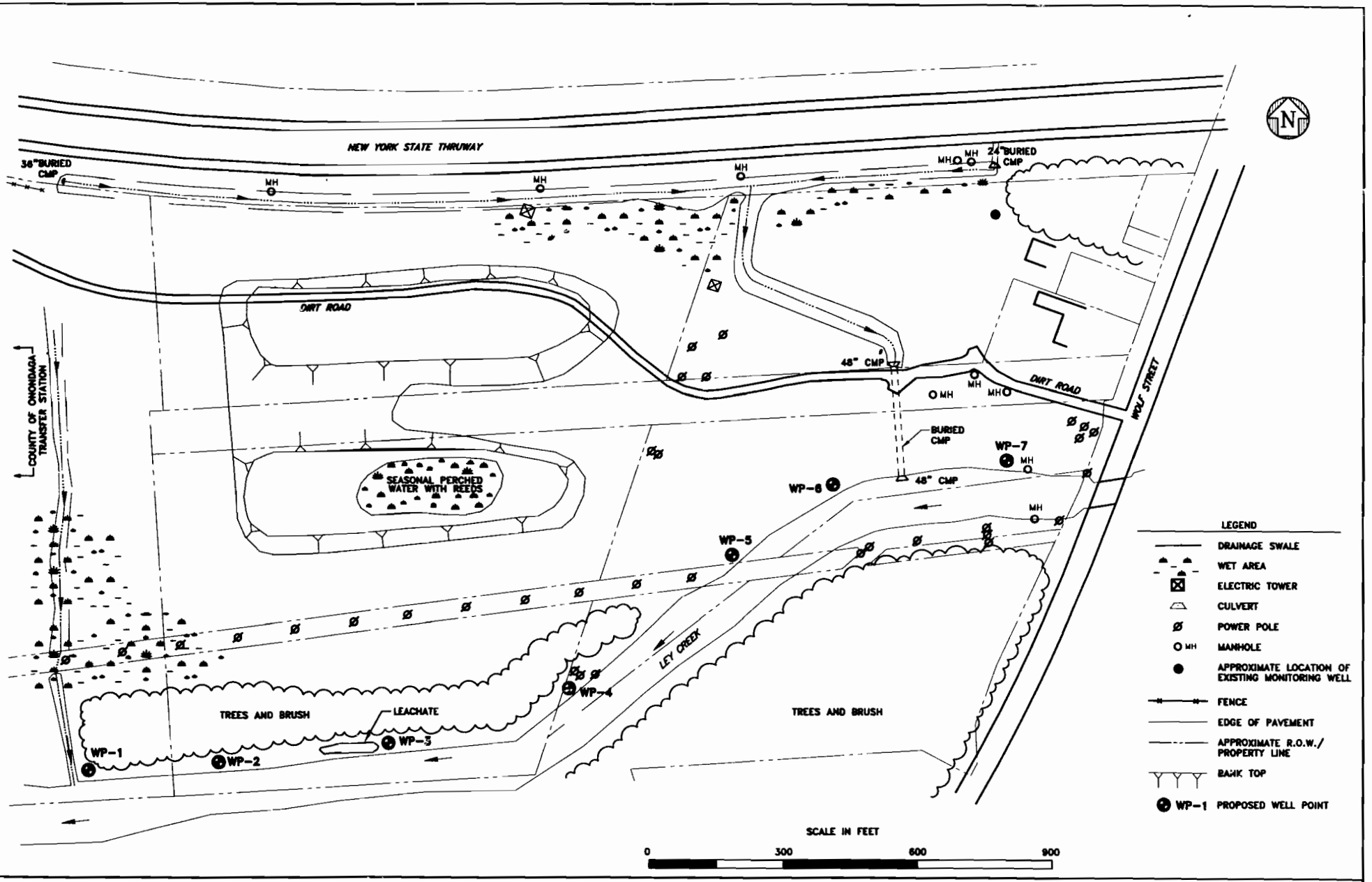

WELL POINT LOCATION MAP

FIGURE NO. 5	PROJECT NO. 6967	CLOUGH, HARBOUR & ASSOCIATES ENGINEERS, SURVEYORS, PLANNERS & LANDSCAPE ARCHITECTS 109 SOUTH WARREN STREET SYRACUSE, NEW YORK 13202
SCALE: 1"=300'±	DATE: FEBRUARY 1998	TOWN OF SALINA LANDFILL REMEDIAL INVESTIGATION/FEASIBILITY STUDY SALINA, NEW YORK

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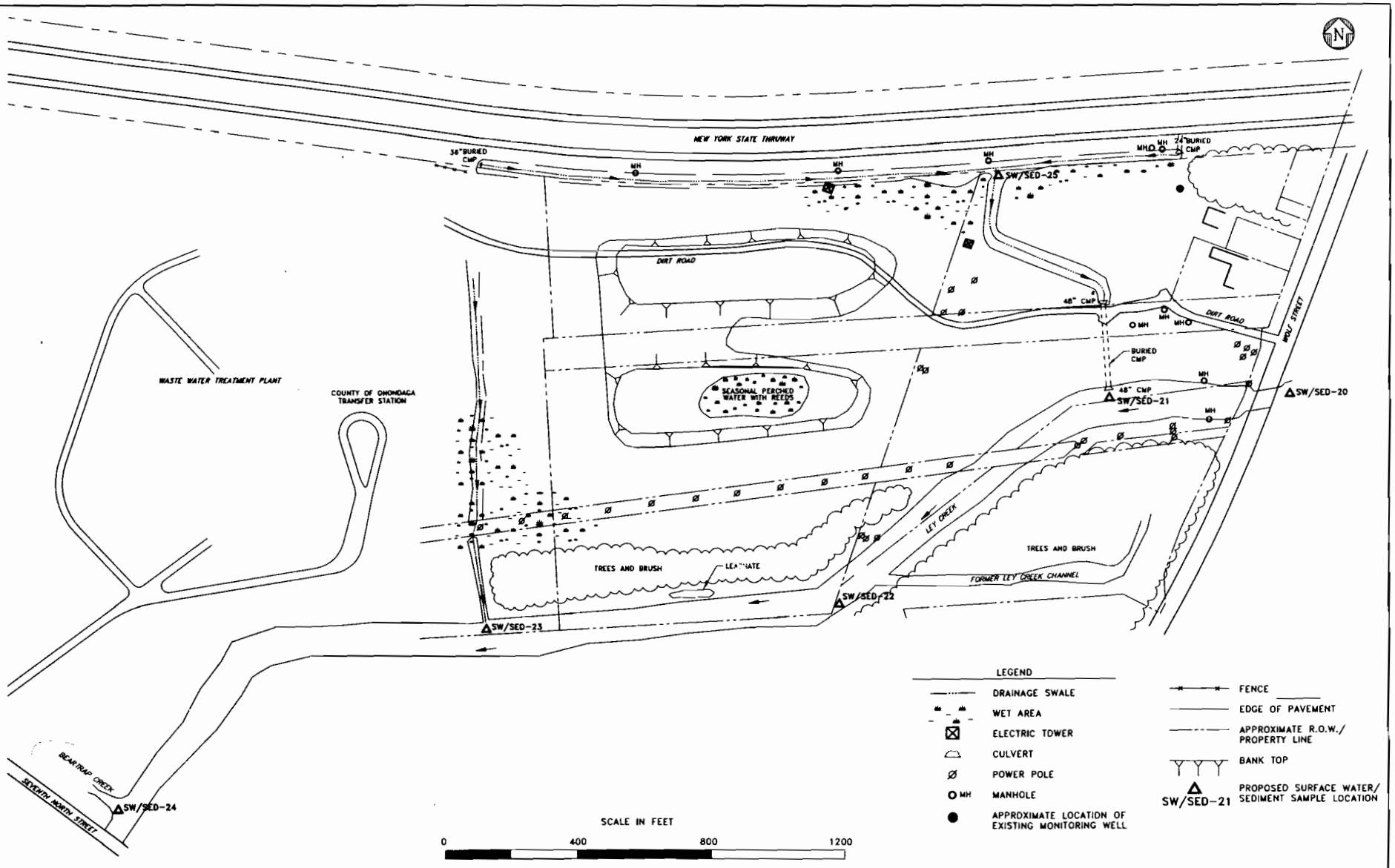

SURFACE WATER/SEDIMENT SAMPLE LOCATION MAP

FIGURE NO. 6	PROJECT NO. 6967	CLOUGH, HARBOUR & ASSOCIATES ENGINEERS, SURVEYORS, PLANNERS & LANDSCAPE ARCHITECTS 109 SOUTH WARREN STREET SYRACUSE, NEW YORK 13202	TOWN OF SALINA LANDFILL REMEDIAL INVESTIGATION/FEASIBILITY STUDY SALINA, NEW YORK
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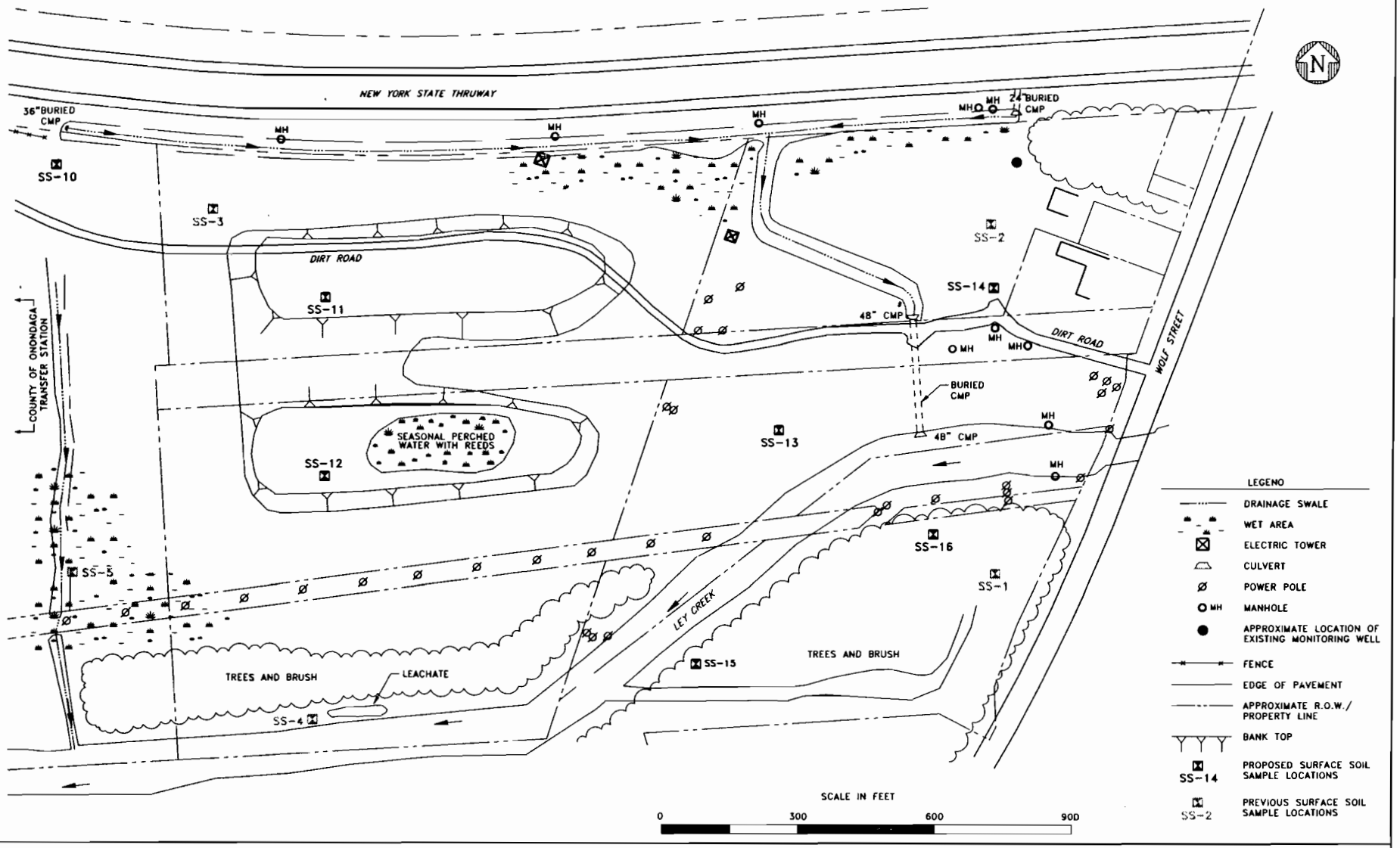
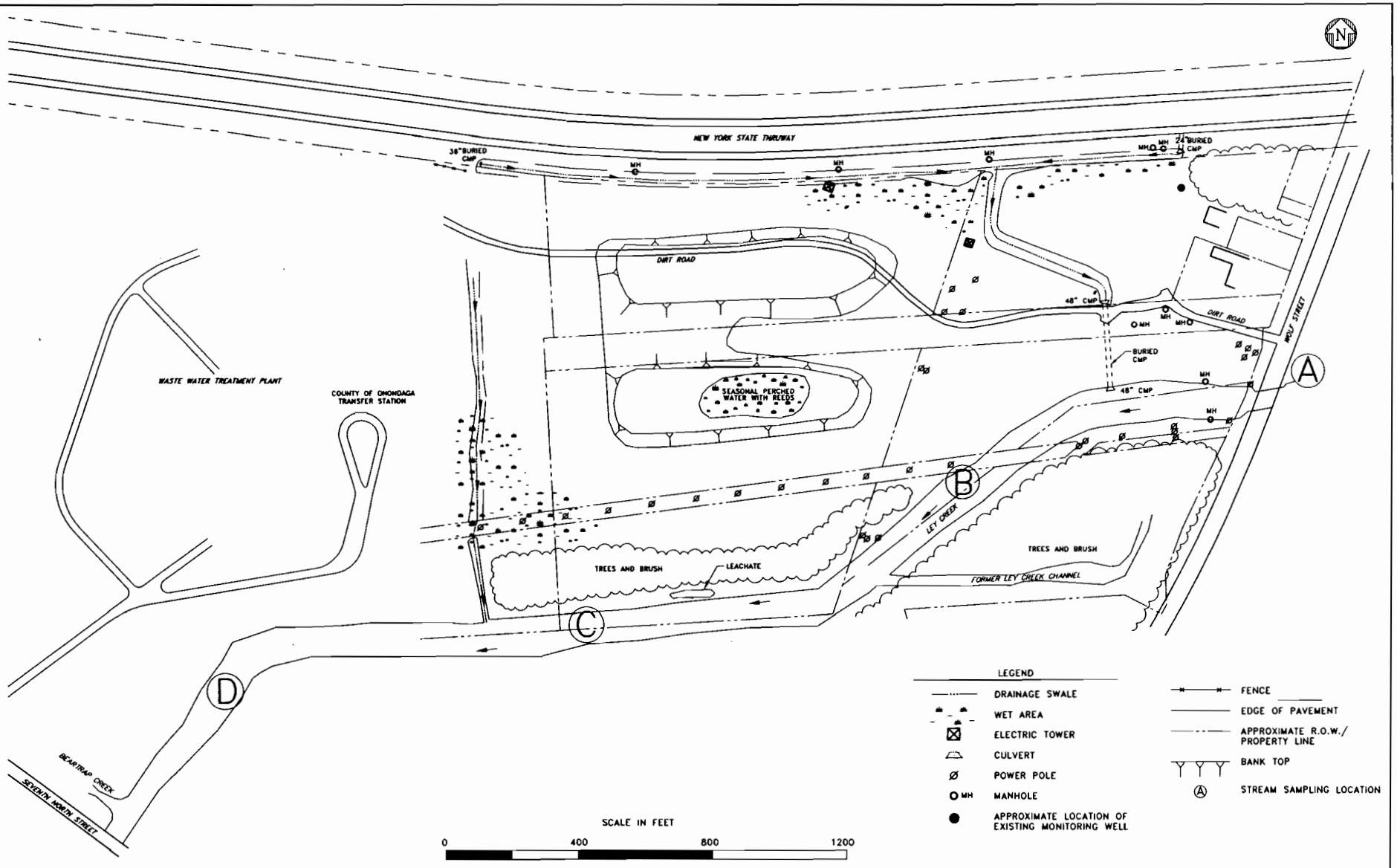


SURFACE SOIL SAMPLE LOCATION MAP

FIGURE NO. 7	PROJECT NO. 6967	CLOUGH, HARBOUR & ASSOCIATES ENGINEERS, SURVEYORS, PLANNERS & LANDSCAPE ARCHITECTS 109 SOUTH WARREN STREET SYRACUSE, NEW YORK 13202	TOWN OF SALINA LANDFILL REMEDIAL INVESTIGATION/FEASIBILITY STUDY SALINA, NEW YORK
SCALE: 1"=300'±	DATE: MAY 1998		

FILENAME: I:\6967\FIG7



APPROXIMATE STREAM SAMPLING AREA FOR ECOLOGICAL RISK ASSESSMENT

FIGURE NO. 8	PROJECT NO. 6967	CLOUGH, HARBOUR & ASSOCIATES ENGINEERS, SURVEYORS, PLANNERS & LANDSCAPE ARCHITECTS 109 SOUTH WARREN STREET SYRACUSE, NEW YORK 13202	TOWN OF SALINA LANDFILL REMEDIAL INVESTIGATION/FEASIBILITY STUDY SALINA, NEW YORK
SCALE: 1"=400'±	DATE: MAY 1998		

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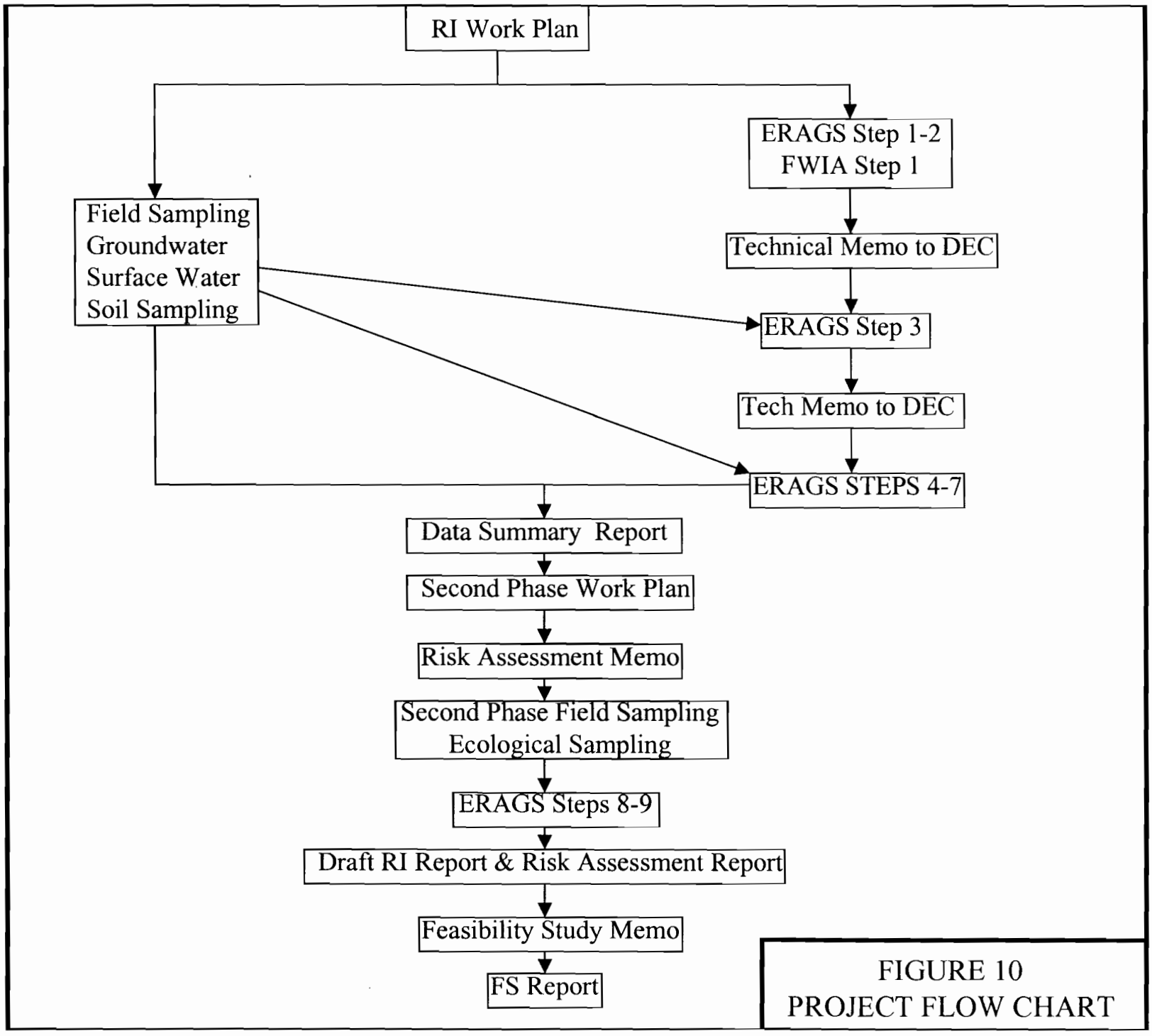
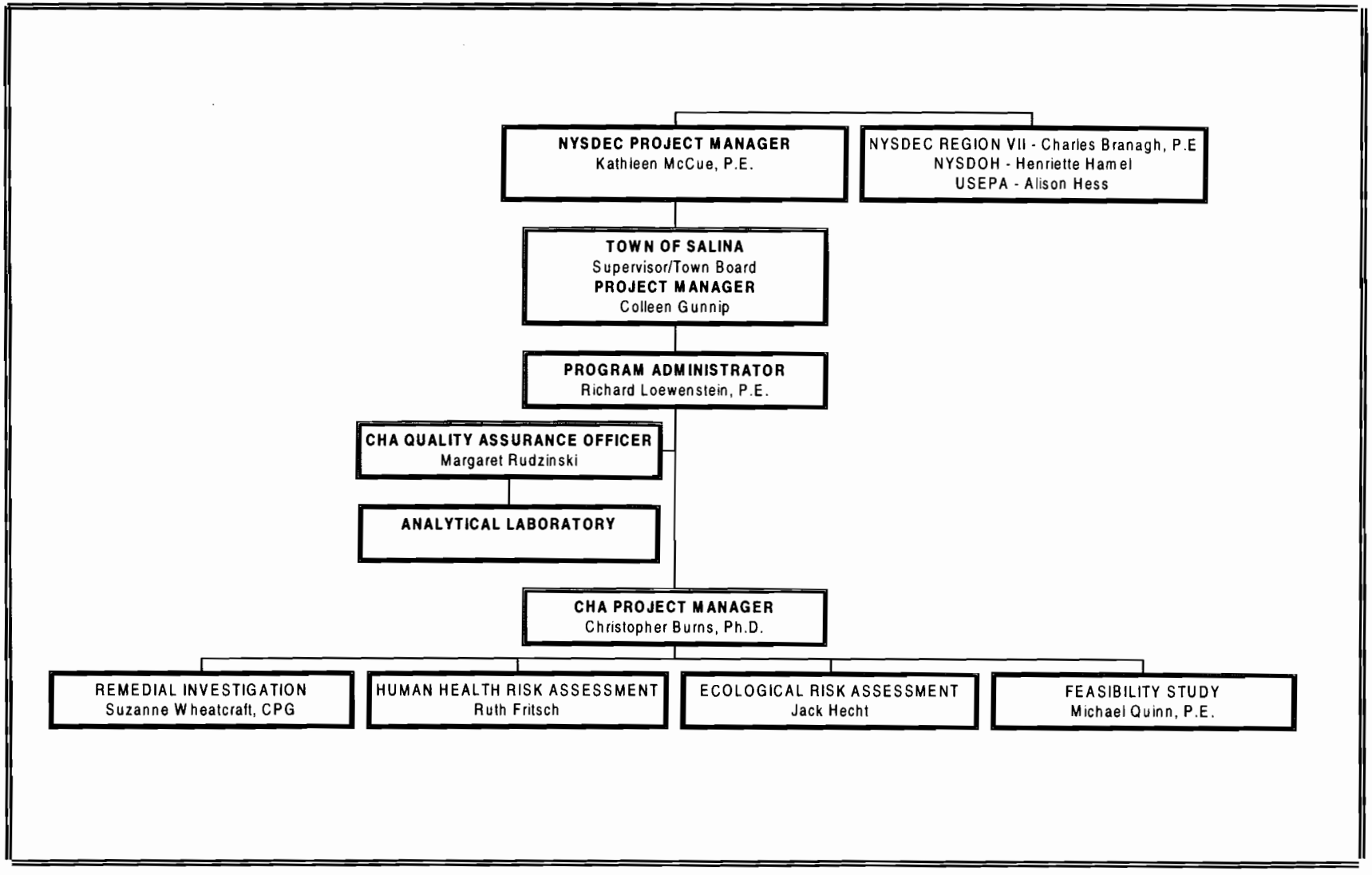


FIGURE 10
PROJECT FLOW CHART

FIGURE 9
TOWN OF SALINA LANDFILL RI/FS
PROJECT MANAGEMENT PLAN



TABLES

TABLE 1
ANALYTICAL SUMMARY
TOWN OF SALINA LANDFILL RI/FS

PARAMETER LIST	Surface Soil			Subsurface Soil			Groundwater Rnd 1			Surface Water Rnd 1			Leachate			Sediment Rnd 1		
	Primary	QC	Total	Primary	QC	Total	Primary	QC	Total	Primary	QC	Total	Primary	QC	Total	Primary	QC	Total
VOCs	7	3	10	22	3	25	17	6	23	5	3	8	6	3	9	10	4	14
Semi-VOCs	7	3	10	22	3	25	17	5	22	5	3	8	6	3	9	10	4	14
Pest/PCBs	7	3	10	22	3	25	17	5	22	5	3	8	6	3	9	10	4	14
Metals + Cn	7	1	8	22	1	23	17	3	20	5	1	6	6	1	7	10	1	11
Dissolved Metals							17	3	20									
Wet Chem Parameters																		
Turbidity							24	0	24									
BOD										20	0	20						
TOC	7	1	8	22	0	22	24	0	24							20	1	21
Hardness										5	0	5						
TDS							24	0	24									
Alkalinity							24	0	24									
Chloride							24	0	24									
Sulfate							24	0	24									
Sulfide							24	0	24									
Nitrate							24	0	24									
TKN							24	0	24									
Ammonia							24	0	24									
Phenols							24	0	24									
Hardness							24	0	24									
Field Parameters																		
Specific Conductance							24	0	24	20	0	20						
pH							24	0	24	20	0	20						
Temperature							24	0	24	20	0	20						
Dissolved Oxygen							24	0	24	20	0	20						